



Federico Ravenna,
University of California,
Santa Cruz

"Asset Prices And Economic Activity In An Era Of Credible Monetary Policy (And Bubbles)"

1. Introduction: The Menace of a Housing Price Bubble
2. Can asset prices move independently of fundamentals ?
3. Do asset price fluctuations affect real economic activity ?
4. Should monetary policy be concerned about asset price fluctuations ?
5. What should the response of the monetary authority be ?
 - 5.1. Is the central bank better off responding to asset prices movements ?
 - 5.2. Inflation targeting: the comprehensive framework for monetary policy
6. The assumptions of economic models and Real World central banking
7. More troubles: risk shifting and the lesson from the Japanese experience
8. Conclusions: Lessons for Monetary Policymakers

1 Introduction¹

Having (momentarily) defeated inflation, today's central banker is faced with the riddle of how to behave as asset prices soar (and plunge). He warns you: "It would be unrealistic to look for a continuation of stock market gains of anything like the magnitude of those recorded in the past couple of years" (Greenspan, chairman of the US Federal Reserve Board, 1997). "Stock prices are pushing the limits of what you can say about the expectation of interest rates staying low and profits going up" (Thiessen, governor of the Bank of Canada, 1998). But the same central banker does not take any action. What is the reason behind this behaviour? What is the model of the economy central bankers rely upon today when guiding monetary policy? Are they getting it right? The shadow of the Japanese recession following the 1989 stock market crash haunts today's central banker.

Throughout the second part of the

'90s, the financial press commented daily on the two intertwined issues of the 'new economy' and the 'bubble economy'. United States labor productivity growth has been averaging 2.2% between 1996 and 1999, well above average productivity growth in the 1990-1997 period (1.3%), in the '80s (1.4%), or in the '70s (1.8%). At the same time, S&P 500 price-earning ratio rose from 17 in 1995, a value higher than in the previous two decades, but comparable to data from the '60s, to over 30 by the end of 1998, a value not seen since 1949 in the US.

As the NASDAQ index lost about 50% of its value between its peak in March 1999 and the end of 2000, suddenly talks of a market crash filled the financial press. Yet we often forget that the market plunge was confined to technology stocks, whereas wider indices of the US stock market, like the Dow Jones Industrial Average and the Russell 2000, did not suffer the same losses (they actually rose in 2000).

Moreover, the NASDAQ index grew at a 40% annual rate between 1995 and 1999 – so that the 5-years performance of the index after the 2000 crash was still by any measure overwhelming. The US stock market did manage to beat the more dire forecasts. Investing in the S&P 500 index in the decade 1996-2006 would still have offered a healthy 5% return, against many predictions to the contrary.

Today the new menace is the possibility of an unchecked price bubble in the US housing market. Inflation-adjusted home sale prices rose by 50% between 1998 and 2006, by far overtaking the increase in rents (Baker, 2006). In metropolitan areas, the increase was on average 80%. In contrast to the dynamics of the last decade, the (quality-adjusted) sale price of houses increased by less than 10% over the entire 1953-1995 period. That is, houses may be more expensive because of inflation, because they are bigger, because a square foot of house offers more ‘housing services’ today than in the 1950s. But the real annual return on a unit of housing service over most of the postwar period in the US has been less than a quarter of a percentage point.

The stunning numbers reported in the press never go unaccompanied by a host of questions: can asset prices move independently of fundamentals? How do they affect the economy? Should monetary policy be concerned with asset price inflation? What should the reaction of the monetary authority be? Does price stability indicate that monetary policy is being appropriately conducted?

2 Can asset prices move independently of fundamentals?

History is replete with episodes in which developments in asset markets have a significant impact on inflation and real economic activity. Large swings in land prices, stock valuations and housing markets have often coincided with boom-bust cycles. This has been all the more true in countries that experienced rapid financial markets liberalization (like Japan, Norway and Sweden: see Allen and Gale, 1999). It is hard to object to the proposition that central banks should take action to minimize macroeconomic instability arising from extreme changes in asset prices. But how to do it and whether central banks can do it at all depend on our understanding of the feedback between asset markets and real economic activity.

Finance theory has that the fundamental value Q_t of an asset is equal to the expected the discounted stream of dividends D_t

$$Q_t = E_t \frac{\sum_{i=0}^{\infty} D_{t+1+i}}{\prod_{j=0}^{\infty} R_{t+1+j}^q} = E_t \frac{D_{t+1} + Q_{t+1}}{R_{t+1}^q} \quad (1)$$

where R_{t+1}^q is the gross discount rate at time t on dividends received at time $t+1$. Fluctuations in the asset price Q_t reflect movements in the expected income flow that the asset will provide (and in the relevant discount rate used to evaluate the future income flow). If asset prices moved only in response to shifts in these underlying economic fundamentals, there would be no space for concern or policy action in response to volatility in market valuations.

