Mr Meyer discusses the new challenges for monetary policy identified at the Jackson Hole conference

Remarks by Mr Laurence H Meyer, Member of the Board of Governors of the US Federal Reserve System, before the Department of Finance Lecture Series, University of Missouri, Columbia, Missouri on 12 October 1999.

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Each year in late August, for the last 23 years, the Federal Reserve Bank of Kansas City has hosted a conference where central bankers from around the world tackle issues relevant to the setting and implementation of monetary policy. They are joined by academics, former Federal Reserve governors, and private-sector economists. A core group returns every year and contributes a particularly strong sense of camaraderie.

The lure of the conference is the extraordinary combination of an excellent choice of topics, a high level of formal presentations and discussions, the opportunity to engage in a series of more informal conversations over coffee, at meals, and on hikes, and to do all this in the shadow of the Tetons. I told Tom Hoenig, the President of the Kansas City Fed, that when I was considering whether or not to accept the nomination to join the Board of Governors, the deciding factor was the prospect that, by doing so, I would receive a lifetime perk of an invitation to the Jackson Hole Conference.

The themes are always interesting, but I found this year's conference particularly stimulating – so much so that I decided to use the presentations and discussions at Jackson Hole as the organizing framework for today's lecture.

The title of this year's conference was "New Challenges for Monetary Policy." The papers described both the emerging consensus about the objectives and strategies underlying the conduct of monetary policy and highlighted a number of new challenges.

In the first section of today's lecture I will outline the framework and identify the objectives of monetary policy, describe the operational procedures used to conduct monetary policy, and discuss the strategy for carrying out monetary policy to achieve those objectives. A number of participants at the conference suggested that there was an emerging consensus about the appropriate strategy – specifically, flexible inflation targeting.

Then I will turn to the new challenges for monetary policy identified at the conference. Each is illustrated by current or recent experience around the world. First, does a low-inflation environment – and specifically the possibility that nominal interest rates might decline to zero in such an environment – constrain the effectiveness of monetary policy, and if so, how can monetary policy adjust to maintain its effectiveness? Second, how should monetary policy respond to movements in asset prices in general and, specifically, to the possibility of asset-market bubbles? Third, what is the best option for exchange rate and monetary policy regimes for small open emerging market countries, in light of increased globalization and especially larger and more volatile international capital flows?

The basic theme of the conference was that flexible inflation targeting provides a constructive response to each of these challenges. Careful design and implementation of the framework, including the choice of an inflation target, would, for example, reduce the prospect that monetary policy might lose its ability to stimulate the economy further because nominal short-term interest rates had fallen to zero. Similarly, following such a disciplined monetary policy would mitigate, though not entirely eliminate, the effect of asset bubbles. Finally, countries that move to a flexible exchange rate regime – as many have done recently – need to put in place a disciplined monetary framework such as is offered by this approach.

I. The monetary policy framework

Let me start this discussion by identifying what the objectives of monetary policy are, and should be, and then discuss what strategies are useful in achieving the objectives.

A. Objectives of monetary policy

One of the themes of the conference was that there is an emerging consensus about the objectives of monetary policy, one that has been reflected in the conduct of monetary policy in many countries for some time and now is finding its way into the rhetoric of policymakers.

I would describe the consensus as an acceptance of a dual mandate for monetary policy. Monetary policy seeks first to achieve and maintain price stability over the longer run and, second, to retain the flexibility to dampen cyclical fluctuations in the economy around full employment. That is, I suspect, a sharper statement than many (and indeed most) central banks today feel comfortable with. At the conference, the consensus was described as "flexible inflation targeting."

Most central banks want to emphasize, with good reason, their price stability objective. This reflects a couple of strongly held views. First, monetary policy, in the long run, principally affects nominal variables such as nominal income, the price level, and the rate of inflation, but has lesser effects on real variables – such as the level of employment or the level or growth rate of output. I expect all central bankers would agree that an environment of price stability offers the best contribution that monetary policy can make to the level and growth of output because it eliminates distortions to resource allocation and disincentives to saving and investment associated with high and variable inflation rates. It follows that a more accommodative monetary policy cannot foster a higher average rate of real growth. The second strongly held view is that because monetary policy is the principal determinant of the inflation rate in the long run, central banks have a responsibility to set an appropriate target for long-run inflation and achieve it. And that target should be price stability or, at the least, a low rate of inflation.

While monetary policy cannot raise the level or rate of growth of output over the long run through any means other than maintaining price stability, it is widely, though not universally, accepted that monetary policy can affect the level and growth rate of output in the short run and, perhaps, therefore contribute to smoothing out fluctuations in the economy around full employment. This is sometimes referred to as the short-run stabilization objective for monetary policy. A central issue for monetary policy is how to balance the dual objectives of price stability and output stabilization and how explicit to be about the commitment to these dual objectives.

