

# Asset Price Bubbles and the Case for Asset-Based Reserve Requirements

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*Federal Reserve chairman Alan Greenspan, as well as other Fed governors, has spiritedly maintained that it is not the job of the central bank to restrain bubbles in asset prices. But this economist argues that, in the real world, asset prices should very much be under the Fed's purview.*

**T**HE YEAR 2002 MARKED THE THIRD CONSECUTIVE YEAR of decline for major U.S. stock market indexes, only the fourth time that has happened in the past hundred years (Kellner 2002). And as the air has escaped the Goldilocks asset price bubble (economy not too hot and not too cold) of the late 1990s, the Federal Reserve has come under increasing criticism for failing to take preemptive action to deflate the bubble (Blustein 2002).

In response to this growing criticism, Federal Reserve chairman Alan Greenspan and its governor, Ben Bernanke, have de-

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fended the Fed in a series of detailed speeches analyzing monetary policy in the context of asset price bubbles. In a speech given at the annual symposium of the Federal Reserve of Kansas City in Jackson Hole, Wyoming, on August 30, 2002, Greenspan outlined the contours of this defense. First, he noted that “it was very difficult to definitively identify a bubble until after the fact—that is, when its bursting confirmed its existence” (Greenspan 2002a, 3). Second, he continued, “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” (*ibid.*). These twin claims were restated in a December 19, 2002, speech before the Economic Club of New York in New York City.

In a similar vein, speaking to the National Association of Business Economics, Bernanke (2002) has also defended the Fed’s record, arguing that there is an asset price bubble “identification problem,” and that even once a bubble has been identified, there is a “difficulty of safe popping.” In that speech, Bernanke also outlined his view of what monetary policy can and should do. In this regard, he argues for targeting the economy and the general level of economic activity rather than asset prices because asset prices only matter to the extent that they contain “useful and timely information about developments in the broader economy” (2002, 2). Thus, in Bernanke’s view, not only is direct targeting of asset price bubbles infeasible, it is also undesirable.

This paper challenges the Greenspan-Bernanke claim that the Fed “cannot” and “should not” target asset prices as part of monetary policy. The starting point is a discussion of the current intellectual framework informing monetary policy, a framework that emphasizes the pursuit of a low inflation target. It is then argued that though inflation targeting is a desirable policy, the Federal Reserve’s economic model cannot provide a coherent

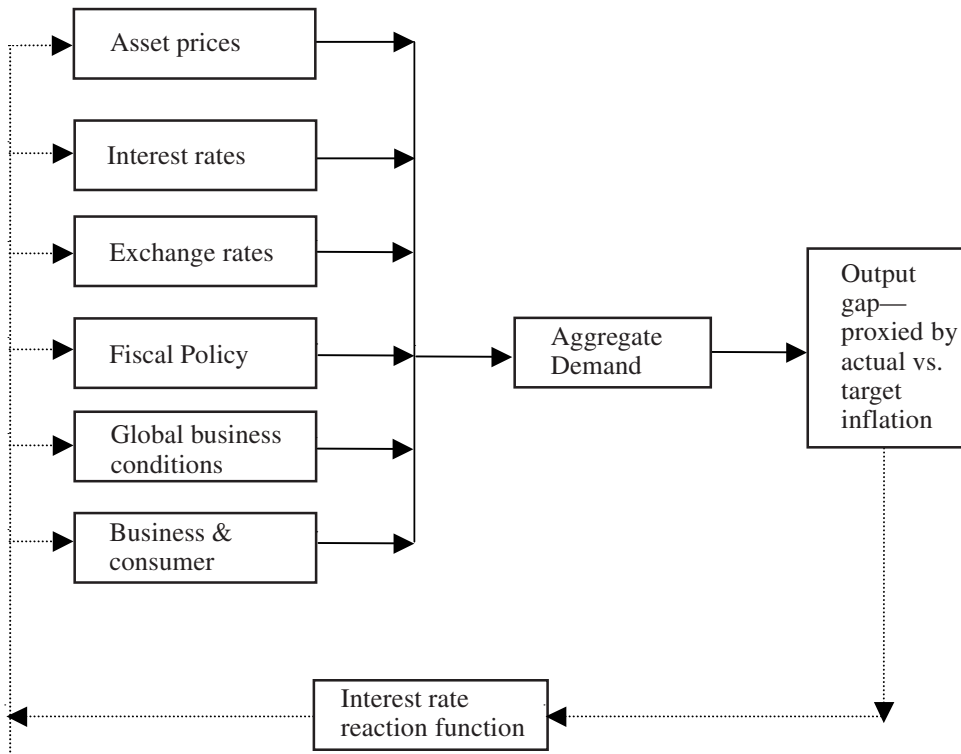
justification for such a policy because of its continued adherence to a nonaccelerating inflation rate of unemployment (NAIRU) framework. However, an alternative minimum unemployment rate of inflation (MURI) model can remedy this incoherence. Thereafter, I explain why inflation targeting is not enough in a financially deregulated economy prone to financial exuberance. Finally, I conclude by describing a system of asset-based reserve requirements (ABRR) that can be used to guard against asset price bubbles—including house price bubbles.

