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Financial Strains and the Zero Lower Bound
The Japanese Experience

Mitsuhiro Fukao

5.1 Introduction

In this chapter, we analyze the cause of the persistent deflation in Japan by estimating the long-run Phillips curve equation using the gross domestic product (GDP) deflator and the estimated GDP gap. We also document the conduct of monetary policy in the face of a zero lower bound of interest rates. The gradually accelerating deflation has been the origin of the two serious problems of the Japanese economy, the nonperforming loan problem and the increasing national debt.

The profit margin of Japanese banks has been too small to cover the increased default risk after the crush of the bubble. Banks have not succeeded in increasing their lending margin under a strong competitive pressure from government-backed financial institutions and weakened borrowers under a deflationary economy. Moreover, under the terms and conditions of government capital injection in March 1999, banks are legally required to maintain and increase loans to small- and medium-sized firms. Because of this situation, banks often disregard the internal model-based required lending margin to make new loans to small companies. Corresponding to the flow-profit figures, the capital position of Japanese banks has been deteriorating.

National debt has been increasing rapidly. Due to the declining tax rev-

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enue and the successive budgetary stimulus packages, the debt-GDP ratio had reached 157 percent by the end of 2003. With an extremely large budget deficit and declining nominal GDP, this ratio was increasing by 8 to 9 points a year. Even though the net debt-GDP ratio is still at 66 percent, it is likely to surpass 100 percent by 2008.

The Japanese economy was in a very serious situation in early 2003. In spite of the zero interest rate policy by the Bank of Japan, the GDP deflator was falling more than 2 percent per annum. The budget deficit was more than 8 percent of GDP, and fiscal consolidation was almost impossible under zero or negative nominal growth. The Nikkei 225 stock price index had fallen to only one-fifth of its peak in 1989. The capital of major banks and life insurance companies was running out very quickly due to the increasing nonperforming loans and falling stock prices.

Since short-term interest rates were already zero, conventional monetary-policy tools had lost effectiveness. Usually a potent monetary-policy weapon, an open market purchase of short-term government papers by the Bank of Japan was no longer effective because zero interest base money and zero interest short-term government papers are now perfect substitutes. Long-term bond yields had fallen to extremely low levels. A further injection of base money was not likely to push down long-term rates further.

Since the spring of 2003, the Japanese economy has shown a surprising recovery (see fig. 5.1). While it is very difficult to identify the causes of this turnaround, we can list the possible contributing factors:

1. The new governor of the Bank of Japan, Toshihiko Fukui, skillfully used "announcement effects" of monetary policy by showing that he is seriously fighting against deflation. While we could not expect much from the individual policy actions taken by the bank, Fukui succeeded in improving the expectations of the Japanese business community. We may call it the "placebo effect" of monetary policy.
2. The rescue of the failing Resona Bank in the spring of 2003 changed the perceived risk profile of shares of major Japanese banks. When the government nationalized the Long-Term Credit Bank of Japan and Nippon Credit Bank in 1998, the shareholders' equity was wiped out. On the other hand, the government saved the shareholders of Resona Bank with public money when it injected capital to the bank. This rescue operation changed the risk of bank stocks and started a "moral hazard rally" in the market.
3. The very rapid expansion of the Chinese economy induced an export boom for Japanese manufacturing companies. Japanese exports to China grew about 30 percent in 2003.
4. The massive official interventions in the foreign exchange market kept the yen relatively weak. The government bought JPY 32.6 trillion worth of U.S. dollars (about US$ 300 billion) in fiscal year 2003 that ended March 2004. This is more than 6 percent of the Japanese GDP and about twice the value of Japanese current account surplus in the same year.

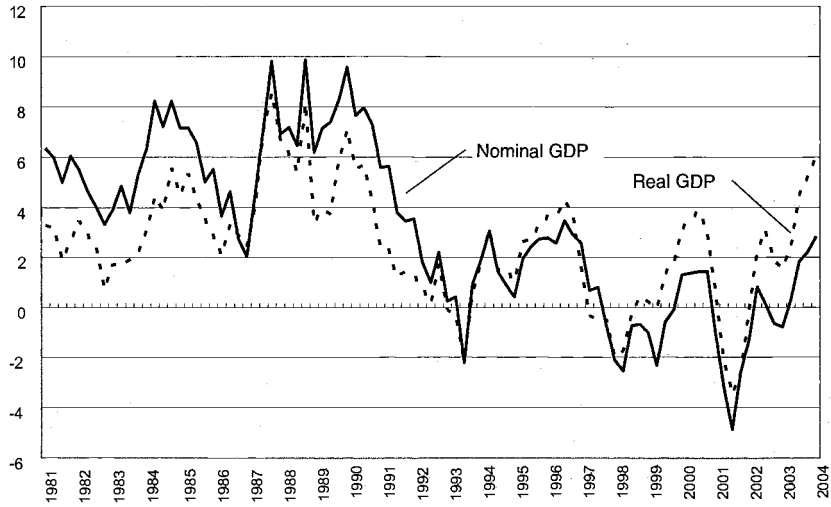


Fig. 5.1 GDP growth rate, annual rate after three-quarter moving average

As a result, the real GDP grew almost 5 percent in fiscal year 2003, and the deflationary gap has shrunk considerably. Corporate profits, private investments, and employment situations have shown a steady recovery.

However, the GDP deflator is still falling about 1.5 percent per annum at the time of this writing. Given the estimated potential growth rate of 1.5 percent, the Japanese economy still faces a risk of having a negative nominal growth again in the near future.

5.2 Gradually Accelerating Deflation

Deflation in Japan is steadily accelerating.[1] Figure 5.2 shows the GDP deflator and core consumer price index (CPI) since 1985. They are seasonally adjusted annual rates (SAAR) and show fairly erratic movements. Both of them are adjusted for value added tax (VAT) increases in 1989 and 1997. The figure also shows their trends estimated by Hodrick-Prescott (HP) Filter with the conventional parameter for quarterly time series. The trend of core CPI started to fall in 1998, and that of GDP deflator started to fall in 1995. The GDP deflator deflation rate has been larger than that of the CPI because the upward bias of CPI is more pronounced than that of the deflator. By the end of 2003, the GDP deflator deflation rate was more than 2 percent and was still accelerating. Figure 5.3 shows that the general

1. In late 2004, the GDP deflator was revised upward significantly. The government introduced chain-weight based deflator figures and the rate of deflation in 2002–2004 was revised upward by about one point. Since I could not update the analysis in this chapter all the tables and figures are based on the old statistics. As a result, you may find that my analysis of the Japanese deflation is rather pessimistic.

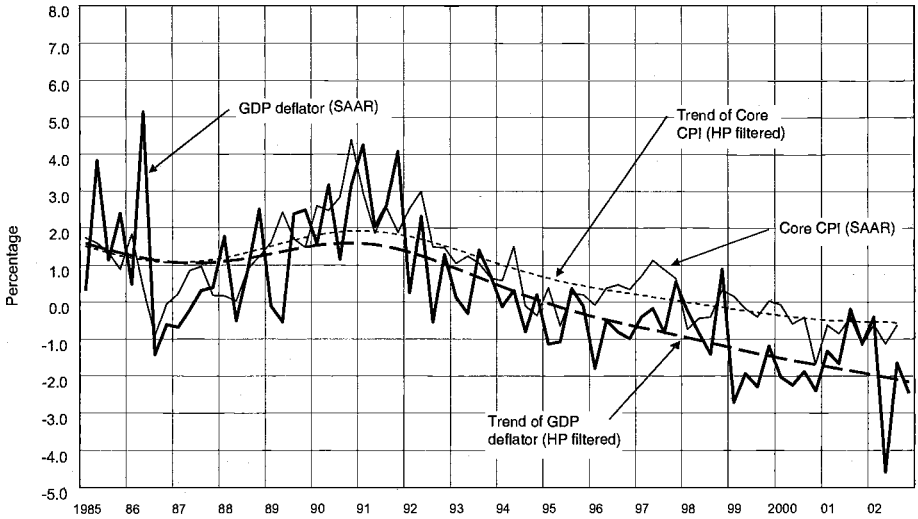


Fig. 5.2 CPI and GDP deflator deflation rates

Source: Japan Center for Economic Research (2003).

Note: GDP deflator inflation rate is adjusted for changes in consumption tax rate in 1989 and 1997.