Both theoretical and, especially, empirical macroeconomics have established the existence of an inescapable trade-off affecting the conduct of monetary policy. The trade-off is between the variability of inflation around its target (zero or some low rate) and the variability of output around its target (the full-employment level of output or potential output).

Autonomous increases or decreases in aggregate spending push output and inflation in the same direction relative to their targets and, therefore, do not bring this trade-off into play. But supply shocks – such as increases or decreases in oil or food prices – drive output and inflation in opposite directions relative to their respective targets. The more quickly monetary policy reacts to restore inflation to its target following a supply shock, the greater will be the variability in output relative to its target.

The reason for this trade-off is that monetary policy affects inflation primarily through its initial effect on the amount of slack in the economy. Tightening monetary policy slows spending growth, opens up some slack temporarily in labor and product markets, and allows the slack to reduce inflation. Once inflation has returned to its target, policy can guide the economy back to full employment. It probably takes a certain amount of slack over time to reduce inflation by a given amount, but reducing inflation rapidly means opening up an especially large output gap for a short period – hence the trade-off between inflation and output stability.

Several countries have moved to inflation-targeting regimes over the last decade or so, setting a numerical target for inflation. This was generally part of a process of shifting responsibility for

monetary policy from finance ministries to independent central banks and often followed a period of poor macroeconomic performance, especially high and variable inflation. The newly independent central banks often identified inflation as the singular objective of monetary policy to gain credibility and facilitate the transition to price stability. In addition, the government wanted to ensure accountability of the central bank and hence often opted for a narrow and explicit objective. With price stability now largely accomplished, some of these central banks are becoming more flexible in their approaches to monetary policy by recognizing a role for short-run stabilization.

B. How explicit should the objectives be?

In the United States, Congress has set the objectives for monetary policy in the Federal Reserve Act, as amended in 1977. The objectives are maximum employment and stable prices, which are mutually consistent and achievable if maximum employment is interpreted as the maximum employment sustainable without rising or falling inflation. This is an explicit expression of a dual mandate.

Inflation-targeting countries typically have goals of about 2% to 2½% for inflation and sometimes establish a range for inflation, for example, 1% to 3%. New Zealand, Canada, Australia, and the United Kingdom are examples of countries with explicit numerical targets, and there are many others. It was widely agreed at Jackson Hole that the United States has, without an explicit target, achieved the same success in reducing inflation as countries with explicit numerical targets. I will not be considering the pros and cons of an explicit numerical target for inflation today, although I recognize this is an important question and one that warrants further discussion.

C. How should policy be conducted to achieve the objectives?

Once the objectives of policy are set, a central bank must choose an operating regime and then develop a strategy for using its instruments to achieve the objectives.

Virtually all central banks carry out monetary policy operations by influencing – in effect setting – some short-term nominal interest rate, typically the rate on overnight inter-bank loans. The FOMC at each meeting sets a target for the federal funds rate and instructs the Manager of the Open Market Desk to achieve that target over the intermeeting period by buying or selling securities. By adjusting this single rate, the Federal Reserve affects the broader array of interest rates and asset prices in the economy and, in turn, affects aggregate demand, the level of real economic activity, and inflation.

There are two ways of describing the strategy for monetary policy. One focuses on "instrument rules," which describe how the policy instrument – in this case a short-term interest rate – should be moved in response to economic developments. Such a rule was designed by Professor John Taylor of Stanford University. The Taylor Rule describes how the federal funds rate should be adjusted in response to movements in output relative to its long-run sustainable level and to movements in inflation relative to its target. The Taylor Rule thus explicitly embodies the dual objectives of monetary policy and is a form of flexible inflation targeting.

In practice, no one expects monetary policy to be conducted according to a rigid rule. Such rules can, however, be useful in informing policy decisions and helping policymakers calibrate their responses to changes in utilization and inflation rates. Moreover, research on how such rules affect the quality of macroeconomic performance can aid policymakers in arriving at their decisions.

A second strategy is to move the instrument in response to the inflation forecast. In this approach, the policymakers start with a forecast of inflation over some interval, typically about two years. Policy is then set over this interval to achieve the price stability target by the end of the period. The interval chosen to reach the inflation target takes into account the fact that the more rapid the return to the target, the greater the variability in output relative to its target. The time interval is thus a vehicle for allowing policymakers to damp movements in output around full employment and at the same time ensure that the inflation objective is eventually achieved.

Inflation forecast targeting has the advantage of being explicitly forward-looking. The Taylor Rule, in contrast, appears to be backward-looking, though the contrast is not as clear in practice as it might

appear. Forecasts are exercises in processing information about current and past developments to yield anticipated future outcomes. The Taylor Rule takes explicit account of only very recent observations on inflation and output, but these are, to be sure, important determinants of future inflation. An inflation forecast approach allows policymakers to consider a wider range of current and past information in projecting future outcomes.

