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Asset Price Bubbles and Monetary Policy: Why Central Banks Have Been Wrong and What Should Be Done

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Asset Price Bubbles and Monetary Policy: Why Central Banks Have Been Wrong and What Should Be Done

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Abstract

Over the last several years debate over monetary policy has focused on two issues, inflation targeting and asset price bubbles. This paper explores the case for explicitly targeting asset price bubbles, a policy that the Federal Reserve Bank has opposed on the grounds that it is both infeasible and undesirable. The paper argues that the Fed is wrong on both counts. Asset price bubbles are identifiable. Bubbles also do significant economic harm through the debt footprint effects they leave behind and through interest rate blunderbuss effects resulting from attempts to mitigate the aggregate demand impact of bubbles. Managing bubbles calls for additional policy instruments. These can be provided a system of asset based reserve requirements (ABRR).

I The policy debate over asset price bubbles

Over the last several years debate over monetary policy has focused on two issues, inflation targeting and asset price bubbles. This paper explores the case for explicitly targeting asset price bubbles.

Figure 1 describes the state of the debate at the Federal Reserve. The figure consists of a two-by-two matrix in which the policy authority can be for or against explicit inflation targets, and for or against explicitly targeting asset price bubbles. Former Federal Reserve Chairman Alan Greenspan was explicitly against both formal inflation targets and targeting asset bubbles (Blustein, 2002; Greenspan, 2002a, 2002b). Current Fed Chairman Bernanke is on record as being in favor of formal inflation targets, but against targeting asset bubbles (Bernanke, 2002; Bernanke et al. 1999, 1997).

The Greenspan – Bernanke opposition to targeting bubbles has two components. First, there is a pragmatic objection that targeting of bubbles is not feasible. Here the argument is that it is not possible to identify bubbles in advance. Moreover, even if they could be identified it would not be possible to safely pop them without exposing the economy to enormous collateral damage. Second, there is a theoretical objection against targeting bubbles which is that explicit targeting of asset market bubbles is not desirable.

The paper argues that neither of these arguments holds up. With regard to the feasibility argument, stock market bubbles can be identified through ordinary measures such as stock market price/earnings ratios, while house price bubbles can be identified through measures as house price/income ratios and house price/rental ratios. Moreover, it is possible to control bubbles without imposing collateral damage.

With regard to the theoretical objection, that too is unfounded. Contrary to the Federal Reserve’s thinking, asset bubbles distort economic activity and leave behind damaging effects that can reduce activity long afterward. This means policy needs to address and minimize their effects.

Lastly, in making the case for targeting asset bubbles the paper does not recommend using interest rates, which is the conventionally assumed instrument for targeting bubbles. Using interest rates in this fashion imposes unacceptable collateral damage on the rest of the economy. Instead, the paper proposes adopting a new asset based reserve requirements (ABRR) regulatory framework that would give the monetary authority additional policy instruments. These instruments can then be specifically targeted on asset prices, thereby avoiding the collateral damage problem.

Figure 1. State of the debate in monetary policy.