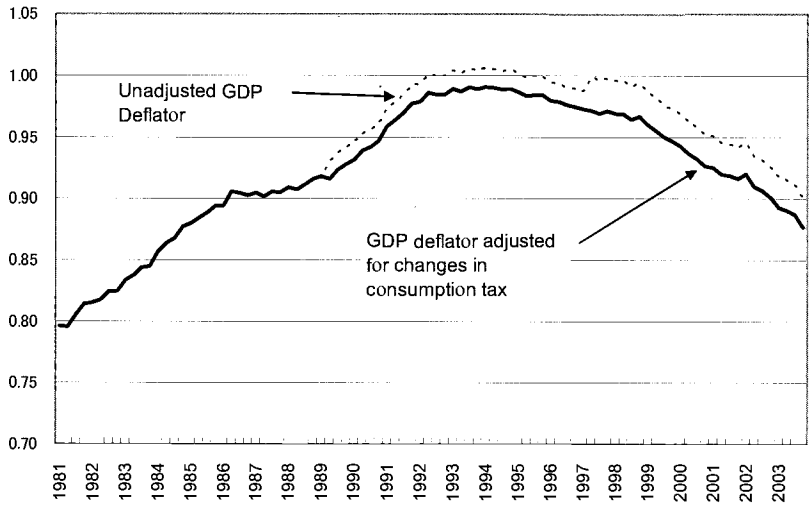


Fig. 5.3 GDP deflator price level (unadjusted 1995 = 1.0)

Note: Adjusted for changes in consumption tax in April 1989 and April 1997.

price level measured by the GDP deflator has fallen by about 12 percent from the peak in early 1994 to the first quarter of 2004.

While the public discussions on monetary policy and deflation generally focus on CPI, the development of the GDP deflator is more important for the health of the Japanese economy. The corporate profit and labor income depend on the nominal GDP that is the product of GDP deflator and real GDP. Tax revenue is also dependent on the nominal GDP. The gap between the CPI and GDP deflator widened in the 1990s, and the average gap over the past five years (1999–2003) was 1.2 percent. This means that even if the Bank of Japan can stabilize the CPI at zero inflation, the GDP deflator will be falling at 1.2 percent. Therefore, in this chapter, we look into the development of the GDP deflator deflation rate.

The Bank of Japan pointed out that the GDP deflator exaggerates the rate of deflation due to the very rapid fall in computer prices and the Paasche index bias.[2] The private investment deflator seems to overstate the deflation by about 3 percent since the first quarter of 2003 because its trend deflation rate jumped from 2 percent to 5 percent. However, the bias of the GDP deflator will be much smaller, at most by about 0.5 percent, because the weight of private investment is about 15 percent of total nominal GDP. Thus, even if we removed this downward bias of the GDP deflator, the GDP deflator is still falling by about 2 percent instead of 2.5 percent. In this context, we have to note that the Bank of Japan paper does not mention the possible upward bias in the GDP deflator (Koga 2003). Because most price indexes do not take account of the quality changes in goods and services, the GDP deflator does have some upward bias from this source. Moreover, the Bank of Japan is not disputing the validity of nominal GDP. Therefore, the correction of the downward bias of GDP deflator due to the Paasche bias means that the real growth rate will also be adjusted downward by the same amount.

The deceleration of inflation in the first half of the 1990s and the acceleration of the deflation rate in the second half of the decade strongly suggest that Japan has maintained a deflationary GDP gap since the collapse of the bubble economy in the late 1980s. I estimated the size of the GDP gap with the Financial Study Group of Japan Center for Economic Research based on the conventional production-function approach.[3] The estimation was made with the following procedure:

1. A Cobb-Douglas production function was estimated with real GDP, labor input (man-hour based), and capital adjusted for capacity utilization.

2. See Koga (2003). James Harrigan pointed out this factor at the meeting in June 2004. I had investigated this problem in the Japan Center for Economic Research (2004) paper in detail but did not include the conclusions in the earlier version of this chapter. I am summarizing the main points in my analysis in the text.

3. See the data appendix of this chapter and Japan Center for Economic Research (2004) for the details of the estimation procedure.

The factor-income share was used to calibrate the parameter of the production function. The trend of the residual of the production function corresponds to the growth of total factor productivity (TFP) of the Japanese economy:

$\ln Y_t = 0.29 \ln K_t + 0.71 \ln L_t + \ln \mathrm{TFP}_t$, where
Y_t = real GDP,
K_t = capital adjusted for capacity utilization,
L_t = labor input measured by man-hours, and
TFP_t = estimated TFP.

Since this TFP growth rate is estimated from the residual of the production function, the TFP reflects possible biases in the GDP deflator. If the GDP deflator exaggerates the deflation rate, the measured TFP growth rate also exaggerates the potential growth rate by the same amount.

2. Estimate the maximum inputs by connecting the cyclical peaks of the labor hour and capacity utilization. In this process, the peaks of labor force were identified for the working-age population and the retirement-age population separately. The peaks of working hours were identified for overtime hours and normal working hours separately because the normal working hours declined due to the changes in the labor-relations law.

3. The maximum production potential is estimated from the production function in step 1 and the maximum labor and capital inputs in step 2. The gap between this maximum GDP and the actual GDP is the unadjusted GDP gap:

$$\text{Unadjusted GDP gap} = \text{Maximum GDP} - \text{Actual GDP}.$$

Figure 5.4 shows the estimated potential GDP growth rate that is defined as the changes in the maximum GDP. The potential growth rate for the past two years has been about 1.5 percent a year. The large negative labor contribution from 1988 to 1994 and from 1997 to 2000 was due to the introduction of the five-day workweek. The TFP was estimated from the smoothed residual term of the equation, and it has been increasing at about 1 percent per annum in recent years. This potential growth rate is important because it also determines the growth rate of "natural level of GDP" in the next step.

4. The "natural level of real GDP" was calculated as a parameter, G^n, in the estimated long-run Phillips curve relationship (table 5.1). This equation assumes that the expected rate of inflation depends on the past inflation rates. The table shows that the natural level of real GDP is lower than the maximum GDP by 3.249 percent:

$$\text{Natural level of GDP} = \text{Maximum GDP} - 3.249\%.$$

At the natural level of GDP, the inflation rate will be steady. If the real GDP is below this natural level, the inflation rate gradually decelerates and be-

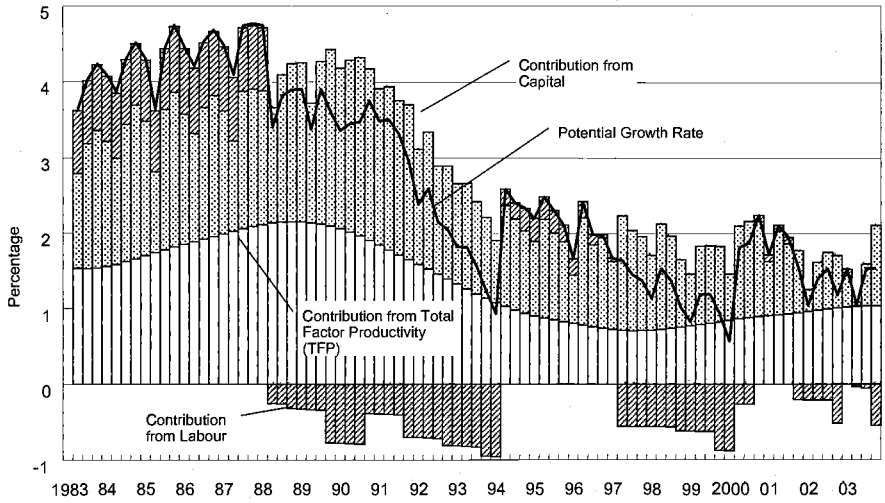


Fig. 5.4 Potential growth rate

Source: Japan Center for Economic Research (2004).

Table 5.1 Estimated price equation with GDP gap (1985/Q1–2003/Q4)

Specification

$$\pi_t = \alpha \times \sum_{i=1}^{4} \pi_{t-i}/4 + (1-\alpha) \times \sum_{i=5}^{8} \pi_{t-i}/4 + \beta \times (G_t - G^n) + \gamma \times \mathrm{DUM} \times (G_t - G^n) + \varepsilon_t$$

$$\pi_t = \underset{(2.51)}{0.551} \times \sum_{i=1}^{4} \pi_{t-i}/4 + \underset{(2.46)}{0.449} \times \sum_{i=5}^{8} \pi_{t-i}\, \pi_{t-i}/4 + \underset{(2.23)}{0.348} \times (G_t - (\underset{(4.13)}{-3.249})) - \underset{(1.69)}{0.267} \times \mathrm{DUM} \times (G_t - (-3.249)) + \varepsilon_t$$

Adjusted $R^2 = 0.43$; Standard error = 1.47

Source: Japan Center for Economic Research (2004).

Notes: π = GDP-deflator inflation rate; G = unadjusted GDP gap; G^n = natural level of GDP gap; and DUM = dummy variable. From 1985 to 1993, DUM = 0; after 1994, DUM = 1.

comes negative. If the real GDP is above the natural level, the inflation rate accelerates.