The bottom line is that it is both desirable and feasible to control asset price bubbles. However, doing so requires new forms of financial market regulation that run counter to the Greenspan Fed's ideological bias against quantitative regulation of financial markets. This bias was reflected in Greenspan's refusal to raise margin requirements—the one tool the Fed currently has to hold down equity market exuberance—in late 1996 when the asset bubble was gaining steam.

### **The Federal Reserve's New Analytical Framework: Does It Make Sense?**

For much of the past two decades, monetary policy has been placed within a NAIRU framework. However, over the course of the 1990s, as unemployment fell below estimates of the NAIRU without any significant increase in inflation, the NAIRU was quietly abandoned as an operational framework for policy and replaced with a focus on inflation.<sup>1</sup> Now, instead of targeting the natural rate of unemployment and having policy driven by a sense of how close the economy is to this barrier, the Fed has shifted to targeting low inflation, albeit with significant discretion.<sup>2</sup>

The Fed's new policy model is described in Figure 1. The basic idea is that the level of aggregate demand (AD) drives fluctuations in the gap (the output gap) between actual and potential



**Figure 1. The Greenspan–Bernanke Monetary Policy Model Showing Why the Fed Does Not Directly Target Asset Prices**

output, and inflation can serve as a proxy for this gap. The level of AD is in turn influenced by a host of factors, including asset prices, interest rates, exchange rates, fiscal policy, global business conditions, and the state of business and consumer confidence. Policy is driven by the state of the output gap as proxied by actual inflation relative to target inflation, and policy decisions get fed back into the economy through the interest-rate-reaction function. Finally, changes in interest rates then feed back and affect, in varying degrees, the factors entering into the common funnel of aggregate demand.

The logic of the model is simple, but there are a number of important points. First, Figure 1 illustrates why the Fed does not directly target asset prices. Economic activity is driven by

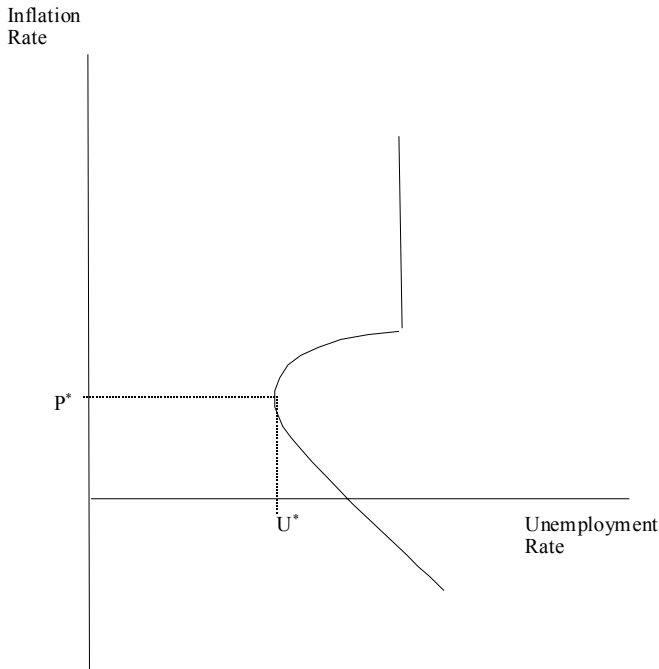
AD, and AD is positively impacted by asset prices. However, asset prices only matter to the extent that they help predict AD, thereby helping to predict inflation. In effect, asset prices and all the other factors impacting AD flow into a common funnel that impacts inflation. The monetary authority's task is to monitor the level of AD, and asset prices only matter to the extent that they provide information on the future level of AD. However, it is the level of AD rather than asset prices that constitutes the policy target. Second, Figure 1 reveals how the Fed remains attached to the concept of a natural rate of unemployment/natural level of output, with fluctuations in AD causing fluctuations around the natural rate. Thus, the Fed has not abandoned the theory of the natural rate. Instead, it has merely substituted inflation as the proxy for the output gap, whereas before it had used the unemployment rate.

