

Board of Governors of the Federal Reserve System

International Finance Discussion Papers

Number 729

June 2002

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Preventing Deflation: Lessons from Japan's Experience in the 1990s

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Abstract: This paper examines Japan's experience in the first half of the 1990s to shed some light on several issues that arise as inflation declines toward zero. Is it possible to recognize when an economy is moving into a phase of sustained deflation? How quickly should monetary policy respond to sharp declines in inflation? Are there factors that inhibit the monetary transmission mechanism as interest rates approach zero? What is the role for fiscal policy in warding off a deflationary episode? We conclude that Japan's sustained deflationary slump was very much unanticipated by Japanese policymakers and observers alike, and that this was a key factor in the authorities' failure to provide sufficient stimulus to maintain growth and positive inflation. Once inflation turned negative and short-term interest rates approached the zero-lower-bound, it became much more difficult for monetary policy to reactivate the economy. We found little compelling evidence that in the lead up to deflation in the first half of the 1990s, the ability of either monetary or fiscal policy to help support the economy fell off significantly. Based on all these considerations, we draw the general lesson from Japan's experience that when inflation and interest rates have fallen close to zero, and the risk of deflation is high, stimulus—both monetary and fiscal—should go beyond the levels conventionally implied by baseline forecasts of future inflation and economic activity.

Keywords: Japan, deflation, monetary policy, Taylor rule, fiscal policy

* Division of International Finance, Board of Governors of the Federal Reserve System. We are grateful to Dale Henderson, David Howard, Karen Johnson, Donald Kohn, David Reifschneider, Vincent Reinhart, David Small, and David Stockton for helpful comments. All errors remain ours. The views in this paper are solely the responsibility of the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System.

I. Introduction and Summary

Since the beginning of 2001, the U.S. federal funds rate has been reduced 475 basis points to a level of only 1.75 percent, the lowest it has been in about four decades. Concerns have arisen that, were a substantial further loosening of monetary conditions required, perhaps because of additional negative shocks to aggregate demand, monetary policy would be limited by the zero lower bound on nominal interest rates. It is debated what the Federal Reserve could do in such circumstances to support a recovery.¹

In this context, many observers naturally draw parallels between the U.S. situation at present and that experienced by Japan in the mid-1990s, when the Bank of Japan reduced interest rates to very low levels and the economy was on the brink of what turned out to be a protracted deflationary slump. Following the collapse of the asset price bubble in early 1990, Japanese growth steadily deteriorated through the first half of the 1990s, rebounded briefly at mid-decade, but has been generally weak since then. Consumer price inflation followed the economy downward, falling below zero in 1995. In response, Japanese short-term interest rates were lowered nearly to zero by late 1995 and have stayed close to zero ever since. However, with prices declining, real interest rates have remained positive, restraining growth.

¹Clouse, Henderson, Orphanides, Small and Tinsley (2000), among others, examine the range of policy actions that the Federal Reserve could undertake to stimulate aggregate demand should the short-term nominal interest rate in the United States come up against its lower bound of zero.

An analysis of Japan's experience may shed light on a host of questions that potentially could face policymakers in the United States and other economies at some future point.² Is it possible to recognize when the economy is moving into a phase of sustained deflation? How quickly should monetary policy respond to sharp declines in inflation? Are there factors that inhibit the monetary transmission mechanism as interest rates approach zero? What is the role for fiscal policy in warding off a deflationary episode?

This note assesses the extent to which Japan's experience can provide some preliminary answers to these questions. Our study focuses on the period from the end of the 1980s, when the stock market peaked and the asset price bubble burst, until the mid-1990s, when inflation moved into negative territory and the policy interest rate was lowered essentially to zero. Section II lays out the historical background to Japan's movement into deflation. Section III addresses the extent to which Japan's deflation was anticipated beforehand; this is important, because the appropriate stance of monetary policy may depend upon whether a weakening of activity and price pressures is expected to be temporary or more sustained. Section IV reviews the track record of Japanese monetary policy in the runup to deflation; we examine both the suitability of the Bank of Japan's monetary strategy, as well as factors that might have impeded the monetary transmission mechanism. Section V assesses the role played by fiscal policy in Japan in propping up economic activity. Finally, Section VI discusses the contribution that an improved mix of monetary and fiscal policies could have made toward maintaining aggregate demand.

²Browne (2001) reviews possible lessons that U.S. policymakers might draw from the Japanese experience in the 1990s. See also Mikitani and Posen (2000) and Makin (2001).

Based on these analyses, we have reached the following conclusions. First, notwithstanding the severity of the collapse in asset prices and the vulnerability of the financial sector to this collapse, Japan's sustained deflationary slump was not anticipated. This was true not only of Japanese policymakers themselves, but also of private-sector and foreign observers, including Federal Reserve staff economists. Two-year-ahead forecasts of GDP growth and inflation by both Federal Reserve staff and the Consensus Economics survey, for example, remained well above actual growth and inflation rates until the second half of the 1990s. Moreover, financial markets had no better handle on the economy's prospects; long-term bond rates remained as high as 5 percent right up until the start of 1995.

The failure of economists and financial markets to forecast Japan's deflationary slump in the early 1990s poses a cautionary note for other policymakers in similar circumstances: deflation can be very difficult to predict in advance. In consequence, as interest rates and inflation rates move closer to zero, monetary policy perhaps should respond not only to baseline forecasts of future activity and prices, but also to the special downside risks—in particular, the possibility of deflation—to those forecasts as well.

This point is well-supported by the second major finding of our study: while the loosening of monetary policy in the early 1990s by the Bank of Japan (BOJ) seemed appropriate given the expectations of future economic developments held at the time, in light of the weakening of spending and prices that took place subsequently, this loosening proved to be inadequate. To reach this assessment, we compared the actual path of short-term Japanese interest rates to that predicted by an estimated Taylor rule based on future inflation rates and output gaps. Actual interest rates fell about as quickly, or more so, than the interest rates called

for by the Taylor rule when Federal Reserve staff *forecasts* of output gaps and inflation were fed into that equation. However, when the *actual*, and weaker, values of future output and inflation were fed into the Taylor rule instead, the equation indicated that interest rates should have declined more rapidly than was in fact the case.³

This suggests that, with the benefit of hindsight, perhaps the most important concern raised by Japanese policy during this period was not that policymakers did not predict the oncoming deflationary slump—after all, neither did most forecasters—but that they did not take out sufficient insurance against downside risks through a precautionary further loosening of monetary policy. Simulations of the staff’s FRB/Global model suggest that, had the BOJ lowered short-term interest rates by a further 200 basis points at any time between 1991 and early-1995, deflation could indeed have been avoided.⁴ (The model indicates that loosening after the second quarter of 1995 would have been too late to avoid deflation, as by that time inflation had already fallen below zero.)

Of course, policymakers in the early 1990s were not sure what would happen, and there was a risk that, if the economy were to recover of its own accord, further monetary loosening would have had unwelcome consequences. Based on the properties of the Federal Reserve Board’s FRB/Global model, an unwarranted—that is, not required to prevent deflation—further cut

³Bernanke and Gertler (1999) reach a similar conclusion using a monetary policy rule that differs in several ways from our estimated Taylor rule. They conclude from their analysis that “Japanese monetary policy was too tight from late 1992 at least until the beginning of 1996.”

⁴FRB/Global is a large-scale macroeconomic model used in analyzing exogenous shocks and alternative policy responses in foreign economies and in examining the impact of these external shocks on the U.S. economy. The structure and key features of the model are described in detail in Levin, Rogers and Tryon (1997).

in interest rates would have led to inflation rates exceeding desired levels for a couple of years, but this would have elicited a tightening of monetary policy in response that would have brought inflation back down to baseline. Thus, compared with the costs of entering into deflation, the costs of excessive monetary loosening would have been relatively limited. That said, with interest rates at historically low levels by late 1993, and with the experience of the asset price bubble of the 1980s fresh in policymakers' minds, it is understandable that the BOJ did not loosen monetary policy more rapidly in the early 1990s.

The third key issue addressed in our study was whether the effectiveness of Japanese monetary policy in influencing the economy might have diminished in the early 1990s. We uncovered, at most, mixed evidence that monetary policy became less effective during this period. Stock prices and the exchange rate apparently failed to respond to concerted declines in policy interest rates during 1991-95, but this probably reflected other factors, and long-term interest rates did decline substantially over this period. In the 1992-95 period, the growth of the monetary base rose above that of the broader aggregates, an indication that a "liquidity trap" may have emerged, but this differential in growth rates did not become especially pronounced until the second half of the 1990s.⁵ Finally, the collapse in asset prices and resultant deterioration of balance sheets, by making firms more reluctant to borrow and banks more reluctant to lend, most likely diminished the ability of monetary policy to stimulate the economy, although by how much is difficult to say. In sum, the effectiveness of Japanese monetary policy may have diminished

⁵The view that Japan is stuck in a liquidity trap is most closely associated with Krugman (1998).

somewhat in the early 1990s, but probably not to the point where the benefits of earlier, sharper easing would have been obviated.

The fourth and final key finding of our study is that, analogously to monetary policy, Japanese fiscal policy became relatively stimulative in the early 1990s by conventional standards, but should have become even more aggressive in an effort to prevent a deflationary slump. The increase in the structural deficit in Japan during the first half of the 1990s generally exceeded that which occurred in several other industrial countries experiencing economic downturns, confirming that fiscal policy was far from unresponsive to the weakening economy. With the benefit of hindsight, however, it is obvious that in none of the other economies was the risk of deflation so pronounced, and hence the need for further fiscal stimulus so great. Simulations of the FRB/Global model suggest that a moderate amount of additional fiscal loosening would have sufficed to prop up economic activity and keep inflation from turning negative. A combination of both fiscal and monetary loosening would have been even more desirable, as it would have reduced the need to rely too heavily on each instrument individually, and thus would have moderated some of the drawbacks associated with pushing either instrument too far.

Some observers have pointed to the coincidence of sustained Japanese fiscal deficits and sustained economic weakness to argue that fiscal policy has become entirely ineffective in influencing economic activity. We found little evidence to support this view. Declines in household savings rates during this period belie the argument that consumers were retrenching in response to concerns about the future tax hikes that might be needed to repay the growing public debt. As well, there is little basis for the assertion that public spending was crowding out private investment, given the declines in long-term interest rates and the degree of slack in the economy

in these years. More likely, it is the sustained weakness of Japanese private spending over the past decade that has required offsetting increases in public spending and budget shortfalls.

To sum up, an analysis of Japan's experience suggests that while deflationary episodes may be difficult to foresee, it should be possible to reduce the chances of their occurring through rapid and substantial policy stimulus. In particular, when inflation and interest rates have fallen close to zero, and the risk of deflation is high, such stimulus should go beyond the levels conventionally implied by baseline forecasts of future inflation and economic activity.⁶ This prescription follows in large part from the asymmetric nature of the risks in such circumstances. Too much stimulus can be taken back later through a corrective tightening of policies. However, if too little stimulus is provided and the economy moves into deflation, the future ability of monetary policy to pull the economy out of its slump can be substantially undermined.⁷

II. Background to Japan's Protracted Slump

Japan's protracted slump can best be understood as the outcome of developments that date from the "bubble economy" period of the late 1980s.⁸ As shown in Exhibit II.1, between

⁶This is consistent with many analyses of appropriate monetary policy in the face of zero-lower-bound constraints, including Reifschneider and Williams (2000), Blinder (2000), Kato and Nishiyama (2001), and IMF (2002), Chapter II.

⁷In this paper, we focus on the constraints to conventional monetary policy posed by the zero-lower-bound on nominal interest rates. We do not dispute the possibility of using other non-conventional means of monetary stimulus once the zero bound is reached—see Krugman (1998), Goodfriend (1997, 2000), Bernanke (2000), Clouse, Henderson, Orphanides, Small and Tinsley (2000), and Svensson (2001), among others, as well as Ueda (2001) for the BOJ's views toward such options. Nevertheless, we would agree with many analysts that once the zero bound is reached, re-activating the economy becomes more difficult and more uncertain.

⁸Numerous studies have focused on the collapse of Japan's bubble economy. See, *inter alia*, Posen (1998), Brunner and Kamin (1996, 1998), Bayoumi and Collins (2000), Mikitani and Posen (2000), and Morsink and Bayoumi (2001).

1986 and 1989, both equity prices and land prices rose precipitously. This, along with relatively low interest rates (Exhibit II.2), substantially eased the financing of investment. As a result, the ratio of bank loans to GDP soared and heavy investment spending contributed to high growth rates of GDP. Productivity growth (not shown) was relatively high during this period, and perhaps as a consequence, CPI inflation (Exhibit II.1) remained relatively contained.

By early 1989, however, as equity and real estate prices continued to soar and inflation moved upward, the BOJ began raising interest rates in a bid to moderate the degree of overheating. In response to monetary tightening and its own unsustainably high level, the stock market collapsed at the beginning of 1990. The growth rate of GDP moved down from its previous peaks in 1990 but still registered 2.5 percent (Q4/Q4) in 1991, while land prices continued to rise. As a consequence, the BOJ continued to raise the official discount rate (Exhibit II.2) until August 1990. It started lowering rates a short period thereafter, as GDP growth fell off more sharply, inflation started to move down, and land prices began to decline as well.

In many respects, the peaking of the bubble economy and the subsequent slowdown followed a standard pattern for post-war business cycles in industrial economies.⁹ Yet, it is apparent, with the benefit of hindsight, that unusually strong forces were at work to hold down growth. First, the high ratio of capital to output accumulated by 1990, which was predicated on expectations of continued high output growth in the future, was revealed to be excessive once the economy slowed. In consequence, profit rates fell and business investment exhibited protracted

⁹Chapter 3 of IMF (2000) focuses on linkages between asset prices and business cycles in industrial economies.

declines over the 1990s.¹⁰ This capital overhang proved hard to erode, however, as declines in output growth forced the capital/output ratio still higher in the 1990s.¹¹

Second, the collapse of equity and, eventually, housing prices led to severe balance sheet problems for households and firms, particularly the latter. Weak stock markets discouraged equity issuance as a means of financing investment, while declining stock and land prices undercut the value of collateral used to secure new loans.¹² Moreover, with the net worth of many firms, particularly in construction and real estate, substantially reduced by the collapse of the asset price bubble, the demand for investment funds fell off sharply.

As a third and related factor, the balance-sheet problems of corporate borrowers led to a deterioration in loan performance and in the financial strength of the banking system.¹³ Owing both to weaknesses in the Japanese supervisory system and to ingrained practices among Japanese bankers, Japanese banks failed to resolve their non-performing loans problems and adequately recapitalize themselves. The continued fragility of the banking system, in turn, has limited its ability to extend new loans and support economic recovery.¹⁴

¹⁰See Ramaswamy (2000) for a more detailed discussion of the behavior of Japanese business investment during the 1990s.

¹¹While investment declined, its level remained relatively high, so that capital formation outpaced the growth of output.

¹²See Bernanke and Gertler (1995), among others, for a discussion of how asset price changes affect economic activity through their effects on the balance sheets of firms, households, and financial intermediaries.

¹³See, *inter alia*, Hoshi and Kashyap (2000), Friedman (2000), and Shimizu (2000).

¹⁴Kwon (1998), Brunner and Kamin (1998), and Bayoumi (2000) present evidence that real economic activity in Japan was affected, via bank lending, by movements in assets prices. Morsink and Bayoumi (2001) also support the key role of banking as a transmission mechanism

All of these factors weighed heavily on growth, shown in Exhibit II.1, which declined from nearly 5 percent (Q4/Q4) in 1990 to nearly zero in both 1992 and 1993. In addition, the yen strengthened dramatically starting in early 1990, contributing to the falloff in economic activity and posing further downward pressure on prices. Twelve-month CPI inflation declined to roughly 1 percent by the close of 1993, while the growth of the GDP deflator fell off even more rapidly.

In response to the slowdown, Japanese economic policy clearly loosened. The overnight call money interest rate declined from a peak of 8.2 percent in March 1991 to 2 percent in March 1995, and declined further to ½ percent by October 1995. Fiscal policy also moved toward stimulus, with the structural budget balance moving from a surplus of 1.3 percent in 1990 to a deficit of nearly 5 percent by 1996.

Whether economic policy loosened enough is the subject of Sections IV and V of this note. However, as demonstrated in Section III, during the early 1990s, few observers expected the slowdown to be as deep and protracted as it turned out to be. Moreover, a temporary revival of growth, starting in mid-1994 and extending through 1996, undercut the need for further stimulus in the eyes of many policymakers.

In retrospect, however, it is apparent that the mid-1990s recovery was quite fragile, and with the advent of the hike in the value-added tax in 1997 and the Asian financial crisis in 1997-98, the economy once more fell into a protracted slump, interrupted only briefly by the high-tech boom in 2000. Moreover, consumer price inflation, after briefly becoming negative in 1995

in Japan.

(partly due to a sharp temporary surge in the yen) and then moving up slightly in 1996 and 1997, has been consistently negative since September 1999.¹⁵

In this context, the question arises as to whether more stimulus should have been provided to support the nascent mid-1990s upturn and help it grow into a more sustained recovery. The 1993-94 period may have been particularly crucial for monetary policy, since that is the last time (with the exception of the short-lived response to the VAT hike in 1997) that inflation rates exceeded zero by a reasonable margin, so that a sufficiently large drop in the policy interest rate could have generated very low or negative short-term real interest rates. After the beginning of 1995, zero or negative inflation rates largely undermined the effectiveness of monetary policy by limiting the extent to which the real interest rate could be lowered.

III. Was Japan's Deflationary Slump Anticipated?

The actions of Japanese policymakers during the first half of 1990s cannot be understood without a sense of their expectations for the Japanese economy. By studying the evolution of forecasts for growth and inflation across the decade, we conclude that most observers were very slow to appreciate how deep and protracted Japan's economic slowdown would be. Similarly, there was little in financial market indicators to suggest that market participants realized that Japan was facing a prolonged deflationary slump until late in the decade.

