Monetary Policy under Zero Interest Rate: Viewpoints of Central Bank Economists

Hiroshi Fujiki, Kunio Okina, and Shigenori Shiratsuka

Various proposals have been raised with respect to a desirable framework of monetary policy under the zero interest rate in Japan. By taking due account of such proposals, this paper intends to examine monetary policy options under the environment of the zero interest rate. In so doing, we first describe the policy framework of the "zero interest rate policy," which was in place from February 1999 to August 2000, and its transmission mechanism. Then, in view of the problems intrinsic to the zero interest rate, we address three important questions: (1) the policy options that might be available in response to future economic developments; (2) the major risks associated with these policy options; and (3) how such risks might change under varying economic conditions. On this basis, we finally consider the medium- and long-term "style" of monetary policy in Japan in order to improve its effectiveness and efficiency.

Key words: Zero interest rate policy; Quantitative easing; Open market operation of outright purchase of long-term government bonds; Dispelling deflationary concern; Styles of monetary policy management

Hiroshi Fujiki: Senior Economist, Institute for Monetary and Economic Studies, and Financial Markets Department, Bank of Japan (E-mail: hiroshi.fujiki@boj.or.jp)
Kunio Okina: Director, Institute for Monetary and Economic Studies, Bank of Japan (E-mail: kunio.okina@boj.or.jp)
Shigenori Shiratsuka: Senior Economist, Institute for Monetary and Economic Studies, Bank of Japan (E-mail: shigenori.shiratsuka@boj.or.jp)

I. Introduction

The primary objective of monetary policy conducted by the Bank of Japan (BOJ) is to maintain price stability, thereby contributing to the sound development of the national economy. This mandate is clearly and indisputably defined in the Bank of Japan Law.[1] However, when it comes to the implementation of monetary policy, there seems to be a considerable divergence of views.

This paper attempts to analyze various options under zero interest rate policy from the standpoint of the monetary authorities. The key element in this analysis is how to weigh probable benefits against potential risks, both of which could be generated by these policy options. Judgment on this point can vary markedly, depending on actual economic conditions.[2]

Since the BOJ decided to terminate the zero interest rate policy on August 11, 2000, one may wonder why we need to look back on this episode from the past in detail. First of all, additional monetary easing under the zero interest rate policy is in itself a theoretically intriguing problem. In addition, there is the possibility that some external shocks might occur and necessitate the exploration of further monetary easing beyond the zero interest rate policy in the future. Assuming that the BOJ cannot entirely rule out this downside possibility and given that it is pursuing unprecedented monetary policy within the zero interest rate framework, it is worthwhile to thoroughly consider the costs and benefits of additional easing.

A major contribution of this paper to the literature on the zero interest rate policy is to provide some numerical examples regarding the potential capital losses that the central bank could incur if it conducts aggressive operations of outright purchase of long-term government bonds under the zero interest rate policy. We hope that our estimates could give readers a quantitative benchmark of the future fiscal consequence.

Many economists have argued that the losses from central bank operations must be added to the national budget, therefore the cost-benefit analysis from the viewpoint of the central bank does not capture the social cost of quantitative easing. However, in our opinion, such a view does not deny the importance of our numerical examples. Rather, the examples convince readers of the importance of understanding future fiscal consequences of quantitative easing under the zero interest rate, which seems to be ignored by many economists except Goodfriend (2000). The examples clearly show that it could be a mistake to investigate monetary policy under the zero interest rate independent of fiscal policy, and that the fiscal authority might need to assist the central bank.

This paper is structured as follows. Chapter II describes the basic features of the zero interest rate policy, and Chapter III summarizes recent discussions on additional monetary easing under the zero interest rate. Chapters IV, V, and VI focus on the

1. Article 2 of the Bank of Japan Law stipulates that "Currency and monetary control shall be aimed at, through the pursuit of price stability, contributing to the sound development of the national economy."
2. Okina (1999a, 1999b) also discusses the policy options for the BOJ under the zero interest rate policy based on the following two criteria: (1) the BOJ will take measures necessary to achieve the sound development of the national economy through the pursuit of price stability in the long run; however, (2) the BOJ will not take such measures if the side effects are deemed greater than the effects, which makes it difficult to achieve the objective in (1).

outright purchase of long-term government bonds, which quite a few Japanese economists have been advocating as an effective countermeasure, should economic conditions worsen again under the zero interest rate. Chapter VII stresses the importance of establishing modalities for effective monetary policy, and Chapter VIII concludes.

Needless to say, monetary policy in Japan is decided by a majority vote at Monetary Policy Meetings.[3] This paper does not aim to elaborate on such official or formal views, but rather present some personal thoughts on the management of monetary policy under the zero interest rate. Thus, it should be noted that what is expressed in this paper does not necessarily represent the official stance of the BOJ.

II. Conduct of Zero Interest Rate Policy

In the following, we review the characteristics of the zero interest rate policy pursued by the BOJ from February 1999 to August 2000.

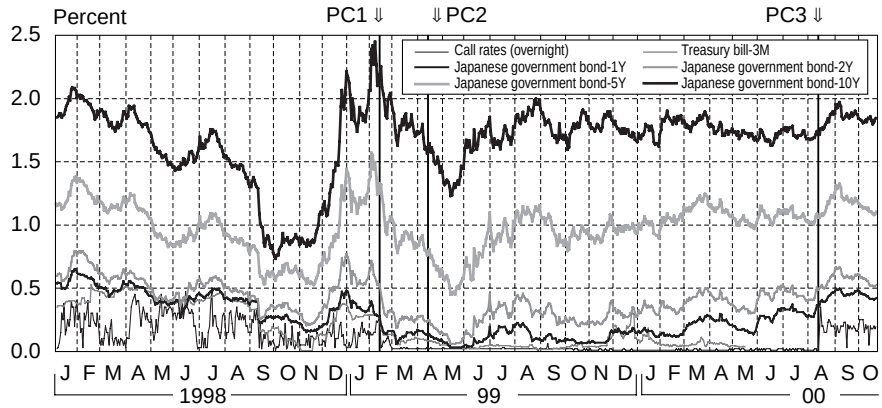
A. Development of Zero Interest Rate Policy

In February 1999, the BOJ adopted the so-called zero interest rate policy to "flexibly provide ample funds and encourage the uncollateralized overnight call rate to move as low as possible,"[4] in order to avoid possible intensification of deflationary pressure and to ensure that the economic downturn would come to a halt.[5] Subsequently, in April 1999, the BOJ declared that it was committed to a zero interest rate policy "until deflationary concerns are dispelled."[6] This policy was intended to work on market expectations so as to stabilize interest rates ranging from overnight to term rates at a low level. Under this policy, the uncollateralized overnight call rate, which is a direct operational target rate of the BOJ, was stable at around virtually zero percent from April 1999 to August 2000 (Figure 1).

On August 11, 2000, the BOJ determined to terminate the zero interest rate policy to "encourage the uncollateralized overnight call rate to move on average around 0.25%." The Bank explained this policy action in the statement on "Change of the Guideline for Money Market Operations" as follows.

3. Information regarding the Monetary Policy Meeting of the BOJ, such as Announcement of the Monetary Policy Meeting Decisions, Monthly Report of Recent Economic and Financial Developments, and Minutes of the Monetary Policy Meeting, is available both in Japanese and English at the same time from the BOJ's website (http://www.boj.or.jp).
4. During the early phase of the zero interest rate policy until the Monetary Policy Meeting on September 21, 1999, the policy directive for the intermeeting period contained an additional remark: "The Bank of Japan will provide ample funds if judged necessary to maintain stability of the financial markets." However, at the meeting on October 13, 1999, this remark was regarded as unnecessary given market conditions at the time and was deleted. In addition, at the same meeting, the wording of the directive was also revised to more explicitly convey the content and aim of the zero interest rate policy.
5. Announcement of the Monetary Policy Meeting Decisions on February 12, 1999 pointed out the following: (1) "corporate and household sentiments remain cautious and private sector activities stagnant"; and (2) "long-term interest rates have risen considerably, and the yen has been appreciating against the dollar."
6. Governor Hayami, at a press conference on April 13, 1999, stated "until we reach a situation in which deflationary concerns are dispelled, we will continue the current policy of providing necessary liquidity to guide the uncollateralized overnight call rate down to virtually zero percent while paying due consideration to maintaining the proper functioning of the market."

Figure 1 Market Interest Rates



Notes: PC1–3 denote the following policy changes:
PC1: Adoption of zero interest rate on February 12, 1999.
PC2: Governor's announcement on the commitment to the zero interest rate "until deflationary concerns are dispelled" at a press conference on April 13, 1999.
PC3: Termination of zero interest rate policy on August 11, 2000.

Sources: Bank of Japan, *Financial and Economic Statistics Monthly*; Bloomberg.

> Over the past one year and a half, Japan's economy has substantially improved, due to such factors as support from macroeconomic policy, recovery of the world economy, diminishing concerns over the financial system, and technological innovation in the broad information and communications area. At present, Japan's economy is showing clearer signs of recovery, and this gradual upturn, led mainly by business fixed investment, is likely to continue. Under such circumstances, the downward pressure on prices stemming from weak demand has markedly receded.
>
> Considering these developments, the Bank of Japan feels confident that Japan's economy has reached the stage where deflationary concern has been dispelled, the condition for lifting the zero interest rate policy.[7]

Financial markets were very stable immediately after the termination of the zero interest rate policy, and it was thus confirmed that market participants had received the policy change calmly (Figure 1). In response to the above decision to change the guideline for money market operations on August 11, 2000, the overnight call rate rose to 0.25 percent, and interest rates on term instruments increased toward the end of August, but were mostly stable thereafter.

B. Components of Zero Interest Rate Policy

In retrospect, important components of the "zero interest rate policy" as a policy framework were (1) guiding the call rate to virtually zero percent (net of the transaction cost in the interbank market); and (2) a commitment to the zero interest rate

7. The original statement can be viewed at the BOJ's website (http://www.boj.or.jp/en/seisaku/00/seisak_f.htm).

policy "until deflationary concerns are dispelled." In other words, two aspects were important for zero interest rate policy to be effective, namely, the "quantity" and the "policy duration."

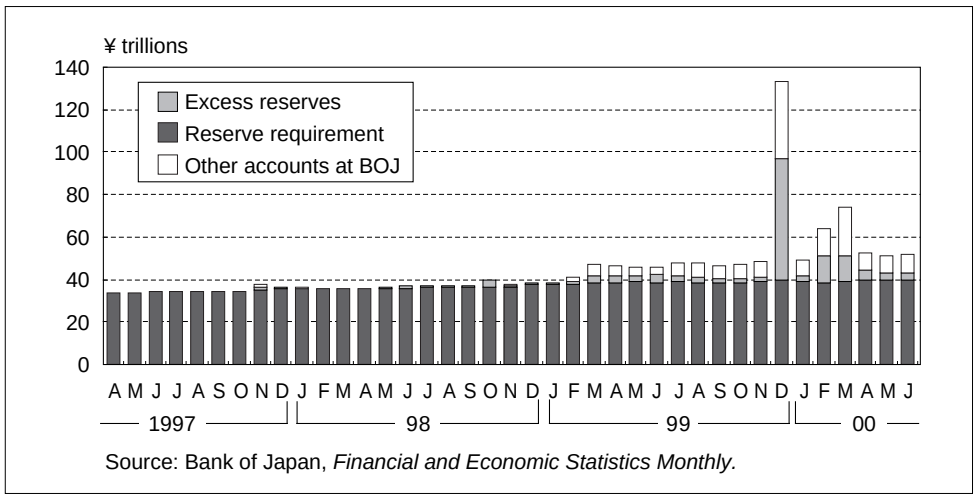
1. Quantitative aspect of the zero interest rate policy

If we focus first on the quantitative aspect of the zero interest rate policy, the BOJ had guided the uncollateralized overnight call rate down to virtually zero percent by providing ample funds that exceeded required reserves by ¥1 trillion.[8] In short, the zero interest rate policy is a policy under which the BOJ provides ample funds until interest rates fall to zero. In other words, in order to implement the zero interest rate policy, the central bank needs to provide funds to meet all short-term credit demand, guiding short-term interest rates to zero.

Under this policy, we saw several phenomena evidencing how abundantly funds have been provided. First, around 70 percent of the excess reserves of ¥1 trillion was placed in the accounts of money market brokers (*tanshi* companies) held at the BOJ (Figure 2). This suggests that financial institutions were no longer worried about their liquidity positions and also their need to hold excess reserves was diminishing. Another remarkable phenomenon was that under-subscription to the BOJ's money market operations had often been observed since the summer of 1999. This refers to the situation where bids by financial institutions fall short of amounts. This meant that even though the BOJ was providing funds at virtually the zero interest rate, financial institutions did not subscribe for the full amount offered. In other words, they were satiated with cash at zero cost of holding it.

Over the year-end of 1999, in order to maintain the zero interest rate the BOJ had to supply additional funds to meet increased demand for reserves in readiness for possible Y2K problems. This suggests that increased demand for reserves, regardless

Figure 2 Reserves of Financial Institutions



Source: Bank of Japan, *Financial and Economic Statistics Monthly.*

8. Financial institutions are legally required to keep reserves in the form of deposits with the BOJ, and amounting to a little less than ¥4 trillion.

of reasons, will be automatically supported by the zero interest rate policy. Apart from the Y2K period, which saw huge excess reserves when liquidity risk increased (Figure 2), under-subscription had been the norm with respect to the BOJ's operations, evidencing lack of demand for excess reserves on the part of private financial institutions. It was thus apparent that private financial institutions' demand for excess reserves was lacking.

