Financial Markets Department Working Paper Series 00-E-3

A Guide to Bank of Japan's Market Operations

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AUGUST 2000

NOTE: Papers in the Financial Markets Department Working Paper Series are circulated in order to stimulate discussion and comments. Views expressed are those of authors and do not necessarily reflect those of the Bank of Japan or the Financial Markets Department.

This paper is an English translation of the Japanese original released in February 2000. In July 2000, the set of statistics "Supply and Demand of Funds and Market Operations" explained in Chart V and Appendix 12 was renamed "Sources of Changes in Current Account Balances at the Bank of Japan and Market Operations."

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I. Introduction[1]

As seen from the many questions we are asked and news reports, market operations by the Bank of Japan are recently the focus of much attention from the public including market participants, analysts, and the press. This paper reflects my personal effort to assist these people and many others to gain a deeper understanding of the market operations carried out by the Bank. It includes an explanation of the role of the Bank's market operations in implementing monetary policy and the current operational framework.

Specifically, Chapter II explains the role of market operations at present, and Chapter III, their operational framework. Chapter IV attempts to answer questions on market operations we have been asked since the introduction of the zero interest rate policy. Chapter V then introduces the details of the changes announced on February 14, 2000, regarding market operations data. Finally, Chapter VI discusses issues for the future.[2]

II. What Are Market Operations?

A. Monetary Policy and Market Operations

The Bank implements monetary policy aiming at contributing to the sound development of the national economy through the pursuit of price stability. The Bank's monetary policy is discussed and determined by the Policy Board at its Monetary Policy Meetings (MPMs).[3] Basically, there are three means of implementing monetary policy: (1)

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[1] This paper has been written by Mr. Atsushi Miyanoya, Chief Manager of the Open Market Operations Division of the Financial Markets Department, with the cooperation of divisional staff.

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[2] Specific practices of market operations are as of the time this paper was written, and any possible misexplanation is the sole responsibility of the author. All opinions in this paper are personal and, therefore, do not represent the view of the Bank of Japan or the Bank's Financial Markets Department.

[3] The Policy Board consists of nine members: the Governor; the two Deputy Governors; and six appointed Members. The Board is responsible for making important decisions on the Bank's policies and business operations in general. Among these, the basic guideline for monetary policy is decided at special meetings called "Monetary Policy Meetings (MPMs)," which are held once or twice a month. The framework of MPMs has the following features: (1) in addition to the Board members, Government representatives attend the meeting as non-voting participants; and (2) decisions made are announced immediately after each meeting, followed about a month later by the release of the "Minutes," an outline of the discussion at each meeting.

market operations; (2) raising or lowering the official discount rates; and (3) raising or lowering the reserve requirement ratios. In the past, changing the official discount rates was the main instrument of monetary policy. This method, however, has been replaced by market operations——purchases and sales of securities and bills in the market by a central bank——through which the Bank guides the market interest rate to a specific level or range.

B. The Guideline for Market Operations

The monetary policy stance is decided by the Policy Board at each MPM as the guideline for market operations (the "directive").[4] This guideline is announced immediately after each MPM. The present guideline indicates the Bank's operating target for monetary policy as a specific level of the uncollateralized overnight call rate (for the current "directive," see Appendix 1).[5] This method of setting a certain interest rate level or a range as the operating target in carrying out monetary policy is called "interest rate targeting." The Bank's Financial Markets Department, the department assigned responsibility for carrying out market operations, guides the interest rate according to the "directive." Specifically, the department, when supplying and absorbing funds, determines the amount and tools of the operation, notifies auctions of market operations to the counterparties, and accepts bids.

Currently, the Bank chooses the uncollateralized overnight call rate as the operating target. There are three reasons for this. First, the overnight call rate is relatively easier for a central bank to control. In the uncollateralized call market, banks and other financial institutions trade overnight funds to make final adjustments of their daily cash positions. Transactions in this market, therefore, reflect the strength of demand for liquidity in the market as a whole. In addition, the rate in this market clearly reflects the

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[4] Upon determination of the guideline for market operations, the Policy Board directs the Bank's staff to carry out market operations accordingly. This is why the guideline is sometimes called the "directive."

[5] As of February 2000, the "directive" aims at an interest rate of virtually zero percent: "The Bank of Japan will flexibly provide ample funds and encourage the uncollateralized overnight call rate to move as low as possible." Although the interest rate of "zero percent" is not specifically stated in the directive, market participants share the common understanding that the implied interest rate is the virtually lowest rate of around 0.02 percent. The virtually lowest rate is zero percent plus the commissions charged by the intermediaries of the call money transaction.

balance between the supply and demand of funds; as overnight transactions are made over an extremely short period, the rate charged on them is less influenced than longer-term rates by market participants' expectations for developments in interest rates or the economy. It is therefore relatively easy for the Bank to control the overnight rate by adjusting funds supply. Second, longer-term rates are determined more by expectations of market participants. It is important, through longer-term rates, to monitor changes in market participants' expectations including those about interest rate developments. Determination of the longer-term rates is thus better left basically to the market, and therefore the Bank's control should be limited to the overnight rate. Third, the uncollateralized overnight call rate, the shortest-term rate, is seen as the standard rate for longer-term rates in the call market and other markets. The Bank is able to influence longer-term rates by controlling the overnight rate making use of interest arbitrage in the market.

C. The Role of Market Operations

As mentioned, the Bank's guideline for market operations is determined by the Policy Board at MPMs. However, people often ask the Bank questions such as "Does today's more-than-usual increase in funds provision through the market operations suggest that the policy stance has been changed toward a further monetary easing?" In addition, market reports are often produced based on similar speculation. The Bank never indicates its policy stance through its daily market operations; it carries them out to fulfill the guideline. The resulting change in the amount of funds provision has no political meaning in itself.

In the past, a specific target level for an interest rate was not always announced in the guideline for market operations. The Bank guided short-term rates lower in March 1995, and it was from then that the Bank began to change its main policy instrument from the official discount rate to market operations aimed at controlling short-term market rates. The public statement announced by the Policy Board on July 7, 1995 was as follows: "The Bank expects market rates to move, on average, somewhat below the official discount rate." At that time, the Bank specified neither the type of the targeted market rate, nor did it pinpoint the targeted level. In the absence of a specified target, the range of short-term rates resulting from daily market operations was sometimes interpreted by the market as the range that the Bank wanted to maintain.

Under the current guideline, however, the Bank has no need to give signals to the market, through daily market operations, about the acceptable range of the overnight rate. This is because an explicit target level is indicated for the uncollateralized overnight call rate——it is obvious to anybody whether the rate is above or below the targeted level. The present market operations, therefore, are conducted based on a simple idea: "Increase the amount of funds provision when the targeted rate is above the specified level, and decrease the amount of funds provision when it is below it." Basically, a similar style of market operations is employed in other central banks such as the Federal Reserve and the European Central Bank, which indicate the monetary policy stance for the immediate future by specifying a level for the target rate.[6]

III. The Framework of Market Operations

As explained above, the uncollateralized overnight call rate, the market operation target, is determined mainly by the balance between the supply and demand of funds. This chapter explains what factors affect their supply and demand.

A. "Funds" to Be Adjusted through Market Operations

It has already been explained that market operations are conducted to adjust the amount of "funds" in the market for the purpose of appropriately guiding the target interest rate. The term "funds" used in this context is defined as follows.

Funds to be adjusted through market operations are the current account balances at the Bank held by private financial institutions (hereafter, CABs**)**, in other words, the balances of financial institutions' deposits with the Bank. The majority of CABs is reserve balances, i.e., reserve-deposit balances held at the Bank by depository institutions to fulfill legal requirements. The rest includes balances maintained to meet payment and settlement needs by depository institutions as well as nondepository institutions, such as securities companies, securities finance companies, and *tanshi* companies (money market brokers-cum-dealers). In this paper, unless otherwise noted, "demand for funds" will refer to

[6] From July 1995, the Federal Reserve started announcing a pin-pointed target level, which is determined by the Federal Open Market Committee (FOMC), for the federal funds rate. Since then, it is commonly acknowledged in the market that there is no longer a need to surmise changes in the monetary policy stance from the minute changes in the daily market operations of the Federal Reserve Bank of New York.

demand for CABs as a whole, which include those of both depository and nondepository institutions. On the other hand, unless otherwise noted, "supply of funds" will refer to CABs, which are supplied through the Bank's operations.

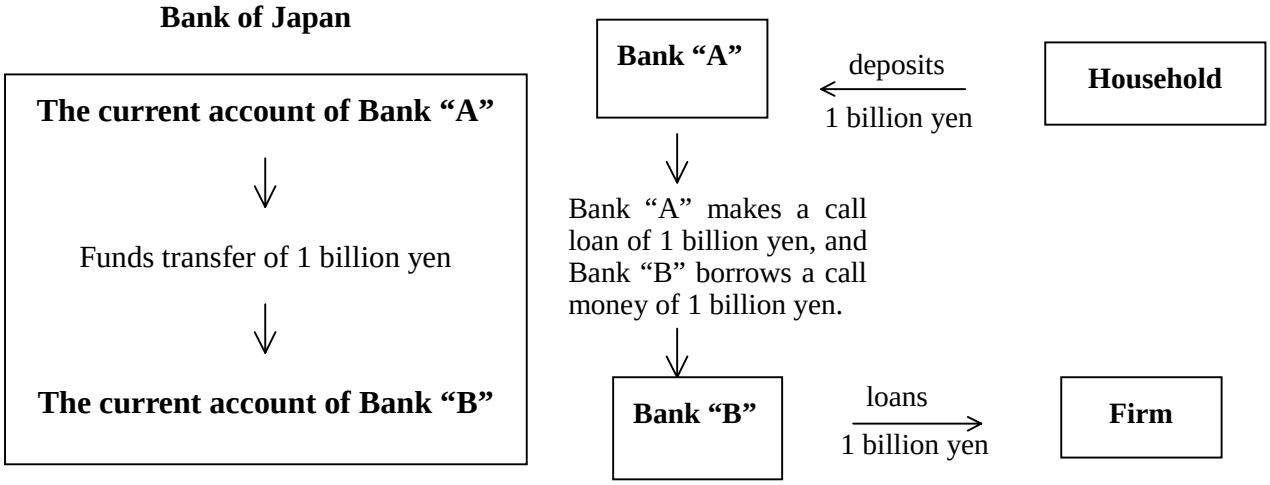
B. The Mechanism of Guiding the Overnight Interest Rate through Market Operations

1. Adjustment of CABs between private financial institutions

Private financial institutions are required, at any point of time, to comply with the request of customers, including firms and households, to withdraw cash from their demand deposits. They also send money to accounts at other financial institutions upon request. In order to smoothly provide these depository and payment services, private financial institutions have to hold sufficient CABs. These daily business operations cause day-to-day fluctuations in the CABs held by individual institutions. Any resulting surplus/shortage in CABs is adjusted between private financial institutions in the money market, especially in the call market where funds are delivered on the day of the contract.[7] Such transfers of funds are usually made between current accounts at the Bank of Japan. For instance, assume that Bank "A" has a CAB surplus of 1 billion yen, and Bank "B" a shortage of the same amount. In this case, CAB surplus/shortage can be offset if Bank "A" makes a call loan to Bank "B" (meaning that Bank "B" borrows call money amounting to 1 billion yen from Bank "A"), and funds are transferred accordingly (see Chart 1). This mutual adjustment of CABs takes place between all private financial institutions.

[7] In addition to the call market, the money market comprises the Euro-yen deposit market, the treasury bill (TB) market, the financing bill (FB) market, the JGB repo market, the certificate of deposit (CD) market, and the commercial paper (CP) market. Most transactions in these markets are future-date-settlement transactions, in which funds are settled one or two days after their contract. The same-day-settlement transactions are made mostly in the call market.

Chart 1: Adjustment of CAB Surplus/Shortage between Banks through Call Money Transactions



2. Adjustment of CABs as a whole through market operations

For private financial institutions, appropriate CABs are mainly determined by funds needs for payment and settlement and the legal reserve requirement. On a day when CABs as a whole are sufficient to meet demand for funds, private financial institutions can offset each others' individual CAB surplus/shortage through the call market. In this case, there is no need for the Bank to intervene. However, when exogenous factors——such as flows in banknotes and treasury funds——cause private financial institutions' CABs as a whole to decrease (increase), overall demand for funds cannot be exactly met even after adjustments between institutions. As a result, an upward (downward) pressure will be exerted on the overnight rate. If the Bank increases (decreases) the supply of funds, this upward (downward) pressure is alleviated and a rise (decline) in the rate is thus prevented. The Bank adjusts the amount of funds supply through market operations, taking into consideration the developments in demand for funds as well as factors affecting the overall provision of CABs; this is the basic mechanism for the Bank to guide the overnight call rate.

C. Factors Affecting the Overnight Call Rate: (1) Demand for CABs

The foregoing section has already explained the process whereby the central bank's funds provision exerts upward or downward pressure on the overnight rate, depending on the size of funds supplied relative to funds demand. The following sections

will explain factors determining demand for funds, that is, private financial institutions' overall demand for CABs.

1. Funds demand for required reserves

Under the reserve requirement system, private depository institutions in Japan are legally obliged to set aside a certain amount of funds as "reserves" in the current accounts at the Bank (for an outline of the reserve requirement system, see Appendix 2).[8] The reserves to be held (required reserves) are determined as a percentage of reservable liabilities. More specifically, private depository institutions are required to hold reserves so that their cumulative total over one month (from the 16th of a month to the 15th of the next, referred to as the reserve maintenance period) equals or exceeds the required amount. There is no need to hold a specific amount each day.[9] Financial institutions, while making efforts to secure reserves that meet legal requirements for the reserve maintenance period, manage daily balances so that the amount exceeding the requirement is kept to a minimum.[10] This is because CABs do not earn interest.

To put it another way, financial institutions are not required to maintain a specific amount of reserves each day, as long as they satisfy the legal reserve requirements over the reserve maintenance period. This gives financial institutions flexibility to substitute reserve balances across days of a maintenance period, based on their forecasts of interest rate developments. For example, if interest rates remained unchanged during the maintenance period, financial institutions' cost of holding reserves would be the same on any day. In practice, however, when the market is dominated by strong speculation that interest rates will rise (decline) in the maintenance period, financial institutions tend to concentrate reserve balance holdings early (late) in the period in an effort to hold down the costs of holding the noninterest-bearing asset. These moves are reflected in the strength (weakness) of demand for reserves and consequently exert an upward (downward) pressure

[8] Financial institutions subject to the reserve requirement system are as follows: banks defined under "the Bank Law," long-term credit banks defined under "the Long-Term Credit Banks Law," *shinkin* banks (with outstanding deposits exceeding 160 billion yen), and Norinchukin Bank.

[9] An extreme case would be to hold the required amount of funds on only one day in the maintenance period and maintain a zero balance for the rest of it.

[10] The period-average required amount of reserves was 3.9 trillion yen in the maintenance period that started from January 16, 2000.

on the overnight rate. This is how market participants' interest rate expectation, through the substitution of balances across days of a period, affects the overnight rate.