Asset prices would passively reflect the market rational expectation² of future economic conditions, playing no other role in the economy than an informational one.

A necessary condition for policy making to be concerned with asset market volatility is that asset price movements may be unrelated to underlying economic fundamentals. In a world without any market friction, of complete information and complete markets, this will hardly be the case. As soon as we leave the realm of benchmark neoclassical economic theory, there exist many ways in which asset prices can become a less-than-perfect informational vehicle for the future state of the economy. This opens the way for asset prices to play an active role in the economy, affecting aggregate variables independently, rather than passively reflecting economic fundamentals.

Non-fundamental fluctuations in asset prices can arise due to the failure of any of the assumptions underlying standard economic theory: rational expectations and complete information.

The high volatility of asset prices relative to economic fundamentals and the persistence of misalignment in asset returns have often been explained with some sort of irrational investors’ behavior. Plenty of empirical evidence documents investors’ behavior departure from standard economic theory (Shiller, 2000). As anecdotal evidence, it is sufficient to mention two well-known phenomena.

First, Frankel and Froot (1992) have amply documented with survey data

that long-term expectations on asset prices among professional investors will consistently differ from short-term expectations. It is straightforward to see that any asset valuation theory relying on rational expectations cannot allow such phenomena. If the price of an asset is expected to rise in a year, investors will buy it now, driving up its price today. If investors expect the price of the asset to rise in the long term, but to fall at shorter time horizon, either they are irrational, or the standard asset valuation theory is inadequate.

Second, at least 60% of professional investors in financial institution claim to rely in some degree on prices' past behavior when taking asset allocation decisions, the more so the shorter the investment horizon. There exists no theory to rationalize the adoption of trend-extrapolating techniques to forecast asset prices within a framework where these prices reflect rational expectation about future economic conditions, and where rational investors would arbitrage away any unexploited information about future economic conditions contained in the price historical time-series.

A major breakthrough of economic theory in the past two decades has been to explain what institutional features of the economy can prompt what looks like irrational behavior. A large body of literature, starting with Black (1993), suggests that the existence of noise traders, coupled with short investment horizon, may prevent markets from correctly pricing assets. These theories suggest that even fully informed, rational traders may not find profitable to bet against

uninformed traders, if their investment horizon is not long enough. By the time rational traders have to cash in their investment, uninformed traders might not have been driven out of the market yet – and the asset price may not have reverted to its 'fair' fundamental value. But this opens the possibility of making a loss by betting against the uninformed traders, implying that rational traders will be better off acting themselves 'irrationally'!

Alternative theories start off with the observation that many market bubbles have developed following financial liberalization, or a conscious decision of the central bank to increase lending. The resulting expansion of credit is accompanied by the increase in the price for assets in limited supply, like land and stocks. After growing for possibly several years, the bubble bursts and asset prices briskly collapse. Japan, Norway, Finland, Sweden, and Mexico all experienced episodes of this kind (Kaminsky and Reinhart, 1998). This course of events suggests that the institutional arrangement in the financial sector may be ultimately the cause for such a bubble (Allen and Gale, 2000). Because banks supply financing through debt contracts and cannot observe the investment decisions of the borrowers, risk shifting will emerge. An investor who has borrowed in order to invest in the risky asset does not bear the full cost of borrowing if the investment turns out badly: he can declare bankruptcy and avoid further losses. When the value of his portfolio is high, however, he keeps the remainder of the value after repaying the bank. This asymmetry generates a preference

for risk. Therefore borrowers will bid up the price of the risky asset above its fundamental value.

Even if capital markets work efficiently, the asset valuation theory summarised in eq. (1) does not guarantee that asset prices will reflect the economic fundamentals. Unfortunately eq.1 will be satisfied by solutions different from Q_t , the fundamental one. In fact,

$$S_t = Q_t + U_t \quad (2)$$

will equally solve eq. 1 under certain conditions. U_t is the so-called 'rational expectations bubble' (Blanchard, 1988). If the bubble term increases with time, the asset price will grow without any shift in economic fundamentals to justify it. The expectation that the bubble will grow is sufficient to bid up the asset price. What is worse, it will be perfectly rational to expect the asset price to rise: the economy is caught in a perverse spiral of self-validating expectations. Investors will buy the overvalued asset expecting its price to grow. The very excess demand generated by such belief will drive up the price, validating investors' expectations. In other words, if every individual expects the price to go up, and acts accordingly – buying the asset – the price will actually increase. In this situation there is no way to define the expectation of a price increase 'irrational'.

Rational bubble theory does not explain why a bubble should develop in the economy in the first place, and as such is of limited use. Nevertheless, it delivers the warning that asset price bubbles cannot easily be ruled out in most economic models.