The Fed's new model raises a number of issues. One issue is whether it can justify inflation targeting. A second issue is, does it pay sufficient attention to asset prices and is the macroeconomic impact of asset prices only felt through the common funnel of AD. Palley (2001–2) provides a detailed examination of the case for inflation targeting, and it turns out that the Fed's model cannot provide a justification for low inflation targeting owing to its underlying reliance on a NAIRU framework. NAIRU-based models assert that there is no trade-off between inflation and unemployment, and that the Phillips curve is vertical. As a result, they provide no guidance as to what the inflation target should be since all inflation rates carry the same cost. Rather than focusing on the "level" of inflation, NAIRU models actually instruct policymakers to focus on the "change" in inflation, which is the true indicator of imbalance in a NAIRU framework. If inflation is increasing, this suggests excess demand conditions; if it is falling, this suggests excess supply. Moreover, if disinflation is costly, NAIRU models recommend that the mon-

etary authority should target the current inflation rate since there is no benefit to be gained by incurring costs of disinflation. And if there are costs to inflation, as Chairman Greenspan asserts (Greenspan 2002b, 5), then the Fed should target zero inflation (i.e., price stability). Put bluntly, NAIRU-based models can explain why policymakers should adopt “stable” inflation targets, but they cannot explain why there should be a target of “low” inflation. Yet, low inflation targets is where the policy debate has converged, suggesting that something is amiss with the theoretical core of the Fed’s new model.

The above analysis leads to the question of whether “low” inflation targeting can be justified. The answer is “yes” if it is placed within a backward-bending Phillips curve framework. In such a framework, workers in depressed industries and firms are willing to accept inflation-induced real wage reductions so as to increase employment, but they do so only as long as the reductions are not too severe. This <<what does “this refer to? Please add noun”>> generates a negatively sloped Phillips curve, but once inflation rises above a threshold level, workers resist real wage reduction. This <<again, what is “this”?”>> then causes inflation to lose its labor market grease effect, and the Phillips curve starts bending backward, as shown in Figure 2. The important feature is that it generates a MURI denoted by  $P^*$ , which is associated with an unemployment rate of  $U^*$ . The monetary authority should then choose the MURI as its inflation target.<sup>3</sup>

Finally, it is worth comparing the difference between a MURI and NAIRU approach to inflation. In NAIRU models, inflation is an outcome “summary statistic” that describes the state of economic balance. If inflation is increasing, this indicates that the economy is overheating (below the NAIRU), and the monetary authority should tighten. The reverse holds if inflation is falling. Contrastingly, in a MURI framework, inflation is an “adjustment



**Figure 2. The Backward-Bending Phillips Curve, Showing the Minimum Inflation Rate of Unemployment (MURI)**

mechanism” that facilitates labor market adjustment. If inflation is below the MURI, an increase in inflation will lower the equilibrium unemployment rate. If it is above, it will raise it. Inflation is therefore a mechanism of adjustment that should be calibrated optimally, rather than an information variable, as in a NAIRU framework.