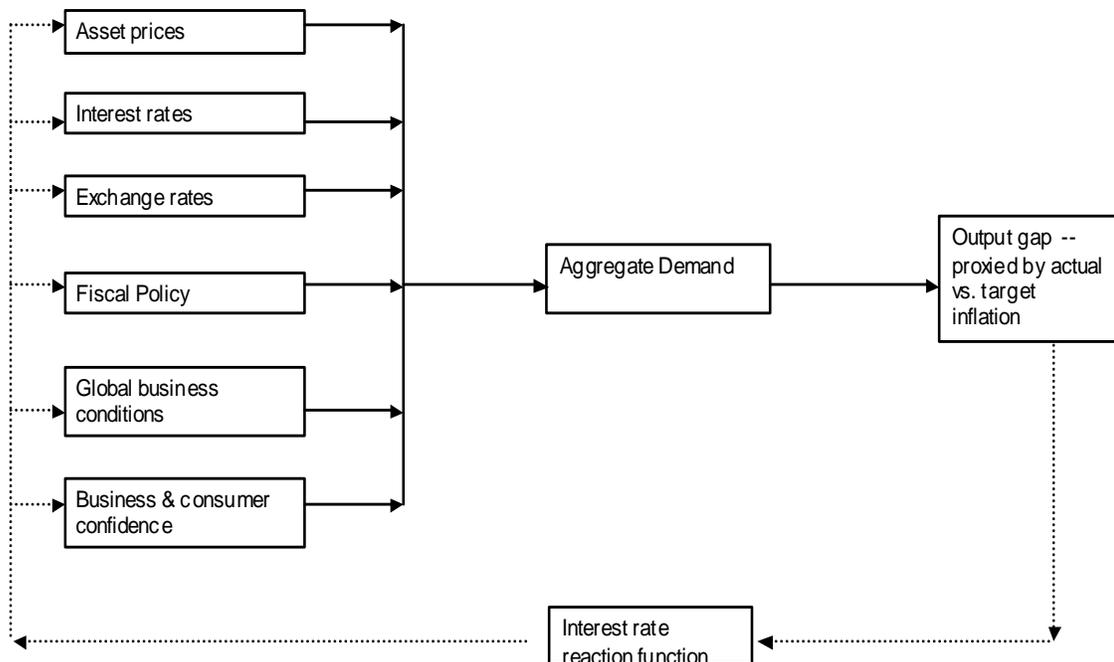
		Inflation Targeting	
		Yes	No
Target asset bubbles	Yes		
	No	Bernanke	Greenspan

II The Fed's economic model

The Federal Reserve's theoretical opposition to targeting asset price bubbles is based on its new theoretical model, which also guides its approach to inflation. Figure 2 provides a stylized representation of that new model. The core logic is that the level of aggregate demand (AD) drives fluctuations in the output gap, which in turn drive the rate of inflation and its deviation from target (be it explicit or implicit). The Fed then responds to these deviations according to its interest rate reaction function – a form of the so-called Taylor rule – and its interest rate response causes an adjustment of AD that brings output and inflation back in line with target.

The important feature of the model is that asset prices are viewed as just one of many different factors influencing AD. Thus, in Figure 2, asset prices enter into the funnel of AD along with business and consumer confidence, global economic conditions, fiscal policy, exchange rates, and interest rates. According to this view, asset price bubbles are no more worthy of the Fed's specific attention than is the state of business confidence. Just as the Fed would not try to target the state of confidence, nor should it try and target asset prices. Instead, it should watch and manage the overall level of AD, and asset prices are just one factor impacting AD.

Figure 2. The Fed's New Model



The Fed's view of the economy and its approach to stabilization policy can be captured by the following simple model. Output is determined by the level of AD and is given by

$$(1) y = E(y, i_L, P_A, \dots) \quad E_y > 0, E_{i_L} < 0, E_{P_A} > 0$$

where y = output, $E(\cdot)$ = AD function, i_L = market loan rate, P_A = price of assets. Equation (1) is the old Keynesian IS function in which AD depends positively on the level of income, negatively on the loan interest rate, and positively on asset prices.

The market interest rate is determined in the financial sector according to

$$(2) i_L = i_F + m$$

where i_F = federal funds rate, and m = bank interest rate mark-up. Equation (2) replaces the old Keynesian LM schedule and captures the reality of interest rate determination in a world of endogenous credit money in which the central bank sets the short-term money market rate. The mark-up reflects the liquidity preference of financial market institutions, and can be considered a catch all for the state of financial market confidence and attitudes toward and assessment of risk.