For example, assume a bubble in asset prices exists at time $t-1$. It may persist with probability p in the following period, growing according to:

$$U_{t+1} = \frac{a}{p} U_t R_{t+1}^q \quad (3)$$

with $p < a < 1$. In case it bursts, with probability $(1-p)$,

$$U_{t+1} = 0$$

Eq. (2) implies that if the bubble survives, it will grow. The expected discounted value of the bubble converges to zero. Thus, the bubble has zero probability of lasting forever (and it is expected not to do so). Yet there is a positive probability that the asset will be overvalued for extended periods of time, the degree of overvaluation increasing exponentially in time. There is no mathematical or economic argument allowing us to rule out such phenomena.

3 Do asset price fluctuations affect real economic activity?

Having established that asset prices may actually reflect non-fundamental factors in the economy does not necessarily imply that the monetary authority should take them into account when formulating its policy stance. In fact, we would need to show that asset price movements exert real effects on the economic activity. If that is the case, central bank intervention in response to asset price fluctuations may be desirable.

Finding empirical evidence that drops in asset valuations are responsible for economic activity downturns proves complicated, because the causality runs in both directions. Typically, asset markets are depressed in times of

economic hardship since the prospects for the economy get gloomy.

Two mechanisms are usually held responsible for the feedback of asset price fluctuations on real economic activity.

The first, and most discussed one, is the wealth effect of asset prices on household consumption. From 1994 to 1997 the aggregate value of US household sector equity holdings roughly doubled, for a dollar gain of about \$5.2 trillion. Surprisingly, when the proposition that household wealth increase has supported the vast US consumption boom of the end of the last decade is tested, the evidence is very mixed. Ludvigson and Steindel (1999) estimate that in the current state of the economy a dollar increase in wealth leads to an increase in consumption of the order of 3 to 4 cents. This is in line with most estimates of the long-run impact of wealth in consumption (Poterba and Samwick, 1995). While there certainly exists a positive correlation of wealth and consumption, the authors find that the response of consumption has been unstable in the post-war period, and very short lived indeed. Consequently, we should not expect increases in wealth to fuel large surges in consumption spending for an extended period of time.

The second channel through which markets' asset valuations can affect the level of economic activity is their effect on firms' balance sheet. In a world of perfect capital markets, financial and credit markets conditions do not affect the real economy. In fact, in such a world the Modigliani-Miller (1958) theorem would apply: the firms'

financial structure is irrelevant for real economic outcomes.

However there is a long-standing alternative tradition in the macroeconomic literature that attributes a prominent role to credit market conditions in affecting the behaviour of the production sector. As Bernanke, Gertler and Gilchrist (1998) show, in a world of information asymmetry where loan contracts cannot be freely enforced and bankruptcy procedures carry net costs for the economy, firms' financial conditions will matter for the level of economic activity. Frictions in the credit market mean that credit to buy production equipment will be extended at a cheaper price to firms who hold more collateral. Put differently, the amount of external finance that a firm will optimally choose is connected to its equity value. The lower the equity value, the higher the risk premium the firm has to pay over the riskless rate to compensate the lender for the possibility of default.

Consider a firm that at the end of period t has a capital stock worth $K_{t+1} Q_t$. The firm finances the working capital partly through internal equity, N_t (corresponding roughly to gross earnings on holdings of equity, or capital stock, from period $t-1$ to t , $R_t^q Q_{t-1} K_t$, less repayment of borrowings), partly through debt. Because of asymmetry and bankruptcy costs in the credit market, the optimal contract will require that the firm pay a premium on the riskless rate for the borrowed funds (which amount to $Q_t K_{t+1} - N_t$). The riskless rate is the opportunity costs of internal funds.

External funds cost an extra premium, which is a decreasing function of the equity/assets ratio:

$$E_t R_{t+1}^q - R_{t+1} = \Psi\left(\frac{N_{t+1}}{Q_t K_{t+1}}\right) \quad (4)$$

Clearly, firms are financially constrained in this setup. If informational problems could be overcome, the optimal contract would call for a zero external finance premium: $E_t R_{t+1}^q - R_{t+1} = 0$ and the level of firms' investment in capital would increase.

Unexpected movements in asset prices Q_t will generate movements in the entrepreneurs' net worth. Growing asset prices, by increasing the value of whatever amount of collateral is available for borrowing, will lower the market-required premium for external finance. On the other hand, a decline in asset values leads to an increase of leverage on the part of borrowers, restricting entrepreneurs' access to credit.

Non-fundamental increases in asset prices will affect the economy primarily by easing credit market constraints on leveraged firms (whose balance sheet value as collateral depends on the market asset price), allowing them to optimally borrow and invest more. Note that this mechanism can operate only to the extent that firms are leveraged. If the production sector were able to completely support its financial needs, the link between asset prices, external finance premium and investment demand would be severed.

