

Japanese Monetary Policy: A Quantity Theory Perspective

Robert L. Hetzel

In the last half century, Japan has exercised an enormously beneficial influence on the world. After the end of World War II, it not only adopted democracy, but it also showed that non-Western countries could combine democracy with attainment of Western living standards. By embracing the use of Western technology and combining it with thrift and hard work, Japan modernized its economy and grew at double-digit rates for two decades in the 1950s and 1960s.

By the early 1970s, Japan took advantage of economies of scale in manufacturing and exported automobiles, steel, ships, and other manufactured goods to the world. By the early 1980s, it aggressively adopted new technology to create a range of electronic consumer goods for export, such as cameras and VCRs. At that point, Japan had also moved beyond importing innovative technology from the West to exporting its own innovations, such as just-in-time manufacturing techniques. More important, the range and quality of goods offered by Japanese firms forced Western companies to remain dynamic and competitive.

Over the post-World War II period, Japan has implemented a variety of monetary regimes. The world can learn valuable economic lessons from Japan by studying its monetary history. Japanese monetary policy divides naturally into two time periods separated by 1987. The first part includes the high inflation of the early 1970s and the establishment of price stability by the mid-1980s. The second part includes the boom-bust episode known as the bubble.¹

■ Robert.Hetzel@rich.frb.org. The author benefited from early discussions with Milton Friedman and Allen Meltzer. He especially benefited from the friendly fire of colleagues—Michael Dotsey, Roy Webb, and John Weinberg. The views in this article are solely those of the author and should not be attributed to the Federal Reserve Bank of Richmond, the Federal Reserve System, or any other individuals.

¹ This article uses a quantity theory framework. “A Quantity Theory Framework for Understanding Monetary Policy,” available upon request from the author, explains this framework.

The variety of monetary regimes implemented by Japan produced the results shown in Figures 1, 2, and 3. Figure 1 shows quarterly observations of four-quarter percentage changes in money (M2+CDs) and nominal output (GDP).² Figure 2 reproduces the nominal output growth series of Figure 1 and adds real output growth. Figure 3 shows inflation measured by the GDP price deflator. Inflation is the difference between nominal and real output growth. The rest of the article attempts to breathe some life into these data series.

1. BRETTON WOODS

Until the demise of Bretton Woods in early 1973, Japan pegged the foreign exchange value of the yen to the dollar. With a pegged exchange rate and with U.S. prices beyond Japanese control, the Japanese price level had to adjust to achieve balance of payments equilibrium. To maintain ongoing balance in its external accounts, Japanese baseline inflation had to match U.S. inflation.³ Furthermore, as Japanese goods became more desirable to the rest of the world, their prices had to rise an additional amount. That is, a favorable change in the terms of trade required inflation in Japan beyond what was occurring at the time in the United States.

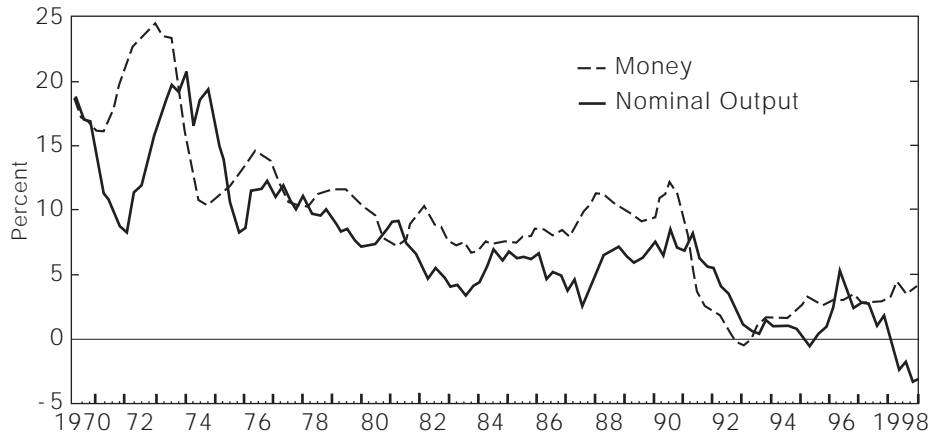
The external constraints imposed by a system of pegged exchange rates required the Bank of Japan (BoJ) to set its discount rate with the objective of targeting the current account balance rather than the state of the domestic economy. At times of current account surpluses, the BoJ lowered its discount rate and money growth and inflation rose. Similarly, at times of current account deficits, the BoJ raised its discount rate and money growth and inflation fell (see Ueda [1997]; Suzuki [1985]; and Yeager [1976]). Changes in economic activity followed changes in money growth with a lag of about three quarters (Yeager 1976, p. 526).

The pegged exchange rate regime served Japan well. In the 1960s, Japan's economy grew rapidly. From 1960 through 1969, Japanese real GDP grew at an annualized rate of 10.4 percent. A major reason for this growth was Japan's ability to mass-produce goods, such as compact automobiles, in big demand by consumers in the West. With its exchange rate pegged at 360 yen to the dollar, the resulting favorable change in the terms of trade required a rise in Japanese prices relative to U.S. prices. From 1961 through 1970, the difference between Japanese and U.S. (GDP deflator) inflation rates was 3 percentage points.

² All references to the Japanese money stock are for M2+CDs.

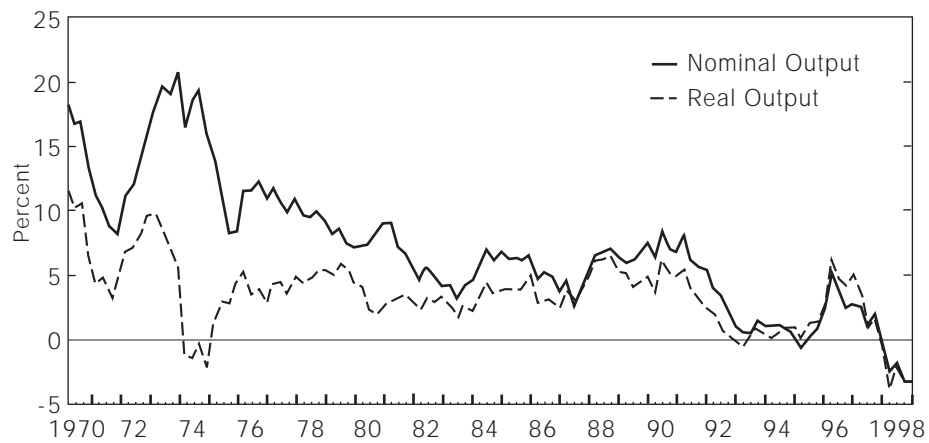
³ Baseline inflation is for traded goods. High productivity growth in the traded goods sector meant that the prices of services and wages rose faster than the prices of traded goods.

Figure 1 Money and Nominal Output Growth for Japan

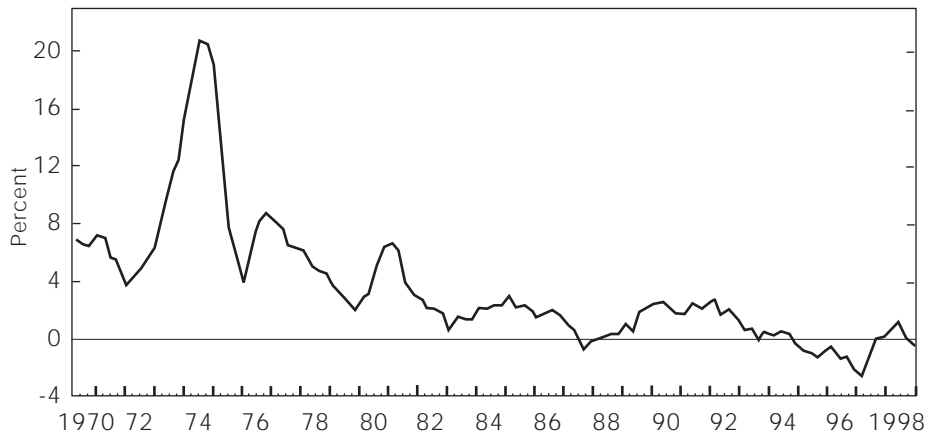


Notes: Quarterly observations of four-quarter percentage changes of money (M2+CDs) and nominal output (GDP). Heavy tick marks indicate fourth quarter of year.