¹⁵Measured inflation, even after adjustment for the hike in the value-added tax in 1997, showed small positive rates during 1996 and 1997, but changes in the index are widely considered to be biased upward, suggesting that true inflation probably remained negative. It has been noted, particularly by the Bank of Japan, that some of the downward pressure on prices in Japan during this period was what has been referred to as "good deflation", resulting from technical change and deregulation in Japan's very rigid service sector. However, even "good deflation" stemming from these sorts of factors can complicate the task of monetary policy.

III.2 Macroeconomic Forecasts

Even as the economy stalled in 1992 and 1993, following the largely unanticipated bursting of Japan's asset bubble in the early 1990s, forecasters appear to have remained optimistic about Japan's medium-run prospects, with most observers predicting a bounce-back to high growth rates within a couple of years. Exhibit III.1 presents forecasts of Japanese GDP growth made by Federal Reserve Board staff, private economists surveyed by Consensus Economics, and IMF staff.¹⁶ For each year, actual growth, the red bars, is compared with forecasts of growth in that year made one year earlier, the blue bars, and forecasts made two years earlier, the black bars. The exhibit makes clear that forecasts fell off much more slowly than actual growth rates, and only in the latter half of the decade did a fundamental reassessment of the outlook for Japan appear to take place.

Similarly, observers were generally slow to adjust downward their forecasts for inflation (Exhibit III.2.) Although analysts for the most part foresaw a period of disinflation for the mid-1990s, the descent into deflation in 1995 appears to have caught analysts off guard. In fact, private sector analysts continued to project positive inflation rates until late in the decade.

To take a closer look at the evolution of macroeconomic forecasts in the early 1990s, Exhibit III.3 shows the progression of forecasts of growth for 1992 (the first year in which economic growth stalled) and inflation for 1995 (when the inflation rate first turned negative). It is clear that forecasters underestimated the extent of the economy's downturn, with both FRB

¹⁶FRB staff forecasts made post-1996 are not shown for reasons of confidentiality. For private economists, we use the average forecast from the survey of private-sector economists published by Consensus Economics Inc (www.consensuseconomics.com) in January of each year. IMF staff forecasts are taken from the IMF World Economic Outlook, various years.

staff and private sector analysts projecting close to 3 percent growth for 1992 as late as the summer of 1991. Forecasters were not much quicker to predict deflation, with both FRB staff and private sector analysts projecting an end to disinflation as late as the beginning of 1995; after that, inflation forecasts were marked down significantly as data showing falling prices began to trickle in. The bottom panel indicates that forecasters did not come to grips with Japan's sustained deflation until relatively late in the decade, when private-sector forecasts for average inflation over the next ten years approached zero.

A question arises as to whether forecasters missed any signals that might have persuaded them to alter their perceptions earlier of the Japanese economy. One possibility is that firms' own assessments of their prospects might have contained valuable predictive information. Exhibit III.4 shows results from the Bank of Japan's closely-watched Tankan survey. Interestingly, firms appear to have swiftly downgraded their future investment plans, likely reflecting the large amount of excess capacity in the aftermath of the bursting of the bubble. As in the case of macroeconomic forecasts, however, firms were overly optimistic about sales and profits prospects in the first half of the 1990s, suggesting that they, too, failed to anticipate the severity and longevity of the slump.

III.3 Financial Market Indicators

Financial market indicators through the mid-1990s also suggest that markets were not expecting the Japanese economy to continue to deteriorate going forward. As indicated in the top panel of Exhibit III.5, long-term bond yields followed short rates downward through 1993. Once short rates flattened out in 1994, however, long-term yields rose again, in part reflecting the temporary pick-up in growth that started in that year. As late as January 1995, at the beginning

of Japan's first year of deflation and of near-zero short-term interest rates, long yields registered 4.7 percent. Concerns about sustained high fiscal deficits may also have contributed to the upward pressure on long yields; however, in view of the fact that long yields declined considerably further by the end of the decade, notwithstanding continued increases in the public sector debt, fiscal concerns probably explain only part of the uptick in these yields in 1994.

Another, related gauge of financial market expectations for the economy is the slope of the yield curve, with steeper curves being consistent with expectations of a future pickup in growth and in short-term interest rates.¹⁷ As shown in the middle panel of Exhibit III.5, this measure, too, suggests that the market held no expectations of a sustained deflationary slump. The spread between the 10-year bond yield and the three-month interest rate rose, on balance, until 1996, and only started to narrow significantly in late 1996, well after short-term interest rates had fallen nearly to zero.

Consistent with these indicators, implied rates from three-month interest rate futures contracts with six- and nine-month maturities indicate that, six and nine months ahead of the actual resumption of policy easing in 1995 by the Bank of Japan, market participants did not expect policy makers to begin lowering short rates. This in turn suggests that market participants perceived that the state of the economy did not warrant further rate cuts at that time.

A final indication that financial markets remained optimistic about the Japanese economy comes from foreign exchange markets, where, as indicated in Exhibit II.2, the value of the yen reached decade highs in mid-1995. In sum, not only did policymakers and professional

¹⁷ See Dotsey (1998) for a review of the empirical literature on the predictive content of the spread between long and short term interest rates for future economic growth.

forecasters fail to appreciate the gravity of Japan's situation as late as 1995, but so, too, did financial markets.

IV. Monetary Policy in the Lead-up to Deflation

This section reviews the response of Japanese monetary policy to the slowdown in the economy. As discussed below, in light of the expectations that policymakers and other observers held for Japan's economic prospects, the loosening of monetary policy that took place during the 1991-95 period did not appear unreasonable or obviously inadequate. Clearly, the Bank of Japan never anticipated the prolonged slump of the 1990s, and at several times during the decade the BOJ believed that it was delivering an unprecedented degree of monetary stimulus. However, the setting of monetary policy made little allowance for the asymmetric risks that faced the economy at this time—in particular, the risk of deflation and the associated possibility that interest rates would hit their zero lower bound. Indeed, the BOJ seemed to be comfortable with the prospect of sustained zero inflation,¹⁸ notwithstanding the fact that zero inflation on average over time will likely imply shorter periods of deflation as well as inflation.¹⁹

¹⁸ BOJ Governor Hayami has stated that “The BOJ's policy is to seek stable prices, not inflation or deflation...” (Reuters, 1998)

¹⁹ Moreover, BOJ officials frequently expressed discomfort with short-term interest rates close to zero, regarding them as abnormal and also as a factor diminishing the incentives for firms and banks to reschedule loans that could not have been sustained in a higher interest-rate environment. Deputy Governor Yamaguchi noted that “the decisive monetary easing and active interventions to support the financial system by the Bank of Japan no doubt averted deflation or financial panic in Japan. On the other hand, those policy decisions might have dampened the restructuring efforts at Japanese financial institutions.” (Yamaguchi, 1999) Governor Hayami has on several occasions raised concerns that low interest rates were delaying reforms and encouraging “moral hazard” on the part of firms. (Kyodo News, 2000, Rowley, 2000) Investors' sense that policymakers were eager to move rates off their zero floor no doubt kept longer-term interest rates elevated.

In the event, these risks became reality and the ability of conventional monetary policy to pull the economy out of recession was substantially undermined. During this period, the effectiveness of any given monetary stance may also have been hindered by headwinds from financial sector weakness, but probably not so much as to have negated the benefits of more concerted monetary easing.

IV.1. Was Monetary Policy Too Tight in the Lead-up to Deflation?

Japanese Monetary Policy Developments: 1990-95

Despite the sharp correction of equity prices that began early in 1990, the BOJ continued to tighten its policy stance through the end of that year as real estate prices rose and output remained above potential. The BOJ began to ease monetary policy in the summer of 1991, soon after real estate prices began to decline and the economy began to grow below its potential rate. The official discount rate (Exhibit II.2) was lowered in seven steps from 6 percent to 1-3/4 percent by September 1993.²⁰ The overnight call-money rate recorded an even more marked decline, falling from a bit over 8 percent during the first half of 1991 to around 2-1/2 percent by the end of 1993.²¹ Over the same period, the yield on 10-year government bonds (Exhibit III.5) dropped from 6-3/4 percent to about 3 percent.

²⁰At the time, these actions were viewed as historic. For example, in a speech given in December 1993, then BOJ Governor Mieno noted that “the present official discount rate of 1.75 percent represents the lowest level of the discount rate in the Bank of Japan’s 111 year history.” (Mieno, 1994.)

²¹In March 1995 the BOJ adopted the uncollateralized call-money rate as its primary policy rate, increased its holdings of short-term money-market securities, and endeavored to keep the call-money rate at or below the official discount rate. Prior to this date, direct loans to banks were more important, and the call-money rate was typically higher than the discount rate.

The BOJ maintained this policy stance unchanged through 1994, as hints of recovery began to emerge. In May 1994, the BOJ observed in its *Quarterly Bulletin* (pp. 32-33) that “Japan’s economic growth appears to have stopped weakening, against the background of progress in capital stock adjustment as well as the permeation of stimulative effects of monetary and fiscal policies to date.” By November, the BOJ noted that the economy was “recovering gradually,” with all categories of spending showing strength, and long-term interest rates moving up in apparent response.²²

During early 1995, however, the fledgling recovery was jeopardized by several adverse developments, including the effects of the Kobe earthquake, a further sharp appreciation of the yen, and a renewed slump in equity prices. The BOJ responded by cutting the official discount rate 75 basis points in April and another 50 basis points in early September, bringing the discount rate to 1/2 percent.²³ The call-money rate registered a roughly parallel decline, also reaching 1/2 percent in September, where it stayed until being lowered essentially to zero in 1999.

What Happened to Real Interest Rates?

While nominal short-term interest rates declined quite a bit over this period, they would have imparted significant stimulus only to the extent that they brought down real interest rates as well. The upper panel of Exhibit IV.1 graphs the nominal call-money rate and two measures of

²²*Quarterly Bulletin*, November 1994, p. 14. Japanese long-term interest rates may also have been responding to the global upswing in long rates following the start of the Federal Reserve’s tightening cycle in early 1994.

²³These actions also were viewed as historic. In November 1995, then Senior Deputy Governor Fukui stated that the discount rate was at a “level unprecedented in history.” He noted that 1 percent had previously been the lowest rate experienced by a major industrial country (i.e., the United States in the 1930s and Switzerland in the 1970s). (Fukui, 1996)

the real call-money rate. The first measure deflates the nominal interest rate using CPI inflation over the previous twelve months ($t / t-12$), while the second measure uses realized inflation over the coming twelve-month period ($t+12 / t$). Between early 1991 and mid-1995, the nominal call-money rate fell about 7 ½ percentage points. Somewhat reassuringly, both measures of the real call-money rate declined as well: the real call-money rate based on future twelve-month inflation ($t+12 / t$) by about 5 ½ percentage points, and the real rate based on previous twelve-month inflation ($t / t-12$) by about 3 ½ percentage points.²⁴

While the BOJ's policy did, in fact, reduce real interest rates, several factors may have partially offset the stimulus coming from these reductions. First, with Japanese productivity growth and potential output growth declining, the equilibrium real interest rate may also have been moving down, accordingly reducing the stimulus coming from declining actual real rates. Second, the sustained appreciation of the yen may have partially offset the lowering of interest rates. Third, as discussed further below, ongoing difficulties in the financial system may have distorted key channels through which monetary policy is transmitted to the economy.

Evidence from Taylor-style Rules for Interest Rates

With nominal and real interest rates having declined substantially, and with the economy showing signs of revival by the mid-1990s, one can understand why Japanese authorities believed the stance of monetary policy to be appropriate, even if in retrospect it turned out to have been too tight. The view that monetary policy was adequately stimulative by conventional standards is supported by econometric estimates of a simple Taylor-style monetary policy rule for

²⁴It should be noted, however, that in 1994 and early 1995, when the BOJ kept the policy rate flat, both measures of real interest rates edged up as inflation continued to decline.

Japan. We also estimate such a rule on U.S. data for comparison. The policy rule relates the call-money (or federal funds) interest rate to four-quarter-ahead expected values of CPI inflation and the output gap.²⁵

The middle panel of Exhibit IV.1 compares the call-money rate for Japan with the fitted Taylor-rule interest rates under two assumptions about the expected inflation rates and output gaps. The dashed lines (labeled “Revised Taylor Rule”) are based on the current published inflation data and current Federal Reserve Board staff estimates of output gaps. The dotted lines (labeled “Real-time Taylor Rule”) are based on the Board staff’s forecasts of inflation and output gaps as of each quarter shown.

Using real-time Board staff forecast data, and based on the standard posed by our estimated Taylor rule, Japan was “too loose” on average from 1990 through 1994. Using revised data, Japanese policy was “too tight” over the same period.²⁶ The primary reason for the discrepancies between the real-time and revised Taylor rules is that inflation turned out lower than forecast in the early 1990s, as was discussed in Section III of this note. Conversely, the bottom panel shows that the U.S. federal funds rate declined faster and farther than would be

²⁵The estimated coefficients imply less weight on the output gap and more weight on inflation than in the original (non-estimated) specification in Taylor (1993), but are close to what other researchers have found empirically for the G-3 countries. See Clarida, Gali, and Gertler (1998) and Fair (2001).

²⁶As noted in the introduction, Bernanke and Gertler (1999) also found BOJ policy to be tighter in this period than indicated by an estimated reaction function, as, to varying degrees, do Clarida, Gertler, and Gali (1997), Junoshi, Kuroki, and Miyao (2000), and Kato and Nishiyama (2001).

implied by the estimated Taylor rule for both real-time and revised data in the wake of the 1990-91 recession.²⁷

Of course, an estimated Taylor rule based on a central bank's actual behavior is not necessarily the most suitable benchmark for assessing monetary policy, particularly as the estimation sample (1981Q1 - 2000Q2) includes the period being examined: 1990-95. However, the estimated parameters of our Taylor rule for Japan are in the neighborhood of what Federal Reserve staff and academic researchers have found for other industrial countries, lending support to the view that our Taylor-rule interest rates reasonably mimic conventional standards for monetary policy.

The bottom line of this analysis is that Japanese monetary policy during 1991-95 appeared appropriate based on the expectations for the economy that prevailed at that time. However, inadequate allowance for downside risk was built into monetary policy, as evidenced by the fact that once actual inflation and growth numbers came in weaker than expected, interest rates ended up being higher than were called for under the Taylor rule.

FRB/Global Model Analysis

Additional evidence that in retrospect the BOJ kept policy too tight, and that looser policy might have helped to avoid deflation, is provided by a series of counterfactual simulations using the Federal Reserve staff's FRB/Global model, shown in Exhibit IV.2.²⁸ In each simulation, monetary policy in Japan and in the other major industrial countries follows a standard Taylor

²⁷This result, too, is consistent with evidence from estimated Taylor rules presented by Clarida, Gertler, and Gali (1997) and Bernanke and Gertler (1999).

²⁸For a description of the model, see Levin, Rogers, and Tryon (1997).

rule.²⁹ Depending upon the simulation, the exercise consisted of permanently reducing the intercept term in the Japanese policy rule by 250 basis points in 1991 Q1 (the simulation represented by the red line), 1994 Q1 (the blue dotted line), and 1995 Q2 (the green dashed line). The policy rules respect the zero bound on nominal interest rates by specifying that the policy rate is the maximum of zero and the rate implied by a Taylor rule.

In each panel the solid black line represents the historical data and the other lines show the alternative simulations. The impact effect of the alternative simulations is to lower the short-term interest rate by about 200 basis points, thereby boosting growth and inflation. The key finding is that, had the BOJ loosened monetary policy to the extent modeled in the simulations at any time up until early 1995, inflation could have been kept positive through the end of the decade. In that sense, the actual policy stance of the BOJ clearly was too tight during the 1991-95 period. Moreover, after that period, with the policy rate already having fallen nearly to zero, the opportunity to avoid deflation simply by lowering interest rates was lost.

Given the inability of conventional monetary policy to stabilize an economy under deflation, and considering the uncertainties associated with unconventional monetary policy options, there is a clear asymmetry of costs to deflation and inflation.³⁰ These simulations support the view that, given the very low rate of inflation and negative output gap that existed in 1994-95, some precautionary further lowering of interest rates would have been valuable to

²⁹In contrast to the estimated Taylor rules described in the preceding sub-section, the policy rules used for the simulations take the (non-estimated) form and coefficients described in Taylor (1993).

³⁰This is very much the view espoused in Reifschneider and Williams (2000), Blinder (2000), Kato and Nishiyama (2001), and IMF (2002), Chapter II.

reduce the probability of deflation, even if the baseline forecast was for higher growth and inflation.

While such precautionary loosening entailed the risk of creating higher-than-desired inflation, this could have been addressed through tightening at a later point. As the simulation clearly demonstrates, even when inflation and interest rates are approaching zero, the effect of initial monetary loosening is short-lived as the output gap and inflation rise above their historical values, causing interest rates to move higher than the baseline after a couple years. What if the BOJ had loosened substantially in 1994, to guard against the risk of deflation, and then unanticipated favorable shocks had lifted output gaps and inflation well into positive territory? In that scenario, based on the logic of the simulation results discussed above, inflation would have risen above desired levels for a number of years, but a tightening of monetary policy by the BOJ in response would have caused short-term interest rates to rise and inflation eventually to decline back to its original baseline.

Of course, a further and precautionary easing in 1994 would have been a difficult decision for the BOJ to have made, considering both the extent to which interest rates already had been lowered and the mounting sentiment that a recovery was imminent. Moreover, BOJ officials at the time may have seen the risk of excessive monetary stimulus as being more than merely boosting inflation above desirable levels for a few years. With the asset-price bubble of the 1980s having been attributed, at least in part, to overly loose monetary policy, the BOJ may have been concerned that lowering interest rates might engender conditions favorable to the

emergence of a new bubble in equity and land prices.³¹ Yet, given the extent to which asset prices had declined by the early 1990s, and given the weakness of both the economy and the financial sector, the risks of a repeat experience of the 1980s bubble were probably quite remote.

