

The Bank of Japan's Finances and Simulations for Profits and CapitalPolicy Infrastructure Division
Monetary Affairs Department

January 2025

The Bank of Japan deems it important to gain a broad understanding of its thinking on central bank finances and monetary policy conduct, and has thus been releasing various communications with regard to how monetary policy conduct affects central bank finances. This paper restates this mechanism and presents simulations for the Bank's future profits and capital by using certain assumptions based on interviews with market participants, taking into account recent changes in monetary policy conduct, including the change of its monetary policy framework and policy interest rate hikes. The results show that, in a scenario in which interest rates are priced in by the market rate, the negative impact on the Bank's finances is limited. Under more severe assumptions, on the other hand, a certain level of financial risk was indicated. The Bank of Japan will continue to ensure its financial soundness in light of the simulation results.

Introduction

Given that unconventional monetary policies accompanied by large-scale balance sheet expansions have the potential to have a large impact on central banks' finances in a phase of balance sheet contraction and policy interest rate hikes, there has been debate on the potential impact on central banks' ability to conduct monetary policy and, by extension, confidence in their currencies. The Bank of Japan has thus worked to ensure its financial soundness by enhancing its capital, and has been releasing various communications with regard to how monetary policy conduct affects central bank finances. For example, in December 2023, the Bank exchanged views with experts regarding the basic thinking on central bank finances and monetary policy conduct and published a research paper, "Central Bank Finances and Monetary Policy Conduct," as a part of its review of monetary policy from a broad perspective¹.

The Bank subsequently changed its monetary policy framework in March 2024 and then, in July 2024, raised the policy interest rate and decided on a plan for the reduction of its purchase amount of Japanese government bonds (JGBs). Given these changes in monetary policy conduct, it seemed beneficial to present a broad picture of the Bank's financial projections, including quantitative factors, with some latitude, to gain a broad understanding of its finances.

This paper therefore first restates the overview of the basic structure of the central bank balance sheet and profits, the mechanism of the amplitude of profit fluctuations as the balance sheet expands and contracts, and the factors affecting profits. Then, based on certain assumptions, we conduct simulations for the Bank's future profits and capital and explain the underlying assumptions, results, and implications.

Mechanism of the Amplitude of Profit Fluctuations Due to the Implementation of Large-Scale Monetary Easing and the Exit from Easing*Characteristics of central bank balance sheets and profits*

Starting with an overview of a central bank's balance sheet, the asset side includes government bonds purchased, while the liability and capital side includes current deposits of financial institutions, government deposits, banknotes in circulation, and capital. A central bank earns interest income on its assets, including the government bonds it purchases, while paying no interest on current deposits (required reserves) and banknotes. This usually allows the central bank to generate stable profits. Profits earned in this way are called "seigniorage." The general setup is that the profits earned by the central bank are ultimately

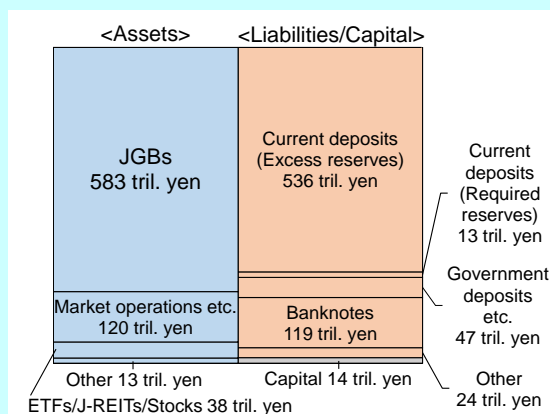
transferred to the government, and the Bank of Japan in general transfers its profits to the government, aside from dividends and the accumulation of reserves.

Increase in profits during balance sheet expansion

When a central bank expands its balance sheet under unconventional monetary policy through, for example, the purchase of government bonds, this leads to increases in the interest on current deposits (excess reserves). However, since the interest rate on government bonds purchased usually exceeds the interest rate on excess reserves, interest income and other income increase in line with growth in holdings of government bonds and other assets, so that the central bank's overall profits increase.