2. Policy duration effect of the zero interest rate policy

Next, considering the "policy duration" effect of the zero interest rate policy, interest rates on longer-term instruments, such as three-month, six-month, and one-year rates, as well as long-term interest rates are important. Such interest rates essentially depend on how long the current abundant provision of funds will last rather than how abundantly funds are provided.

The "policy duration" effects are underpinned by the "expectation theory" of interest rate determination. Pure expectation theory tells us that long-term interest rates today should basically reflect the future course of short-term interest rates. For example, the one-year interest rate is determined by market expectations for overnight interest rates from a given point in time until one year later. Based on a more practical and general formula, long-term interest rates would be a sum of market expectations on the future course of short-term interest rates and a term premium (based on risk caused by uncertainty or the preference of market participants). Premiums being constant, fluctuations of interest rates on term instruments reflect changes in expectations in this case.

As economic conditions vary, the central bank cannot say it will not change the short-term interest rates during any period of time regardless of economic or price movements in practice. Hence, as a condition for terminating the zero interest rate policy, the BOJ cannot give a definite time frame, but only say "not until deflationary concerns are dispelled."

As a consequence, term interest rates have declined substantially to very low levels. Looking at short-term interest rates (as of February 2000), the three-month rate was 0.04 percent and the one-year rate 0.12 percent. Such a decline in short-term interest rates had worked as an anchor for medium- and long-term interest rates through the intermarket arbitrage function, on which expectation theory was based. Hence, the zero interest rate policy was highly effective in enhancing monetary easing, affecting the yield curve.

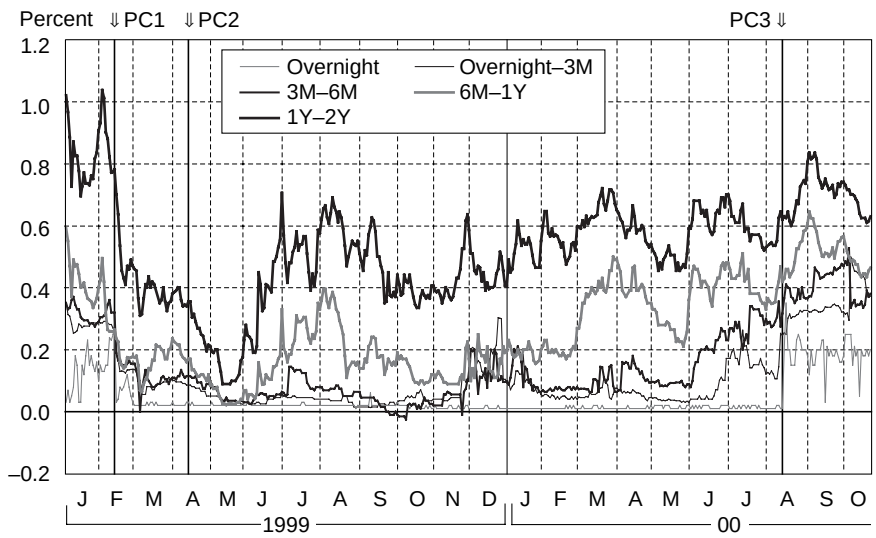
To see the policy duration effect due to this commitment, it is useful to look at the implied forward rate (IFR) estimated from the short term interest rates (Figure 3). Since the introduction of the zero interest rate policy on February 12, 1999, IFRs were on a downward trend. However, from the middle of March 1999, the IFRs, particularly those from six months to one year temporally, increased. Observe that immediately after the announcement of the commitment on April 13, 1999 "until deflationary concerns are dispelled," those IFRs declined again by June. Although longer-term IFRs increased again after that, it is noteworthy that the IFRs ranging from six months to one year remained around 0.1–0.2 percent after the yen's appreciation in summer 1999. On the contrary, in June to July 2000, IFRs ranging from three months to six months, and from overnight to three months started rising

in succession, reflecting growing expectations of an early termination of the zero interest rate policy.

The above movements of IFRs indicate that the zero interest rate policy has an automatic stabilizer element in its easing effect. That is, if the economy is on a downward trend, market participants believe termination of the zero interest rate policy should be put off, thus bringing longer-term interest rates down to flatten the yield curve. To the contrary, if the economy is on an upward trend, market participants believe the termination should get closer, thus raising longer-term interest rates to steepen the yield curve rise, acting as a brake on the easing effect.

In doing so, it is crucially important to promote the smoother formation of market expectations regarding the future course of monetary policy. Members of the BOJ's Policy Board thus discussed deflationary concerns at every Monetary Policy Meeting and the BOJ publishes the minutes of such meetings as well as Monthly Report of Recent Economic and Financial Developments. Therefore, the zero interest rate policy could be regarded as a forward-looking monetary policy framework taking into account market participants' expectations through indicating the policy duration embodied in "until we reach a situation in which deflationary concerns are dispelled."[9]

Figure 3 Implied Forward Rates



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Source: Bloomberg.

9. See Ueda (1999, 2000). Taking into account that the economy continuously faces structural change, forward-looking monetary policy management is not necessarily the same as automatic policy management using forecasts based on past experience. This is discussed in the latter part of this paper when we refer to Greenspan (1997).

C. Quantitative Easing under Zero Interest Rate Policy

Since inflation is a monetary phenomenon, it is necessary to maintain money supply growth at a level sufficiently high to fight deflationary pressures. To this end, interest rates should be lowered and an ample monetary base provided. But, if it is deemed desirable to increase money supply, the question remains whether the BOJ would be able to automatically increase it by expanding the monetary base. If the main constraint on the expansion of money supply is not related to the monetary base, it is natural that money supply will not grow significantly by providing an ample monetary base and reducing banks' funding costs to around zero percent.

To compare the level of money supply to that of the real economic activities, we plotted the trend value before the bubble period; calculated using a long time-series, 1970 to 1986) of Marshallian *k* (M2+CDs or monetary base/nominal GDP: the inverse of the velocity of monetary aggregates) in terms of M2+CDs and monetary base (Figure 4 [1] and [2]). It was found that the divergence of Marshallian *k* in terms of monetary base has been expanding continuously since 1992 while the trend of M2+CDs has been practically flat (from 1992 to 1996, though it declined below the trend in 1997).[10] The difference between these movements possibly reflects the decline in the financial intermediary function of financial institutions offsetting both the monetary easing effect of low interest rates and expansion of the monetary base. In this situation, the money multiplier is markedly decreasing (Figure 4 [3]).[11]

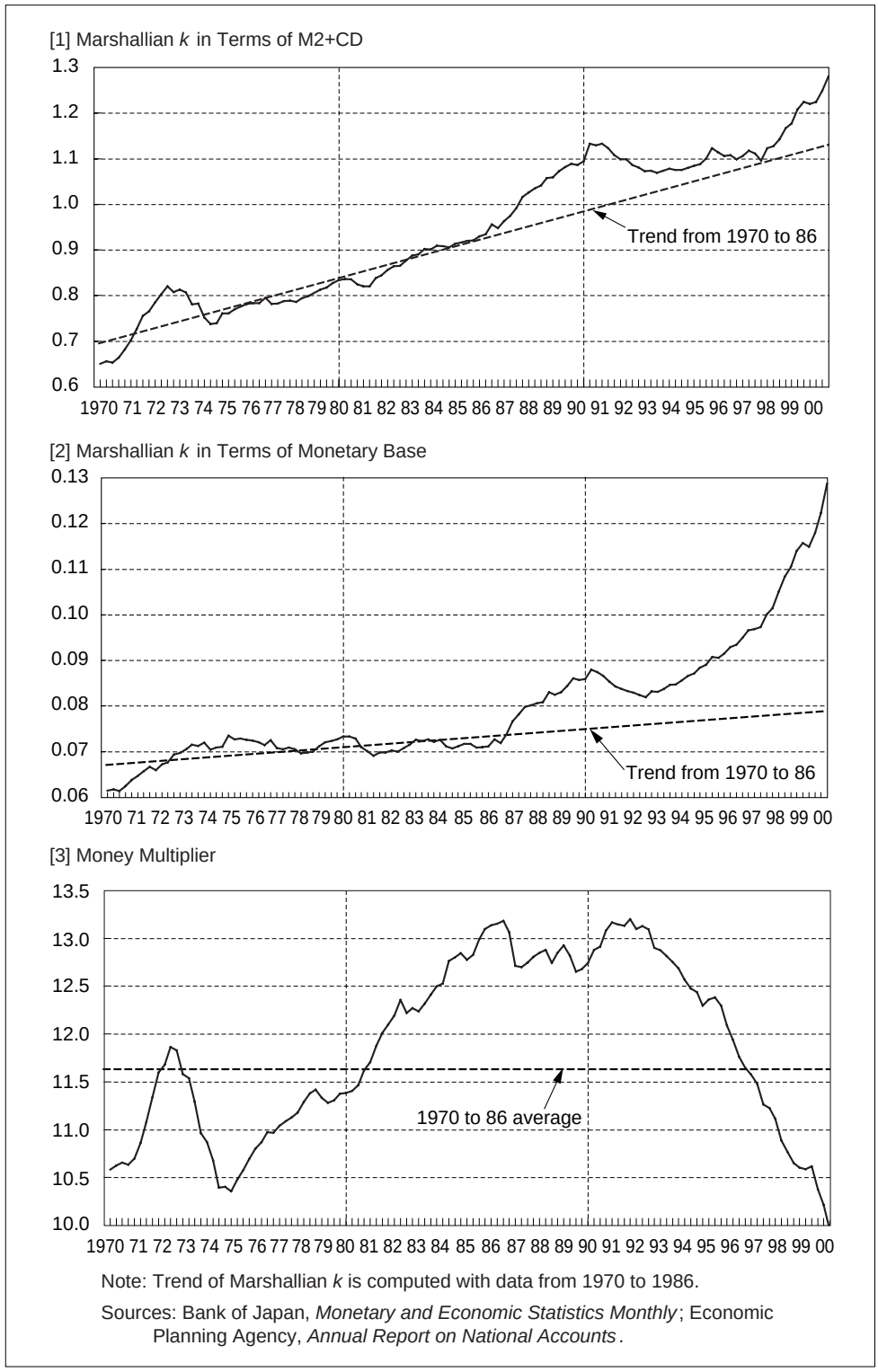
In the meantime, banks are contributing to money supply growth by purchasing government bonds and other assets instead of providing loans, which used to be a main factor for money supply growth (Figure 5). Constraints on the expansion of bank loans include such problems as (1) a decline in the risk-taking capacity of banks resulting from the erosion of their capital due to nonperforming assets; (2) the lack of profitable projects; and (3) the inability of many firms to borrow money because of the debt incurred on previous projects. Unless such problems are solved through appropriate measures corresponding to respective constraints, the provision of funds will not result in the expansion of bank lending.

D. Effects and Limitation of Orthodox Operations

As to the aforementioned limits of quantitative easing, the simple and commonly advocated counterargument is that the BOJ should inject more monetary base if the monetary easing effect of supplying monetary base is constrained by some factors. But under the zero interest rate policy, the effects of quantitative easing through orthodox operations would be logically zero. Let us discuss this point from the viewpoint of substitutability between financial assets.

10. The reason we chose to divide data in 1986 is we assume that the bubble period began in 1987. See Okina, Shirakawa, and Shiratsuka (2001) for the detailed discussion on the definition of bubble period. We also assume that the Marshallian *k* of nominal interest and the money multiplier effect cancel each other out.
11. Since the money multiplier is a parameter reflecting household asset choice, lower interest rates would guide it lower, with the opportunity cost of holding banknotes decreasing and the ratio of banknotes in circulation to money supply increasing. The drop in the money multiplier in 1999 was largely caused by excess monetary base due to the zero interest rate policy. In fact, financial system instability increased from 1997 to 1998, but from 1999 the financial intermediary function ceased deteriorating, indebted to policy responses including the injection of public funds. Therefore, it is misleading to directly connect the money multiplier and the financial intermediary function of banks.

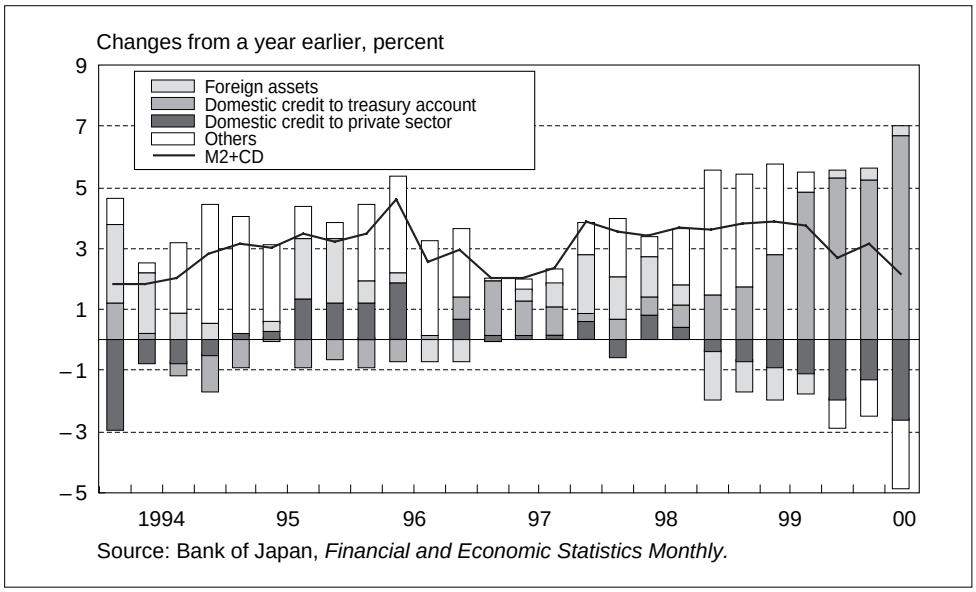
Figure 4 Marshallian *k* and Money Multiplier



Note: Trend of Marshallian *k* is computed with data from 1970 to 1986.