Evidence from Monetary Aggregates

Another perspective on whether in retrospect the BOJ kept policy too restrictive in the early 1990s is the growth of the monetary base and various broad aggregates. Exhibit IV.3 plots twelve-month growth rates of broad liquidity, M2 plus CDs, and the monetary base. Growth rates of these aggregates fell nearly continuously from 1990 to 1992, perhaps indicative of excessive policy tightness. Moreover, while the growth of the monetary base picked up thereafter, the growth rates of the broader aggregates—particularly M2 plus CDs—recovered by less, suggesting that the BOJ’s reductions in interest rates, substantial as they were, may not have been sufficient.³²

However, the demand for money generally declines as economies move into recession and the growth of nominal income slows, and as discussed further below, reductions in both the demand and supply of credit may have caused the broader aggregates to grow particularly slowly. Hence, while the slowdown in the monetary aggregates is suggestive of excessively tight policy,

³¹ Market observers certainly believed the BOJ held this concern. According to one news report, “private sector economics say that the central bank has eased fiscal (*sic*) policy too grudgingly, for fear of rekindling the speculative bubble that led to the collapse of the stock and real estate markets since the late 1980s.” (Reuters News Service, 1993) According to another report several years later, then BOJ Governor Matsushita noted that “prolonged easy monetary policy contributed to the creation of Japan’s ‘bubble economy’ of inflated stock and land prices in the late 1980s. Traders said this was interpreted as implying that the bank would raise interest rates to avoid creating another bubble.” (Reuters News Service, 1996)

³² Makin (2001), among others, cites reduced monetary growth in the early 1990s as evidence of excessive monetary tightening.

particularly in 1991 and 1992, it is not definitive on this point, and moreover, monetary growth picked up appreciably later on.

IV.2 The Effectiveness of Monetary Policy

The failure of the Japanese economy to revive in the 1990s, even after substantial declines in real short-term interest rates, raises concerns about whether Japanese policy might have lost its ability to influence the economy during this period. While evidence on this issue is not fully conclusive, our sense is that much of the failure of monetary loosening to support asset prices and to boost the economy owed to offsetting shocks rather than to a genuine breakdown of the monetary transmission mechanism. The “financial headwinds” associated with the collapse of asset prices probably did, to some extent, hinder the ability of monetary policy to boost activity. Additionally, especially after 1995, Japan did exhibit symptoms suggestive of a “liquidity trap”. Even so, there is little evidence that the transmission channels of monetary policy were so diminished as to have obviated the benefits of faster and sharper monetary easing in the 1991-95 period.

The Impact of Monetary Policy on Asset Prices

Asset prices are key channels for the transmission of monetary policy to the real economy. We focus here on the behavior of long-term bond prices, equity prices, land prices, and exchange rates. Exhibit III.5 shows that 10-year government bond yields fell nearly as much as short-term yields between 1991 and the present, although this decline was both slower and more prone to temporary reversals.

Exhibit II.1 shows that land prices have fallen steadily since 1991, but that equity prices more or less stabilized about a year after the BOJ began to ease policy. Given that land and

equity prices were unsustainably high before 1991, their failure to respond more vigorously to monetary easing is quite understandable.

The relationship between exchange rates and domestic monetary policy is complicated by the effects of foreign monetary policy and other factors that influence risk premia. The yen rose nearly continuously from 1991 through mid-1995, despite the reduction in short-term Japanese interest rates. However, interest rates fell during much of this period in the United States and Europe as well, at least partially offsetting the effect on the yen of easier Japanese monetary policy. An additional factor behind yen strength may have been the desire of banks and investors to repatriate foreign assets as balance sheets weakened after the bursting of the equity and real estate bubbles.³³

Overall, therefore, asset prices in Japan do appear to have responded about as one would have expected in the face of monetary policy easing in the early 1990s, especially considering the impact of other factors—notably the asset price bubble and the behavior of foreign interest rates.

Evidence for a Liquidity Trap?

A situation in which the policy interest rate is constrained by a lower bound of zero is sometimes referred to as a liquidity trap.³⁴ One implication of a liquidity trap is that large increases in base money may have little effect on broader monetary aggregates as components within the broader aggregate become very close substitutes (since all yield a similar rate of

³³According to one market report, Japan's slump had "prompted many investors to switch into low-risk government bonds, pushing down share prices and unrealized gains on companies' equity portfolios...To bolster battered balance sheets, companies moved to repatriate overseas earnings, pushing the yen up further. (Reuters, 1995)

³⁴This is the simplest definition of a liquidity trap, and that used in Ueda (2001).

return).³⁵ It is also at least theoretically possible that elements of a liquidity trap may emerge when interest rates are low but still above zero, should asset holders consider interest rates to be too low to compensate them for the risk or inconvenience of holding less liquid assets.

Exhibit IV.3 shows that the monetary base began to grow faster than M2 plus CDs starting in 1992 and faster than broad liquidity starting in 1993, suggestive of the emergence of a liquidity trap. However, at least during the 1992-1995 period, the difference in the growth rate of the monetary base relative to that of the broader aggregates was comparatively limited, and as discussed earlier, may have reflected other factors: a decline in the demand for money due to the economic slowdown, or a reduction in the money multiplier owing to reduced credit activity.

Beginning in late 1995, however, after the call money interest rate had fallen nearly to zero, base money started growing at roughly double the rates of the broader aggregates.³⁶ In late 2001 base money growth took a further upward turn. These observations imply that Japan may be in a liquidity trap now, even if it was not during the early 1990s.

Financial Market “Headwinds”

Probably the most commonly cited special factor behind Japan’s poor performance in the 1990s is the weakness of Japanese financial institutions, especially its banks, associated with the

³⁵Whether this obviates the usefulness of quantitative monetary easing—including through purchases of domestic (non-government-bond) securities, real goods, or foreign assets—remains a topic of debate. See, inter alia, Krugman (1998), Goodfriend (1997, 2000), Bernanke (2000), Blinder (2000), Svensson (2001) and Ueda (2001).

³⁶The upward spike in base money growth at end-1999 and the downward spike at end-2000 reflect a temporary surge in demand associated with the century date change.

sharp decline of Japanese equity and real estate prices.³⁷ The bursting of the asset price bubble at the beginning of the decade led to a substantial deterioration of household and corporate balance sheets, substantial increases in non-performing loans, and concordant declines in the strength of the banking system. These developments, in turn, are said to have given rise to “headwinds” that held back economic growth, including a reduced ability and willingness of financial institutions to lend, a reduced desire of businesses to take on new debt, and attempts by households to restore lost wealth by saving more. Under these circumstances, it is quite possible that the ability of monetary policy to stimulate lending and spending through lower interest rates may have been impaired to some extent.

Our sense is that the deterioration of household balance sheets in Japan, while substantial, did not significantly weaken household spending. Exhibit IV.4 compares Japanese savings rates to those of other countries that, to varying degrees, experienced financial difficulties in the early 1990s. Compared to the sharp increases in savings rates experienced in the Nordic countries and in the United Kingdom, as households responded to the collapse of residential property price bubbles and associated economic downturns, savings rates in Japan actually declined through much of the 1990s.

Both anecdotal and statistical evidence point to a much stronger effect of the collapse of the asset price bubble on the borrowing and investment spending of Japanese firms. As indicated in the lower panel of Exhibit IV.3, the growth of bank credit moved down from very high rates to near zero in the 1993-98 period, and since then has been negative; this may also be seen in the

³⁷See, *inter alia*, Kwon (1998), Brunner and Kamin (1998), Bayoumi (2000), Shimizu (2000), and Morsink and Bayoumi (2001).

declining ratio of bank credit outstanding to GDP in Exhibit II.2. The counterpart of the downturn in bank credit was a substantial decline in non-residential investment spending, which fell from 20 percent of GDP in 1990 to 14.5 percent by 1999.

The downturn in business investment and borrowing in part may reflect a reduced supply of credit, reflecting the weakened condition of banks. The Tankan survey response of firms' views of actual and forecast credit conditions deteriorated significantly, on balance, in the 1990s. At the same time, however, reductions in the demand for investment funds, owing to firms' financial problems, have been important. Under these circumstances, it is likely that reductions in monetary policy interest rates would be less successful in inducing additional borrowing and spending than in a less financially fragile environment.

Even so, our sense is that Japan's financial difficulties were very unlikely to have fully eliminated the impact of monetary policy on credit and spending.³⁸ Moreover, by reducing debt service burdens and providing support to asset prices, lowering interest rates more rapidly could have alleviated earlier some of the constraints on demand posed by balance sheet problems. Hence, financial fragility did not obviate the potential effectiveness of additional monetary easing in Japan during the 1990s.

V. Fiscal Policy

This section looks at whether Japanese fiscal policy, in hindsight, could have done more to help avoid the deflation and economic stagnation that set in during the 1990s. Much as in the case of monetary policy, the evidence suggests that by conventional standards, considerable fiscal

³⁸Gibson (1995) provides some evidence on the relatively small role played by bank weakness in the investment slowdown.

stimulus was provided during the first half of the decade. However, because of the strong downward pressures on private spending, sustained budget deficits failed to substantially boost the economy. Additionally, fiscal stimulus packages might have been more effective in supporting demand had they been designed somewhat differently.³⁹ Hence, in light of the risks prevailing in the mid-1990s, greater and more appropriately targeted fiscal stimulus would have been desirable.

V.1 Was the Stance of Fiscal Policy Appropriate?

Japanese Budget Developments

Despite the sharp decline in Japanese real GDP growth in 1992 (see upper table in Exhibit V.1), the fiscal impulse, measured by the change in the structural deficit (the last column), was only slightly expansionary in 1992. However, the continued weakness in real GDP growth in 1993 prompted a more substantial fiscal impulse that year (nearly 2½ percent of GDP). Fiscal policy was then close to neutral in 1994 as the economy seemed to be improving and the debt burden was beginning to rise, but became stimulative again in 1995.

Fiscal Strategy Issues

In addition to the mere size of the structural deficit, other budget choices have a bearing on whether fiscal policy is stimulative: tax cuts vs. spending increases, temporary vs. permanent measures, and the manner in which fiscal actions are implemented. During the 1990s in Japan, these issues triggered considerable debate among academics and policymakers.

³⁹ See Posen (1998), Chapter 2, Muhliesen (2000), and Kuttner and Posen (2002) for further discussion of the scope and effectiveness of Japanese fiscal policy in the 1990s.

The actual choices made by the fiscal authorities can best be understood in the light of several factors. First, owing in part to more limited social safety nets, Japan's budget is less cyclically sensitive than in other industrial countries and provides fewer automatic stabilizers. Therefore, fiscal stimulus is much more reliant on discretionary fiscal action in Japan.⁴⁰ Second, partially due to concerns about the effect of an aging population on future budgets, the authorities initially were extremely reluctant to undertake any measures that could have become embedded on a sustained basis in future budgets.⁴¹

In part reflecting these considerations, Japanese fiscal stimulus was not provided through its formal budgets, but rather through a series of supplementary fiscal packages, listed in Exhibit V.1.⁴² Moreover, as is evident from the table, these packages tended to rely heavily on measures that could be easily reversed later on: public works, which already were higher than in other industrial countries, and, to a lesser extent and later in the downturn, temporary tax cuts such as the 5.9 trillion yen temporary income tax rebate for FY 1994. By putting money in people's pockets, these actions probably worked as well as others in achieving "first-round" stimulus effects, assuming many consumers were liquidity constrained. Yet, if fiscal stimulus is to encourage self-sustaining growth, it must lead to "second-round" expenditures by the private sector, and here the government's fiscal strategy has been criticized.⁴³

⁴⁰ See Posen (1998), Chapter 2, and Muhliesen (2000).

⁴¹ See Posen (1998), Chapter 3.

⁴² From the OECD Economic Surveys of Japan, various years. These surveys also contain additional information and analysis regarding the fiscal packages.

⁴³ See Ishii and Wada (1998) for a discussion of the problems associated with major public works projects in Japan.

With respect to public investment, some observers have suggested that reliance on public works is very politically-driven in Japan, as legislators use these expenditures to build support in their home districts.⁴⁴ Therefore, many projects—for example, bridges and roads in lightly-traveled areas—failed to address the most pressing infrastructure needs. It has been argued that such public investment might have been more effective in igniting a self-sustaining expansion had it been directed toward more visibly productive projects, which, in addition to raising productivity, might also have boosted consumption by increasing confidence in the future growth potential of the economy.⁴⁵ (Section V.2 below addresses two other criticisms leveled against deficit-financed spending more generally, that it crowds out private investment and that it leads to “Ricardian” contractions in private consumption.)

Other types of government spending might have been more worthwhile than public works, particularly given already high levels of public investment. Much has been made of Japan’s long-standing tradition whereby firms are reluctant to lay off workers and authorities are reluctant to force poorly-performing firms into bankruptcy.⁴⁶ Expenditures to create a more secure social safety net and to support worker training and assistance might have helped ease the reluctance to add to unemployment and hence speeded the adjustment in employment and industry after the bursting of the bubble. Moreover, to the extent that recipients of such safety-

⁴⁴ See Lincoln (2001), Chapter 3, and Hijino (2001).

⁴⁵ See Yoshino and Sakakibara (2002).

⁴⁶ Kazuo (1995), Chapter 7 discusses Japanese employment practices. Lincoln (2001) discusses how vested interests in Japan can hinder restructuring and resource reallocation.

net expenditures were liquidity constrained, this might have led to more significant second-round expenditures than public works projects.

It has also been suggested that a heavier reliance on tax cuts in the earlier packages might have been more effective in igniting a self-sustaining expansion. Classic Keynesian analysis suggests that government spending is more effective in raising aggregate demand than tax reductions, since some of a tax cut will be saved. However, if tax cuts lead to greater second- and third-round private spending increases, they may still afford greater stimulus than public expenditure hikes.

In this regard, the temporary tax cuts initially implemented by the government probably were not very effective. In general, consumers are believed to smooth their lifetime consumption expenditures to match their expected lifetime income. Since a temporary tax cut has little impact on lifetime income, a larger portion is saved than with a permanent tax cut. However, as noted above, the government was reluctant to engage in permanent tax cuts given the rapid aging of the Japanese population and the associated fiscal burden.

More effective, and yet temporary, tax cuts could have been devised had they focused on consumption rather than on income. At one point the Japanese government did attempt to stimulate spending through “consumption vouchers”,⁴⁷ but there was no way to ensure that vouchers would have been used for spending that would not have taken place anyway. One approach that was not tried, but which might well have been more effective, was a temporary consumption tax cut: consumers are more likely to spend money now if they believe that goods

⁴⁷ These vouchers, known as “Regional Promotion Coupons,” were part of the Emergency Economic measures proposed in November 1998 and implemented in early 1999.

will be more expensive later. Its strong incentives for consumption, combined with its temporary nature (which would have been desirable for long-term budgetary reasons), point to a temporary consumption tax cut as a very useful instrument for Japan in the early 1990s.

Comparisons with Other Recessions

With the benefit of hindsight, and leaving aside the particular ways in which stimulus might be provided, it might seem obvious that greater Japanese fiscal stimulus in the early 1990s would have been helpful. However, the cumulative increase of about 2½ percentage points in the structural deficit in Japan in 1992-1993 (Exhibit V.1) seems to be at least as great as what other countries have done in recessionary periods, as shown in Exhibit V.2. For instance, the fiscal impulse in the United States is estimated to have totaled about 2¾ percent of GDP over 1982-1984, when the U.S. output gap was much larger. Fiscal stimulus was more limited during the 1990-1991 recession in the United States. The only countries that appear to have provided more fiscal stimulus during recent recessionary periods were Canada in the period 1982-84 (about 4 percentage points of GDP over three years in response to an output gap that is estimated to have exceeded 7 percent of GDP) and the United Kingdom in 1992-1993 (nearly 5 percentage points over three years).

FRB/Global Model Analysis

Could additional fiscal policy stimulus have helped prevent the Japanese economy from sliding into deflation? The table in the upper panel of Exhibit V.3 shows the results of a simulation with the FRB/Global model that calculates the amount of additional fiscal stimulus that would have been needed in each of the three years 1993-1995 to keep the output gap at zero, assuming that real short-term interest rates were fixed at their historical levels. The amounts

range from $\frac{1}{2}$ - 1 percent of GDP, which are not trivial, but were still quite feasible, particularly in 1994 while the debt burden still appeared to be manageable. In this simulation, moreover, the model indicates that inflation would have been $\frac{1}{2}$ to $\frac{3}{4}$ percentage points higher, thus staying in the positive range, although still quite low.

The relatively small amounts of additional stimulus estimated to be needed to have returned the output gap to zero reflect the very large fiscal multiplier for Japan embedded in the FRB/Global model. As shown in the table in the lower panel of Exhibit V.3, this multiplier is estimated to be greater in Japan than in most of the other industrial countries, mainly because the share of imports is lower, so there is less “leakage” from the classic Keynesian multiplier. In practice, of course, Japanese fiscal policy may have had a smaller impact on the economy than incorporated into the model, for reasons discussed earlier in this section. However, even if we assume that the Japanese fiscal multiplier was only one third the size of that embedded in the model, the cumulative fiscal cost of keeping output at potential during 1993-95 would have been about 6 percent of GDP. This cost, while considerable, would have been money well spent, had it helped avert deflation and a prolonged economic slump.

V.2 Did Fiscal Policy Become Ineffective in the 1990s

In light of the fact that protracted economic stagnation coincided with sustained fiscal deficits and large increases in Japanese public sector debt, some observers have suggested that fiscal policy may have lost its ability to influence economic activity in the 1990s.⁴⁸ It has been argued that the run-up in public debt may merely have led to offsetting reductions in private

⁴⁸See Perri (2001). Asako (1997) provides a survey of the literature on possible reasons for a decline in multiplier effects of fiscal policies in Japan.

consumption.⁴⁹ (According to this “Ricardian” view, consumers may reduce spending by an amount similar to the increase in government expenditures if they regard those expenditures as unproductive, so that the higher government debt has to be repaid later through higher taxes.) In theory, it is also possible that higher public investment may have crowded out private investment by raising long-term interest rates higher than they otherwise would have been, particularly given concerns over the effects of Japan’s aging population on future budgets and public sector debt levels. Finally, it is possible that more fiscal stimulus might have only resulted in greater appreciation of the yen, which, as shown in Exhibit V.4, appears to have contributed to a sharp fall in net exports in 1994 and 1995.