### **Why Inflation Targeting Is Insufficient: The Problem of Asset Price and Debt Bubbles**

The concept of the MURI provides an alternative theoretical framework for situating discussions of inflation targeting, and it shows how interest-rate policy should be guided. However, this still leaves open the critical question of whether monetary policy should respond to asset price inflation in an inflation-

targeting regime. This section addresses this question, and identifies three possible responses:

(1) The monetary authority should leave its inflation target unchanged and should not view asset prices as a stand-alone concern.

(2) The monetary authority should modify its measure of inflation to incorporate asset price inflation.

(3) Asset price inflation poses a special problem that calls for additional policy instruments.

The section argues that this third response is the right one.

Greenspan and Bernanke can be viewed as supporting response number one. In their view, asset prices feed through the common funnel of aggregate demand, and asset prices are therefore only important to the extent that they help predict and manage AD. As such, they do not constitute a separate target deserving of special attention.

A second response, advocated by Goodhart (2001), is that the measurement of inflation needs to be adjusted to include asset prices, which are currently excluded. This conclusion fits with earlier theoretical work by Alchian and Klein (1973) that reached a similar conclusion. At an empirical level, Bryan <<do you mean Bryan as in Refs, or should that spelling be Bryan?>> et al. (2002) show that the exclusion of asset prices from the U.S. consumer price index (CPI) understates inflation by about one-quarter percentage point. Charles Goodhart (2001) and Goodhart and Boris Hofmann (2001) then show that asset prices—especially house prices—matter for future price inflation, and they therefore argue that this reality merits having monetary policy respond independently to asset prices.<sup>4</sup> However, such a policy recommendation is potentially problematic in that the monetary authority may now find itself with two targets (asset prices and the output gap) but only one instrument—the interest rate. These considerations point to the need for additional policy instruments.<sup>5</sup>



A third response is that inflation is an insufficient guide for monetary policy. This is because economies can incur significant balance-sheet disorders that may build without any immediate effect on inflation, yet these balance-sheet disorders can have huge employment and output costs when they ultimately come to be resolved.<sup>6</sup> Such disorders are shorthand for asset price and debt bubbles, and they are more likely to occur in today's environment of innovation and deregulated financial markets. This is because financial innovation and deregulation have increased the elasticity of production of private credit, allowing rapid and large changes in balance sheets and debt positions the sustainability of which becomes clear only later.<sup>7</sup>

The problem for policy is that an inflation-targeting regime may overlook the buildup of balance-sheet and asset-price disorders for a number of reasons. First, asset prices are not counted as part of inflation measures, and the CPI includes neither equity nor home prices. This can be corrected by adding these prices to the CPI, but that would in turn complicate the process of wage setting and inflation indexation for purposes of real income protection.<sup>8</sup> Second, in an increasingly globalized economic environment, increased spending generated by asset price and debt bubbles can be accommodated via the trade deficit. Consequently, there may be no impact on the domestic price level, and instead private agents may incur debts to banks that in turn borrow from foreign lenders. Third, the economic dangers of asset price bubbles may be unrelated to aggregate demand and inflation. For instance, increased asset values may be applied as collateral to incur debt that is used to purchase additional assets, thereby pushing asset prices up further. In this case, the result may be an unsustainable debt pyramid that pulls down the entire financial transactions system when it crashes. Fourth, the negative spending impacts of asset price bubbles may be compositional rather than aggregate. Thus, asset price bubbles may

spur investment spending booms that are founded on distorted perceptions, and when these investments fail, there may be significant negative blow-back into the financial system that impacts overall economic activity.

The above arguments explain why an inflation-targeting regime may fail to pick up asset price inflation. However, even if this problem were resolved, there would remain a problem of having asset prices and concerns with private-sector balance sheets drive interest rate policy. This corresponds to using a policy blunderbuss that inflicts significant collateral damage on the rest of economy. Moreover, this damage is compounded by the fact that there are significant distributional asymmetries regarding who benefits from asset price bubbles and who bears the cost of pricking these bubbles with higher interest rates.