In estimating the Phillips curve with the data since 1985, we found that the acceleration of deflation rate in the second half of the 1990s was much slower than the deceleration of inflation in the first half of the 1990s. This is probably due to the fact that it is easier to reduce the wage increases than to accelerate the pace of wage reductions.[4] Therefore, we assumed a structural change in the equation when the GDP deflator started to fall in 1994. The acceleration parameter under deflation, 0.081 (0.081 = 0.348 – 0.267), was only one-quarter of the parameter under inflation, 0.348.

4. See Kuroda and Yamamoto (2003) for evidence of downward wage rigidity in Japan.

5. The adjusted GDP gap is estimated by adding this natural level of GDP gap, 3.249, to the unadjusted GDP gap. In the following, we refer to this adjusted GDP gap as the GDP gap:

$$\text{Adjusted GDP gap} = \text{Unadjusted GDP gap} + 3.249\%.$$

Figure 5.5 shows the estimated GDP gap with the GDP deflator inflation rate. Since SAAR data are highly erratic, we used a three-quarter moving average of SAAR series for the chart. The GDP gap hit the peak of 2.5 percent in 1990 and started to fall. It became negative in mid-1992, and the deflationary environment has continued since then. The gap narrowed to zero in early 1997 when the planned increase of the VAT stimulated consumption on consumer durables and housing. However, the gap became very large by mid-1999 due mainly to the financial crisis from the fall of 1997 until early 1999. Although capital injection and the cyclical recovery briefly narrowed the gap in 2000, the Japanese economy fell into a deeper trough in 2002. We can see that the deflationary gap reached 6.9 percent of the natural level of GDP in the first quarter of 2002.

Our estimated GDP gap figures and the Phillips curve show that the widening GDP gap led to the acceleration of deflation from 1995 to 2003. This result indicates that the aggregate-demand shocks were more important than the aggregate-supply shocks as a cause of persistent deflation in Japan. Monetary policy should have responded more strongly to stem the deflationary pressure from the demand side.

Since then, the Japanese economy recovered slowly until mid-2003 and

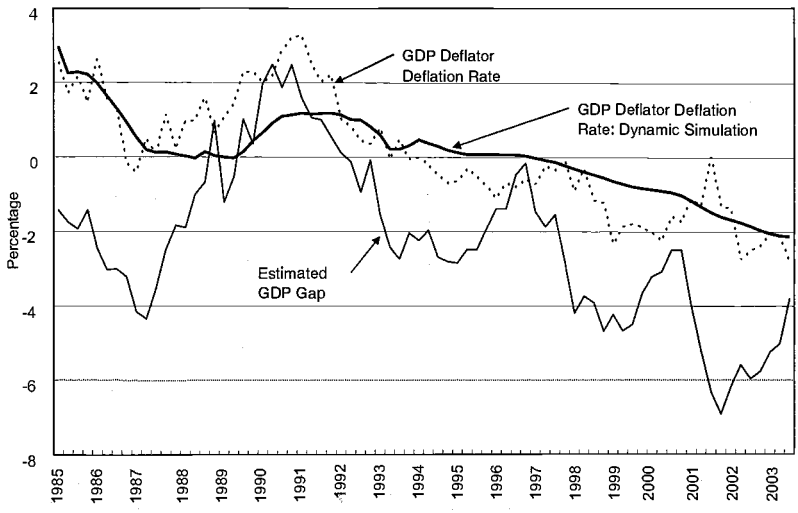


Fig. 5.5 Estimated GDP gap and deflation rate
Source: Japan Center for Economic Research (2004).

the growth rate accelerated. By the first quarter of 2004, the GDP gap had declined to less than 4 percent.

5.3 Deflation and Nonperforming Loan Problem

Banking in Japan has become an unprofitable, structurally depressed industry. Excluding capital gains realized by selling shares and real estate, Japan's banks as a group have been in the red since the year ending March 1994 (fiscal year 1993). The primary cause of this is a low profit margin and a high level of loan losses. In this section, I rely on Fukao (2003) and explain the performance of the Japanese banking sector since the mid-1990s.

Table 5.2 shows the profit-loss accounts of all commercial banks. In the ten years from fiscal year 1992 to fiscal year 2002, banks made around JPY 10 trillion each year as lending margin (row A, defined as interest and dividends earned minus interest paid). Revenue from such sources as bond and currency dealing and service charges were about JPY 3 trillion (row B). This includes all other revenue except capital gains realized on stocks and real estate. Revenues from banks' principal operations therefore amount to roughly JPY 13 trillion yen a year (row A + row B).

Total costs—including personnel and other operating expenses—were over JPY 7 trillion (row C). Operating costs declined during the 1998–2000 period because of cost-cutting measures. It is likely to be difficult to continue that pace of cost cutting. Certainly, the banks may cut labor costs further by reducing employment and cutting average compensation. But the banks have to invest heavily in information technology to remain competitive.

In the 1990s, banks stinted on improving systems because of the preoccupation with bad-loan problems, and now they have poor-quality computer systems. Thus, for example, the zengin electronic fund transfer system, which is the main payment system among bank customers, cannot handle two-byte codes, so it cannot send customer names and messages in kanji (characters). As a result, more and more payments (especially utility bills) are handled by convenience store chains, which have installed sophisticated terminals.

Since the early 1990s more and more loans held by banks have turned into nonperforming assets. Banks have suffered over JPY 6 trillion in loan losses each year since fiscal year 1994 (table 5.2, row E). As a result, banks have not reported positive net-operating profit since fiscal year 1993 (row F). However, because of occasional realization of capital gains on stocks and real estate (row G), banks have shown a positive bottom line in some years (row F + row G).

Clearly, the profit margin of Japanese banks is too small to cover the increased default risk after the crash of the bubble. Banks have not succeeded in increasing their lending margin under a strong competitive pressure from

Table 5.2 **Profitability of Japanese banking sector, by financial year (trillion yen)**

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003[a]
Lending margin (A)	7.1	8.9	9.8	9.2	9.7	10.8	10.7	10.0	9.6	9.7	9.4	9.8	9.4	9.0
Other revenue (B)	2.6	2.2	2.5	2.8	2.1	3.3	3.7	3.6	3.1	2.5	3.0	3.1	3.6	4.3
Operating costs (C)	7.1	7.5	7.7	7.7	7.8	7.8	8.0	8.0	7.5	7.3	7.1	7.0	7.0	6.7
Salaries and wages	3.7	3.9	4.0	4.0	4.0	4.0	4.0	4.0	3.6	3.5	3.4	3.2	2.8	3.1
Gross profit (D) = (A) + (B) – (C)	2.6	3.5	4.5	4.3	4.0	6.3	6.4	5.6	5.2	4.9	5.3	5.9	6.0	6.6
Loan Loss (E)	0.8	1.0	2.0	4.6	6.2	13.3	7.3	13.5	13.5	6.3	6.6	9.4	7.0	6.1
Net operating profit (F) = (D) – (E)	1.8	2.5	2.5	–0.4	–2.2	–7.0	–1.0	–7.9	–8.3	–1.4	–1.3	–3.5	–1.0	0.5
Realized capital gains (G)	2.0	0.7	0.0	2.0	3.2	4.4	1.2	3.6	1.4	3.8	1.4	–2.4	–4.1	0.6
Net profit (F) + (G)	3.8	3.3	2.5	1.7	1.0	–2.6	0.2	–4.2	–6.9	2.3	0.1	–5.9	–5.1	1.0
Asset	927.6	914.4	859.5	849.8	845.0	848.2	856.0	848.0	759.7	737.2	804.3	772.0	739.0	750.0
Outstanding loans	522.0	537.0	542.0	539.0	539.0	554.0	563.0	536.0	492.0	476.0	474.0	465.0	435.0	423.0

Source: Japan Center for Economic Research (2001). Updated by the author.

Note: Financial statement of all commercial banks. Other revenue (B) includes all the other profit such as dealing profits and fees but excludes realized capital gains of stocks and real estates. Realized capital gains includes gains of stocks and real estates.

[a]2003 numbers are for the eleven major banks.

government-backed financial institutions and weakened borrowers under a deflationary economy. Moreover, under the terms and conditions of government capital injection in March 1999, banks are legally required to maintain and increase loans to small- and medium-sized firms. Sinsei Bank, which reduced loans to small- and medium-sized firms, was ordered to increase such loans by the Financial Services Agency of Japan (FSA). Because of this situation, banks often disregard the internal model-based required lending margin to make new loans to small companies. Given these poor lending market conditions, Citibank decided to significantly reduce consumer-loan business in Japan.[5]

Corresponding to the flow-profit figures, the capital position of Japanese banks has been deteriorating. Under Japanese accounting rules for banks and lenient application by the regulators, Bank for International Settlements (BIS) capital ratios have been manipulated in many ways. First, banks have underreserved against bad loans. This tends to increase bank core capital by the same amount.