In fact, the Bank's profits turned upward around fiscal 2013, when QQE was introduced. Since then, the level has been rising along with the balance sheet expansion, with operating profits reaching a record high of 4.6 trillion yen in fiscal 2023, which resulted in 2.2 trillion yen of transfers to the Treasury (Charts 1, 2, 3).

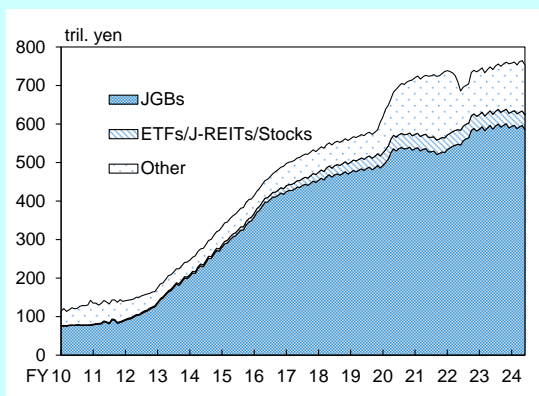
[Chart 1] The Bank's Balance Sheet



Source: Bank of Japan.

Note: Figures are as of the end of Sep. 2024.

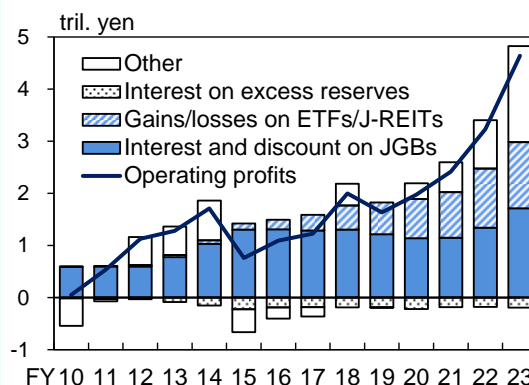
[Chart 2] The Bank's Assets



Source: Bank of Japan.

Note: "Other" includes loans provided by the Bank.

[Chart 3] The Bank's Operating Profits

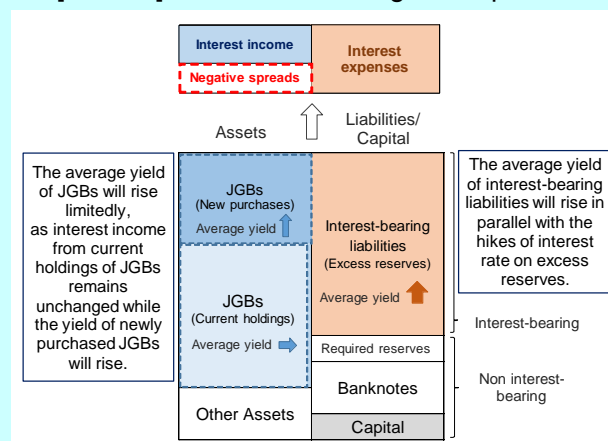


Source: Bank of Japan.

Decline in profits during balance sheet contraction

The Bank of Japan changed its monetary policy framework in March 2024 and raised its policy interest rate and decided on a plan for the reduction of its purchase amount of JGBs in July 2024. During such a phase, when the balance sheet shrinks and the central bank raises the interest rate on excess reserves, interest expenses will increase, putting downward pressure on its profits (Chart 4).