CABs to meet reserve requirements can also be utilized to satisfy funds demand for payment and settlement. This will be explained in detail in the following section.

2. Funds demand for payment and settlement

As already mentioned, private financial institutions maintain sufficient balances at the Bank not only to fulfill the reserve requirement but also to provide for daily payment and settlement needs. In doing so, they tend to adjust their CABs based on the amount of reserves to be held per day under the reserve requirement system (period-average required reserves.) This is because, in Japan, period-average required reserves are generally larger than balances to be set aside for daily payment and settlement.[11] However, on some specific days of a month or at around the end of accounting periods——when the volume of settlement, including bills and checks settlement, becomes larger than usual——CABs that are just enough to satisfy period-average required reserves could fail to meet funds demand for payment and settlement.[12] In Japan, about 70 percent of call money transactions are settled at the 1:00 p.m. settlement time (the bills and checks clearing time). Therefore, on a day when the amount of settlement is expected to be large, major banks try to secure enough funds at 1:00 p.m. rather than at the final settlement time, which is around 5:00 p.m.[13] On these days, the overnight call rate can rise regardless of the reserve situation until then, due mainly to the increased funds demand for payment and settlement. Demand for funds is significantly affected when funds demand for payment and settlement

[11] This relationship is valid under the combination of the current reserve requirement system, the reserve ratios, and the settlement system via current accounts at the Bank. Funds demand for payment and settlement could constantly exceed demand for reserves in the case of changes to the above combination or changes in the financial environment.

[12] On the 5th, 10th, 15th, 20th, 25th, and the last day of each month, the amount of bills and checks settlement is larger than usual.

[13] Almost all funds settlements via current accounts at the Bank are carried out by netting out all payment instructions at a certain designated time: around 9:00 a.m.; around 1:00 p.m.; around 3:00 p.m., and around 5:00 p.m. This settlement method is called designated-time settlement. The uncollateralized overnight call rate tends to peak at the settlement at the 1:00 p.m. settlement time, and decline thereafter. The Bank plans to shift its settlement system by the end of 2000 to real-time gross settlement (RTGS), under which every payment instruction is processed real time and on an order-by-order basis.

exceeds that for reserves.

Funds demand for payment and settlement is also influenced by market participants' view of liquidity risk. Liquidity risk is the risk of financial institutions not being able to procure enough liquidity in the money market such as the call money market, for instance, in the face of a sudden and massive withdrawal of deposits. This risk could surface as a result of an aggravation of banks' nonperforming-asset problem and other factors that increase concerns about the stability of the financial system. For example, a series of failures of major banks and securities companies in 1997 and 1998 triggered widespread concerns about the stability of the financial system. These concerns encouraged private financial institutions to hold CABs above required reserves, resulting in upward pressure on interest rates.

Concerns related to liquidity risk could also arise when a serious malfunctioning of the market is anticipated, for instance, when funds settlement risk intensifies or when the market becomes extremely inactive. A typical example recently observed was the concern about the Year 2000 problem. Many financial institutions held larger-than-usual CABs toward the year-end of 1999 in anticipation of the settlement risk that might result from operational problems with computers.

In these cases, provision of funds conducted based only on required reserves and the normal level of funds settlement needs would fail to meet demand.

D. Factors Affecting the Overnight Call Rate: (2) Exogenous Factors Affecting CABs

The term "operating factors" is often used to describe factors, other than market operations, that cause a surplus/shortage in CABs as a whole. In this paper, they will be referred to as "factors affecting CABs." Details of these factors and how they are forecasted are given in the sections below.

1. Types of factors

Major factors affecting CABs are (1) issuance and withdrawal from circulation of banknotes (banknote factors), and (2) flow of treasury funds between private financial institutions and the government (treasury funds factors).[14] Movements in these factors

[14] Other central banks also analyze reserve factors in a similar way. In the United States, for example, factors affecting demand and provision of reserves are called "factors affecting reserve

reflect economic activities of many entities such as firms, households, the government, and even nonresidents, and cannot be controlled by a central bank or by individual private financial institutions at least in the short term. Thus, these factors are considered as exogenous factors in the context of daily market operations.

(a) Banknotes in circulation increase, for example, when financial institutions obtain banknotes by debiting their accounts at the Bank to provide for firms' demand for cash for wage payments and households' demand for cash for a long weekend. As is shown by the resulting decrease in CABs, an increase in banknotes in circulation is a *funds (CAB)-shortage factor.* On the other hand, banknotes in circulation decline, for example, when financial institutions credit their accounts at the Bank by returning banknotes obtained from their customers after a long weekend. As is shown by the resulting increase in CABs, a decrease in banknote circulation is a *funds (CAB)-surplus factor*.[15]

(b) The treasury balance at the Bank decreases when the government debits its account at the Bank and credits the accounts of private financial institutions for, e.g., the payment of pensions to households or that for public works to firms. Flows of treasury funds between the government and private financial institutions thus take place through their accounts at the Bank. Therefore, a decline in the treasury balance is accompanied by an increase in CABs, and is a *funds (CAB)-surplus factor*. On the other hand, an increase in the treasury balance, which occurs when the government receives funds from private financial institutions in the process of collecting funds such as taxes from households and firms, is a *funds (CAB)-shortage factor*.

The settlement of yen funds accompanying foreign exchange interventions also affects CABs because settlements are made between the treasury deposit and private financial institutions' current accounts, both at the Bank. In yen-selling

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balances," and factors that cause surplus/shortage in reserve balances as a whole are called "autonomous factors," which include banknote factors and treasury funds factors.

[15] People are often confused about why an increase in banknotes in circulation, which would increase banknote holdings of financial institutions, is a funds-shortage factor. The key is that "funds" here means CABs. When households and firms obtain banknotes from banks, less funds are left in their accounts for debiting of payments using credit cards or payments of utilities, i.e., obtaining cash causes a decrease in funds available at the banks. The same applies to the relationship between financial institutions and their CABs.

intervention, treasury funds are transferred to the current accounts of private financial institutions at the Bank, and the reverse occurs in yen-buying intervention.

2. Forecasting changes in banknotes in circulation and the treasury balance

Daily fluctuations in banknotes in circulation and the treasury balance cause day-to-day shortage/surplus in CABs as a whole. It is therefore necessary for the Bank to forecast as accurately as possible changes in banknotes in circulation and in the treasury balance in determining the size of funds provision through market operations. A projection is first made for the medium term of about three months ahead. This is then revised and refined to projections for a month, a week, and a day ahead. The projection for the day is even revised several times. To ensure high accuracy, the head office and the branches of the Bank gather necessary information from private financial institutions and government agencies on a daily basis. Patterns of CAB surplus/shortage in the past as well as analyses of economic and monetary indicators are also taken into account in making medium-term projections (see Appendix 3).

(a) For banknotes, medium-term projections are based mainly on analyses of past seasonal patterns and recent growth trend. Short-term projections are based on the aggregated forecasts of the issuance and withdrawal from circulation of banknotes by private financial institutions. Forecasts made by each financial institution are collected through the branch-network of the Bank.

(b) For treasury funds, medium-term projections are based on data collected by the Bank about individual government agencies' schedules for the payment and receipt of funds, as well as on analyses of economic indicators such as firms' financial statements. Short-term projections are based on the aggregated forecasts of the payment and receipt of treasury funds by government agencies and private financial institutions, which are collected by the Bank.

To enhance disclosure of information on market operations, the Bank releases, on a monthly and daily basis, both projected and actual figures of the changes in banknotes, treasury funds and other items, as well as the resulting CAB surplus/shortage.[16] These

[16] Exogenous factors affecting CABs include "other factors," which can be categorized neither as banknote nor treasury funds factors. An example is the funds transfer between yen accounts held at the Bank by foreign central banks or international financial institutions and the current accounts of

figures are released in the form of the "Supply and Demand of Funds and Market Operations" table (the "funds-table"). Actual figures include the amount of funds provided/absorbed through market operations, as well as reserve and current account balances (see Appendix 4).[17] Among the major central banks, the Bank of Japan is the only one that discloses projections for the daily changes in banknotes and treasury funds besides the actual figures. Factors affecting CABs are exogenous for each private financial institution. Thus, the disclosure of daily projection may be contributing to the stabilization of the overnight call rate by causing market participants' view of supply of/demand for funds to converge.[18] This system offers high transparency because market participants are able to check the accuracy of the Bank's projection and the amount of funds provided by the Bank through market operations.

3. Fluctuations in banknotes in circulation and the treasury balance

In Japan, daily fluctuation in banknotes in circulation and the treasury balance is very large compared with that of the United States and Europe (for details, see Box 1). For example, in 1998, the average weekly fluctuation (in absolute value terms) in banknotes was approximately seven times larger in Japan (1,067.4 billion yen) than in the United States (141.6 billion yen), and that in the treasury balance was approximately four times larger in Japan (2,354.7 billion yen) than in the United States (518.1 billion yen; see Appendix 5).[19] These large fluctuations cause daily fluctuation in CAB surplus/shortage to become so large that it is almost impossible to make adjustments within a day's operation.

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private financial institutions at the Bank. The item "Treasury funds and others " includes the treasury funds factor and this "other factors." Estimated and actual figures are released on the Bank's Web site (http://www.boj.or.jp/en/siryo/siryo.htm). Daily/monthly figures are updated daily/monthly, respectively.

[17] The Bank has decided to change the formula for the "Supply and Demand of Funds and Market Operations" table from March 16, 2000. For details of the change, see Chapter II, Section B, and Appendix 13.

[18] Although the difference in the interest rate level and the settlement system should be noted (Japan adopts designated-time settlement while the United States adopts real-time gross settlement), the volatility of the changes from a day earlier (the standard deviation of the gap between the target level and actual interest rates) in the overnight rate (the uncollateralized call rate in Japan and the federal funds rate for the United States) is lower in Japan than in the United States: about 0.05 percent in Japan and about 0.21 percent in the United States.

[19] Assumed as 1 U.S. dollar = 100 yen.

It therefore becomes necessary to project CAB surplus/shortage and conduct market operations from an early stage (see Section E, 1 below). Projection of CAB surplus/shortage is significantly important in this sense as well.

E. Determining the Amount of Funds Provision through Market Operations

The sections that follow explain how the Bank determines the amount of funds provision/absorption through market operations, considering the demand for funds and projections for factors affecting CABs, both mentioned above.

1. Operations that offset fluctuations in CABs

The most basic method used by the Bank in determining the amount of funds provision through market operations is to offset surplus/shortage in CABs resulting from fluctuations in banknotes in circulation and the treasury balance, thereby preventing increases/decreases in CABs as a whole. Movements in banknotes and treasury funds are greatly influenced by seasonal factors. Therefore, most operations are carried out to offset both daily and seasonal surplus/shortage in CABs. To illustrate this point, suppose that a CAB shortage resulting from the receipt of corporate income tax by the government is projected for the second day of a month, and a CAB surplus resulting from the payment of pensions for the 15th day of the next. In this case, the Bank injects funds into the market through an operation starting on the second day of the month and maturing on the 15th day of the following month. In this way, the Bank absorbs the amount of CAB surplus projected for the 15th day of the following month (see Appendix 7). Operations starting on future dates are often employed to adjust seasonal CAB surplus/shortage. Final adjustments are then made through operations for the day (for detail, see Section 2 below).

2. Final adjustment through same-day-settlement operations

The Bank forecasts the change in the total CAB for the day by netting out (1) the projection of CAB surplus/shortage, calculated based on the projected changes in banknotes in circulation and the treasury balance, and (2) the amount of operations offered before the day (the amount of future-date-settlement operations starting on the day and the amount of the operations that have already been started and mature on the day).[20] The net increase in

[20] Before the implementation of operations for the day concerned, the market knows the projected

CABs for the day is calculated as the sum of this projected increase/decrease in the total CAB and the amount of same-day-settlement operations. The amount of same-day-settlement operations is decided based on the strength of funds demand for the day, which is checked by interviewing financial institutions and monitoring developments of the bid and offered call rates in the morning. The Bank notifies its operational counterparties of the amount decided for the operation at 9:20 a.m. Through the adjustment of the amount of same-day-settlement operations——by either providing funds that exceed or fall short of the demand for CABs——the Bank is able to guide the uncollateralized overnight call rate to move in line with the guideline.

In this way, the Bank combines future-date-settlement operations and same-day-settlement operations in providing funds into the market in the short term.

3. Provision of long-term funds——outright purchases of Japanese government bonds (JGBs)

As explained, in the short term, banknotes in circulation and the treasury balance are affected by seasonal swings. Demand for banknotes, however, strengthens in the long term, accompanying the expansionary trend of the economy and the resulting increase in payment and settlement volume. In meeting this long-term demand for money, it seems most natural to employ long-term operations. The Bank, therefore, conducts outright purchases of JGBs so that the resulting provision of funds matches the long-term growth in banknotes. Recently, in February 2000, the Bank conducted outright purchases of JGBs twice in a month, each amounting to 200 billion yen. If only short-term operations were used to meet long-term demand for funds, it would be very inefficient. For example, the operations would be more frequent, thereby increasing the number of auctions and frequency of delivery of the traded securities. On the other hand, if the amount in each operation was raised significantly to reduce the number of operations, the bids could be well below the offered amount, preventing the Bank from providing funds smoothly. Also, if the Bank were to significantly increase the amount of its JGB outright purchases, there could be more need for funds absorption rather than provision in the short term, forcing the

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increase/decrease in the total CAB. At around 5:30 p.m. on the previous day, the Bank's Financial Markets Department announces the projection for the amount of CAB surplus/shortage and the amount of funds provided/absorbed through operations offered before the day concerned.

Bank to make constant efforts to absorb funds.

4. Measuring the size of funds provision

How do we measure the size of funds provision? Various yardsticks are used in different countries; sometimes more than one even in the same country. There is no absolute criterion, as all of these yardsticks are applied on the basis of several assumptions. An effective yardstick in countries employing interest rate targeting would be the level of a market rate set as a target. As long as the target rate stays around the specific targeted level, supply of funds is regarded as adequately meeting demand. Demand for required reserves could also be a yardstick. Taking this as demand for funds, funds provision is evaluated by (1) comparing actual reserves outstanding with the period-average of required reserves, or (2) monitoring the pace of progress in satisfying reserve requirements in the reserve maintenance period.[21]

Until recently, the Bank employed a method that also focused on required reserves but was different from the above. This method assumes the following: (1) required reserves usually exceed the amount of funds required for payment and settlement; and (2) reserve holders would normally maintain reserve balances just enough to meet requirements because reserves do not earn interest. On these assumptions, the Bank calculated the difference between the reserve balance after the day's funds provision and demand for required reserves (represented by daily-average remaining required reserves). [22] The Bank released this figure when announcing offers for regular market operations for the day.

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[21] The second method compares the actual and standard "progress rates" of reserve accumulation. The actual progress rate on Day T (the T-th day of the maintenance period) is defined as the actual cumulative total of the daily reserve balance on Day T divided by the cumulative total of required reserves on the last day of the period. On the other hand, the standard progress rate on Day T——calculated on the assumption that the period-average required reserve balance is maintained throughout the period——equals T divided by the total number of days in the period. For example, in a thirty-day maintenance period, the standard progress rate on the fifteenth day would be 50 percent. If the required cumulative total is 120 trillion yen, the period-average required reserve balance is 4 trillion yen. In this case, the progress rate would be 50 percent if the cumulative total was 60 trillion yen on the 15th day. This would be an "average" pace of accumulation. If the actual progress rate exceeds/falls below 50 percent, it is considered as a "faster/slower" pace.