The Fed chooses its federal funds target with the goal of hitting its output target, y^* . This generates a federal funds rate of

$$(3) i_F^* = E^{-1}(y^*, m, P_A, \dots) \quad di_F^*/dy^* < 0, di_F^*/dm < 0, di_F^*/dP_A > 0$$

The federal funds target is a negative function of the output target (y^*), a negative function of the financial sector's mark-up (m), and a positive function of asset prices (P_A) & other factors influencing AD.¹

The model is illustrated in Figure 3. A higher output target requires a lower federal funds rate because the monetary authority must bring down the market interest rate to increase AD. Likewise, a higher financial sector mark-up requires a lower federal funds rate. The reason is that to obtain the market interest rate needed to hit the output target the monetary authority must bring down the base cost of funds.

¹ The output target can be interpreted as the full employment level of output or the level of output consistent with the Fed's inflation target.

Asset prices affect AD work through the common funnel described in Figure 2. Thus, a bubble induced increase in asset prices induces the Fed to raise its target funds rate in order to maintain AD at a level consistent with its output target. This situation is shown in Figure 4. After the bubble is over the Fed then lowers its target funds rate. The underlying logic is that economic conditions are smoothly reversible. Consequently, after a bubble the Fed can engineer a return to the initial equilibrium conditions.

Figure 3. The Fed's Model

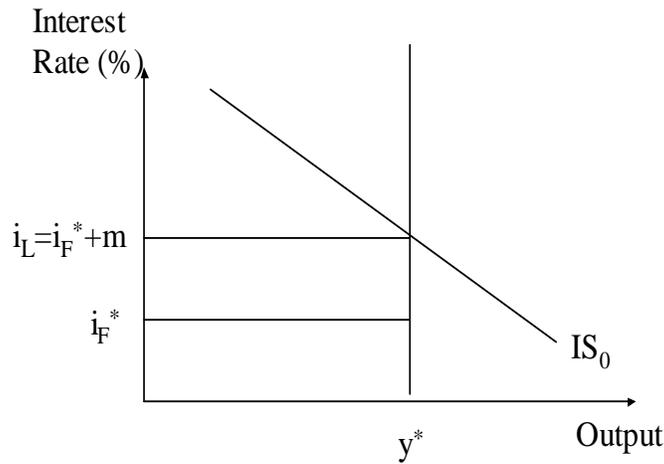
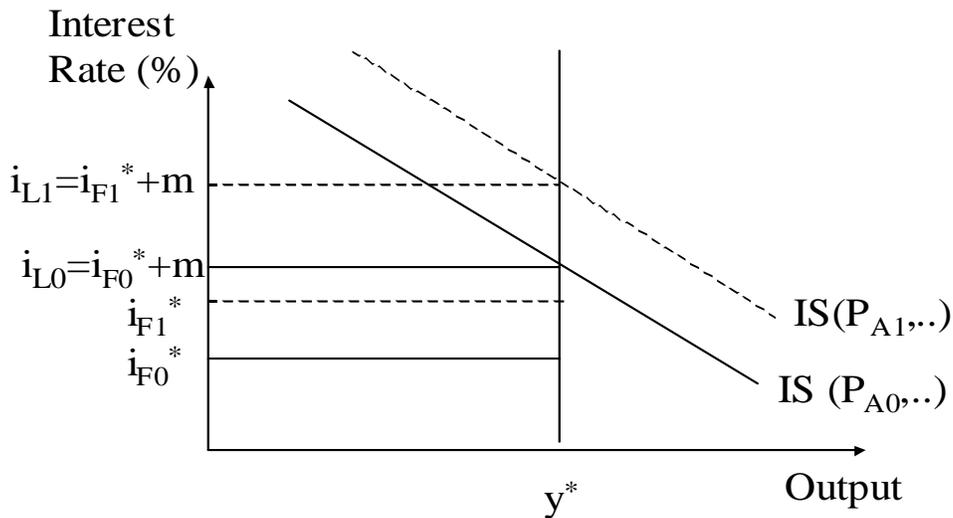


Figure 4. Asset Bubbles & The Fed's Model

$$P_{A1} > P_{A0}$$



III Why the Fed's model is wrong

There are two problems with the Fed's model as described above. The first is that it ignores debt "footprint" effects produced by bubbles. The second is that it ignores the "blunderbuss" effect of interest rate adjustments aimed at mitigating the AD effects of bubbles. Both of these effects have been visible in the recent U.S. house price bubble.