Sources: Bank of Japan, *Monetary and Economic Statistics Monthly*; Economic Planning Agency, *Annual Report on National Accounts*.

Figure 5 M2+CD and Credit



Under the zero interest rate policy, with the central bank providing reserves until the short-term interest rate becomes zero, short-term government bills and the monetary base become almost perfect substitutes. In such case, orthodox operations, exchanging short-term government bills with the monetary base does not affect the equilibrium. This is because, in a general equilibrium model of asset markets, the equilibrium interest rate does not change with the exchange of two assets that are almost perfect substitutes. Therefore, under the zero interest rate policy, quantitative easing by conducting short-term government securities operations is not effective.[12]

The same conclusion can be obtained in discussing monetary easing by not sterilizing intervention in the foreign exchange market. The proposal of unsterilized intervention is meaningless, not only practically but theoretically, under a zero interest rate policy.[13]

From a practical viewpoint, the amount involved in foreign exchange intervention is trivial. Foreign exchange intervention amounts to only ¥1–3 trillion a month, as it did even during the time of Deputy Minister of Finance Eisuke Sakakibara, compared with the massive flow of funds in and out of the money markets, amounting to a few trillion yen a day, or the BOJ's massive provision of funds for Y2K problems, which reached ¥50 trillion at their peak. It is thus meaningless to make an issue only of funds stemming from foreign exchange intervention. In addition, foreign exchange intervention in Japan is within the jurisdiction of the Ministry of Finance (MOF), and hence the BOJ, as its agent, cannot disclose such information at its discretion. As a result, even if the BOJ announces unsterilized intervention, it cannot be held

12. Despite this situation, there have been efforts to shorten the time lag between the central bank's short-term financial asset operation and the date of settlement. In this context, the effectiveness of operations could be improving.
13. For practical issues related to sterilized versus unsterilized foreign exchange intervention, see Okina and Shiratsuka (2000).

accountable for its announcement since the information related to intervention was not disclosed until August 2000.[14]

Moreover, under the zero interest rate policy, discussing whether or not to sterilize foreign exchange intervention is theoretically meaningless. Sterilization, in general, means absorbing the monetary base, which is created by the foreign exchange market interventions, by selling short-term financial assets. However, such operations under the zero interest rate policy result in an exchange of perfectly substitutable financial assets, thus never affecting the general equilibrium in the financial markets. Therefore, whether foreign exchange intervention is sterilized or not, the equilibrium should be unchanged.[15]

Summing up the discussion above, under the zero interest rate policy, "quantitative easing"—providing additional monetary base by orthodox operations, such as buying short-term financial assets—does not affect the general equilibrium of interest rates or amount of lending. In other words, providing monetary base under the zero interest rate policy is not an effective monetary easing measure theoretically unless the financial assets involved are not substitutes for the monetary base. This also means that the level of monetary base, or reserves as a component, cannot be an appropriate indicator for monetary conditions under the zero interest rate policy.[16] At the same time, we should bear in mind that this discussion is valid only when the zero interest rate is maintained by providing ample monetary base.

III. Academic Knowledge on Policy Options for Additional Monetary Easing under Zero Interest Rate

As a next step, we will examine additional monetary easing under a zero interest rate policy, on which more attention has been focused from a theoretical point of view. But before we do this in Chapter IV, we should briefly summarize policy recommendations regarding the additional easing of monetary policy under a zero interest rate.[17]

14. On August 7, 2000, the MOF released the results of Foreign Exchange Intervention Operations from April to June 2000. More specifically, it disclosed the total amount of foreign exchange intervention operations for the period from April through June 2000, and daily operations (the date, total amount of the day, and currency pairs) in this period. Interested readers can download the original press release from (http://www.mof.go.jp/english/feio/e124_6.htm).
15. From this argument, it can be concluded that as long as the BOJ is committed to the zero interest rate policy, the MOF could conduct a kind of monetary easing through foreign exchange intervention. This is because, provided the BOJ continues the zero interest rate policy, short-term government bills become equivalent to broad monetary base. For example, MOF intervention, buying U.S. dollars and providing short-term government bills to the market, is equal to the BOJ buying dollars and providing funds. Remember that such an aggressive foreign exchange intervention, if ever conducted, might require the cooperation of other countries as well.
16. Cole and Kocherlakota (1998) showed that a zero nominal interest rate environment could become a Pareto Optimum (the so-called Freedman Rule) in a general equilibrium model, and proved that an optimal path of monetary policy under zero interest rates imposes the following two constraints on the monetary base: (1) monetary base converges to zero in the distant future; and (2) monetary base falls faster than the subjective discount rate. In other words, under zero interest rates, since both an increase and decrease in monetary base could be an optimal path in the short term, we obtain no information by looking at fluctuation of monetary base according to the quantitative theory of money. In short, the argument "monetary base not increasing is evidence of poor monetary policy management" is not persuasive under zero interest rates.
17. Readers can find a comprehensive discussion in Oda and Okina (2001).

A. Theoretical Summary for Policy Options for Additional Monetary Easing

At the outset, it should be recognized that the knowledge of central bankers and economists regarding the spillover effects of an easing monetary policy under a zero interest rate is limited. For example, Clarida, Gali, and Gertler (1999) argue, "When the nominal rate is at zero, the only way a central bank can reduce the real interest rate is to generate a rise in expected inflation. How the central bank should go about this and whether cooperation from fiscal policy is necessary are important open questions." Indeed, there is no consensus on additional easing monetary policy under a zero interest rate because discussions are backed by different models and different understanding of the way monetary policy influences the economy in the long run.

Having stated the limitations, the arguments put forward can be summarized under six headings.[18]

[1] Quantitative easing through depreciation

In this argument, substantial intervention in the foreign exchange market can make the yen depreciate through portfolio rebalancing effects and expectations for the yen's depreciation. If the monetary authorities succeed in doing this, corporate export activities will be vitalized and the inflation rate will rise in line with the growth of the economy (we can also expect a rise in import prices due to the yen's depreciation). In this strategy, advocates focus on the belief in purchasing-power parity theory in the long run and influence on expectations in the short run.

[2] Quantitative easing through penetration of portfolio rebalancing effects

Here, the monetary authorities purchase assets other than short-term financial assets, for example, more long-term government bonds than presently, and wait for the permeation of quantitative easing effects through portfolio rebalancing effects in the long term. If the monetary authorities succeed in doing this, on the one hand long-term interest rates will fall and, on the other, investments will recover since asset prices rise more than the replacement cost. In addition, consumption will be activated in line with the recovery of asset prices. Thus, the economy will recover gradually and inflation will gradually rise. Advocates of this strategy place more importance on the neutrality of money in the long run initially and less on the influence on expectations.

[3] Quantitative easing working on credit channel

The monetary authorities commit to purchasing massive amounts of assets other than short-term financial assets, for example, long-term government bonds, anticipating a rise in asset prices that could activate credit channels. Firstly, they expect an improvement in household and corporate balance sheets, the recovery of collateral prices, an increase in the net corporate asset value and capital of banks, and a gradual rise in inflation. Importance is attached not only to the neutrality of money in the long run but also the influence on expectations. A change in asset prices caused by

18. While we summarize many issues addressed by many authors, this is not to say that no other points remain. For example, Goodfriend (2000) ambitiously argues for the possibility of the introduction of negative nominal interest on electronic money (taxation). We think that his proposal is very interesting. However, considering the need for a substantial amount of investment and time for preparation to make this proposal operational, we do not discuss it further here.

a change in expectations can utilize the above-mentioned effects even though the change in long-term interest rates is negligible.

[4] Stimulus of nominal aggregate demand close to fiscal functions

This argument expects that monetary policy will substitute for, or support, the income-transfer function of fiscal policy. The most extreme way of doing this is by issuing money through the underwriting of government bonds in compensation for a tax cut. This means that monetary policy stimulates aggregate demand by financing the fiscal deficit through actual "helicopter money" (i.e., a theoretical experiment often found in finance textbooks that increases the monetary base through the dissemination of banknotes from a helicopter). In this strategy, advocates intend to transfer purchasing power directly to households to stimulate nominal aggregate demand and avoid deflation. However, it is necessary that such a policy be simultaneously implemented with fiscal policy. The aggregate demand stimulus effect will vary since it depends on expectations as to whether the tax cut is permanent or temporary. The policy recommendation that a central bank should directly finance the corporate sector by extending credit to corporations (which could use private banks as agents) or finance government-affiliated financial institutions is also a form of income transfer.

[5] Working on a dynamic path of expected inflation

This is a policy recommendation whereby the monetary authorities try to influence the expected rate of inflation by changing monetary policy style such as announcing an inflation target. In this argument, any measures to raise the inflation rate can be utilized as long as they influence market expectations. Hence, this argument is usually combined with the previous four arguments. Needless to say, the time horizon for influencing expectations is of consequence.

[6] Reflationary policy including equity and land prices

This argument is a mixture of Irving Fisher's debt-deflation theory (Fisher [1933]) and the wisdom of recent finance theory on which argument (3) depends.[19] In Japan, there is an argument supporting reflationary policy which holds that only inflation can resolve the accumulation of government debt stemming from successive stimulus packages and heightening corporate debt.

B. Policy Proposals from Abroad

As a next step in categorizing policy options, we examine recommendations emanating from abroad.

Bernanke (2000) supports quantitative easing through the yen's depreciation (argument [1] above) and holds that it is the most appropriate policy option, with arguments (3) and (4) being alternatives when it is impossible to induce depreciation for any reason. At the same time, Bernanke (2000) suggests using inflation targeting (argument [5]) with a commitment to a zero interest rate.[20] Meltzer (1999)

19. Fisher's debt-deflation theory has recently received attention because of prevailing recognition that, under information asymmetry with respect to loans, a problem arises in which a decline in asset value decreases the payment ability of economic entities which incurred liabilities, and deflation influences not income distribution but the real economy (Bernanke [1995]).
20. In Bernanke (2000), fiscal policy is a given constant.

and McKinnon (1999) hold different views regarding causes of the yen's appreciation, but both recommend inducing depreciation.[21] Moreover, McCallum (2000) emphasizes theoretical spillover effects of easing monetary policy based on the exchange rates.

Goodfriend (2000) is representative of those who lean toward arguments (2) and (3) simultaneously. He has a negative view of depreciation (argument [1]) for large economies, and argues that, if the BOJ is to implement long-term government bond purchasing operations, portfolio rebalancing effects (on which argument [2] is based) will not suffice, and recommends large-scale bond purchasing operations which could obtain the effects of argument (3). Goodfriend sees argument (4) as a complementary policy to option (3).

Krugman (1999a) is a typical paper, emphasizing the role of expectations as described in argument (5). Krugman strongly recommends announcement of inflation targeting to escape the liquidity trap.[22] He argues that both the yen's depreciation (argument [1]) and long-term government bond purchasing operations might require the BOJ or the MOF to purchase foreign assets or government bonds equal to the investment-savings gap in Japan. However, if Japanese held most U.S. government bonds, it would cause a political problem, therefore he suggests that the direct influence on expectations described in argument (5) is desirable.

C. Policy Proposals at Home

Turning to arguments by authors at home, Hamada (1999) emphasizes the yen's depreciation as in argument (1). Since this argument has just been discussed and further details can be found in another paper,[23] we will not elaborate further here.

Regarding policy recommendations under arguments (2) and (3), many authors recommend an increase in long-term government bond purchasing. However, ways to achieve this differ from author to author. For example, Hamada (2000) insists on lowering long-term interest rates, Iwata (2000a, 2000b) recommends lowering long-term interest rates in the short run but allowing them to rise over the medium to long term, and Fukao (2000) advocates influencing inflation expectations through long-term government bond purchasing operations to raise long-term interest rates and influence expectations. There thus appears to be no consensus on this issue.[24] Moreover, Itoh and Shimoi (1999) recommend that the BOJ proactively effect long-term government bond purchasing operations so as not to be politically pressured into underwriting government bonds.