### **Inflation Targeting and the Danger of Asset Market Moral Hazard**

In addition to failing to address the problem of balance-sheet disorders, relying exclusively on inflation targeting also risks creating policy moral hazard in asset markets. The underlying cause of the moral hazard is that asset prices may rise considerably during periods of expansion without necessarily inducing inflation and a tightening response from the monetary authority. However, once the expansion comes to an end, asset prices stand exposed. At this stage a significant downward correction of asset prices risks significant negative consequences. First, falling asset prices could freeze markets to the extent that they create negative net equity positions that make it impossible for debt-burdened asset holders to sell. Second, by reducing collateral values, falling asset prices also make it harder to get new loans. Third, falling asset prices make it harder to assess the value of new investment projects, particularly those in areas such as

construction. Fourth, falling asset prices may strike at consumer confidence just when maintaining confidence is critical to aggregate demand.

All these considerations suggest that the monetary authority will have an interest in actively preventing asset prices from falling. Thus, whereas the monetary authority may pay little explicit heed during the upturn, it steps in to protect values during the downturn. Indeed, this approach may well characterize Federal Reserve policy during 2001. Prima facie, the mildness of the recession and the relative stability of inflation did not call for as rapid and dramatic interest rate reductions as actually occurred, suggesting that the Fed may have been guided by a desire to maintain asset prices and avoid an equity market meltdown.

The Fed was almost certainly right to pursue this policy, since under the existing system it needs to keep asset prices up in a downturn. However, the policy <<**changed from 'it'. OK?>> is suggestive of the ultimate expression of "too big to fail," and the moral hazard is clear. Under inflation targeting, the Fed may have no cause to actively prevent asset price inflation on the way up, but then may find itself compelled to limit asset price declines on the way down. The message to investors is take advantage of this asymmetric policy posture and hold flex-price assets, which sets the stage for bigger future asset price bubbles.**

### **Asset-Based Reserve Requirements: A Solution to the Asset Bubble Control Problem**

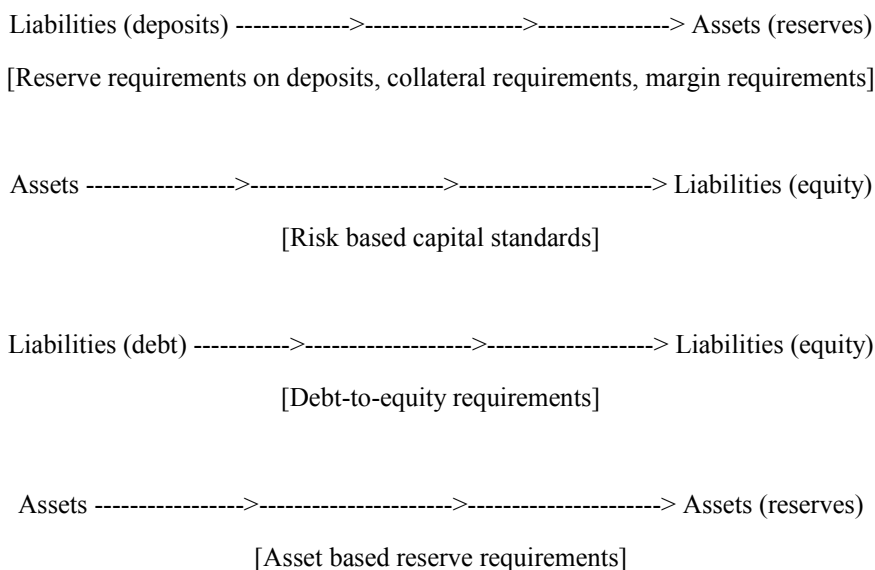
The above considerations show that inflation targeting alone is not enough. It needs to be supplemented with a direct focus on asset markets. However, using interest rates to control asset market bubbles risks inflicting significant collateral damage on the rest of the economy. This <<**please supply noun to designate "this">> resonates with Bernanke's observations that "lean-**

ing against the bubble is unlikely to be productive (Bernanke 2002, p. <<page no? insert number, delete p.>>),” while aggressive bubble popping “may well succeed but only at the risk of throttling a legitimate economic boom or, worse, throwing the whole economy into depression (Bernanke 2002, 6).<sup>9</sup>