Second, banks have large deferred-tax assets on their balance sheets even though they have been losing money continually since 1993 and loss carry-forwards are limited to five years. There is little prospect of utilizing the deferred-tax asset by showing genuine profit in the near future, so it should be written off.

Table 5.3 shows the capital structure of major Japanese banks. In March 2003, more than 100 percent of tier I capital of Resona Bank and Mitsui Trust Holdings consisted of deferred tax assets (present value of the future tax shelter). More than one-half of the tier I capital of United Financial of Japan (UFJ) and Sumitomo-Mitsui Financial Group corresponds to the deferred tax asset. One-third of the tier I capital of Tokyo-Mitsubishi Group is also the deferred tax asset. This situation improved somewhat one year later. Except for UFJ Group, all the other banks' reduced deferred tax asset. Resona bank could reduce deferred tax asset by the capital injection by the government. The weakened UFJ Group is merging with the Mitsubishi Tokyo Financial Group.

Third, friendly life insurance companies hold banks' subordinated debts and bank stocks. The banks, in turn, hold subordinated loans and surplus notes of the life insurance companies. At the end of March 2003, Japanese banks provided JPY 1.9 trillion of capital to ten major life insurance companies. On the other hand, ten major life insurance companies held JPY 1.9 trillion of banks stocks and JPY 4.4 trillion of subordinated liabilities of banks.[6] This is double gearing, and the cross-held quasi capital should

5. According to the March 16, 2003, edition of Japan *Economic Journal,* Japanese edition, Citibank group would eliminate up to 500 consumer-loan offices and about 2,000 employees by the end of 2003.

6. See Fukao and Japan Center for Economic Research (2004, 133).

Table 5.3 The ratio of deferred tax asset in the core capital of major Japanese banks

	March 2004			March 2003
	Core capital (billion yen) (A)	Net DTA (billion yen) (B)	Ratio (%) (B/A)	Ratio (%) (B/A)
Mitsubishi Tokyo Financial Group	3,655	647	17.7	39.0
UFJ Group	2,149	1,397	65.0	57.1
Sumitomo Mitsui Financial Group	3,567	1,666	46.7	58.1
Mizuho Financial Group	3,941	1,333	33.8	60.8
Chuo Mitsui Group	483	269	55.7	101.5
Resona Bank	892	53	5.9	109.6
Sumitomo Trust	790	141	17.9	37.4

Source: Disclosure materials of individual banks.
Note: Net DTA means deferred tax assets minus deferred tax liabilities.

not be treated as genuine capital for either the banks or the life insurance companies.

The capital position of banks is quite sensitive to stock prices. Table 5.4 shows the capital structure of all commercial banks. Core capital based on traditional historical cost accounting is adjusted for unrealized capital gains on stocks, deferred taxes, the public capital injection, and underreserving for loan losses. Although banks showed JPY 24.8 trillion of capital on their balance sheet at the end of March 2003, this figure was inflated with JPY 10.6 trillion of deferred-tax assets, JPY 5.4 trillion of underreserving, and JPY 7.3 trillion of government capital. Removing these amounts, the privately held equity of the banking sector was only JPY 1.5 trillion. This is very small compared to the JPY 64.6 trillion of classified loans and JPY 23.2 trillion of stocks held by banks.

In the early 1990s, unrealized capital gains (the difference between table 5.4 columns [A] and [B]) were very large and banks could withstand fluctuations in stock prices. However, in the 1990s, banks sold stock to realize gains to offset huge loan losses. The increase in book value of shares (column [B]) during the 1990s shows that the banks were buying back most of the stock they had sold.

Table 5.5 shows the distribution of core capital ratios (leverage ratios) of major Japanese banks. By adjusting the underreserving and deferred tax assets, four banks had negative equity at the end of March 2003. The weighted average capital ratio declined from 3.21 percent in March 2000 to 0.30 percent in March 2003. Only two banks maintained more than 6 percent leverage ratios. One is Shinsei Bank, the former Long-Term Credit Bank of Japan (nationalized in October 1998 and privatized in March 2000). The other is Aozora Bank, the former Nippon Credit Bank (nationalized in

Table 5.4 **Stock portfolios and capital in the banking sector (trillion yen)**

	Market value of shares held by banks (A)	Book value of shares held by banks (B)	Capital account (core capital) (C)	Deferred tax asset (D)	Estimated underreserving (E)	Equity capital held by the government (F)	Net private capital (C) + ([A] – [B]) × 0.6 – (D) – (E) – (F)	Nikkei225 Index
March 1991	77.7	33.1	30.2	0.0	n.a.	0.0	57.0	26,292
March 1992	56.4	34.5	31.3	0.0	n.a.	0.0	44.4	19,346
March 1993	56.4	34.5	31.8	0.0	n.a.	0.0	44.9	18,591
March 1994	61.9	36.5	32.3	0.0	n.a.	0.0	47.5	19,112
March 1995	52.0	39.8	32.3	0.0	n.a.	0.0	39.6	13,140
March 1996	64.3	43.0	27.9	0.0	n.a.	0.0	40.7	21,407
March 1997	54.1	42.9	28.5	0.0	15.0	0.0	20.2	18,003
March 1998	50.8	45.7	24.5	0.0	5.1	0.3	22.2	16,527
March 1999	47.1	42.7	33.7	8.4	4.6	6.3	17.1	15,837
March 2000	54.5	44.4	35.2	8.1	6.6	6.9	19.7	20,337
March 2001	44.5	44.3	36.7	7.3	7.6	7.1	14.8	13,000
March 2002	34.4	34.4	29.3	10.7	6.9	7.2	4.5	11,025
March 2003	23.2	23.2	24.8	10.6	5.4	7.3	1.5	7,973

Source: Federation of Bankers Associations of Japan, various issues.

Notes: Tables represent amounts on the banking accounts of all banks in Japan. Estimated underreserving (E) = required loan loss reserve – actual loan loss reserve. Required loan loss reserve = 1 percent of normal loan + 20 percent of substandard loan + 70 percent of doubtful loan + 100 percent of estimated loss loan.

Table 5.5 **Distribution of adjusted capital/asset ratio of major Japanese banks**

	Number of banks								
	Total	Less than –2%	–2% to 0%	0% to 2%	2% to 4%	4% to 6%	More than 6%	Weighted Average (%)	Nikkei 225 index
March 2000	18	0	0	1	16	0	1	3.21	20,337
March 2001	18	0	0	10	6	0	2	1.91	13,000
March 2002	15	0	2	10	1	0	2	0.80	11,025
March 2003	14	1	3	8	0	0	2	0.30	7,873

Source: Japan Center for Economic Research (2001, 2003). The figures are updated by the author.

Notes: Major banks include city banks, long-term credit banks, and major trust banks. We excluded three new but small trust banks: Nomura Trust, Mitsui Asset Trust, and Resona Trust. Two privatized long-term credit banks after nationalization maintain "more than 6 percent" capital. Adjusted capital = core capital + unrealized capital gains and losses + loan loss reserves – estimated required loan loss reserves – deferred tax assets. Estimated required loan loss reserves = 100 percent of defaulted loans + 70 percent of risk loans + 20 percent of doubtful loans + 1 percent of normal loans. Adjusted capital-asset ratio = Adjusted capital/gross assets.

Table 5.6 **Illustrative example of banking-sector profit margin**

	Current situations	Mild inflation
Lending rate (A)	2.0	4.0
Inflation rate (B)	–2.0	2.0
Real interest rate (A) – (B)	4.0	2.0
Funding cost of banks (C)	0.2	1.0
Profit margin (A) – (C)	1.8	3.0

December 1998 and privatized in December 2000). All other banks show declining trends in the ratios.

To sum up, banks are losing money by high levels of loan losses and very thin profit margins. The banking sector is running out of capital, and the banks are surviving with government guarantees of their liabilities. In order to stabilize the banking sector, it is necessary to increase the lending margin of banks. As we will see in the next section, borrowers are already facing relatively high real interest rates due to the gradual acceleration of deflation. Therefore, an increase in the average lending rate is likely to depress the Japanese economy and will aggravate the deflation. In order to avoid this adverse effect, it is necessary to raise nominal interest rates without raising the real cost of debt for weakened borrowers. The only way to do this is to stop deflation and have a mild inflation (table 5.6). By raising trend inflation rate from minus 2 percent to plus 2 percent, for example, banks can raise average lending rate from the current 2 percent to 4 percent. At the same time, the real cost of debt for borrowers will fall from 4 percent to 2 percent.

