BOJ Reports & Research Papers

Financial System Report

BANK OF JAPAN

APRIL 2024

The total of major banks, regional banks, and *shinkin* banks covered in this *Report* is as follows (as of end-March 2024).

Major banks comprise the following 10 banks: Mizuho Bank, MUFG Bank, Sumitomo Mitsui Banking Corporation, Resona Bank, Saitama Resona Bank, Mitsubishi UFJ Trust and Banking Corporation, Mizuho Trust and Banking Company, Sumitomo Mitsui Trust Bank, SBI Shinsei Bank, and Aozora Bank. Regional banks comprise the 62 member banks of the Regional Banks Association of Japan (Regional banks I) and the 37 member banks of the Second Association of Regional Banks (Regional banks II). *Shinkin* banks are the 247 *shinkin* banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as of end-March 2024.

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Objectives of the *Financial System Report*

The Bank of Japan's *Financial System Report* has two main objectives. The first is to assess the stability of Japan's financial system. The second is to communicate with all related parties on the future tasks and challenges in order to ensure the system's stability.

The *Report* assesses the vulnerabilities of the financial system from a macroprudential perspective. Within a macroprudential framework, institutional designs and policy measures are developed based on risk assessments in the financial system in order to ensure the stability of the overall financial system. In so doing, the interconnectedness of the real economy, financial and capital markets, and financial institutions' behavior are taken into account.

The Bank uses the results of the analysis set out in the *Report* in planning policies to ensure the stability of the financial system and for providing guidance and advice to financial institutions through on-site examinations and off-site monitoring. It makes use of the results in international discussions on regulation, supervision, and vulnerability assessment. In relation to the conduct of monetary policy, the macro assessment of financial system stability is also regarded as important input for the Bank in assessing risks in economic and price developments from a medium- to long-term perspective.

Motivations behind the April 2024 issue

This issue of the *Report* takes a deep dive into real estate risk and interest rate risk, which should be closely monitored for the time being. On this basis, the *Report* assesses the resilience of and potential vulnerabilities in Japan's financial system.

Real estate risk is one of the risks that are discussed globally. Real estate markets in the United States and Europe have been experiencing a gradual correction, and this could affect Japan's financial system via Japanese banks that have exposures to these markets and real estate funds with globally diversified portfolios. So far, there has been no significant downward pressure on Japan's real estate market, but attention should be paid to changes in the commercial areas in central Tokyo. It is important to accurately assess the impact of domestic and foreign real estate risk on the financial system.

Interest rate risk is a fundamental risk for banks, which engage in maturity transformation. The significance of managing such risk has been increasing further in a situation of higher market interest rates. Moreover, interest rate risk profiles of not only banks but also households and firms have been changing under the prolonged low interest rate environment. In view of these changes, the *Report* examines in detail the resilience of each economic entity to rising interest rates, as well as the speed and size of the pass-through of rising interest rates to banks' investment income and funding costs.

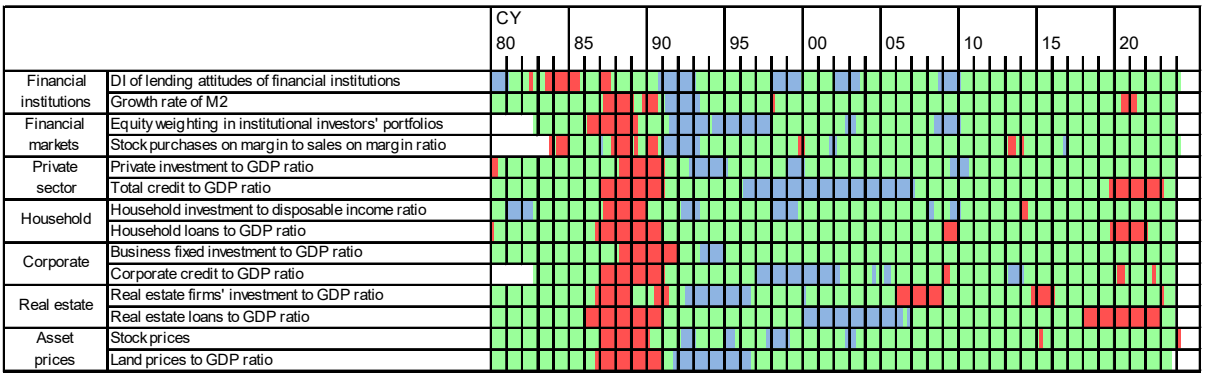
Contents

I. Executive summary: Stability assessment of Japan's financial system

Japan's financial system has been maintaining stability on the whole.

Financial intermediation has continued its smooth functioning. In the loan market, banks' lending stance has remained active and loans outstanding have continued to increase (see Box 4 for interest rate developments before and after the changes in the monetary policy framework in March 2024). No major financial imbalances can be observed in these financial intermediation activities (Chart I-1).[1]

Chart I-1: Heat map



Note: See Chart III-3-1.

Japanese banks have sufficient capital bases and stable funding bases to withstand various types of stress. However, vigilance against tail risks continues to be warranted. The period of stress may be prolonged further with continuing global monetary tightening and the resultant concerns about a slowdown in foreign economies. From a long-term perspective, a decline in banks' loss-absorbing capacity could lead to a contraction of financial intermediation activities or an overheating, such as excessive search for yield. With these in mind, it is necessary to address the following potential vulnerabilities appropriately and ensure the stability of Japan's financial system into the future.

Domestic and foreign real estate risk and its impact → Chapters III-C, IV-A, IV-B, V-B, and Box 1

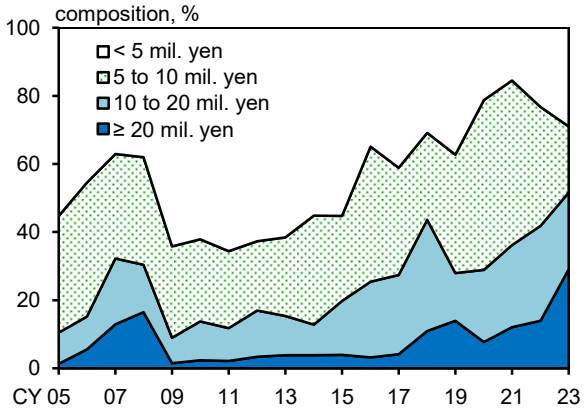
In Japan's real estate market, valuations of some properties seem relatively high. In some limited commercial areas in central Tokyo, transactions in higher price ranges have been increasing (Chart I-2). So far, a rise in office vacancy rates has been limited to parts of central Tokyo, unlike in the United States, where such a rise is observed in a wide range of areas. However, there have been changes in Japan's real estate market; foreign investors, who had been active in acquiring real estate in Japan, became net sellers in the second half of 2023 for the first time in four years (Chart I-3).

Meanwhile, the delinquency rate of loans for offices has risen further in the United States. Close attention should therefore continue to be paid to the possible impact of changes in the U.S. and other foreign real estate markets on Japan's real estate market via foreign investment funds that diversify their investment globally. Against this background, one of the assumptions in the macro

[1] The heat map in Chart I-1 shows that the *stock prices* indicator has turned "red," which signals an overheating. Stock prices have risen, reflecting expectations for firms' business performance and corporate governance reforms. So far, the impact of rising stock prices on the financial cycle has been limited; moreover, the uptrend in stock prices has been moderate compared to previous episodes when financial imbalances built up (see Section C of Chapter III). In addition, valuations of stock prices have remained at their past average.

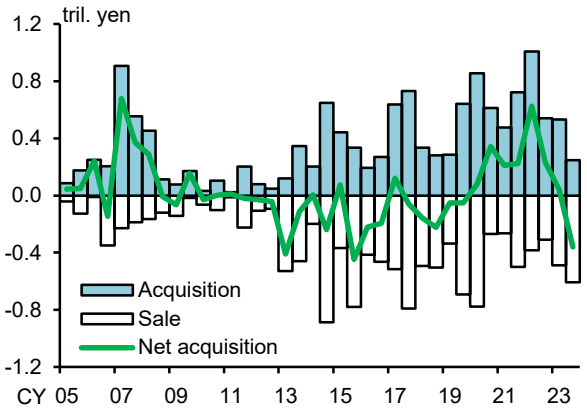
stress testing in this *Report* is that there is a repricing of commercial real estate in some limited metropolitan areas triggered by a correction in foreign real estate markets. The results show that banks' economic losses (domestic and foreign credit costs as well as valuation and realized losses on securities) due to the real estate shock are limited on a macro basis (Chart I-4). Since Japanese banks' foreign real estate financing is small, additional economic losses would be limited even when assuming a considerable correction in the U.S. real estate market.

Chart I-2: Distribution of transaction prices



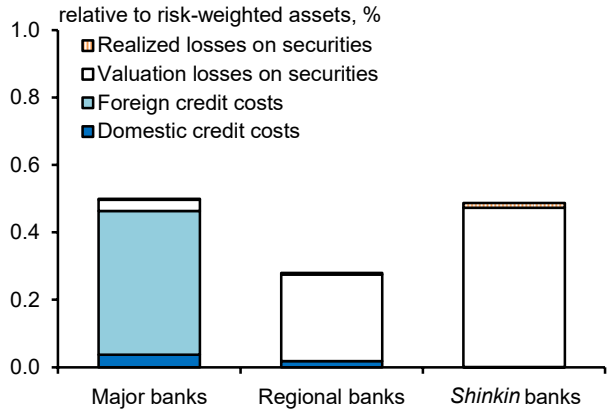
Note: Shows the transaction prices of commercial land in the 5 central wards of Tokyo. See Chart III-3-11.

Chart I-3: Real estate transactions by foreign investors



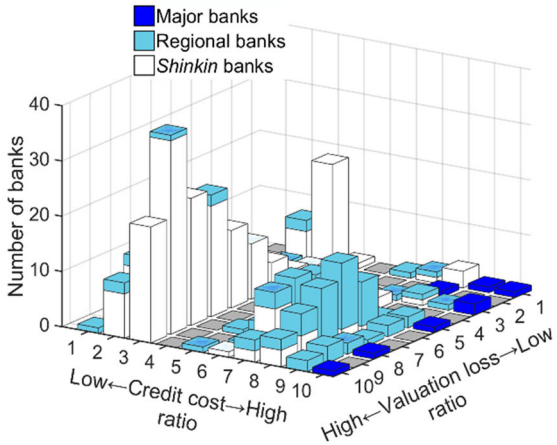
Note: See Chart III-3-12.

Chart I-4: Economic losses from the real estate shock



Note: See Chart V-2-8.

Chart I-5: Distribution of banks by type of loss



Note: See Chart V-2-10.