Some critics of the Fed have argued that it should have raised interest rates to forestall the 1990s asset bubble. This section argues that rather than raising interest rates, the monetary authority needs additional policy instruments that enable it to target asset markets while leaving interest rates free to target inflation. To this end, monetary authorities should adopt a system of asset-based reserve requirements (ABRR). These requirements would be applied across all FIs, <<please spell out>> reflecting the fact that earlier business line distinctions have now largely disappeared as a result of deregulation and competitive convergence. In this new environment, functional rather than sectoral regulation is called for. However, to ensure a level playing field that avoids having regulation confer any unfair competitive advantage, regulation should be conducted on the basis of what companies do rather than what they are called.

The full details of the proposed system of ABRR are laid out in Palley (2000b). The main features are (1) FIs would be required to hold reserve requirements against all assets, though some asset categories could be zero-rated, and (2) reserve requirement ratios could be adjusted at the discretion of the central bank.

Before going into the merits of the proposal, it is worth exploring how the structure of ABRR compares with other forms of balance sheet regulation. This comparison is described in Figure 3. The traditional form of reserve requirement—such as applied to bank deposit accounts—is a liabilities-based system in which the composition of liabilities determines the level of required reserve holdings. Causation therefore runs from the liabilities side of the balance sheet to the asset side. Collateral



**Figure 3. Different Structures of Balance Sheet Regulation.**

Arrows represent direction of causation

requirements, such as margin requirements, present another example of a liabilities-based system with the level of debt determining asset holdings.<sup>10</sup> Risk-based capital standards reverse the direction of causation, and have the composition of assets determine the amount of equity (a liability) that firms must hold. Debt-to-equity requirements are a liability-to-liability form of regulation, and they have the level of debt determining a minimum level of equity holding. Finally, ABRR is a form of asset-to-asset regulation. Under the current proposed scheme, FIs would be obliged to hold liabilities of the central bank as reserves, but, in principle, qualifying reserve assets could be broadened to include other high-quality liquid assets.

There are a number of merits to the proposed system of ABRR. First, having the reserve requirement ratio vary by asset category would enable the monetary authority to change the relative cost of holding different asset categories by adjusting relative requirements, and this could be done without changing general level of

interest rates. For instance, if the monetary authority wanted to discourage equity holdings, it could do so by increasing reserve requirements on equity holdings. Likewise, if it wanted to discourage commercial mortgage borrowing, it could do so by raising the reserve requirement on new commercial mortgages. The same holds for residential mortgage borrowing. This means that the Fed could, in principle, deal with housing price bubbles—a phenomenon that some feel is now under way in the U.S. housing market. In effect, the monetary authority would gain  $n-1$  additional policy instruments, where  $n$  is the number of asset classes.<sup>11</sup>

A second merit is that ABRR can be used to promote flows of funds to areas deemed to be socially deserving (Pollin 1993; Thurow 1972). Thus, a lower reserve requirement on a particular asset category, such as community development loans, would increase their relative return and attract more funding.

Third, asset-based reserve requirements have good automatic countercyclical properties. When asset prices and bank lending increase in booms, this **<<this?? Change to “the demand for reserves will increase”??>>** will increase the demand for reserves, which will automatically engender monetary tightening. Analogously, when asset prices and bank lending fall into slumps, it automatically releases reserves and contributes to monetary expansion. Moreover, to the extent that modern financial business cycles are driven by expansion and contractions of the asset side of balance sheets, this automatic property attaches directly to the most salient part of the financial transmission mechanism.

Fourth, ABRR promises to yield significant seignorage benefits. Fifth, and finally, ABRR promises to strengthen monetary policy predicated upon open market operations by rebuilding the demand for reserves. Recently, Benjamin Friedman (1999) has speculated that monetary policy could become irrelevant because of diminished demand for reserves, and because lack of a connection between the demand for reserves and economic

activity.<sup>12</sup> ABRR can reestablish a robust and strong link between the demand for reserves and economic activity because expansion of financial asset values and quantities is the central financial component of today's economic environment.