We have to take note of the fact that a simple injection of government capital to weakened banks would not stabilize the banking sector without a bigger lending margin. Loss-making banks will deplete the injected money sooner or later. In order to revitalize the banking sector without aggravating deflation, the government has to do two things: allow banks to obtain enough lending margin that is consistent with the expected credit costs, and reduce real interest rates by stopping deflation.

Given the sharp recovery of stock prices and the improving performance of borrowing firms, banks showed better results for the fiscal year ending March 2004. The Nikkei index rose from 7,973 at the end of March 2003 to 11,715 one year later. This sharp recovery of stock prices increased the market value of stocks held by banks by about JPY 5 trillion. The recovery of the economy also reduced the loan-loss figures for most banks. On the other hand, one major bank, Resona, and one regional bank, Ashikaga, were effectively nationalized in 2003. Resona group banks alone lost as much as JPY 1,340 billion for fiscal year 2003, and Ashikaga banks also lost JPY 775 billion for the same fiscal year. This means that the banking sector is close to the break-even point but not earning enough of a profit margin to stand

on its own feet. Probably, banks have to increase lending margin by about 50 to 100 basis points to make their lending reasonably profitable.

5.4 Macroeconomic Policy under Large GDP Gap and Zero Interest Rate

The Bank of Japan (BOJ) is providing a large amount of monetary base, but broadly defined money supply is not increasing much (figure 5.6). As the short-term interest rates moved close to zero, the monetary base was hoarded by banks and short-term money market dealers and was held as current deposits at the BOJ. Figure 5.7 shows a phase diagram of monetary base and nominal short-term interest rates since 1986, and it can be regarded as an empirical demand function for monetary base. When the short-term nominal interest rate was between 1 and 8 percent, the monetary base–GDP ratio moved between 7 and 9 percent. However, when the short-term interest rate reached 0.5 percent in the summer of 1995, the demand for monetary base became very elastic. The monetary base–GDP ratio increased to 11 percent when the zero-interest-rate policy was adopted in February 1999. From the start of the quantitative easing in March 2001 until the end of 2003, the ratio increased from 12.5 percent to more than 20 percent. The flat part of figure 5.7 clearly shows that the Japanese economy has been in a liquidity trap.

Figure 5.8 shows the reaction function of the BOJ in the face of the falling inflation rate. The overnight call rate was reduced in line with the GDP deflator inflation rate. A one-point fall in the deflation rate induced

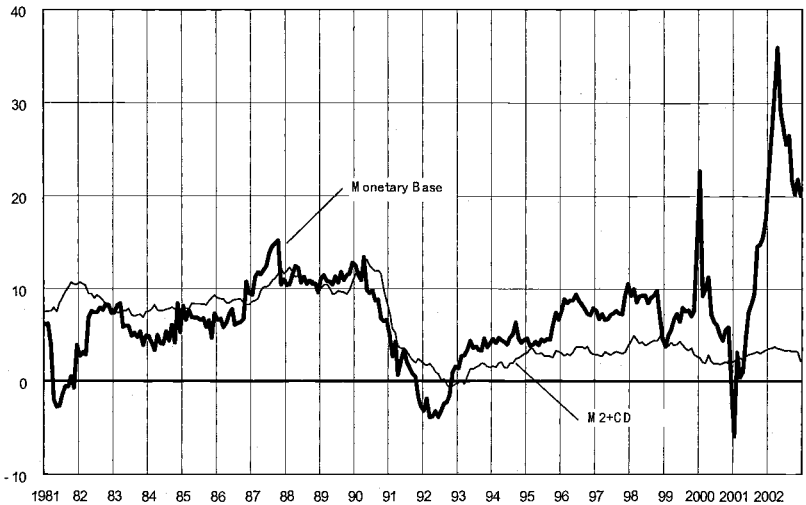


Fig. 5.6 Money supply developments
Source: Japan Center for Economic Research (2003).

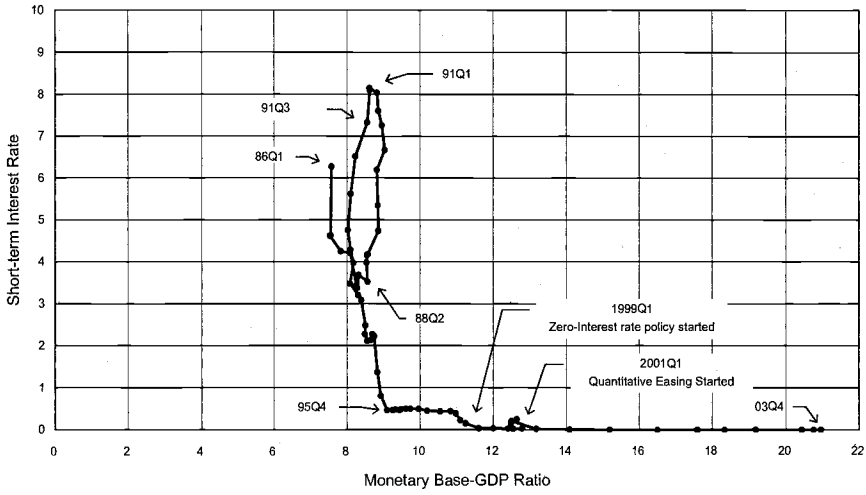
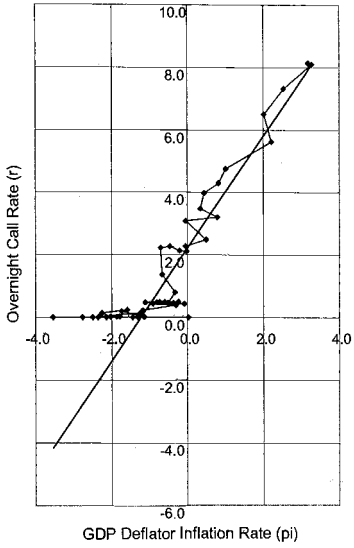


Fig. 5.7 Demand for monetary base



OLS regression 1991/1-1999/1
Period: before zero-interest rate policy

r = 2.210 + 1.800 x pi + e R2 = 0.89
(15.8) (16.2) F = 261.4
SE = 0.82

r: Overnight call rate
pi: GDP deflator inflation rate
e: Error term

Real interest rate reaction function
r - pi = 2.210 + 0.800 x pi

Fig. 5.8 Inflation and short-term money rate (1991–2003)

the BOJ to cut the nominal rate by 1.8 points, thereby reducing the real interest rate by 0.8 points. The BOJ ran out of room for maneuvering when the deflation rate fell down to minus 1.23 percent (1.23 = 2.21/1.80). The bank faced the zero lower bound of the nominal interest rate.

In spite of the aggressive increase of monetary base by the BOJ, real interest rates have been on a rising trend since mid-1998. Figure 5.9 shows

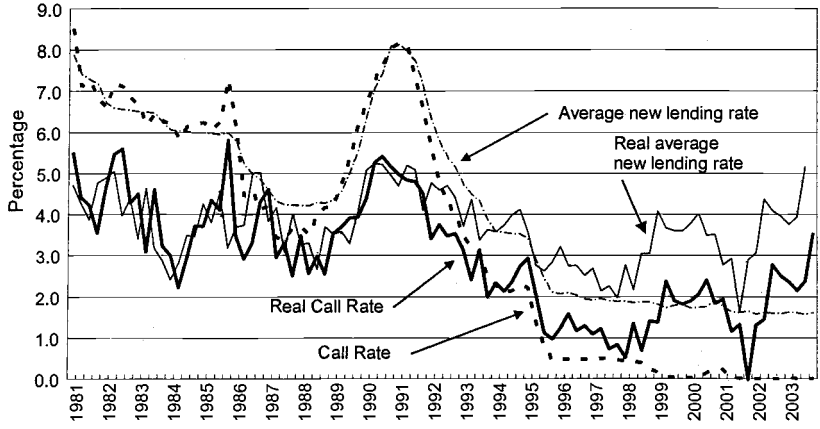


Fig. 5.9 Real and nominal interest rates

Note: Real interest rates are estimated with three-quarter moving average of GDP deflator inflation rate (SAAR).

nominal and real interest rates since 1986. This figure shows the average new lending rate of all banks and overnight call rates. The call rate indicates the short-term interest rates for high-quality borrowers. On the other hand, the average new lending rate indicates the borrowing costs for small and medium-sized enterprises (SMEs). Nominal rates are shown in dotted lines and the real rates in solid lines. While the real and nominal interest rates fell until 1998, the real rates started to rise because of the acceleration of deflation.