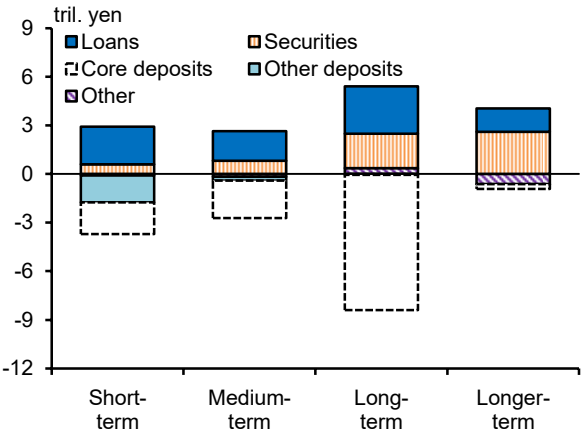
In Japan, however, as the expansionary phase of the financial cycle has become more prolonged, banks have built up real estate-related exposures (loans and securities investments). In particular, there has been an increase in common exposures to real estate in the metropolitan areas among banks. Therefore, even a shock limited to the commercial real estate market in the metropolitan areas could affect a wide range of banks nationwide, regardless of type of bank (Chart I-5).

Resilience to rising interest rates by economic entity → Chapters III-C and IV-A to C

In the banking sector, interest rate risk in the banking book (IRRBB) for yen (in terms of the 100 BPV; taking core deposits into account) is generally in balance between assets and liabilities (Chart I-6). The duration gap -- the difference between repricing schedules of interest payments for assets and liabilities (not taking core deposits into account) -- has been shrinking recently, with the duration

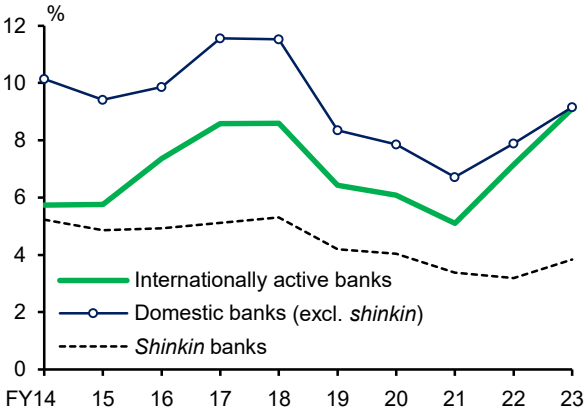
of securities shortening amid concerns over the risk of higher interest rates. Reflecting such rebalancing behavior, banks' resilience to rising interest rates has been on an improving trend. Chart I-7 shows estimates of the maximum interest rate on 10-year Japanese government bonds (JGBs) at which banks can maintain sufficient loss-absorbing capacity even if the rise in the interest rate increases their valuation losses on securities. The maximum interest rate, which had followed a declining trend under the low interest rate environment, has been increasing recently.

Chart I-6: Interest rate risk



Note: See Chart IV-3-1.

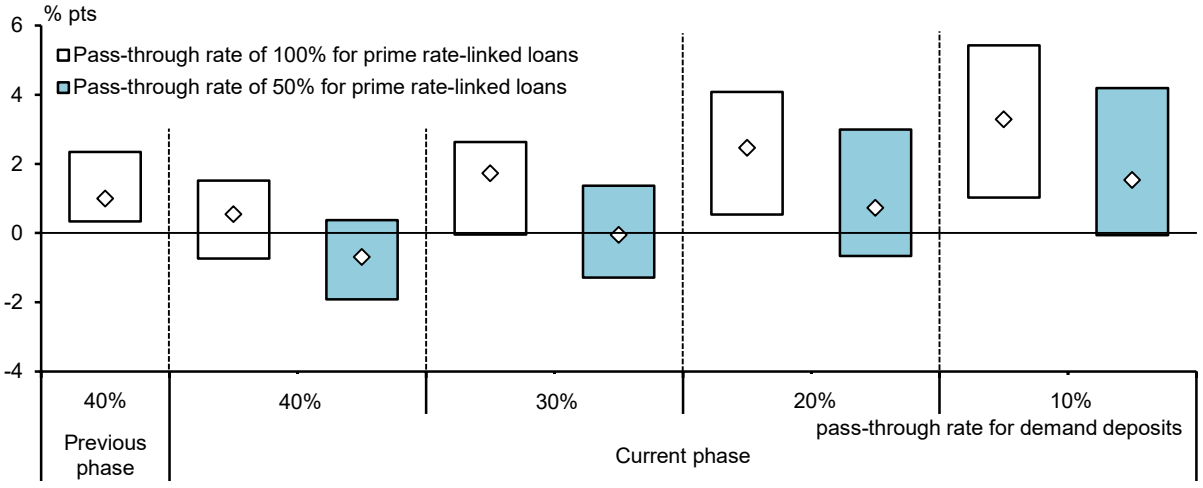
Chart I-7: Maximum interest rate at which economic capital is maintained



Note: Shows the estimates of 10-year JGB yields at which capital adequacy ratios taking valuation gains/losses on securities into account are equal to the regulatory level. See Chart IV-2-7.

However, the impact of the rise in market interest rates on banks' profits depends on the interest rate pass-through to loans and deposits, as well as changes in the yield curve (Chart I-8). The pass-through rates are affected by the supply and demand balance and the competitive environment in the loan and deposit markets, as well as relationships with customers. In addition, it should be noted that the impact of the rise in market interest rates on banks' profits varies depending on their balance sheet structures, and there is uncertainty over the stickiness of deposits.

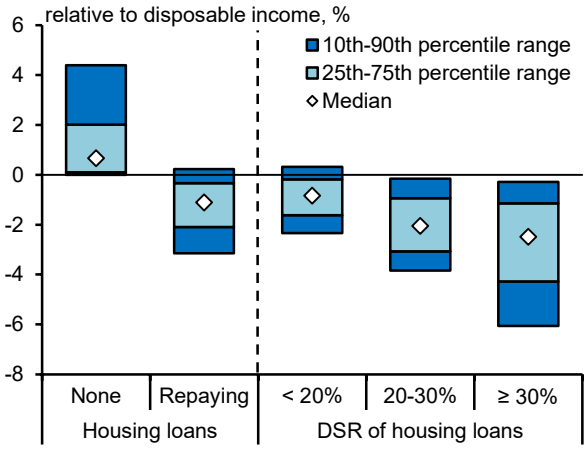
Chart I-8: Simulation results: Changes in interest income balance



Note: Shows the medians (markers) and 25th-75th percentile ranges (bands) of changes in the banks' interest income balance as ratios to domestic net interest income when the yield curve shifts upward by 0.1 percentage points. The pass-through rates for loans other than prime rate-linked loans and securities are 100 percent, and those for time deposits are 80 percent. "Previous phase" is as of fiscal 2006; "Current phase" is as of September 2023. See Chart IV-3-7.

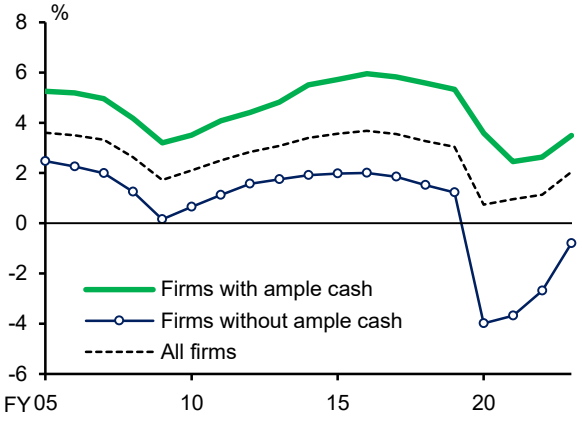
In the household sector, an improving economy and the resulting rise in interest rates can be expected to lead to an improvement in household income and in the interest-related balance on the whole. For borrowers of housing loans, the rules to prevent drastic changes in payments mean that the increase in principal and interest payments will be limited in the short term; the payment burden will be partially offset by the increase in interest income from deposits and other assets held by households (Chart I-9). In the corporate sector, firms' profits have been on an improving trend. Even with higher borrowing interest rates, many firms have sufficient profitability to withstand the interest payment burden (Chart I-10). That said, there is considerable heterogeneity in household and corporate finances. Among households with a high debt servicing ratio (DSR) -- the ratio of annual repayments to annual income -- and firms with low interest coverage ratios (ICRs), there are some that are less resilient to higher interest rates.

Chart I-9: Changes in interest-related balance



Note: Shows the households' distribution of changes in the balance when short-term interest rates increase by 1 percentage point. See Chart III-3-20.

Chart I-10: Borrowing rates at which ICR falls below 1

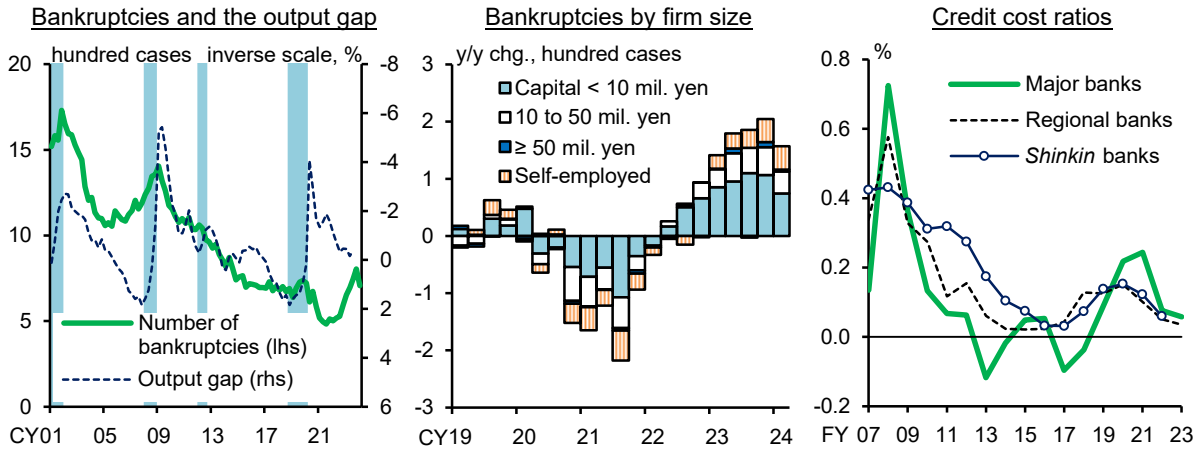


Note: Shows the estimates of borrowing rates at which ICR equals one. "Firms with/without ample cash" indicate firms with cash reserves equal to half or more and less than half of their annual administrative expenses, respectively. See Chart IV-1-5.

Other notable developments

Corporate bankruptcies: The number of corporate bankruptcies and defaults has increased even though economic activity has been on a recovery trend (Chart I-11). With the labor market tightening, there have been bankruptcies resulting from labor shortages. Even in this situation, banks' credit

Chart I-11: Number of corporate bankruptcies and credit cost ratios



Note: See Charts IV-1-3 and IV-1-6.