## **ABRR Versus Risk-Based Capital Requirements**

Proposing an alternative system of financial regulation invites comparison with the current system of risk-based capital standards (RBCS). As noted earlier, a principal difference concerns the way in which balance sheet components link. RBCS relies on an asset-to-liability link, while ABRR works through an asset-to-asset link.

The first advantage of ABRR is that these requirements are countercyclical. Contrastingly, RBCS tends to be procyclical. Thus, the quality of assets tends to improve with the cycle that can free up equity capital, and it tends to deteriorate with downturns. This means banks have to find more capital in downturns, which is exactly when it is most difficult to raise capital. This gives FIs an incentive not to make risky loans in recessions, which can contribute to credit crunches. Moreover, when an asset is written off under ABRR, it releases reserves and is expansionary. And the reverse holds if an asset is written back. Contrastingly, under RBCS's writing off an asset eliminates equity and forces banks to find more equity or cut back on risky asset holdings.

A second disadvantage of RBCS is that it is not useful as a tool of discretionary monetary stabilization policy. This is because equity holdings cannot be adjusted with easy flexibility since equity capital is difficult and costly to raise. A third disadvantage is that RBCS yields no seignorage benefits, and nor do these standards improve the efficacy of monetary policy by strengthening the robustness and economic connectedness of the demand for reserves.

In sum, ABRR dominates RBCS as a form of quantitative regu-

lation capable of reining in the increased elasticity of private production of money. The new financial landscape calls for more policy instruments that can support interest-rate policy focused on managing the general level of economic activity. ABRR can supply these instruments, providing the monetary authority with specific instruments for dealing with asset and debt bubble problems. These new instruments can, of course, be supplemented with existing instruments. Thus, margin requirements can continue to be of use for purposes of controlling equity markets. Finally, capital standards can also have a place to the extent that moral hazard is viewed as the predominant problem. However, such standards are not appropriate as an instrument of stabilization policy.<sup>13</sup>

## Conclusion

Recently, the Fed has been subject to a growing chorus of criticism that it failed to forestall the asset bubble of the late 1990s. Chairman Greenspan and Governor Bernanke have argued that such forestalling was not feasible, nor was it even desirable, given the Fed's inflation-targeting approach to macroeconomic management. This paper has explored the logic of the Greenspan-Bernanke defense. Inflation targeting provides a sensible framework for monetary policy, but it is also an incomplete framework because it pays inadequate attention to asset markets and balance sheets. Remedying this failing does not mean using interest-rates policy to target asset markets. Instead, it calls for supplementing inflation targeting with financial intermediary balance sheet regulation that can guard against the financial instability. To this end, this paper has suggested the adoption of a system of asset-based reserve requirements. The bottom line is that the Greenspan-Bernanke defense does not hold up. Prevention of asset price bubbles, without infliction of significant collateral damage on the economy, is both desirable and feasible.



However, doing so requires quantitative regulation in financial markets, which calls for breaking with the Federal Reserve's current dominant ideological animus opposing such regulation.

## Notes

1. The shift away from NAIRU-based operating policy has been driven by the fact that empirical estimates of NAIRU have proven to be extremely volatile (Staiger et al. 1997), which undermines its practical usefulness for policy. The inadequacy of the NAIRU as an operational guide for policy became especially clear in the 1990s when the U.S. unemployment rate fell far below estimates of the NAIRU without any significant uptick in inflation. A second problem is that empirical estimates of the NAIRU tend to track the actual unemployment, thereby risking a "structural unemployment policy trap" (Palley 1999a). Such a trap emerges because policymakers are led to misinterpret cyclical jumps in unemployment as jumps in the NAIRU. Lack of a countercyclical policy response can then become self-validating to the extent that prolonged unemployment and demand weakness destroy human, physical, and organizational capital, thereby transforming cyclical unemployment into structural unemployment. The concept of the NAIRU is reviewed in a symposium in the *Journal of Economic Perspectives* (September–October 1997). James Galbraith (1997) is especially critical of the NAIRU as a framework for policy.