[Chart 4] Mechanism of Negative Spreads

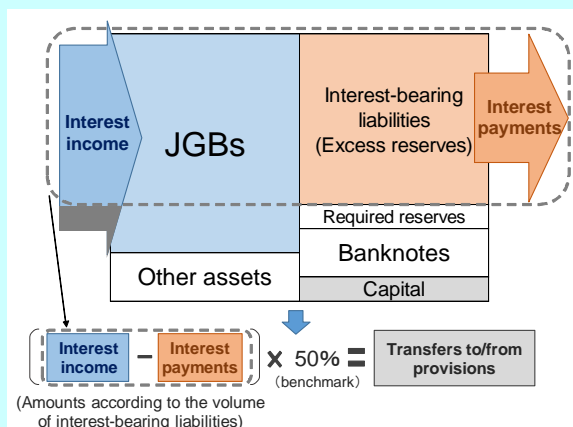


Source: Bank of Japan.

As noted above, while profits are boosted by balance sheet expansion during a phase of monetary easing, they tend to decline during the exit phase, owing to the increase in interest rates on current deposits (excess reserves) and other factors.

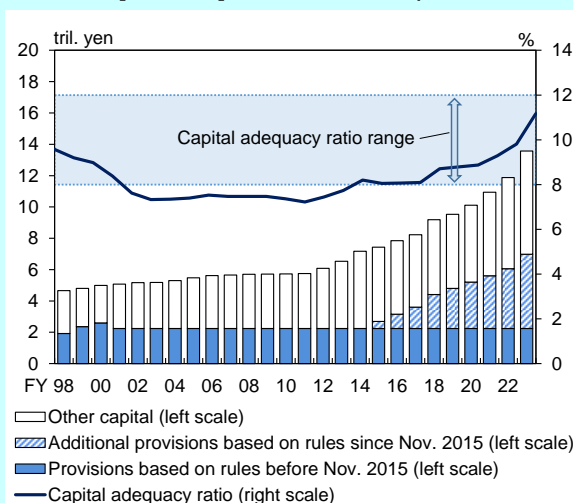
In light of these characteristics, the Bank has been working to enhance its capital by, for example, expanding measures pertaining to provisions for possible losses on bonds transactions in 2015² in order to reduce the amplitude of profit fluctuations during the monetary easing and exit phases and to ensure its

[Chart 5] Illustration of Provisions for Possible Losses on Bonds Transactions



Source: Bank of Japan.

[Chart 6] The Bank's Capital



Source: Bank of Japan.

Note: "Other capital" includes legal reserves etc.

Meanwhile, if market interest rates rise, the market value of government bond holdings will decline. However, given that, with few exceptions, it does not sell its government bond holdings, the Bank of Japan, like the U.S. Federal Reserve (FRB) and the European Central Bank (ECB), employs the amortized cost method. Thus, unrealized losses resulting from a decline in the market value of government bonds do not directly affect central bank profits/losses unless the bonds are sold prior to maturity. Unrealized gains/losses -- that is, gains and losses that will not be realized unless government bonds are sold -- and actual profits/losses are two different things (Chart 7).

[Chart 7] Major Central Banks' Valuation of Their Government Bonds

	Valuation method
FRB	At amortized cost
ECB	At amortized cost
BOE	At market value
RBA	At market value
BOJ	At amortized cost

Sources: Federal Reserve; European Central Bank; Bank of England; Reserve Bank of Australia; Bank of Japan.

Subsequent recovery

Once the balance sheet starts to contract, the central bank's profits will be under downward pressure for a while through the mechanisms described. Eventually, however, interest expenses will decline as current deposits (excess reserves) decrease. On the other hand, holdings of government bonds will be successively replaced by higher-yielding bonds and interest income will rise. Thus, while the central bank may temporarily incur losses, even if this occurs, profits will eventually recover.

Factors Affecting the Amplitude of Profit Fluctuations

The degree to which profits fluctuate during such a phase of balance sheet contraction depends to a large extent on developments in short- and long-term interest rates, the size of and developments in the balance sheet, and other factors.