Yet, there is little compelling evidence for the view that Japanese fiscal policy substantially lost its ability to influence the economy. First, the “Ricardian” argument that consumption was being held back by concerns about the rising government debt is belied by the fact that, during the 1990s, Japanese household savings rate actually declined on balance (Exhibit IV.4). In fact, as indicated in the table in Exhibit V.4, during the early 1990s, consumption spending actually held up surprisingly well, considering the fall in income growth. Second, considering the substantial declines in long-term interest rates that occurred during the first half of the 1990s, and given the degree of slack in the economy, it is hard to see how fiscal stimulus should have crowded out private investment on a sustained basis. For the same reason, it is unlikely that the runup in government deficits contributed much to the rise in the value of the yen during this period.

⁴⁹ Asher (2000) argues that “with public anxiety over the ballooning public debt growing it seems that this is generating a fair degree of Ricardian ‘precautionary saving,’ ” but Kuttner and Posen (2002) find little evidence in support of this view.

The more likely explanation for the failure of fiscal stimulus to ignite a self-sustaining expansion during the 1990s is that, in the aftermath to the bursting of the “bubble economy,” Japanese fiscal policy was reacting to large and sustained shortfalls in private demand, so that increases in fiscal deficits generally were offset by reductions in private spending.⁵⁰ For example, the lower panel of Exhibit V.4 indicates that the substantial increase in the growth rate of public investment in 1992-1993 was well-synchronized with the drop-off in growth in private investment. As shown in the table, private investment, particularly nonresidential fixed and inventory investment, accounted for most of the weakness in real GDP in 1992 and 1993, largely offsetting the fiscal stimulus in those years. The fact that real GDP growth stayed positive in 1992 and 1993 suggests that fiscal policy was at least partially effective in counteracting a significant negative shock. As noted earlier, the downturn in the economy in 1997, when the consumption tax was raised and fiscal policy turned contractionary, also speaks to the effectiveness of fiscal policy.

In addition to the strong downward forces on the economy, the apparent tepid response of private spending to fiscal stimulus may also reflect the fact that the Japanese stimulus packages may not have been designed so as to maximize their macroeconomic impact, rather than that fiscal policy had lost its inherent ability to stimulate the economy.⁵¹ As noted above, heavy reliance on public works projects and, to a lesser extent, temporary tax credits may have diminished the effectiveness of fiscal stimulus. Greater reliance on social safety net expenditures

⁵⁰ See Bayoumi and Collins (2000) for a detailed analysis of the adjustment of the Japanese economy following the bursting of the 1980s asset price bubble.

⁵¹ See Posen (1998) and Yoshino and Sakakibara (2002).

and temporary consumption tax credits might both have provided more genuine stimulus and improved the economy's long-run growth potential.

Section VI. The Monetary and Fiscal Policy Mix

The previous two sections conclude that either easier monetary policy or easier fiscal policy would have been helpful in preventing deflation and a protracted slump in Japan. Model simulations showed the potential effects of each policy in isolation. In some instances, however, the simultaneous application of both monetary and fiscal policies may better help to achieve a desired macroeconomic outcome.⁵² If there are limitations on how fast the policy levers can be moved, using both levers at the same time can yield a given level of stimulus faster.

In addition, in situations such as that faced by Japan in the 1990s, use of both policy levers at the same time may reduce the undesirable side effects that each entails, by reducing the need to push any one instrument too far. For example, tax cuts or spending increases add to the burden of public debt that must be serviced in the future. Moreover, fiscal actions by their nature provide only temporary stimulus to the economy; to continue the stimulative effect in later periods requires further tax cuts or spending increases, with consequent implications for the debt. Monetary policy actions provide more sustainable stimulus, but they can have undesirable side effects as well. In particular, excessive reliance on monetary easing may induce overshooting or cycles in asset prices and/or exchange rates which may be undesirable for other reasons. Finally,

⁵²The structure of the FRB/Global model is such that the combined effects of monetary and fiscal policies on output and inflation are roughly the sum of the effects of each policy in isolation. For this reason, we do not present additional simulations of coordinated fiscal and monetary actions.

in a low-inflation environment, conventional monetary policy is limited by the zero bound on nominal interest rates, the issue triggering our interest in the Japanese experience.

To the extent that additional macroeconomic stimulus was desirable in Japan in the early 1990s, the mix probably should have been tilted toward more monetary easing, particularly in the earlier stages. This conclusion is based on the looming debt burden due to the rapid aging of the population, the weakness of equity and land prices, and the strengthening of the exchange rate. A more expansionary monetary policy in 1994 might have avoided the sharp increase in real long-term interest rates and hefty yen appreciation that occurred that year. However, as nominal interest rates approached zero in the mid-1990s, the scope for conventional macroeconomic easing clearly shifted toward fiscal policy, despite the heavy debt burden.

Given the advantages of loosening both monetary and fiscal policy, particularly in 1994, why did the Japanese not pursue such a policy? The answer probably has both an economic and a political component. First, as noted earlier, the economy had begun to recover that year, and the authorities may have viewed the increase in both interest rates and the exchange rate as validation by the market that the slump was nearing an end, rather than as an impediment to growth that needed to be counteracted. In addition, the Bank of Japan appears to have been reluctant to be viewed as passively monetizing government debt, out of fear that such a policy could erode the BOJ's credibility and eventually lead to runaway inflation.⁵³

Of course, most outside observers would now argue that some inflation would have been desirable. A limited amount of debt monetization might have been helpful in raising inflationary

⁵³Ueda (2001) cites concerns that purchases of government bonds may boost inflation expectations and hence raise long-term interest rates.

expectations, thus raising wage settlements, lowering real interest rates, and stimulating consumer spending. More consistent monetary and fiscal policies, in which the government was expected not to push deficit spending too far while fiscal expansion was underpinned by monetary support, might have had a greater impact on the economy than more expansionary monetary or fiscal policy alone.

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Appendix: Taylor Rule Accounting in Japanese and U.S. Downturns

Jon Faust, John Rogers and Jonathan Wright

This appendix outlines work on the empirical analysis of monetary policy rules during recent economic slowdowns in Japan and the United States. We compare the actual short term interest rate to the fitted interest rate from a Taylor rule in Japan and the United States for the years 1990-1995.

We consider a 4 quarter ahead forward-looking Taylor rule as used by Clarida, Gali and Gertler (1998) among others, which specifies that the fitted interest rate is given by

$$r_t = \rho r_{t-1} + (1-\rho)[\mu_0 + \mu_y E_t y_{t+4} + \mu_\pi E_t \pi_{t+4}]$$

where y_t is the output gap, π_t is the four-quarter inflation rate, and the coefficient ρ is between 0 and 1. The term $r_t^* = \mu_0 + \mu_y E_t y_{t+4} + \mu_\pi E_t \pi_{t+4}$ denotes the target interest rate, but the actual interest rate adjusts slowly towards this target rate whenever ρ is positive, capturing the empirical fact that central banks are generally reluctant to move the short-term rate too fast. The parameters of this Taylor rule are estimated by instrumental variables methods, using 4 lags of the interest rate, inflation and output gap as instruments.

We estimated this Taylor rule for both Japan and the United States using quarterly data from 1981Q1 to 2001Q3. The estimated coefficients are reported in Table A.1. For the United States, our measure of the output gap is 100 times the log difference between real GDP and potential real GDP, as calculated by Federal Reserve Board staff, inflation is measured by the CPI (excluding food and energy) and the interest rate is the effective Federal Funds rate. For Japan, we use the staff measure of the output gap, inflation is measured by the CPI⁵⁴ and the interest rate is the uncollateralized overnight call money rate. The results are similar to those found by Clarida, Gali and Gertler (1998), though their sample was shorter. Specifically, the coefficient on inflation is high for both countries, while the coefficient on the output gap is close to zero. The estimated monetary policy reaction functions for the United States and Japan are quite similar.

⁵⁴There were jumps in the CPI in 1989Q2 and 1997Q2 due to the introduction of VAT, and the increase in VAT from 3% to 5%, respectively. Since presumably monetary policy should not respond to inflation changes that are purely tax induced, we netted these effects out by subtracting 1.3% off the inflation rate around the 1989Q2 jump and 1.6% off the inflation rate around the 1997Q2 jump.

For both Japan and the United States in the years 1990-1995, we can compare the actual interest rate with the fitted interest rate. We use r_t^* , the fitted target rate⁵⁵. This fitted rate uses the *ex-post* realized and revised data on the output gap and inflation. Because these data were not available to the monetary authorities at the time that monetary policy was being set, we also look at a fitted rate using the same parameter values but with the real-time staff forecasts of the output gap and inflation. We refer to these two sets of fitted values as the revised data and real-time data fitted values respectively. We do not have real-time forecasts of the output gap for Japan, and use the actual realized data instead. However, since the coefficient on the output gap in the estimated Taylor rule for Japan is close to zero, using real-time forecasts of the output gap instead probably would not make much difference⁵⁶.

The middle panel of Exhibit IV.1 shows the actual interest rate and the revised data and real-time data fitted values for Japan in 1990-1995. Judged from the benchmark of the revised data, the Bank of Japan cut interest rates slowly relative to the Taylor rule. The revised-data Taylor rule would have called for a sharp easing of monetary policy during 1991 and 1992 in particular. The fitted target rate based on revised data hits zero in 1994. However using the real-time data, the Bank of Japan cut interest rates about in line with the Taylor rule over this time. If anything, it cut interest rates a little faster. The discrepancy arises because inflation forecasts were consistently too high over this period. These inflation forecasts were Federal Reserve Board staff forecasts, but Consensus Economics survey forecasts at the time were also similarly wrong.

The bottom panel of Exhibit IV.1 shows the actual interest rate and the revised data and real-time data fitted values for the United States over this same period. Monetary policy was exactly in line with the Taylor rule based on revised data during 1990, but subsequently fell below both the rate prescribed by the Taylor rule based on either real-time or revised data. This fast pace of easing is especially striking given that the Taylor rule fitted interest rate is the *target* rate that does not incorporate any smoothing.

So, over these years, the Fed loosened monetary policy rapidly, viewed from the benchmark of the Taylor rule with either revised or real-time data. In contrast, the Bank of Japan loosened monetary policy about in line with the real-time Taylor rule, but too slowly if judged from the perspective of the revised data Taylor rule.

⁵⁵It is standard in the Taylor rule literature to report the fitted target interest rate rather than the fitted actual interest rate that depends on r_{t-1} . The latter is close to the interest rate in the previous period, because the smoothing coefficient ρ is close to 1. It would be possible instead to report a fitted actual interest rate that depends on the lagged value of the fitted interest rate rather than the lagged actual interest rate, but results for this exercise will be sensitive to where this recursion begins. We instead just report r_t^* , but note that a central bank that is attempting to smooth interest rates should ease more slowly than this in a downturn.

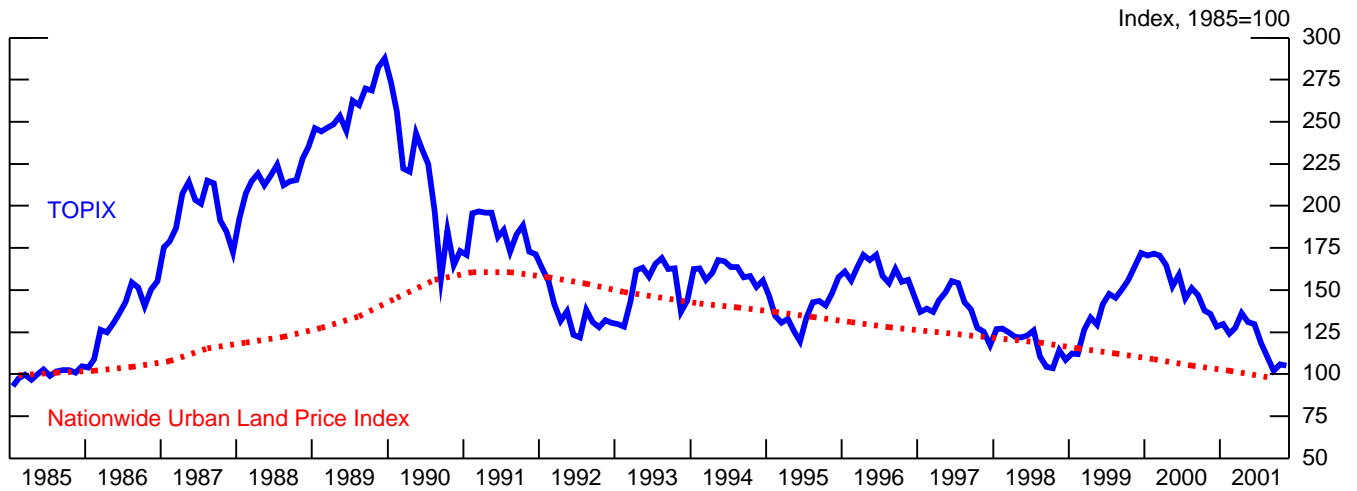
⁵⁶The OECD *Economic Outlook* in December 1994 forecast an output gap for Japan in 1995 of -2.9%, as opposed to a currently estimated realization of -0.68% (annual average). This discrepancy would call for an 8 basis point shift in the target interest rate.

These Taylor rule accounting exercises do not speak to the optimality of any monetary policy rule. In some simple models, forward-looking linear Taylor rules may be optimal (see e.g. Svensson (1997)). These models do not incorporate a zero bound on nominal interest rates, nor issues of capital overhang, or regime switching that may, on occasion, make a more aggressive response of monetary policy optimal (see e.g. Blinder (2000), Kato and Nishiyama (2001) and Reifschneider and Williams (2000)).

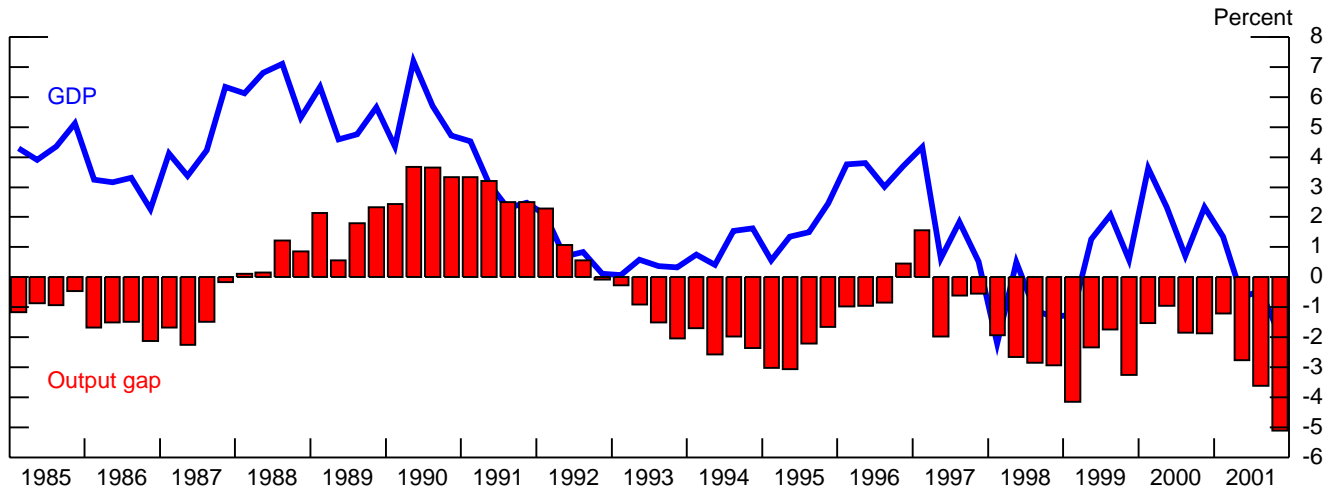
Table A.1: Estimated Coefficients of Forward-Looking Taylor Rules
(Standard Errors)

	United States	Japan
μ_0	0.51 (1.99)	0.91 (0.95)
μ_y	0.19 (0.35)	0.05 (0.41)
μ_π	1.74 (0.62)	2.31 (0.63)
ρ	0.78 (0.06)	0.86 (0.05)

Equity and Land Prices



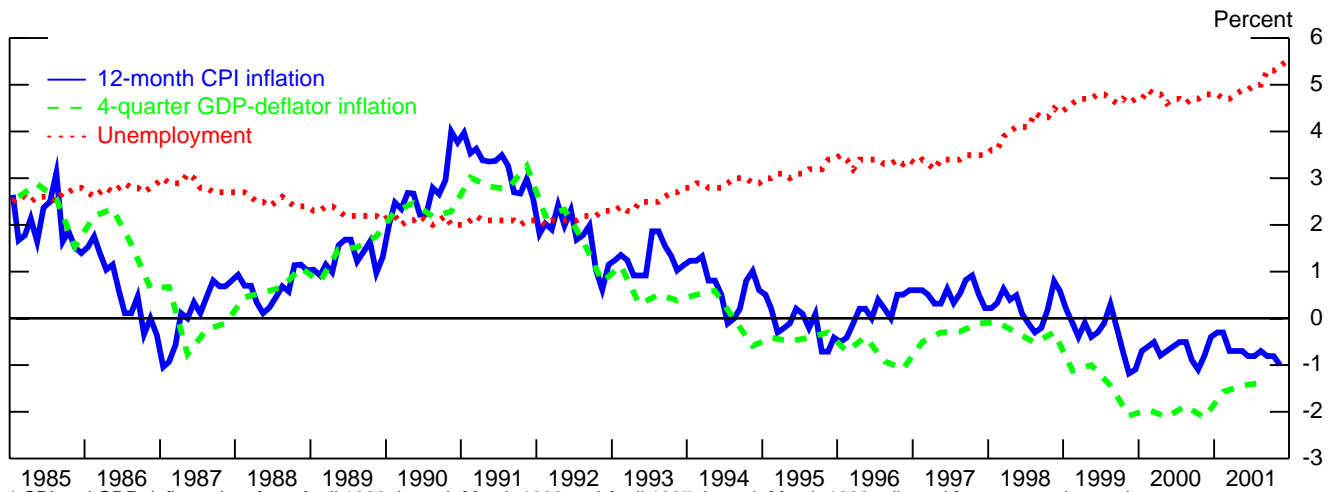
Real GDP Growth* and Output Gap**



* Four-quarter percent change.