[22] The "daily-average remaining required reserves" is the average reserve balance that should be accumulated daily by reserve holders in the remaining days of the reserve maintenance period. The maintenance period starts from the 16th of the month and ends on the 15th of the month following.

This method, however, became less effective with the introduction of the zero interest rate policy, and was, therefore, revised in February 2000 (for details, refer to Chapters 4 and 5). The framework of the old method is explained below.

In this method, the following two numbers are compared: (1) the projected total reserve balance (including same-day-settlement operations for the day) and (2) the remaining required reserves (daily-average) of all reserve holders. If the former is larger/smaller than the latter, the difference is called the "daily excess/shortfall of reserves." The situation where the former equals the latter is referred to as "reserve-neutral." The Bank accelerates/slows reserve holders' pace of reserve accumulation by creating a "daily excess/shortfall of reserves," weakening/strengthening demand for required reserves in the remaining maintenance period (for the calculation of the "daily excess/shortfall of reserves," see Box 2).

The Bank decides the size of funds provision for the day based on the expected divergence of the overnight call rate from the target level stated in the guideline, taking into account developments in funds demand and their impact on the overnight rate. Demand for funds is forecasted based on changes in demand for reserves monitored through the pace of reserve accumulation. Bids and offers in the call market are also taken into account, because, as already explained, demand for payment and settlement could greatly influence funds demand on some days.

Under the current monetary policy framework, daily operations are conducted to guide the overnight call rate to the level specified in the guideline. The "daily excess/shortfall of reserves" does not reflect the Bank's policy stance; it is merely one yardstick for evaluating the size of funds provision. Thus, unless the guideline has been changed, an increase/decrease in the Bank's daily funds provision never indicates a policy change.

F. Determining the Method of Funds Provision/Absorption

The Bank decides the size, tools, and maturity of the operation, and then notifies the counterparties of operations. Auctions for operations to adjust funds for the day (same-day-settlement operations) are offered at 9:20 a.m., and those to adjust funds for the following days are offered at designated time between 9:30 a.m. and 12:10 p.m.

1. Selection of tools

Ten operation tools are currently available to the Bank (for details, see Table 1 and Appendix 8).

Table 1: Tools of Market Operations

Provision of short-term funds	
	Purchases of TBs/FBs under repurchase agreements
	Outright purchases of TBs/FBs
	Borrowing of JGBs against cash collateral (JGB repos)
	Outright purchases of bills
	Purchases of CP under repurchase agreements
	Outright purchases of bills backed by corporate debt obligations
Absorption of funds over a short-term	
	Sales of TBs/FBs under repurchase agreements
	Outright sales of TBs/FBs
	Outright sales of bills issued by the Bank of Japan
Provision of long-term funds	
	Outright purchases of JGBs

The tools in Table 1 differ in flexibility, possible transaction volume, and maturity, and are selected considering these characteristics along with the market practice and the settlement method.

Of the tools in Table 1, those with high flexibility suitable for same-day-settlement operation are currently limited to the following: for funds provision, purchases of TBs/FBs under repurchase agreements and outright purchases of bills; and for funds absorption, sales of TBs/FBs under repurchase agreements and outright sales of bills issued by the Bank (BOJ bills).[23] In addition, possible time of settlement varies with the tool.[24] Japanese

[23] Bank of Japan loans extended at the official discount rate against eligible collateral are also another means of providing short-term funds. However, the Bank decided to avoid, in principle, using this measure in monetary adjustment from January 1996.

"Purchases of securities under repurchase agreements" refers to securities transactions in which purchases are made under an agreement that the Bank will sell back the purchased securities to the counterparty on a specific future date. In this transaction, funds are supplied on the execution day and absorbed on the day the securities are sold back. This transaction, therefore, has the function of providing short-term funds. On the other hand, sales under repurchase agreements, under which sales are made under an agreement that securities will be purchased back by the Bank, have the

government security (JGS) operations——sales/purchases under repurchase agreements and outright purchases/sales of TBs and FBs, borrowing of JGBs against cash collateral (JGB repos), and outright purchases of JGBs——are settled only at "the 3:00 p.m. settlement time," settlement that usually takes place around 3:00 p.m. On the other hand, bill operations——outright purchases of bills and sales of BOJ bills and purchases of CP under repurchase agreements——can be settled at "the 1:00 p.m. settlement time" (bill and check clearing time), "the 3:00 p.m. settlement time," or "the 5:00 p.m. settlement time" (see Appendix 8.)[25] Therefore, when demand for funds strengthens quite early in the day, for example, due to large issuance of banknotes, the Bank utilizes bill operations that are settled at the 1:00 p.m. settlement time.

As far as transaction volume is concerned, outright purchases of bills had been most heavily utilized in the Bank's market operations because of the large size of the bill market. At present, however, purchases of TB/FB under repurchase agreements are being most actively utilized. This reflects the rapid expansion of the TB/FB market since the introduction of the public auction system for FBs in April 1999.[26] The amount outstanding of operations by type of instrument as of end-December 1999, when there was a record-high amount outstanding of 46 trillion yen, was 21.5 trillion yen for purchases of TBs and FBs under repurchase agreements; 10.0 trillion yen for JGB repos; 9.5 trillion yen for purchases of CP under repurchase agreements; 3.1 trillion yen for outright purchases of bills; 1.9

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function of absorbing funds over the short-term. Purchases/sales transactions without such conditions are called outright purchases/sales.

Operation tools with high flexibility have an efficient security or collateral delivery system. For example, in purchase/sales of TBs and FBs under repurchase agreements, the whole process of the auction is carried out on line through the BOJ-NET (see note 31), in other words, involves no physical delivery. In the case of outright purchases of bills, eligible collateral——such as bills issued by companies with good financial performance——is entrusted to the Bank by the financial institutions in advance. Outright sales of bills issued by the Bank involve no exchange of collateral because the Bank itself is the issuer of the bills concerned.

[24] See note 13.

[25] Settlements for purchases of CP under repurchase agreements are not made at the 5:00 p.m. settlement time.

[26] Financing bills (FBs) are discounted bills issued by the government to raise short-term funds. Until March 1999, FBs were offered at a fixed discount rate below market interest rates. Therefore, private financial institutions rarely submitted bids and the Bank had been purchasing almost the entire amount issued. Since April 1999, however, public auction has, in principle, been used for the issuance of FBs. Since then, the FB market has been expanding rapidly.

trillion yen for outright purchases of TBs and FBs; and 0.5 trillion yen for outright purchases of bills backed by corporate debt obligations.

Maturity of transaction is specified in "principal terms and conditions" for each operation decided by the Policy Board. Specifically, maturity of transaction is six months or less for JGS operations such as purchases/sales of TBs and FBs under repurchase agreements and JGB repos, and three months or less for bills operations such as outright purchases of bills and outright sales of BOJ bills, purchases of CP under repurchase agreements, and outright purchases of bills backed by corporate debt obligations. Nevertheless, the maturity of JGS operations is not always longer than that for bill operations, because, in practice, maturities of each operation are determined taking into account market conditions and the market's view of future interest rate developments.

Table 2: Time of Regular Auction Offers for Market Operations

Time of offer	Type of settlement	Type of operation
9:20 a.m.	Same day settlement	Purchases/sales of TBs and FBs under repurchase agreements, outright purchases of bills, and outright sales of bills drawn by the Bank.
9:30 a.m.	Future day settlement	Borrowing of JGBs against cash collateral (JGB repos).
10:10 a.m.	Future day settlement	Purchases/sales of TBs and FBs, outright purchases of TBs and FBs, sales of CP under repurchase agreements, and outright purchases of JGBs.
12:10 p.m.	Same day settlement	Outright sales of bills issued by the Bank of Japan.
	Future day settlement	Outright purchases of bills, outright purchases of bills backed by corporate debt obligations, and outright sales of bills issued by the Bank of Japan.

2. Implementation of operations

At present, competitive yield auction is employed for all market operations carried out by the Bank. Offers are made at a specific time but separately for same-day-settlement operations and for future-day-settlement operations (see Table 2). News agencies are simultaneously notified of offers made to the counterparties, and through these news

agencies the information is spread to market participants.[27] The Bank fixes the offer time in order to facilitate smooth participation of the counterparties in the auctions. Of these offers, those for same-day-settlement operations offered at 9:20 a.m. attract most attention from the market. This is because the amount of funds provision for the day is usually finalized then.

However, even after offers are made at 9:20 a.m., the Bank carries out additional operations as needed if a large divergence of the overnight rate from the target level is anticipated because of unexpected developments. Such unexpected developments include (1) a surge in demand for funds settlement and the appearance of liquidity concerns, both of which could result in an unexpected upswing in funds needs, and (2) oversupply of funds, which could cause interest rates to decline.

After an auction is announced, the Bank receives bids and accepts them (conventional auction) to make sales/purchases of an intended amount. Successful bids are determined.[28] The whole process of the auction——from the receipt of bids to the acceptance of them——is completed in the fastest possible manner. As soon as successful bids are determined, the counterparties and the news agencies are notified of the results including the amounts of total bids and accepted bids, and the lowest and average rates of accepted bids. This information may sometimes affect interest rate developments in the market concerned. Auction results, however, rely completely on bids submitted and do not reflect the Bank's policy stance. As has been stressed repeatedly, various operations are carried out to appropriately guide the uncollateralized overnight call rate by conducting supply/absorption of funds. The operations, therefore, do not aim at controlling interest rates in the markets for TBs, FBs, and CP, or in any other markets in which the Bank conducts operations.

It is true that the Bank's operations are highly influential in the TB, FB, and CP markets because they account for a large share of the total transaction volume in these markets. The Bank's share expands especially when funds are provided to replenish deep

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[27] In December 1989, the Bank started sending, in real time, monetary adjustment information, such notification of offers and bid results, to six news agencies: Kyodo News; Bridge Information Systems, Inc.; Jiji Press, Ltd.; Bloomberg L.P.; Reuters Japan Ltd.; and QUICK Corp.

[28] The Bank conducts a conventional auction, accepting bids in the order that is most advantageous until the total of accepted bids reaches the intended amount. Transactions are made at the rate or price submitted by bidders.

funds shortage resulting from seasonal movements in banknotes in circulation and the treasury balance. In this situation, the market may suppose that the Bank is pushing down interest rates in the market concerned, but the sole purpose of the operation is to provide necessary funds. Fluctuation in the outstanding amount of short-term operations is peculiar to Japan since there are large seasonal swings in banknotes and the treasury balance. It is these seasonal factors that cause operations to be bigger or smaller than dealers had expected. In view of this, the Bank not only conducts market operations in such a manner as will achieve smooth adjustment of funds, but also takes care to avoid sending unintended signals to the market.

3. Selection of eligible operation counterparties

The Bank offers auctions for market operations to pre-selected bidders. Depending on the types of operations, offers are either made to all the pre-selected bidders or only to some. In the latter case, while certain bidders can participate in auctions every time, the rest takes turns to do so.[29]

In order to achieve more transparent monetary policy and increased accountability as stipulated in the new Bank of Japan Law (effective from April 1998), the Bank started to select bidders on a regular basis. Bidders are selected based on criteria that are determined by the Policy Board and are made public. Bidders are expected to bid actively on the Bank's offers, to expeditiously and accurately process transactions, and to provide market information or analysis useful to the Bank in implementing monetary policy.[30] To ensure that these expectations would be met, the Board set the following criteria:

(a) Bidders must hold current accounts at the Bank's head office.
(b) Bidders must be of adequate creditworthiness.
(c) Bidders must be on-line participants in the BOJ-NET.[31]
(d) Bidders must be active players in the market concerned.

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[29] To the rest, offers are made at intervals (in principle, once in every two auctions).

[30] Useful information and analysis include offer-bid rates, as well as regular reports on developments in the particular market.

[31] The BOJ-NET is the Bank of Japan Financial Network System. This is a system that connects financial institutions and the Bank on line. BOJ-NET participants can originate instructions from their terminals to make funds settlement via current accounts at the Bank, and to register or transfer JGSs; they can also submit bids in auction for market operations on line.

(e) For those who have previously been counterparties of the Bank's operations, the amount of successful bids in the past will be considered.

Since the selection of bidders for JGB repo operations in June 1998, bidders of various operations have been selected among applicants. Currently, for all types of operations, except for purchases/sales of bills (only offered to six *tanshi* companies), bidders are selected regularly (usually once a year) based on the announced criteria, and the result of the selection is made public.

Types of financial institutions vary according to the operation since bidders are selected taking into consideration how actively they participate in the market. Bidders are mainly securities companies for JGB-related operations, and banks for purchases of CP under repurchase agreements and outright purchases of bills backed by corporate debts (see Appendix 9).[32]

IV. Issues concerning Market Operations under the Zero Interest Rate Policy

The Bank adopted the so-called zero interest rate policy at a Monetary Policy Meeting held on February 12, 1999. Since then, the Bank has been providing ample funds in accordance with the policy guideline, "the Bank of Japan will flexibly provide ample funds and encourage the uncollateralized overnight call rate to move as low as possible." As a result, the overnight call rate has been moving stably at around 0.02-0.03 percent, a virtually zero interest rate.

To maintain the zero interest rate, the Bank has been providing massive funds exceeding the demand for required reserves by around 1 trillion yen each day. Consequently, notable changes have appeared in CABs. First, reserve holders have come to hold constantly a large amount of excess reserves. And second, non-reserve holders have come to hold constantly a vast amount of CABs. In the past, such excess reserves

[32] Some people mistakenly believe that the Bank is supplying funds through market operations only to banks, and argue that this will be fruitless given the decline in their function as financial intermediaries. This argument may have been true in the past when the Bank's main operation tools were Bank of Japan loans and bill operations. Currently, however, the counterparties of operations in the Bank's main operation tools, such as purchases of TBs/FBs under repurchase agreements, borrowing of JGBs against cash collateral, and outright purchases of TBs/FBs, are primarily securities companies, which participate in the auction on behalf of not only themselves but also their customers including institutional investors.

and non-reserve holders' CABs were negligible, and the average reserve balance during a reserve maintenance period was more or less equivalent to the period-average required reserves and to the period-average total CAB of both reserve and non-reserve holders.[33] However, since the introduction of the zero interest rate policy, with the expansion in the amount of excess reserves and non-reserve holders' CABs, the total CAB has always been larger than the reserve balance, which has always exceeded the amount of required reserves (see Table 3).

Table 3: Changes in the Amount of Required Reserves, Reserve Balance, and CABs

Billions of yen; period average

	April-September 1997	April-September 1999
Required reserves (A)	3,402.6	3,857.6
Excess reserves (B)	8.8	289.3
Reserve balance (A+B)	3,411.4	4,146.9
CABs held by non-reserve holders (C)	4.8	533.9
Total CAB (A+B+C)	3,416.2	4,680.8

This situation under the zero interest rate policy has led to some market participants misunderstanding the Bank's monetary policy stance and becoming suspicious about the reliability of market operations data released by the Bank. The following sections will explain these problems and clear up any confusion.