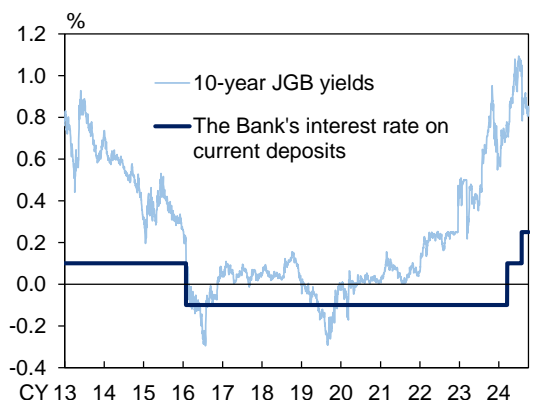
Developments in short- and long-term interest rates

The Bank of Japan, as noted above, changed its monetary policy framework in March 2024 and raised the policy interest rate in July 2024. In addition, if the outlook for economic activity and prices presented in the October 2024 Outlook Report is realized, the Bank will accordingly continue to raise the policy interest rate and adjust the degree of monetary accommodation (Chart 8).

Developments in short- and long-term interest rates in this context will affect the pace of the increase in interest expenses and interest income during the phase of balance sheet contraction, eventually affecting profits. For example, with regard to the interest rate on excess reserves (short-term rate), the higher the rate, the greater the downward pressure on profits, reflecting higher interest expenses on current deposits (excess reserves). On the other hand, a widening in the spread

between long- and short-term interest rates will put greater upward pressure on profits, thanks to the effect of replacing government bonds with higher-yielding bonds.

[Chart 8] Short- and Long-Term Interest Rates



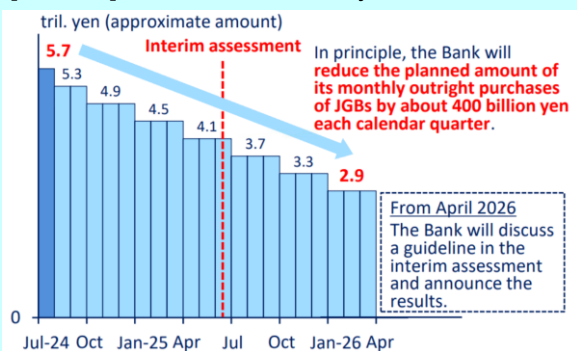
Sources: Bank of Japan; Bloomberg.

Note: "The Bank's interest rate on current deposits" is the rate applied to the Policy-Rate Balance under negative interest rate policy and to the excess reserves in other periods.

Size of and developments in the balance sheet

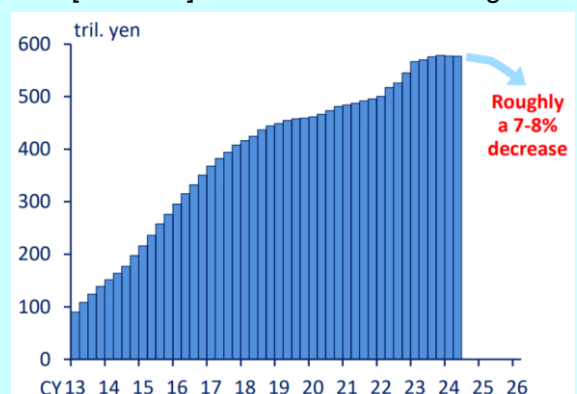
As noted above, the Bank decided on a plan for the reduction of its purchase amount of JGBs in July 2024 and will conduct an interim assessment of the plan at the June 2025 Monetary Policy Meeting (Charts 9, 10).

[Chart 9] Amounts of Monthly JGB Purchases



Source: Bank of Japan.

[Chart 10] The Bank's JGB holdings



Source: Bank of Japan.