D. Setting the inflation target

Setting the inflation target to be consistent with price stability sounds straightforward, but an important theme at this summer's conference was the variety of options and implications of this choice. The obvious choice would be a target of zero for inflation, taking into account biases in published price measures. But an intriguing alternative is to set a target for the price level. If a disturbance results in a period of inflation, under a zero inflation target, the objective is to return to a zero inflation rate. When inflation has been returned to zero, however, the price level will be higher than it was before the disturbance. Under a constant price level target, the aim is to return to the initial price level, requiring a period of deflation to offset the effect of the period of higher inflation. This can produce a more predictable price level in the long run, but many analysts are concerned about how the economy would respond to a period of deflation.

Yet another alternative is to target a low positive inflation rate – specifically an inflation rate somewhat above a level that reflected estimates of the bias in published measures. One of the issues I will discuss shortly is whether targeting a low, positive rate of "true" inflation (what I call price stability plus cushion) might result in better cyclical performance of the economy than a zero inflation target.

Still another choice is an average inflation target. If the target was 2% and inflation temporarily moved to 3%, an average inflation target policy would encourage a decline in the inflation rate to below 2% for a while, moving the average back to 2%. This allows for a predictable (albeit rising) long-run price level, while avoiding the deflationary episodes that would occasionally be called for under a constant price level target.

II. Monetary policy in a low-inflation environment

I turn now to the challenges associated with the conduct of monetary policy in a low-inflation environment. The issue here is whether, at very low inflation rates, the cyclical performance of the economy would deteriorate. If this were the case, the objectives or strategy of monetary policy would need to be adjusted. Among the possible responses is adjusting the definition of the inflation target, so I will be building on the preceding discussion.

A. Keynes' liquidity trap and the zero nominal bound problem

John Maynard Keynes, in his classic work, *The General Theory of Employment, Interest and Money*, warned that monetary policy might become ineffective once interest rates fell to some low level at which wealth owners might become indifferent as to whether they held money or bonds. In the language of economists, money and bonds might become perfect substitutes. In this case, it would be impossible for monetary policy to affect interest rates by affecting the composition of portfolios, specifically the amount of money held relative to bonds. Keynes called this situation a "liquidity trap." Since the end of the Great Depression, many have interpreted Keynes' liquidity trap to be a theoretical curiosity rather than a practical problem likely to confront policymakers. But with short-term rates now at zero in Japan and low inflation almost everywhere in the industrialized world, the problem is taken more seriously by central banks – to the point that it was one of the topics at Jackson Hole.

Keynes' views on the liquidity trap have, in my view, often been misunderstood. Keynes understood that central banks could push rates on short-term government debt to zero. The liquidity trap, as Keynes used the term, is better thought of as a term-structure trap or, more generally, a limit on how low long-term and private interest rates can go once the interest rate on short-term government debt is

pushed to zero. When short-term government rates reached zero, Keynes believed that there would still be positive interest rates on both longer-term government securities and private debt and that monetary policy then would be unable to push those rates any lower.

The conventional view is that the level of long-term rates is determined by current and expected short-term rates. Given that market participants are unlikely to expect that zero short-term rates will be sustained for 20 or 30 years, the maturity of long-term bonds, rates on long-term securities will remain positive when short-term rates reach zero. Stated somewhat differently, shocks that would otherwise lower short-term rates cannot do so at the zero bound, while shocks that would raise short-term rates still will do so. In addition, private rates differ from government rates by an amount that reflects the risk of default on private debt, assuming that government debt is viewed as being default free. Even if the rate on government debt reaches zero, therefore, private debt will still carry positive rates.

The liquidity trap is sometimes referred to as the problem of the zero bound on nominal interest rates. Nominal interest rates cannot be negative, because, in this case, everyone would want to hold cash. Consequently, an environment of very low inflation would constrain how low monetary policy could push real interest rates in response to a recession and, therefore, be associated with less-favorable cyclical performance of the economy. If inflation were 2%, for example, monetary policy, by driving the nominal interest rate to zero, could push real interest rates to minus 2%. If prices were stable, on the other hand, the limit on the real interest rate would be zero, and this limit might constrain the ability of monetary policy to offset downward shocks to the economy.

B. Nominal rigidities

Another long-standing explanation for why low inflation might result in a deterioration in macroeconomic performance is the possible existence of nominal wage rigidities – specifically, a reluctance to reduce nominal wages. Relative wage movements are important signals and incentives that guide labor resources to their most highly valued uses. When inflation is very low, achieving this variation in relative real wages depends on some wages falling. If nominal wage cuts are rare, efficiency in the allocation of resources may decline, and as a result, output might be lower at price stability than if there were some low rate of inflation. And in the absence of declines in nominal wages for some workers, average real wages will be higher, and hence average employment lower, at price stability. Although there is some evidence of downward nominal wage rigidity, there is no evidence that this has an effect on aggregate wage and price inflation or the natural rate of unemployment in the postwar period – even when inflation has been very low. In addition, it is not clear how much rigidity would remain if we achieved and sustained steady low inflation.