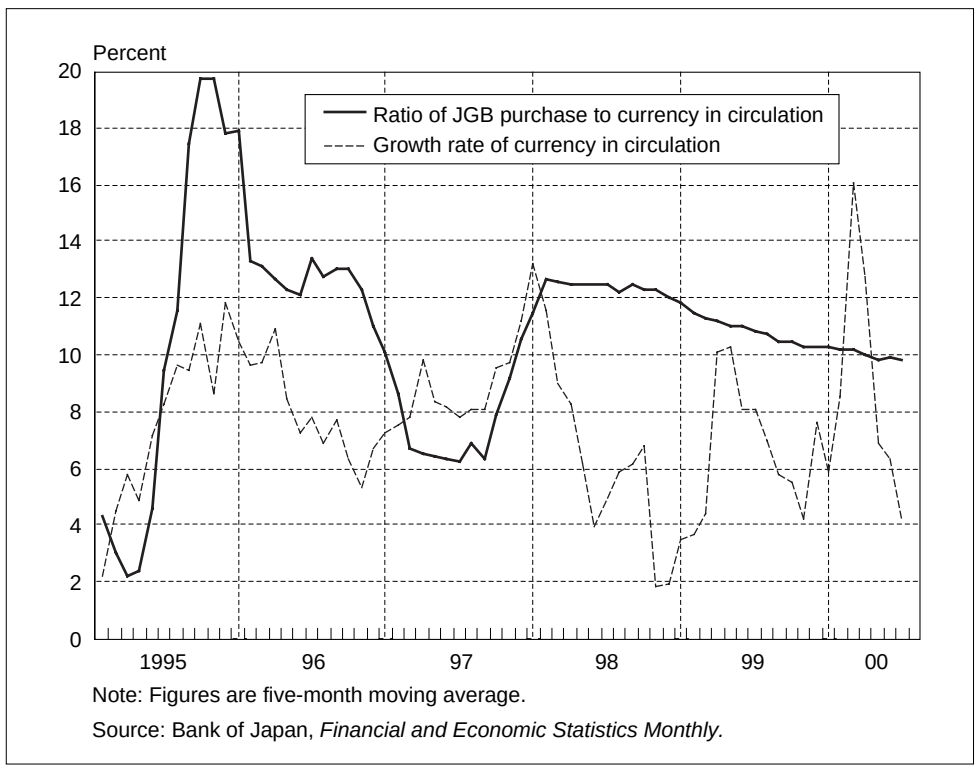
Apart from the difference in standpoint, there are many arguments that recommend an increase in long-term government bond purchasing operations.

21. In his policy recommendations, Meltzer (1999) argues that monetary easing through argument (2) is not enough and McKinnon insists that the yen's appreciation is caused by expectations that the yen will appreciate as a result of trade friction with the United States, an area where monetary easing has no effects.
22. Krugman (1999b) also argues it is not likely that additional fiscal policy would let the economy jump to a "good equilibrium" among multiple equilibria (expectation for structural adjustment guides the economy to expansionary equilibrium).
23. See Okina and Shiratsuka (2000).
24. Apart from the issue of the outright purchase of government bonds, Watanabe (2000) insists that influencing expectations is important.

The background to such argument generally takes into account two circumstances. First, outright purchase of long-term government bonds seems to be a natural policy option for additional quantitative easing, since it could be regarded as just an extension of the currently employed operation by the BOJ. In fact, as of February 2000, the BOJ purchases long-term government bonds totaling ¥400 billion a month (about ¥200 billion on two occasions), based on the principle that the operation meets the increasing demand for banknotes in the long run, reflecting the economic growth and resultant increase in payment transactions. Second, the fiscal debt and limitations of fiscal policy are well recognized.

Indeed, the BOJ has already been effecting large-scale outright purchases of long-term government bonds compared with its assets and holds a large amount of government bonds. As mentioned, long-term government bond purchasing operations are conducted to meet the increasing demand for banknotes in the long run, reflecting economic growth. Since the beginning of 1998, the ratio of the BOJ's purchase of government bonds to currency in circulation surpasses the growth rate of currency in circulation except for the period corresponding to the Y2K problem (Figure 6). In other words, the BOJ implements the outright purchase of long-term government bonds on a larger scale than the growth in currency demand. This is because the BOJ maintains the same level of government bond purchases, after it doubled the size of operations from ¥200 billion to ¥400 billion in November 1997 when financial unease intensified and demand for currency increased.

Figure 6 Size of Outright Purchase Operation of JGBs



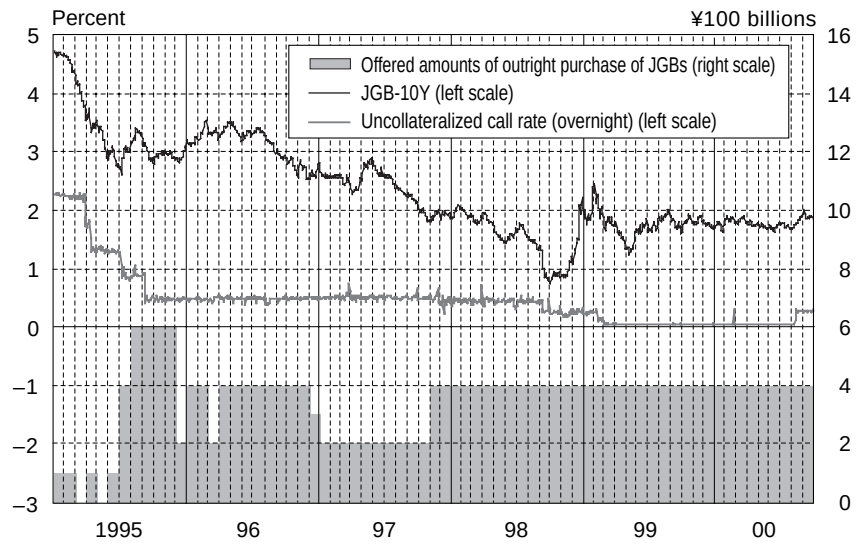
Note: Figures are five-month moving average.

Source: Bank of Japan, *Financial and Economic Statistics Monthly.*

However, there has not been any influence on long-term interest rates (Figure 7). On the other hand, as a result of the outright purchase of long-term government bonds, the BOJ's government bond holdings amount to nearly 40 percent of its total assets, similar to the case of the United States (Table 1). However, the ratio of the BOJ's holdings of government bonds to the total amount of long-term government bonds issued was only 11 percent at end-March 1999.

Next, we should consider the fiscal debt situation and the boundary of fiscal policy. Japan's dependency on public bonds (national budget, flow basis) in fiscal 2000 skyrocketed to 38.4 percent from 10.6 percent in 1990. On a stock basis, long-term debt is equivalent to 132.9 percent of GDP in fiscal 2000 (based on the government outlook), said to be the worst level among industrialized countries. While conditions for the sustainability of Japan's fiscal debt have been satisfied in

Figure 7 Amounts of Outright Purchase Operation of JGBs and Market Rates



Source: Bank of Japan, *Financial and Economic Statistics Monthly.*

Table 1 Central Banks' Holding of Government Bonds

	Time	Total assets (a)	Outright purchase of government bonds (b)	(b)/(a)	Long government bonds (c)	(c)/(a)
BOJ (¥ trillions)	End-March 1999	79.7	49.1	61.5%	29.7	37.3%
FRB (US$100 millions)	End-December 1998	5,446	4,521	83.0%	2,082	38.2%
ECB (100 million euros)	Beginning January 1999	6,994	602	8.6%	n.a.	n.a.

Note: Regarding the FRB, long government bonds refer to those with maturity of more than one year.
Sources: Bank of Japan, *Activities by the Bank of Japan*; Federal Reserve Board, *85th Annual Report, 1998*; European Central Bank, *Consolidated Opening Financial Statement of the Eurosystem as at 1 January 1999*.

many empirical studies, based on most recent data Doi (1999) reports that such conditions were not fulfilled regarding Japan's general fiscal budget during 1956–98.

Based on these circumstances, Iwata (2000a) points out that "Taking into account the diminishing urgency of the situation and to minimize the bad effects of economic policy heavily weighted on fiscal policy, more weight should be given to monetary and structural policy to reduce dependence on fiscal policy." He suggests that the outright purchase operations of long-term government bonds increases private-sector cash holdings even in a liquidity trap, and hence could increase money supply even in the absence of demand for funds.

D. Framework to Evaluate Policy Options

The most sensible expansionary policy under a zero interest rate is an expansionary fiscal policy as suggested by Keynes.[25] However, this traditional way of resolution is useless under circumstances in which the sustainability of fiscal debt is uncertain. The standard resolution for the ideal relation between the fiscal burden and monetary policy is, as Frenkel (1998) points out from the lesson of the fiscal debt of industrialized countries in the 1980s, that monetary policy should not deviate from attempting to achieve its main objectives and fiscal imbalances should, in principle, be dealt with by structural reform. However, such a policy recommendation cannot easily be accepted in Japan at the present juncture.

IV. Transmission Channel for Outright Purchase of Long-Term Government Bonds under Zero Interest Rate

Chapters IV to VI will study the effects, risks, and side effects of the additional easing of monetary policy under zero interest rate, focusing on the outright purchase operations of long-term government bonds that have so often been recommended. As discussed in the previous chapter, we elaborate this topic because of its theoretical interest and to obtain some lessons for the conduct of monetary policy under zero interest rate. Thus, our discussion is not directly related with the conduct of the bank's monetary policy in the near future. In this chapter, we summarize the effects of the outright purchase of long-term government bonds.

A. Impacts of Market Operations to Exchange Imperfectly Substitutable Financial Assets

Goodfriend (2000) provides a useful basis to understand the economic stimulus effect of the outright purchase of long-term government bonds.[26] Although we give details in the Appendix, the crux of his discussion is that the outright purchase of long-term government bonds under zero interest rate influences the real economy by the following two channels: (1) portfolio rebalancing effects; and (2) affecting

25. Meyer (1999) argues that "in case of a nominal interest rate boundary, fiscal policy could and should carry more of the stabilization burden, as has been the case in Japan recently."
26. Although Goodfriend (2000) very ambitiously argues for the possibility of the introduction of negative nominal interest on electronic money (taxation), in this paper we only treat issues relevant to the outright purchase of government bonds.

the external finance premium through a change in the collateral value of assets and subsequent change in banks' lending activities. Considering the latter aspect, the role of expectations is important. It should be noted that the BOJ's intention for effecting the outright purchase of long-term government bonds has hitherto been to meet continuous increase in demand for liquidity as the economy grows. Thus, it is totally different in nature from the role expected by the outright purchase of long-term government bonds mentioned here.

Considering the effects of the outright purchase of short-term government bonds under zero interest rate from this point of view, there would be no portfolio rebalancing effects and no effects stemming from change in the external finance premium, if money only accumulated as deposits of *tanshi* money brokers with the BOJ. Regarding the effects of such operations on expectations, there could be some if market participants believed that the increase in the monetary base was conveying a monetary policy message (regardless of the reason) as market participants focus on the amount of excess reserve (its effectiveness is uncertain because the effects are based on a misconception). However, since theoretical aspects cannot explain the effects except for the impacts on expectations, it is difficult for central banks to use such operations to send their messages.

Before moving on to the practical issues regarding the outright purchase of long-term government bonds, it is useful to overview empirical knowledge with respect to two operations where a central bank intends to influence asset markets that have high but not perfect substitutability: (1) "operation twists" and (2) sterilized intervention. Note that the discussion in the remaining part of this chapter differs from that of Goodfriend (2000), because his discussion presumes that both short and long interest rates are pressed against zero, while the following discussions do not.[27]

"Operation twists," which were executed under the Kennedy administration, are the precedent for exchanging short- and long-term government bonds. This experiment was conducted for the purpose of raising short-term interest rates to encourage short-term capital inflow to defend the U.S. dollar and to lower long-term interest rates to promote domestic corporate investment.

According to Shiller (1990), a study of that time which analyzed the effectiveness of "operation twists" by testing whether a proxy variable for government debt policy has additional significance for a model which regressed long-term interest rates by the distribution lag of short-term interest rates, no evidence was found that government debt management policy was effective. Since then, such analysis has been criticized because it treats expectations as given and government debt management policy as exogenous. Shiller (1990) sums up that the stricter the model the more subjective is the treatment of expectations and determination of endogenous and exogenous variables, and that therefore it is difficult to come to any robust, quantitative conclusion.

Apart from empirical analysis, though the "operation twists" were not effective in lowering long-term interest rates, theoretically it may be conjectured that this was because of the operation's small scale at the time and that a larger-scale operation could have been effective.

27. See the Appendix for the details on this point.

It is possible to understand that the outright purchase of long-term government bonds is an experiment to employ the operation intends to lower long-term interest rates, while maintaining zero short-term interest rates. In this context, it is understandable that an experiment on a massive scale might be necessary for certain effects to materialize. However, in the case of an experiment to discover whether long-term interest rates are controllable, significant factors on the effectiveness of the operation include not only the question of whether the operation is on a large scale or not, but also the expectations of market participants in an experimental environment. The latter include expectations regarding future monetary policy and the inflation rate formed by market participants reflecting the economy's current situation, the risk premium stemming from uncertainty and the development of future fiscal policy, and so forth.

Next, the issue of sterilized intervention in foreign exchange markets suggests the following points regarding portfolio rebalancing effects between domestic currency-denominated assets and foreign currency-denominated assets.[28]

First, if domestic bonds and foreign bonds are perfectly substitutable, unsterilized intervention has no effects. However, from the theoretical viewpoint, if domestic bonds and foreign bonds are not perfectly substitutable, intervention can devalue the local currency through portfolio rebalancing effects. Second, it is not sterilized intervention itself but the monetary authorities revealing their monetary policy stance that often influences market expectations (signaling effects).[29] Empirically, the recognition that portfolio rebalancing effects are small has been spreading and the main concerns have focused on the effects of sterilized intervention influencing monetary policy expectations (signaling effects).