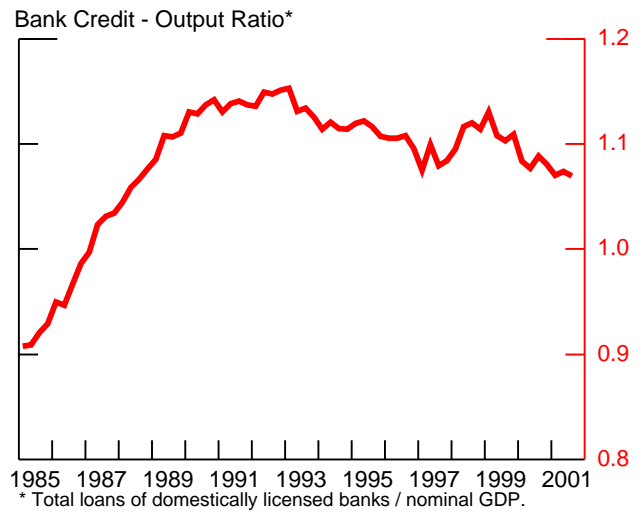
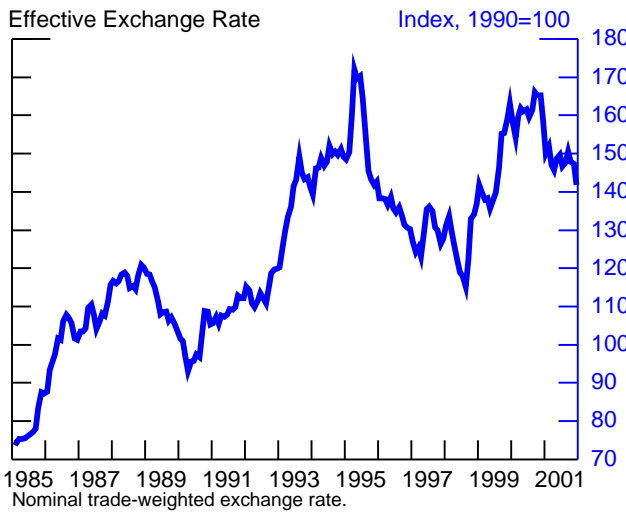
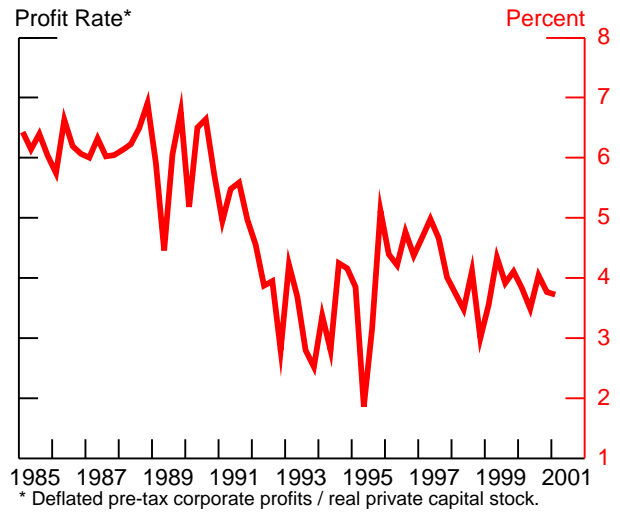
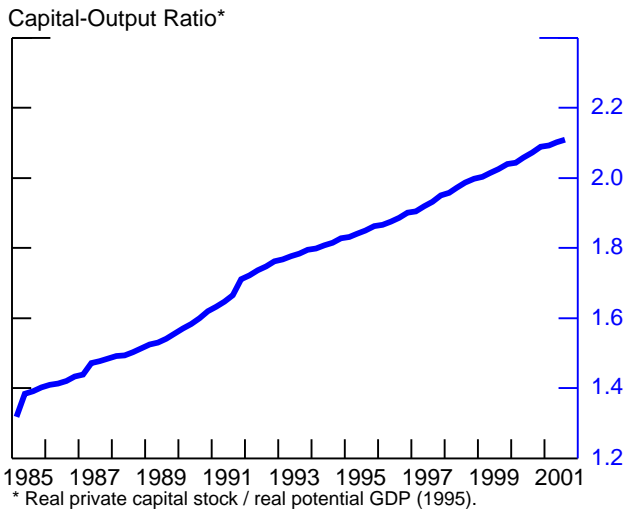
** Quarterly estimate.

Inflation* & Unemployment



* CPI and GDP deflator data from April 1989 through March 1990 and April 1997 through March 1998 adjusted for consumption tax increase.

Capital-Output Ratio & Profit Rate



Policy Interest Rates & Change in Structural Budget Balances

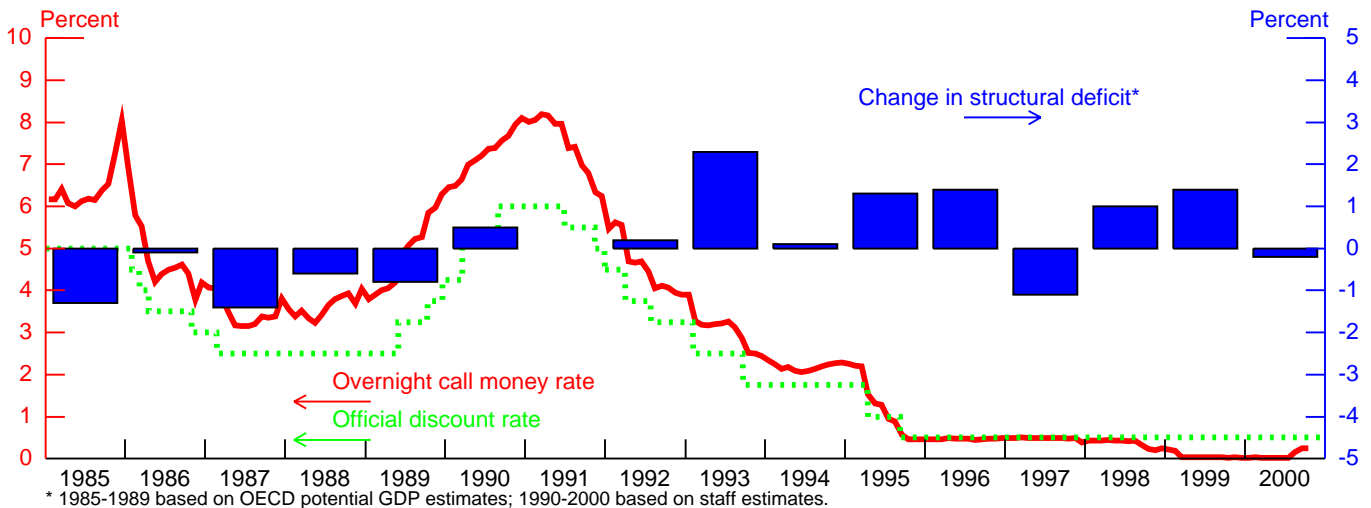
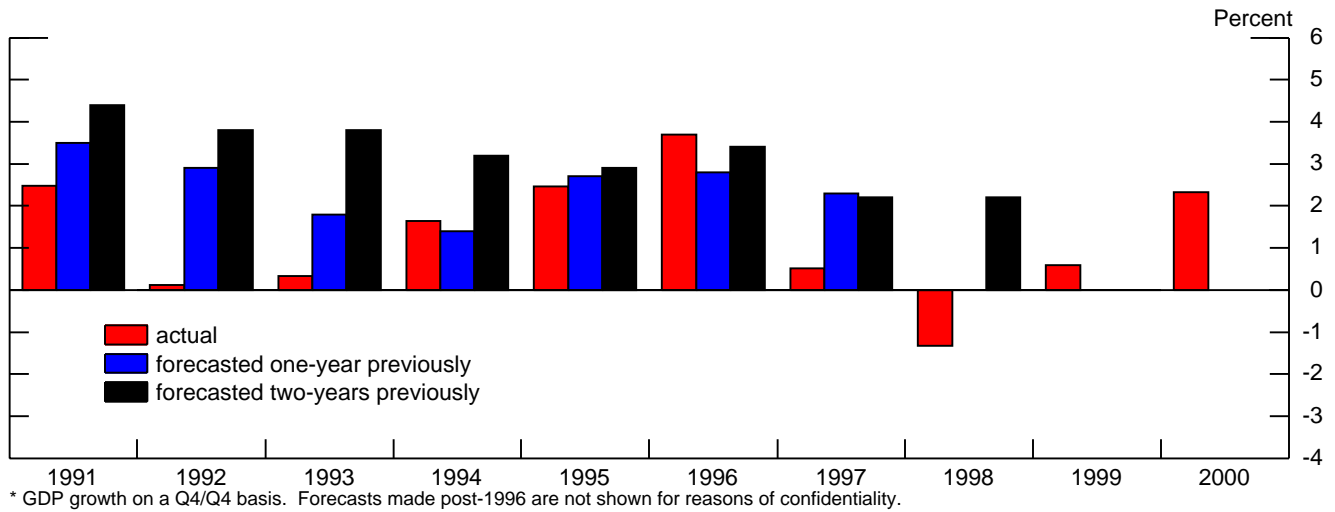