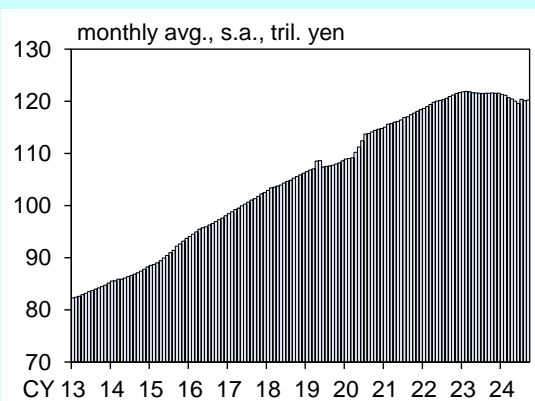
The size of the balance sheet and related developments impact the pace of the increase in interest expenses and interest income. For example, if the balance sheet is larger before contraction, this will put greater downward pressure on profits due to the higher interest expenses on excess reserves brought about by interest rate hikes on the reserves. Also, basically, the greater the extent of the reinvestment of proceeds from redemption of government bond holdings at maturity³, the greater the upward pressure on profits, thanks to the effect of government bonds being replaced by higher-yielding bonds, although this will be affected by the above-mentioned developments in short- and long-term interest rates.

Others: banknotes etc.

The ratio of non-interest-bearing banknotes to interest-bearing current deposits (excess reserves) will also affect profits. For example, when non-interest-bearing banknotes decrease, their share of total liabilities will fall and profits will come under downward pressure.

However, demand for banknotes depends on a variety of factors, including the size of the economy and the growing trend toward a cashless economy as well as the level of interest rates on deposits and other assets. Thus, it is difficult to predict how banknotes in circulation will change (Chart 11).

[Chart 11] Banknotes in Circulation



Source: Bank of Japan.

Furthermore, in case of the Bank of Japan, dividends received from assets such as ETFs have reached a sizable amount, making a substantial contribution to profits (Chart 3). Thus, the investment yield from such assets as ETFs will also impact future profits.

Simulations for Future Profits and Capital

Based on the mechanism discussed above, in the following section we present simulations⁴ for the Bank's future profits and capital carried out for roughly a ten year period. The results of the simulations, as noted above, greatly depend on the assumptions used, such as developments in interest rates and the size of the Bank's balance sheet. These simulation might also be misconstrued as implications for the Bank's future conduct of monetary policy. Therefore, for the simulations, the Bank conducted interviews with market participants⁵ and set the following plausible assumptions⁶.

Underlying assumptions

(1) Developments in short- and long-term interest rates

It is assumed that short-term interest rates would develop in line with the implied forward rates in the OIS market⁷ and that long-term interest rates would develop in accordance with the implied forward rate calculated by the JGB yield curve ("the path of interest rates priced in by the market rate").

In addition to the path of interest rates priced in by the market rate, we show a range of simulations with assumptions in which (a) short-term interest rates will range from 1.0% to 2.0% over the next few years, and (b) the spread between long- and short-term interest rates will range from +0.25%P to +0.75%P⁸.

(2) Size of and developments in the balance sheet

For the convenience of the simulations, it is assumed that the size of the Bank's balance sheet would be in line with the plan for the reduction of the purchase amount of JGBs decided in July 2024, in which the Bank will reduce its JGB purchase amounts to about 3 trillion yen per month over January - March 2026, and leave the purchase amount unchanged from April 2026 (Charts 9, 10)⁹. It is also assumed that the size of assets for which future treatments have already been announced would be in line with the announced treatments and that the size of other assets would remain unchanged.