2. Frederic Mishkin and Adam Posen (1997), Ben Bernanke and Mishkin (1997), and Benanke et al. (1999) represent early proponents for inflation targeting and have helped put it on the policy front burner.

3. James Tobin (1972) and Palley (1994) <<1994 a, b, or c?>> provide a micro-founded explanation of the traditional negatively sloped Keynesian Phillips curve that rests on the presence of downward nominal wage rigidity. Robert Rowthorn (1977) provides the first example of a backward-bending Phillips curve in a model that has a discrete break in the Phillips curve. George Akerlof et al. (2000) present a model of a backward-bending Phillips curve that rests on near-rationality in wage setting by workers, and Palley (2000a) presents a model in which workers are fully rational but use inflation to adjust their real wages. Palley (1998) provides an alternative public finance rationale for a backward-bending Phillips curve. The logic is that distortionary "sand" effects of inflation on money demand and the tax system may come to outweigh the nominal wage grease effects. These sand effects have been emphasized by <<first name? Add to References, both publs.>> Feldstein (1979, 1983).

4. Karl Case et al. (2001) also report the significance of housing prices for consumption.

5. This is the classic policy problem identified by Jan Tinbergen (1952).

6. Concerns with balance-sheet disorders leads to the debt-deflation hypothesis of Irving Fisher (1933) and the financial instability hypothesis of Hyman Minsky (1982). Palley (1994c) presents a speculative consumer debt-driven model of the

business cycle. Bernanke et al. (1996) present an investment debt-driven model of the cycle. Nobuhiro Kiyotaki and John Moore (1997) present an investment model in a similar spirit. Palley (1999b) explores the problem of deflation in a fix-price Keynesian temporary disequilibrium model with debt.

7. This “elasticity of credit production” interpretation of financial deregulation derives from post-Keynesian endogenous money supply theory in which bank lending drives the money supply (Moore 1988; Palley 1987–88, 1994a). In post-Keynesian theory, money is viewed as an IOU (Wray 1998), and the private sector has always been capable of creating IOUs. Financial innovation and deregulation have simply enhanced this capacity.

8. Bryan <<do you mean Boyan as in refs? If so, add Milanovic as his first name>> et al. (2002) show that including the impact of asset prices on the CPI would raise the rate of inflation by one-quarter percentage point. Since CPI indexation is often used to protect real incomes (as with social security), augmenting the CPI to include asset prices could reward persons twice in that they would benefit from the underlying asset price inflation, and they would then get an income adjustment on top of this. Moreover, this double rewarding would, of course, be skewed toward the wealthy.

9. The view that the Fed should have raised rates to cool the bubble is championed by Stephen Cecchetti, former research director of the Federal Reserve Bank of New York (see Blustein 2002).

10. It is interesting to compare collateral and conventional liability-based reserve requirements that have banks holding liabilities of the central bank. The latter have the advantage of providing seignorage, and central bank liabilities are also absolutely liquid and subject to zero price risk. Contrastingly, collateral can be subject to considerable price fluctuation, which can make collateral requirements highly procyclical. Thus, prices may fall into slumps, obliging agents to ante up more collateral, which they may be unable to do. This situation can then trigger default.

11. The asset bubble policy problem can be understood in terms of Tinbergen’s (1952) targets and instruments framework. Under the current regime the monetary authority has one instrument and two targets (the real economy and financial markets). ABRR will give the monetary authority additional instruments that can be targeted to financial markets, leaving the interest rate free to target the real economy.

12. Palley (2001) discusses the Friedman hypothesis in terms of the e-money revolution, and concludes that though a demand for reserves will remain, it will constitute an increasingly unsatisfactory foundation for conducting monetary policy.

13. Tobin (1998) has also suggested modernizing the Federal Reserve’s balance sheet by allowing it to buy and sell corporate equities and bonds. However, this raises concerns about backdoor nationalization and favoring some companies over others in terms of credit access.

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