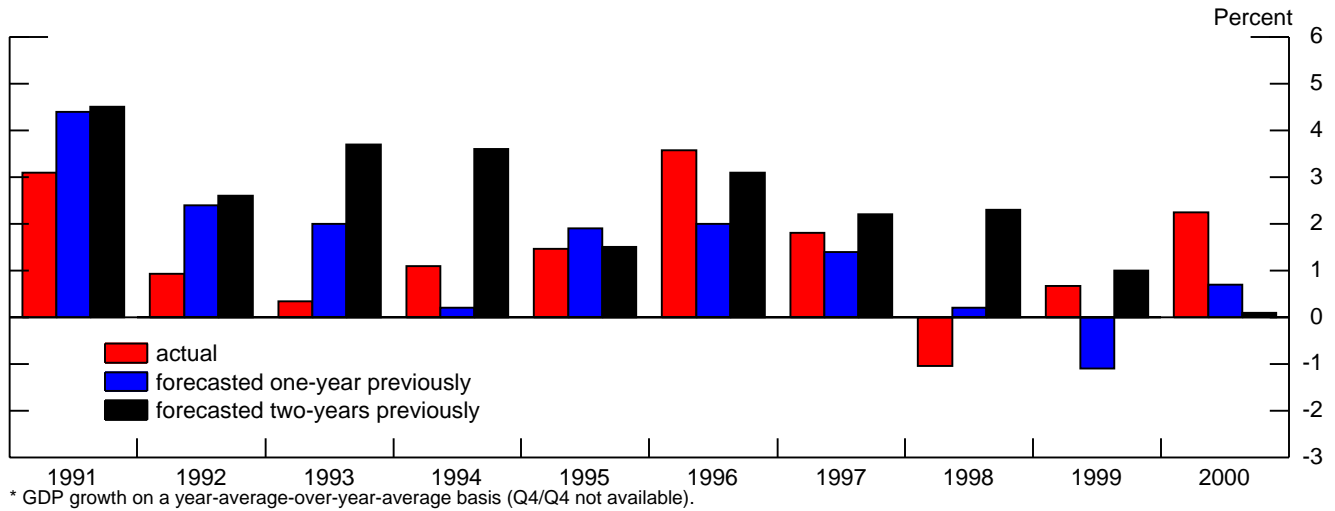
Exhibit III.1

Growth Forecasts

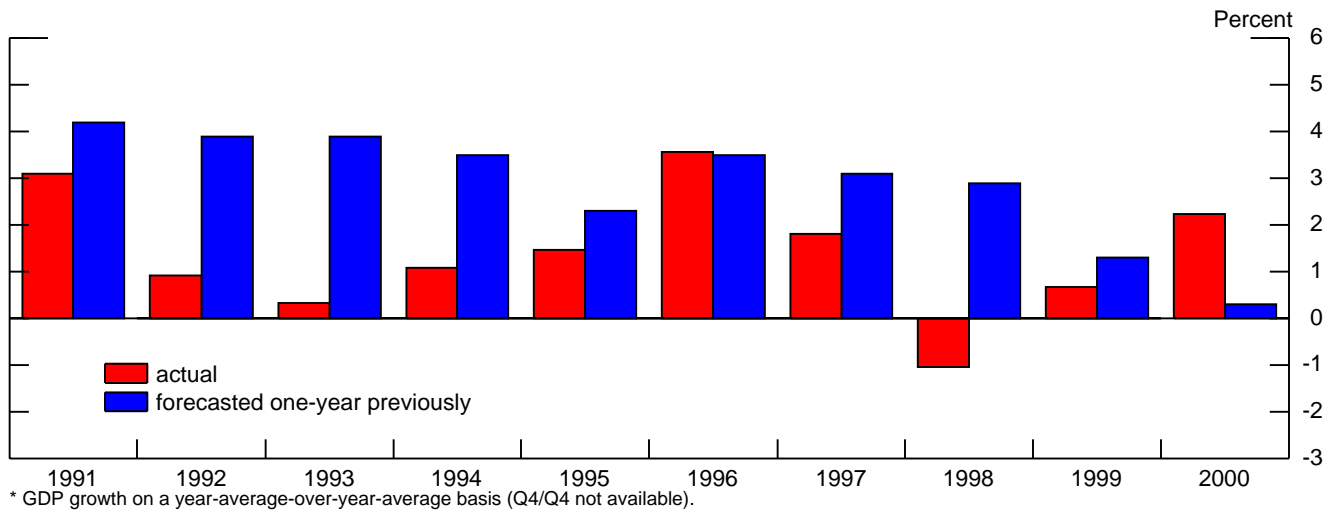
FRB*



Consensus*

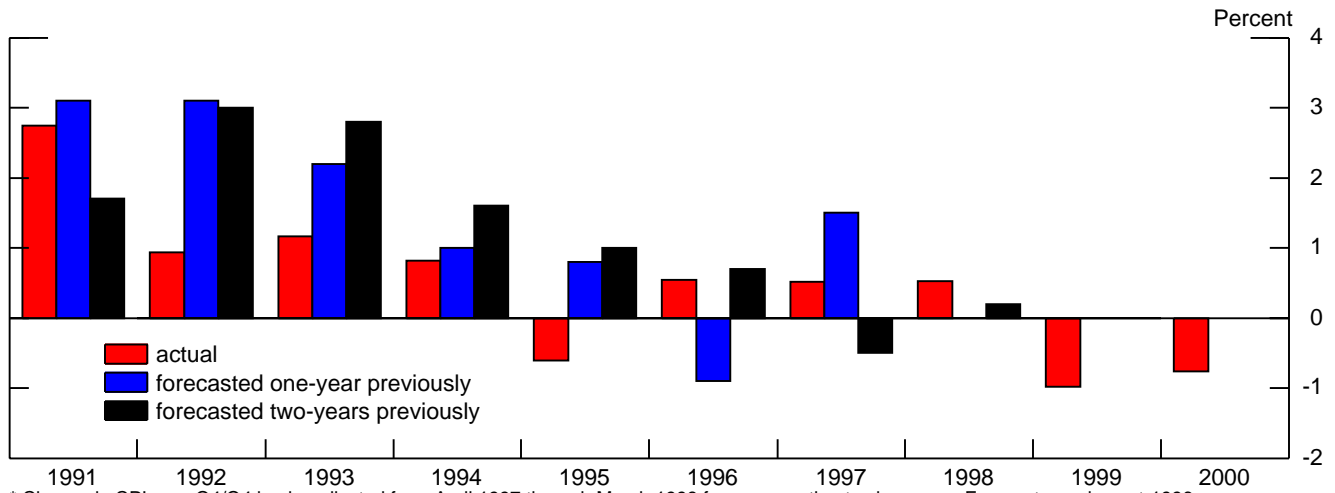


IMF*



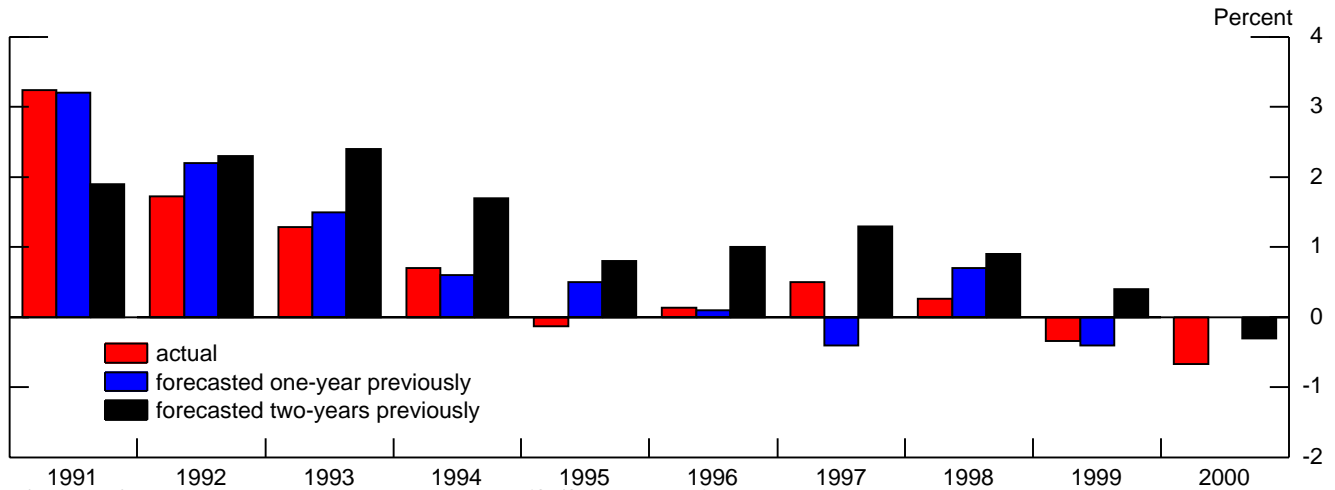
Inflation Forecasts

FRB*



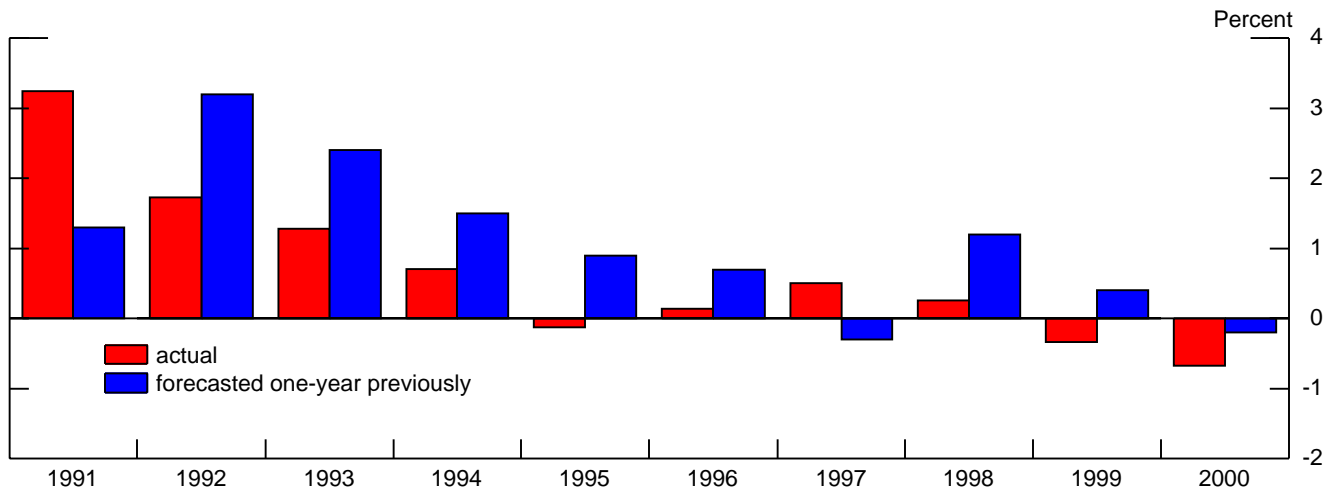
* Change in CPI on a Q4/Q4 basis, adjusted from April 1997 through March 1998 for consumption tax increase. Forecasts made post-1996 are not shown for reasons of confidentiality.

Consensus*



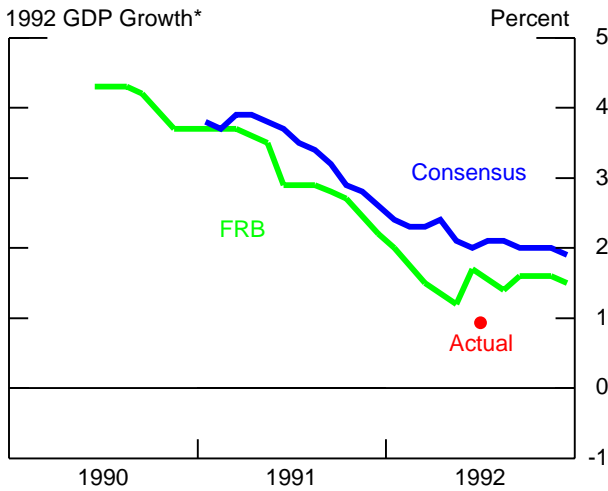
* Change in CPI on a year-average-over-year-average basis (Q4/Q4 not available), adjusted from April 1997 through March 1998 for consumption tax increase.

IMF*

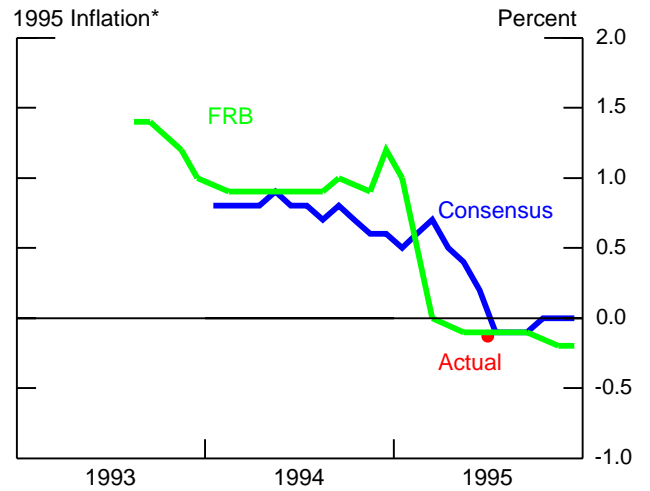


* Change in CPI on a year-average-over-year-average basis (Q4/Q4 not available), adjusted from April 1997 through March 1998 for consumption tax increase.

Evolution of Growth (1992) and Inflation (1995) Forecasts

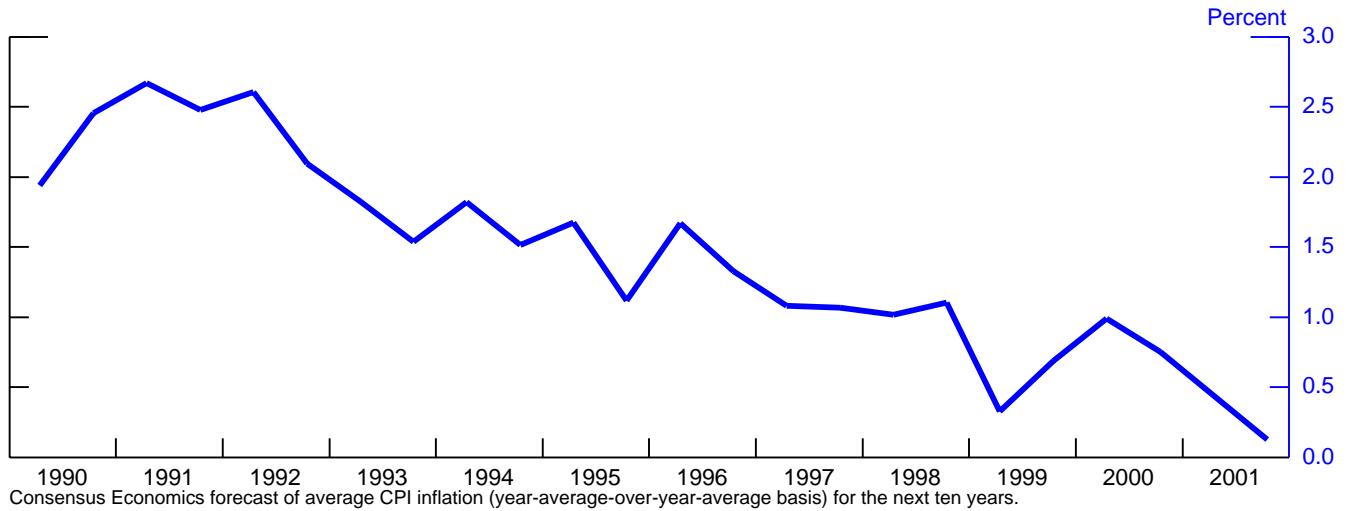


* Both series are on a year-average-over-year-average basis.



* Both series are on a year-average-over-year-average basis.

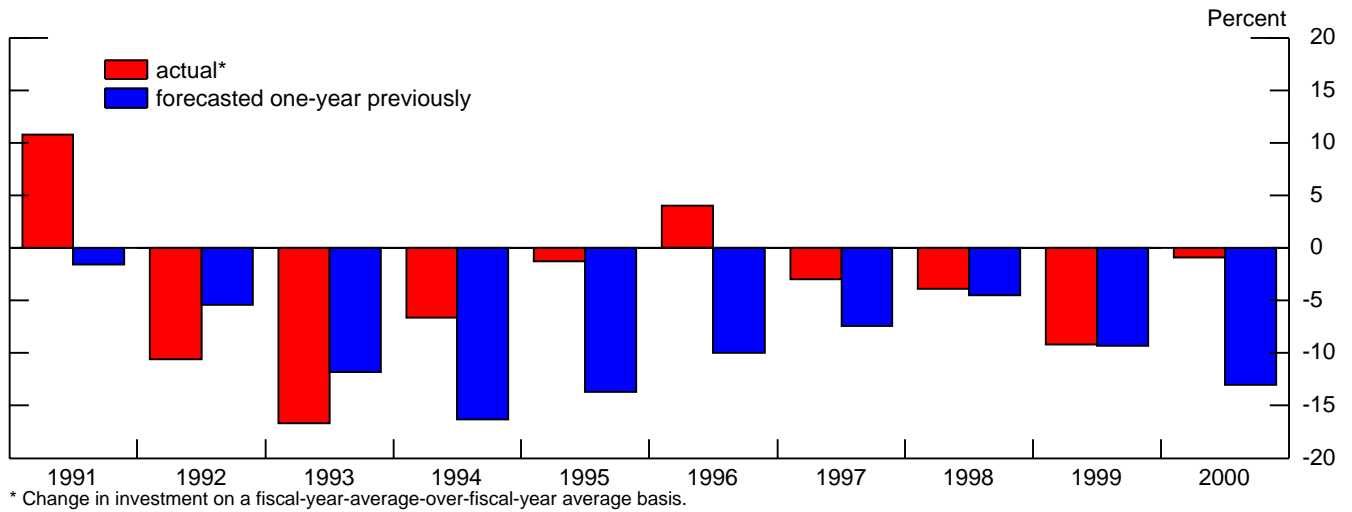
10-Year Inflation Expectations*



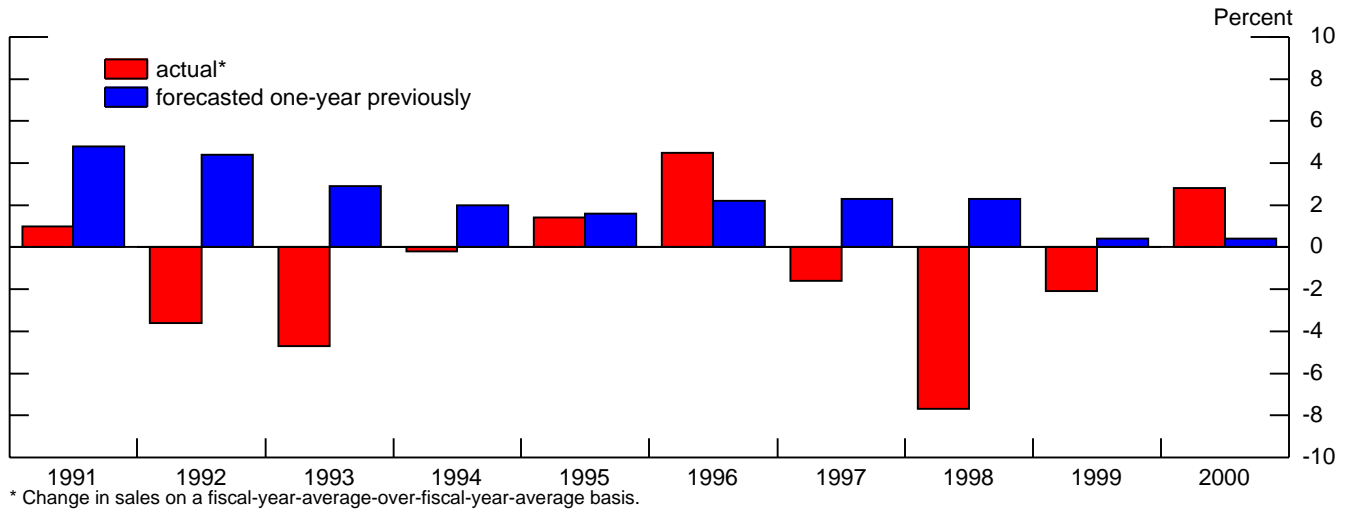
Consensus Economics forecast of average CPI inflation (year-average-over-year-average basis) for the next ten years.