C. Japan's current experience

As I noted earlier, Japan presents a laboratory for observing an economy with low inflation. Japan enjoyed effective price stability through most of the 1980s. In the 1990s it was hit with a number of adverse shocks, from bursting asset bubbles and associated banking system problems early in the decade to the financial meltdown of its Asian trading partners in late 1997. In continuing its efforts to move the economy toward recovery, the Bank of Japan last February lowered short-term interest rates to almost zero. Although Japan registered surprisingly robust growth in the first half, most observers see private-sector demand as still quite weak despite the low short-term rates.

Nevertheless, that the Bank of Japan has apparently exhausted its ability to stimulate the economy through conventional policy. This raises two questions. How could monetary policymakers have avoided this predicament, and once they were in it were there unconventional forms of monetary policy that would have permitted them to provide additional stimulus to demand?

D. How to avoid the problem

At the Jackson Hole conference, Mervyn King and Lars Svensson argued that a flexible inflation-targeting regime would help policymakers avoid this problem in the first place. While King in particular had some doubts about the zero nominal interest rate bound and especially about the

existence of nominal rigidities, both he and Svensson noted that opting for a positive inflation rate as a target was a prudent way of avoiding testing either of these hypotheses. Indeed, they both noted that inflation-targeting central banks virtually always opt for inflation targets greater than zero and greater than estimates of the inflation bias in published measures of inflation. Recent research suggests that even a cushion of 1 percentage point (above an amount equal to the expected bias in inflation measures) can go a long way towards avoiding the problem of deteriorating cyclical performance at low inflation rates.

The second key to avoiding this problem is to have a symmetrical inflation target. This means one that evokes an aggressive response to both falling below and to rising above the inflation target. One could take this further. Monetary policymakers can always choke-off inflation by raising real interest rates, because there is no limit to how high real interest rates can be pushed. There is a limit, however, to how low real interest rates can decline, given the zero nominal interest rate bound. Therefore, to the degree that any asymmetry is called for, it might be to move more quickly and more decisively with respect to downward than to upward disturbances to aggregate demand, at least when beginning from already low nominal interest rates. This allows policymakers to substitute speed for the magnitude of decline when responding to downside shocks.

A third possibility is that the zero nominal bound problem can be reduced or eliminated either by a credible price level target or by an average inflation target. If the price level falls in response to downside shocks, a price level target will imply that monetary policy will move more aggressively to stimulate the economy, once demand recovers and monetary policy has regained its effectiveness, than would have been the case with a traditional inflation target. This would ensure that a period of deflation will be followed by a corresponding period of inflation. Assuming bondholders take into account this more aggressive stimulus, bondholders will project that zero nominal short-term interest rates will be maintained longer than would otherwise be the case, justifying lower long-term interest rates today.

A similar result could be achieved by an average inflation target. If inflation was zero for a while, bondholders would project a period of inflation above the long-run inflation target – for example, 3% or 4% instead of 2% – until the average inflation rate returned to 2%. This would lead to expectations that short-term interest rates would remain low for a longer period and contribute to a decline in real long-term rates today.

E. What to do if nominal rates fall to zero?

If a target for price level, positive inflation rate, or average inflation rate had not been implemented and made credible before a central bank was confronted by zero nominal interest rates, the central bank could, of course, introduce them at that time. However, such a move might lack credibility. It might be seen as an emergency program that might not be sustained once the economy recovered and moved away from the zero nominal bound. Moreover, with prices falling and the economy in recession, one could imagine a good deal of skepticism about the ability of the central bank to meet its objective.

Paul Krugman has urged the Bank of Japan to move to a positive inflation target as a way of lowering real interest rates and stimulating the economy. The Bank of Japan has resisted, arguing that, given its inability to increase aggregate demand, there would be little credibility in setting a positive inflation target. Even if the Bank of Japan today cannot expect to stimulate demand and thereby raise inflation, they will almost surely have this opportunity well before today's long-term bonds mature. They could therefore commit today to maintaining a positive inflation rate when it becomes possible and thereby raise inflation expectations today and lower real interest rates. However, such a distant increase in inflation might not have much impact on the real cost of borrowing today, so I continue to be skeptical that initiating an inflation targeting approach, once confronted by the zero nominal bound, offers a reliable way out of the zero nominal bound problem.

A second approach would be to undertake unconventional monetary policy operations. Conventional monetary policy is implemented, as I described, by employing open market operations concentrated in repurchase agreements or in the short end of the government debt market. An alternative approach,

sometimes referred to as a monetization strategy, focuses on increasing the money supply rather than on the level of short-term interest rates. At Jackson Hole, Allan Meltzer offered a clear framework for the way such a policy direction might allow additional stimulus after conventional operations had lowered nominal short-term interest rates to zero.