There is a second way in which the balance-sheet mechanism is relevant for the behaviour of the economy. While a bubble obviously stimulates

the investment component of aggregate demand through the balance-sheet channel, other shocks in the economy will naturally affect asset prices. The resulting variations in credit market constraints provide a powerful mechanism for the transmission of shocks in the economy. Consider a productivity shock to the economy that increases the potential output of the aggregate production sector. Together with it, the associated rise in asset price – now capital has become more productive, and its demand soars – will prompt further investment spending by lowering the external finance premium. The increase in investment may also lead to further increases in asset prices, inducing additional spending (Bernanke and Gertler, 1999). These multiplier effects, first explored by Kyotaki and Moore (1997) will be operative as well in the case of a spending spree driven by asset market bubbles – and at the time the bubble will burst. To the extent that the premium for external finance is countercyclical, the balance sheet channel amplifies investment and output fluctuations of any shock to the economy.

4 Should monetary policy be concerned about asset price fluctuations?

We have up to now established that an asset price bubble will increase household spending via the wealth effect, and investment spending via the firms' balance-sheet effect. This picture corresponds to the much advertised 'misallocation of resources' danger of an unwarranted asset prices rise. Households will consume out

of their paper wealth, lending and investment decisions will be based on inflated market-relative-to-book value, and new firms will start business for the only reason that capital markets are so receptive: it's easy to raise financing. Eventually the bubble will burst, and the economy will experience a full 'boom-bust' cycle.

To what extent should the monetary authority be concerned with this chain of events depends on the goals set for its policy actions. It is by now widely accepted that monetary policy is not the right tool to enhance the sustainable growth rate of a nation's output. In fact, central banks around the world are concerned about GDP growth not in absolute terms, but relative to some measure of potential output.

Either explicitly or implicitly, most central banks' charter focuses on price stability. Transparency of the objective is one important reason for stating a goal in terms of price (inflation rate) stability. But there exists a deeper meaning for shaping the role of the monetary authority in the economy in such terms. Twenty years of research in the field of real business cycle theory have firmly established the idea that a large part of output variability can be ascribed to real shocks to the economy, affecting supply and demand. This means that output fluctuations, being the economy's reaction to real shocks, are optimal: what is really changing is the potential output. If we accept this description of the economy there is no role for monetary policy. With fully flexible wages and prices, the economy will always attain its maximum output. The central bank could restrict its action

to a steady growth of money supply, or to supplying a constant quantity of money. Then, as real shocks hit the economy, we would observe one-time shifts in the price level.

Of course, this framework fails to give an account of sustained periods of inflation and of prolonged deviations of output growth from its potential level. Introducing sluggish adjustment in prices or wages will do the trick of getting a more accurate description of the economy. If prices display some degree of stickiness, the central bank can adjust money supply to guarantee stable prices (or low and stable inflation) as real shocks hit the economy. This will make sure that frictions in the market do not get in the way when the economy adjusts to the new level of potential output. Otherwise, the economy will over- or under-react to real shocks, output will deviate from its optimal level, and associated with the output deviation, sustained periods of inflation or deflation will emerge.

In fact, if price stickiness were the only friction in the economy, targeting the price (inflation) level would automatically stabilize the output gap, and vice-versa. In general, this will not be true inasmuch other variables, like nominal wages, display sluggish adjustment as well. That is the reason why considerations of output deviations from potential output enter independently the objective function of central banks. A tradeoff exists between the goals of output and inflation stabilization.

Where does this lead regarding the question of whether central banks should be concerned about asset price

bubbles? If excess volatility in asset price makes the central bank job of attaining price stability harder, then it should be a concern for the monetary authority. And when we look at the price stability goal as a way, although imperfect, to stabilize the output gap, we have to ask whether asset price bubbles interfere with the output objective in the same way as other real shocks to the economy. If that is not the case, stabilizing the inflation rate might not help in stabilizing output in the face of extreme asset price fluctuations. This will require the central bank to give independent consideration to asset price movements, beyond counteracting



the consequences of their swings for inflation. What monetary policy should do when confronted with a bubble in asset prices hinges on how we answer to this question.

Finally, we must not neglect that the monetary authority has as well a fundamental supervisory role of the banking system in every nation in the world. It is expected to mitigate the fragility problem of a sector of the economy so much exposed to 'systemic risk': the danger that failure of one firm will lead to widespread default in the industry. This worry is rooted

in the belief that the banking system plays a central role in the financing of the economy, and that disruptions in this delicate mechanism may lead to prolonged downturns in economic activity. What role does asset prices volatility play in this respect? We will return on this issue in a subsequent paragraph, as we will see that the biggest harm of asset price bubbles may come from the disruptions they create in the financial intermediation sector.

5 What should the response of the monetary authority be?

Having specified how asset price bubbles feedback into the economy, and how they may interfere with central banks' objectives, we are now down to the crucial point: when a decision to respond is made, what should that response be?