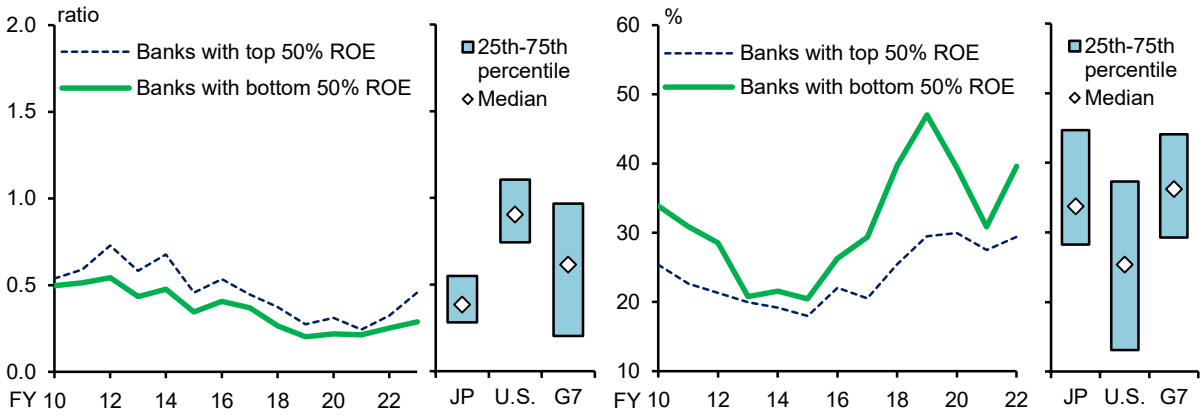
costs have remained limited. This is partly because small-sized firms account for the overwhelming majority of recent bankruptcies and defaults. However, there have been some cases recently where banks have recorded large credit costs on "common exposures," i.e., loans to the same borrowers by multiple banks, such as so-called "cross-prefecture" lending. It is difficult for banks to obtain monitoring information on these borrower firms, and this is one reason why debt governance is unlikely to operate effectively. It is therefore essential for banks to minimize these information gaps.

→ Chapters III-A and IV-A

Stock prices: Stock prices have risen. The recent rise reflects market expectations for firms' solid business performance and corporate governance reforms. For banks, higher stock prices increase market risk associated with stockholdings, while they also improve room for realizing gains. Meanwhile, listed banks have been increasing dividends and raising their dividend payout ratios in an effort to improve their market valuation (Chart I-12). This tendency has also been observed among banks with low loss-absorbing capacity such as low profitability. The distribution of profits in banks' capital policies should be based on their capital bases and profitability.

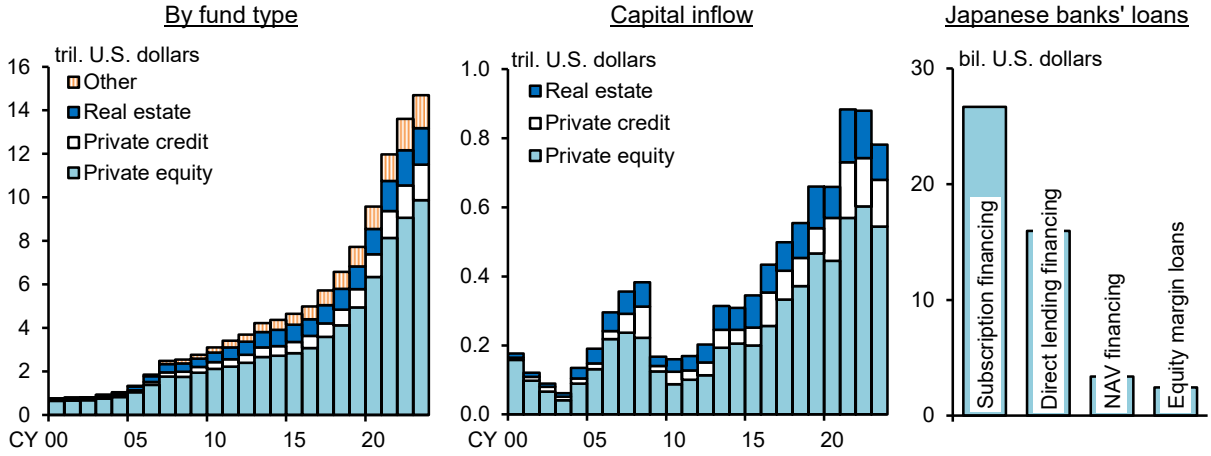
→ Chapters II-B and V-A

Chart I-12: P/B ratios (lhs) and dividend payout ratios (rhs) of listed banks



Note: "G7" excludes Japan and the U.S. See Chart V-1-7.

Chart I-13: Private fund markets



Note: The left-hand chart covers worldwide and the middle chart covers the Americas. The right-hand chart shows the three major banks' outstanding loans to funds in the Americas. See Charts B3-1 and B3-2.

Foreign private funds: The foreign private fund market has been growing rapidly in recent years (Chart I-13). Private funds play the role of complementing and substituting for traditional financial intermediation based on investment capital from investors and funds borrowed from banks. Japanese banks also have exposures to private funds, although the size is small. In the private fund market, the growth pace has changed as the increase in the inflow of funds has peaked out. Moreover, the credit risks of private funds and banks that extend loans to them have been rising, as seen in the increase in the interest payment burden of firms in which these funds invest.

→ Chapter IV-A and Box 3

The Bank of Japan will promote financial institutions' initiatives to address these potential vulnerabilities through on-site examinations and off-site monitoring.[2] It will continue to closely monitor the impact of various risk-taking moves by financial institutions on the financial system from a macroprudential perspective.

[2] See *On-Site Examination Policy for Fiscal 2024* (March 2024) for details on the basic approach in conducting on-site examinations in fiscal 2024.

II. Risks observed in financial and capital markets

- In global financial markets, market sentiment continued to improve over the second half of fiscal 2023, with diminished concern over prolonged monetary tightening.[3] In the United States and Europe, prices of risky assets have risen, reflecting a decline in long-term interest rates.
- Japanese financial markets have been generally calm. Short-term interest rates have been in line with the Bank of Japan's guideline for market operations. Long-term interest rates were more or less flat over the second half of fiscal 2023, moving in tandem with those in the United States and Europe. The liquidity and functioning of Japanese government bond (JGB) markets have remained at improved levels on the whole compared with around the beginning of 2023. Japanese stock prices have increased substantially, driven by capital flows of foreign investors.
- However, uncertainty about financial markets remains high. There have been concerns in domestic and foreign financial markets over the following factors in the United States and Europe: a risk of inflation rates staying elevated and the cumulative effects of monetary tightening on economic activity and financial systems. In this situation, attention should continue to be paid to the possibility that global financial conditions will tighten further through repricing of assets and outflows of funds from emerging market economies.

A. Global financial markets

In global financial markets, market sentiment continued to improve over the second half of fiscal 2023, with diminished concern over prolonged monetary tightening. In the United States and Europe, prices of risky assets have risen, reflecting a decline in long-term interest rates. However, market attention has continued to be drawn to uncertainties over the outlook for the global economy. Moreover, the markets have continued to show some nervousness, as seen in implied volatilities of interest rates staying high, with speculation over monetary policy in the United States and Europe.

U.S. and European bond markets

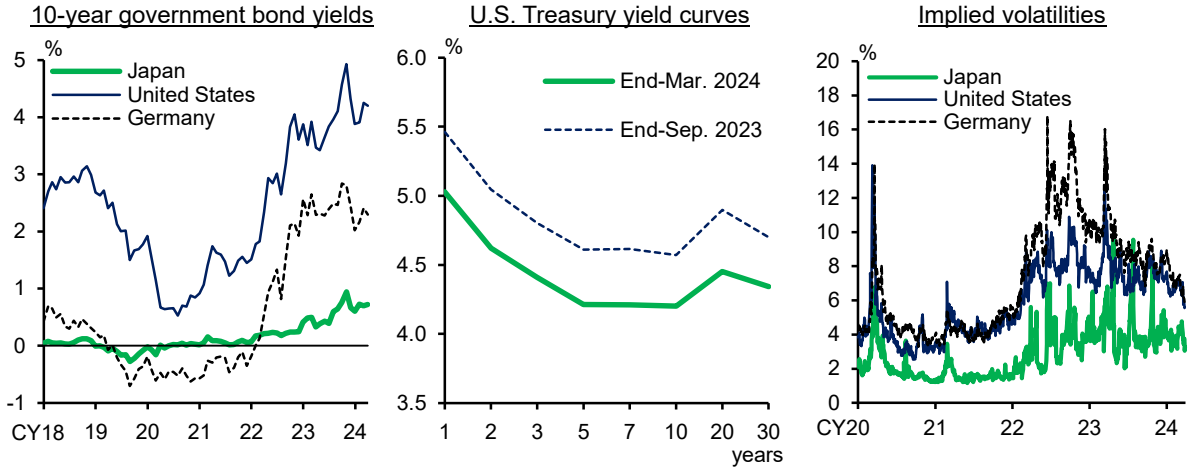
Long-term interest rates in the United States and Europe declined over the second half of fiscal 2023; the rates rose through late October 2023 but declined significantly thereafter with diminished concern over prolonged monetary tightening (Chart II-1-1). The yield curve for U.S. Treasuries has remained inverted. Implied volatilities of government bond futures have stayed high in both the United States and Europe.

U.S. and European stock markets

Stock prices in the United States and Europe have risen substantially, partly because market participants have favored a decline in long-term interest rates (Chart II-1-2). In the United States, the S&P 500 hit a record high. Expected earnings per share (EPS) for U.S. firms have continued to rise moderately, led by high-tech firms and semiconductor firms, owing to market expectations for a spread of generative artificial intelligence (AI) and other new technologies. Meanwhile, implied volatilities of stock prices have been generally stable both in the United States and Europe.

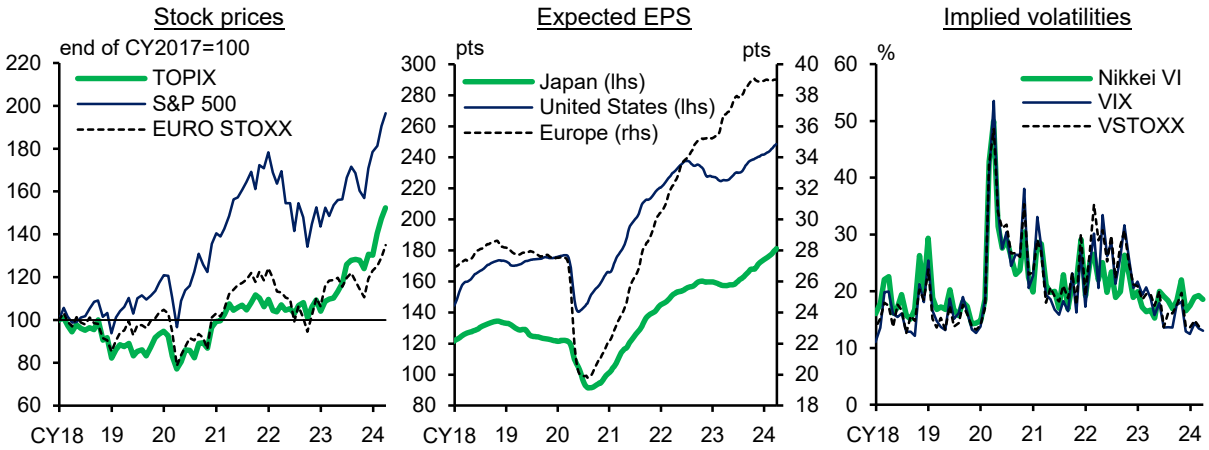
[3] In Japan, the fiscal year starts in April and ends in March of the following year.