In the typical model, money and bonds become perfect substitutes at some low interest rate, perhaps zero, and we have a liquidity trap where monetary policy loses its power to add further stimulus by lowering interest rates on bonds. Meltzer suggested this result reflects more the limits of the typical model than the limits on monetary policy. He suggested that in a more realistic model incorporating multiple assets – for example, long-term as well as short-term government bonds, private as well as government debt, and equities as well as bonds and money – there are two ways in which the economy can escape from the apparent liquidity trap. In an activist approach, monetary policy would increase the sum of the money supply and short-term government debt – the assets that have become perfect substitutes – by widening the scope of open market operations to include purchases of long-term government debt and perhaps private debt and foreign exchange. Such operations might lower interest rates on long-term and private securities and/or result in a depreciation of the currency, in all cases stimulating aggregate demand.

A more passive approach would allow deflation to raise the real value of the sum of money balances and short-term debt. This will be the outcome of deflation as long as the central bank does not let the nominal money supply decline as the price level falls. An increase in the real money supply would then result in increased purchases of a wide array of financial assets, including longer-term government bonds and private debt and perhaps even equities. The net result will be lower interest rates on long-term and private securities and higher values of equities that, in turn, will stimulate spending, over and above the stimulus that results from the wealth effect associated with increased real money balances.

This analysis raises an interesting set of questions about which reasonable people can disagree. Theory would seem to leave open the possibility that such wider operations might provide incremental stimulus, but I read the empirical evidence and historical experience as raising doubts about the effectiveness of such actions. Important questions relate to both the theoretical structure of asset demands and empirical evidence about portfolio behavior and asset markets. The issue of whether relative supply of short and long-term bonds affects the term structure of interest rates is crucial.

The most widely accepted theory of the term structure, called the pure expectations model, holds that long-term interest rates are a weighted average of current and expected future short-term rates. This approach leaves no room for relative supply effects and is consistent with the term structure trap that I have associated with Keynes. There is, however, a competing theoretical model, often referred to as the market segmentation approach, which allows for the effect of relative supplies. I have never given much weight to the role of relative supply effects in affecting the term structure or exchange rates, given the failure of empirical studies to find much evidence of such effects. Of course, at the extreme, the Bank of Japan could set the price and hence interest rate on long-term bonds if it was prepared to take all these assets onto its balance sheet. But such operations almost certainly blur the distinction between monetary and fiscal policies.

Another reason for skepticism is that the domestic channel through which monetary policy works in Japan operates very importantly through the banking system. The continuing banking sector problems suggest that this channel remains weak, if not inoperative. Specifically, if additional reserves were injected into the banking system, a larger share of them would likely be held as excess reserves rather than to be lent out. In this case, attention shifts to the effect of monetization on exchange rates and to the recommendation that the Bank of Japan raise the money supply by purchasing foreign currency, an operation sometimes referred to as unsterilized exchange rate intervention.

There is a case in which unsterilized intervention has a more powerful effect on exchange rates than sterilized intervention (where the central bank absorbs any reverses introduced as part of exchange rate intervention). But this incremental effect arises because unsterilized intervention is expected to lower the country's interest rates and the lower interest rates would, in turn, put downward pressure on the

country's exchange rate. If the interest rate channel does not operate because of a liquidity trap, this could raise questions about the effect of unsterilized foreign exchange intervention.

Even in this context, however, there may be some positive effects of unsterilized intervention. This operation, like open market operations conducted in long-term securities, is a way of raising the sum of money and short-term government securities. As portfolios are rebalanced, the increase in the money supply may result in purchases of long-term government securities, private securities, and foreign currency denominated assets. This could affect a range of interest rates and the exchange rate. Though once again there is a question about the degree to which relative supplies of assets have an important bearing on relative rates of return.

Moreover, such a strategy faces other obstacles. First, in Japan, foreign exchange operations are at the discretion of the Ministry of Finance. Therefore, implementing a monetization strategy in this way would appear to shift the decision about the timing and magnitude of monetary policy from the newly independent central bank back to the Ministry of Finance. Second, pursuing a stimulus program focused on yen depreciation might exacerbate tensions related to the already wide current account imbalances in Japan and the United States as well as possibly interfere with the recoveries under way among Japan's Asian trading partners.

So I remain skeptical that there is much leverage in the monetization approach. Nevertheless, if the Japanese economy fails to respond to the policies now in place, one could argue for some experimentation in this direction, given the absence of other options for monetary policy.

Finally, in cases of a nominal interest rate bound, fiscal policy could and should carry more of the stabilization burden, as has been the case in Japan recently.