Tankan Survey

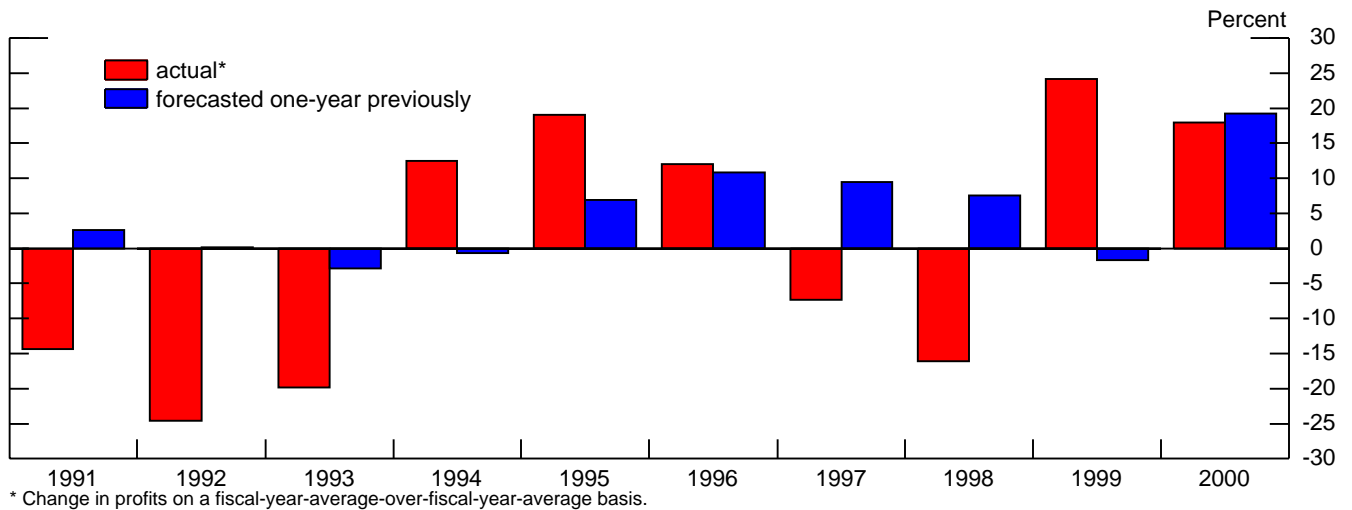
Nominal Investment Growth



Nominal Sales Growth

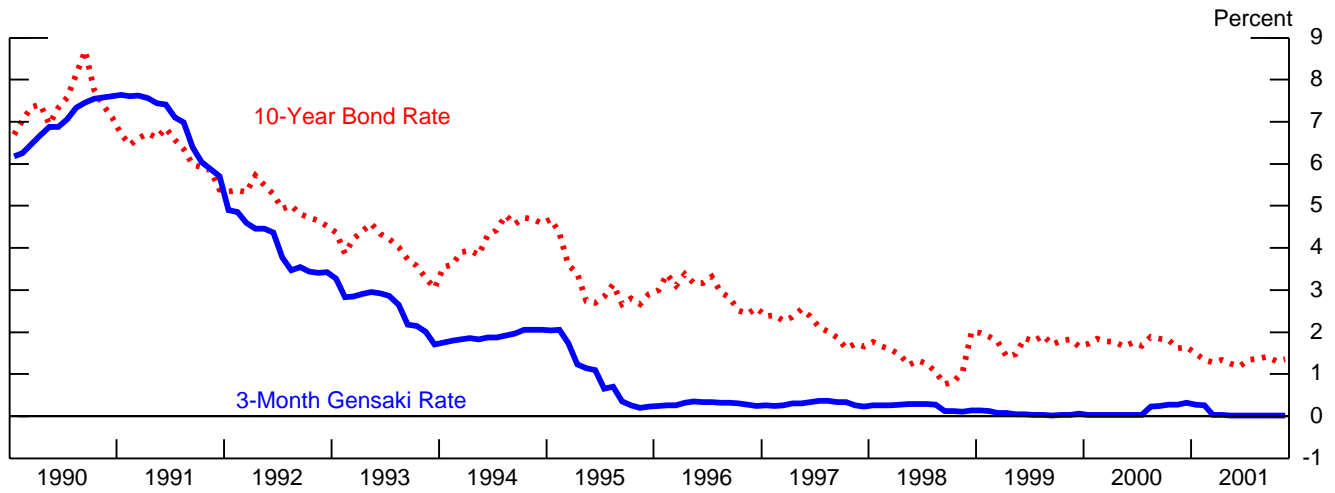


Nominal Profit Growth

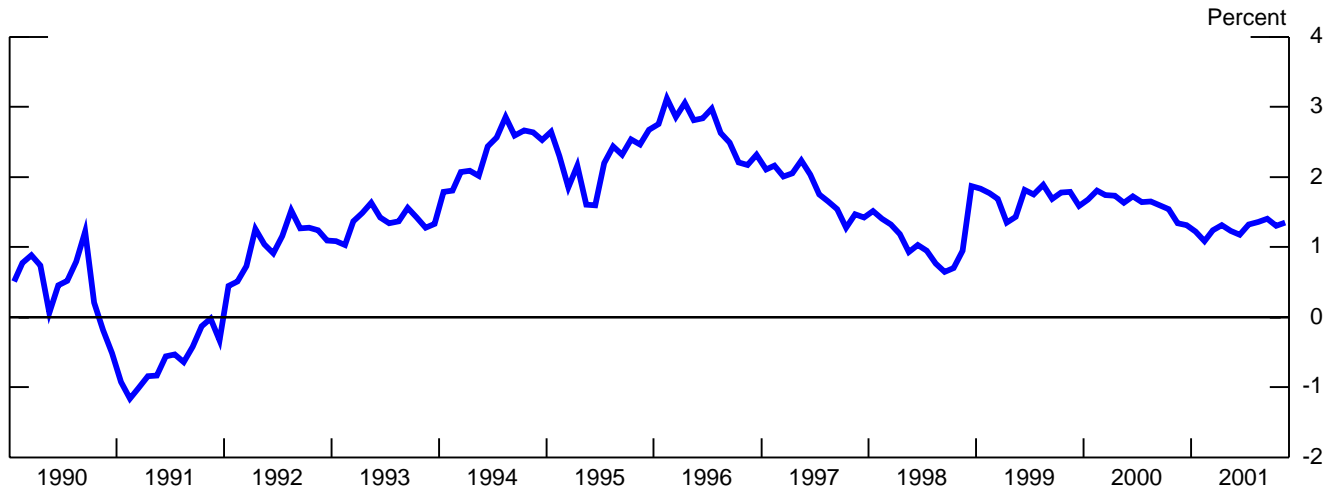


Financial Market Indicators

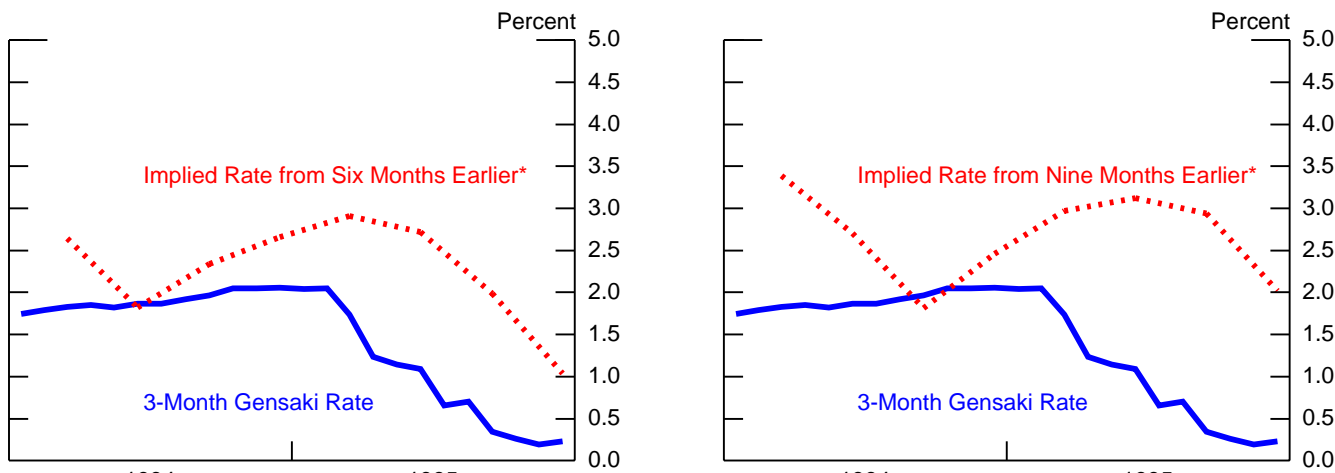
10-Year and 3-Month Gensaki Rates



Spread Between 10-Year Bond and 3-Month Gensaki



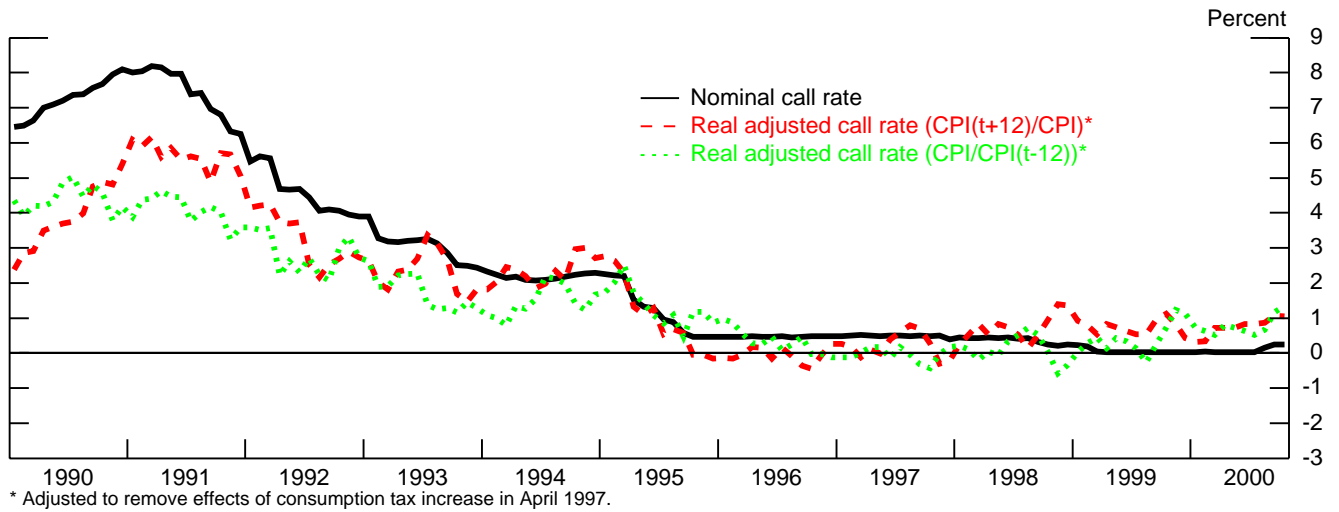
3-Month Interest Rates - Actual and Expected



* Derived from futures on 3-month Euro-Yen deposit rates.

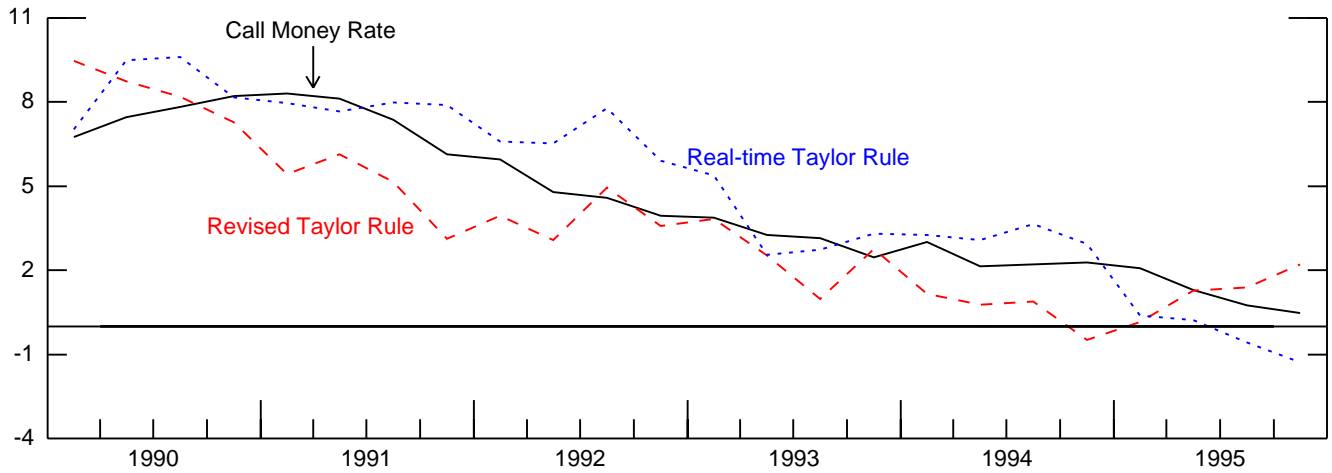
* Derived from futures on 3-month Euro-Yen deposit rates.

Nominal Policy Rate vs. Real Policy Rate

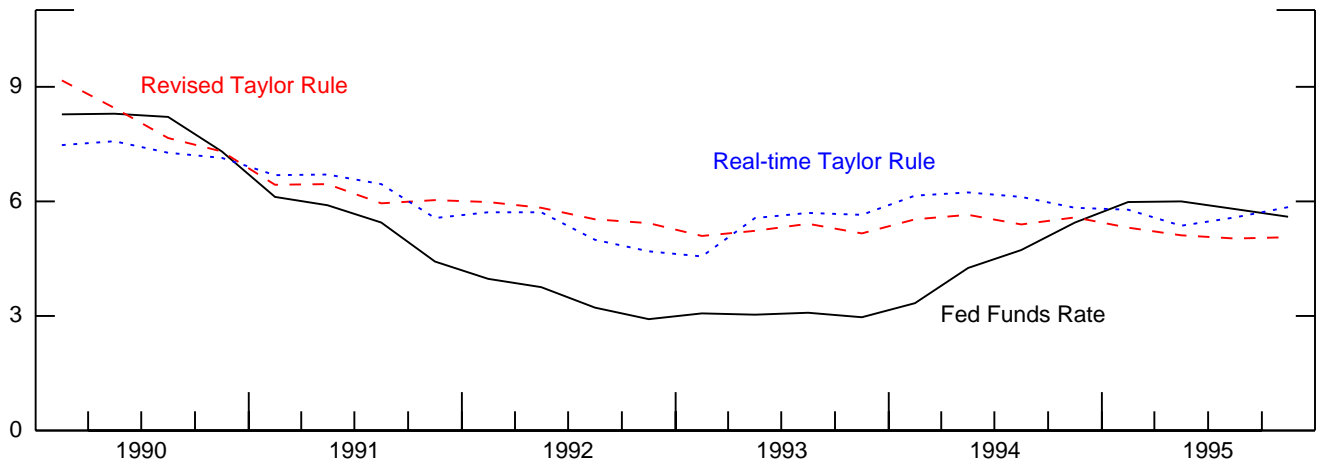


Taylor - Rule Analysis of US and Japanese Interest Rates

Japan 1990-1995

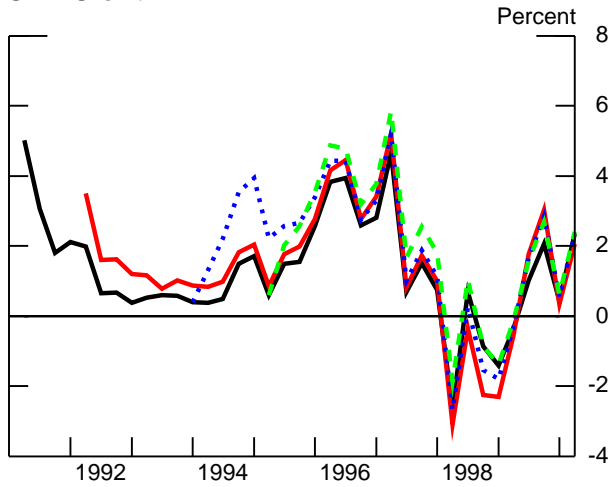


United States 1990-1995

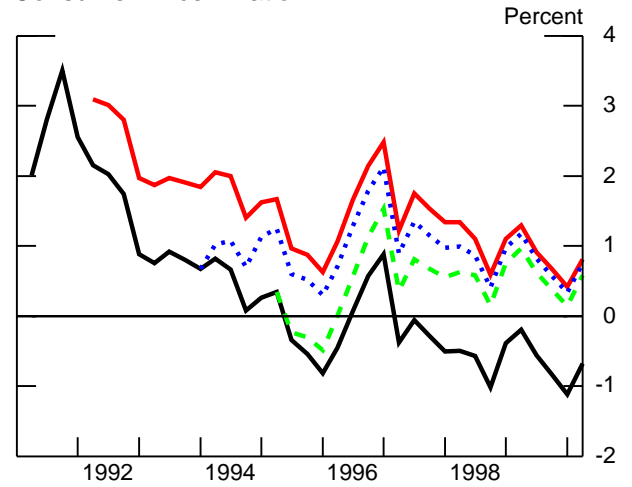


FRB/Global Simulations of Alternative Japanese Monetary Policies

GDP Growth

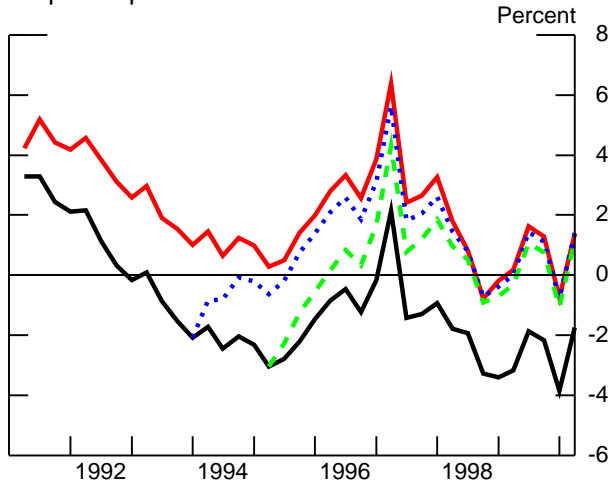


Consumer Price Inflation*

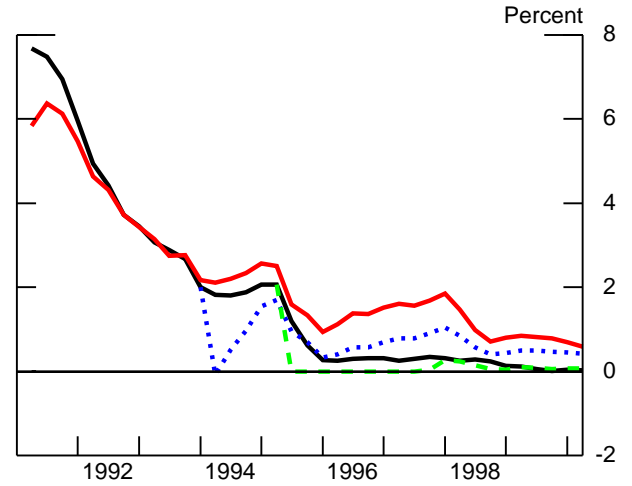


*Adjusted for estimated effect of consumption tax increase in 1997q2.