Figure 2 Real and Nominal Output Growth for Japan



Notes: Quarterly observations of four-quarter percentage changes of real and nominal output (GDP). Heavy tick marks indicate fourth quarter of year.

Figure 3 Inflation in Japan

Notes: Quarterly observations of four-quarter percentage changes in prices (GDP price deflator). Heavy tick marks indicate fourth quarter of year.

Even with this difference in inflation rates, the yen was seriously undervalued by 1971. In the first half of the 1960s, the United States achieved near price stability. From 1960 through 1964, inflation rose in the United States at an annualized rate of only 1.4 percent. Then, from 1965 through 1970, U.S. inflation rose at an annualized rate of 4.1 percent. In Japan, on the other hand, inflation rose at an annualized rate of 5.8 percent between 1960 and 1965. Higher inflation in Japan than in the United States reflected the favorable change in Japan's terms of trade. However, from 1966 through 1969, the rate of Japanese inflation did not increase in line with U.S. inflation—in fact, at 5.7 percent, it remained at almost the same prior rate. So by early 1971, the yen was seriously undervalued and the dollar overvalued.

An overvalued dollar forced a change in U.S. policy in summer 1971. Earlier, in 1970, the Federal Reserve (the Fed) lowered short-term interest rates in response to U.S. recession. Capital then flowed out of the United States, further weakening the dollar. In 1971, the U.S. trade balance turned negative—for the first time in the twentieth century. On August 15, 1971, President Nixon announced measures to force a devaluation of the dollar. He closed the gold window to foreign central banks and imposed a 10 percent surcharge on imports into the United States. The surcharge gave the United States a club with which to force foreign countries like Japan to revalue their currencies relative to the dollar.

Figure 4 Yen/Dollar Exchange Rate

Notes: Quarterly observations of yen/dollar exchange rate. Heavy tick marks indicate fourth quarter of year.

Investors knew that foreign currencies could only rise in value relative to the dollar, so they flooded foreign central banks like the BoJ with dollars for conversion into their currencies. The BoJ purchased dollars in an attempt to maintain the existing parity of 360 yen to the dollar. The resulting increase in high-powered money allowed a surge in Japanese money creation starting in 1971Q3, followed by a surge in nominal GDP in 1972 (Figure 1). Money growth peaked at almost 25 percent in early 1973, and nominal GDP growth peaked at almost 20 percent in 1974.

In response to the turbulent events of the year, Japan, along with other member countries of the Bretton Woods system, agreed to a devaluation of the dollar in December 1971. In particular, Japan agreed to a revaluation of the yen relative to the dollar of 16.9 percent, along with a margin of fluctuation of 2 1/4 percent (Figure 4). However, the devaluation was insufficient, and by summer 1972, the yen had risen to its new ceiling. The BoJ then had to resume buying dollars and expanding its domestic money stock. In early February 1973, as inflation rose sharply in the United States, the dollar again weakened. Rather than continue large-scale intervention to support the dollar, the BoJ let the yen float. In early March 1973, the entire Bretton Woods system collapsed.

Japan's experience demonstrated to the countries of the Bretton Woods system (other than the United States) that if they wanted to control their own inflation rates they had to gain control over the rate at which their central

banks created money. They realized that to do so, they would have to allow their currencies to float against the dollar.

2. THE GOLDEN AGE OF JAPANESE MONETARY POLICY

After the system of pegged exchange rates came to an end, the BoJ moved decisively to gain control over money creation and inflation. The three-month Gensaki rate (a market rate on three-month repurchase agreements) went from 5.5 percent in 1973Q1 to 17.5 percent in 1974Q1 (Figure 5). Money growth, which had risen at an annual rate of 25 percent over the two and one-half years ending in 1973Q2, fell sharply to rates between 10 and 15 percent (Figure 1). Inflation (GDP deflator) peaked at about 27 percent (annualized rate) in 1974Q2 but then fell rapidly (Figure 3).

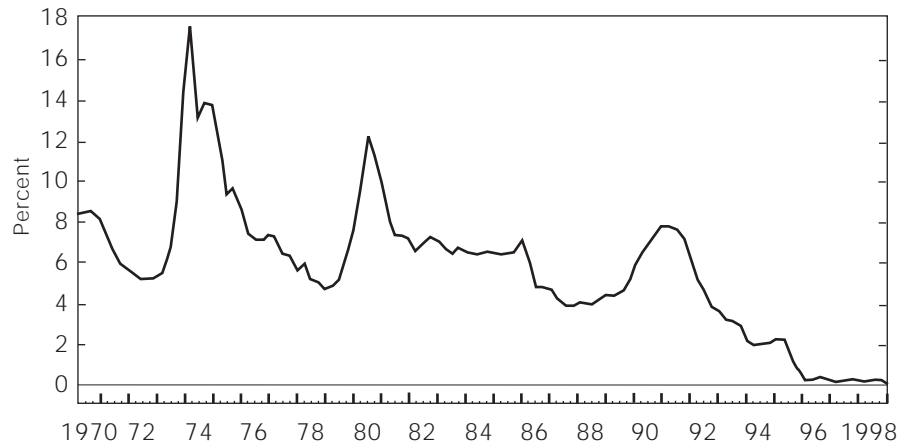
For more than a decade the BoJ concentrated on restoring and maintaining price stability. Suzuki (1985, p. 3) emphasizes the importance the BoJ attached to the behavior of money:⁴

Since 1975, when the Bank of Japan began to watch the money supply as an intermediate target, fluctuations in the growth rate of money stock have become small. They have remained in a range of $\pm 2.5\%$ deviation from the trend line At the same time, the trend rate of monetary growth itself has been declining gradually, dropping from 15% [in the mid-1970s] to 7-8% recently [1985]. Consequently, the rate of growth of nominal GNP has also declined in the same way. It is interesting to note, however, that the decline in the growth rate of nominal GNP manifested itself as a decline in the inflation rate . . . without affecting the growth rate of real GNP.

Suzuki (1985, p. 6, and 1986, p. 192) also emphasizes that the BoJ viewed moderate money growth as essential to achieve credibility for its policy of lowering inflation. Hutchison (1988), on the basis of empirical estimation of a reaction function for the BoJ, concludes that the BoJ used money (M2+CDs) as an intermediate target.

The BoJ, however, never put in place explicit procedures for monetary control (Ito 1989). Suzuki (1985, p. 6) explains that an explicit target for money would have limited the independence of monetary policy because of political pressure to set the target to conform with the official economic forecast of the government. Further, Suzuki (1984, p. 39, and 1985, p. 5) states that the BoJ considered one to two years as the time period for which monetary control mattered. Moreover, based on an examination of the determinants of changes in the BoJ's discount rate, Ueda (1997, p. 263) writes, “. . . before 1974, monetary policy . . . responded only to the current account, while since then

⁴ In the 1980s, Suzuki was Director of the Institute for Monetary and Economic Studies at the Bank of Japan.

Figure 5 Japanese Three-Month Gensaki Rate

Notes: Quarterly observations of three-month government Treasury bill with Repurchase Agreement (Gensaki) rate. Heavy tick marks indicate fourth quarter of year.

it has responded also to inflation and GDP developments.” To summarize, in setting its discount rate, the BoJ responded to observed economic conditions rather than attempting to achieve short-term stability of money growth.

During the period that began in the last half of 1973 and continued through the end of 1986, the BoJ basically pursued nominal expenditure targeting using a simple feedback rule for changing short-term interest rates. That is, Japan relied on standard “lean-against-the-wind” procedures where it set its interest rate instrument in response to economic activity. In this way, the BoJ achieved the moderate money growth necessary to control inflation indirectly rather than directly through operationally binding short-term money targets. Nevertheless, money growth acted as a constraint because the BoJ tied the credibility of its goal of restoring price stability to long-run moderation in money growth.