(3) Others

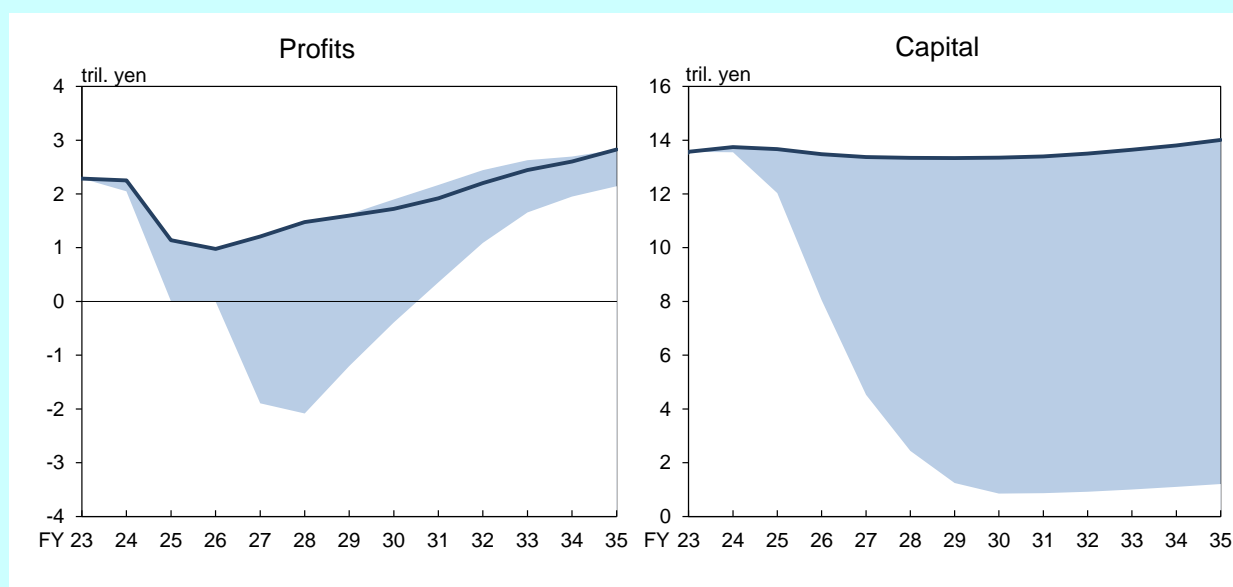
For the convenience of the simulations, the amount of banknotes and foreign exchange rates are also assumed to remain unchanged at the level as of the end of September 2024. Investment yields from the assets such as ETFs are assumed to be those of the past five-year average (FY 2019 – FY 2023).

Results

(1) Profits

First, the results of the simulations show that the Bank's profits were pushed downward in all scenarios, due to higher interest expenses on excess reserves brought about by interest rate hikes on the reserves (Chart 12). In the scenario based on the path of interest rates priced in by the market rate, the Bank maintained positive profits. On the other hand, the scenarios with more

[Chart 12] Results of Simulations for the Bank's Profits and Capital



Sources: Bank of Japan; Bloomberg; QUICK.

Note: The solid lines show the result of the scenario based on the path of interest rates priced in by the market rate; shaded areas denote the ranges of the results of the scenarios based on the interest rate developments outlined in (a) and (b) noted above and the path of interest rates priced in by the market rate.

severe assumptions among the interest rate developments shown in (a) and (b) above – i.e. where the level of short-term interest rates is higher and the spread between long- and short-term interest rates is narrower – showed the possibility of temporary losses. However, including such scenarios, the results showed profits recovering in the long run, as interest expenses decline in line with decreases in current deposits (excess reserves), and the Bank's JGB holdings are successively replaced by higher-yielding bonds and interest income rises.

(2) Capital

Next, regarding the Bank's capital, both scenarios resulted in a decrease in capital toward the middle of the forecast period, due to transfers from provisions and legal reserves. In the scenario based on the path of interest rates priced in by the market rate, the extent of the decrease in capital was limited. On the other hand, the scenarios with more severe assumptions among the interest rate developments shown in (a) and (b) above resulted in a large decrease in capital, well below the Bank's capital adequacy ratio range (approximately 8 to 12 percent¹⁰). Meanwhile, the reason why capital shows a tendency of coming under greater downward pressure and recovering more slowly compared to profits is as follows: in the case of losses, capital decreases to the same extent as the losses, while in the case of positive net income, the accumulation of capital is limited, since a large part of profits are assumed to be transferred to the government for the convenience of the simulations.