Footprint effects refer to financial stock effects that linger after a bubble is done. Thus, asset price bubbles are usually fuelled by borrowing, and that borrowing leaves behind a debt footprint effect. When interest rates come down after bubble, past borrowing leaves behind debt burdens that can weigh down economy. The monetary authority may then be unable to adequately offset the AD effects of these burdens because of the zero nominal interest rate floor.

Blunderbuss effects refer to the adverse impacts that increased interest rates have on sectors other than those affected by asset bubble. Thus, raising interest rates to counter a bubble can adversely change the composition of output, giving rise to negative long term effects. One problem is that higher interest rates may decrease investment spending, which in turn reduces future productivity and output. A second problem is that higher interest rates may appreciate the exchange rate, adversely impacting the trade balance and manufacturing. If the appreciation is prolonged, that can accelerate de-industrialization and increase the adjustment strains of globalization. Consequently, blunderbuss effects can have both short and long run impacts on manufacturing and growth.

The working and impact of debt footprint and interest rate blunderbuss effects can be incorporated into a modified version of the Fed's model. Now, the goods market is described shown by the following IS equation

$$(3) \quad y = E(y, i_L, P_A, B, D_{-1}, \dots) \quad E_y > 0, E_{iL} < 0, E_{P_A} > 0, E_B > 0, E_D < 0$$

where B = this period borrowing, and D_{-1} = last period's debt stock. The current flow of borrowing has a positive impact on AD, while last period's debt stock has a negative impact. It is this debt stock that gives rise to debt footprint effects.

Additionally, aggregate demand is decomposed into consumption, investment, net exports, and government spending as follows:

$$(4) E = C(y, i_L, P_A, B, D_{-1}, \dots) + I(i_L, B, e(i_L)) + NX(C(\cdot), e(i_L)) + G$$

$$C_y > 0, C_{iL} < 0, C_{PA} > 0, C_B > 0, C_D < 0, I_{iL} < 0, NX_C < 0, NX_e < 0, e_{iL} > 0$$

where C = consumption, I = investment, NX = net exports, G = government spending, e = exchange rate (FX/\$), -1 = last period level. Investment spending is a negative function of the interest rate, the level of debt, and the exchange rate.² Likewise, net exports are also affected by the interest rate. A higher interest rate appreciates the exchange rate, which lowers net exports. However, a higher interest rate reduces consumption, which increases net exports. The conventional assumption, which is also assumed here, is that a higher interest rate has a net negative impact on net exports.

The financial sector is described as follows:

$$(6) i_L = i_F + m(D_{-1}, \dots) \quad m_D > 0$$

$$(7) D = D_{-1} + B(dP_A, \dots) \quad B_{dPA} > 0$$

$$(8) P_A = P_{A-1} + dP_A$$

where dP_A = change in asset prices. Equation (6) determines the market loan rate as a mark-up over the federal funds rate, but now the mark-up is a positive function of the debt stock. Equation (7) determines the evolution of the debt stock, which is equal to last period's debt plus this period's borrowing. This period's borrowing is a positive function of the change in asset prices. Equation (8) determines the evolution of asset prices, with the term dP_A capturing the effect of a bubble.

The Federal Reserve sets the federal funds rate, which is determined as follows

$$(9) i_F = i_F^*$$

² In principle one could distinguish between household and corporate debt, but that would then introduce multiple interest rates making. The exchange rate negatively impacts investment by increasing import competition that reduces profitability.

