Bubbles, Liquidity traps, and Monetary Policy. Comments on Jinushi et al, and on Bernanke.

Olivier Blanchard

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Monetary policy has been rather boring in most OECD countries since the mid 1980s. This is largely the price of (earlier) success: Inflation started low, fluctuations in demand were limited, and steady–as–you–go policy turned out to be all that was required. Not so in Japan, where the central bank has had to confront two of the toughest issues of monetary policy: how to react to asset bubbles and their aftermath, and, more recently, what to do when interest rates have already been reduced to zero. The paper by Jinushi et al, which focuses on the past, forces us to revisit the first issue. The paper by Bernanke, which focuses on current policy, forces us to think about the second. Let me take each one in turn.

1 Bubbles and monetary policy

How monetary policy should react to bubbles is clearly of more than historical interest. We now have one and a half experiments, the Japanese one, and the U.S. one on the way up. What remains to be played out is the U.S. one on the way down. It is an understatement that this may not be a bad time to assess the lessons from the Japanese full experiment.

Let me start by making the world much simpler than it is. Assume the central bank *knows* that there is a bubble in the stock market, that the price of stocks exceeds fundamentals. In other words, ignore the fact—a

fact painfully clear in current discussions of the U.S. stock market—that, no matter what the level of the stock market, things are never that clear, at least ex-ante. (Ex-post, I do not know of an economist who argues that the stock market increase in Japan in the late 1980s reflected fundamentals.) I shall return to this issue later. Assume also that bubbles eventually come to an end, and prices return to fundamentals, often abruptly.

The question is then: What should the central bank do? Let me go at it, step by step.

In an important and influential paper, Ben Bernanke and Mark Gertler made the following argument: If the central bank is conducting the right monetary policy, then the existence of a bubble should not lead it to change the way it conducts policy. More specifically, they argued, if monetary policy is aimed at inflation targeting, such a policy will deliver the best outcome, bubble or no bubble.

The intuition underlying their argument is simple and powerful—and, indeed, reflects the attractiveness of inflation targeting as a monetary policy rule: Maintaining inflation, current and expected, at a constant level, is in effect the same as maintaining output at its natural level. So, if the bubble leads to an increase in demand, and this in turn leads to an increase in output above its natural level, inflation will increase, leading the central bank to tighten—exactly what it should do under the circumstances. If instead, the bubble leaves demand unaffected, then monetary policy will be unchanged—again, exactly what it should be under the circumstances.

This is an attractive answer. It is surely an attractive answer from the viewpoint of the central bank: Having to respond to bubbles is likely to be unpopular with financial investors. Much better to be able to say that the central bank only concentrates on inflation. It may also be the best first pass answer: One can think of many worse policies, including perhaps that pursued in Japan in the late 1980s (again, more on this below). Yet, it may not be the best answer, for at least two reasons:

- The first is *composition effects*.

  Suppose that the bubble affects some components of spending more than others. To be more concrete, suppose that the bubble leads to an increase in investment in publicly held firms, relative to the rest of aggregate spending. Is this a reasonable assumption? I think so. Let me elaborate a bit.

  The question of what firms should do when they perceive that their stock is overvalued is a difficult one. (See Blanchard et al. [1993] for a discussion and some empirical evidence.) One answer is that firms should issue shares and use the proceeds not for capital accumulation (which drives down the marginal profit rate) but rather to buy assets like government bonds. However such behavior by firms is likely to put the financial investors on edge, and prick the bubble. So, firms may well increase investment beyond what is justified by fundamentals when there is a bubble. The empirical evidence suggests that this is indeed what typically happens.

  This is only half of the argument. Even if investment goes up, consumption may go up as well. Consumers' wealth is higher, and it is reasonable for consumers to want to increase consumption. As I read it, the evidence is that the increase in the stock market in the U.S. in the 1990s has indeed boosted consumption given income, but not quite by as much as traditional estimates of wealth effects might have suggested.

  So let me proceed on the assumption that investment is more affected by the bubble than the rest of spending. Indeed, for simplicity, let me assume that only investment is directly affected by the bubble. And, to remove the ambiguity always present in words, let me use (very simple) algebra here. Let the equilibrium condition in the goods market be given by:

$$y = i(r, b) + c(r)$$

The right hand side gives the demand for goods, which is the sum of investment i, itself a function of the interest rate, r, and the bubble, b, and non investment (everything else, but call it consumption for simplicity), c, which is only a function of the interest rate r. It would change nothing but also add nothing to include output as a determinant of both i and c. The left hand side is output. The equilibrium condition is that output equals demand.