Chart II-1-1: Bond markets



Note: In the right-hand chart, implied volatilities are calculated from options on government bond futures. Latest data for the left- and right-hand charts are as of March 2024 and end-March 2024, respectively.
Source: Bloomberg.

Chart II-1-2: Stock markets



Note: 1. In the middle chart, the data for Japan, the United States, and Europe indicate expected EPS for the next 12 months of the TOPIX, the S&P 500, and the EURO STOXX, respectively. 4-week backward moving averages.
2. Latest data for the left- and right-hand charts are as of March 2024. Latest data for the middle chart are as of end-March 2024.
Source: Bloomberg; LSEG Datastream.

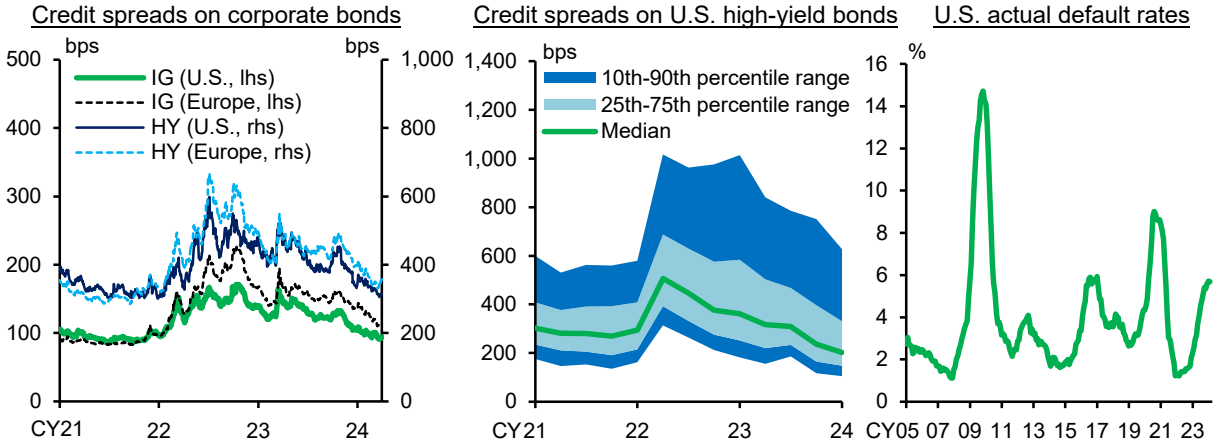
U.S. and European credit markets

In U.S. and European credit markets, credit spreads on both investment-grade bonds and high-yield bonds have narrowed (left panel of Chart II-1-3). Credit spreads on U.S. high-yield bonds have narrowed to the level seen at the beginning of 2022 on the whole. However, spreads on some of these bonds have remained significantly wide, mainly due to the cumulative effects of monetary tightening (middle panel of the chart). Moreover, some market participants have been concerned about the possibility of the default rate staying elevated (right panel of the chart).

Emerging markets and international commodity markets

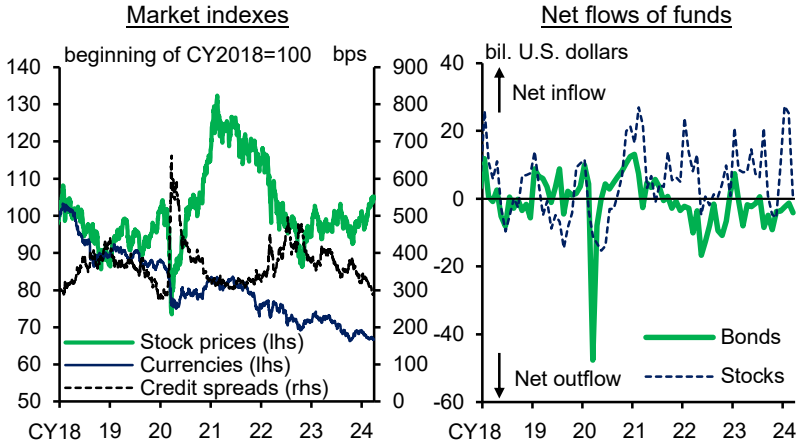
Market sentiment has also continued to improve in emerging markets. Stock prices and currencies have been firm, and credit spreads of government bonds have narrowed somewhat (Chart II-1-4). Looking at net flows of emerging market funds, bond funds have seen smaller net outflows, with diminished concern over prolonged monetary tightening in the United States and Europe. Equity funds have started to see net inflows again.

Chart II-1-3: Corporate bond markets



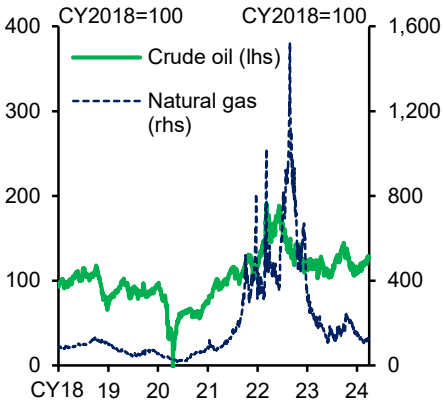
Note: 1. In the left-hand chart, "IG" and "HY" indicate investment-grade bonds and high-yield bonds, respectively. Latest data as of end-March 2024.
2. The middle chart is based on data by issue. Latest data as of end-March 2024.
3. The right-hand chart indicates trailing 12-month default rates of speculative-grade corporate bonds and loans, etc. Latest data as of February 2024.
Source: ICE Data Indices, LLC; Moody's Ratings.

Chart II-1-4: Emerging markets



Note: 1. In the left-hand chart, "Stock prices," "Currencies," and "Credit spreads" indicate the MSCI EM Local Index, the J.P. Morgan EMCI Index, and yield spreads of the EMBI Global over U.S. Treasuries, respectively.
2. Latest data for the left- and right-hand charts are as of end-March 2024 and March 2024, respectively.
Source: Bloomberg; EPFR; Haver Analytics.

Chart II-1-5: Commodity prices



Note: "Crude oil" and "Natural gas" indicate WTI crude oil futures and Dutch TTF futures, respectively. Latest data as of end-March 2024.
Source: Bloomberg.

In international commodity markets, commodity prices temporarily went up against the background of intensified tensions in the Middle East (Chart II-1-5). However, prices of crude oil declined over the second half of fiscal 2023, as oil-producing economies failed to reach a consensus on additional coordinated oil production cuts. Prices of natural gas have been flat against the backdrop of high levels of inventories in Europe.

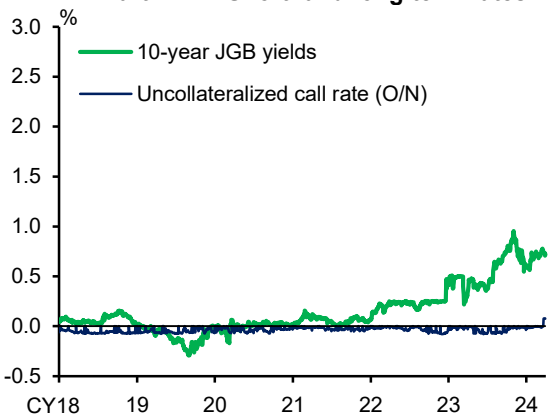
B. Japanese financial markets

Japanese financial markets have been generally calm. Short-term interest rates have been in line with the Bank's guideline for market operations. Long-term interest rates were more or less flat over the second half of fiscal 2023, moving in tandem with those in the United States and Europe. The liquidity and functioning of JGB markets have remained at improved levels on the whole compared with around the beginning of 2023. Japanese stock prices have increased substantially, driven by capital flows of foreign investors.

Short- and long-term interest rates

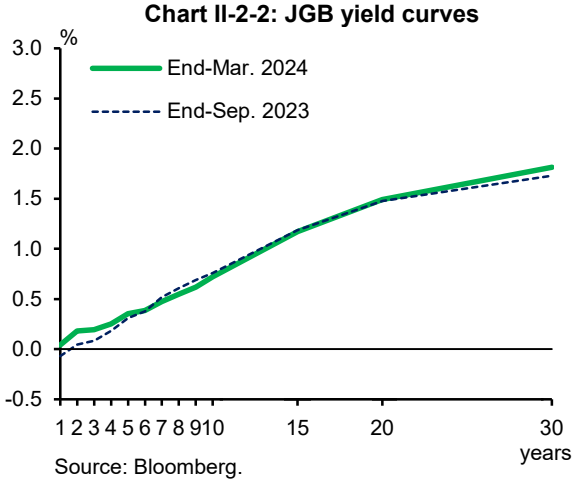
The short-term interest rate (the uncollateralized overnight call rate) had been in negative territory under Quantitative and Qualitative Monetary Easing (QQE) with Yield Curve Control (YCC). Following the changes in the Bank's monetary policy framework in March 2024, the rate has remained at 0 to 0.1 percent, in line with the new guideline for market operations (Chart II-2-1).[4,5] Long-term interest rates were more or less flat over the second half of fiscal 2023; the rates moved in tandem with those in the United States and Europe, with the Bank further increasing the flexibility in the conduct of YCC and changing its monetary policy framework. The yield curve for JGBs was also unchanged in general (Chart II-2-2). Meanwhile, implied volatility of JGB futures has been high, albeit with fluctuations, partly reflecting market participants' cautiousness about a possible rise in interest rates (Chart II-1-1).

Chart II-2-1: Short- and long-term rates



Note: Latest data as of end-March 2024.
Source: Bloomberg; BOJ.

Chart II-2-2: JGB yield curves



Source: Bloomberg.

Liquidity and functioning of JGB markets

The liquidity and functioning of JGB markets have remained at improved levels on the whole compared with around the beginning of 2023.[6] According to the *Bond Market Survey*, the diffusion index for the degree of bond market functioning from the surveyed institutions' viewpoint has continued to improve (Chart II-2-3).[7] With regard to developments in interest rates, the shape of

[4] In October 2023, the Bank decided to further increase the flexibility in the conduct of YCC. Specifically, it decided to conduct YCC with the upper bound of 1.0 percent for 10-year JGB yields as a reference and control the yields mainly through large-scale JGB purchases and nimble market operations. Operations through which the Bank offered to purchase an unlimited amount of 10-year JGBs at 1.0 percent every business day were ceased.