Behold: under certain conditions, economic theory answers that the central bank should do nothing more than its usual job, and that this will actually take care of whatever feedback asset price bubbles have on real economic activity!

The argument can be summarized in this way: asset price bubbles will generate output gaps deviations very much in the same way as other real shocks to the economy, and will exert similar inflation pressures. Therefore, it is really an empirical issue whether the usual response of central banks to output and inflation imbalances is enough, or whether asset price bubbles need 'special care'.

Bernanke and Gertler (1999) lay out a model of the US economy where the

question can be answered formally. Their framework allows a quantitative evaluation of different policy alternatives. In the model asset price bubbles affect the economy via the two channels previously highlighted: the households' 'wealth effect' and the firms' 'balance-sheet effect'. Every firm and household in the model economy behaves optimally and has rational expectations about the future course of the economy. This includes expectations about the behavior of the central bank.

The first key ingredient of the model is the structure of the financial intermediation sector, that plays a crucial role in the transmission of shocks to the rest of the economy. Households supply their savings to a financial intermediary, which can be thought of as a mutual fund. In turn, the financial intermediary loans funds to the production sector. Because of information asymmetry, firms have to pay a premium on the riskless rate to borrow funds from the financial intermediary. The mechanism, by which collateralized loans generate a link between the entrepreneurs net worth and the premium for external funds, and its effect on the rest of the economy, has been described in the previous section. It is important here to note that entrepreneurs enter into a loan contract where they accept to take on all the risk connected with exogenous shocks to the economy. In other words, once the economy is hit by a negative shock, entrepreneurs will pay a higher rate of interest on the loaned funds to compensate the intermediary for the higher default rate among firms. In

this way the financial intermediary is guaranteed to earn the riskless rate of return, which will be returned to households.

The second key ingredient of the model is the way monetary policy is modeled, and how this feeds back into the economy and in the expectations the private sector has of the behaviour of the economy as it is hit by shocks.

The monetary authority plays a prominent role in the way shocks diffuse into the economy by systematically responding to variations in the level of aggregate variables. Systematic monetary policy acts through two mechanisms. First, it directly affects the level of real activity, counterbalancing whatever real shock hits the economy, (hopefully) trying to stabilize the economy around its optimal path (the situation the economy would achieve if there were no market frictions and prices and wages were fully flexible). Second, in a world where the private sector has rational expectations about the future course of the economy, individuals will take into account the systematic reactions of monetary policy to movements in the aggregate economic variables. For example, a very aggressive inflation targeting policy will prompt little movements in interest rates, since individuals foresee a hike in interest rates as a consequence of higher levels of economic activity and inflation, and will therefore avoid overheating the economy.

5.1 Is the central bank better off responding to asset prices movements?

Equipped with a credible rule for

monetary policy, the Bernanke and Gertler model allows us to evaluate the desirability of a central bank response to asset price bubbles.

Would the central bank act wisely by responding to the increase in the asset price as well as to expected inflation? Suppose that interest rates will be hiked by 10 basis points for every percentage point increase in the asset prices.

Responding to the bubble generates a perverse effect. The fundamental value of the asset is pushed down by the expectation that interest rates will surge along with the bubble. This movement in the asset price more than offsets the stimulative effect of the bubble. As the economy falls into recession, a deflation sets in. Because the central bank does not respond aggressively to the deflation by increasing money supply, prices and output keep spiraling down. Bernanke and Gertler (1999) note that the resulting contraction of the economy relies on very sophisticated forward looking behaviour on behalf of the private sector. Nevertheless, the exercise points at the danger that monetary policy may be destabilizing when targeting asset prices.

A central bank that responds to an asset price bubble and at the same time aggressively targets inflation might stabilize the output gap as the bubble grows. The trouble is, the economy will overheat at the burst of the bubble, and the policy will cause much higher volatility in inflation when compared to an aggressive policy responding only to inflation. Moreover, the model economy provides strong arguments in favor of an aggressive policy against expected inflation. In fact countering

the inflationary pressure arising from an asset prices bubble does most of the job needed to stabilize the economy.

5.2 Inflation targeting: the comprehensive framework for monetary policy

The quantitative model of Bernanke and Gertler (1999) delivers a clear-cut message for policy management: no asset busting, please. On the contrary, the results that we obtained go a long way in supporting what is in most countries the standard practice of central banks: the so-called flexible inflation targeting policy.

The rule which performs better in the policy experiments calls for raising aggressively the nominal interest rate as forecasted inflation spikes up. The central bank makes sure in this way that the real interest rate increases whenever inflationary pressures appear in the economy. This action will curb the interest-rate sensitive components of demand, slowing down the economy, and the overheating of prices. This framework corresponds to setting a long term inflation rate objective for the central bank, and giving the monetary authority the flexibility to adjust the interest rate to make sure the goal is met in the long-run. At the same time, other considerations (output or exchange rate targets) can prompt monetary policy action in the shorter term.