In response to the bubble, the central bank can then pursue one of two policies (or a policy in between).

It can target inflation, or equivalently, try to achieve constant output, constant y, by increasing the interest rate in face of the bubble. But such a policy clearly comes with a change in the composition of output. Output, y, may be constant. But investment, i, is higher, and, by implication consumption, c is lower. In other words, on the way up, the bubble leads to excessive capital accumulation.

It can instead target investment, make sure that there is no excessive capital accumulation. This implies increasing the interest rate so i, not y, remains constant. This policy is clearly more aggressive than the first, and generates a recession: Investment is the same, but, because of high interest rates, consumption is lower, and so are demand and output.

Which strategy should the central bank pursue? The first strategy is the one recommended by Bernanke and Gertler. It keeps output stable as the bubble grows. But it may imply a very unpleasant aftermath once the bubble has crashed: A lot of useless capital, serious collateral problems for firms, and thus a potentially low natural level of output

(the higher capital stock, and the collateral problems work in opposite directions here), for some time after the crash. (A very nice discussion of what may happen in general, and of what happened in Japan after the crash is given by Flemming [1999].) The second strategy avoids this problem. But it does so at the expense of tighter monetary policy and thus lower output as the bubble grows.

Admittedly, the choice facing the central bank is not pleasant. But this is not the point. The point is that the right strategy is likely to be somewhere in between the two pure strategies, i.e. to tighten money more in the presence of a bubble than is implied by inflation targeting.

- The reason why the central bank faces an unpleasant choice is a very standard one: It has one instrument, namely r, in the presence of two targets, y and i. This characterization of the choice may be too stark, for at least two reasons:

  First, there is at least one other instrument at the government's disposal, fiscal policy. Together, loose fiscal and tight money can achieve the desired outcome. The need for the combined use of the two instruments is a recurrent theme in macro textbooks, even if it has taken a back seat in current policy discussions.

  Second, the discussion takes as given that the bubble b has a life of its own, independent of the stance of monetary policy. But this is surely wrong. Bubbles, by definition, are not based on fundamentals, but on animal spirits. And there are good reasons to believe that the stance of monetary policy can excite or dampen these spirits.

  If Alan Greenspan stated that a reasonable level for the Dow Jones was 8,000, and that he was willing to move the interest rate so as to get there, few of us doubt the stock market would tumble down

> even in the absence of any change in the interest rate. (This is not a recommendation to the Fed, for reasons to be discussed below...)
>
> This suggests that he announcement of a policy that bubbles will be dealt with harshly might prevent the emergence of such bubbles in the first place. If this were truly the case, then the central bank, by announcing a differential response to inflation and to bubbles, could achieve both of its goals: an output level equal to the natural level, and no bubble and, by implication, no distortion. This is surely too optimistic a view. But it suggests that announcing that monetary policy will react to bubbles may have substantial benefits and few costs.

It is important to note at this point that the two arguments I have presented are not about "pricking bubbles", but about preventing their emergence. An analogy to inflation and inflation targeting is relevant here. Reducing inflation when it is high is difficult and painful. This is not what inflation targeting is about: inflation targeting is a way of avoiding high inflation in the first place. Similarly, pricking a large bubble is difficult—and surely much more uncertain than reducing inflation. This is why announcing today that the right value for the Dow Jones is 8,000 would be a highly dangerous move. Just as for inflation, this is not what is proposed here. What is proposed is a policy designed, if not to prevent bubbles, at least to prevent them from becoming too big.

This last argument however takes us back to the initial assumption, the assumption that bubbles are easily identifiable. In fact, bubbles are hard to identify, even when they have gone on for a while and appear very large. This is a fortiori true when they are younger and smaller. So, how does the advice above translate in a world in which the central bank never knows for sure whether it is fundamentals or non fundamentals at work? Quite simply, I think it translates into an additional term in the Taylor rule.

Write the standard Taylor rule as:

$$(r - r_n) = a_\pi(\pi - \pi^*) + a_y(y - y^*)$$

where r is the real interest rate, and r_n is the natural interest rate (the rate of interest consistent with output being at the natural level), π and π^* are actual and target inflation, y and y^* are the actual and natural levels of output. The discussion above suggests introducing an additional term $a(P/E) - (P/E)^*$, namely the deviation of the price earnings ratio from what can be called the natural price-earnings ratio, based on expectations about the growth of earnings and the required rate of return on equity. Other things equal, if the P/E ratio is too high, the central bank should increase the real interest rate; if it is too low, the central bank should decrease the real interest rate.