Abandonment of pegged exchange rates in favor of floating exchange rates allowed the BoJ to gain control over the reserve creation of the banking system and ultimately over money creation. The BoJ-engineered reduction in money growth and inflation initiated a profound change in professional and popular views about the nature of inflation. Inflation came to be seen as a monetary rather than a nonmonetary phenomenon. In time, Japan, as well as other countries, assigned responsibility for the control of inflation to their central banks.

The 1970s produced not only high inflation but also stagflation—the simultaneous occurrence of inflation and unemployment. Stagflation provided the empirical impetus for the rise of the rational-expectations school, which

initially emphasized the role expectations play in explaining the interaction of real and monetary phenomena. As expounded by Milton Friedman (1968) and Robert Lucas (1981), the natural-rate/rational-expectations version of the Phillips curve implies that the existing empirical correlation between inflation and the unemployment rate derives from unanticipated, rather than anticipated, changes in inflation. From an inflation rate of 15 percent in 1976, Japan essentially returned to price stability by 1982. The fact that it did so without a recession supported this formulation of the Phillips curve.

3. THE OIL PRICE SHOCKS

In the 1970s, some economists blamed the dramatic surges in inflation that occurred during that period on special factors, especially the two oil price increases engineered by the Organization of Petroleum Exporting Countries (OPEC). The first increase began in October 1973 and the second in December 1978. It is difficult to assess this special-factors explanation of inflation because prior to both oil price shocks, money growth had risen significantly in major industrial countries. When one assigns responsibility for inflation, he must then disentangle the effects of a highly expansionary monetary policy from the effects of the oil price rise. In the case of the second oil price shock, however, Japan had broken ranks with other major countries in its pursuit of a disinflationary monetary policy. As a result, Japan offers as close to a controlled experiment as economists can obtain for assessing the oil price explanation of inflation.

In the case of the first oil price shock, a problem with the special-factors explanation is that inflation had already started to rise before the shock. The sharp rise in the price of oil occurred after 1973Q3 with the start of the October Yom Kippur war in the Middle East. From September 1973 to March 1974, the price of oil (Saudi Arabian light-34 crude) rose from \$2.80 a barrel to \$9.60 a barrel. In Japan, CPI inflation had run around 4.5 percent in the last half of 1972. However, by 1973Q3, it had already risen to 12.8 percent.

Prior to the second oil price shock, as opposed to the first, monetary policy had fairly persistently concentrated on lowering inflation. The second shock began in 1978Q4 when the price of oil jumped from \$12.80 a barrel to \$40 a barrel by 1979Q4. One can look at the inflation bulge following the oil price rise to measure the impact of that rise on inflation. Because Japan imports most of its fuel, the rise in the price of oil directly affected its wholesale price index of raw materials, which includes the prices of imported raw materials. This index increased 73.7 percent in the 12 months ending March 1980 (Suzuki 1981, pp. 408–09).

These price rises passed on to the broad-based GDP deflator but to a much lesser extent. The GDP inflation rate rose significantly only in two quarters, 1980Q2 and 1980Q3, when it rose at an annualized rate of 9.9 and 8.3 percent, respectively. Figure 3, which shows four-quarter percentage changes in the GDP

deflator, reveals the inflation bulge. By this measure, inflation rose temporarily from a low value of 2.1 percent (for the four quarters ending 1979Q3) to a peak of 6.6 percent (for the four quarters ending 1980Q3).

However, this rise of a maximum of 4.5 percentage points in the inflation rate for four-quarter changes in inflation overstates the impact of the oil price rise. Prior to the rise, the value of the yen had risen dramatically (Figure 4). The rise in the yen-dollar exchange rate from 290 in early 1977 to 190 by late 1978 amounted to a one-third appreciation. The appreciation produced a transitory reduction in inflation lasting into 1979 that exaggerated the size of the inflation bulge shown in Figure 3. At the time, the Organization for Economic Cooperation and Development (OECD) attributed some of the low inflation prior to this bulge to the one-time effect of lower import prices produced by a rising yen (Yeager 1981, p. 169).

The inflation rate for the eight quarters prior to the rise in GDP inflation (from 1977Q4 to 1979Q3) was 3.4 percent. In the subsequent four quarters (1979Q4 to 1980Q3), the inflation rate rose to 6.6 percent. In the next four quarters (1980Q4 to 1981Q3), it fell back to 3.3 percent. The rise in the middle four quarters of about 3.2 percentage points appears to be a reasonable estimate of the direct effect of the oil price rise.

At the time, some economists argued that, to avoid adverse effects on output, central banks should allow a rise in the money stock to accommodate increases in the price level caused by relative price increases. However, the BoJ continued to concentrate on maintaining the public's expectation of inflation at a moderate level. With the occurrence of the oil price shock in late 1978, the BoJ began to raise short-term interest rates from their level of about 4.25 percent. In late 1979, when broad measures of inflation began to rise, it raised rates sharply until they exceeded 12 percent by March 1980. Consequently, money growth fell from 11.7 percent in the four quarters ending 1979Q3 to 8.2 percent in the five quarters ending 1980Q4.

Despite the aggressive actions taken by the BoJ to contain inflation and despite the importance of imported oil to Japan, the effect of the oil price rise on output appears to have been moderate. Over the period of unusual price rise (1979Q4 to 1980Q3), real GDP growth was 2 percent. Over the subsequent ten years, real GDP growth averaged an annualized 4.2 percent. It thus appears that the oil price shock reduced real output growth about 2 percentage points for one year.

Although oil imports had risen in importance by the end of the decade, the second oil price shock affected inflation and real output much less adversely than the first.⁵ Monetary policy made the difference. In the first instance, the

⁵ In 1972 and 1973, oil imports amounted to 2 percent of GDP. In 1979, they amounted to 4.4 percent of GDP and in 1980, 6.6 percent (Hutchison 1991, p. 10).

BoJ concentrated on reducing the size of the balance of payments surplus and on minimizing the impact on the economy of the yen revaluation agreed to in December 1971 (Ueda 1993, p. 200). In the second instance, the BoJ concentrated on retaining credibility for its inflation objective. The change in the behavior of wages in the second period compared to the first shows that the BoJ succeeded. In 1973 and 1974, nominal wage growth reached 21.9 and 29.1 percent, respectively. In 1980, nominal wage growth rose only slightly to 6.6 percent, from 5.9 percent in 1978 and 6.5 percent in 1979 (Ueda 1993, p. 201).

Japanese experience with the second oil price shock demonstrated that relative price shocks can exert a transitory influence on inflation. However, the contrasting experience between the first and second oil price shocks demonstrated the importance of the monetary regime in place. Random perturbations in the price level due to one-time effects exert minimal impact on real economic activity and no influence on trend inflation if the public believes that the central bank will maintain long-run price stability.

4. A RETURN TO EXCHANGE RATE TARGETING

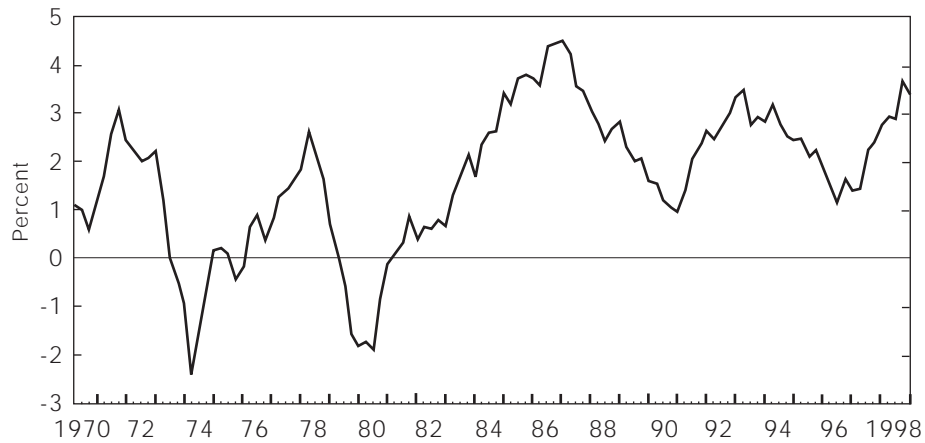
In the last half of the 1980s, the BoJ moved away from stabilizing nominal expenditure and money growth. Instead, it began to attach importance once again to stabilizing the exchange rate. Especially after the Louvre Accord of February 1987, the BoJ limited interest rate increases to restrain appreciation of the yen.