III. Asset market bubbles and monetary policy

Let me move to the challenge of how monetary policy should respond to suspicions of asset market bubbles. An asset market bubble refers to an extended increase in the price of assets not justified by the fundamentals. Such movements might be associated with waves of optimism or pessimism that become self-perpetuating.

There is not a complete agreement as to the usefulness of the concept of asset bubbles. I do find it plausible that market prices might sometimes, and for some period, depart from values that are justified by fundamental forces. Over longer periods, markets will converge back to fundamental value. However, when large departures occur, there is potential for a sharp correction that, in turn, can have damaging consequences for the real economy. There are two asset markets that are of special importance. The first is the equity market and the second the market for real property – land and buildings.

The fundamental value of a stock is the present value of the expected earnings stream of the firm in question, derived by applying a discount factor that accounts for both the interest rate on safe assets and a risk factor appropriate to the uncertainties about the expected future earnings stream. The fundamentals underpinning the price of equities are therefore the expected increase in earnings and the discount rate that transforms expected earnings into a price for the asset. Equity prices could rise above their fundamental value if investors hold unrealistic expectations about earnings growth, if they assume that the earnings stream is more stable than it will turn out to be, or if they otherwise believe there is less risk associated with holding the equities than turns out to be the case. In these cases, reality will at some point disappoint relative to expectations and force a reappraisal of the value of equities. A similar process underlies the price of real property.

Monetary policy, as I emphasized earlier, focuses on price stability and damping fluctuations around full employment. Should it also focus on encouraging asset prices to return towards perceived fundamental value, if asset prices appear to depart significantly from policymakers' perception of that fundamental value? That is another question tackled at the Jackson Hole conference. It is one motivated by at least two recent experiences. First, the Japanese economy is often described today as suffering from a burst in an asset bubble. During the 1980s, the Japanese economy registered very

strong growth, low inflation, and soaring equity and property prices. In 1989, following a tightening of monetary policy, there was a sharp collapse in asset prices. Equity prices fell by 60% and urban land values by more than 75%.

In addition to direct effects via the decline in wealth on consumer spending, the collapse of asset prices had a devastating effect on the banking system. Real property dominates the collateral underlying many of the loans of most banking systems. A collapse in real property values, therefore, leaves most loans without adequate collateral support. In addition, in Japan, the banks hold considerable equities in their portfolios. Japanese banks therefore suffered a double blow in the collapse of equity and property prices. As a result, with the capital of the banking system severely depleted, banks had to restrict their lending, leading to a severe credit crunch that added to the forces depressing the Japanese economy.

The second experience hits closer to home. Many have viewed the surge in equity prices in the United States over the past four years as evidence of a bubble. *The Economist* magazine is a leading proponent of this view, and many others subscribe in varying degrees to this characterization. It is true that the rise in equity prices – averaging 25% to 30% a year over the last four years – is unprecedented and that current values challenge previous valuation standards. But one could argue that structural changes in the economy have raised the sustainable level and growth of earnings and lowered the volatility of earnings or otherwise reduced the perceived risk in equities. Such structural changes could, in principle, justify at least a substantial portion of the rise in equity prices. But the question at issue here is whether policymakers should substitute their judgment about fundamental value for the market's assessment and use monetary policy to encourage a convergence back to their own estimate of fundamental value.

The paper by Bernanke and Gertler at the Jackson Hole conference addressed this question. They used a methodology that has proved valuable in studying a number of other questions related to the strategy of monetary policy. They first construct a small model of the US economy and then subject this model to a series of disturbances that reflect the economy's historical experience. They observe the resulting variability of inflation and output relative to their respective targets. The base model includes a policy rule according to which short-term interest rates are adjusted in response to economic developments. Bernanke and Gertler examine whether an attempt by policymakers to return equity prices towards their estimate of fundamental value improves macroeconomic performance, judged in terms of inflation variability and output variability. Confidence in their conclusion is, of course, affected by how well one believes the model captures the performance of the economy. Nevertheless, their methodology is well designed and it is worth considering their conclusions.

They find that policymakers cannot improve the outcomes by responding directly to suspected deviations of equity prices from fundamentals, but that a policy focused on achieving price stability and damping fluctuations around full employment will mitigate the adverse consequences of equity market bubbles. That is, a monetary policy focused on price stability and output stabilization will respond to the effects of higher equity prices on aggregate demand, real economic activity, and inflation. This will generally dampen movements in equity prices, while contributing to meeting the broader macroeconomic objectives of monetary policy. However, given the difficulty in distinguishing between changes in asset prices dominated by fundamental forces and those driven by non-fundamental forces, policymakers should not target asset prices or try to guide them to the policymakers' estimate of fundamental value.