A. Perception of the Projected Daily Excess/Shortfall of Reserves as a Signal of the Policy Stance

The historically unprecedented zero interest rate policy attracted the attention of many market participants who did not use to pay much attention to the Bank's day-to-day market operations, such as participants outside the money market and those abroad. Consequently, due partly to a misapprehension concerning the role of the Bank's market operations, which is to achieve the guideline set by the Policy Board, the projected daily

[33] The CABs of non-reserve holders and excess reserves increased somewhat when anxiety about the financial system heightened from fall 1997 to end-1998, but the daily average of those was still less than 100 billion yen.

excess/shortfall of reserves, an unique feature of disclosure of information by the Bank, has been incorrectly perceived as indicating the extent of monetary easing by the Bank. In particular, the fact that the Bank has continued to provide ample funds of about 1 trillion yen in excess of the daily required reserves in order to maintain a virtually zero interest rate has led some market participants to think that a change in this projected reserve excess (so-called *Tsumi-Ue* in Japanese) would be some kind of policy signal.

However, as already discussed, changes in the amount of daily market operations or in the projected daily excess/shortfall of reserves cannot imply policy changes since the target for the uncollateralized overnight call rate is stipulated by the Bank's policy guideline. The only reason the Bank has continued to announce the projected daily excess/shortfall of reserves is for the market's convenience.

B. The Credibility of Market Operations Data

The Bank has projected the daily funds surplus/shortage, and has expressed the size of funds provision by means of the projected daily excess/shortfall of reserves——i.e., the difference between the projected reserve balance at the end of the day and the period average of remaining required reserves——on the basis of the following conditions, mentioned earlier: (1) the actual period average of reserves equals the period average of required reserves, i.e., no excess reserves are held by reserve holders; and (2) funds provided by the Bank are held only by reserve holders (see Chapter III, Section E, 4).

However, these conditions have not been met since the introduction of the zero interest rate policy. The Bank has been providing ample funds far exceeding the demand for required reserves in order to guide the uncollateralized overnight call rate to move at virtually zero percent. And thus, reserve holders have constantly held excess reserves, and a substantial proportion of funds provided through market operations have been held continuously by non-reserve holders, such as *tanshi* companies. As a result, the actual funds surplus/shortage has been differing significantly from the projections released in the late afternoon of the previous business day, and the actual reserve excess/shortfall has also been diverging widely from the projections announced at 9:20 a.m. each day (see Table 4). These discrepancies became larger particularly toward the end of December 1999, when the Bank injected an enormous amount of liquidity into the money market to accommodate increased precautionary demand for funds in the face of concern over the Year 2000

problem. Some have misunderstood the cause of the discrepancies and concluded that the accuracy of the Bank's projections had deteriorated or that the Bank had not been providing enough funds in the market.

In fact, however, the background to these phenomena is as follows.

First, regarding the funds surplus/shortage, the projection considers the total of excess reserves and non-reserve holders' CABs that existed at the end of the previous day to be a funds-surplus factor under "treasury funds and others." This is based on the assumption that all of these excess funds will be made available to reserve holders who are in the market that day to accumulate required reserves.[34] In reality, however, since there is always ample liquidity in the market, these funds often remain in the accounts of reserve holders as excess reserves and in the accounts of non-reserve holders.

Second, regarding the daily excess/shortfall of reserves, the projection assumes that the funds provided by the Bank through market operations will be held by reserve holders who have not yet satisfied reserve requirements, as in the above case. In fact, however, most of the funds provided by the Bank end up being held as excess reserves by reserve holders or in the current accounts of non-reserve holders (see Appendix 10).

Table 4: Difference between Projected and Actual Funds Surplus/Shortage[1]

Billions of yen; daily averages of the reserve maintenance period[2]

	November 1999 period	December 1999 period
Funds surplus/shortage		
Projected (a)	580	8,110
Actual (b)	-320	-360
Difference (a-b)	**900**	**8,470**
Daily excess/shortfall of reserves		
Projected (c)	1,020	10,700
Actual (d)	-10	860
Difference (c-d)	**1,030**	**9,840**

Notes: 1. Minus denotes shortage/shortfall.
2. Reserve maintenance period is one month, from the 16th of the month to the 15th of the following month.

[34] Funds in the current accounts at the Bank bear no interest. It is therefore assumed that both of (1) reserve holders who happened to hold excess reserves and (2) non-reserve holders who held current account balances at the end of business hours would make these funds available to reserve holders the following day to earn interest.

Thus, the difference between the projected and the realized funds surplus/shortage and reserve excess/shortfall arises from a technical matter, the current formula for the funds-table. It is not true that the accuracy of the Bank's projections has deteriorated since the introduction of the zero interest rate policy. When the projected and the realized funds surplus/shortage are compared excluding the excess reserves of reserve holders and the CABs of non-reserve holders——that is, only on the basis of changes in banknotes and the treasury balance——the difference between the two has been around 100 billion yen on average and has not changed much since the introduction of the zero interest rate policy (see Table 5).

Table 5: The Daily Average of Differences between the Projected Funds Surplus/Shortage (Excluding the Effect of Excess Reserves and Non-Reserve Holders' CABs) and the Actual Result

Billions of yen

	March-November 1998	March-November 1999
Differences resulted from:		
Banknote factors	35	29
Treasury funds factors	74	94

The fact that a projected reserve excess of as large as 1 trillion yen has actually resulted in a small excess or even a shortfall is not because the Bank has failed to provide enough funds in the money market but because most of the funds provided through market operations have been held by reserve holders which had already satisfied their reserve requirements and by non-reserve holders. Total CAB, including excess reserves of reserve holders and CABs of non-reserve holders, shows that, on most days, the Bank has been providing more than 1 trillion yen in excess of the daily average of remaining required reserves amounting to 3-4 trillion yen. Further, even when reserves fell short of the average remaining required reserves, the overnight call rate did not rise at all, and this is verification of the fact that the Bank has been providing sufficient funds in the market and that participants have been aware of this (see Appendix 11).

C. Drop in Remaining Required Reserves due to the Bank's Continued Provision of Ample Funds in the Market

The daily excess/shortfall of reserves is a variable figure indicating the difference at the end of the day between the reserve balance and the daily average of remaining required reserves. If the Bank conducted market operations to create a large reserve excess each day and those funds were held by reserve holders who have not yet satisfied reserve requirements as required reserves, the remaining required reserves would decrease rapidly. In other words, if the Bank continued to provide 1 trillion yen in excess of the average daily remaining required reserves every day, and if such funds provision was effective in satisfying reserve requirements, the amount of required reserves would become so small that the extra 1 trillion yen provided by the Bank might not be enough to meet the demand for funds settlement.

Table 6: Relationship between the Reserve Excess, the Remaining Required Reserves, and the Reserve Balance[1]

Trillions of yen

The daily reserve excess		Day 1	Day 15	Day 20	Day 30
1.0	Remaining required reserves (daily average)	4.0	3.3	2.9	0.0
	Reserve balance	5.0	4.3	3.9	1.0
2.0	Remaining required reserves (daily average)	4.0	2.6	1.9	0.0
	Reserve balance	6.0	4.6	3.9	2.0
3.0	Remaining required reserves (daily average)	4.0	2.0	0.8	0.0
	Reserve balance	7.0	5.0	3.8	3.0

Note: 1. Based on the assumption that the period-average required reserves are 4 trillion yen and the reserve maintenance period consists of 30 days.

Let us assume that (1) the Bank creates a reserve excess of 1 trillion yen each day; and (2) the funds are held by reserve holders who have not yet satisfied reserve requirements as required reserves, and not by non-reserve holders (see Table 6). If the reserve balance is 5 trillion yen on the first day of the reserve maintenance period, the daily

average of remaining required reserves will be 2.9 trillion yen on the 20th day and the reserve balance will be 3.9 trillion yen. On the 30th day, the remaining required reserves will be zero and the reserve balance will be 1 trillion yen. In this case, the uncollateralized overnight call rate may rise since the reserve balance of 1 trillion yen is not sufficient to cover the demand for funds settlement. Then the Bank might have to conduct market operations to increase the reserve balance to a larger level, for example 3 trillion yen, resulting in the reserve excess expanding to 3 trillion yen. However, such a large increase in the reserve excess might cause some market participants to mistakenly believe that the Bank had eased monetary policy.

Although the above problem had existed since the introduction of the zero interest rate policy, it did not come to the fore. This was because most of the massive funds provided by the Bank were held by non-reserve holders and by reserve holders who had already satisfied their reserve requirements, and thus the pace of reserve accumulation remained slow. However, the problem surfaced in the December 1999 reserve maintenance period (December 16, 1999 to January 15, 2000). When the Bank conducted market operations at the end of the year to accommodate a surge in financial institutions' demand for liquidity reflecting concerns about the Year 2000 problem, it provided funds to create a reserve excess of 22.6 trillion yen, which was to remain in current accounts over the five days from December 30, 1999 through January 3, 2000 because of the new year and bank holidays. As a result, the amount of remaining required reserves used in the calculation of the daily excess/shortfall of reserves became zero as of the morning announcement of the Bank's market operations on December 30, 1999.[35] This caused some confusion in the market as some participants were unable to figure out the accurate amount of the reserve excess, and some even thought that the Bank's policy stance had changed.

Specifically, the market was puzzled about how to calculate the reserve excess when the amount of remaining required reserves was zero. The Bank received many inquiries about its projected reserve excess/shortfall, and there were some incorrect reports

[35] The daily excess/shortfall of reserves is the difference between the reserve balance at the end of the day and the daily average of remaining required reserves. Thus, in theory, when the remaining required reserves become zero, all of the Bank's provision of CABs——which is assumed to equal the day's reserve balance——will be the reserve excess/shortfall.

in the media on the figures.

Also, when concerns about the Year 2000 problem seemed to have abated at the beginning of 2000, the Bank started to absorb the excessive liquidity that had been provided toward the end of 1999. Some foreign exchange market participants saw that the Bank's pace of absorption was slow compared to major central banks overseas, and wrongly thought that this might indicate a shift in the Bank's policy to a new framework of quantitative easing or that the Bank might be intending to push the yen down. It is true that the Bank took a relatively long time to absorb funds after the turn of the year compared to major central banks overseas, but this was because the Bank had provided an exceptionally large amount of funds in the market. The impression that the Bank was slow to drain these funds might mainly stem from the fact that the daily reserve excess through January 15, 2000 stayed fairly larger than before. This larger-than-usual reserve excess, however, was a technical result reflecting the fact that the daily average of remaining required reserves, usually about 4 trillion yen, had been zero since the end of 1999.

D. Under-Subscription in Market Operations

Because the Bank has provided massive funds that exceed the daily average of remaining required reserves by about 1 trillion yen each day, confidence about the availability of liquidity has strengthened among financial institutions. This, together with weak credit demand of firms and households, considerably dampened the fund-raising demand of private banks. Under these circumstances, cases of under-subscription, in the auctions for market operations, where bids from financial institutions do not reach the amount offered by the Bank, were often observed in market operations such as bill purchasing operations from June to September 1999 (see Table 7). This phenomenon can be considered as evidence that the Bank has been providing funds to the greatest possible extent.

Under-subscription did not occur from October 1999 to January 2000, when anxiety over liquidity risk heightened reflecting concerns about the Year 2000 problem. Toward the end of 1999, when demand for excess liquidity peaked among private financial institutions, the Bank provided the largest ever CAB of more than 20 trillion yen in excess of the daily average of remaining required reserves, and a series of the auctions for providing such massive liquidity was fully subscribed. This shows that the Bank intends

actively to provide ample funds whenever needed under the current monetary policy, and is able to do that as long as demand for liquidity exists. However, since the end of January 2000, after concerns about the Year 2000 problem abated, demand for liquidity has contracted significantly again, and there has been under-subscription in future-day-settlement operations. Even under these conditions, the uncollateralized overnight call rate has been moving stably at around 0.02-0.03 percent.

Table 7: The Number of Cases of Under-Subscription in Market Operations

Number of cases

	Bill purchases	Purchases of bills backed by corporate debt obligations	CP purchases with repurchase agreements	TB/FB purchases with repurchase agreements	JGB borrowing against cash collateral
June-September 1999	9	1	1	1	—
January-February 2000[1]	—	1	—	5	1

Note: 1. The numbers are up to and including February 10, 2000.

V. Changes regarding Market Operations Data

A. Enhancing the Transparency of Market Operations

As mentioned in the previous section, we have received questions regarding the Bank's market operations since the implementation of the zero interest rate policy. As explained above, daily market operations are conducted in accordance with the guideline decided by the Policy Board at Monetary Policy Meetings. Based on the guideline, the Bank has been providing ample funds in the market, and as a result, the uncollateralized overnight call rate has been stable at virtually zero percent. The Bank's market operations have thus been effective in guiding the rate. Nevertheless, some market participants have a misunderstanding of and questions about the market operations as described in the previous chapter. This seems to suggest unclearness and complexity in market operations.

The Bank has been working to enhance the transparency of its market operations. It has provided as much information as possible: for example, (1) daily release of projected

and realized funds surplus/shortage in the money market, (2) immediate release of auction results, and (3) disclosure of the criteria for selecting counterparties for market operations. Further, considering the fact that funds have been accumulating constantly in the accounts of non-reserve holders since the implementation of the zero interest rate policy, the Bank began in April 1999 to release the daily total CAB. This was to allow market participants to easily grasp the CABs of non-reserve holders by comparing the balances with reserve deposits.

However, in a situation where excess reserves of reserve holders and CABs of non-reserve holders are at a constantly high level, the method of measuring the size of funds injected into the market based solely on the demand for required reserves has become impractical. One can confirm that projections are close to the realized daily funds surplus/shortage and reserve excess/shortfall if CABs of non-reserve holders and excess reserves are subtracted from the figures. However, such calculation is extremely complex and difficult.

Further, the precondition that demand for required reserves exceeds the amount necessary for funds settlement will not always be valid after the introduction of the real-time gross settlement (RTGS) system. This reinforces the need to devise a new way of disclosing information on market operations and the underlying funds surplus/shortage so that the diverse activities of market participants and developments in the financial market as a whole are more accurately described. Needless to say, the new way should reduce to a minimum the difference between the Bank's projections and the actual results.

B. Changes to the Table for "Supply and Demand of Funds and Market Operations" and the Discontinuation of Announcement of the Projected Reserve Excess/Shortfall

On February 14, 1999, the Bank announced that it would change the formula for the "Supply and Demand of Funds and Market Operations" table (the funds-table), and stop announcing the projected reserve excess/shortfall, both of which had been released daily by the Bank's Financial Markets Department (the changes became effective on March 16). These changes are aimed at enhancing the Bank's transparency in relation to market operations by providing relevant information in a more appropriate and easily understandable way. The outline of the changes are as provided below (for details, see

Appendix 12).