As explained in Section 1, in a fixed exchange rate regime, the central bank responds to a positive, rising balance of payments by lowering the discount rate. Starting in 1986, the BoJ moved partway back toward this monetary regime through a dirty float. That is, the BoJ lowered short-term interest rates in response to a positive current account balance and an appreciating yen. Lower interest rates made monetary policy expansionary.

An expansionary monetary policy dealt with both domestic and foreign pressures. Japanese exporters wanted the government to stimulate domestic demand to cushion the adverse effect of an appreciating yen on their exports. Furthermore, the U.S. government wanted Japan to stimulate domestic demand as a way of reducing its payments surplus through increased imports. By 1986, a rising Japanese trade surplus had kindled protectionist sentiment in the U.S. Congress, which threatened Japan with retaliatory trade measures.⁶

While the dollar rose in value against the currencies of other countries in the first half of the 1980s, the yen maintained its value. Starting in early 1985,

⁶ These comments follow the discussion in Volcker and Gyohten (1992, pp. 248–58); James (1996, pp. 433–53); Ueda (1997, pp. 264–65, and 1993, pp. 207–09); and Sawamoto and Ichikawa (1994, pp. 94–96).

Figure 6 Japanese Current Account as a Percentage of GDP

Notes: Quarterly observations of current account balance divided by GDP. Heavy tick marks indicate fourth quarter of year.

the dollar began to depreciate against other currencies and the yen. The yen appreciated dramatically, rising from about 260 yen to the dollar in early 1985 to about 125 in early 1988. In response, the Japanese current account fell from early 1987 on, but only slowly (Figure 6).

In the September 1985 Plaza Agreement, the Group of Five countries had agreed to encourage the depreciation of the dollar that had begun earlier in the year. However, the continued strong Japanese current account balance eventually changed the focus from intervening in the foreign exchange market to raising Japanese imports by stimulating domestic demand in Japan. The Louvre Accord of February 1987 committed Japan to reducing its balance of payments surplus through an expansion of aggregate demand. From 7 percent in 1985Q4, the BoJ pushed the three-month Gensaki rate to 3.75 percent in 1987Q3.

Japan's money growth began to rise in 1987Q1. From an annualized rate of 8.1 percent from 1982Q1 through 1986Q4, it rose to 11.3 percent from 1987Q1 through 1990Q2. Because the Japanese public had come to expect price stability, the higher money growth initially impacted primarily real variables (GDP growth and real wealth) rather than prices. As a result, real GDP growth began to rise in 1987Q3. From an average annualized rate of 3.3 percent from 1980Q1 through 1987Q2, it rose to 5.7 percent from 1987Q3 through 1990Q2 (Figure 2). In 1989Q2 inflation began to rise. From an average annualized rate of 1 percent from 1985Q1 through 1989Q1, it rose to 2.8 percent from 1989Q2 through 1991Q4.

5. TARGETING ASSET PRICES

The rise in asset prices in the latter part of the 1980s came to be known as the bubble. As noted, CPI inflation rose only moderately in this period. The BoJ concluded that inflation targeting was inappropriate: instead of varying its policy instrument (the level of short-term interest rates) in response to the observed behavior of the prices of goods and services, it should respond to asset prices.⁷ The BoJ believed that large rises in asset prices would inevitably be reversed with deleterious effects on the financial system and on real growth.⁸ The belief held by many in Japan that the rise in asset prices, by exacerbating disparities of wealth, undermined the egalitarian character of Japanese society reinforced the BoJ's determination to limit those price rises (Ueda 1993, p. 205).

The asset price targeting of the post-bubble period can be understood as analogous to a commodity standard monetary regime. Instead of fixing the nominal price of an asset like gold, the central bank attempted to influence the nominal price of a much broader collection of assets—the country's reproducible and nonreproducible capital stock (equities and land). The situation was analogous to that of England's return to the gold standard in 1926 at the pre-World War I parity for sterling. The Bank of England had to force a deflation of the general price level to bring about a reduction in the price of gold. Assuming that a significant part of the rise in Japan's asset prices derived from real factors, the BoJ policy of lowering the yen price of assets required deflation in goods prices. As a result, Japanese monetary policy became strongly contractionary in mid-1990.

The expansionary monetary policy that began in 1987 had raised the real price of assets such as land. However, monetary expansion was not the sole source of the rise. The rise in asset prices also derived significantly from real factors. In the late 1980s, the price of land rose as Tokyo became an Asian center for growth of the service and information sectors. The deregulation of Japanese financial markets in the 1980s also increased Tokyo's attractiveness as an international financial center (Sawamoto and Ichikawa 1994, p. 91).

In May 1989, with an increase in the discount rate, the BoJ began pushing interest rates up sharply. The Gensaki rate went from 4.3 percent in 1989Q2 to 7.6 percent in 1990Q4 and 1991Q1. Reflecting the rate increase, money growth began to fall in 1990Q3, even becoming negative for three quarters

⁷ For example, Sawamoto and Ichikawa (1994, p. 100) note, "It may be said that this argument is widely accepted, although opinions differ as to the desirability of making the stability of asset prices part of a target for monetary policy. . . ."

⁸ For example, the governor of the BoJ, Yasushi Mieno (1994, p. 9), stated in a speech, ". . . it is apparent that with large fluctuations in asset prices since the second half of the 1980s, major fluctuations occurred in the economy as well, and sustainable growth was undermined. Therefore, asset price fluctuations are clearly a cause as well as a signal of fluctuations in economic activity. It is for this reason that the Bank of Japan includes asset price developments among the variables that it monitors."

after 1992Q1. Real GDP barely grew from 1992Q2 through 1995Q1.⁹ From a peak of about 38,000 in early 1990, the Nikkei stock index fell to about 15,000 in 1992. Land prices began falling in 1991 and have continued falling to date.

It is essential to distinguish between shocks and the mechanisms that propagate those shocks. The initial shock was monetary—a rise in interest rates engineered through monetary contraction. The subsequent fall in asset prices reflected in part the direct effect of the rise in interest rates and in part the indirect effect of recession on expected future earnings. The reduction in wealth then propagated the real effects of the original monetary shock. One by-product of the fall in wealth was the creation of a mass of bad debts in the banking system. By reducing the efficacy of financial intermediation, those debts in turn amplified the original shock to the real economy.¹⁰

The fall in asset prices, which began in early 1990, came to be seen as precipitating the downturn—an inevitable collapse of a speculative bubble. The resulting mass of bad debts was the mechanism that propagated the shock. While superficially plausible, such an explanation is unsatisfactory. Japan had experienced a massive loss of wealth in World War II. Furthermore, the war

⁹ For a discussion of Japanese monetary policy in the early nineties, see Goodfriend (1997).

¹⁰ There is an analogy with U.S. monetary policy in the Depression. In the United States during the 1920s, the opportunities for growth appeared to have greatly expanded with the advent of mass production. The stock market rose accordingly. The Federal Reserve interpreted the rise as evidence of speculative extension of credit and initiated a rise in interest rates through a monetary contraction. The Fed then administered additional shocks. In fall 1931, it raised the discount rate sharply when Britain abandoned the gold standard. In spring 1932, it allowed a significant number of banks to close through bank runs.

The depressed state of the stock market during the Depression made the 1928 rise in the stock market appear to be a bubble. And the low level of interest rates made monetary policy appear impotent. The Fed restricted itself to preventing another presumed speculative rise in credit. Accordingly, in 1936 and 1937, it raised required reserves ratios sharply. The money stock then fell and economic recovery turned into renewed economic decline. Milton Friedman summarizes the conventional view of monetary policy in the Depression, a view which he and Anna Schwartz challenge in their 1963 book *A Monetary History of the United States*, in the following:

Beginning in mid-1928, the Federal Reserve System, concerned about stock market speculation, adopted a monetary policy of nearly continuous restraint. . . . [In] the great contraction from 1929–1933 . . . the System pleaded impotence, arguing explicitly that the non-monetary forces making for contraction were so strong and violent that it was powerless to stem the tide, and implicitly that the depth of the decline in the money stock was due to the depth of the decline in business activity, rather than . . . the reverse (Friedman [1967] 1969, pp. 89 and 91).