$$(10) i_F^* = E^{-1}(y^*, P_A, B(dP_A), D_{-1}, \dots) \geq 0$$

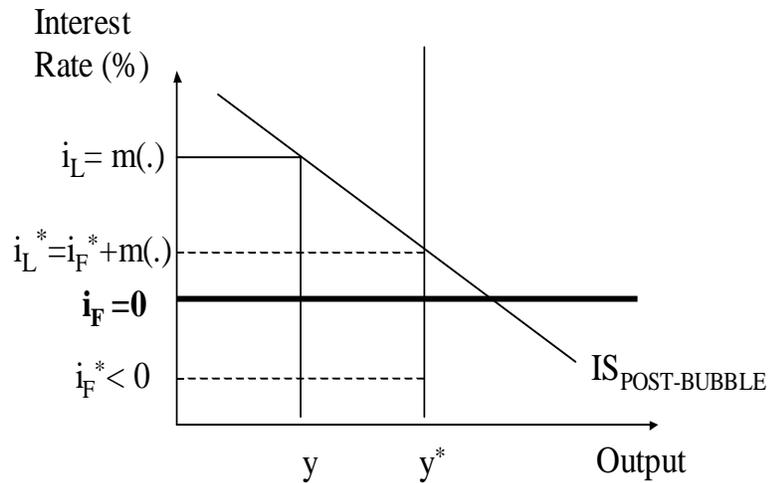
Thus, the Fed sets the funds rate with an eye to hitting its output target. The funds rate is affected by asset price bubbles through their impact on borrowing and AD. Confronted by a bubble that increases AD, the Fed raises the funds rate to neutralize the bubble's AD impact.

The blunderbuss effect of interest rate policy operates via equation (5). An asset price bubble increases AD, causing the Fed to raise rates. This has a negative impact on investment spending, and it also appreciates the exchange rate and has a negative effect on net exports. Such effects have been very present in the most recent U.S. economic expansion. Thus, as the Fed gradually raised interest rates to try and slow the house price bubble and construction boom, this contributed to a strong dollar, record trade deficits, and weak investment spending.

The footprint effect works through both goods markets and the financial sector. Asset price bubbles increase consumption spending via the wealth effect and via increased borrowing. Increased borrowing raises debt, which then creates a debt footprint effect. The following period when the bubble dies down the economy is left with a debt footprint that exerts a direct drag on spending in the goods market. Additionally, the increase in debt causes financial institutions to increase their credit mark-up, widening the spread between the federal funds rate and the market loan rate. The net result is AD contracts directly, and the market interest rate rises yielding a negative indirect effect on AD. Both types of effect have been visible in the wake of the bursting of the house price bubble.

From a policy perspective the danger is that the economy may get stuck in a post-bubble trap, such as is illustrated in Figure 5. The source of the problem is the zero bound to the nominal federal funds rate. Thus, given post-bubble depressed AD conditions and higher interest rate mark-ups, the monetary authority may not be able to push its policy interest rate to a level sufficiently low to achieve its real output target.

Figure 5. The Post Bubble Trap.



Moreover, pushing interest rates down to artificial lows can have reverse blunderbuss effects. Thus, just as raising the interest rate distorted the composition of economic activity, so too can excessively lowering it. In particular, this can produce exchange rate depreciation that causes imported inflation and lowers living standards by worsening the terms of trade. It may also encourage renewed speculation in land purchases, storage activities, and long-lived activities that are sensitive to interest rates.

Lastly, in addition to a post-bubble trap, there may also be post-bubble capacity effects. One effect already noted is the potential destruction of manufacturing and tradable goods production capacity during the course of the bubble. A second effect, emphasized by Bernanke (1983), is the potential for destruction of financial capacity when the bubble deflates. Thus, deflation of a bubble combined with ensuing income contraction may trigger bankruptcies, which in turn cause banks and financial intermediaries to fail. This process of destruction of financial sector capacity combined with the destruction of the credit-worthiness of borrowers may disrupt the normal provision of credit. That can produce an outcome analogous to prolonged credit rationing in which only the only very best and most connected customers get credit. Consequently, both aggregate supply and aggregate demand may contract, leaving the economy stuck far below “normal” potential output.