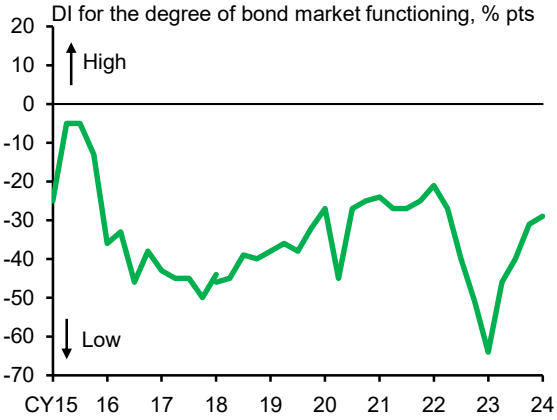
[5] In March 2024, the Bank decided to change its monetary policy framework, judging that it is now within sight that the price stability target of 2 percent will be achieved in a sustainable and stable manner. Specifically, the Bank has set the uncollateralized overnight call rate as the policy interest rate and will encourage that rate to remain at around 0 to 0.1 percent. With regard to purchases of JGBs, the Bank will continue its purchases at broadly the same amount as before (it currently purchases about 6 trillion yen per month). Furthermore, the Bank has discontinued purchases of exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs).

[6] See "Liquidity Indicators in the JGB Markets" on the Bank's website. The Financial Markets Department of the Bank generally updates and releases liquidity indicators of the JGB markets on a quarterly basis.

[7] Participants of the 18th round of the "Bond Market Group" meetings held in December 2023 noted that the correlation of domestic long-term interest rates with foreign interest rate and domestic price developments had strengthened and that the functioning of the JGB market had been improving. They also raised the reduction in the amount of the Bank's scheduled JGB purchases as an example of its nimble market operations that took into account, among other factors, supply and demand conditions in the JGB market, and viewed that it had contributed to stabilizing the formation of interest rates.

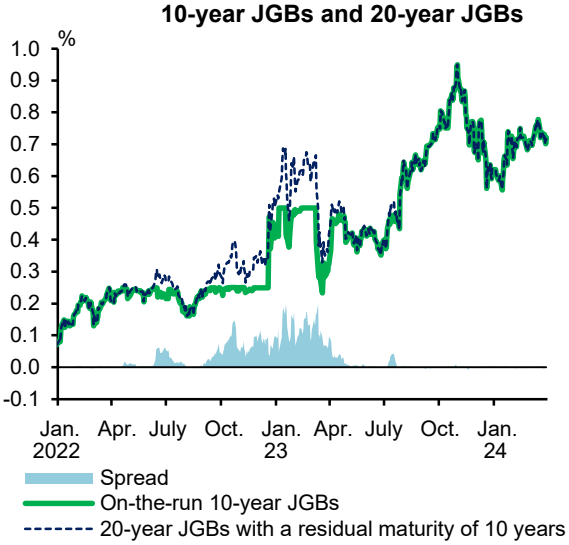
the yield curve for JGBs has stayed smooth. Yield differentials among issues with the same remaining maturity have continued to be eliminated (Chart II-2-4). Looking at liquidity indicators in JGB markets, inter-dealer transaction volume for cash JGBs has increased somewhat compared with a while ago (Chart II-2-5). Market depth and resiliency in the JGB futures market temporarily declined, mainly reflecting market participants' cautiousness about a possible rise in interest rates, but generally have remained at improved levels compared with around the beginning of 2023.

Chart II-2-3: Bond market survey



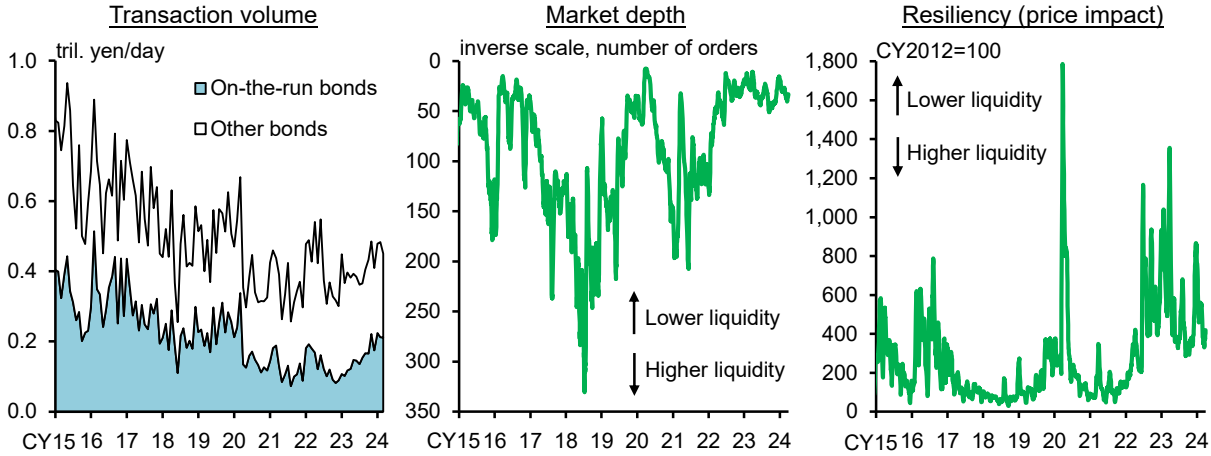
Note: 1. Based on the proportion of responding institutions selecting a given choice, the DI is calculated as follows: DI for the degree of current bond market functioning = "high" - "low."
2. The data from February 2018 onward cover major institutional investors. Latest data are based on the February 2024 survey.
Source: BOJ.

Chart II-2-4: Yield spread between on-the-run 10-year JGBs and 20-year JGBs



Note: Based on the trading reference statistics of the JSDA. Compound yield. Latest data as of end-March 2024.
Source: JSDA; QUICK.

Chart II-2-5: Liquidity indicators in JGB markets



Note: 1. The left-hand chart indicates inter-dealer transaction volume for cash JGBs (2-, 5-, 10-, 20-, 30-, and 40-year JGBs) via Japan Bond Trading. Latest data as of March 2024.
2. The middle chart indicates the number of orders for JGB futures at the best-ask price with 1-minute frequency (median for each business day). The right-hand chart indicates the price change per unit volume of transactions for JGB futures for each business day. 10-day backward moving averages. Latest data as of end-March 2024.
Source: Japan Bond Trading; Nikkei Inc., "NIKKEI NEEDS"; QUICK.

It is not straightforward, however, to assess these indicators in the short term, because they tend to be volatile and are affected by developments in foreign bond markets. In addition, since these indicators have remained in a state of deterioration from a medium- to long-term perspective, close attention should continue to be paid to developments in market functioning after the changes in the monetary policy framework.

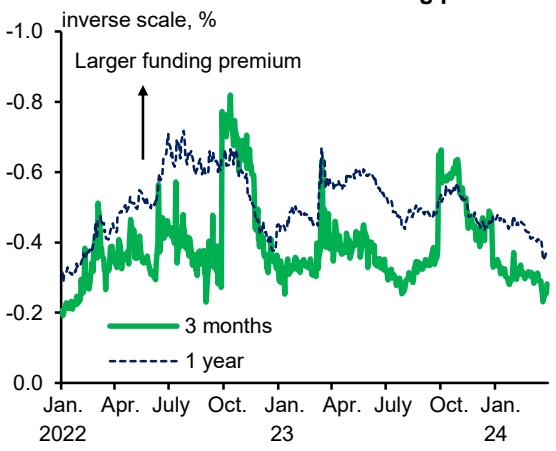
FX, stock, and credit markets

In FX markets, the U.S. dollar/yen rate was more or less unchanged over the second half of fiscal 2023 (Chart II-2-6). The yen temporarily appreciated against the U.S. dollar toward the beginning of 2024, in tandem with a decline in U.S. interest rates. However, it subsequently has depreciated, with market attention being paid to the yield differential between Japan and the United States. Dollar funding premiums in the FX swap market have been stable in general (Chart II-2-7).

Chart II-2-6: U.S. dollar/yen rates

Note: Latest data as of end-March 2024.
Source: Bloomberg.

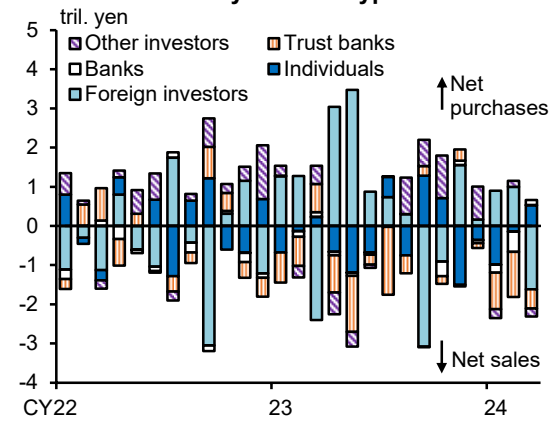
Chart II-2-7: U.S. dollar funding premiums



Note: "3 months" refers to premiums on FX swaps (inverse scale). "1 year" refers to alpha of basis swaps. Latest data as of end-March 2024.
Source: Bloomberg.

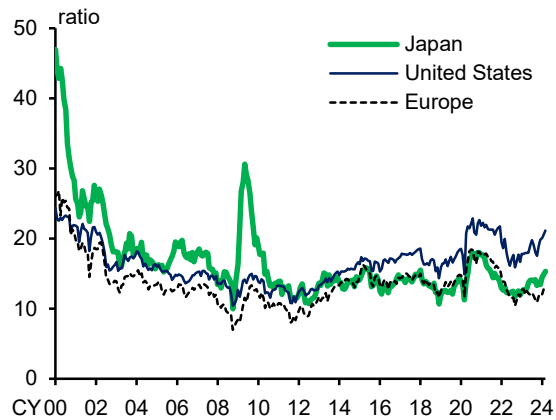
In capital markets, Japanese stock prices have increased substantially, driven by capital flows of foreign investors, amid solid corporate financial results and expectations for corporate governance reforms (Charts II-1-2 and II-2-8). Since the start of 2024, stock prices have also been pushed up by expectations of an inflow of funds associated with the introduction of the new Nippon Individual Savings Account (NISA) program, as well as a rise in prices of semiconductor-related stocks that reflected an increase in prices of U.S. high-tech stocks. The Nikkei 225 Stock Average hit a record high. Expected EPS has kept rising, due to solid corporate financial results on the back of a resumption of domestic economic activity and progress in cost pass-through (Chart II-1-2). Price-earnings (P/E) ratios have risen further, although they have remained at the historical average level (Chart II-2-9).

Chart II-2-8: Japanese stock investments by investor type



Note: The sum of net investments in cash and futures stock markets. Excludes securities companies. Latest data as of March 2024.
Source: Osaka Exchange; Tokyo Stock Exchange.