The belief that the Depression was the result of a breakdown in financial intermediation that was produced by prior unrestrained speculation spurred the creation of numerous public agencies to revive lending. The Reconstruction Finance Corporation, started in the Hoover Administration, purchased the bad debts of banks and large corporations. Congress created the Federal Home Loan Bank System in 1932 to provide credit to housing. In 1933, Congress created the Federal Deposit Insurance Corporation. Also in that year, it created Production Credit Associations and Banks for Cooperatives to stimulate lending to farmers. However, the failure of these measures to end the Depression indicates that the bad debts were a by-product, not a cause, of the Depression.

had disrupted its financial system. However, this catastrophe did not produce economic stagnation. Instead the Japanese responded by increasing their supply of labor, and output rose dramatically. Why would they respond differently later?

The story that Japan's economic distress resulted from the collapse of a speculative bubble contained dramatic elements of greed and retribution, elements with mass appeal. That explanation relegated monetary policy to the role of avoiding future speculative bubbles. As a result, monetary policy did not relieve the relentless pressure for price deflation.

6. THE MAGNITUDE OF THE MONETARY SHOCK

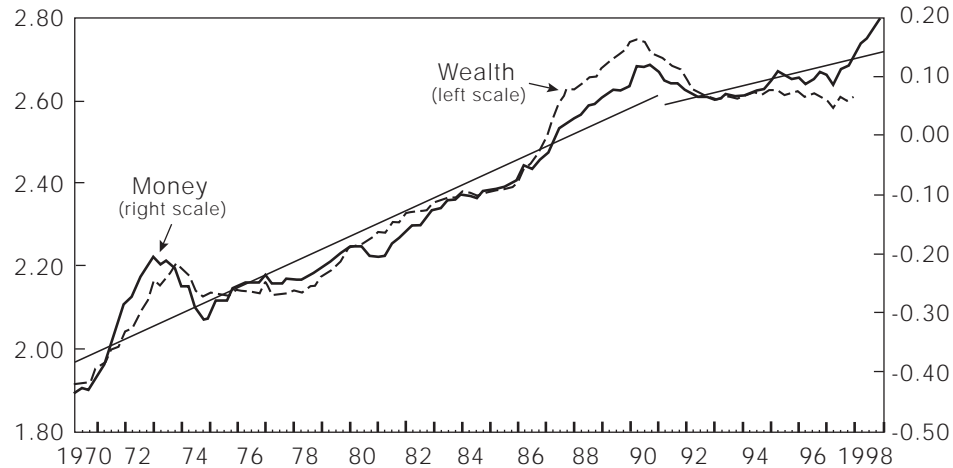
One can measure the magnitude of the monetary shock by determining the extent to which actual money growth has fallen short of the growth consistent with price stability.¹¹ Formula (1), the equation of exchange, aids in the calculation:

$$\dot{m} = \dot{p} + \dot{k} + \dot{y} \quad (1)$$

From left to right, the variables of (1) are growth in money, inflation, growth in the demand for real money expressed as a fraction of real expenditure, and growth in real expenditure. One can substitute into (1) trend values for growth of k and y that abstract from the monetary disturbances of the nineties. Figure 7 shows values of k from 1970Q1 through 1998Q4. (The slope of the trend line is the trend growth in k .) They rise secularly until the monetary contraction of the nineties. The growth of k from 1970 through 1990 is 2.2 percent. The figure used in equation (1) for growth in real expenditure (output) comes from the sum of labor-force growth and an estimate of longer-term productivity growth. From 1990Q1 through 1994Q4, the labor force grew at an annualized rate of 1 percent. From 1980Q1 through 1987Q2, the period before the monetary expansion of the late 1980s, labor productivity (real GDP per worker) grew at an annualized rate of 2.3 percent. The sum (1 plus 2.3) implies a figure for trend real output growth of 3.3 percent in the first half of the nineties. The sum of this figure and secular growth in k (2.2 percent) gives 5.5 percent as the rate of growth of money consistent with price stability.

The 5.5 percent figure for noninflationary money growth is based on labor-force growth of 1 percent. At present, the working-age population is no longer growing (OECD 1997, p. 113), so noninflationary trend money growth is probably near 4.5 percent. Nevertheless, the 5.5 percent figure applies to most of the nineties. From 1991Q1 through 1998Q4, money grew at an annualized rate of

¹¹ The calculations are for measured price stability. Biases in measurement of the price level in Japan make measured price stability consistent with deflation of 1 to 2 percent.

Figure 7 The Ratios of Nonmonetary Wealth and Money to Expenditure

Notes: The solid line is the logarithmic ratio of money (M2+CDs) to GDP. The trend lines are fitted to this series for the intervals 1970 to 1990 and 1991 to 1998. The dashed line is the logarithmic ratio of nonmonetary wealth to GDP. Wealth is from Sekine (1998) and includes financial assets such as land, housing, and inventories. Heavy tick marks indicate fourth quarter of year.

only 2.4 percent. This shortfall of about 3 percentage points in noninflationary money growth for eight years implies that the price level would have had to fall 24 percent to avoid any adverse impact on the real economy.

Even though this figure appears large, it ignores factors that might have increased the demand for money and thus required an even greater fall in the price level. First, the level of short-term interest rates is at historically low levels in Japan. The three-month Gensaki rate fell to only 0.3 percent starting in 1995Q4. At such low interest rates, the demand for money may increase significantly (Wolman 1997). Second, uncertainty may have increased the demand for money.¹² For example, uncertainty over the extent of the financial sector safety net in the fall of 1997 caused by the failure of Yamaichi Securities and Hokkaido Takushoku Bank may have increased the demand for money. The relatively rapid growth of narrow money (M1) in 1997 and 1998

¹² [Households] “have become extremely risk averse in their portfolio allocation behaviour. . . . [H]ouseholds have shifted their portfolios, as mentioned, towards bank deposits [and] currency” (OECD 1998, p. 51).

relative to broad money (M2+CDs) may be evidence of an increased demand for liquidity.¹³

7. MONETARY NONNEUTRALITY

The magnitude of the monetary shock can also be seen through the fall in the trend rate of growth of money. Money growth was at an annualized rate of 9.5 percent over the ten-year period ending 1990Q2. It then fell to only 1.1 percent from 1991Q1 through 1994Q2. With a lag of almost two years, in 1992Q1 inflation did begin to fall, but only enough to produce moderate deflation. Economists disagree about why the price level adjusts sluggishly in response to nominal monetary disturbances. Ironically, the BoJ's hard-earned credibility for maintaining price stability very likely impeded a large-scale, sustained deflation.¹⁴

Growth of both real expenditure and real wealth adjusted in response to contractionary monetary policy.¹⁵ Money growth fell 6.9 percentage points over the eight-year interval of 1990Q3 to 1998Q4 relative to the prior ten-year interval. Had inflation adjusted with complete flexibility, nominal GDP growth would have fallen by the same amount. Instead, it fell only 4.1 percentage points. That fall divided into a 1.1 percentage point reduction in GDP inflation and a 2.9 percentage point reduction in real GDP growth. Much of the real

¹³ In 1997 and 1998, M1 grew at an annualized rate of about 8.5 percent, and M2 grew at about 3.6 percent.

¹⁴ There are no direct observations of expectations of inflation in Japan. It seems plausible that the consistent policy of restoring price stability pursued by the BoJ from the mid-1970s to the mid-1980s earned it credibility. One piece of supporting evidence is the limited effect on inflation and wages of the price rises associated with the second oil price shock. Another piece of evidence that establishes the credibility of the BoJ's commitment to price stability comes from the coexistence of low government ten-year benchmark bond rates with a high and rising government debt-to-GDP ratio. At least through 1998, the public must have assigned no probability to central bank monetization of government debt.