IV Asset bubbles and the policy instrument problem

The above analysis shows that monetary authorities need to be able to respond to asset price bubbles – especially in real estate. However, responding with higher interest rates gives rise to the blunderbuss effect, and that points to need for additional policy instruments to target bubbles. Such additional instruments can be provided via a system of asset based reserve requirements (ABRR) such as has been suggested by Palley (2000, 2003, 2004)

Under a system of ABRR financial intermediaries hold reserves against their assets. The reserve requirement for each asset category is adjustable and set at the discretion of the monetary authority, and asset categories can be zero-rated. Moreover, to prevent regulatory arbitrage and avoid unfair competitive distortions, a system of ABRR should be applied to all financial intermediaries. In effect, financial intermediaries should be regulated on the basis of “function” and not “form”, thereby ensuring a level playing field for similar businesses regardless of the form firms choose to take.³

Given n different asset categories, such a regulatory system creates $n - 1$ additional policy instruments. The logic is as follows. Let i_j denote the equilibrium interest rate on the j th asset category. Without a system of ABRR the interest rate on this type of asset is

$$(8) i_j = i_F + m_j(\cdot)$$

where $m_j(\cdot)$ = mark-up required by financial firms for holding assets of type j . Now, suppose assets in the j th category are subject to a per dollar reserve requirement of k_j . In that event, the required interest rate will adjust to

$$(9) i_j = [1 + k_j]i_F + m_j(\cdot) \quad j = 1, \dots, n$$

The logic is that because financial firms have to hold reserves of k_j they will require a higher return to compensate for the holding cost of those reserves.

³ The need for uniform regulation of the financial system based on function and not form is emphasized by D'Arista and Schlesinger (1993). They presciently foresaw that the development of an unregulated parallel banking would lead to the type of credit excesses witnessed in the US house price bubble and mortgage crisis.

More generally, imposing reserve requirements on asset holdings creates a wedge between the interest rate on the asset class and the monetary authority's policy interest rate (which in the U.S. is the federal funds rate). The monetary authority can adjust the size of this wedge by varying the reserve requirement, and in doing so can change relative returns across asset classes. That gives it $n - 1$ extra policy instruments whereby it can change relative interest rates on assets, and thereby influence portfolio and lending allocations.

The comparative logic of ABRR is illustrated in Figure 6, which shows the different economic logic embedded in different systems of balance sheet regulation. The first system is liability based reserve requirements (LBRR), which is the conventional way of regulating banking systems. Under LBRR banks hold reserves (an asset) against deposits (a liability), so that the direction of causation flows from the liability side of the balance sheet to the asset side. When banks take on additional deposit liabilities they must hold additional reserves.

The second form of balance sheet regulation is risk based capital standards, which is the current preferred form of regulation. Under this system assets are categorized by riskiness, and banks must hold more equity capital (a balance sheet liability) against more risky assets. Thus, causation runs from the asset side of the balance sheet to the liability side. When banks take on additional risky assets they must hold more equity capital.

Figure 6. Comparison of different forms of balance sheet regulation

- (1) Liabilities-----→-----Assets
[LBRR = Reserves on deposits, collateral/margin requirements]
- (2) Assets -----→----- Liabilities
[Risk based capital standards]
- (3) Liabilities-----→-----Liabilities
[Debt-to-equity requirements]
- (4) Assets -----→----- Assets
[ABRR]

The third form of balance sheet regulation is debt-to-equity standards. Both debt and equity are balance sheet liabilities, so that causation runs between liability categories. If financial firms take on more debt, they must hold more equity.

The fourth and final form of balance sheet regulation is asset based reserve requirements. Under this system firms must hold reserves (an asset) against other assets. Thus, if firms expand the assets they hold, they must also increase their reserve holdings. Causation is therefore contained within the asset side of the balance sheet, and runs from assets to assets.

Lastly, ABRR have some similarities with margin requirements, and they can therefore be easily misunderstood as equivalent. That is wrong, and there are significant differences. One difference is that ABRR would be levied against lenders, whereas stock market margin requirements are levied against borrowers who borrow to buy stock. A second key difference is that ABRR are counter-cyclical, whereas margin requirements can be pro-cyclical and create instability. Thus, if asset prices fall, margin requirements generate margin calls that oblige lenders to post additional collateral. That demand furthers stresses the system at a time it is already stressed, and if borrowers are unable to meet the call their holdings may be sold which further depresses asset prices. In contrast, under a system of ABRR the decline in asset prices will free up reserves, as required reserve holdings are based on the market value of the asset.