1. Changes in the formula for the funds-table

The funds-table has been changed as follows:

Current formula: funds surplus/shortage + funds provided/absorbed through market operations = changes in required and excess reserves of reserve holders (see Attachment 2 to Appendix 12).

New formula: funds surplus/shortage + funds provided/absorbed through market operations = changes in CABs (see Attachment 3 to Appendix 12).[36]

By changing the formula for the funds-table as above, the problem of continuing large differences between projected and realized fund surplus/shortage can be avoided, because CABs include those held by non-reserve holders in addition to reserves held by reserve holders.

2. Discontinuation of announcing the projected reserve excess/shortfall

The Bank has discontinued announcement of the projected reserve excess/shortfall. The announcement was usually made at 9:20 in the morning, when money market operations for the day are announced. Instead, it announces the projection of the daily increase/decrease in CABs including the effect of market operations during the day.

An example of the new announcement is as follows:

"The Bank will provide (absorb) XX billion yen through purchases (sales) of TBs and FBs under repurchase agreements today. As a result, it projects that current account balances at the Bank will increase (decrease) by YY billion yen compared to those on the previous day."

As mentioned in (1) above, funds provided through market operations are all reflected in CABs. Therefore, the projection of the daily increase/decrease in CABs will not diverge widely and constantly from the actual results. It should be stressed once again that the guideline for market operations is decided at Monetary Policy Meetings of the Bank's Policy Board, and that daily market operations are implemented accordingly. Therefore, the projected daily increase/decrease in CABs, which replaced the projected

[36] CABs (current account balances) = amount outstanding of both required and excess reserves held by reserve holders + amount outstanding of current account balances held by non-reserve holders.

reserve excess/shortfall on March 16, should be seen as a mere reference for measuring the size of funds provision through market operations.

VI. Conclusion

The function of market operations is to guide the target interest rate by smoothly providing and absorbing funds in the market. The Bank has been expanding and improving market operation tools to strengthen this function. To enhance the transparency of the operations, the Bank has made increased use of the market mechanism——for example, changing bidding systems from limit order to public auction and introducing a public scheme for selecting operation counterparties——and has disclosed more information on market operations (Appendix 13).

Due to technological innovation, deregulation, and globalization of financial transactions, the environment surrounding market operations——i.e., methods of financial transactions, channels for exchanging trading information, and the infrastructure for trading and settlement——is constantly changing. Since the Bank conducts market operations via transactions in the market, the framework and the techniques of the operations must develop in line with such structural changes. The Bank will thus continue to work to provide more information on market operations in such a way that it can be understood easily, and further improve market operation tools as well as increase the efficiency of related business in order to carry out market operations smoothly.

Box 1: Reasons behind Large Fluctuations in Banknotes in Circulation and the Treasury Balance

Large fluctuations in banknotes in circulation and the treasury balance can be explained as follows.

A. Banknotes in Circulation

In Japan, the amount of banknotes in circulation is extremely large relative to the size of the economy. For example, the size of Japan's economy is about half that of the United States, while the amount of banknotes in circulation is almost equal. As of the end of 1998, the amount was 55.9 trillion yen in Japan and 51.8 trillion yen in the United States (see Appendix 6). This difference occurs partly because checks are rarely used for payment by individuals and also because credit cards are less common in Japan than in the United States. More use of banknotes leads to larger daily and seasonal fluctuations. For example, issuance of banknotes increases reflecting spending needs in specific periods of the year: in late December before the new year; in March before the new fiscal year; and before the Golden Week, a holiday period around the end of April to the beginning of May. On the other hand, more banknotes are withdrawn from circulation after the above periods because they flow back into private financial institutions. An increase in issuance of banknotes is also regularly observed toward the end of the month or the week and an increase in withdrawal from circulation around the beginning of the month or the week.

B. Treasury Balance

Fluctuations in the treasury balance are larger than in banknotes (see Appendix 5). This is because (1) treasury funds are paid and received by the government solely through its account at the Bank, (2) the days of payment (for example, of pensions) and receipt (for example, of taxes) of treasury funds are fixed for each government agency, (3) for the sake of efficient business operations, payment and receipt of treasury funds are not frequent. For example, corporate income tax is received by the government twice a year for each semiannual business period, and pensions are paid out six times a year.[1]

[1] In the United States, part of Treasury funds settlement is carried out through Treasury Tax and Loan Accounts held at private banks. Payment and receipt of Treasury funds on different dates are therefore offset in these accounts. Nevertheless, the amount of funds that private banks can hold in these accounts is limited to the amount of eligible collateral submitted by each bank.

Box 2: Calculation of "Daily Excess/Shortfall of Reserves"

"Daily excess/shortfall of reserves" = the overall reserve balance including same-day-settlement operations on Day N (RE) – period-average remaining required reserves for Day (N+1) (RR).

RE = the overall reserve balance on Day (N-1) + projected funds surplus/shortage on Day N + overall amount of funds supplied/absorbed through market operations on Day N (OMO).

RR = (cumulative total of remaining required reserves after Day N - RE)/number of days left in the maintenance period after Day N.

OMO = amount of settlement on Day N resulting from operations already conducted + amount of operations that were offered as future-day-settlement operations before Day N and starts on Day N + amount of same-day-settlement operations on Day N.

Where

reserve demand (RD) ≈ RR,

reserve supply (RS) ≈ RE,

then

creation of an excess in reserves (RE>RR) would result in RS>RD, and

creation of a shortfall in reserves (RE<RR) would result in RS<RD.

Appendix 1: An Example of the "Directive"

January 17, 2000
Bank of Japan

At the Monetary Policy Meeting held today, the Bank of Japan decided, by majority vote, to maintain its "zero interest rate policy" to assure permeation of the effects of monetary easing.

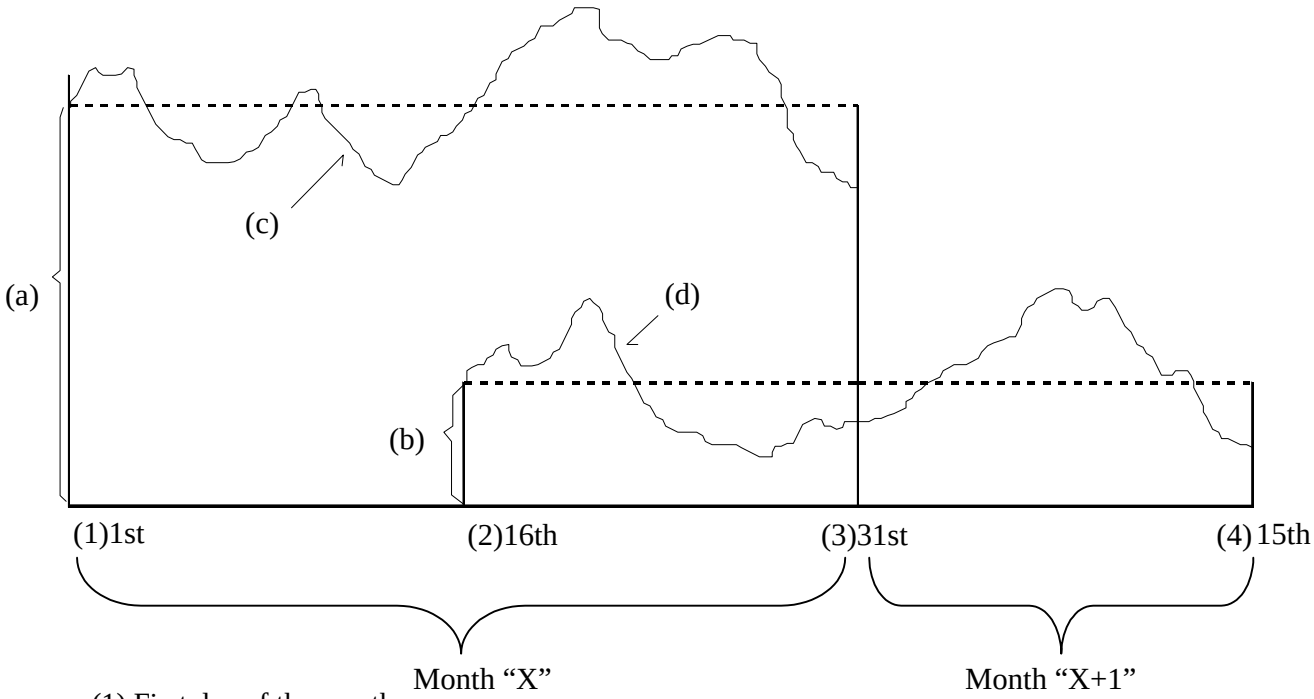
The guideline for money market operations in the inter-meeting period ahead is as follows:

> The Bank of Japan will flexibly provide ample funds and encourage the uncollateralized overnight call rate to move as low as possible.

Appendix 2: Outline of the Reserve Requirement System

A. The Reserve Requirement System

In accordance with the "Law Concerning the Reserve Deposit Requirement System," the reserve requirement system was introduced in 1957, and the reserve requirement ratios were first set in September 1959. Financial institutions subject to this system ("reserve holders") are obliged to hold required reserves calculated using the reserve ratios, by depositing funds in their current accounts at the Bank of Japan for no interest. This amount is determined by the size of deposits and other reservable liabilities in the starting month of the reserve maintenance period. Over a maintenance period from the 16th of a month to the 15th of the next, reserve holders must accumulate reserves so that their cumulative total (i.e., daily balances times the number of days for the period) equals or exceeds the required amount (i.e., period-averages to be held times the number of days for the period).



(1) First day of the month
(2) 16th of the month
(3) Last day of the month
(4) 15th of the following month
(1)-(3) Computation period
(2)-(4) Reserve maintenance period

(a) Average balance of reservable liabilities in the computation period

(b) Average reserve balance to be held in the reserve maintenance period: equal to or larger than (a) times the reserve requirement ratio

(c) Daily balance of reservable liabilities

(d) Daily reserve balance

B. The Current Reserve Requirement Ratios

(1) Reserve ratios on deposits

%

Banks, long-term credit banks, *shinkin* banks (with deposit balance exceeding 160 billion yen)			
	Deposits outstanding	Time deposits (includes certificates of deposit)	Other deposits
	More than 2.5 trillion yen	1.2	1.3
	More than 1.2 trillion yen to 2.5 trillion yen	0.9	1.3
	More than 500 billion yen to 1.2 trillion yen	0.05	0.8
	More than 50 billion yen to 500 billion yen	0.05	0.1
The Norinchukin Bank		0.05	0.1

(2) Reserve ratio on debentures outstanding: 0.1%

(3) Reserve ratio on principal of money in trust (includes loan trusts): 0.1%

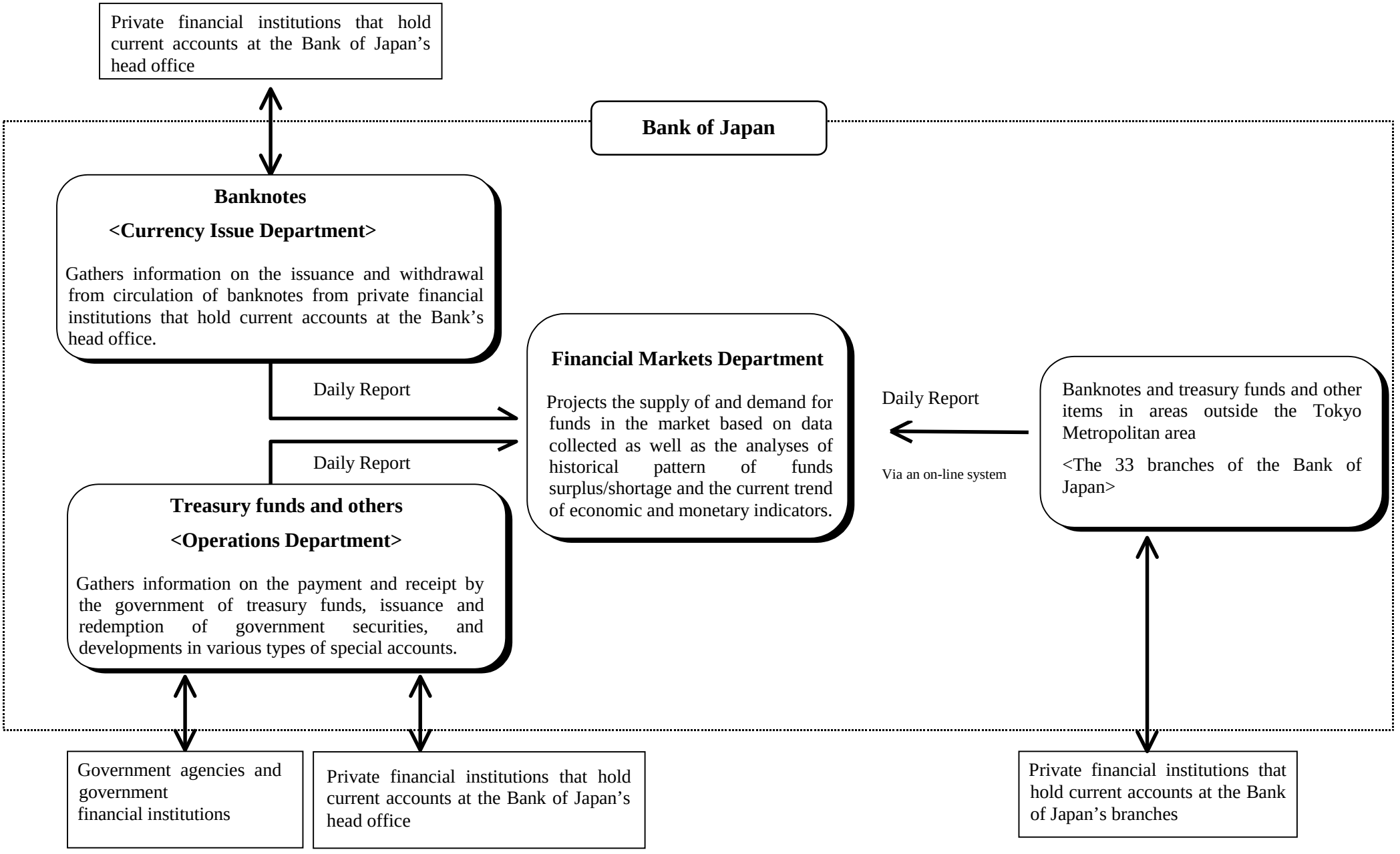
(4) Reserve ratio on foreign currency liabilities against nonresidents (excludes those in the Special International Financial Transaction Account): 0.15%

(5) Reserve ratios on the residents' foreign currency deposits (excludes those in the Special International Financial Transaction Account): 0.2% for time deposits; 0.25% for other deposits

(6) Reserve ratio on liabilities in nonresidents' yen accounts (excludes those in the Special International Financial Transaction Account): 0.15%

(7) Reserve ratio on funds transferred from the Special International Financial Transaction Account to other accounts: 0.15%

Appendix 3: Forecasting Factors Affecting CABs



Appendix 4: Supply and Demand of Funds and Market Operations for Jan. 17 (Mon.)[1]

Financial Markets Dept.
Bank of Japan

(100 million yen)