The discussion of the paper by Rudy Dornbusch and comments by Federal Reserve Chairman Alan Greenspan added an important additional theme related to monetary policy and equity prices. Dornbusch took note of the setting, pointing out that the two sides of the Teton Mountains are dramatically different. One side slopes downwards gradually and gracefully. The other side drops off quite precipitously. So it is with equity prices. On the way up, they typically move gradually. While they sometimes also move downward gradually, downward movements are occasionally steeper and more discontinuous than upward movements. Monetary policymakers sometimes face additional problems in the case of such steep declines in asset values. Credit markets may become extremely illiquid and even fail to operate for a period. It is not simply that interest rates on private securities

rise, but that virtually all buying and selling may temporarily cease. This can create extreme problems for those who rely on short-term financing and, in the extreme, the resulting financial distress can threaten the solvency of some financial institutions. In such situations, monetary policy typically intervenes to provide liquidity, until markets recover and begin to operate more normally.

Because of this, it is sometimes alleged that monetary policy stands ready to intervene to protect market prices in a downturn. Chairman Greenspan commented that markets are asymmetric, not monetary policy. He emphasized that monetary policy does not operate with a target for equity prices when they are falling any more than it does when equity prices are rising. In both cases, monetary policy responds only indirectly to equity prices, by taking equity prices into account in the assessment of aggregate demand. But monetary policy has to respond quickly to the special circumstances that accompany a collapse of asset values, specifically the extreme illiquidity and seizing up of credit markets. This occurred both in 1987 and, more recently, in the fall of 1998.

IV. Globalization and monetary policy: choosing exchange rate and monetary policy regimes

The world economy has become increasingly globalized over the last couple of decades, measured both by the flow of trade among countries and especially by the flow of international capital. An important challenge facing central banks around the world is how this globalization has affected their ability to pursue domestic objectives with monetary policy and, indeed, whether it is even possible to preserve an independent monetary policy.

The freedom to pursue an independent monetary policy will be determined, to an important degree, by the choice of exchange rate regime. A government that pegs its exchange rate to another country, for example, gives up its ability to pursue an independent monetary policy. Its interest rates must be set to support the fixed exchange rate and will generally move with the interest rate in the country to which it is pegged. Countries pegged to the dollar, in effect, are tied to the monetary policy pursued by the United States. Such regimes are particularly effective ways to make a transition from hyperinflation to the low inflation rate of the country to which the currency is pegged. For example, if the country has no history of an independent central bank successfully achieving low inflation, the country might be better off abandoning the attempt at independent monetary policy and buying into another country's monetary policy and inflation outcomes. This is precisely the decision made by Argentina, and it has contributed to maintaining low inflation, following the transition from hyperinflation that had been achieved just prior to its decision to fix its exchange rate to the dollar.

It follows that if a country wants to have an independent monetary policy, it must choose a flexible exchange rate regime and if it chooses a flexible exchange rate regime it must complement it with a disciplined monetary policy. Many countries pursuing this course have opted for flexible inflation targeting.

But, under any exchange rate regime, small open economies in general and emerging market economies in particular are challenged by volatile international capital flows. The challenge under an adjustable peg – a regime in which the exchange rate is fixed at any point in time but can be adjusted over time – is particularly severe. If investors believe that a currency is overvalued, they will engage in transactions – such as purchasing assets denominated in other currencies or selling short the domestic currency – that will pay off if the currency is devalued. These very transactions will make it difficult for the country to sustain its current exchange rate.

For a while, the country may sustain its current exchange rate by buying its currency with dollar reserves at the fixed exchange rate and raising its interest rates. But, depending on the size of capital flows, official reserves could be quickly depleted, forcing the country to abandon the peg altogether and float its currency. In addition, the higher interest rates used to defend the exchange rate may threaten a sharp decline in the economy and a collapse of the banking system. When this happens, currency values and equity prices often plunge below appropriate levels, with resulting adverse consequences to the real economy.

The conventional wisdom today is that small open economies face a choice of one of the extremes – either a flexible exchange rate regime complemented by a disciplined monetary policy or a very fixed exchange rate regime, characterized by a currency board or by adopting some other country's currency, as in dollarization.

A currency board is an arrangement whereby the domestic currency of a country is required to be fully backed by reserves held in some other country's currency, such as dollars. Hong Kong and Argentina have currency boards. If global investors attack such a currency, the use of official reserves to support the currency depletes reserves and requires a corresponding decline in the supply of the domestic currency. This automatically pushes up domestic interest rates to support the currency. The value of the currency board is that it puts domestic monetary policy on automatic pilot, and guarantees that policy will move aggressively to support the fixed exchange rate when it is under attack. The markets no longer have to worry about the willingness of the policy authorities to adjust interest rates aggressively enough to support the currency.