V Advantages of ABRR

A system of ABRR has numerous advantages. First, ABRR enable the monetary authority to affect the relative cost of different asset categories while holding the policy interest rate constant. That provides monetary authorities with a precision instrument for influencing portfolio and lending allocations. For instance, if a monetary authority wanted to dampen a property bubble, it could impose reserve requirements on new mortgages. That would raise the cost of mortgages without raising the general level of interest rates, so that the bubble would be targeted without imposing interest rate blunderbuss effects on the rest of the economy.

Second, as identified by Thurow (1972) and Pollin (1993) ABRR can be used to direct investment finance to neglected socially deserving areas. For instance, if policymakers want to

address problems of inner-city decline, they could impose negative reserve requirements on loans made for purposes of inner-city development. In effect, the central bank would subsidize such loans by lending reserves interest free to banks making such socially approved loans.

Third, ABRR have good counter-cyclical properties that render them a form of automatic stabilizer. The reserves held against an asset are calculated on the basis of the asset's value. That means when asset prices increase, as they do in booms, financial firms need to increase their reserve holdings, thereby exercising a brake on the boom. The reverse holds for economic contractions. Thus, when asset prices fall as has been happening recently in the mortgage backed securities market, this automatically frees up reserves and liquidity.

A fourth benefit is the seignorage that accrues to the central bank as a result of financial firms holding non-interest reserves issued by the central bank. A fifth and related benefit, is that ABRR re-build the demand for reserves issued by the central bank. This stands to strengthen monetary policy transmission mechanism that has been eroded in recent years by the relative decline of banks compared to other financial intermediaries (Friedman, 1999).

Of particular interest are the relative merits of ABRR compared to risk based capital standards (RBCS), which is the system of regulation currently advocated by central banks. A first important strength of ABRR is that they promote counter-cyclical adjustment, whereas RBCS are pro-cyclical. In financial downturns ABRR release reserves as asset prices fall, and they increase demand for reserves as asset prices rise. In contrast, RBCS force firms to raise more equity as assets deteriorate in quality, and that can be difficult during downturns. Consequently, RBCS can exacerbate credit crises. Indeed, to preserve capital financial firms may cut back on financing riskier activities during downturns. This impacts that part of financial markets most impacted by downturns amplifies the downturn, and the 2007-08 US mortgage crisis seems to provide evidence for this pattern of behavior.

A second advantage of ABRR is that it can be used as a tool of discretionary monetary policy since the monetary authority can easily adjust reserve requirements in accordance with market conditions. That gives the monetary authority a tool for targeting particular asset categories that may be subject to asset price bubbles. Additionally, ABRR can serve some of the same functions as RBCS to the extent that the discretionary reserve requirement takes into account the riskiness

of asset classes. Thus, if the monetary authority wants to discourage holdings of a particularly risky asset class, it can raise the reserve requirement on that class. RBCS are less suitable for this type of discretionary policy since it is costly for firms to raise equity capital, and it can be especially costly and difficult to do so in economic downturns and times of financial stress.

A third advantage of ABRR relative to RBCS is that the former confer seignorage benefits, whereas RBCS do not. Additionally, ABRR strengthen the monetary policy transmission mechanism by increasing demand for the liabilities of the central bank, while RBCS do not.

This said, in principle, the two systems of regulation can even be combined. Thus, RBCS can be used to discourage excessive risk-taking by ensuring that financial firms have “some skin in the game”, while ABRR can be used to assist monetary policy and target specific asset market problems.

VI Government bonds as the reserve asset

The reserve asset in a system of ABRR is usually thought to be the liabilities of the central bank. However, an alternative possibility is to use government bonds as the reserve asset. This has both advantages and disadvantages.