		Projections	Results (preliminary)	Results (final)
Banknotes (Minus: net issuance)		5,800	5,500	5,522
Treasury funds and others (Minus: net receipt of funds)		23,500	15,200	15,139
Excess/shortage of funds (Minus: shortage)		29,300	20,700	20,661
BOJ Credit	Loans		1,500	1,504
	Outright purchases of bills	-3,000	-3,000	-3,003
	Outright sales of bills drawn by BOJ	-3,800 7,000	-5,000 (S) <start at 5:00pm> -4,200 (S) -3,800 7,000	-5,002 (S) <start at 5:00pm> -4,162 (S) -3,808 7,003
	Purchases of CP under repurchase agreements			
	Purchases of TBs/FBs under repurchases agreements	4,000 -6,000	4,000 -6,000	4,000 -6,005
	Sales of TBs/FBs under repurchase agreements	-6,000	-6,000 (S) -6,000	-6,003 (S) -6,005
	Outright purchases of TBs/FBs			
	Outright sales of TBs/FBs			
	Borrowing of JGBs against cash collateral (JGB repos)			
	Purchases of JGBs under repurchase agreements			
	Outright purchases of JGBs			
	Subtotal		-21,500	-21,481
Net changes in reserves			-800	-800
Reserve balances			44,700	44,700
	Excess/shortfall of remaining required reserve balances		-1,300	-1,300
	Daily average of remaining required reserve balances		39,100	39,100
(Reference) Current account balances (amounts outstanding)[2]			53,500	53,500

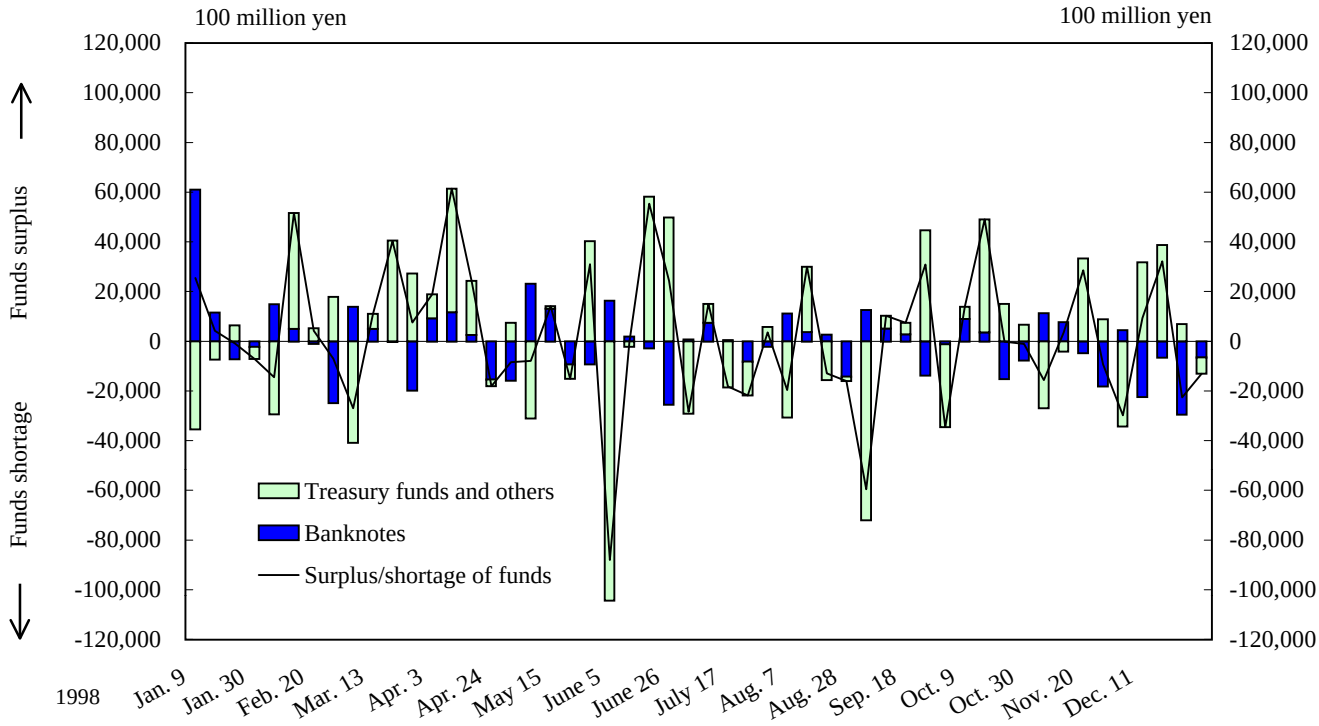
Notes:

1. Figures of projections and preliminary results are rounded off to 10 billions. As for figures of reserve balances and current account balances, final results are also rounded numbers. Projections for Market Operations include only those offered prior to the compilation of this report. Same-day-start operations are marked with an "S." Operations are settled at 3:00 p.m. unless otherwise indicated as "1:00 p.m." or "5:00 p.m."

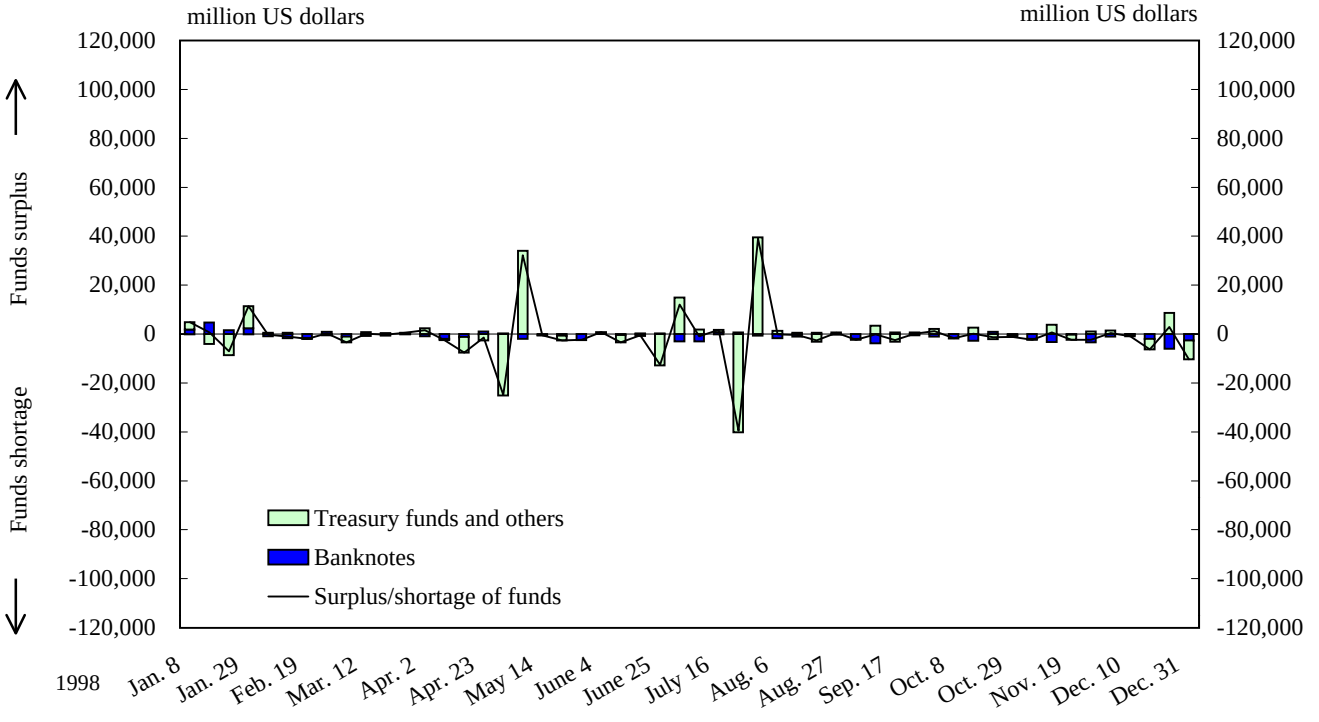
2. The total of the current account deposits with the BOJ held by financial institutions (excluding accounts held by government financial institutions). Reserves are included in this.

Appendix 5: Fluctuations in Supply and Demand of Funds

Japan



The United States[1]



Note: 1. Assuming 1 US dollar = 100 yen, 1 million US dollar equals 100million yen.
The vertical scales of the charts are the same, and thus both charts are comparable.

Appendix 6: Banknotes in Circulation in Japan, the United States, and the Euro Area[1]

		Japan		United States		Euro area	
		100 million yen	%; ratio to nominal GDP	million dollars	%; ratio to nominal GDP	million euro	%; ratio to nominal GDP
1998	Dec.	558,648	11.2	518,257	5.9		
1999	Jan.	506,424	10.2	506,835	5.8	326,534	5.6
	Feb.	512,528	10.3	512,771	5.9	325,207	5.5
	Mar.	512,866	10.3	516,067	5.9	327,128	5.6
	Apr.	529,324	10.6	520,644	5.9	332,280	5.7
	May	508,431	10.2	526,353	6.0	335,147	5.7
	June	523,026	10.5	528,923	6.0	337,877	5.8
	July	521,355	10.5	534,465	6.1	345,768	5.9
	Aug.	514,103	10.3	537,160	6.1	340,626	5.8
	Sep.	513,885	10.3	544,082	6.2	340,327	5.8
	Oct.	522,150	10.5	555,448	6.3	343,584	5.9
	Nov.	528,369	10.6	578,547	6.6	343,342	5.9
	Dec.[2]	654,048 <+125,679>	13.1 <+2.5>	628,357 <+49,810>	7.2 <+0.6>	374,953 <+31,611>	6.4 <+0.5>
1999 [3]		528,876	10.6	540,804	6.2	339,398	5.8
Jan. to Nov. 1999[3],[4]		517,496	10.4	532,845	6.1	336,165	5.7
(Reference) Nominal GDP for 1998		4,984,993	—	8,759,900	—	5,863,800	—

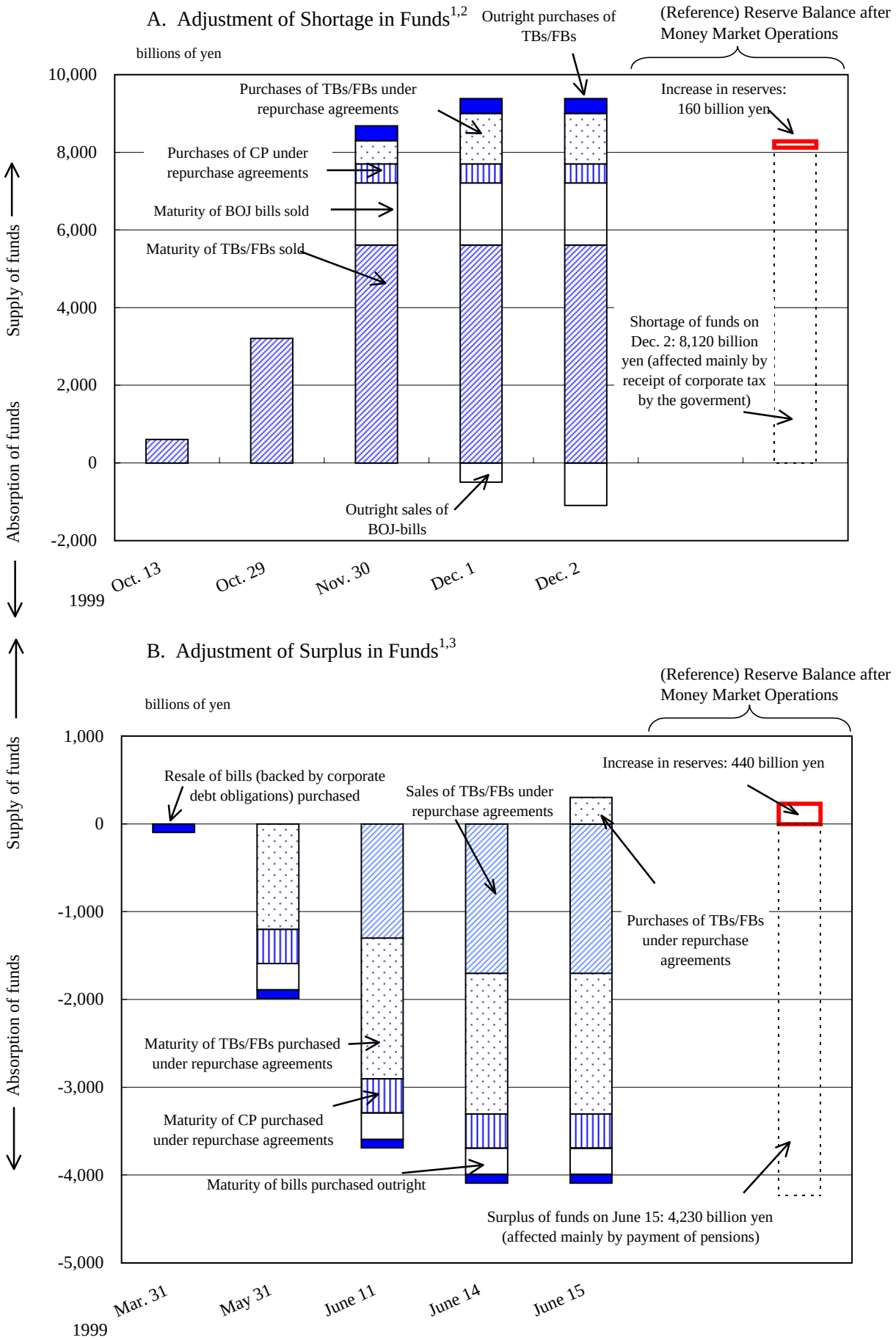
Notes:

1. Amount outstanding as of the end of the month for Japan, the last Wednesday of the month for the United States, and the last Friday of the month for the euro area.
   For December 1999, however, data are the amounts as of the 29th and the 31st for the United States and the euro area, respectively.
   If 1 US dollar is assumed equivalent to 1 euro and 100 yen——i.e., if 1 million US dollars are assumed equivalent to 1 million euros and 100 thousand yen——figures are comparable without an adjustment in exchange rates.

2. Figures in triangle brackets are changes from a month earlier.
3. Arithmetic average of end-month figures.
4. As figures for December 1999 are affected by concerns over the Year 2000 problem, the monthly averages for January-November 1999 are shown for reference.

Appendix 7: Short-Term Adjustment of Funds Surplus/Shortage

Funds-injecting operations (funds-draining operations) also work as funds draining (funds-injecting) instruments at their maturity dates. Taking advantage of such characteristics, the Bank deals with a massive funds shortage (surplus) on a day by setting maturity of several funds-draining (funds-injecting) operations on that day, as well as by starting funds-injecting (funds-draining) operations.



Notes: 1. Dates on the horizontal axis are the starting days of the operations.
2. The maturity date of the operations was December 2.
3. The maturity date of the operations was June 15.