One natural objection at this point is that the central bank knows little about the "natural P/E ratio". The point is well taken, but it applies to at least two other components of the Taylor rule: How much does the central bank know about the natural interest rate, and about the natural level of output? The issue of having to know the right natural interest rate is typically finessed by replacing r_n by a constant in the specification of the rule. But this is not satisfactory. A rule which aimed at the wrong natural rate could be very bad for the economy in the long run. And, in Europe or in Japan today, reasonable estimates of the natural level of output cover a wide range of output values. In other words, constructing an estimate of P/E^* based on the long run warranted rate of growth of earnings and an estimate of the required rate of return on stocks is no different from constructing estimates of r_n^* or y^*. In this sense, the subliminal message sent by the apparent simplicity of the Taylor rule is misleading: Monetary policy is not so easy.

In much of this discussion, I obviously had the current stock market

boom in the United States in mind. But, based on the discussion, let me now return to Japan. Here, the paper by Jinushi et al delivers a clear message, and one which I very much believe. The arguments I have developed imply that monetary policy should have been tighter than implied by inflation targeting on the upside of the bubble, more expansionary on the down side. The evidence is that the opposite happened. Jinushi et al show that there was a "delay in restraint" in 1987-88, and "insufficient restraint" in 1990, and then "delay in easing" from 1992-95. (This confirms the empirical results in Bernanke and Gertler.) This will not come as a great surprise: Japanese monetary policy made the bubble and its aftermath worse than they could have been. Unfortunately, one cannot rule out that the outcome will turn out to be very different in the United States.

2 Liquidity traps and Monetary Policy

Turning to current Japanese monetary policy, I find myself very much in agreement with the arguments presented by Ben Bernanke in his paper for this issue. Even at zero short term interest rates, there is plenty that monetary policy can and should do. Let me develop four points in turn.

- One of the major macroeconomic issues in Japan is how much of the poor performance in the 1990s is due to a decrease in the natural level of output (due to the poor state of financial intermediation, and so on), and how much to a deviation of output below this natural level.

  I fully agree with Bernanke that the old method of looking at what is happening at inflation is still the right way to proceed, at least as a first pass. The Phillips curve wisdom remains largely true in modern treatments of the determination of prices, wages, and output: If output is above its natural level, then we are likely to see inflation to increase. If it is below, inflation is likely to decrease. As inflation is

slowly decreasing today in Japan, this strongly suggests that output is below its natural level.

One caveat is in order here. Part of the lore of macroeconomics is the story of how the increase in inflation in the 1970s changed the Phillips curve relation from one between the unemployment rate (or equivalently, and more relevant in the case of Japan, the output gap) and the level of the inflation rate to one between the unemployment rate and the change in the inflation rate. In Japan and elsewhere, we may now be seeing the same process in reverse. Low and fairly stable inflation may well be shifting the way people form expectations of inflation, and shifting the relation back to a relation between the output gap and the level of the inflation rate. Put another way, low inflation rather than declining inflation may in the current context be the signal that output is too low.

- I also fully agree with the point first made by Krugman, and developed by Bernanke, that, even with zero nominal interest rates, monetary policy can still affect long real rates, and thus aggregate demand and output.

  Let me use a bit of algebra here. If we look at an economy in which nominal rates are approximately equal to zero, the expectations hypothesis implies that the T–year nominal interest rate (yield to maturity on a T–period coupon bond) is approximately equal to the unweighted average of current and future one-year rates:

$$i_T \approx \frac{1}{T}[\sum_{1}^{T} i_{1t}^{e}]$$

  where i_T is the T–year nominal rate, and i_1 is the one-year nominal rate. By implication, the T-year real interest rate, r_T is given by:

$$r_T \approx \frac{1}{T}[\sum_{1}^{T} i^e_{1t} - (\log P^e_T - \log P_0)]$$

where P_0 is the price level today, and P^e_T the price level expected T years from now. This relation implies that, for a given sequence of expected nominal interest rates, an increase in P^e_T translates $1/T$ for 1 in a decrease in the long real rate today.