In some countries, like Canada, New Zealand, United Kingdom and Sweden, the central bank explicitly states the long-term inflation target, and publishes updated reports on the prospects for future inflation, and the

actions the central bank is going to take to prevent inflation from deviating from the long run target. The transparency of the policy rules ensures that the central bank is fully accountable for the evolution of inflation. Moreover, explicitly targeting the inflation rate forces the monetary authority to take into account the future costs in terms of output that will be incurred to bring inflation back to target when overly expansionary policy are pursued.

Bernanke and Gertler (1999) show that inflation targeting allows the central bank to respond to the toxic side-effects of an asset boom, in a more effective, stabilizing fashion (and without all the risks connected to guessing when asset price are misaligned from fundamentals). Inflation targeting implies that interest rates will rise during (inflationary) asset price booms, and fall during (deflationary) asset price busts. On top of being automatically stabilizing (and thus helping to insulate to a certain extent firms' balance-sheet from the adverse consequences of falling asset valuations), this policy has beneficial effects on the private sector expectations. Knowing that the monetary authority behaves in a countercyclical manner, financial-market participant may be less prone to overreact and panic in the face of large swings in asset market valuations.

It seems central bankers can find a lot of support in their current practices from economic theory. Having discussed what sort of model of the economy can justify their actions when confronted with extreme volatility in asset markets, we now need to wonder

whether they are getting it right – is the economic framework we examined an accurate description of the real economy?

6 The assumptions of economic models and Real World central banking

A well thought economic model, calibrated on the United States economy, supports the case that asset price targeting is a destabilizing monetary policy even when coupled with aggressive pre-emptive policy against inflation. At best, it can offer in the long run some gains in terms of output stabilization, at the expense of much higher variability in the inflation rate, an option hardly acceptable to most policy makers nowadays. We underlined that the issue, largely empirical, does not have an obvious answer, rather depends on the details of the model. But certainly the results seem pretty robust as we look across different policy rules. They are especially strong when we take into account that in the simulations the central bank knows that asset prices are rising because of a bubble. In reality, the monetary authority might end up slowing down the economy when asset price growth is driven by increased productivity. In the end, it will induce additional instability in the economy. The inability to identify speculative bubbles makes it difficult to take timely and well-measured countervailing actions in the framework of a monetary policy systematically responding to asset price movements. The model we presented does not take into account this collateral damage (Cogley, 1999).

Having said this, we must acknowledge that the model economy relies on many assumptions that could make it easier to rule out any advantage in asset price targeting. The economy we looked at lives in a world where policy-makers set their interest rate-oriented strategy in a forward looking fashion and where markets – and this matters a lot – are fully aware of, and believe in this strategy. What is the consequence of taking this world down to earth? Let's look at the impact of the assumptions made in the Bernanke and Gertler (1999) model for our interpretation of the transmission mechanism in the economy.

First, the Rational Expectation Hypothesis affects pervasively the behaviour of the private and public sector in the model. There are at least three, very relevant ways in which today's economy may depart from this assumption:

a) The model assumes the monetary authority is fully informed about all variables in the economy, and knows exactly the working of the economy, when forming its forecast of future inflation. This may turn out to be a very optimistic view of central bank capabilities. Asset prices may contain valuable information about the private sector expectations of future prices and income. Indeed, this is the sense in which the Bank of International Settlement (1997) suggested there could be a larger role for asset prices in monetary policy decision making. More than one study (Giammarino, 1998) indicates that, contrary to what is usually believed, stocks are not an hedge against inflation – in fact as

inflation increases, stock returns decrease. If stocks and other assets help in predicting the future inflation rate, the central bank should include them in its interest rate rule. Not really because of any sophisticated asset-busting or asset valuations stabilization policy, but only to get help from market valuations in forecasting inflation. Therefore, even flexible inflation targeting policy will benefit from the central bank's concern with asset prices.

b) In theoretical models the private sector is fully aware of the policy followed by the central bank. In fact, it uses this information for forecasting the future course of the economy, and adjusts its behaviour accordingly. This assumption may look extreme. Not so much, though, for a central bank which has attained the degree of accountability and transparency that flexible inflation targeting allows. But the criticism is compelling in settings where the central bank independence is hampered, and the leeway it has in following its own stated goals is unclear and variable in time. This will certainly affect the results of any economic model relying on rational expectations. It is hard to say by how much the results will change.

c) Finally, bubble-popping and crashes in asset prices may not find the private sector so confident in the future as economic fundamentals warrants. Panic can set in and a reverse wealth effect can be asymmetric: the negative impact of declining asset prices could be sharper than the positive impact of rising asset prices. Households may sharply scale back spending in order to

maintain the value of their portfolios. In fact this has been the case during the Japanese stock market crash. Household saving increased even while interest rates plunged to their lowest level in history. Anyway, this means that bubble bursts carry extra costs, not accounted by the standard transmission mechanisms of the economy. Then again, extra care for asset price movements is called for.