Appendix 8: Tools of Market Operation[1]

Purpose of operation	Tools	Type of transaction	Start Day (T: day of offering)	Time of settlement		Maturity of operation	Counterparties (Number of counterparties)	Amount outstanding (1 trillions of yen)[2]	Largest amount outstanding since fiscal 1998 (1 trillions of yen)[2]
				Day of the start	Due date				
Supply of funds	Purchases of bills (excluding those backed by corporate debt obligations)	Outright transactions with pre-fixed maturity date on bills	From T + 0 to T + 4	Bill and check clearing time[3] or 3:00 p.m.	3:00 p.m.	Three months or less	*Tanshi* companies (6) (Banks and other institutions participate indirectly)	2.5	6.1 (Dec. 30, 1998)
	Purchases of bills backed by corporate debts		T + 2	3:00 p.m.	3:00 p.m.		Includes banks and securities firms (20)	0.4	0.5 (Nov. 18, 1999)
	Purchases of CP under repurchase agreements	Under repurchase agreements	T + 2	Bill and check clearing time[3] or 3:00 p.m.	Bill and check clearing time[3]		Includes banks, securities firms, and *tanshi* companies (35)	6.6	9.5 (Dec. 10, 1999)
	Purchases of TBs/FBs under repurchase agreements		From T + 0 to T + 2	3:00 p.m.	3:00 p.m.	Six months or less	Includes banks, securities firms, and *tanshi* companies (50)	19.4	21.5 (Dec. 30, 1999)
	Outright purchases of TBs/FBs	Outright transactions	T + 3	3:00 p.m.	——	——		0.8	1.9 (Dec. 22, 1999)
	Borrowing of JGBs against cash collateral (JGB repos)	Transaction similar to repurchase agreements (Borrowing of securities)	T + 2	3:00 p.m.	3:00 p.m.	Six months or less	Includes banks, securities firms, and *tanshi* companies (35)	8.1	10.0 (Dec. 30, 1999)
	Outright purchases of JGBs	Outright transactions	T + 3	3:00 p.m.	——	——	Includes banks and securities firms (40)	Amount outstanding as of end-Sep. 1999: 427.7 [5]	

Absorption of funds	Sales of bills issued by the Bank of Japan	Outright transactions with pre-fixed maturity date on bills	From T + 0 To T + 4	3:00 p.m. or the final settlement time[4]	Bill and check clearing time[3] or 3:00 p.m.	Three months or less	*Tanshi* companies (6) (Banks and other financial institutions participate indirectly)	6.7	23.2 (Dec. 21, 1998)
	Sales of TBs/FBs under repurchase agreements	Under repurchase agreements	From T + 0 To T + 2	3:00 p.m.	3:00 p.m.	Six months or less	Counterparties same as for purchases of TBs/FBs under repurchase agreements and outright purchases of TBs/FBs	4.0	10.7 (Aug. 19, 1999)
	Outright sales of TBs/FBs	Outright transactions	T + 3	3:00 p.m.	——	——		——	——

Notes:
1. Data are as of the end of January 2000.
2. No data exist for outright sales of TBs/FBs because this operation has been used only from February 1, 2000.
3. Bill and check clearing time is usually around 1:00 p.m.
4. Final settlement time is usually around 5:00 p.m.
5. The figure is the total of the following: (1) 10-year interest-bearing JGBs; (2) 20-year interest-bearing JGBs; and (3) long-term JGBs sold under a repurchase agreement. Data are taken from the Bank's "Schedule for Financial Statements for the First Half of the 115th Fiscal Period."

Appendix 9: Counterparties in Money Market Operations

	Number of counterparties Total		Banks		Securities companies		Others[1]	
		% in share		% in share		% in share		% in share
Total[2]	192	100.0	79	41.1	82	42.7	31	16.1
Bill operations[2]	67	100.0	37	55.2	12	17.9	18	26.9
Outright purchases of bills (excluding those backed by corporate debts)	6	100.0	0	0.0	0	0.0	6	100.0
Outright sales of bills	6	100.0	0	0.0	0	0.0	6	100.0
Outright purchases of bills (backed by corporate debts)	20	100.0	19	95.0	1	5.0	0	0.0
Purchases of CP under repurchases agreements	35	100.0	18	51.4	11	31.4	6	17.1
JGB operations[2]	125	100.0	42	33.6	70	56.0	13	10.4
Outright purchasing/sales of TBs and FBs[3]	50	100.0	19	38.0	25	50.0	6	12.0
Borrowing of JGBs against cash collateral	35	100.0	11	31.4	17	48.6	7	20.0
Outright purchases of JGBs	40	100.0	12	30.0	28	70.0	0	0.0

Notes:

1. “Others” refer to *tanshi* companies (money market broker-cum-dealers) and securities finance companies.

2. Totals and subtotals are the sum of each figure, meaning some financial institutions are double-counted.

3. Counterparties are the same for purchases/sales of TBs and FBs under repurchase agreements.

Appendix 10: Difference between the Projected Daily Excess/Shortfall of Reserves and Actual Result

billions of yen

Reserve balance at the end of the previous day	A	4,000
Remaining required reserves (amount per day)	B	4,000

		Projection
Funds surplus/shortage for the day	C=D+E	800
Banknotes	D	400
Treasury funds and others	E	400
Bank of Japan credit (market operations and loans)	F	200
Change in the reserve balance from the previous day at close of business	G=C+F	1,000

A total of excess reserves held by reserve holders and current account balances held by non-reserve holders:700

		Projection	Actual result
Reserve balance at the end of the day	H=A+G	5,000	4,300
Remaining required reserves from the following day (amount per day)	I	3,965.5	3,989.7
Reserve excess/shortfall	J=H-I	+1,034.5	+310.3

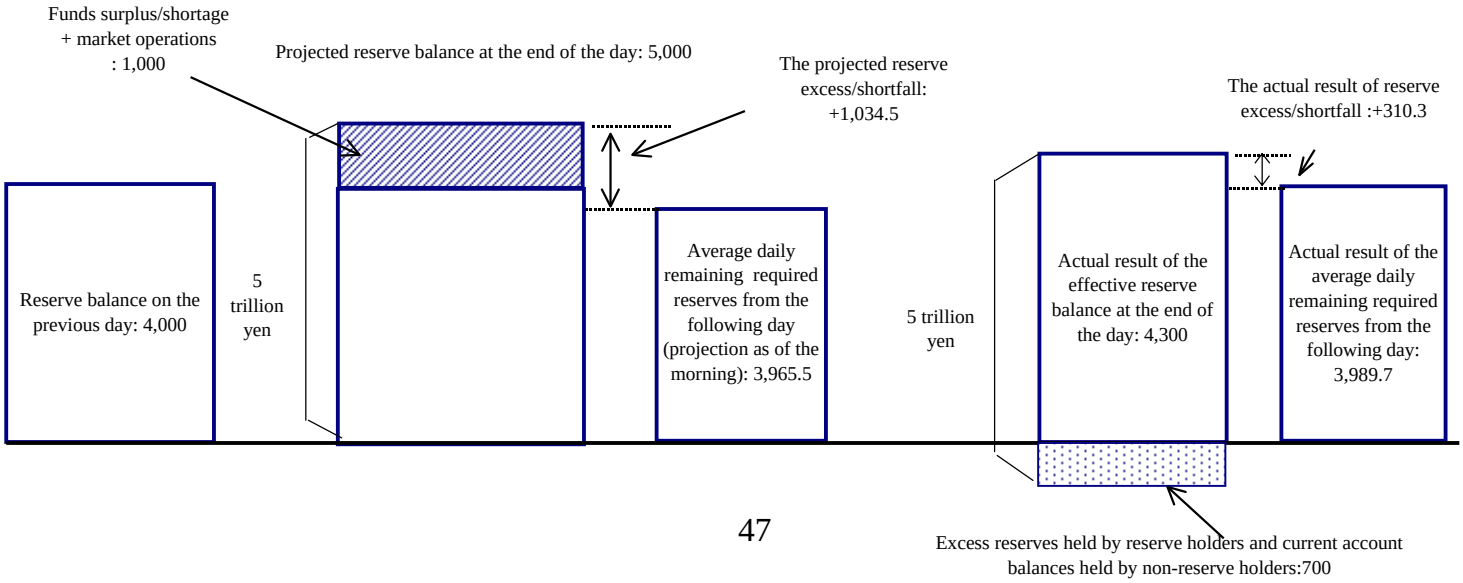
= (B×K-H×L) /M
= (4,000×30 days-5,000×1 day) /29 days

= (B×K-H×L) /M
= (4,000×30 days-4,300×1 day) /29 days

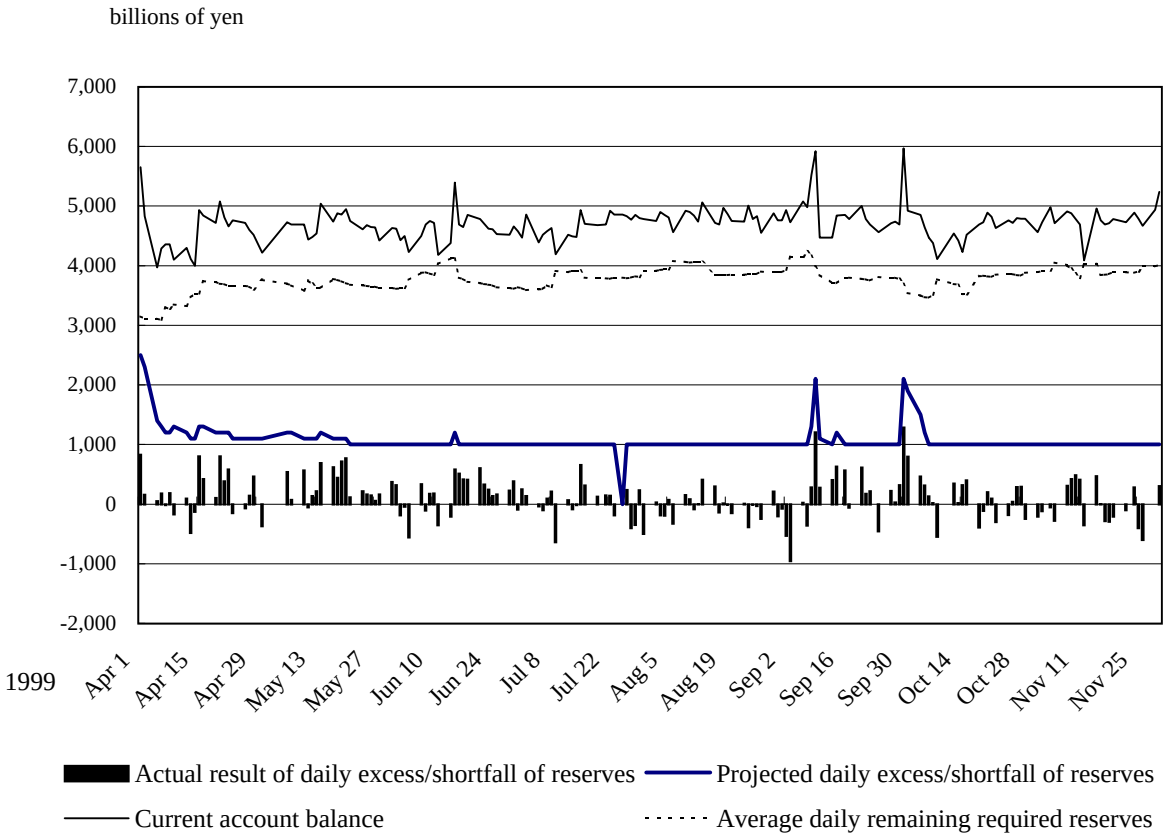
Remaining days of the reserve maintenance period counted from the current day[1]	K	30
The number of days for which the reserve balance of the day counts[2]	L	1
Remaining days of the reserve maintenance period counted from the following day	M=K-L	29

Note: 1. A reserve maintenance period is one month, starting from the 16th day of the month and ending on the 15th day of the next month.
2. Reserve balances held on weekdays are counted as having been held for one day, and those held on weekdays before the weekend or a holiday are counted as having been held for one day plus the number of days of the weekend or the holiday.

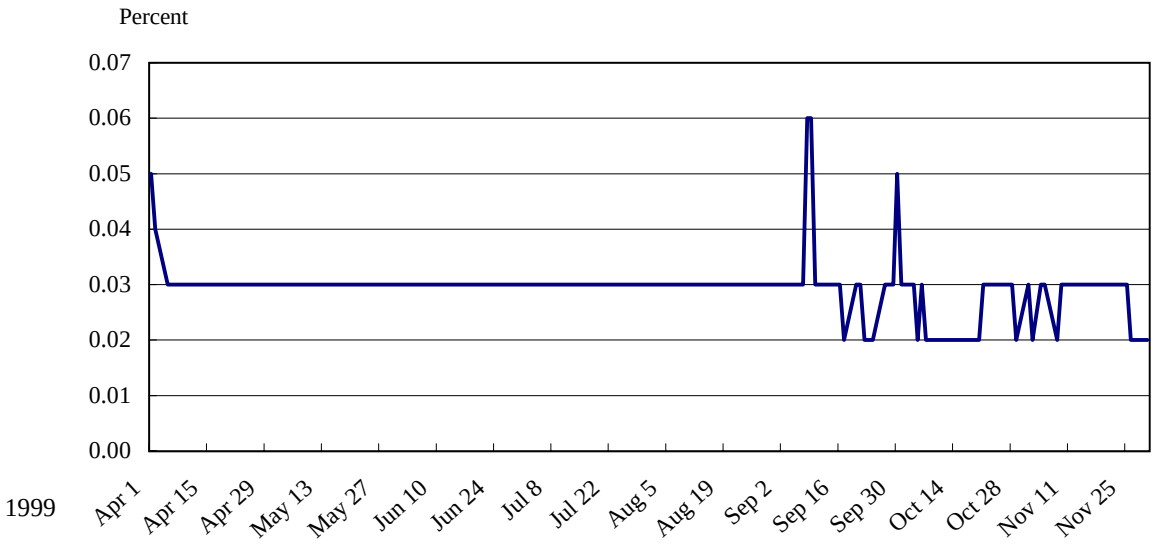
<A Diagram of the Concept>



Appendix 11: Developments in the Projected Daily Excess/Shortfall of Reserves and the Actual Result of the Current Account Balance[1]



Developments in the Uncollateralized Overnight Call Rate



Note: 1. Data are from April 1999, when the zero interest rate policy was initiated, until November 1999, just before full-scale preparation for the Year 2000 problem.

Appendix 12

February 14, 2000
Financial Markets Department
Bank of Japan

Changes regarding Money Market Operations Data

The Bank of Japan has decided to change the formula for the "Supply and Demand of Funds and Market Operations" table (hereafter, *the funds-table*), and also for the "projection of the reserve balance that exceeds (or falls below) remaining required reserves[1]" (hereafter, *the projected reserve excess/shortfall*), both of which are disclosed daily by Financial Markets Department. These changes are aimed at enhancing accountability in money market operations by providing relevant information in a more appropriate and easier way to understand.