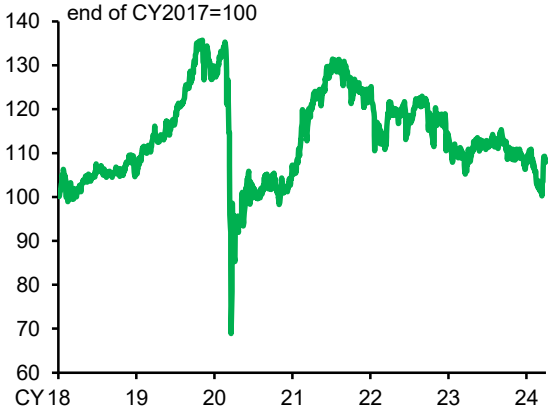
Chart II-2-9: P/E ratios



Note: The data for Japan, the United States, and Europe are calculated using expected EPS for the next 12 months of the TOPIX, the S&P 500, and the EURO STOXX, respectively. Latest data as of March 2024.
Source: LSEG Datastream.

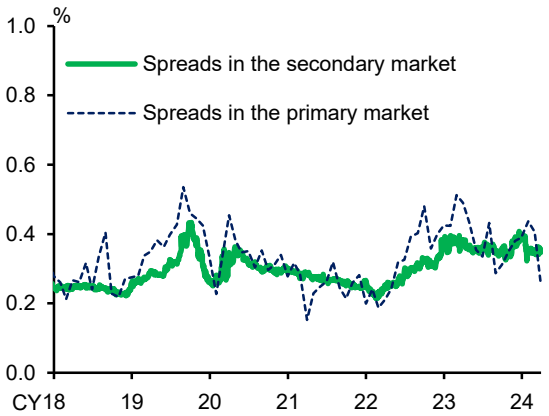
Prices of Japan real estate investment trusts (J-REITs) have remained weighed down, despite a substantial increase in stock prices (Chart II-2-10). Market attention has been paid to relatively high office vacancy rates and a possible rise in domestic interest rates.

Chart II-2-10: Tokyo Stock Exchange REIT Index



Note: Latest data as of end-March 2024.
Source: Bloomberg.

Chart II-2-11: Credit spreads on corporate bonds (AA-rated)



Note: 1. "Spreads in the secondary market" (daily data) indicates yield spreads of corporate bonds with remaining maturity of 3-7 years over government bonds. Latest data as of end-March 2024.
2. "Spreads in the primary market" (monthly data) indicates yield spreads of newly-issued corporate bonds with maturity of less than 15 years over government bonds. Bonds issued by banks and securities companies, etc. are excluded. Latest data as of March 2024.
Source: Bloomberg; Capital Eye; I-N Information Systems; JSDA; QUICK.

In the meantime, yield spreads of corporate bonds in both the primary and secondary markets have been more or less flat (Chart II-2-11). Issuance rates for CP have risen somewhat, in tandem with short-term interest rates. The shortening of maturity of newly-issued CP and corporate bonds has been observed, with attention being paid to a possible rise in interest rates.

C. Risks to financial markets

Uncertainty about financial markets remains high. There have been concerns in domestic and foreign financial markets over the following factors in the United States and Europe: a risk of inflation rates staying elevated and the cumulative effects of monetary tightening on economic activity and financial systems. In the U.S. short-term money market, market participants have been concerned about the possibility that the reduction in the Federal Reserve's balance sheet could exert upward pressure on interest rates.

In the stock and credit markets, there remain concerns over the cumulative effects of U.S. and European monetary tightening on financial conditions and funding of firms with low credit ratings. In the U.S. and European real estate industries, attention has been paid to developments in commercial real estate, reflecting the deterioration in the funding environment due to monetary tightening and weakening supply-demand conditions for office buildings. In the U.S. banking industry, there have been concerns about an increase in credit costs of commercial real estate loans, particularly among medium-sized and small banks.

In emerging markets, although concerns over capital outflows have abated compared with a while ago, future developments continue to warrant close monitoring, particularly in countries with fiscal

and financial vulnerability. In international commodity markets, attention needs to be paid to the impact of geopolitical factors, such as the situations in Ukraine and the Middle East, and of the slowdown in the Chinese economy on commodity and grain prices.

Attention should continue to be paid to the possibility that the materialization of these risks could lead to further tightening in global financial conditions, such as repricing of risky assets and a deterioration in the U.S. dollar funding environment.

III. Financial intermediation

- Financial intermediation has continued its smooth functioning in Japan. Banks' lending stance has remained active. As for domestic loans, banks have met the demand for real estate-related loans, as well as that for working capital amid the recovery in economic activity. As for foreign lending, major banks have been selective amid concerns over downside risks to foreign economies. Meanwhile, banks have been cautious about making securities investment amid concerns over the risk of higher interest rates.
- Assets under management held by non-bank financial intermediaries (NBFIs) have remained on an uptrend. Investment funds' assets under management have continued to increase on the back of inflows of funds from households. Financial dealers and brokers' short-term repo transactions have continued to be seen on both the asset and liability sides. On the other hand, life insurance companies' foreign bond positions have been under downward pressure from inverted foreign yield curves.
- No major financial imbalances can be observed in these various financial intermediation activities. Regarding the financial gap, which captures the financial cycle, the positive gap has narrowed due to the rebalancing of private debt and economic activity, reflecting the recovery of economic activity. However, with the expansionary phase of the financial cycle becoming prolonged, real estate-related loans have been at a high level. In the commercial real estate market, where the increase in lending and the large supply of office buildings have continued, valuations of some properties seem relatively high.

A. Financial intermediation by the banking sector

1. Loans

The annual growth rate of domestic loans by private banks has remained around 3 percent (Chart III-1-1).[8,9] This increase continues to be driven mainly by demand for working capital amid the recovery in economic activity. In addition, there has been an increase in demand for real estate-related loans and loan demand reflecting merger and acquisition (M&A) deals. The lending of regional and *shinkin* banks is under downward pressure stemming from repayments on effectively interest-free and unsecured loans (so-called zero-zero loans).

Loans to both large and medium-sized firms and small firms have continued to increase (Chart III-1-2). Firms' demand for loans as perceived by banks has also continued to rise (right panel of Chart III-1-3).

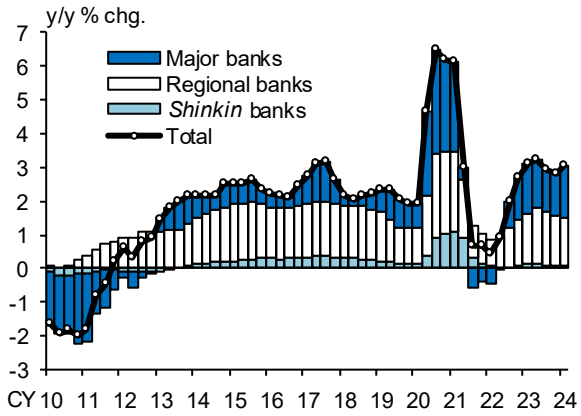
Meanwhile, banks' lending stance continues to be active. Major banks have been increasing their lending while ensuring loan profitability. Regional banks are also planning to increase lending with

[8] Regarding corporate loans supported by public financing -- defined as the sum of loans by government-affiliated banks and loans by private banks guaranteed by credit guarantee corporations -- a factor that exerts downward pressure on the outstanding amount is the repayment of zero-zero loans. On the other hand, a factor that exerts upward pressure on the outstanding amount is loans related to support to improve firms' business conditions. Moreover, there have been requests for loans and repayment moratoria by firms affected by the Noto Peninsula Earthquake.

[9] The annual increase in the yen-denominated value of foreign currency-denominated loans (foreign currency-denominated impact loans) is attributable to the effect of the depreciation of the yen.

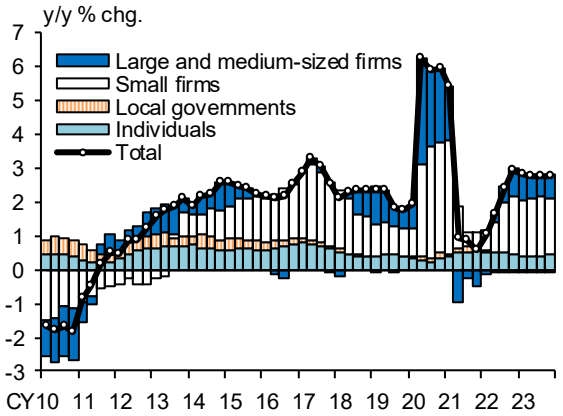
the aim of boosting their interest income on loans. Both major and regional banks have maintained their active lending stance, and no major or regional bank has tightened credit standards (left panel of Chart III-1-3). Banks' lending attitudes as perceived by both large and small firms have been accommodative (middle panel of Chart III-1-3).

Chart III-1-1: Banks' domestic loans outstanding



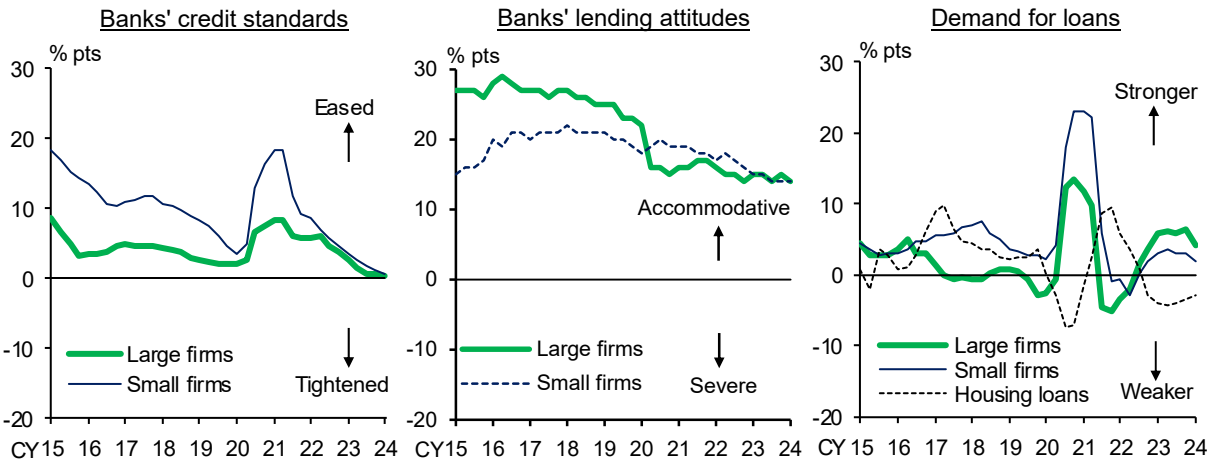
Note: Latest data as of January-February 2024.
Source: BOJ.

Chart III-1-2: Banks' loans outstanding by type of borrower



Note: Loans to banks and insurance companies are excluded. Latest data as of end-December 2023.
Source: BOJ.