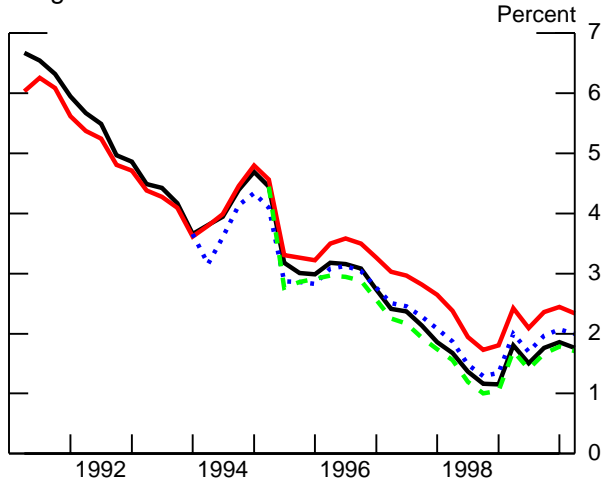
Output Gap



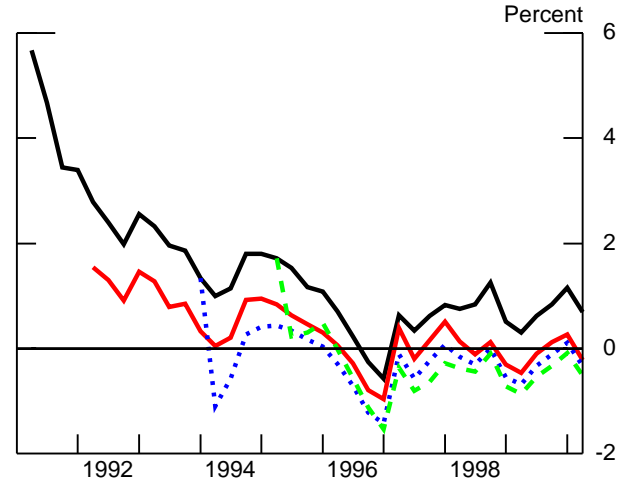
Short-Term Nominal Interest Rate



Long-Term Nominal Interest Rate



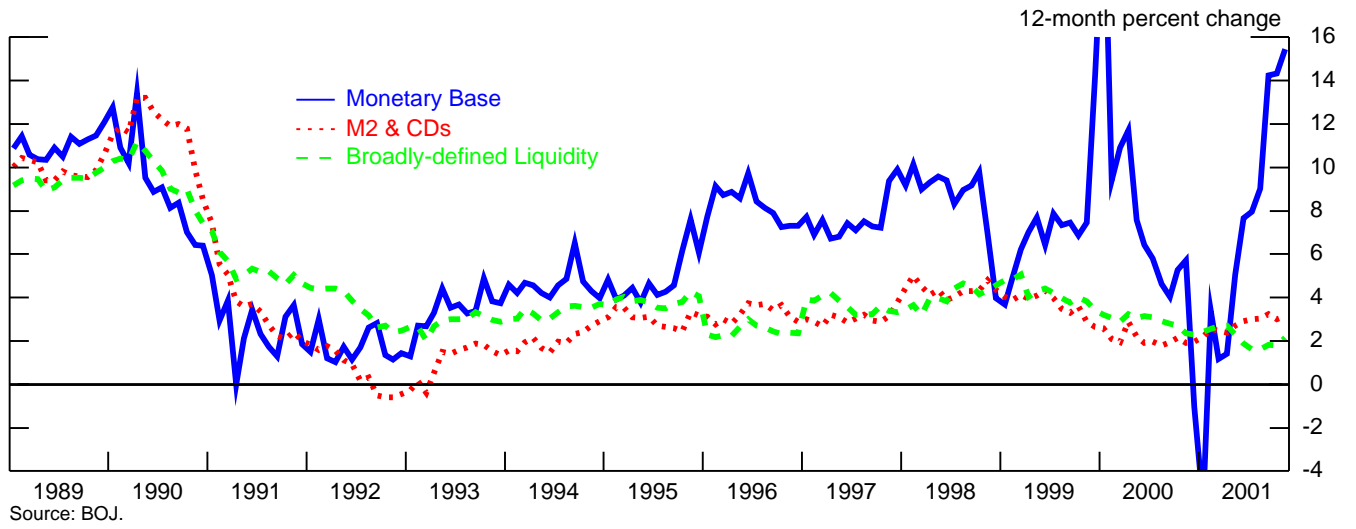
Real Short-Term Interest Rate*



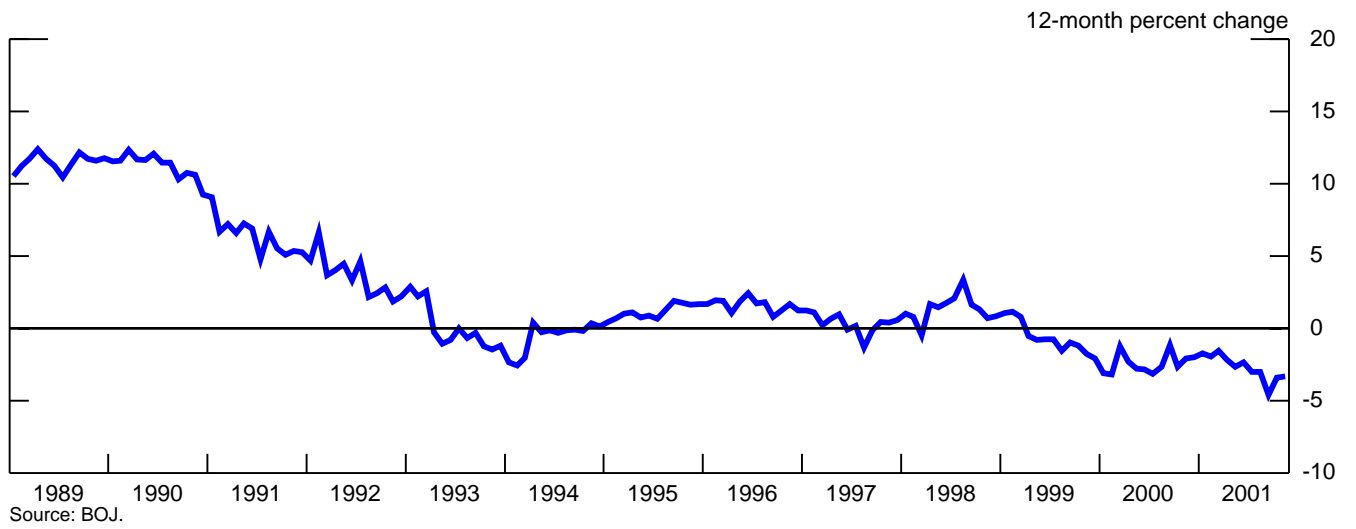
*Short-term nominal rate minus consumer price inflation over the previous four quarters.

- Baseline (actual historical path)
- 250 basis point exogenous fall in nominal interest rate in 1991q1
- · · 250 basis point exogenous fall in nominal interest rate in 1994q1
- - - 250 basis point exogenous fall in nominal interest rate in 1995q2

Growth of Monetary Aggregates



Japanese Bank Credit



Household Sector

Household Savings Rates in Selected Countries

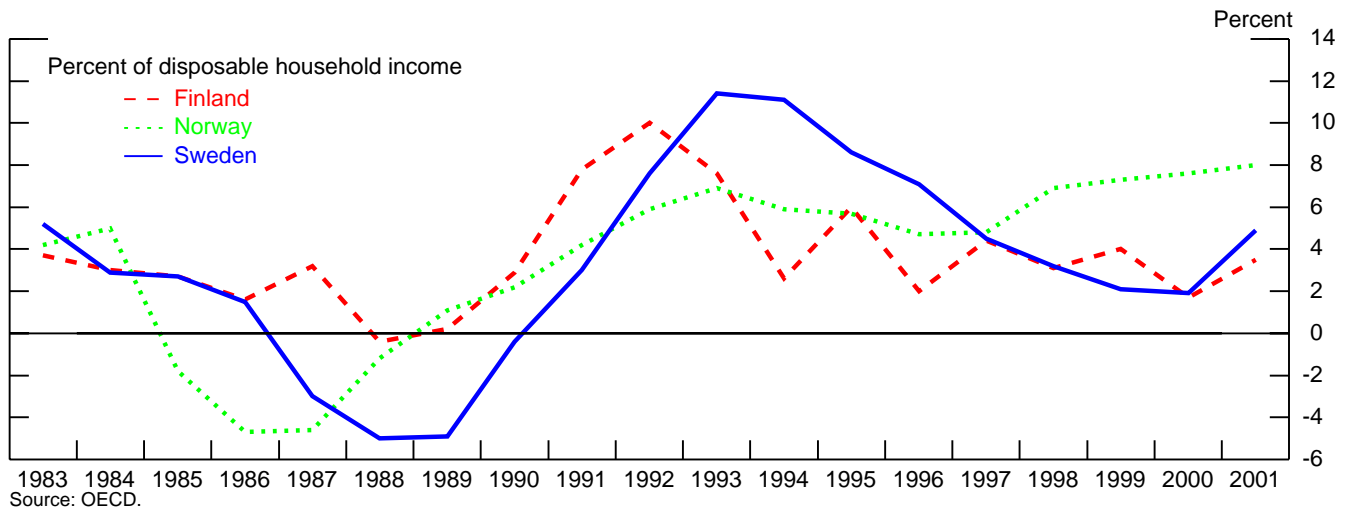
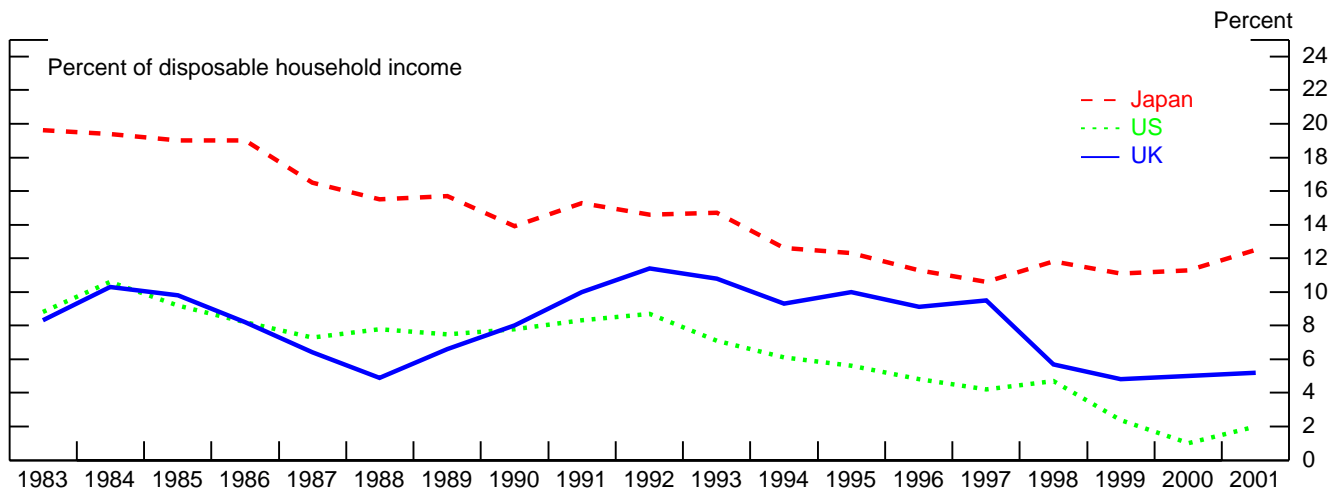


Exhibit V.1

Fiscal Policy Indicators Japan Fiscal Status (percent)

	GDP Growth (Q4/Q4)	Output Gap (Q4 Estimate)	Actual Deficit/ GDP (OECD)	Gross Debt/ GDP (OECD)	Net Debt GDP (OECD)	Changes in Structural Deficit
1990	4.7	3.3	1.9	64.6	12.4	0.5
1991	2.5	2.5	1.8	61.6	6.4	0.1
1992	0.1	-0.1	0.8	63.5	7.3	0.2
1993	0.3	-2.0	-2.4	69.0	10.1	2.4
1994	1.6	-2.4	-2.8	73.9	12.1	0.1
1995	2.5	-1.7	-4.2	80.4	16.9	1.2

Fiscal Packages (trillion yen)

	Total Amount	Public Works	Other Spending	Tax Cuts
1992 Aug	10.7	6.3	4.5	0.0
1993 Apr	13.2	7.6	5.4	0.2
1993 Sept	6.2	2.0	4.2	0.0
1994 Feb	15.3	4.5	4.9	5.9
1995 Apr	4.6	1.1	3.5	0.0
1995 Sept	12.8	6.5	6.3	0.0
1998 Apr	16.7	7.7	4.4	4.6
1998 Nov	23.9	8.1	9.8	6.0
1999 Nov	18.0	6.8	11.2	0.0
2000 Oct	11.0	5.2	5.8	0.0
Cumulative	132.4	54.7	59.9	16.6

Source: EPA, MOF and OECD.

G-7 Fiscal Situation in Recessionary Periods (percent)

	GDP Growth (Q4/Q4)	Output Gap (Q4 Estimate)	Changes in Structural Deficit		GDP Growth (Q4/Q4)	Output Gap (Q4 Estimate)	Changes in Structural Deficit
United States				United States			
1981	1.2	-5.4	-0.5	1990	0.5	-2.4	0.8
1982	-1.6	-9.6	1.1	1991	0.8	-3.7	-0.2
1983	7.6	-5.5	1.2	1992	4.0	-2.1	1.1
1984	5.6	-3.1	0.4	1993	2.6	-1.9	-0.8
West Germany				Germany			
1981	0.6	-0.7	-0.3	1992	0.7	0.0	-0.3
1982	-1.3	-3.9	-2.0	1993	-0.3	-1.6	-0.7
1983	3.9	-1.9	-0.8	1994	2.9	0.1	-0.1
1984	2.6	-1.0	0.0	1995	1.1	-0.2	1.1
Canada				Canada			
1981	1.7	-1.5	-1.1	1990	-1.2	-0.7	0.2
1982	-3.7	-7.6	1.1	1991	-0.6	-3.8	0.1
1983	6.2	-4.4	1.3	1992	0.9	-5.3	-0.1
1984	5.7	-1.6	1.3	1993	2.9	-4.9	-0.5
United Kingdom				United Kingdom			
1979	2.0	3.5	-0.5	1990	-0.5	0.6	1.6
1980	-4.1	-2.2	-2.3	1991	-0.6	-1.7	-1.1
1981	0.7	-3.2	-1.5	1992	0.9	-2.7	2.7
1982	2.0	-3.2	-1.0	1993	3.4	-1.5	1.7
1983	4.5	-1.6	1.2	1994	4.9	0.9	0.4
France				Italy			
1992	0.1	0.0	1.4	1990	0.7	0.0	1.2
1993	0.3	-2.1	0.2	1991	1.9	1.1	-1.3
1994	2.9	-1.1	-0.5	1992	-0.8	-1.1	-1.0
1995	0.6	-2.4	0.0	1993	0.1	-2.4	-1.8

* Changes in Structural Deficit: Positive entries indicate fiscal expansion, negative entries indicate contraction. Based on OECD data for actual budget deficits, adjusted using estimated output gaps.

Exhibit V.3

Fiscal Shock That Would Have Kept Output At Potential

	Estimated Output Gap (percent of GDP)	Increase in Govt Spending As % of Baseline GDP Required to Close Output Gap	Change in Inflation* Relative to Baseline (percent)
1993-Q4	-2.1	0.6	0.7
1994-Q4	-2.3	0.8	0.8
1995-Q4	-1.5	0.6	0.5

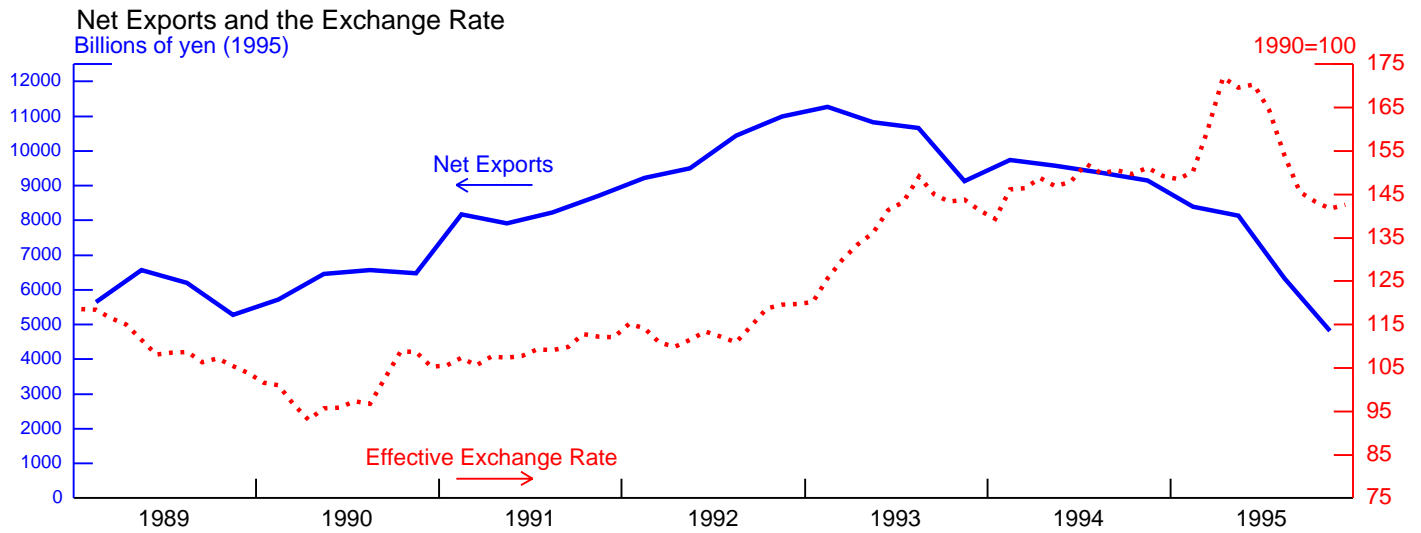
* Q4/Q4.

Estimates of Fiscal Multipliers from FRB/Global Model

	<u>Fixed real interest rate</u>	<u>'Taylor-rule' monetary policy</u>
US	1.13	1.06
Germany	2.09	1.92
Euro Area	2.30	1.79
United Kingdom	1.49	1.05
Canada	1.23	1.12
Japan	2.99	2.33

Impact on GDP after 3 quarters of a sustained increase in government consumption equal to 1 percentage point of GDP.

Exhibit V.4

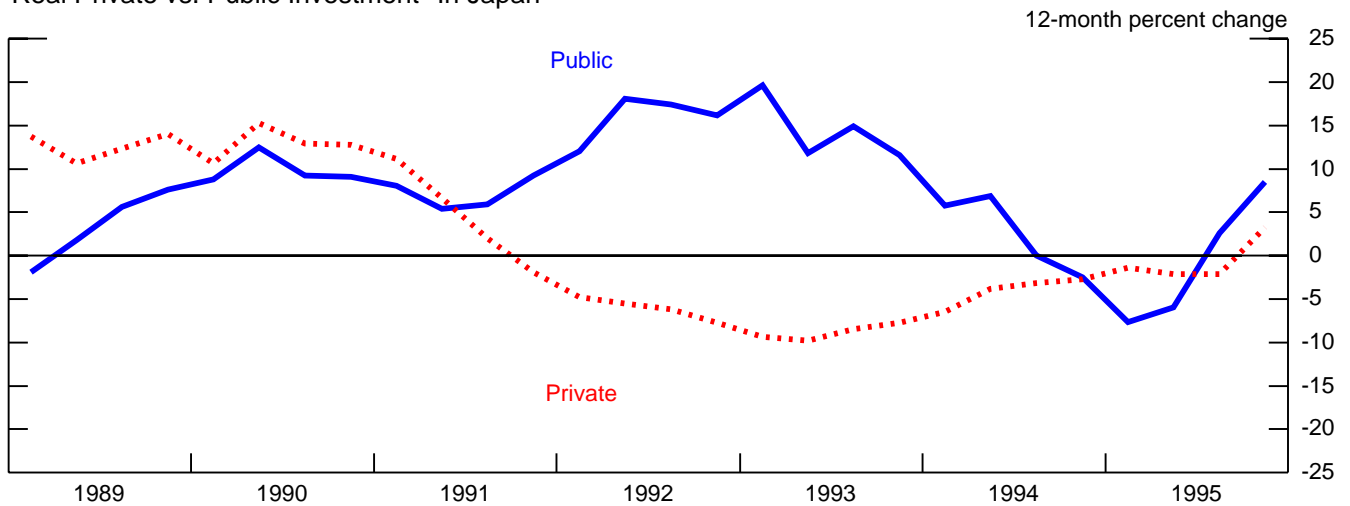


Contributions to Japan's GDP Growth*

	GDP	Private Cons	Resid Invest	Non-Resid Invest	Chg in Inven	Govt. Invest	Govt. Cons	Net Exp	Percent
1990	4.7	1.6	0.3	2.1	-0.2	0.3	0.5	0.3	
1991	2.5	1.8	0.2	-0.1	0.1	0.4	0.6	0.5	
1992	0.1	0.7	0.2	-1.7	-0.5	1.0	0.4	0.5	
1993	0.3	1.3	0.3	-1.8	-0.2	0.9	0.3	-0.4	
1994	1.6	1.5	0.3	-0.4	0.2	-0.1	0.5	0.0	
1995	2.5	0.6	0.2	1.1	0.6	0.7	0.6	-0.9	
1996	3.7	1.5	0.3	1.1	0.0	-0.5	0.5	0.3	

* Q4/Q4.

Real Private vs. Public Investment* In Japan



* Fixed investment.