Moreover, we have to pay attention to the fact that the gap between the lending rates and the call rate gradually increased in the 1990s. In the 1980s, the difference between the lending rate and the call rate was very small and less than 50 basis points. By the mid-1990s, the gap increased to over 150 basis points. The increasing gap is the result of the decontrol on deposit interest rates and the decline of market interest rates toward zero. Banks lost regulatory rent from deposits in the early 1990s. As the market rates fell toward zero in the 1990s, banks had to raise loan rates to maintain their profit margin. The real new lending rate is close to 4 percent, which is close to the booming bubble period in the late 1980s. Even the real call rate is about 2 percent, which is much higher than the real short-term market rate in the United States of the same period. The high real cost of funding for SMEs is depressing economic activities.

Japan has been in a deflationary trap. High real interest rates due to deflation have been depressing the economy. The depressed economy, in turn, has accelerated deflation, and real interest rates rose further as a result. Conventional open market purchase of government notes and bonds is no longer effective. Since interest rates on short-term treasury bills (TBs) are

very close to zero, they have become a perfect substitute for monetary base. An open market purchase of TBs has no expansionary effect because it is an exchange of two perfectly substitutable assets. An open market purchase of long-term government bonds is also ineffective because long-term interest rates are extremely low and the BOJ cannot push down long-term rates any lower.

Even in a liquidity trap, it is possible to consider unconventional monetary-policy measures. The BOJ can buy stocks and/or real estate as instruments of open market operations. The bank started to buy limited amounts of stocks from banks in October 2003 so as to reduce the excessive market risk of stock portfolios held by commercial banks. Because the amount was very limited (the ceiling of the total purchase was initially set at JPY 2 trillion in October 2003 and was increased to JPY 3 trillion in March 2003), its expansionary effect has been limited. The BOJ and the government can also buy foreign-currency-denominated assets to weaken the yen. Since the Ministry of Finance decides the intervention policy in the foreign exchange market, the BOJ cannot use foreign exchange as an instrument of open market operations by itself.

In 2003, the Ministry of Finance carried out massive foreign exchange intervention to keep the yen weak (fig. 5.10). Total purchase of foreign currencies, mostly U.S. dollars, amounted to JPY 20.4 trillion in 2003 and JPY 14.8 trillion in the first quarter of 2004. This is a massive intervention because JPY 35.2 trillion amounts to 7 percent of Japan's GDP. This foreign exchange intervention is accompanied by the BOJ's quantitative expansion of the monetary base. The bank increased its monetary base by JPY 21 tril-

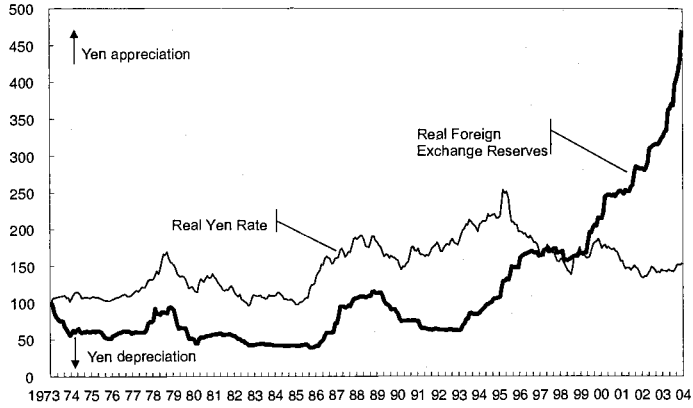


Fig. 5.10 Japanese foreign exchange reserve and real yen-dollar rate

Source: Japan Center for Economic Research (2004).

Notes: Index is equal to 100 in February 1973. Real reserve = Nominal reserve (US$) × Japanese GDP deflator/US GDP deflator/Japanese nominal GDP. Real exchange rate = Nominal yen-dollar rate × (US GDP deflator/Japanese GDP deflator).

Table 5.7 Projection on general government budget deficits

Year	Nominal GDP growth growth rate	Primary balance–GDP ratio	General government gross debt–GDP ratio	General government net debt–GDP ratio	Effective interest rate on net debt	Net interest cost GDP ratio
1999	–1.4	–5.8	120.4	36.0	3.5	1.3
2000	0.8	–6.1	130.7	43.5	3.1	1.3
2001	–1.1	–4.7	142.0	51.0	2.8	1.4
2002	–1.5	–6.0	150.2	59.2	2.1	1.2
2003	0.1	–6.3	157.6	66.6	2.1	1.4
2004	0.0	–6.3	165.3	74.3	2.1	1.6
2005	0.0	–6.3	173.2	82.2	2.3	1.9
2006	0.0	–6.3	181.4	90.4	2.7	2.4
2007	0.0	–6.3	190.1	99.1	3.0	3.0
2008	0.0	–6.3	199.4	108.4	4.0	4.3
2009	0.0	–6.3	210.0	119.0	4.0	4.8

Source: Figures until 2003 are based on International Monetary Fund, *World Economic Outlook,* and Organisation for Economic Co-operation and Development, *Economic Outlook.*

Notes: General government gross asset is assumed to be constant after 2002. Sharp downgradings of JGB are assumed after 2006.

lion from the end of 2002 to the end of March 2004. This intervention policy may have kept the yen relatively weak in 2003 and contributed to the recovery of the economy to some extent.

As a cost of this intervention policy, the Japanese government has increased its foreign exchange exposure. The foreign exchange reserves reached US$827 billion at the end of March and were equivalent to 17 percent of GDP. A 10 percent fall of the U.S. dollar induces a capital loss of 1.7 percent of GDP to the Japanese government.

Regarding fiscal policy, the extremely large budget deficit also makes it very difficult to use fiscal policy to stimulate the economy. Table 5.7 shows the budgetary situations of the general government of Japan, including the central government, local government, and the social security fund. The gross debt–GDP ratio was already 158 percent at the end of 2003. With an extremely large budget deficit and stagnant nominal GDP, this ratio is likely to increase by 8 to 9 points a year. The gross debt of the general government will reach 200 percent by 2008. Even though the net debt–GDP ratio is still at 66 percent, it is likely to surpass 100 percent by 2008. Moreover, these figures do not include off-balance-sheet liabilities such as failing national pension systems and loss-making government-owned companies.

At the time of this writing, the Japanese yen government bond (JGB) is rated AA– by Standard & Poor's and A2 by Moody's, and these are the lowest ratings among major countries. Unless the Japanese economy can get out of deflation with the current economic recovery, I expect that the JGB will be downgraded further. In that event, the government will have to shift its funding from long-term bonds to short-term notes so as to reduce in-

terest costs. However, the shortening maturity of JGB will increase the funding vulnerability against a sharp rise in interest rates.

Such downgrading of government bonds would adversely affect the international operations of Japanese financial institutions and companies. Since sovereign credit rating usually sets the ceiling rate for private companies, they will face a rising funding cost in international financial markets.

5.5 Concluding Remarks

In this chapter, we analyzed the causes of the persistent deflation in Japan. We found that the deflation has been accelerating gradually since the mid-1990s. Because of the acceleration of deflation, real interest rates are rising and conventional monetary-policy tools have lost effectiveness.

As we explained in the introduction, the Japanese economy started to recover in 2003 due to the succession of propitious events. If the economy can overcome deflation with this recovery, the Japanese episode of zero interest rate will be over. However, we economists have to think hard to come up with monetary-policy instruments that will be effective even under a deflation. One such instrument is the idea of a Gesell tax or the famous stamp duty on money.[7] By levying taxes on the outstanding amount of government-guaranteed financial assets, it is possible to set nominal return on safe assets at a negative number. In other words, it is possible to overcome the zero lower bound on nominal interest rates by introducing a new tax on some financial assets. In the following, I summarize my proposal in my earlier paper.[8]

The government may levy a tax on the balance of all the government-guaranteed financial assets. Taxable assets include all the central and local government liabilities; all the government-guaranteed assets, such as postal saving deposits and postal life insurance policies; and all the yen liabilities of the banking sector that are effectively guaranteed by the deposit insurance system. In order to avoid tax loopholes, yen cash payments on derivative transactions by banks should also be taxed. It is necessary to levy tax on the monetary base, including banknotes and central bank deposits from private banks. In order to tax cash, the BOJ may print new bank notes and levy fees for the exchange with old bank notes. Alternatively, the government can levy stamp duty on old bank notes. Since taxable assets are the liabilities of the government bodies and the banking sector, this tax can be implemented fairly easily under the current tax collection system. The most messy part is the taxation on the bank notes. All the automated teller machines and automatic vending machines need adjustments for new notes.

7. See chapter 23 of Keynes (1936). Goodfriend (2000) also discussed the possible taxation on currency to fight against deflation.