Chart III-1-3: Loan-related DIs

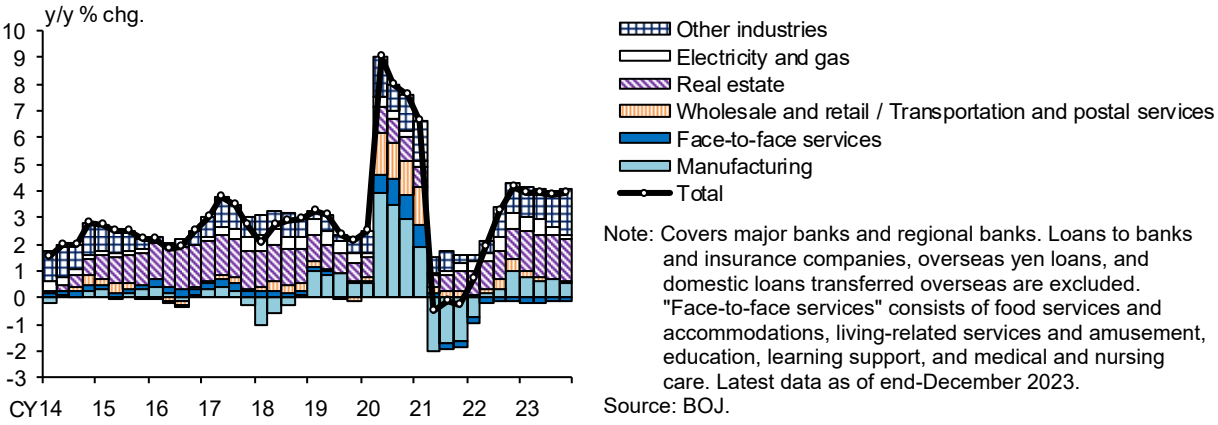


Note: 1. The left- and right-hand charts show 4-quarter backward moving averages. Latest data as of January 2024.
2. Latest data for the middle chart are as of March 2024.
Source: BOJ.

Loans by type of borrower

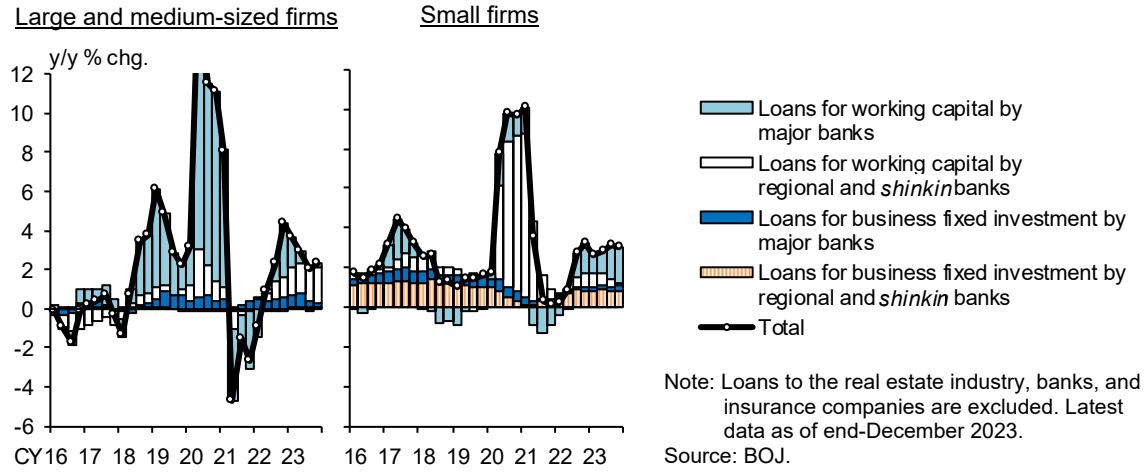
Loans to real estate businesses have continued to increase (Chart III-1-4). Growth in loans to the manufacturing as well as electricity and gas industries has decelerated, partly because demand for working capital has abated, reflecting the decline in import goods prices. As for working capital, while the loan growth rate has decelerated for large and medium-sized firms, it is unchanged for small firms (Chart III-1-5). Meanwhile, loans for business fixed investment have increased moderately, especially for small firms. In addition to the renewal investment along with the economic recovery, labor-saving investment to address labor shortages and fixed investment for decarbonization have contributed to this increase.

Chart III-1-4: Corporate loans outstanding by industry



Note: Covers major banks and regional banks. Loans to banks and insurance companies, overseas yen loans, and domestic loans transferred overseas are excluded. "Face-to-face services" consists of food services and accommodations, living-related services and amusement, education, learning support, and medical and nursing care. Latest data as of end-December 2023.
Source: BOJ.

Chart III-1-5: Corporate loans outstanding by type of loan

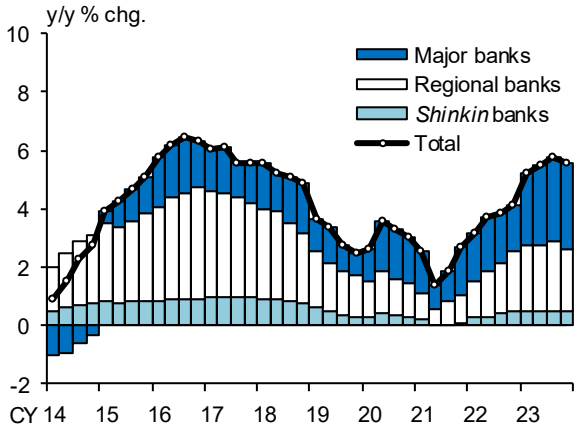


Note: Loans to the real estate industry, banks, and insurance companies are excluded. Latest data as of end-December 2023.
Source: BOJ.

Real estate-related loans

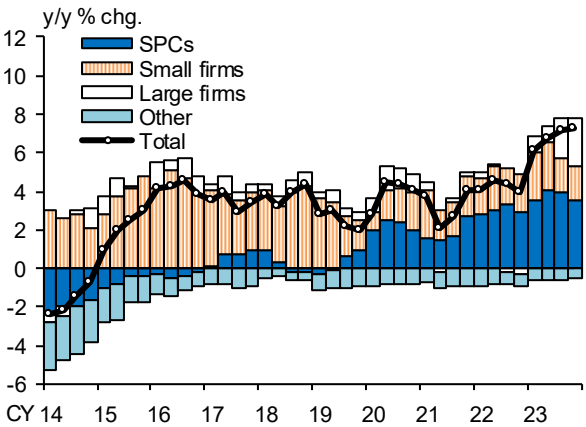
Loans to real estate businesses have continued to grow at a relatively high rate at both major and regional banks (Chart III-1-6). At major banks, loans to real estate investment funds and real estate investment trusts (REITs) with relatively high lending margins have been the main contributors to this increase (Chart III-1-7, where the former is represented by "SPCs" and the latter is included in "small firms"). Loans to major real estate developers ("large firms" in the chart) have also been

Chart III-1-6: Banks' real estate loans outstanding



Note: Latest data as of end-December 2023.
Source: BOJ.

Chart III-1-7: Real estate loans by major banks

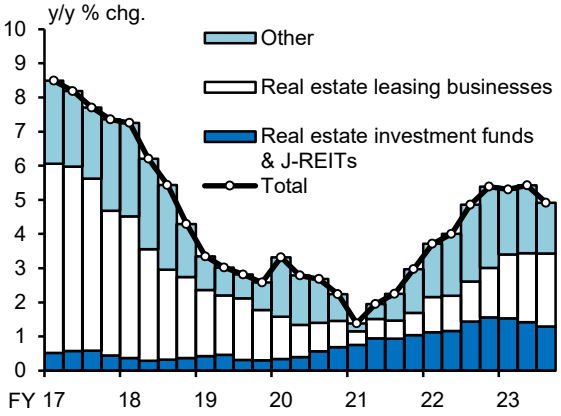


Note: "Small firms" includes J-REITs. Latest data as of end-December 2023.
Source: BOJ.

increasing at a faster pace. Major banks have actively met solid demand for funds while managing credit exposures cautiously based on current real estate market conditions and past periods of market stress.

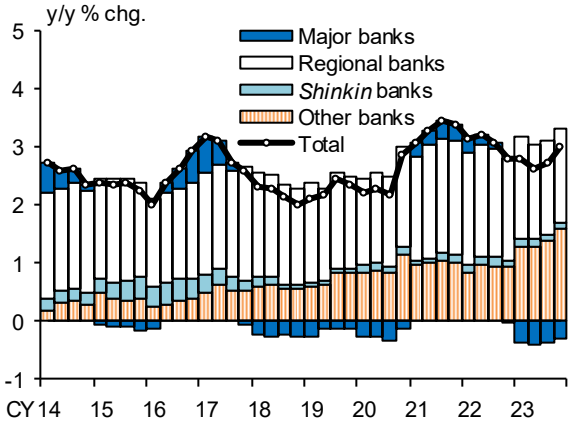
At regional banks, loans to real estate investment funds and to non-residential real estate leasing businesses have been on an uptrend (Chart III-1-8, where these loans are included in "other").[10] Loan demand has also increased in local cities due to the construction of new leasing properties such as office buildings and logistics facilities. Loans to real estate leasing businesses, which had decelerated during the pandemic, have been increasing at a faster pace again. On the back of these market developments, some regional banks have been increasing the share of loans to real estate businesses.

Chart III-1-8: Real estate loans by regional banks



Note: Covers 86 regional banks, for which a breakdown of real estate loans is available. "Real estate leasing businesses" is for residential use. Latest data as of end-December 2023.
Source: BOJ.

Chart III-1-9: Banks' housing loans outstanding



Note: "Other banks" covers domestically licensed banks but excludes major banks and regional banks. Latest data as of end-December 2023.
Source: BOJ.

Housing loans, which account for a large share of loans to individuals, have continued to grow at around 3 percent (Chart III-1-9). On the demand side, although housing starts have declined, the outstanding amount of housing loans has been pushed up due to the larger amount per loan reflecting the rise in property prices. On the supply side, the increase in the outstanding amount has been led by internet-only banks (included in "other banks" in the chart), which offer highly preferential interest rates. At major banks, housing loans have declined, partly because of their greater focus on profitability and resultant selective lending stance. At regional banks, the pace of increase in the outstanding amount has decelerated.

Loan interest rates

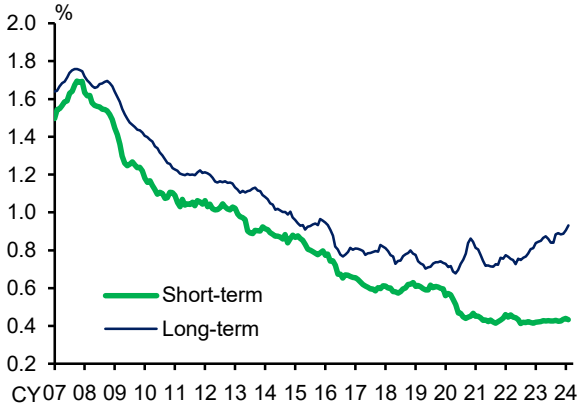
With regard to banks' average contract interest rates on new loans and discounts, short-term lending rates have been hovering around record low levels (Chart III-1-10).[11] Long-term lending rates, especially fixed interest rates for corporate loans, have been rising. Meanwhile, the difference between interest rates on floating-rate and fixed-rate housing loans has become larger (Chart III-

[10] Looking at the breakdown of loans to real estate businesses by regional banks, loans to real estate leasing businesses account for half of total loans. Of these loans, the ratio of loans to individuals to corporate loans is 3:2. Loans to real estate investment funds account for only 10 percent. The remaining 40 percent includes various loans, including those to real estate sales agents.