¹⁵ One reader pointed out that economists have been unable to construct models capable of explaining protracted slowdowns in real growth. The primary nonmonetary model is the real business cycle model, where recessions occur because of negative productivity shocks. However, economists have been unable to identify such shocks independently of the data series to be explained—real output. Monetary models emphasize either unanticipated monetary shocks or staggered price setting, perhaps because of contractual arrangements. In the former case, the monetary nonneutrality disappears when the public learns that the trend rate of growth of the money stock has fallen. In the latter case it disappears when the public resets or renegotiates fixed nominal prices. (Neither model deals with the length of time required for the public, long accustomed to a stable monetary regime, to adapt to a monetary regime requiring persistent deflation.) In order to understand the effects of their policies, monetary policymakers must then rely on a combination of models and historical episodes that possess the characteristics of controlled experiments. Friedman and Schwartz ([1963] 1969, pp. 216–22) list historical episodes where a prolonged economic slowdown has followed an independent monetary disturbance.

adjustment occurred in the form of a reduction in the growth rate of real non-monetary wealth, which fell 9.3 percentage points over these two intervals.¹⁶

An interesting empirical fact is that the long-standing stable relationship between real money, real GDP, and real wealth continued even through the post-bubble period. In particular, the relationship between these variables remained consistent both in the event of negative and positive monetary shocks. This empirical consistency appears in the stability of the money demand functions estimated by the BoJ (1997) and Sekine (1998).¹⁷ Both authors find long-run stability in the demand for money (M2+CDs) by the Japanese public. That stability survived the deregulation of the Japanese banking system in the 1980s (Sawamoto and Ichikawa 1994) and the bubble and post-bubble economy. That is, both authors find a stable relationship between real money, real GDP, and real wealth (defined to exclude money) that survived the boom and bust period. Figure 7 shows the positive relationship between the ratio of money to GDP (real money) and the ratio of nonmonetary wealth to GDP (nonmonetary wealth is from Sekine [1998]).

Why should a deflationary shock have prolonged real consequences? The answer given here is that the BoJ has created an environment where the public expects price stability. In that environment, it is hard for corporations to cut wages.¹⁸ Without widespread wage cutting, corporations are reluctant to cut prices. Hourly wages continued to rise in the 1990s through 1997. The corresponding rise in real wages increased labor's share of national income from 68 percent in the 1980s to about 74 percent in 1998 (DIR 1998–99, p. 7). Correspondingly, corporate profits have fallen and so has the value of corporate equities. The fall in profits has led corporations to reduce capital expenditures in 1998, and the fall in wealth has led consumers to spend less. However, neither of these phenomena are causal; they propagate the monetary shock.

¹⁶ Nominal GDP growth went from 6 percent to 1.9 percent. GDP deflator growth went from 1.8 percent to 0.7 percent. Real GDP growth went from 4.2 percent to 1.3 percent. Growth in real nonmonetary wealth went from 9.5 percent to 0.2 percent. The wealth figure is from Sekine (1998).

¹⁷ Both authors use a cointegration analysis that involves regressing real money (M2+CDs) on an error-correction term, an opportunity cost variable, and scale variables. The opportunity cost variable is the difference between a rival interest rate and the own rate on money. The scale variables are real GDP and nonmonetary wealth. As a measure of wealth, the BoJ uses both an urban land price index and total financial assets of corporate business and personal sectors from flow of funds data. Sekine uses a broader measure of wealth from the System of National Accounts. The BoJ estimates its regression over the period 1968Q4 through 1996Q3, and Sekine estimates his over 1975Q1 through 1994Q4. The long lags in data availability on wealth determine the end dates. Yash Mehra and Jeffrey Walker, economists at the Federal Reserve Bank of Richmond, updated the work of the BoJ through 1998Q1. They found continued stability of the original money demand function.

¹⁸ The Japanese system of lifetime employment has limited the ability of corporations to cut wages. The absence of a credible threat to fire employees limits corporate bargaining power.

8. RETURN TO A DIRTY FLOAT

Real GDP revived for a while in the mid-nineties, rising at 3 percent from 1995Q2 through 1997Q1. One contributing factor was a modest rise in money growth. From 1994Q2 through 1996Q3, money grew at an annualized rate of 3.2 percent. Moreover, inflation turned negative. The GDP deflator fell at an annualized rate of 0.7 percent from 1994Q2 through 1996Q4. An appreciating yen, which rose from about 160 yen to the dollar in 1990 to about 80 in 1995, facilitated the deflation. The combination of modest money growth and deflation increased real money balances. As a result, spending revived.

The revival in economic activity came to an end after 1997Q2. The precipitating factor in the onset of recession was the increase in the consumption tax rate from 3 to 5 percent on April 1, 1997. That increase produced a rise in inflation. CPI inflation, which had been running at a rate of 0.5 percent (year over year) jumped to almost 2.5 percent through March 1998. The BoJ did not accommodate the rise in inflation with higher money growth. Over the period subsequent to the tax hike, 1997Q2 through 1998Q1, M2 grew at an annualized rate of 3.3 percent, only slightly higher than the prior 3 percent growth.¹⁹ The public reduced its real expenditures in response to the fall in its real money balances. An inventory cycle amplified the initial shock, and economic activity continued to decline throughout 1998.

As the economy weakened, the BoJ kept short-term interest rates unchanged. A primary reason was a fear that lower interest rates would produce a depreciation of the yen. The same fear kept the BoJ (1998, pp. 12–13) from aiming for faster money growth:

. . . lower interest rates will reduce households' interest income. We then face the question whether consumer confidence, already low, would be further undermined. There is also the issue of whether lower interest rates would trigger an additional depreciation of the yen. . . . [T]he possibility cannot be denied that a depreciation of the yen could, by provoking falls in other Asian currencies against the U.S. dollar and causing a drop in stock prices in tandem, amplify people's anxieties. . . . [I]f a lowering of interest rates is problematic because it may have an adverse effect on consumer confidence and the yen's exchange rate, then we must realize that "monetary expansion" will give rise to exactly the same problems.

¹⁹ The rise in inflation in itself would have produced a greater demand for nominal money and, at the prevailing call money rate of about 0.5 percent, a greater supply. However, the turmoil in financial markets in fall 1997, especially after the failure of Yamaichi Securities and Hokkaido Takushoku Bank, probably augmented the public's desire to save. (The widespread recognition at the time that the government would be liable for much of the bad debts of the banking system raised concerns that the government could have difficulty meeting its future pension liabilities.) Given no change in the level of short-term rates maintained by the BoJ, a reduction in the equilibrium real interest rate due to this increased desire to save made monetary policy more contractionary. The continued low rate of growth of money in this period probably reflected both forces.

Japan received strong external pressure not to allow a depreciation of the yen. In fall 1997, the International Monetary Fund negotiated rescue packages with Pacific Rim countries that required them to raise domestic interest rates to cushion the fall in their currencies. The fear was that a reduction in interest rates in Japan would put additional pressure on the currencies of these countries arising from a falling yen. For example, a falling yen would have put additional pressure on Korea, whose exports such as steel, cars, and consumer electronics compete with Japan's. Moreover, in early summer 1998, the Chinese Foreign Ministry and the governor of China's central bank made statements that observers interpreted as a threat to devalue the renminbi if the yen continued to fall. On June 17, 1998, concern over weakness in the yen led President Clinton and Prime Minister Ryutaro Hashimoto to agree to a joint intervention in the foreign exchange market to bolster the yen.

On September 9, 1998, the BoJ lowered its unsecured overnight call loan rate from around 0.5 percent to around 0.25 percent. Commenting on this rate reduction, a Knight-Ridder (1998) story stated that

A senior official at the Economic Planning Agency . . . said the Japanese central bank had not been able to take easier credit policy as the yen's weakness (against the dollar) is feared to exacerbate the economic and financial crises in Asian countries. However, the yen's recovery from about 145 to the dollar in mid-August to below 131 . . . had given the BoJ a "leeway" to ease its credit policy.