A second assumption of the model that is exposed to criticism is the perfect credibility the monetary authority enjoys as an aggressive inflation buster. If the private sector does not rely on the monetary policy adhering to the advertised goals, a very strong channel by which policy works will be lost. And with it, the possibility for the central bank of limiting the damage to the economy of asset market bubbles by counterbalancing the inflationary pressures they generate. Then, a central bank known to respond to asset price misalignments could do a better job.

But we kept the strongest blow to unhampered inflation targeting prescription last – the liquidity crunch. As the bubble bursts, one possibility is that credit markets come to a full stop in providing funds for investments. Within a short time, pervasive default may ensue. The danger calls for quick action as asset price crashes. What if credit becomes simply unavailable? Such a scenario is plausible when the banking system capacity to lend is hampered. The Japanese stock market crash is a clear example of how remote from reality the perfectly hedged banking system scenario is.

7 More troubles: risk shifting and the lesson from the Japanese experience

An investor who bears limited liability and is able to shift part of the investment risk on a bank unable to monitor how the financing provided is employed will bid up the asset price, and foster a misalignment between the price and the fundamental value. In this situation the banking system is bearing a disproportionately large portion of the risk, for which it receives no compensation. As the bubble bursts, the wave of defaults may inflict serious damage to the banking system, and prevent it from performing its financing role. There are a number of mechanisms which may lead to close ties between the health of the banking system and real activity. If banks suffer a number of loan defaults, bank capital will be depreciated. The bank may have no alternative but to cut back the volume of new loans. If a significant part of the banking system is entrenched, there can be a substantial effect on output, leading to more defaults and a further reduction of loans, in a downward spiral. This is a different mechanism from the external finance premium movements examined in the Bernanke and Gertler model economy. In fact, we are looking now at how the choice of financing are influenced by the financial status of the intermediaries, not of firms. While the balance-sheet channel identifies demand factors (changes in collateral) in the transmission of asset price movements to the real sector, the lending channel concerns supply factors (changes in the intermediary capital).

During the 1980s and early 1990s several Oecd countries suffered from a credit crunch. Japan's experience is perhaps the most interesting, since the credit crunch came after a long period of expansion and low inflation. From 1982 to 1989 stock prices in Japan rose an average of 25% per year, and price/earnings ratios rose from 23 to 67. Land prices also rose very rapidly after 1986. The overall performance of the Japanese economy was exceptional: real GDP grew on average more than 10% a year in the second part of the '80s, inflation was low by historical standards, and productivity gained substantially. But between 1990 and 1992 the stock market lost 40% of its value, and the Japanese economy entered a long period of stagnation, that lasts till the present day.

With the benefit of hindsight, as Lynn Browne (1999) notes, it is easy to say that Japan experienced an asset price bubble. Yet the strong economic performance of Japan seemed to justify the extreme rise in stock and land prices. What is especially relevant to the US experience in the second part of the '90s, the Japanese extraordinary performance was not accompanied by rising inflation. Several temporary factors contributed to keeping the inflation rate low: the lagged effects of the 100% appreciation of the Yen against the US Dollar after the Plaza Agreement, the international pressure on the Bank of Japan to keep interest rates low, and especially the financial liberalization process.

By the end of the eighties Japanese banks had entered into new and riskier lines of business, following the

extensive deregulation of the financial system started in 1984. On the one hand, many of the banks' best customers substituted cheaper equity financing for bank financing, forcing competition among banks, which undertook riskier operations to retain market share. On the other end, the banks themselves were profiting from the enormous amount of real estate development that was occurring as a result of the asset boom, and was providing banks with a new source of loan customers.

The cost to the banks, which would not become fully apparent until after the bursting of the bubble, was that they were exposed to downturns in asset prices (as well as to the business losses of the borrowers). The initial trigger for the bubble crash was the Bank of Japan monetary policy tightening, mild in 1989, more aggressive in the two subsequent years. The high interest rates of 1990 and 1991 raised the cost of capital sharply, slashed private sector net worth, and in the end crushed the profitability of an overexposed banking sector. The process of financial intermediation was severely compromised, yet the problems of the banks were allowed to fester until, following the broader Asian crises in 1997, the system threatened to collapse altogether.

The Japanese experience shows that extreme changes in the financial intermediaries' capital can be a powerful transmission mechanism of asset price bubbles and financial distress to the real economy. The lag between rapid growth and eventual rise in inflation happened to be longer than usual during the eighties in Japan. Had the

Bank of Japan responded to the signals about future inflation contained in the asset price movements, tightening policy perhaps one or two year earlier than it did, the collapse of the banking system and the long stagnation of the '90s might have been avoided.