B. Conditions for Enhancing the Effectiveness of Outright Purchase of Long-Term Government Bonds

Based on the suggestion of "operation twists" and sterilized intervention, the effects of operations, which exchange some assets for imperfectly substitutable ones, comprise two elements: (1) influencing the economy by changing the return on several asset classes; and (2) changing expectations with regard to the future course of policy actions. Moreover, among these two elements, we find that the latter is likely to be more effective. Such suggestions are consistent with the view of Goodfriend (2000) that expectations play a role in the process of raising asset prices.

In addition, Goodfriend (2000) argues that for additional quantitative monetary easing effects to permeate, open market operations might depend on the expectation of future intentions for open market operations, as the effect of present monetary policy depends on expectations for short-term interest rates. He also argues that to influence private-sector expectations, the injection of a larger monetary base than in normal times might be needed in terms of the practicality of operations. In this regard, attention should be paid to amounts and frequency of operations in the future.

28. See Eijffinger (1998), a recent survey paper dealing with this subject.
29. However, due to data constraints regarding foreign exchange intervention it is not yet clear whether "talk down or up" is sufficient to indicate the stance of the authorities, or whether to attain market credibility the authorities need to make some commitment such as an indication that they will shoulder the cost if they take contradictory actions. It is also not clear as to what extent signaling effects would actually be observed.

The views of scholars on the effects of such policy vary. Bryant (2000) recommends operations in foreign exchange markets, arguing "I would like to insist more strongly than Goodfriend has insisted that under the liquidity trap the effect of the outright purchase of long-term government bonds is uncertain and not dependable." Woodford (1999) takes the position that if the expectation theory of the term structure of interest rates holds, then the effectiveness of such operations does not come from the effect of the outright purchase of long-term government bonds but is dependent on whether the central bank can make a credible commitment to future monetary policy.

From this point of view, a necessary condition for promoting the effectiveness of the outright purchase of long-term government bonds might be that the monetary authorities dared to commit to greater operations than market participants expected. Although the impacts of such a policy on the expectations held by the market participants are uncertain, further study is required on private-sector expectations with regard to the future course of asset prices.

V. Two Views on the Implementation of Outright Purchase of Long-Term Governments Bonds under the Zero Interest Rate Policy

Bearing the previous theoretical summary in mind, let us assume that the BOJ aims at further monetary easing by increasing the outright purchase of long-term government bonds under the zero interest rate policy. There are two specific options depending on which of the following two paths the central bank emphasizes: (1) a decline in long-term interest rates; or (2) private-sector expectations with respect to a change in the zero interest rate policy, future inflation, and asset price developments.

The first option is to gradually increase the amount of conventional outright purchases of long-term government bonds that the BOJ used to implement. In this case, the decrease in the long-term government bond yield will be emphasized as a channel through which monetary easing is transmitted and the effects working on market participants' expectation will be relatively mild. Let us call this option the "mild outright purchase of long-term government bonds."[30]

The second path is, in order to make easing effects more dramatic, to implement massive and active operations by emphasizing their difference from conventional outright purchase operations. This aims at having both portfolio rebalancing effects and actively affecting expectations and credit channels. We call this the "aggressive outright purchase operation of long-term government bonds."

As previously mentioned, when the authorities select from the various policy options, a basic viewpoint is to compare anticipated effects with risks or side effects. In addition, it should be noted that such effects as well as risks or side effects depend considerably on economic conditions at the time, including market participants'

30. Even regarding an operation which the BOJ does not announce and which is considered mild, the fact that the BOJ has increased the outright purchase of long-term government bonds might be received by market participants as a strong message and thereby temporarily affect expectations significantly. However, such was not the case in November 1997.

expectations as to future monetary policy and inflation which are formed by reflecting such economic conditions. In the following, by making a clear distinction between the two options on the outright purchase of long-term government bonds, the effects, problems in implementation, and risks or side effects are discussed.

When we take into account the current situation of the Japanese government bond (JGB) market, these operations are likely to change illiquid long-term bonds held by financial institutions into monetary base.[31] Liquid long-term government bonds must have been already playing an important role as collateral for financial transactions or tools for risk hedging. Therefore, a central bank increasingly buying only such highly liquid bonds will, *ceteris paribus*, likely aggravate market functioning and, moreover, financial institutions are not expected to bid in operations featuring such liquid bonds.[32] If this is the case, implementing an operation aiming at a specific illiquid issue so as to minimize the adverse impact on the government bond market will give financial institutions an opportunity to newly rebalance portfolios.

A. Mild Operations of Outright Purchase of Long-Term Government Bonds

1. Implementation and effects

While "mild operations" will change the role of the outright purchase of long-term government bonds from a conventional response to increasing long-term demand for banknotes to a monetary easing measure to complement the zero interest rate policy, operationally speaking it can be regarded as an extension of the conventional outright operation.

By gradually increasing the outright purchase amount of long-term government bonds, the BOJ expects to see the decrease in the yield of long-term government bonds. For example, Bernanke (2000) states that once the outright purchases of long-term government bonds are implemented, "imperfect substitutability between assets would assert itself, and the prices of assets being acquired would rise." In addition, Iwata (2000a) argues that the outright purchases of long-term government bonds are effective even when the economy is in a liquidity trap in that they (1) activate stock investment through reducing risk premium, and (2) encourage investment in other high-risk assets.

However, we consider that the impact on expectations, which influence the external finance premium, is weak. Thus, its effect on banks' lending behavior would

31. See Shirakawa (1999) for a current analysis of market liquidity in the JGB market. When looking at the bid-ask spread, an indicator of the liquidity of the JGB market, the spread is the largest for all types of maturity among industrial countries. For example, if we take the "current issue," a 10-year bond issued most recently and the largest in terms of issue amount in Japan, the bid-ask spread is 0.7 percent of face value, larger than that in the United States (0.03 percent), the United Kingdom (0.04 percent), Canada (0.05 percent), and Italy (0.06 percent). The same tendency can also be seen for bonds of different maturity. In addition, while market liquidity measured by the bid-ask spread generally declines as the maturity lengthens in major overseas government bond markets, in Japan the bid-ask spread becomes the smallest for government bonds with a 7-10 year maturity (long-term zone). Furthermore, if we compare Japanese and U.S. bond turnover by issue year, Japan is overwhelmingly concentrated in the long-term zone. And, finally, turnover in the futures market is greater than that in the spot market, indicating the relatively higher liquidity of the futures market and active use to complement the low liquidity of the spot market.

32. This can easily be imagined from the situation in which the size of the U.S. Treasury bond buyback program announced in January 2000 exceeded what market participants had expected, and in the most liquid U.S. Treasury bond market 30-year bonds quickly came to be seen as overpriced.

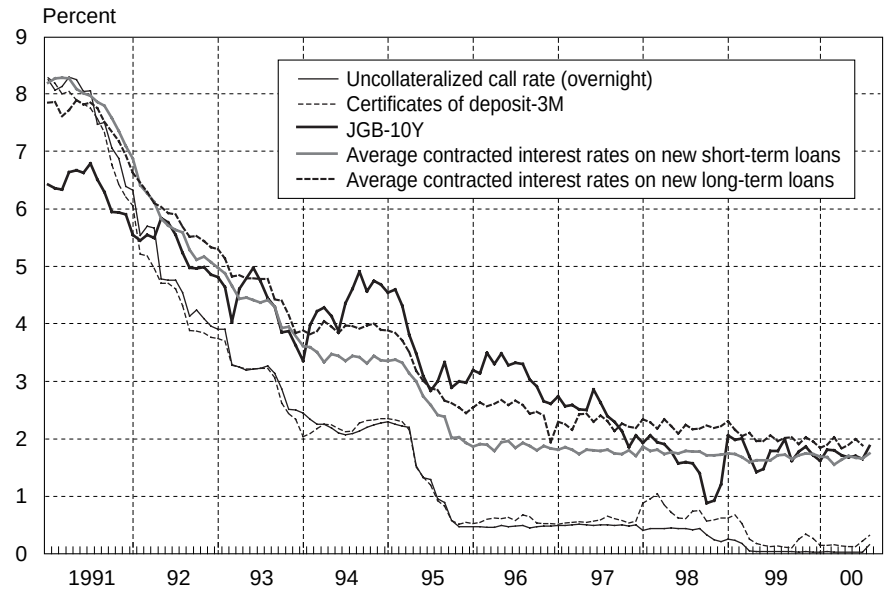
be limited given the current situation in which credit channels are not facilitating lending and thereby not stimulating the economy. For example, while short- and long-term interest rates have been declining, average contracted interest rates on new loans have shown little change (Figure 8).[33]

In sum, the best scenario that the BOJ can expect from the mild outright purchase operations of long-term government bonds is that nominal interest rates initially decline, but then subsequently rise along with a rise in inflation expectations as anticipation of an economic recovery increases. If the economy does recover gradually and leads to a scenario where increased tax revenues prompt fiscal reconstruction, then a situation can be avoided in which the term premium substantially increases and long-term interest rates rapidly rise. However, even in such a case, it is most likely there would be a long time lag between implementation of the operation and the materialization of effects on prices and economic activity. Moreover, the effects are extremely uncertain.

2. Risks or side effects

The following risks are inherent in the mild outright purchase of long-term government bonds.

Figure 8 Average Contracted Interest Rates on Loans



Source: Bank of Japan, *Financial and Economic Statistics Monthly.*

33. Note that there were more corporate insolvencies in those periods, therefore credit risk, which can only be recognized *ex post*, might have well increased. Such interest rate development suggests there might be some factors that have offset an increase in the credit risk premium. In addition, it should be noted that the overdraft rate declined more rapidly than other lending rates, while average contracted interest rates on new loans did not cover the overdraft rate. Therefore, it might be the case that overall lending rates including overdraft lending declined a little more rapidly.

First of all, as "operation twists" in the United States have had few effects, effects of the operation might not be observed since it is mild, resulting in a prolonged operation and, in the meantime, funds provided through the outright purchase of long-term government bonds might accumulate in the BOJ's current account. As previously mentioned, the outstanding balance of long-term government bonds that accounts for 40 percent of the BOJ's balance sheet only corresponds to some 10 percent of long-term government bonds outstanding as a whole. Therefore, compared with the BOJ's balance sheet a mild operation might result in being ineffective.

Second, unless the effects of the outright purchases of long-term government bonds materialize relatively quickly, bonds will increasingly accumulate on the BOJ's balance sheet, thereby perhaps inducing a long-term fiscal burden. Such concerns might well push up long-term interest rates more than expected inflation by affecting term premiums. By "term premium," we mean the risk premium with uncertainties in the future development of interest rates and inflation rates. Indeed, it could be suggested that the adoption of inflation targeting might restrain the uncertainty of inflation risk. However, inflation policy is expected to raise the inflation rate, something that has never been tried before. It seems impossible for the central bank to reduce the inflation rate at will even in a period of disinflation. Furthermore, if the central bank tried to inflate the economy at any cost, excessive easing would result in, and the resulting stop-go policy would lead to, a higher variability of interest rates and inflation expectations. Higher uncertainty regarding future inflation would increase long-term interest rates, reflecting the increased risk premium.

B. Aggressive Operations of Outright Purchase of Long-Term Government Bonds

1. Implementation and effects

The aggressive outright purchase of long-term government bonds aims at actively working on private-sector expectations about the future course of monetary operations, interest rates, and asset prices through making a commitment to implement operations in a size far more than normally expected, thereby not only raising asset prices but also increasing bank lending. This is based on the authors' belief that, at present, there is little possibility operations in small quantities will have any effect on expectations which, in turn, affect asset prices and private expenditures.

Therefore, for aggressive outright purchases of long-term government bonds to be effective, expectations with respect to future operations are quite important. In this case, as an advocate of this type of operation, Goodfriend (2000) argues that "Ordinarily, relatively small changes in aggregate bank reserves are sufficient to support interest rate policy actions. At the interest rate floor, however, open market purchases must influence liquidity broadly defined in order to be effective. That may require large-scale injections of monetary base, perhaps orders of magnitude larger than usual." However, since there is a high degree of uncertainty about the effects of exchanging long-term government bonds for monetary base, in actual implementation the size and frequency of operations are ambiguous.

Taking into account these points, aggressive operations should be regarded as a high-risk, high-return policy option verging on a high-stakes bet. Although they try

to actively work on expectations and aim at buoying up the economy, the effects are quite uncertain since the key of the operations is how they affect expectations. Nonetheless, such a bet would be worth making if the Japanese economy faced a very serious recession, and counting on the policy duration effect of the zero interest rate policy looked insufficient given the economic conditions.

2. Risks or side effects

The aggressive outright purchase of long-term government bonds involves the following risks.

The first risk relates to how one assesses the effects of the aggressive outright purchase of long-term government bonds on expectations. Iwata (2000a) argues that if a central bank declares its commitment to such operations, it would affect market expectations and enable a decline in long-term interest rates and a rise in stock prices.