9. MONETARY POLICY IN THE NINETIES

Popular commentary characterizes Japanese monetary policy as "easy" because of the low level of interest rates. The failure of this allegedly easy monetary policy to revive economic activity then leads to the conclusion that monetary policy in Japan is impotent. For example, a *Wall Street Journal* (1998, p. A19) article stated

. . . sometimes, a nation's economy and financial system are so sick that conventional links between monetary policy and economic activity are damaged. . . . Many economists think that Japan has now fallen into a "liquidity trap," a bind no major economy has seen since the 1930s. In that state, interest rates hover near zero, but demand remains stagnant. There is no room to cut rates more.

It is true that interest rates are at historically low levels in Japan, but monetary policy is still contractionary if the BoJ maintains short-term rates above their equilibrium value. The equilibrium interest rate is the sum of the expected rate of inflation (deflation) plus the equilibrium real rate. Examination of each component indicates that the equilibrium value of the interest rate is near zero. First, expected inflation is probably zero or slightly negative. At present, the level of the CPI is basically steady, but the domestic wholesale

price index has fallen steadily since 1991. The result is to lower the equilibrium interest rate.

Second, the equilibrium real rate of interest is likely close to zero. In the investment boom of the late 1980s, private investment reached 30 percent of GDP. In the nineties, the capital stock continued to grow at a 3 percent or somewhat higher rate (OECD 1998, Figure 30). Continued investment probably sprang from the belief that Japan would resume normal growth after the 1991–1992 recession. The government further added to the capital stock by investing about 8 percent of GDP annually in infrastructure.

At the same time, real growth stagnated. Neither retail sales nor industrial production have grown from early 1992 to the present. It seems likely that the combination of sluggish domestic growth and continued growth in the capital stock produced a capital stock that is larger than optimal. Consequently, the marginal return to capital is probably near zero.

Despite low interest rates, saving remains high in Japan because the rapidly aging population needs to provide for its retirement. The unfunded liabilities (on a present-value basis) of Japan's public pension system are 180 percent of GDP (Matsuoka 1998). In addition, continued large government deficits are making the debt/GDP ratio in Japan among the highest in the world. General government (central and local government and social security funds) debt to GDP will rise to 130 percent of GDP in fiscal year 1999. The problem is that Japan's structural (cycle-adjusted) deficit is positive (DIR 1998–99, pp. 21–23).²⁰

This imbalance creates a fear that the government will not be able to meet its pension obligations. At the same time, those saving for retirement have seen the value of their assets plunge.²¹ House and stock prices are back to the levels of the early 1980s. Many Japanese now own homes whose value falls short of their mortgage obligation. As a consequence, Japanese saving is driving the equilibrium real interest rate toward zero.²²

²⁰ Without a change in fiscal policy, the ratio of debt to GDP will rise indefinitely in Japan because the product of outstanding government debt and the difference between the long-term interest rate and nominal GDP growth exceeds the primary fiscal balance, where the latter is the fiscal balance excluding interest payments. The structural deficit in Japan, including national and local government and social security, is 2.4 percent of GDP (DIR 1998–99, p. 23).

²¹ "Overall, the nation has had to confront cumulative capital losses [from 1990 through 1996] of around one quadrillion yen (about \$7 trillion) which represents some two full years' worth of Japanese GDP and over 14 percent of the nation's total assets at the end of 1989. . . . [L]and prices have . . . fallen [from 1991 through 1998] by an average of around 4 percent per year" (OECD 1998, pp. 45–50).

²² "The capital losses have had a number of obvious economic effects. . . . Households have been the biggest losers. . . . The resulting amount of negative equity for the owner of a typical 65-square-metre apartment in Central Tokyo purchased at the peak would reach 12 to 15 million yen (\$100,000). . . . [T]hey [households] have probably boosted saving to try to restore some of this wealth. . ." (OECD 1998, p. 50).

The combination of zero, or negative, expected inflation with an equilibrium real rate near zero means that even the low market rates currently observed in Japan are consistent with contractionary monetary policy. A number of economists have argued that the BoJ should look at money growth rather than interest rates. Specifically, the BoJ should undertake open market purchases to increase the monetary base to the extent required to spur money growth (Friedman 1997; Goodfriend 1997; Laurent 1994, 1995; and Meltzer 1998).

If the BoJ were to expand the money stock, Japanese citizens would find themselves with larger amounts of money in their pockets.²³ Some extra money would be useful for emergencies, but beyond a point, individuals would spend additional money. Furthermore, the ability of the BoJ to create money is unlimited. It follows that the BoJ can stimulate spending. That spending would raise asset prices and spur both investment and consumption.

In opposition to this quantity theory of money argument, others have claimed that an expansionary monetary policy would be like “pushing on a string.” The argument is as follows: If higher money growth is to affect the real economy, that money growth must still work through interest rates. And interest rates are so low that a further reduction could not make any difference. However, as economists like Pigou (1947) noted, this possibility ignores the wealth effects that higher real money balances would create in pushing interest rates down to zero. Bailey (1971, p. 113) expresses the argument as follows:

Consider . . . a choice urban site whose expected annual rent is \$1 per square foot. . . . [A] rate of interest of 5 percent per year implies a price of \$20 per square foot. . . . Should the rate of interest fall to . . . 0.0000001 percent, [the price would be] \$10 million per square foot, and so on. . . . It is hard to doubt that someone would be tempted by the time these [latter] prices were reached . . . to consume out of capital . . . enough to overwhelm other households’ saving and eliminate aggregate net saving.

Moreover, at an interest rate close to zero, investors will again find the price of capital so cheap that they will want to accumulate capital. They will produce goods of great durability. And they will expand exports. Initially, the exchange rate would fall, but the economy would recover.

²³ The BoJ can expand the money stock by undertaking open market purchases, which enlarge bank reserves. In principle, the banks could limit an increase in the money stock by simply holding the additional reserves in their vaults. However, reserves yield no interest. At some point, open market purchases would make their reserves large enough that banks would surely purchase safe, short-term assets like government debt.

From February 1998 through February 1999, M2+CDs increased by 3.5 percent, while bank reserves increased by 9.4 percent. The BoJ could raise the rate of bank reserve growth to successively higher levels until it found a level of reserve growth that would produce the desired money growth. There is no limit to the ability of the BoJ to monetize assets and thus raise bank reserve growth. (Figures are from BoJ, *Reports and Statistics*, “Money Stock,” and “Figures on Reserves,” available on the BoJ web site.)

10. WHERE SHOULD JAPAN GO FROM HERE?

The stability of Japanese money demand and the difficulty of interpreting the economic impact of interest rates in an environment of deflation and depressed economic activity suggest that the BoJ should adopt an explicit target for money (M2+CDs) growth. The targeted growth rate should be high enough to relieve deflationary pressure on the price level. But what growth rate should the BoJ target? How does the BoJ maintain credibility for a policy of price stability?

The argument for temporarily high money growth is to relieve pressure for deflation. However, high money growth could become a source of instability if it were to cause the public to believe that inflation would become positive.²⁴ A policy of maintaining price stability would then be destabilizing (see Barro and Gordon [1983]). The public must believe that money growth above the level consistent with long-term price stability is temporary. A move to structural balance in the government deficit would help in that respect. As long as the government fiscal deficit maintains a structural imbalance, as opposed to a cyclical imbalance, the public might fear that the government would monetize its debt rather than repay it.²⁵

The Japanese public must remain convinced that a reflationary monetary policy will not produce the alleged speculative excesses of the bubble period. The BoJ could target a rate of growth of money of, say, 9 percent (double the long-run growth rate assumed above to be consistent with price stability). At the same time, it could monitor the value of assets.²⁶ Over the period 1976Q1 to 1987Q1 (the period of stable money growth around a declining trend), real nonmonetary wealth grew at an annualized rate of 7.6 percent. The BoJ could lower its money target to 4.5 percent whenever the growth of wealth exceeded this value. It would also revert to the 4.5 percent figure when real GDP growth appeared to have stabilized at a sustainable value.