Bonds are flex-price financial assets whose price adjusts in response to changes in market interest rate conditions. Higher interest rates reduce the value of bond holdings, and if the value of firms other assets are unchanged that would require firms to hold additional bonds. The reverse would hold when market interest rates fall.

On the advantage side, this response of bond prices would provide an automatic stabilizer. Thus, when the economy started to boom or when inflation increased, interest rates would tend to rise and bond prices fall. This would automatically cause financial firms to have to allocate resources to buying additional bonds to top up their bond holdings, which would limit their other financing activities.⁴

⁴ Purchasing additional bonds would tend to drive up bond prices, which would mitigate the automatic stabilizer effect, but the net effect would still be stabilizing.

On the disadvantage side, fluctuations in interest rates would tend to create uncertainty for financial firms. Additionally, to the extent that bond market interest rates move perversely or do not respond to the business cycle, this would limit the automatic stabilizer property.

Finally, with regard to public finances, using government bonds as the reserve asset would increase demand for bonds, which would facilitate budget deficit financing and lower debt servicing costs. Balanced against this, the central bank would lose the seignorage from having its liabilities serve as the reserve asset.

VII ABRR and the euro zone

ABRR have particular relevance for the euro zone and the European Central bank (ECB). The establishment of the euro represents an important step in the creation of an integrated European economy. Over time it should yield dividends as increased competition and lower transaction costs generate increased efficiency. However, member countries have had to give up their own exchange rates and interest rates, which has created problems for economic management by reducing the number of policy instruments. In particular, the ECB must wrestle with how to set interest rates when some countries are booming, while others suffer high unemployment.

ABRR can help fill this policy instrument gap. This is because the ABRR can be implemented on a geographic basis by varying reserve requirements across countries. Real estate lending, which has been a major concern, is particularly suited to this. Thus, if Spain and Ireland are suffering excessive house price inflation, the ECB could raise reserve requirements on mortgage loans secured by property in those countries. That would quickly raise mortgage loan rates in Spain and Ireland without raising rates in other countries.

Geographically contingent ABRR will create incentives to shop for credit across countries. That means ABRR with a geographic dimension will work best when linked to geographically specific assets that cannot escape. This includes mortgage lending that is secured by collateralized property, and shares for which legal title is registered where companies are incorporated. But jurisdictional shopping is expensive, and that itself is a cost that can allow ABRR to create cross-country interest rate differentials for wide categories of assets.

Additionally, jurisdictional shopping would tend to promote cross-country financial integration, which is a long-term goal of the euro project. So even here there is an upside.

One possible problem is that a system of ABRR might raise political conflicts between the ECB and member countries. For instance, if the ECB chose to raise ABRR in just one country (say Spain because of its housing boom), that could evoke an adverse political response in that country. This suggests a dual system of ABRR operating at both the pan-European and national levels. Pan-European policy would be controlled by the ECB, which would have the power to set ABRR across the euro zone with common requirements in all countries. However, individual country central banks would have the right to set country specific asset reserve requirement ratios, subject to the proviso that they be no lower than the requirement ratio set by the ECB. This would give countries the power to set monetary policy that was tighter than that set by the ECB, but not looser.

VIII Conclusion

In recent years monetary policy debate has focused on inflation targeting and whether monetary authorities should intervene to deal with asset price bubbles. Both former Federal Reserve Chairman Alan Greenspan and current Federal Reserve Chairman Ben Bernanke are on record as being against targeting bubbles.

This paper has argued that their view is mistaken. Asset price bubbles can be identified, and they are economically destructive. That was shown by the earlier deflation of Japan's real estate bubble, and it is being shown again with the deflation of the U.S. house price bubble. That means policy should address them. However, having said this, the paper is against using the monetary authority's policy interest rate to target bubbles as that imposes unacceptable collateral damage. Instead, the paper recommends adopting a system of ABRR that can provide additional policy instruments that enable targeting of asset markets without raising the general level of interest rates.

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