An important question here is what would happen to the term premiums requested for long-term interest rates. A term premium might reflect both risk premium on uncertainty about future inflation and credit risk regarding government bonds. The fact that long-term interest rates have been stable at 1–2 percent under a monetary policy which embarked on an unprecedented zero interest rate can be attributed to the following two factors. First, expectations that short-term interest rates will remain low on the presumption of expected stable inflation. Second, the absence of heightening credit risk attaching to government bonds, despite downgrading by rating agencies such as Moody's, since they factor in the BOJ's stable policy stance that puts emphasis on the maintenance of fiscal discipline.

In Japan, where calls for fiscal reform have intensified, it is probable that a massive increase in the outright purchase of government bonds is seen by the public as a loss of fiscal discipline or recognized as virtually equivalent to the central bank's underwriting of government bonds. Thus, it would likely result in the further downgrading of JGBs, thus leading to the situation where government bond price formation is to a large extent determined from the viewpoint of credit risk. In addition, if uncertainty about the outlook for inflation increases due to the decisive outright purchase of government bonds, inflation risk premium also rises. Based on these two factors, the central bank's commitment to a massive increase in the outright purchase of government bonds would rapidly see long-term interest rates rising more than expected inflation and force fiscal conditions into a further difficult situation. Under such a scenario, as Asher (1999) stated, there is a risk that the outright purchase of government bonds itself would become a crucial factor inducing economic deterioration through a hike in long-term interest rates and a substantial adverse impact on fiscal conditions.

The second risk is that the BOJ might incur a substantial capital loss, resulting in a serious burden on the government's budget in the future. If the BOJ's commitment to "aim at positive inflation within the range of price stability while maintaining the zero interest rate policy until deflationary concerns are dispelled" is believed by the market, it is the same as an increase in long-term interest rates and maintenance of the zero interest rate (at least to prevent an inverted yield curve); in other words, "the BOJ incurring a substantial capital loss" will be factored into market expectations from the beginning. In such a case, the best scenario would be the aggressive outright

purchase of long-term government bonds first leading to a substantial decline in long-term interest rates, followed by a rise in asset prices and inflation, and then the BOJ naturally shifting away from the zero interest rate policy.[34]

Against such a view, while a case in which the BOJ becomes insolvent is not envisaged in the current Bank of Japan Law, there is a view that even if the BOJ's payments to the treasury decrease, it would be a trivial problem if one looks at the balance sheet of the government and the BOJ together.[35] However, as we explain later, if we consider the fact that monetary base provided by the aggressive outright purchase of government bonds should eventually be absorbed in order to maintain inflation within a range of price stability, the fiscal burden will not end with a temporary capital loss.

Let us assume that monetary base provided through additional monetary easing is geared toward bank lending and, in order to prevent money supply from increasing too much, the BOJ tries to bring total monetary base back to a level prior to the implementation of additional monetary easing. However, since prices of long-term government bonds that the BOJ holds have already fallen sharply by the time the BOJ absorbs the monetary base, the monetary base provided additionally in the past might not be fully absorbed even if the BOJ sold all long-term government bonds it was holding. In this case, the BOJ would be forced to additionally sell its long-term financial assets to absorb the money. Therefore, an increase in long-term interest rates and maintenance of the zero interest rate (at least to prevent an inverted yield curve)—in other words, to declare that the BOJ will incur a substantial capital loss—might well result in increasing the private holding of government debt as Goodfriend (2000) points out. In this sense, the outright purchase of long-term government bonds can be eventually regarded as a fiscal policy measure. We will return to this point later.

C. Size of Operations and Capital Loss of the BOJ

What would be the practical validity of applying a scenario involving a specific purchase amount and interest rate to the two views regarding the outright purchase of long-term government bonds? To this end, we provide a simple estimation of the size of operations and the magnitude of capital loss in the following.

At the outset, it should be noted that mild and aggressive operations cannot be distinguished by the sheer size of the operations. First, whether an operation is mild or aggressive depends on the extent to which the BOJ intends to actively work on the public expectations. Second, there is no quantitative criterion on the amount necessary to make an operation aggressive.

In evaluating the risk attaching to such an operation, the important factor is a rise in the term premium, but we cannot necessarily assume a linear relationship between the size of operation and the term premium.[36] It is impossible to precisely forecast not

34. It should be noted that if effects on expectations are very strong, long-term interest rates may rise from the outset, asset prices rise further, and external fund premiums decline.
35. A typical argument can be found in Iwata (2000a) and Bernanke (2000).
36. Please remember that by "term premium" we mean the risk premium with the uncertainties in the future development of interest rates and inflation rates.

only the term premium but also the capital loss that would be incurred by the BOJ since long-term interest rates would be significantly affected by economic conditions at the time and changes in expectations. Nevertheless, to know the extent to which the BOJ would incur a capital loss would likely provide a certain reference point.

In this context, let us look at the relationship between quantitative monetary indexes and nominal economic activity. At present, Marshallian k, or the inverse of velocity of money, measured by M2+CDs, has been substantially above the trend reflecting easy monetary conditions (Figure 4 [1]). On the other hand, the money multiplier has substantially declined and the money surplus in terms of monetary base has further expanded (Figure 4 [1], [2], and [3]).

This can be theoretically summarized as follows. If we denote k as Marshallian k and ϕ as the money multiplier, since (M2+CDs) = k*(nominal GDP) and (M2+CDs) = ϕ*(monetary base), then we obtain (nominal GDP) = (ϕ/k)*(monetary base).

While the above formula does not describes causality, a decline in k is emphasized from the viewpoint of portfolio rebalancing since funds will eventually shift to assets such as stocks. On the other hand, an idea that risk taking by the banking sector should be strengthened in order to heighten ϕ will be emphasized from the viewpoint of credit channels. That one cannot accurately forecast the consequence of the outright purchase of long-term government bonds means that it is necessary to look at k and ϕ with a certain leeway.

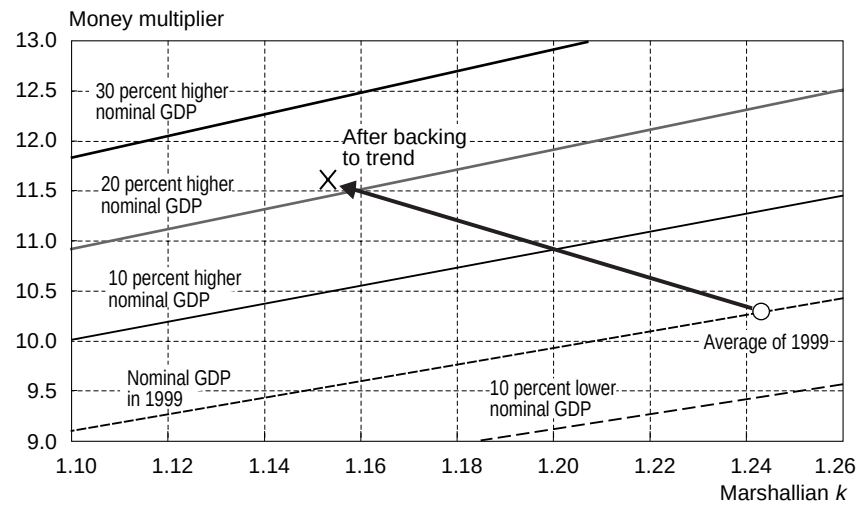
In the following, we estimated, when k and ϕ change, how the level of nominal GDP consistent with such changes compares with that of 1999 using average 1999 monetary base as a benchmark. Namely, in the formula (nominal GDP) = (ϕ/k)*(monetary base), we fixed the level of monetary base as the average of 1999 monetary base, and let k and ϕ take various values (Figure 9).

Plausible values for k and ϕ have to be contemplated based on the experience of Japan's economy, and when we assume that k changes to the level of the trend during 1970–86 and ϕ to the average of the same period, then we obtain a result that nominal GDP needs to rise some 22 percent from the level of 1999.[37] We do not think that a 22 percent increase in nominal GDP will be achieved solely by inflation. However, the estimate suggests that when an operation is implemented and k and ϕ rapidly return to the trend, even Japan's economy achieves 3 percent annual real growth for two years, and 8 percent annual inflation would still be necessary. Under such a situation, we think monetary tightening is necessary.

Taking these points into account, even if the BOJ makes additional fund provision in the future through the outright purchase of long-term government bonds, it is likely that, after the economic recovery, the BOJ will be required to absorb the funds in an amount more than it provided. This implies that a powerful drug such as the central bank's massive outright purchase of long-term government bonds is accompanied by a risk that after full throttle it becomes difficult to contain inflation to a mild level unless the central bank suddenly puts on the brake.

37. For reasons for using data up to 1986, see Footnote 10.

Figure 9 Degree of Excessiveness of Monetary Aggregates



Note: Plotted lines are combinations of the Marshallian *k* and monetary multiplier that correspond to the average amount of monetary base in 1999 and the nominal GDP. Nominal GDP must increase from ○ to ×, if the Marshallian *k* and monetary multiplier return to the trend and average of 1970–86, respectively.

Sources: Bank of Japan, *Monetary and Economic Statistics Monthly*; Economic Planning Agency, *Annual Report on National Accounts*.

Taking into account the points mentioned above, we present our estimate of the cost and the total amount of operations with respect to the outright purchase of government bonds. In the following, we neglected the possibility of absorbing additional fund provision and assumed that, after economic recovery, the amount provided through the additional outright purchase of government bonds would be absorbed by the central bank's selling of its long-term government bonds.

As a reference for considering the mild outright purchase of long-term government bonds, we first estimated the maximum size of operation the BOJ can implement if it does not declare a response to an emergency situation. Thus, the BOJ tries to limit the impact of the operation on its financial position to a range within which it can cope. Specifically, we assume that the BOJ contains a possible future capital loss within its "reserve for possible losses on securities transactions" (¥2.4 trillion as of end-September 1999).[38] Under this assumption, we estimate the possible size of operation, with the various combinations of time-to-repurchase and long-term interest rates at that time.

As a next step, we make a simple estimation of the size of capital loss related to the aggressive outright purchase of long-term government bonds. In this case, the BOJ is assumed to conduct an operation regardless of the impact on its financial position. We tentatively assume that the BOJ purchases ¥60 trillion in long-term

38. The BOJ is allowed to appropriate the "reserve for possible losses on securities transactions," pursuant to Article 15 of the Enforcement Ordinance of the Bank of Japan Law and other related rules and regulations, to cover a net loss of securities transactions.

government bonds, which corresponds to 10 percent of the outstanding amount of M2+CDs, and 20 percent of that of long-term government bonds. In both cases, we compute the capital loss of long-term government bonds, under the assumption that we purchase the long-term government bonds with a 2 percent coupon and 10-year time-to-maturity at par, implying that long-term interest rates are currently at 2 percent (Table 2 [Reference]).

First, let us look at the estimates of a mild outright purchase operation of long-term government bonds (Table 2 [1]). If long-term interest rates do not rise from the current level and remain at around 2.5 percent despite the BOJ's operation, and if the BOJ sells them back one or two years from now, the BOJ could implement a sizable ¥60–70 trillion operation within a capital loss of some ¥2.4 trillion. This amount almost corresponds to the size of the aggressive outright purchase operation of long-term government bonds. However, if we assume that long-term interest rates will rise to 5 percent (3–4 percent long-term real interest rates reflecting the term premium plus 1–2 percent expected inflation), which is not so high compared with rates witnessed in the previous economic recovery phase, the total amount of operation which the BOJ can implement would be limited to about ¥12 trillion. Since the BOJ has been implementing the outright purchase of long-term government bonds in the amount of ¥400 billion monthly (¥4.8 trillion annually) as of February 2000, this ¥12 trillion limitation means that if the BOJ tries to realize a ¥12 trillion operation within one year, the magnitude would be 2.5 times the current one, and 1.25 times if it tries to realize it within two years. If the BOJ assumed more risk from an interest rate rise or the possibility that it would be forced to additionally sell long-term government bonds it holds and thus incur capital losses, the amount of operation would be further suppressed.

Next, we make a simple estimation of the size of capital loss related to the aggressive outright purchase of long-term government bonds (Table 2 [2]). As mentioned above, if the BOJ purchases ¥60 trillion in long-term government bonds, it is only when long-term interest rates rise a little and remain around 2.5 percent that a capital loss accompanied by an interest rate rise is contained within the range of the ¥2.4 trillion "reserve for possible losses on securities transactions." If we assume that long-term interest rates rise to 5 percent, the BOJ would incur a capital loss of about ¥12 trillion when it sells back the purchased long-term government bonds in one to two years and about ¥8 trillion if it sells in five years. Since the monetary base that corresponds to such capital losses cannot be entirely absorbed by selling the purchased bonds through the BOJ's operation, the BOJ would be forced to additionally sell other assets, resulting in the private sector holding more government debt in the long run.