Dollarization – which I will use broadly to refer to the strategy of adopting some other country's currency – takes the currency board one step further. Under a currency board, the threat remains that the government will abandon this arrangement and devalue the currency or let it float. Dollarization increases the commitment of a country to a fixed exchange rate. Under dollarization, a country uses dollars for its domestic currency. It therefore faces dollar interest rates, although these rates will not necessarily be the same as those prevailing in the United States. Once again it has given up independent monetary policy. The advantage of this regime is that it might reduce risk premia that remain in domestic interest rates under a currency board that reflects the risk that the currency board might be abandoned. Of course, a country could reverse dollarization as well, but the costs of such a move would be very great.

At the Jackson Hole conference, Eichengreen and Hausmann presented a discussion of the choice between flexible and very fixed exchange rates for small open economies. They suggested that a problem that besets many such economies is that, because of weak institutions and a failure to pursue sound policies, neither the government nor private citizens can borrow long-term or abroad in their domestic currency. The result is dangerous portfolio mismatches – long-term projects are financed with short-term debt and/or domestic projects are financed with foreign currency loans. In either case, the government and private citizens are subjected to the risks of unexpected changes in short-term interest rates and/or to the risks of a change in exchange rates. A currency board or dollarization arrangement, in such a case, might reduce the risks associated with such mismatches. As a result, the country might be able to reduce its risk premium, lower its vulnerability, and increase its access to long-term and foreign finance.

In my view, the underlying problem, however, is often the mismatch between the speed with which an emerging market economy participates in the global economy and the speed with which its institutions and policies adapt to global norms. The best choice over time would appear to be to develop robust domestic institutions and pursue sound policies, including a disciplined monetary policy, and adopt a flexible exchange rate regime. An increased reliance on foreign direct investment relative to short-term portfolio capital might also be desirable. The real question is how to get there from where many emerging market economies find themselves today.

There are, I believe, many advantages to a flexible exchange rate regime. It avoids the problem of choosing the right level at which to fix the exchange rate. It allows exchange rates to move in response to shocks or structural trends, alleviating the need for other aspects of the economy – such as domestic demand or the level of wages and prices – to carry the burden of adjustment. Floating exchange rates also serve as indicators of investor confidence, providing feedback to policymakers as to whether they are pursuing appropriate policies. Floating and perhaps volatile exchange rates also remind both borrowers and lenders of the risks inherent in international finance and may militate against the development of bubbles and excessive capital flows. Finally, where the monetary authority is sufficiently credible and disciplined, floating exchange rates allow for independent and perhaps countercyclical monetary policy.

And, it is worth pointing out some of the downside risks associated with currency boards or dollarization. Either a currency board or dollarization requires a strong banking system because under these regimes governments lose their ability to print money and act as a lender of last resort. Many developing countries fail to meet this prerequisite. In addition, dollarization would not completely eliminate risk premia, because debt repayment problems are certainly possible in fully dollarized economies. So, an important issue is how much of the prevailing risk premia faced by small open emerging market economies is due to exchange rate risk and how much to other considerations. Finally, lower risk premiums could have the perverse effect of alleviating pressure on governments to pursue structural reforms that would lead to a more lasting improvement in the economy's performance.

On balance, I continue to lean towards flexible exchange rate regimes, but now better appreciate that there could be circumstances favorable to very fixed exchange rate regimes, including as a transition to flexible exchange rates, once the credibility of a country's economic policies and institutions is sufficiently developed.

V. What I learned from the Jackson Hole Conference

I have presented today a short course that might be called the "Jackson Hole Seminar." As any professor will tell you, the test of a seminar is what the students learn. But handing out a test would not be a pleasant way for a visitor to conclude his visit to your campus. So I will end with some comments on what I learned at Jackson Hole.

1. There is an emerging consensus towards flexible inflation targeting. Some central banks are more transparent about the dual objectives and some are more explicit about the inflation target, but there is a broad agreement about what the targets should be. There is somewhat less agreement about how monetary policy should be conducted to achieve the targets, but some convergence here as well.

2. While there are some intriguing new ideas about price level or average inflation targets, the consensus based on practice and recent performance around the world is that a low, but positive inflation target remains prudent. I refer to this target as price stability plus a cushion. The cushion mitigates the risk that monetary policy might lose its ability to provide further stimulus before it was able to adequately dampen the effect of downward shocks to the economy.

3. The conference offered a better understanding of how a monetization option might allow additional stimulus once monetary policy had pushed the nominal interest rate on short-term government debt to zero. But it did not offer much confidence, to me at least, that monetization is an effective way out of the current predicament in Japan or that initiating an inflation target, once having encountered this problem, would be effective.

4. The conference provided some support to the conventional wisdom – at least the conventional wisdom inside the Federal Reserve – about how monetary policy should or should not respond to suspected asset market bubbles.

5. The conference also provided a nicely balanced assessment of the choice between the extreme solutions for exchange rate regimes – that is, between flexible and very fixed exchange rate regimes. While the discussion clarified the problems and choices, it still left me still leaning towards flexible exchange rates.