Japan should allow the money stock to rise sufficiently to remove the downward pressure on the price level. Over the longer run, it should return to

²⁴ This view is in opposition to Krugman's (1998) view that the BoJ should attempt to convince the public that it intends to inflate in the future.

²⁵ Starting with the locomotive strategy of the Carter Administration, Western governments have periodically pressured Japan to use deficit spending to stimulate its economy as a way of increasing its exports. (See the discussion of the Louvre Accord in Section 4.) The idea is that deficit spending would not only stimulate economic activity but would also raise interest rates. Higher interest rates would strengthen the yen and make Japanese exports less competitive. An expansionary monetary policy would also have stimulated economic activity, but by lowering interest rates. However, lower interest rates would weaken the yen and make Japanese exports more competitive, thereby exacerbating trade frictions. In actual fact, deficit spending has done little for Japan. In the 1990s, despite a rise in the level of general government debt from around 70 percent of GDP in 1990 to well over 100 percent by the end of 1998, real growth has stagnated.

²⁶ The BoJ would need to construct a proxy for wealth based on the stock market and recent information on land prices. The proposal reflects a suggestion in Meltzer (1998).

its “Golden Age” of monetary policy, 1975 to 1986, when the BoJ stabilized money growth and nominal expenditure growth to achieve price stability.

REFERENCES

- Bailey, Martin J. *National Income and the Price Level*. New York: McGraw-Hill, 1971.
- Bank of Japan. “Money Stock,” and “Figures on Reserves,” *Reports and Statistics*. Available: <http://www.boj.or.jp>.
- _____. Speech by Governor Masuru Hayami to the Yomiuri International Economic Society in Tokyo, July 29, 1998, reprinted in Bank for International Settlements *BIS Review*, 75/1998. Available: <http://www.bis.org/publ>.
- _____. Bank of Japan *Quarterly Bulletin*. “On the Relationship between Monetary Aggregates and Economic Activities in Japan: A Study Focusing on Long-Term Equilibrium Relationships,” November 1997, pp. 104–24.
- Barro, Robert J., and David B. Gordon. “A Positive Theory of Monetary Policy in a Natural Rate Model,” *Journal of Political Economy*, vol. 91 (August 1983), pp. 589–610.
- Daiwa Institute of Research (DIR). *Japan’s Economic Outlook* (Winter 1998–99).
- Friedman, Milton. “ R_x for Japan: Back to the Future,” *The Wall Street Journal*, December 17, 1997, p. A22.
- _____. “The Monetary Theory and Policy of Henry Simons” (1967), and “The Role of Monetary Policy” (1968), in Milton Friedman, *The Optimum Quantity of Money*. Chicago: Aldine, 1969.
- Friedman, Milton, and Anna J. Schwartz. “Money and Business Cycles” (1963), in Milton Friedman, *The Optimum Quantity of Money*. Chicago: Aldine, 1969.
- _____. *A Monetary History of the United States, 1867–1960*. Princeton: Princeton University Press, 1963.
- Glick, Reuven, and Michael M. Hutchison. “Monetary Policy, Intervention and Exchange Rates in Japan,” in Reuven Glick and Michael M. Hutchison, eds., *Exchange Rate Policy and Interdependence*. New York: Cambridge University Press, 1994.
- Goodfriend, Marvin. “Comments,” in Iwao Kuroda, ed., *Towards More Effective Monetary Policy*. Tokyo: Bank of Japan, 1997.

- Humphrey, Thomas M., and Robert E. Keleher. *The Monetary Approach to the Balance of Payments, Exchange Rates, and World Inflation*. New York: Praeger Publishers, 1982.
- Hutchison, Michael M. "Aggregate Demand, Uncertainty and Oil Prices: The 1990 Oil Shock in Comparative Perspective," Bank for International Settlements Economic Papers No. 31. August 1991.
- _____. "Monetary Control with an Exchange Rate Objective: The Bank of Japan, 1973–86," *Journal of International Money and Finance*, vol. 7 (1988), pp. 261–71.
- Ito, Takatoshi. "Is the Bank of Japan a Closet Monetarist? Monetary Targeting in Japan, 1978–1988," Working Paper 2879. Cambridge, Mass.: National Bureau of Economic Research, March 1989.
- James, Harold. *International Monetary Cooperation Since Bretton Woods*. Washington: International Monetary Fund, 1996.
- Knight-Ridder. Story #9830, September 10, 1998.
- Krugman, Paul. "Setting Sun; Japan: What Went Wrong," posted June 11, 1998. Available: <http://web.mit.edu/krugman/www/japan.html>.
- Laurent, Robert. "Shades of the Thirties," *The Wall Street Journal*, August 1, 1995.
- _____. "Monetary Policies in the Early 1990s—Reflections of the Early 1930s," Working Paper 94–26. Chicago: Federal Reserve Bank of Chicago, December 1994.
- Lucas, Robert E. "Expectations and the Neutrality of Money," in Robert E. Lucas, Jr., ed., *Studies in Business-Cycle Theory*. Cambridge, Mass.: The MIT Press, 1981.
- Matsuoka, Mikihiro. "Japan's Government Debt." Daiwa Institute of Research, August 12, 1998.
- Meltzer, Allan. "Time to Print Money," *Financial Times*, July 17, 1998.
- Mieno, Yasushi. "The Conduct of Monetary Policy by the Bank of Japan," Bank of Japan *Quarterly Bulletin* (August 1994), pp. 6–12.
- Nikkei Weekly*. "Pension Reform Panel Skirts Key Funding Issues," October 19, 1998, p. 3.
- Organization for Economic Cooperation and Development. *OECD Economic Surveys, 1996–1997 and 1998, Japan*. Paris: OECD, 1997 and 1998.
- Pigou, A. C. "Economic Progress in a Stable Environment," *Economica* (August 1947), pp. 180–88.
- Sawamoto, Kuniho, and Nobuyuki Ichikawa. "Implementation of Monetary Policy in Japan," in Tomas J. T. Balino and Carlo Cottarelli, eds., *Frameworks for Monetary Stability*. Washington: International Monetary Fund, 1994.

- Sekine, Toshitaka. "Financial Liberalization, the Wealth Effect, and the Demand for Broad Money in Japan," Bank of Japan *Monetary and Economic Studies*, May 1998, pp. 35–55.
- Suzuki, Yoshio. *Money, Finance and Macroeconomic Performance in Japan*. New Haven: Yale University Press, 1986.
- . "Japan's Monetary Policy over the Past 10 Years," Bank of Japan *Monetary and Economic Studies*, vol. 3 (September 1985), pp. 1–9.
- . "Financial Innovation and Monetary Policy in Japan," Bank of Japan *Monetary and Economic Studies*, vol. 2 (June 1984), pp. 1–45.
- . "Why Is the Performance of the Japanese Economy so Much Better?" *Journal of Japanese Studies* (1981), pp. 403–13.
- Ueda, Kazuo. "Japanese Monetary Policy, Rules or Discretion? A Reconsideration," in Iwao Kuroda, ed., *Towards More Effective Monetary Policy*. Tokyo: Bank of Japan, 1997.
- . "Japanese Monetary Policy from 1970 to 1990: Rules or Discretion?" in Kumiharu Shigehara, ed., *Price Stabilization in the 1990s*. Tokyo: Bank of Japan, 1993.
- Volcker, Paul A., and Toyoo Gyohten. *Changing Fortunes: The World's Money and the Threat to American Leadership*. New York: Random House, 1992.
- The Wall Street Journal*. "'Wealth Effect' Tends to Linger on for Years," September 10, 1998.
- The Washington Post*. "Japan Pressed to Aid Slumping Economy," April 4, 1998.
- Wolman, Alexander L. "Zero Inflation and the Friedman Rule: A Welfare Comparison," Federal Reserve Bank of Richmond *Economic Quarterly*, vol. 83 (Fall 1997), pp. 1–21.
- Yeager, Leland B. *Experiences with Stopping Inflation*. Washington: American Enterprise Institute, 1981.
- . *International Monetary Relations: Theory, History, and Policy*, 2d ed. New York: Harper & Row, 1976.