A further counterargument is that such potential capital loss could be offset by an increase in the BOJ's operating income, reflecting higher interest rates for the assets on the Bank's balance sheet after terminating the zero interest rate policy. However, even if we assume an optimistic scenario in which the short-term interest rate and long-term interest rate shift by the same amount, it will take more than five years to cover the additional capital loss from an aggressive outright purchase of long-term government bonds through such increases in operating income (Table 2 [3]). The

Table 2 Size of Outright Purchase Operations of JGBs

[1] Amount of Outright Purchase in Mild Operations
¥ trillions

Long-term rate	Timing of absorbing reserves (years later)				
	1	2	3	4	5
2.5	60.2	66.9	75.6	87.1	103.3
3.0	30.8	34.2	38.5	44.3	52.4
3.5	21.0	23.3	26.2	30.0	35.4
4.0	16.1	17.8	20.0	22.9	27.0
4.5	13.2	14.6	16.3	18.6	21.9
5.0	11.3	12.4	13.8	15.8	18.5
5.5	9.9	10.8	12.1	13.7	16.1
6.0	8.8	9.7	10.7	12.2	14.2

[2] Capital Loss from Aggressive Operations
¥ trillions

Long-term rate	Timing of absorbing reserves (years later)				
	1	2	3	4	5
2.5	2.4	2.2	1.9	1.7	1.4
3.0	4.7	4.2	3.7	3.3	2.7
3.5	6.8	6.2	5.5	4.8	4.1
4.0	8.9	8.1	7.2	6.3	5.3
4.5	10.9	9.9	8.8	7.7	6.6
5.0	12.8	11.6	10.4	9.1	7.8
5.5	14.6	13.3	11.9	10.5	9.0
6.0	16.3	14.9	13.4	11.8	10.1

[3] Interest Rate Revenues from the Bank's Short-Term Assets
¥ trillions

Short-term rate	Timing of absorbing reserves (years later)				
	1	2	3	4	5
1.0	0.3	0.7	1.0	1.4	1.7
1.5	0.5	1.0	1.5	2.1	2.6
2.0	0.7	1.4	2.1	2.8	3.5
2.5	0.8	1.7	2.6	3.5	4.5
3.0	1.0	2.1	3.2	4.3	5.4
3.5	1.2	2.4	3.7	5.0	6.4
4.0	1.3	2.8	4.3	5.8	7.5
4.5	1.5	3.1	4.8	6.6	8.5

[Reference] Market Value of JGB (2 Percent Coupon)
Yen

Long-term rate	Time-to-maturity (years)					
	10	9	8	7	6	5
2.5	95.6	96.0	96.4	96.8	97.2	97.7
3.0	91.5	92.2	93.0	93.8	94.6	95.4
3.5	87.5	88.6	89.7	90.8	92.0	93.2
4.0	83.8	85.1	86.5	88.0	89.5	91.1
4.5	80.2	81.8	83.5	85.3	87.1	89.0
5.0	76.8	78.7	80.6	82.6	84.8	87.0
5.5	73.6	75.7	77.8	80.1	82.5	85.1
6.0	70.6	72.8	75.2	77.7	80.3	83.2

increase would be just ¥1.2 trillion for the first year, and its cumulative increase would be ¥6.4 trillion after five years.[39]

VI. Practical Validity of Outright Purchase of Long-Term Government Bonds

Based on the simulation results in the previous chapter, this chapter examines the practical validity of two views of outright purchase of long-term government bonds.

A. Evaluation of Two Views on the Outright Purchase of Long-Term Government Bonds

We first summarize our evaluation with respect to the two policy options: the mild or aggressive outright purchase of long-term government bonds.

In our evaluation, we took account of several factors such as (1) the impact of a deflationary shock on the economy; (2) effects and risks stemming from the outright purchase of long-term government bonds; (3) comparison of the policy effects with those of the "built-in stabilizer" policy duration effects under the zero interest rate policy; and (4) a possibility that desirable policy measures might be appropriately chosen according to the nature of the shock.

For example, in the case of (4) above, if a deflationary shock is occasioned by the misalignment of foreign exchange rates, it would be natural to consider purchasing the U.S. dollar rather than long-term government bonds. In addition, depending on the cause of a deflationary shock, it might be possible to aim at further monetary easing by increasing the variety of monetary operations under the zero interest rate policy. As was the case in autumn 1998, if intensifying concern over market liquidity brings about a deflationary impact on the economy, nominal interest rates on medium- to long-term government bonds will decline through a "flight to quality." This may lead to widening spreads between yields on government bonds and those on corporate bonds and commercial paper (CP). In such a case, the central bank might, by implementing CP and corporate bond operations, consider implementing monetary easing effects through guaranteeing liquidity to the financial system without incurring credit risk itself.

In the following, we discuss issues pertaining to the outright purchase of long-term government bonds from the viewpoints of (1)–(3) above.

1. Evaluation of mild operations

First of all, in order to contain the BOJ's capital loss within its "reserve for possible losses on securities transactions," the size of mild outright purchases of long-term

39. Assumptions regarding the simplified BOJ's balance sheet as of March 1999 are as follows:
- Monetary base: Monetary base is ¥60 trillion, and is approximately divided into (1) ¥30 trillion of outright purchase of long-term government bonds; and (2) other financial assets, such as short-term government securities, and bills.
- Redemption of long-term government bonds: One-ninth of outstanding amounts of long-term government bonds are redeemed every year (the BOJ's outright purchase of long-term government bonds is limited to those for which one year has passed since their issuance).
- Short-term interest rates: 3.5 percent (long-term interest rates are assumed to be 5 percent).

government bonds becomes limited. Assuming a total operation of about ¥10 trillion, this is some 3 percent of the medium- to long-term government bonds outstanding amounting to ¥293 trillion as of end-1999. Put metaphorically, if one thinks of the impact on apple prices of buying 10 apples out of 300, a substantial impact cannot be expected.

Suppose the central bank implements such an operation when the economy is stagnant and price changes have been slightly negative. There is considerable risk that the term premium will rise reflecting concern over erosion of fiscal discipline as well as extreme uncertainty regarding impacts of quantitative easing if one compares the size of the operation with that of the government bond market.

Under such circumstances, it is quite possible to expect that policy duration effects of the zero interest rate policy would be strengthened to restrain the pressure on the long-term interest rates to rise. It is deemed more practical to contain the zero interest rate policy to support the autonomous recovery of economic activities, when demand for funds will expand reflecting the autonomous recovery of economic activities. Moreover, when the economy is faced with a massive deflationary shock, the effectiveness of the mild outright purchase operation of long-term government bonds is highly questionable, considering the insignificant effects of portfolio rebalancing in the foreign exchange market interventions.

2. Evaluation of aggressive operations

With respect to a central bank's commitment to the aggressive outright purchase of long-term government bonds, it is out of the question to make such a commitment suddenly in a situation where the economy is sluggish and the consumer price index (CPI) has been exhibiting a small negative growth rate. This is because such a commitment would be accompanied by the real risk of pushing up the term premium. However, suppose the economy faces a rapid economic downturn provoking concerns of the economy tumbling into a deflationary spiral as witnessed during the Great Depression. Then the central bank's commitment to the aggressive outright purchase of long-term government bonds would be regarded as the proper response of the central bank pursuing its mandate of price stability and thus the risk of a sharp rise in term premium would be less. Under such circumstances, the public and the market would be more tolerant of the central bank daring to take a measure that carries risk and has uncertain effects.

Some advocates insist that if the outright purchase of long-term government bonds is implemented within both a limited period and amount, it would not erode fiscal discipline and thus would not be problematic. However, taking into account the signaling effect with respect to future monetary policy, the limitation referred to above would substantially offset the effect. In such a case, it would become necessary for the BOJ to make clear, in order to send a strong signal to the market, that it will implement massive operations and is prepared to incur a capital loss. Thus, it is necessary for the BOJ to explicitly examine with the fiscal authority how to handle the expected capital loss, and clarify the responses, as Goodfriend (2000) discusses in the U.S. context.

If one considers the aggressive outright purchase of long-term government bonds as a last-resort operation in an emergency economic situation, it becomes necessary

to retain to the maximum extent possible the aggressive effect on expectations. Therefore, if the BOJ decides to implement the mild outright purchase of long-term government bonds (as an experimental operation) at a stage when the economy is somewhat stagnant and year-on-year price changes have been slightly negative, such an operation becomes the normal state and lessens the impact on expectations. Bearing this point in mind, we believe it inappropriate to easily implement the mild outright purchase of long-term government bonds.

B. Fiscal Burden of Outright Purchase of Long-Term Government Bonds

As discussed, the massive outright purchase of long-term government bonds will, even if successful in rescuing the economy from a deflationary shock, likely result in the central bank incurring a capital loss and lead to an increase in private-sector holding of government debt. In such a case, a view separating fiscal and monetary policy, such as "given the government debt situation, fiscal policy has reached its limit, therefore, when the economy deteriorates or (as some argue) it is below the potential growth rate, monetary policy should step in to take risks and decide on further monetary easing," would not be relevant. In this case, if the government tries to avoid the additional fiscal burden, monetary policy would fail to absorb the excess monetary base after the economic recovery, thus leading the BOJ to lose its control over inflation.

If the market believes that such a scenario is most likely, then the massive outright purchase of long-term government bonds will be received as virtually equivalent to the central bank's underwriting of government bonds leading to the erosion of fiscal discipline. In this case, there are risks that, due to a rise in inflation expectations and also in the term premium stemming from increased uncertainty over its extent, long-term interest rates might increase more rapidly than expected inflation, thereby making fiscal consolidation all the more difficult.

As such, in the special circumstances where interest rates are virtually zero percent while a huge amount of government debt exists, a proposal asking for "additional monetary easing since fiscal policy has reached its limit" boils down to asking, sooner or later, that an additional fiscal burden be borne under the zero interest rate policy. In other words, it is highly likely that, instead of an orthodox function of monetary policy which emphasizes the provision of macro liquidity, a channel through which the function of fiscal policy affects the economy will become the policy option (monetary policy turns into fiscal policy).

If one also takes into account monetary transfer by a central bank, as a part of fiscal policy, in considering monetary easing, it can be argued that one should compare a central bank's direct lending to the corporate sector—such as lending to firms (or via a private bank as an agent) or to government-affiliated financial institutions—with the cost and effects of the mild outright purchase of long-term government bonds, the effects of which are extremely uncertain. Needless to say, if a central bank's direct lending to the private sector means allocating funds that the BOJ ought to pay to the national treasury (which ultimately belong to the public) to firms as subsidies, it would be quite an unusual move for a central bank.

In addition, if the fiscal authority becomes able to effect funding at quite a low interest rate as a result of the central bank's additional monetary easing under the zero

interest rate policy, and if such an expectation is maintained for some time, then there might be a side effect that the authority assumes an optimistic funding plan for its debt. If an improvement in the fiscal imbalance has been hampered by difficulties in reducing fiscal expenditure under such an optimistic funding plan (for example, a case where additional fiscal expenditure becomes a vested interest or where surveillance on the efficiency of fiscal expenditure loosens due to expectations of prolonged low interest rates), market concerns over fiscal prospects might induce a rise in risk premium attaching to nominal long-term interest rates, gradually making it difficult to issue additional government bonds.[40]

If, by any chance, the issuance of government bonds comes to a halt, then, contrary to what Iwata (2000a) had expected, a situation materializes in which, due to the budget constraints of a unified government (central bank plus government), the fiscal deficit is eventually financed through the central bank increasing the money supply—the so-called unpleasant monetarist arithmetic (Sargent and Wallace [1981]). "Unpleasant monetarist arithmetic" in this context means that, even if independence is attached to a central bank institutionally by defining price stability as its mandate, if fiscal policy lacks discipline for any reason, independence will not guarantee a free hand in monetary policy with respect to price stability.

In this context, it is important to seek ways to ensure fiscal policy flexibility in normal times. Specifically, taking into account that there is an increasing portion of government expenditure which it is difficult to reduce, such as social security-related expenditure, it might be necessary to devise other ways of expenditure through the budget system. In this regard, it is quite a suggestive experience that U.S. budget enforcement laws stipulate two principles: (1) instituting an upper limit on discretionary spending items such as defense; and (2) adopting a "pay-as-you-go" principle that mandates either cuts in entitlements or tax hikes whenever a policy change results in net budget shortfalls. When these principles cannot be kept, an expenditure reduction across the board is ordered, thereby adding constraints to the budget formulation process of the Congress, and this in fact has resulted in contributing to a reduction in the U.S. fiscal deficit (Tomita [1999]).

VII. Styles of Monetary Policy Management

Taking into account the various ideas regarding monetary operations of the BOJ under the zero interest rate policy, here we will examine the future framework for implementing monetary policy in Japan, focusing on "style."

A. Styles of Monetary Policy

While we have touched on inflation targeting in previous chapters, here we will elaborate upon it in detail. Inflation targeting is not a general approach for all

40. Such a situation might be triggered by a temporary deterioration in supply and demand conditions in the government bond market. If such a situation suggests a huge capital loss on long-term government bonds on the part of private financial institutions and might threaten financial system stability, it becomes an issue that a central bank cannot neglect.

monetary authorities. For example, neither the Fed nor European Central Bank (ECB) has introduced it even though the ECB defines price stability as price index growth,[41] and the Fed reports the views of the Federal Open Market Committee (FOMC) to Congress.

Considering the actual monetary policy framework in the United States and Europe, the concern is how to establish a framework under which the monetary authorities can appropriately convey their intention regarding monetary policy to market participants, given the speed of information transmission and capital outflows/inflows in global financial markets. Thus, the question turns to what kind of approach exists other than inflation targeting.