So suppose the central bank wants to decrease the 10–year real rate by, say, 200 basis points. All which is needed is that it convinces markets that the price level 10 years from now will be higher by 20%. Equivalently—if we take for granted that, eventually, changes in money translate into proportional changes in the price level—all which is needed is it convinces markets that money growth will be cumulatively higher over the next 10 years by 20%.

How does it achieve this change in expectations? In this context, many economists have advocated the use of inflation targeting by the Bank of Japan. If initial expectations are that inflation is likely to run at 0% on average for the foreseable future, the announcement that the Japanese central bank is targeting an inflation rate of 2% a year for the next 10 years should in principle be enough to decrease the long real rate today by 2%. In practice however, financial markets tend to believe deeds more than words. Thus, an alternative strategy may be to increase the stock of high powered money today by, say, 20%, and commit not to reverse the increase in the future. Given the initial increase, the commitment not to reverse may be more credible than just an inflation target.

This use of monetary policy has often been presented as rather exotic, perhaps too exotic to be relied on. Paul Krugman's presentation of the case as the need for the Bank of Japan to engineer more inflation, while

conceptually right, may have been counterproductive here. In fact, this use of monetary policy is far from exotic. Indeed, one can argue that monetary policy works mostly—entirely?—through its effects on expectations.

If, when the federal funds rate changed in the United States, financial markets did not expect this change to last for some time, the change would barely affect the term structure of interest rates. It is only because financial markets expect the change in the federal funds rate to last for some time—or even, as is typically the case these days in the United States, to signal further changes to come—that the term structure is so strongly affected by monetary policy. Expectations are crucial. The only thing which is specific to Japan today is that the emphasis is not on changes in future expected nominal interest rates, but on the expected future price level. This is not an essential difference.

- A very similar argument applies to the effect of monetary policy on the current nominal, and by implication on the current real exchange rate.

  Again, let me start with some basic algebra. Assuming the interest parity condition holds, and solving it forward gives:

$$e = [\frac{(1+i_T^*)^T}{(1+i_T)^T}]e_T^e$$

  where i_T is the T–period domestic nominal interest rate, i_T^* is the T–period foreign nominal interest rate, e is the nominal exchange rate, and e_T^e is the nominal exchange rate expected to prevail T years from now. The nominal exchange rate today depends on the T–year domestic and foreign rates, and the nominal exchange rate expected 10 years from now.

Much of the focus has been on the implied relation between domestic nominal interest rates and the nominal exchange rate. The traditional way to engineer a depreciation and thus to increase demand and output is to decrease the domestic interest rate, leading to an increase in e, and thus to a depreciation today. This is the channel that is not available to Japan at this stage: It has decreased i_T roughly as far it can go.

This does not mean that monetary policy cannot affect the exchange rate. To see why, one needs to shift the focus to the relation between the exchange rate today and the exchange rate expected T years from now. Note the implication of the above relation: Given domestic and foreign interest rates, a change of x% in the expected exchange rate T years from now will be reflected, no matter what the path of interest rates, and no matter what T is, in a change of x% of the nominal exchange rate today.

If we believe that relative PPP holds in the long run, i.e. if we believe that, for T large enough, the nominal exchange rate eventually reflects changes in the price level, then all the central bank has to do is to convince markets that the price level will be higher than they anticipated. If it can convince markets that the price level 10 years from now will be 20% higher than they expected, then the yen will depreciate today by 20%. How does it do that? This leads us back to the previous discussion, and to the same answer: This is probably best achieved through a combination of inflation targeting and a current large increase in the stock of high powered money.

There is one interesting difference between the long real rate and the exchange rate channels however. In an economy without indexed bonds, the decrease in real interest rates will not be directly visible. But the decrease in the nominal exchange rate will. This will allow

both the central bank and financial markets to assess the credibility of the new policy, and help them in assessing the future.

- One last point. I have a much less positive view of measures aimed at changing relative interest rates (say, rates on corporate bonds relative to government bonds) through changes in their relative supply. If done through open market operations, where the central bank buys, say, commercial paper rather than government bonds, the amounts are likely to be much too small to make any significant difference. The ratio of high powered money to GDP in Japan is around 12%. Thus even a change of 20% of high powered money represents a change equal to only 2.4% of GDP. With a ratio of government bonds to GDP ratio approaching 100% in Japan, whether the increase in money is used to buy short or long term government bonds is unlikely to make much difference to their relative equilibrium rates of return. To make a difference would imply either letting the central bank be very long in some securities and very short in others, or letting the money supply change by truly enormous magnitudes. Such a policy is neither desirable nor necessary.

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