8 Conclusions

Is the US economy heading towards stagnation? Should monetary policy take a different stance as the housing frenzy comes to a sudden halt? Japanese banks' capacity to lend during the bubble economy period was much more sensitive to asset prices fluctuations when compared to today's US banking system. The increase in default rates in the sub-prime mortgage market of the late 2006 and early 2007 is not going to affect the banking system, the Federal Reserve holds. Moreover, US banks and their regulators have focused intently on evaluating risk after the collapse of many banks in New England and the Southwest in the 1980s.

US monetary policy is today much more concerned with forestalling an investor panic in asset prices, and the housing market seems to have tapered off and stabilized in the second half of 2006. Homeowners, in other words, do not seem prone to abandon en masse their investment in the housing market until most of their unrealized profits disappear. For once, economics' theory validates the current practice of central banking, and the real world economy seems to comply to the predictions of economic theory – Mr. Greenspan may have gotten it right, and Mr. Bernanke may

be getting it right once again. 

Endnotes

¹ The organization of the paper follows closely, and comments on, the work by Bernanke and Gertler (1999), which provides a comprehensive setup for the analysis of asset price fluctuations and monetary policy.

² We term the expectation of a variable 'rational' when it is formed exploiting all the available information, and is consistent with the working of the economy.

Bibliography

- Allen, F. and Gale, D., (1999), "Bubbles, crises and policy", *Oxford Review of Economic Policy* 15(3): 9-18.
- -, (2000), "Bubbles and crises", *Economic Journal* 110(460): 236-55.
- Baker, Dean, (2006), "The menace of an unchecked price bubble", *Economists' Voice*, March.
- Bernanke, B. and Gertler, M., (1999), "Monetary policy and asset price volatility", *Federal Reserve Bank of Kansas City Economic Review* 84(4): 17-51.
- Bernanke, B., Gertler, M. and Gilchrist, S., (1998), "The financial accelerator in a quantitative business cycle framework", *NBER Working Paper* 6455.
- Black, F., (1993), "Noise", in Thaler, Richard H., ed., *Advances in behavioral finance*, New York: Russell Sage Foundation
- Blanchard, Olivier, and Fischer, Stanley, (1988), *Lectures on Macroeconomics*, MIT Press.
- Browne, Lynn, (1999), "U.S. Economic Performance: Good Fortune, Bubble, or New Era?", *Federal Reserve Bank*

of Boston New England Economic Review May-June 1999: 3-20

- Cogley, T., (1999), "Should the Fed Take Deliberate Steps to Deflate Asset Price Bubbles?", *Federal Reserve Bank of San Francisco Economic Review* 0(1): 42-52.
- Frankel, J. and Froot, K., (1992), "Using Survey Data to Test Standard Propositions Regarding Exchange Rate Expectations", in MacDonald, Ronald and Taylor, Mark P., eds. *Exchange rate economics*. Volume 2. *International Library of Critical Writings in Economics*, vol. 16, Aldershot, U.K.: Elgar.
- Giammarino, R., (1998), "Central Bank policy, inflation and asset prices", in *Information in Financial Asset Prices*, Proceedings of a conference held by the Bank of Canada, May 1998.
- Kaminsky, G. and Reinhart, C., (1998), "Financial Crises in Asia and Latin America: Then and Now", *American Economic Review* 88(2): 444-48.
- Kiyotaki, Nobuhiro and Moore, John, (1997), "Credit Cycles," *Journal of Political Economy* 105(2): 211-48.
- Ludvigson, S. and Steindel, C., (1999), "How Important Is the Stock Market Effect on Consumption?", *Federal Reserve Bank of New York Economic Policy Review* 5(2): 29-51
- Poterba, J. and Samwick, A., (1995), "Stock Ownership Patterns, Stock Market Fluctuations, and Consumption", *Brookings Papers on Economic Activity* 0(2): 295-357.
- Shiller, R., (2000), "The Stock Market and Investment in the New Economy: Some Tangible Facts and Intangible Fictions", *Brookings Papers on Economic Activity* 0(1): 115-120.

THE INDIA ECONOMY REVIEW 2007

Volume 4 | Quarterly Issue: 30th September 2007

www.iipmthinktank.com
www.gidf.org

INDIA'S POLICY DEFICIT: PLANNING FOR CHANGE

- RETHINK
- EDIFY
- DELINEATE



INSIDE THIS ISSUE

- ▶ Policy Prelusion(s)
- ▶ Breaking Barriers...
- ▶ Ideas For India
- ▶ It's The Policy, Stupid...
- ▶ Open World
- ▶ Planning India
- ▶ Principle Speak

AN IIPM THINK TANK

GREAT INDIAN DREAM FOUNDATION PRESENTATION