8. See Fukao (2003) for the details of this proposal.

In order to have expansionary effects, this Gesell tax has to be somewhat higher than the rate of deflation. Given the recent deflation rate of 1 to 2 percent per annum, the tax rate can be set at around 2 percent. This tax has to be levied repeatedly as long as deflation continues. The Gesell tax can be regarded as a substitute for inflation tax on government liabilities. When an economy experiences a steady and mild inflation, the government can enjoy declining real value of its liabilities. This inflation tax has expansionary effects on the economy by encouraging rational economic agents to invest in real assets. In a deflationary economy, the increasing real value of safe assets has contractionary effects on the economy.

This Gesell tax will have very strong expansionary effects on expenditures. People will shift assets from "safe" assets to risky assets. In other words, people will shift from taxable assets to all the nontaxable assets. Since stocks, real estate, corporate bonds, foreign bonds, and consumer durables are not taxed, the demand for these assets will increase. The yen exchange rate will also depreciate against foreign currencies. This tax will also stimulate bank lending activities. Banks will shift assets from BOJ deposits and government bonds to loans and corporate bonds. Intercorporate credit will also expand because receivables are not taxed, but cash and deposits will be taxed.

This tax will also generate a large amount of revenue for the government. The total tax revenue of 2 percent tax on government-guaranteed financial assets would amount to about 28 trillion yen. The government could make use of the tax revenue to reduce its budget deficit, recapitalize deposit insurance funds, or improve its antiunemployment policy. It is possible to sweeten this tax proposal by distributing cash to all the people living in Japan. The cost of distributing 50,000 yen per person to everybody is 7 trillion yen, and this cost is only one-quarter of the revenue from this tax.

One negative aspect of this tax is the possible negative effect on the credit rating of the Japanese government. For example, Moody's Investors Service states that an imposition of tax on the government liabilities may constitute an event of partial default by the government. However, this is a relatively minor problem because only a small portion of JGB is held by foreign investors.

Appendix

Potential GDP and GDP gaps are estimated from the following data:

1. *Real GDP, GDP deflator:* Cabinet Office, Economic Social Research Institute, quarterly series.

2. *Capital stock:* Cabinet Office, Economic Social Research Institute, quarterly series. The data were adjusted to remove the gaps due to privatization of Nippon Telephone and Telegraph Co. (1985 Q2), Japan Tobacco

Co. (1985 Q2), Electric Power Development Co. (1986 Q4), East Japan Railway Co. (1987 Q2), and sales of new trunk lines from the government to railway companies (1991 Q4).

3. *Capacity utilization ratio for the manufacturing sector:* Ministry of Economy and Trade (METI), capacity utilization index for the manufacturing sector.

4. *Capacity utilization ratio for the nonmanufacturing sector:* Since there are no statistics on the capacity utilization for the nonmanufacturing sector, we estimated the ratio by using the Bank of Japan Tankan statistics on the diffusion index (DI) on capacity utilization. First, we estimated the relationship between the capacity utilization ratio for the manufacturing sector (METI data) and Tankan DI of the same sector:

$$\text{Manufacturing capacity utilization} = 109.18 - 0.53 \times \text{Manufacturing Tankan DI}.$$

By replacing Manufacturing Tankan DI with Nonmanufacturing DI, we estimated the capacity utilization ratio for the nonmanufacturing sector after 1991 Q1. Since there is no Tankan DI data for the nonmanufacturing sector before 1990 Q4, we estimated nonmanufacturing-sector DI with the following equation and manufacturing Tankan DI:

$$\text{Nonmanufacturing DI} = -5.75 + 0.44 \times \text{Manufacturing Tankan DI}.$$

Both capacity utilization ratios are normalized to be 100 at their peaks.

Figure 5A.1 shows the estimated capacity utilization for nonmanufacturing as well as manufacturing sector capacity utilization.

5. *Actual capital input:* Estimated from the following equation:

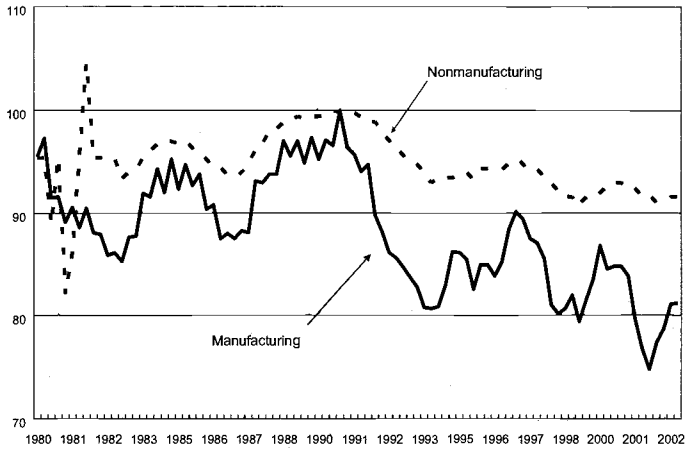


Fig. 5A.1 Capital utilization ratios of manufacturing and nonmanufacturing sectors (manufacturing: 1990:4 = 100, nonmanufacturing: 1990:1 = 100)

Source: Japan Center for Economic Research (2004).

Actual capital input = [(manufacturingsector capital stock)
× (manufacturing sector capacity utilization ratio)
+ (nonmanufacturing-sector capital stock)
× (nonmanufacturing-sector capacity utilization ratio)] ÷ 100.

6. *Potential capital input:* Estimated from the following equation:

Potential capital input = Manufacturing-sector capital stock
+ Nonmanufacturing-sector capital stock.

7. *Actual labor input:* Actual labor input on a man-hour basis is estimated by the following equation:

Actual labor input = Number of employees and self-employed
× (Scheduled working hours
+ Overtime working hours).

Number of employees and self-employed: Ministry of Public Management, Home Affairs, Posts and Telecommunications, Statistics on Labor, all industries.

Working hours: Ministry of Health, Labor and Welfare, Monthly Labor Survey, average monthly working hours per employee in all establishments of more than five workers. Figure 5A.2 shows the development of scheduled

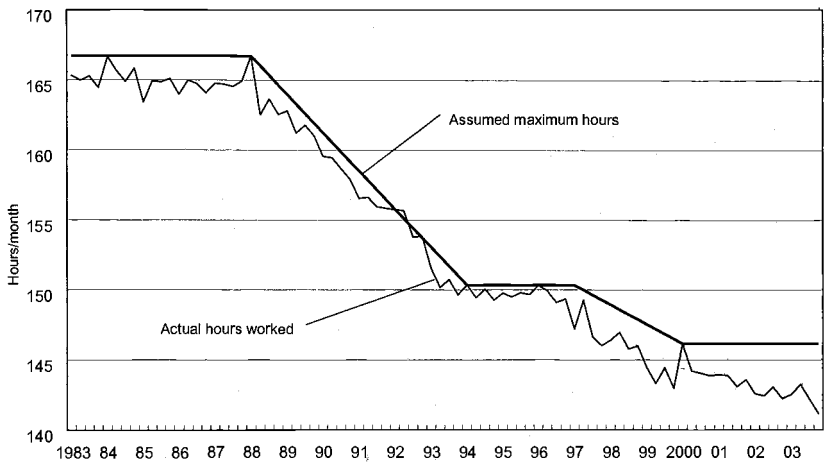


Fig. 5A.2 Regular hours per worker

Source: Japan Center for Economic Research (2004).

working hours. Because of the gradual introduction of the five-day workweek in 1988 for large companies and in 1997 for small companies, the scheduled hours declined twice.

8. *Potential labor input:* Potential labor input is estimated by connecting the past peaks of all the variables in *Actual labor input.*

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Comment Piti Disyatat

Overview

The chapter provides a focused and interesting account of the causes of persistent deflation in Japan, highlighting the implications that price declines have had on the banking sector. The discussion is broadly divided

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The views expressed here are those of the author and do not necessarily represent those of the Bank of Thailand or Bank of Thailand policy.

into two parts. The first concentrates on linking persistent and accelerating deflation to the existence of a negative output gap, while the second focuses more on the macroeconomic impact of a deflationary environment and implications for policy.

Although much of the chapter is descriptive in nature, the analysis does point out a close link between the author's estimated output gap and developments in the GDP deflator. In this regard, it would be useful if the chapter clarified a bit more the reasons behind focusing on the GDP deflator as a measure of prices rather than the CPI. On the state of the banking system, the chapter lays out clearly the main reasons why things may appear better then they are. In particular, it points out hidden weaknesses in banks' capital position and highlights the fact that Japanese banks' plight is far from over. To gain a better appreciation of how extensive the problem is, it would be nice if more information on the cross-section variation in banks' balance sheets were provided (indeed, table 5.3 indicates substantial differences across banks and suggests that things are perhaps worse for smaller banks).