Concluding Remarks

Under a fiat money system, confidence in the currency is not directly ensured by the assets held by the central bank or its financial soundness, but by the appropriate conduct of monetary policy with the aim of achieving price stability.

Based on this premise, as mentioned above, central banks are generally set up in such a way that they make profits from a somewhat longer-term perspective. The simulations above showed the possibility of temporary losses in the scenarios with more severe assumptions. However, even if this occurs, it will not lead to negative equity, and profits will eventually recover as interest expenses decline in line with decreases in current deposits (excess reserves), and as the Bank's JGB holdings are successively replaced by higher-yielding bonds and interest income rises. Moreover, central banks can supply their own means of payment and settlement. Therefore, even if the central bank temporarily incurs losses or has negative equity, this does not impede its ability to conduct monetary policy.

That said, this does not mean that the central bank can run up unlimited losses and negative equity. If the central bank's financial risks become a matter of undue attention and give rise to unnecessary confusion over monetary policy, there is a risk that this could lead to a decline in its credibility. The simulations above presented a certain level of financial risks in the sense of the possibility of temporary losses and a large decrease in the capital well below the target capital ratio range in the scenarios with more severe assumptions. Therefore, the Bank of Japan will continue to ensure its financial soundness.

¹ With regard to the details of central bank finances and the Bank's balance sheet and profit structure explained in this paper, see Monetary Affairs Department, Bank of Japan (2023), "Central Bank Finances and Monetary Policy Conduct," Broad-Perspective Review Series and UEDA Kazuo (2023), "Central Bank Finances and Monetary Policy Conduct", Speech at the 2023 Autumn Annual Meeting of the Japan Society of Monetary Economics.

² Before the expansion of the measures in 2015, the treatment was as follows: "The benchmark for provisions for possible losses on bonds transactions shall be 50 percent of the difference between profits from the sale or redemption of Japanese government bonds (JGBs) and the sum of (1) losses from the sale or redemption of JGBs and (2) losses from the revaluation of JGBs at the end of the fiscal year. In the case of profits, transfers to provision shall be made, while in the case of losses, transfers from provisions shall be made. In making transfers to/from provisions, the capital adequacy ratio and other factors shall be taken into consideration."

With regard to the details, see Box 2 of the Monetary Affairs

Department, Bank of Japan (2023) above, "Overview of Provisions for Possible Losses on Bonds Transactions" (p. 38-39).

³ The maturities of government bonds for reinvestment will also affect profits through changes in the maturity distributions of the assets.

⁴ The basis for the calculations is the Bank's balance sheet as of the end of September 2024.

⁵ The Bank conducted interviews with market participants such as major banks and securities firms and used the results of the interviews.

⁶ In addition to the underlying assumptions (1) to (3) above, for the convenience of the simulations, in general, transfers to/from provisions for possible losses on bonds transactions are assumed to be 50 percent of gains/losses on these transactions, and transfers to legal reserves are assumed to be 5 percent of the surplus resulting from the settlement of profits and losses for each business year.

⁷ A type of interest rate swap involving the exchange of the

weighted average overnight rate (for JPY, Tokyo OverNight Average rate, TONA) compounded over a specified term and a fixed interest rate agreed at the time of contract.

⁸ Major central banks such as FRB also made simulations based on interest rates priced in by the market rate and the results of surveys of market participants.

⁹ At the June 2025 Monetary Policy Meeting, the Bank will conduct an interim assessment of the plan for the reduction of its purchase amount of JGBs. At the meeting, it will also discuss a guideline for its JGB purchases from April 2026 and announce the results.

¹⁰ Article 18 (1) of "Accounting Rules of the Bank of Japan" stipulates "Transfers to/from provisions for possible losses on bonds transactions and for possible losses on foreign exchange transactions, and transfers to legal reserve shall be carried out as required to maintain the capital adequacy ratio at around 10

percent, within the range of about two percentage points above or below that level, at the ends of the first half of the fiscal year and of the full fiscal year."

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