Padoa-Schioppa (1996) pointed out that monetary policy focus has shifted to methods of implementation and dissemination of information necessary to better enable central banks to pursue price stability, which has been widely regarded as a mandate for central banks based on the experience of the 1970s. These methods are divided according to "styles." In this context, styles are behavioral patterns that central banks may adopt in various situations and are a much broader concept than policy rules as suggested by some economists. Styles can be divided into two types: (1) a commitment for a period of time to a single numerical target such as the foreign exchange rate, money supply, or inflation; and (2) the "classical" acquisition of confidence by conducting monetary policy based on an overall consideration without prior commitment to a specific target.

B. Practical Choice of a Style

It is not feasible for Japan to make a commitment to the foreign exchange rate, although Mundel (2000) suggested doing so. In particular, it is difficult to strengthen linkage of the yen and a currency basket comprising the U.S. dollar and euro and to further suppose a fixed exchange rate system in the long run. Nor it is easy to introduce monetary targeting, once adopted successfully in Switzerland and Germany, considering the unstable empirical relationship between money demand and the real economy in Japan.

In addition, there are various views of inflation targeting, which has recently received much attention. For example, the operational style of inflation targeting adopted in each country varies. In the United Kingdom, the government decides a concrete chart; in Sweden, the central bank sets it; in New Zealand and Canada, the government and central bank cooperate. The objective of targeting also differs from specifying a chart (in the United Kingdom) to setting a range (other countries). Furthermore, accountability varies.

The big difference between the classical "discretion" style and inflation targeting, in appearance, is commitment to a concrete target of inflation. Other merits of inflation targeting such as assurance of the independence of monetary policy's operational objectives, transparency of policy management, and accountability are achievable under other frameworks in light of the experience in the United States.

41. The ECB defines price stability to be maintained over the medium term as "the situation where growth in the consumer price index (HICI) is below 2 percent."

Central banks, which may influence market expectations, enhance their credibility by positively conveying information regarding policy objectives, securing transparency and accountability, achieving objectives, and being consistent in terms of the policy.[42]

For example, in a speech in September 1997, Federal Reserve Board Chairman Alan Greenspan said that the conduct of monetary policy might naturally be discretionary in circumstances where economic restructuring has been drastically effected (Greenspan [1997]). We cannot forecast economic change precisely if we just apply the historical relationships among various economic factors, because they have been altered as a consequence of structural change. In pursuing the policy objective of sustainable growth by maintaining price stability, it is not sufficient to follow any one mechanical rule based on previous relationships. *Ad hoc* or discretionary policy based on tentative decisions without any coherent criteria is problematic because it is vulnerable to political pressure.

C. Framework for Discussion on the Choice of Style of Monetary Policy

In light of the above, just as there are various types of inflation targeting, style based on an overall consideration may also take various forms. In other words, each central bank has been pursuing a "trial and error" approach to finding a desirable "style" that is in accordance with economic and social change. The concern of central banks is to acquire credibility by enhancing transparency and accountability and to further improve the situation by conducting flexible monetary policy rather than to find answers as to which style should be adopted.

From this viewpoint, the question as to what is a desirable style for the BOJ's monetary policy does not boil down to a question of whether inflation targeting should be adopted or not. In fact, Bernanke and Mishkin (1997) showed that inflation targeting is a "constrained discretion" somewhere in the middle of two extreme approaches, "strict rule" and "pure discretion." Kuttner and Posen (1999) stated that "adoption of inflation targeting constitutes a test of whether central bank communication can substitute for strict and simple rules," thus concluding that the difference of the interpretation in adopting monetary policy is ideological for central bankers, similar to the argument between rules-versus-discretion.

In this context, if the BOJ presently tries to establish a framework for implementing monetary policy by restricting discretion under open independence, it would be based on the same premise for adopting inflation targeting. It is also important for the BOJ to establish a stable relationship with market participants and the public by developing and improving its own style appropriate to the economic situation and Japan's central banking system.

On October 13, 2000, the BOJ published a report entitled "On Price Stability" (BOJ [2000]) that defines price stability as "an environment where economic agents

42. In this regard, we should also note the idea that while publication of all information regarding monetary policy is not undesirable, enhancing the transparency of economic policy by conveying information is needed. For example, Noyer (2000) stated, in reply to criticism that the ECB lacks policy transparency, that "It is [therefore] important to judge carefully the contribution which the various elements of communication can make to the fulfillment of the primary objective of monetary policy." He also pointed out that "publishing forecasts might finally increase uncertainty and even complicate the maintenance of price stability," since economic forecasts should be evaluated appropriately in consideration of internal risks and uncertainty under structural reform.

including households and firms can make decisions regarding such economic activity as consumption and investment without being concerned about the fluctuation of the general price level." This report summarizes the discussion among the Policy Board members on the issues related to price stability and concluded as follows:[43]

(1) In view of the current movement of prices in Japan, an inflation rate that is consistent with the sound development of the economy is likely to be lower in the short term than in the long term.
(2) If some numerical values are adopted as the definition of price stability, they are expected to be valid for a very long period of time. In view of the current development of prices in Japan, it is difficult to set specific numerical values to the definition of price stability that are consistent with the sound development of the economy. Furthermore, even if some numerical values were announced, they would not serve as a reliable guidepost in the conduct of monetary policy, and the exercise would not likely contribute to enhancing transparency of the conduct of monetary policy. Therefore, it is not deemed appropriate to define price stability by numerical values.
(3) While paying due attention to changes in the economy, the BOJ will nevertheless continue to explore whether price stability can be expressed by some numerical values.

It is necessary for the BOJ to bear in mind that a sustainable "style" that continues for a long time and temporary "operations" in an emergency situation, such as the zero interest rate policy, differ. In fact, Woodford (1999) pointed out that when a temporary emergency measure is compared with a policy rule to which a central bank can commit itself for a long period, the former is accompanied by a serious time inconsistency problem and thus cannot affect economic entities' expectations. Therefore, he argued that a monetary policy tool under zero inflation should be a part of a policy framework to which the BOJ can commit itself for a long period.

VIII. Conclusions

This paper has explained the basic framework of monetary policy under the zero interest rate policy. In addition, it has examined such crucial issues as (1) what options beyond the zero interest rate policy would be available in response to deterioration in the economic situation; (2) what would be the potential risks associated with these policy options; and (3) how these risks might change under a variety of economic conditions. On the basis of these analyses, we have emphasized the importance of establishing modalities for effective monetary policy, with due consideration given to actual conditions.

We argue that further monetary easing beyond the zero interest rate policy, most typified by the outright purchase of long-term government bonds, should be viewed

43. Based on the report titled "On Price Stability," the BOJ decided to issue "Outlook and Risk Assessment of the Economy and Prices." The first report was issued on October 31, 2000. "Outlook and Risk Assessment of the Economy and Prices" includes the forecasts of Policy Board members on real GDP, domestic wholesale price index (WPI), and CPI (excluding perishables).

as a bet which we would only be forced to explore in the event the Japanese economy stands on the brink of serious deflation. Considering the uncertainty and risks surrounding these unconventional measures, it is quite inappropriate to introduce them merely on an experimental basis. Of course, this does not mean that further monetary easing may not be warranted in any circumstances, nor that other easing measures not covered in this paper are infeasible. If other means of further easing turn out to be available, we should not spare any effort to study them.

With regard to monetary policy in Japan, there seems to be some oversimplified idea that the adoption of inflation targeting would be a panacea for current economic difficulties. This should remind central bankers, who must make policy decisions on a real-time basis amid drastic structural transformation, of the unfruitful traditional "rule versus discretion" debate in terms of monetary policy implementation. It also leads us to the well-known criticism presented by McCallum (1995).

With this in mind, we can say that the search for desirable modalities for monetary policy is not necessarily tantamount to making a decision about inflation targeting. If the present policy framework adopted by the BOJ has an orientation toward attaining an optimal blend between a strictly rule-based approach and unconstrained discretion, the eventual modalities can be said to have some commonalities with inflation targeting. In other words, the proper sequence we should follow is to start from a particular modality for monetary policy, enhance its transparency and accountability, secure external credibility, and conduct monetary policy in a flexible manner. This process is self-reinforcing in the sense that it will bolster the credibility of monetary policy.

During the course of prolonged economic stagnation, it is becoming clearer in Japan that monetary policy is neither a cure-all for an economic slump nor a substitute for policy measures directed at latent structural problems on the supply side (see Yamaguchi [1999] and Shirakawa [2000] for more details). In a similar vein, Dr. Issing of the ECB has made it clear (Issing [1999]) that unemployment is the most pressing structural problem facing Europe, and that a continuing decline in the jobless rate can only be achieved through structural adjustment which might cause pain to some vested interests. In light of this, we presume that the division of roles between monetary policy and structural policy is also an issue to be addressed by the BOJ.

APPENDIX: GOODFRIEND'S ARGUMENT WITH RESPECT TO THE EFFECTS OF THE OUTRIGHT PURCHASE OF LONG-TERM GOVERNMENT BONDS

In this Appendix, we explain how the outright purchase of long-term government bonds stimulates the economy based on Goodfriend (2000).

Goodfriend (2000) assumes that, for a given consumption amount, money is used to facilitate the exchange and reduce the time needed for the transaction. He calls "narrow liquidity services" those provided by the medium of exchange allowing the public to economize on "shopping time" in transactions. He also assumes that the time saved through the additional holding of money will diminish as the amount of money held increases and finally becomes zero.

The money demand model assumed here is the Shopping Time Model in McCallum and Goodfriend (1988). In an economy, one unit of goods is produced by using capital stock and labor. The goods can either be spent or used for production as investment goods. Households will allocate time among leisure transactions to obtain goods to consume, and production, and in every period select a combination of production, consumption, investment, real money balance, and short-term bondholding balance, so as to maximize the discounted present value of utility obtained in each period from consumption and leisure. The optimal money demand function for households is a complex function dependent on the future inflation rate, short-term interest rates, past capital stock, and money demand balance. However, if one transforms the household money demand function by using the relationship at the equilibrium, one can obtain a relationship in which the money demand balance of each period only depends on the corresponding period's consumption and nominal short-term interest rates, similar to the relationship of the money demand function in the portfolio rebalancing model.

In this model, if nominal short-term interest rates decline to zero and a central bank increased money supply and exchanged it for short-term government bonds, a mechanism—in which time needed for consumption is reduced due to an increase in money thus resulting in increases in production—no longer works. In other words, when interest rates on short-term financial assets become virtually zero, "an expansionary open market operation cannot relax the transaction constraint any further to free shopping time for more productive uses. At that point the economy may be said to be satiated in narrow liquidity services provided by the medium of exchange."

On the other hand, he defines "liquidity broadly as a service yield provided by assets according to how easily they can be turned into cash, either by sale or by serving as collateral for external financing." Therefore, liquidity services defined broadly are used to reduce exposure against what Bernanke and Gertler (1989, 1995) called the "external finance premium." As explained in the following, in Goodfriend (2000), liquidity services defined broadly at the core of a mechanism through which a quantitative monetary easing policy can have some effect even when nominal short-term interest rates are zero.

Furthermore, Goodfriend (2000) assumed that the operational target for short-term term interest rates does not change, and considered the effects of the

outright purchase of long-term government bonds as a policy response in the event the economy was hit by a new aggregate demand shock. In such a case, he regards the outright purchase of long-term government bonds as a policy measure working on liquidity services defined broadly, with the effects spreading to the real economy through (1) the portfolio rebalancing channel, and (2) the credit channel. As regards the portfolio rebalancing channel, consider the following story.[44]

When a central bank buys less liquid assets (those include the long-term government bond) with money at zero nominal interest rate, the marginal broad liquidity services yield falls. The public then wishes to rebalance its portfolio by attempting to sell money for less liquid assets. Since the public cannot rid itself of the excess money balances, the result is that the prices of less liquid assets rise. The rise in the prices of less liquid assets restores asset market equilibrium by (1) lowering the expected future appreciation of less liquid assets, and (2) lowering the return in utility, interest, or liquidity services as a percent of the prices of less liquid assets.

When asset prices recover, households will consume more out of current income. At the same time, if asset prices rise and Tobin's q sufficiently rises, investment will recover. A decline in the savings ratio and increase in investment will have some effect in preventing income, consumption, and employment from declining. Furthermore, increases in the marginal profit on real and organizational capital and in corporate profits as well as a decline in the marginal utility of consumption will further increase asset prices.

If one focuses on the point that long-term government bonds have high cash convertibility as well as high liquidity, some might question whether liquidity services defined broadly increase by converting long-term government bonds into monetary base. However, when the yield on long-term government bonds sufficiently declines under the zero interest rate policy, the risk of incurring a capital loss due to a future interest rate rise will increase relatively, and the possibility of converting into cash without a collateral asset value loss or capital loss declines. Therefore, if long-term government bonds are exchanged for monetary base, liquidity services defined broadly will increase more than in normal times.

Next, we consider the credit channel, which Bernanke and Gertler (1995) emphasized. Here the purchase of long-term government bonds will reduce the external finance premium through an increase in more liquid financial assets and a rise in asset prices, enabling monetary easing effects to permeate. If the external finance premium declines as collateral value is restored, net assets and bank capital increase, resulting in the credit spread shrinking and bank lending recovering. Since borrowing cost, which depends on future income, declines, expenditure will increase. And if expenditure increases, the multiplier effect will materialize with respect to current income, thereby perhaps accelerating investment.

44. We owe the next paragraph to the comment made by Dr. Marvin Goodfriend.

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