1. Background

(1) Calculation of the funds-table and the projected reserve excess/shortfall assumes that the provision of funds through money market operations is reflected in changes in remaining required reserves. Despite the Bank of Japan's ample provision of liquidity under its zero-interest rate policy, most such liquidity has been held as excess reserves by deposit-taking financial institutions that are subject to reserve requirements (hereafter, *reserve holders*), and/or as current account balances by institutions not subject to reserve requirements (hereafter, *non-reserve holders*). As a result, the following differences have been observed which have been discussed at Monetary Policy Meetings of the Bank's Policy Board (see Attachment 1):

A. Continuing large differences between the projected fund surplus/shortage and actual results in the funds-table.

B. Continuing large differences between the projected reserve excess/shortfall in the daily announcement and actual results.

---

[1] Remaining required reserves are the average daily reserves that should be deposited during the remaining days of the reserve maintenance period. The reserve maintenance period commences from the 16th of one month to the 15th of the next.

These differences are due to the following assumption in the current formula for the funds-table. At the time of projecting the fund surplus/shortage, the total of excess reserves held by reserve holders and current account balances held by non-reserve holders on the previous day is factored as funds surplus in under 'treasury and other factors' in the funds-table of the day, assuming that it will be used for reserve requirements for that day. In fact, at the end of the day, we continue to observe excess reserves held by reserve holders as well as current account balances held by non-reserve holders. Thus, the difference arises between the projection and actual result.

(2) Such differences widened toward end-1999 when the Bank injected an extremely large amount of liquidity to accommodate increased precautionary demand for funds in the face of possible Y2K problems.

Difference between Projection and Actual Results

(Daily average for the reserve maintenance period; billion yen)

		November 1999	December 1999
Fund surplus/shortage			
Projection	(a)	580	8,110
Actual result	(b)	-320	-360
Difference	**(a-b)**	**900**	**8,470**
Reserve excess/shortfall			
Projection	(c)	1,020	10,700
Actual result	(d)	-10	860
Difference	**(c-d)**	**1,030**	**9,840**

Note: Minus denotes shortage/shortfall.

(3) These observations and the forthcoming introduction of RTGS prompt a need for constructing a new formula that can more accurately describe the activities of market participants and developments in the financial market as a whole.

2. Changes

(1) Funds-table calculation

The funds-table will be changed in the following way:

Old: Fund surplus/shortage + Money market operations = Changes in both the required and

excess reserves of reserve holders (see Attachment 2)

New: Fund surplus/shortage + Money market operations = Changes in current account balances[2] (see Attachment 3)

By changing the formula for the funds-table as above, we can avoid the problem of continuing large differences between projections and actual results with regard to the fund surplus/shortage since current account balances include those held by non-reserve holders as well as reserves held by reserve holders.

Actual outstanding of excess reserves held by reserve holders and current account balances held by non-reserve holders, currently disclosed monthly, will be disclosed daily as components of the current account balances in the funds-table. Actual remaining required reserves will continue to be disclosed for reference.

With regard to the actual fund surplus/shortage in the funds-table, the Bank will cease disclosing the final report (as shown by the shaded column in Attachment 2) which is currently announced the morning of the following day since the only way in which it differs from the preliminary report announced the evening of the same day is in the denomination (in the preliminary report, ten billion yen, while in the final report, a hundred million yen).

(2) Announcement of projected reserve excess/shortfall

The Bank will cease announcing the projected reserve excess/shortfall, usually at 9:20 in the morning when money market operations for the day are announced. Instead, it will start announcing the projection of the daily increase/decrease in current account balances as a result of money market operations for the day.

An example of the new announcement: "The Bank will provide (absorb) XX billion yen through purchases (sales) of TBs and FBs under repurchase agreements today. As a result, it is projected that current account balances will increase (decrease) by YY billion yen compared to those on the previous day."

It should be noted that the guideline for money market operations is decided at Monetary

[2] Current account balances = Outstanding amount of both required and excess reserves held by reserve holders + Outstanding amount of current account balances held by non-reserve holders.

Policy Meetings of the Bank's Policy Board, and that daily money market operations are implemented accordingly. For example, the guideline decided on February 10 continues to encourage the uncollateralized overnight call rate to move as low as possible by providing amply liquidity. Both the 'old' projected reserve excess/shortfall and the 'new' projection of daily increase/decrease in current account balances are disclosed for reference in measuring the size of funds provision through money market operations.

3. Effective Date

These changes will become effective from March 16.

For further information, contact

Open Market Operations Division, Financial Markets Department
Mr. Atsushi Miyanoya (3277-1234) or Mr. Jun Iwasaki (3277-1284).

(Attachment 1)

Discussions at the Monetary Policy Meetings on the current " Supply and Demand of Funds" table

(Excerpts from the minutes of the Monetary Policy Meetings)

(April 22, 1999)

…… some members pointed out that the relationship between the daily interest rate level and the daily supply-demand balance of funds and that between the daily interest rate level and the Bank's morning projection of reserves at the end of the day—— the projection announced each morning of the amount of reserves that would exceed the " remaining required reserves" (the daily average of reserves that should be deposited in the remaining days of the reserve maintenance period) at the end of the day—— had become quite obscure. ……

The few members who claimed that the relationship between interest rates and the supply-demand balance of funds was blurred presented the view that the most influential factor in the determination of the overnight call rate at present was neither the total amount of money in the Bank's current accounts nor the total excess reserves held by financial institutions subject to reserve requirements, but was the Bank's morning projection of the amount of reserves that would exceed the " remaining required reserves." Having said so, they acknowledged that large divergences had been observed between the Bank's morning projection and the actual amount of funds exceeding the " remaining required reserves" at 5 p.m., when the reserves of individual banks are officially calculated, due to the large leakage of funds to *tanshi* companies. They expressed concern as to whether the Bank, in this situation, would be able to successfully convey its message to the market and exert adequate influence as it had always done. Since insufficient communication between the Bank and the market could impair the transparency of money market operations, some members suggested the Bank's staff to consider releasing not only the daily amount outstanding of reserves, but also such figures as the daily amount outstanding of funds in the Bank's current accounts, including those of financial institutions not subject to reserve requirements.

(August 13, 1999)

The member also noted that the gap between the amount of projected and actual " daily excess of reserves" had widened since the introduction of the zero interest rate policy. The member warned that such a situation, if it continued, could impair the credibility of the Bank. Further, this member expressed the opinion that the gap had originated from a framework of projection that could not exclude the effects of current accounts at the Bank held by *tanshi* companies, and that the framework did not suit the current financial environment and market operations. The member advocated a revision of such a framework as a whole, including how to project the " daily excess of reserves" and supply and demand of funds in the money market.

(Attachment 2)

Supply and Demand of Funds and Market Operations

for Jan.17 (mon)

Financial Markets Dept.
Bank of Japan

100 million yen

		Projections	Results (preliminary)	Results (final)
Banknotes (-: net issuance)		5,800	5,500	5,522
Treasury funds and others (-: net receipt of funds)		23,500	15,200	15,139
Excess / shortage of funds (-: shortage)		29,300	20,700	20,661
BOJ Credit	Loans		1,500	1,504
	Outright purchases of bills	-3,000	-3,000	-3,003
	Outright sales of bills drawn by BOJ	-3,800 7,000	-5,000 (S) <start at 5:00pm> -4,200 (S) -3,800 7,000	-5,002 (S) <start at 5:00pm> -4,162 (S) -3,808 7,003
	Purchases of CPs under repurchase agreements			
	Purchases of TBs/FBs under repurchase agreements	4,000 -6,000	4,000 -6,000	4,000 -6,005
	Sales of TBs/FBs under repurchase agreements	-6,000	-6,000 (S) -6,000	-6,003 (S) -6,005
	Outright purchases of TBs/FBs			
	Outright sales of TBs/FBs			
	Borrowing of JGBs against cash collateral (JGB-Repos)			
	Purchases of JGBs under repurchase agreements			
	Purchases of JGBs under repurchase agreements			
	Outright purchases of JGBs			
	Subtotal		-21,500	-21,481
Net change in reserves			- 800	- 800
Reserve balances			44,700	44,700
	Excess/shortfall of remaining required reserve balances		- 1,300	- 1,300
	Daily average of remaining required reserve balances		39,100	39,100
(cf) Current account deposits (amounts outstanding)			53,500	53,500

(Notes)

1. Figures of "forecast" and "preliminary" are rounded off to 10 billions.
   As for figures of reserve balances and current account deposits, final results are also rounded numbers.
2. Forecasts for Market Operations include only those offered prior to the compilation of this report.
3. Same-day-settled operations are marked with a "S".
4. Operations are settled at 3:00 pm unless otherwise indicated (such as "1:00pm" or "5:00pm").
5. "Current account deposits (outstanding) " is the total of the current account deposits with the BOJ held by financial institutions (excluding accounts held by governmental financial institutions). Reserves are included in this.

(Attachment 3)

Supply and Demand of Funds and Market Operations

for Jan.17 (Mon)

Financial Markets Dept.
Bank of Japan

100 million yen

		Projections	Results
Banknotes (-: net issuance)		5,800	5,500
Treasury funds and others (-: net receipt of funds)		-7,500	-7,100
Excess / shortage of funds (-: shortage)		-1,700	-1,600
BOJ Loans and Market Operations	Loans		1,500
	Outright purchases of bills (regular)	-3,000	-3,000
	Outright purchases of bills (utilizing corporate bonds)		
	Outrigt sales of bills drawn by BOJ	-3,800 7,000	-5,000 (S) <start at 5:00pm> -4,200 (S) -3,800 7,000
	Purchases of CPs under repurchase agreements		
	Purchases of TBs/FBs under repurchase agreements	4,000 -6,000	4,000 -6,000
	Sales of TBs/FBs under repurchase agreements	-6,000	-6,000 (S) -6,000
	Outright purchases of TBs/FBs		
	Outright sales of TBs/FBs		
	Borrowing of JGBs against cash collateral (JGB-Repos)		
	Purchases of JGBs under repurchase agreements		
	Outright purchases of JGBs		
	Subtotal		-21,500
Net change in current account deposits			-23,100
Current account deposits (amounts outstanding)			53,500
Reserve balances			44,700
Held by institutions that have satisfied reserve requirements of the current period			6,900
Excess Reserves			6,900
Held by institutions that have NOT satisfied reserve requirements of the current period			37,800
Current account deposits held by institutions NOT subject to reserve requirements			8,800

Required reserves for the current maintenance period (Jan.16-Feb.15)	1,211,300
Remaining required reserves on and after Jan.18	1,134,500
Remaining required reserves on and after Jan.18 (daily average)	39,100

(Notes)

1. Figures are rounded off to 10 billions.
2. Forecasts for Market Operations include only those offered prior to the compilation of this report.
3. Same-day-settled operations are marked with a "S".
4. Operations are settled at 3:00 pm unless otherwise indicated (such as "1:00pm" or "5:00pm").
5. "Current account deposits (outstanding) " is the total of the current account deposits with the BOJ held by financial institutions. Reserves are included in this.

Appendix 13: Chronology of Improvements in Market Operations

Table 1: Enhancement of Operation Tools and Revision of Eligible Collateral in 1990-99

1990	Jan.	● Treasury bill (TB) operations are introduced (consolidated later as the present TBs/FBs purchasing operations with repurchase agreements).
1991	Jan.	● Competitive bidding is introduced for bill purchasing operations. Bonds and foreign-currency-denominated bills are added to the list of collateral eligible for the operations.
	Nov.	● Same-day-settlement——i.e., delivery of operations on the day of the offer——is introduced for TB operations. This change is due to the coming into operation of the Bank of Japan Financial Network System (BOJ-NET) for the settlement of TB transactions.
1994	May	● Competitive bidding is introduced for bill selling operations (sales of BOJ bills).
1995	July	● Same-day-settlement is introduced for bill purchasing/selling operations with competitive bidding.
	Nov.	● Competitive bidding is introduced for commercial paper (CP) purchasing operations with repurchase agreements. In addition, the range of counterparties is expanded to include banks and securities companies, whereas previously it was limited to the six *tanshi* companies.
1996	Jan.	● The Bank abolishes the credit line system, and decides to, in principle, avoid using Bank of Japan loans in monetary adjustment.
1997	Nov.	● Borrowing of Japanese government bonds (JGBs) against cash collateral (JGB repo operation) is introduced. ● Bill selling operations starting at the final settlement time (around 5:00 p.m.) are introduced.
1998	Nov.	● The scope of eligible CP for CP operations is expanded to include issues maturing within one year from the day following purchase, whereas previously it was limited to those maturing within three months.

1999	Jan.	● Eligible JGBs used in repo operations are expanded to include 4- and 6-year JGBs (previously, they were limited to 10- and 20-year JGBs).
	Feb.	● Competitive bidding is introduced for financing bill (FB) operations (consolidated later as the present short-term TBs/FBs selling operations with repurchase agreements). In addition, the range of counterparties was expanded to banks and securities companies, whereas previously it was limited to the six *tanshi* companies.
	Mar.	● Bill purchasing operations utilizing corporate debt obligations as eligible collateral are introduced. ● In line with the introduction of public tender for FB issuance, market operations utilizing TBs and FBs are consolidated as TBs/FBs operations.
	June	● The scope of JGBs in the Bank's JGB outright purchasing operations is, in principle, expanded to all issues of 10- and 20-year bonds. The Bank specifies the issues excluded, whereas previously it specified 20 types for purchase.
	Sep.	● Debt obligations issued by financial institutions holding current accounts with the Bank are excluded from eligible collateral. However, bank debentures are considered eligible until end-March 2001, and CP issued by securities firms and securities finance companies are to remain eligible if they are accepted by the Bank by end-March 2000.
	Oct.	● Outright purchases/sales of TBs and FBs are introduced. ● Eligible counterparties are the same as those in TBs/FBs operations with repurchase agreements. ● The range of JGBs used in repo operations is expanded to include two-year JGBs. ● Asset-backed securities (ABSs) are added to the list of collateral eligible for the Bank's credit (the basic policy was released in September 1999). For the time being, ABSs are to be eligible only as collateral for the Bank's bill purchasing operations utilizing corporate debt obligations.

Table 2: Chronology of Improvements in Disclosure of Information on Market Operations in 1989-99

1989	Aug.	● The Bank starts to release daily data on the supply/demand of funds in the money market and the amount of funds supplied/absorbed through money market operations.
1995	Feb.	● The Bank starts to release information on the results of bidding in market operations, such as the total amount of bids and successful bids.
	Dec.	● The Bank starts to provide the market, through news agencies, with on-line information regarding market operations and supply/demand of funds in the money market.
1998	June	● The Bank discloses how it determines the total amount of successful bids for each operation. ● The Bank increases the amount of information released about the results of bidding in market operations, such as the average successful bid rates and the best successful bid rates. ● The Bank releases the criteria for selecting bidders in JGB repo operations, and starts selecting them based on the criteria.
	Oct.	● The Bank starts to release monthly figures on reserves, including the amount of excess reserves.
	Dec.	● The Bank releases the criteria for selecting bidders in TBs/FBs operations and CP operations, and starts selecting bidders based on the criteria.
1999	Feb.	● The Bank releases the criteria for selecting bidders in bill purchasing operations utilizing corporate debt obligations, and starts selecting bidders based on the criteria.
	Mar.	● The Bank releases the criteria for selecting bidders in JGB outright purchasing operations, and starts selecting bidders based on the criteria.
	Apr.	● The Bank starts to release daily data on current account balances.