The chapter could emphasize more the role that problems in the banking sector and sluggish loan growth have contributed to persistent deflation. What is needed to end deflation is an expansion in broader monetary aggregates, since these are effectively the balances that ultimately "chase" real goods and services. But it is not that central banks can directly increase broad-money supply and bank lending. They must do so through the provision of funds to financial institutions in exchange for bonds or foreign exchange. When credit markets function properly, this expansion in loanable funds leads to a rise in the supply credit that underpins the increase in broad money. However, given the ongoing banking-sector problems, monetary expansion through traditional channels may not be effective in raising broad-money aggregates. The problem stems from lingering balance-sheet weaknesses that continue to plague both the banking and corporate sectors. At the same time, excess capacity and uncertainty about future economic prospects have dampened the demand for credit. When firms are not eager to raise funds and banks are not eager to lend, higher liquidity in the banking system will not translate into higher liquidity in the economy. In this way, the slow pace of banking and corporate restructuring has contributed to the persistence of deflation in Japan.

Implications for Policy

The chapter stresses the need to improve banks' profitability through increasing lending rates while at the same time not exacerbating real debt burdens on borrowers. The only way in which this can be achieved is thus through the attainment of a positive inflation rate. The chapter does not, however, say how to achieve this. Indeed, given the large number of rec-

ommendations in the literature, it would have been nice to see where Fukao stands on this issue.

More important, however, focusing on loan margins alone is unlikely to solve the banking sector's problem since much of it is a *stock* problem associated with credit quality. Indeed, given the low demand for loans, abundant liquidity, and high degree of competition with respect to loan extension, it is unclear whether banks will actually be able to raise nominal loan rates. Other potentially more productive ways to increase spreads include (a) the moving of excess liquidity into loans; (b) the restructuring of nonperforming loans (NPLs) to yield positive returns again; and (c) the resolution of NPLs and liquidation of foreclosed assets into cash that can be invested.

The Japanese economy would certainly benefit from a reestablishment of consumer, business, and investor confidence, which cannot happen unless the macroenvironment becomes supportive. From this perspective, stopping deflation is a central element of the solution. However, it is only a first step. Many of the potential benefits lie elsewhere. The chapter could perhaps emphasize more the structural nature of the problem in Japan in which deflation is only one of the symptoms. Policy initiatives should stress the need for NPLs to be recognized at the appropriate prices and loans to bankrupt companies not rolled over. Incentives for accelerated restructuring and disposal of nonviable assets should be emphasized. At the same time, any further public injection of money must be accompanied by strict conditionality to make sure that the money is not used simply to prop up the system.

The chapter could also elaborate more on the dangers associated with the Japanese government's ballooning debt stock. Such a discussion could also usefully focus on the contingent liabilities of the government, including the possibility of large marked-to-market losses associated with the rapid accumulation of reserves that may occur should the U.S. dollar weaken further and yields on U.S. treasuries rise (as many expect). In this regard, credibility of the medium-term fiscal consolidation can be enhanced by setting clear medium-term debt targets.

Monetary Policy

To overcome the zero lower bound (ZLB) on interest rates, the chapter suggests the introduction of a tax on money holdings. However, this is unlikely to be either practical or desirable since it is the banks, not households, that are hoarding base money, and such a scheme may have adverse implications for consumer confidence. Also, if the tax encourages banks to spend money when there is simply no loan demand, banks may be encouraged to take on more risk than they should.

More substantially, it should be stressed that the ZLB does not entail in-

effectiveness of monetary policy. While the ZLB indeed limits the use of traditional methods of boosting aggregate demand, it does not prevent central banks from turning to other means. In particular, short-term interest rates are simply one intermediate target of monetary policy, and should this cease to be a useful benchmark for policy, central banks can turn to other targets (such as money supply or exchange rates). The real complication of the ZLB lies in the fact that switching operational targets introduces uncertainty with respect to the size and lags of the economy's response to policy actions, making it harder to set policy targets to achieve the desired effect.

Finally, while much of the literature—this chapter included—has focused on the difficulties associated with how to conduct monetary policy against the backdrop of deflation and a ZLB constraint, it is also unclear how effective policy will be once interest rates are positive because of excess liquidity problems in banks. In particular, with loan demand still weak and plenty of funds to lend, the pass-through from changes in short-term money market rates controlled by the central bank to retail rates may be much smaller and slower than usual.

Overall, the chapter provides a succinct analysis of the key problems associated with deflation in Japan with an illuminating discussion of the state of the banking system. That said, it paints a somewhat pessimistic picture of the Japanese economy in contrast to recent data releases, which appear to indicate a brighter prospect for sustained recovery.

Comment James Harrigan

Fukao covers a lot of ground in his chapter, and I agree with much of what he says, particularly in his discussion of the financial sector. I have some questions about his analysis of the macroeconomic situation, however, and that is where I will focus my remarks.

Fukao's presentation of the Phillips curve is somewhat unusual, so it may be useful to summarize his analysis. He uses three concepts of output. The first is actual real GDP as reported in the national accounts. In the data used in the statistical model, no adjustment is made for the large and growing bias in the GDP deflator, although the importance of this is discussed elsewhere in the text.

The second concept of output used is what is called "potential GDP." This is calculated in three steps:

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1. Estimate maximum possible levels of capital and labor input, $K_t^{\max}$ and $L_t^{\max}$.

2. Calculate aggregate TFP from a Cobb-Douglas production function using actual levels of capital and labor input,

$$\ln \text{TFP}_t = \ln Y_t - 0.29 \ln K_t - 0.71 \ln L_t.$$

3. Calculate the level of potential GDP as

$$\ln Y_t^{\max} = \ln \text{TFP}_t + 0.29 \ln K_t^{\max} + 0.71 \ln L_t^{\max}.$$

This definition of potential GDP doesn't seem like a useful number for several reasons. First, this level is never attainable as a market equilibrium or any other system of allocating resources. Second, the interpretation of TFP is problematic. As is well known, measured aggregate TFP has an important cyclical component which partially reflects labor hoarding. As a consequence, TFP growth will fall during periods of slack resource use even if there has been no negative shock to underlying technological possibilities. Taking the trend in measured TFP, as Fukao does, will not solve this problem in the Japanese case since resource use has been slack for so long and will therefore affect the estimated trend.

The final output concept used is "natural GDP," which is defined as a constant fraction of potential GDP,

$$Y_t^n = 0.97\, Y_t^{\max}.$$

The fraction 0.97 is estimated as part of the estimation of the Phillips curve relationship. The Phillips curve is unorthodox, since it imposes purely backward expectations that have a unit root (the sum of the coefficients on lagged inflation sum to one). A constant output gap leads to a constant change in inflation, and the coefficient on the output gap changes in 1994. The dynamics of inflation implied by the Phillips curve can be summarized as

$$\Delta\pi_t = 0.35 \ln \frac{Y_t^n}{Y_t} \quad 1985-1993$$

$$\Delta\pi_t = 0.08 \ln \frac{Y_t^n}{Y_t} \quad 1994-2003.$$

This statistical model is best interpreted as a reduced-form data description, rather than a structural model that explains how macro weakness has led to deflation. The reason for this is that there is no role for forward-looking expectations in this model, nor are there supply shocks.

Even as a purely reduced-form relationship, the equation is questionable. The sharp drop in the estimated relationship between inflation and output gap starting in 1994 is puzzling, especially since it appears from the *t*-statistics in the equation that it would be impossible to reject the hypoth-

esis that the true relationship is zero. If so, the model has rather surprising implications: long-run inflation is a random walk after 1994.

More generally, Fukao's macroeconomic analysis leaves many unanswered questions. Recession, deflation, insolvent banks, and a high government debt are all jointly determined in principle and surely in practice, which leaves causation unclear. In my view, the most important unanswered questions are

- What exogenous shocks and/or policy errors caused the Lost Decade?
- What policies might extricate Japan from Lost Decade 2.0?

Fukao closes with some remarks about the fiscal position of the Japanese state that stress the large gross debt. I agree with Broda and Weinstein's (2004) view that what matters for economic analysis of fiscal policy is the government's net debt, which Fukao acknowledges is far less alarming.

Finally, I think it is inappropriate to take seriously the rating downgrades of Japanese government bonds. Taken literally, such downgrades suggest that the probability of the Japanese state defaulting on the nominal value of bonds issued in yen is strictly greater than zero. Given that the Japanese state can print an infinite amount of yen at zero cost, my estimate of default probability is zero.

Reference

Broda, Christian, and Weinstein, David E. Happy news from the dismal science: Reassessing the Japanese fiscal policy and sustainability. NBER Working Paper no. 10988. Cambridge, MA: National Bureau of Economic Research, December.