[11] See Box 4 for interest rate developments before and after the changes in the monetary policy framework in March 2024.

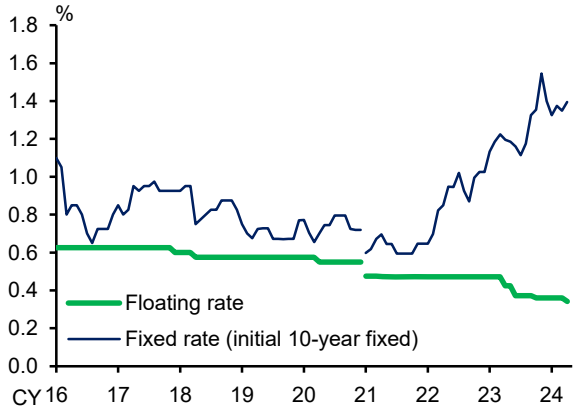
1-11). Interest rates on floating-rate housing loans, which account for 80 percent of new housing loans, have been low. Interest rates on fixed-rate housing loans have declined somewhat, but they remain relatively high compared to the levels observed in the past few years.

Chart III-1-10: Average contract interest rates on new loans and discounts



Note: Covers domestically licensed banks. 6-month backward moving averages. Latest data as of February 2024.
Source: BOJ.

Chart III-1-11: Interest rates on housing loans

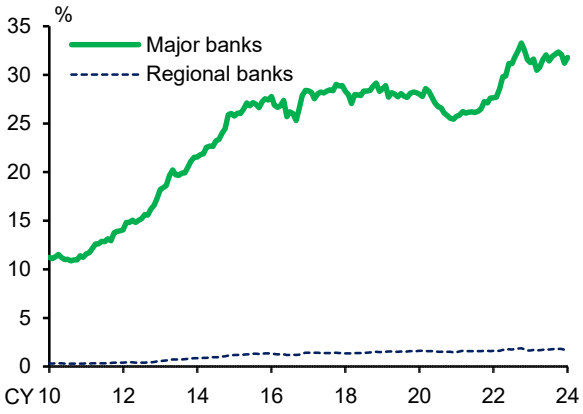


Note: Shows medians of some major banks (preferential rates are taken into account). Covers loans with administrative fees from 2021 and those with guarantee fees up to 2020. Latest data as of April 2024.
Source: Published accounts of each bank.

Foreign loans

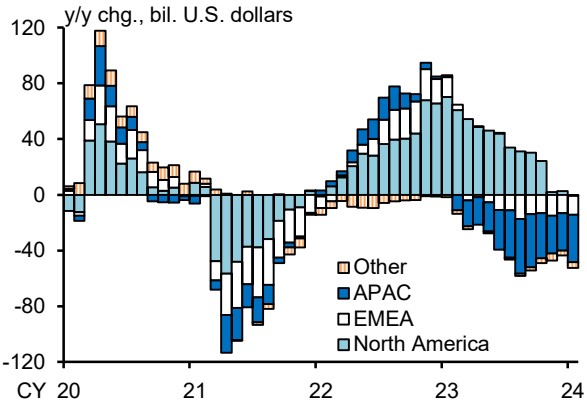
With foreign loans accounting for over 30 percent of their loan portfolios, major banks are more susceptible to foreign financial and economic conditions (Chart III-1-12). Against this background, major banks have been selective in their foreign lending (Chart III-1-13). Concerns over downside risks to foreign economies and the correction risk in foreign real estate markets have also contributed to such lending stance.

Chart III-1-12: Share of foreign loans in total loans



Note: On a non-consolidated basis. Latest data as of end-January 2024.
Source: BOJ.

Chart III-1-13: Foreign loans outstanding of the three major banks by region



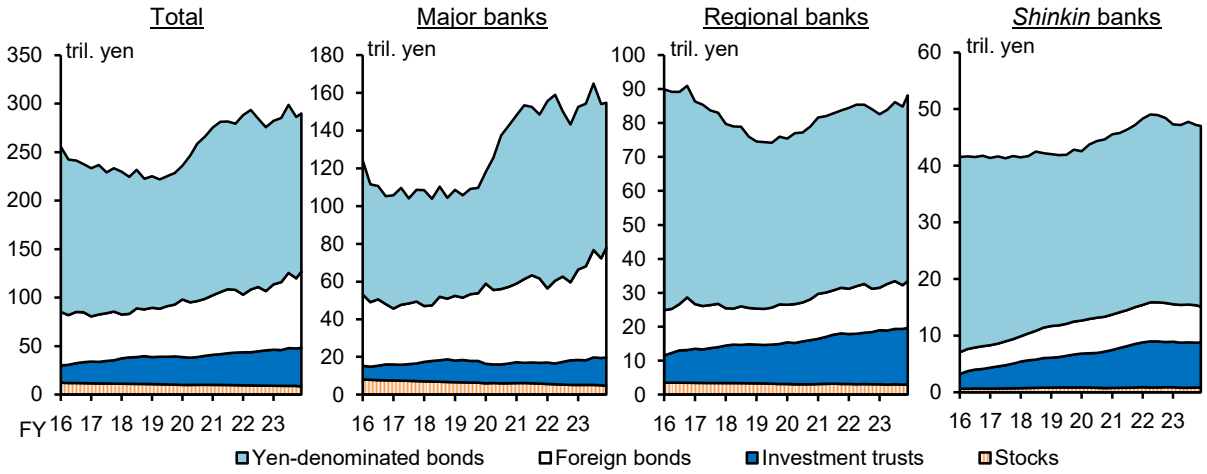
Note: Latest data as of end-January 2024.
Source: BOJ.

On the demand side, loan demand has been sluggish in all regions due to the rise in loan interest rates. Increases in loan demand have been seen in some limited areas, such as loans to investment funds, on which major banks have been focusing. On the supply side, reviews and the resultant reduction of loans to low-return borrowers at major banks have put downward pressure on lending.

2. Securities investment

Banks have continued to make domestic securities investments in a risk-conservative manner amid concerns over the risk of higher interest rates (Chart III-1-14). As for foreign securities investment, banks have adjusted their positions with an eye on the timing of future interest rate cuts.[12]

Chart III-1-14: Outstanding amount of securities among banks



Note: 1. "Investment trusts" includes domestic and foreign investment, and some securities other than investment trusts.
2. "Stocks" is based on the outstanding amount on a book value basis and excludes foreign stocks.
3. The data are the sum of figures for domestic and foreign branches, with the exception of those for major banks' "Stocks," which are figures for domestic branches. Latest data as of end-February 2024.

Source: BOJ.

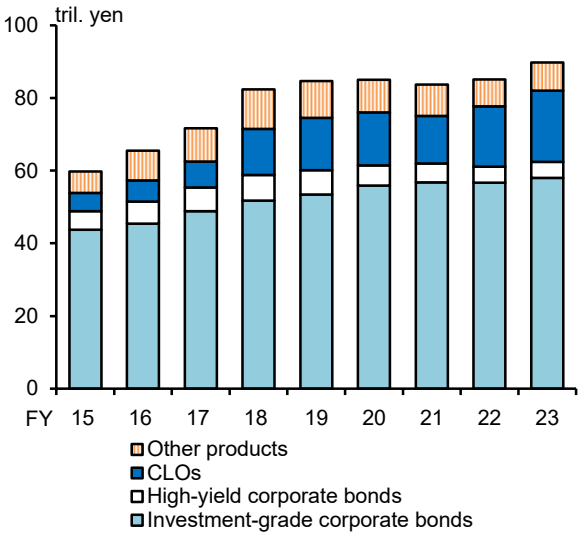
Major banks have held back from accumulating holdings of yen-denominated bonds, including JGBs, municipal bonds, and corporate bonds amid concerns over the risk of rising interest rates. They have continued with interest rate hedging by purchasing inverse mutual funds, for which net asset values increase when interest rates rise. They have taken a cautious stance toward investing in foreign bonds on the whole with foreign yield curves remaining inverted. Some banks have adopted flexible trading strategies with the aim of obtaining capital gains. Strategic stockholdings, i.e., stockholdings for the purpose of maintaining business ties with firms, have continued to fall, partly as a response to growing social awareness regarding corporate governance.

Regional and *shinkin* banks have also adopted a risk-conservative investment stance. Amid concerns over the risk of higher interest rates, both regional and *shinkin* banks have been cautious about increasing holdings of yen-denominated bonds. To curtail the risk of valuation losses, some banks have replaced these bonds with held-to-maturity bonds; some have purchased inverse mutual funds. As for foreign bonds, some banks have restored some of their positions that they had reduced, but the increase in holdings has been limited. Other banks have increased investment in domestic real estate funds with the aim of improving investment yields.

Banks have also been cautious about taking risks in foreign credit products. They have reduced their positions in high-yield bonds to reduce market credit risk (Chart III-1-15). However, the outstanding amount of investment in foreign credit products by Japanese banks has increased, mainly due to an increase in investment in collateralized loan obligations (CLOs). Banks have continued to prefer CLOs, which offer floating-rate coupons, with a view to containing the risk of negative interest margins. Moreover, large financial institutions have increased their alternative investment holdings, such as private equity holdings, in order to diversify risk (Chart III-1-16).

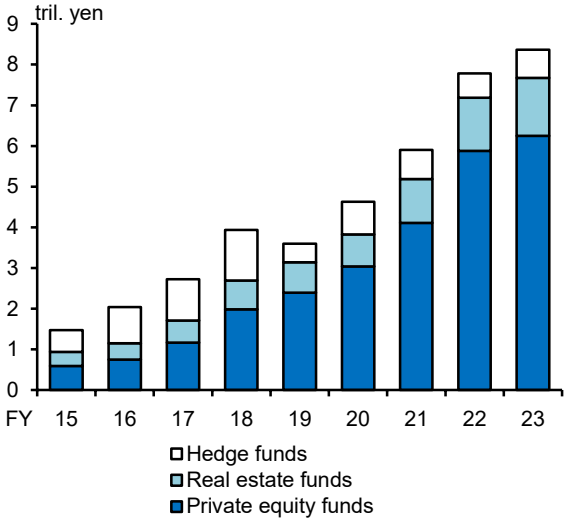
[12] One of the reasons for the increase in the amount outstanding of foreign currency-denominated securities investment (calculated in yen terms) is the yen's depreciation.

Chart III-1-15: Foreign credit product investment



Note: Covers major banks, regional banks, *shinkin* banks, Japan Post Bank, and a central organization of financial cooperatives. Latest data as of end-September 2023.
Source: BOJ.

Chart III-1-16: Foreign alternative investment

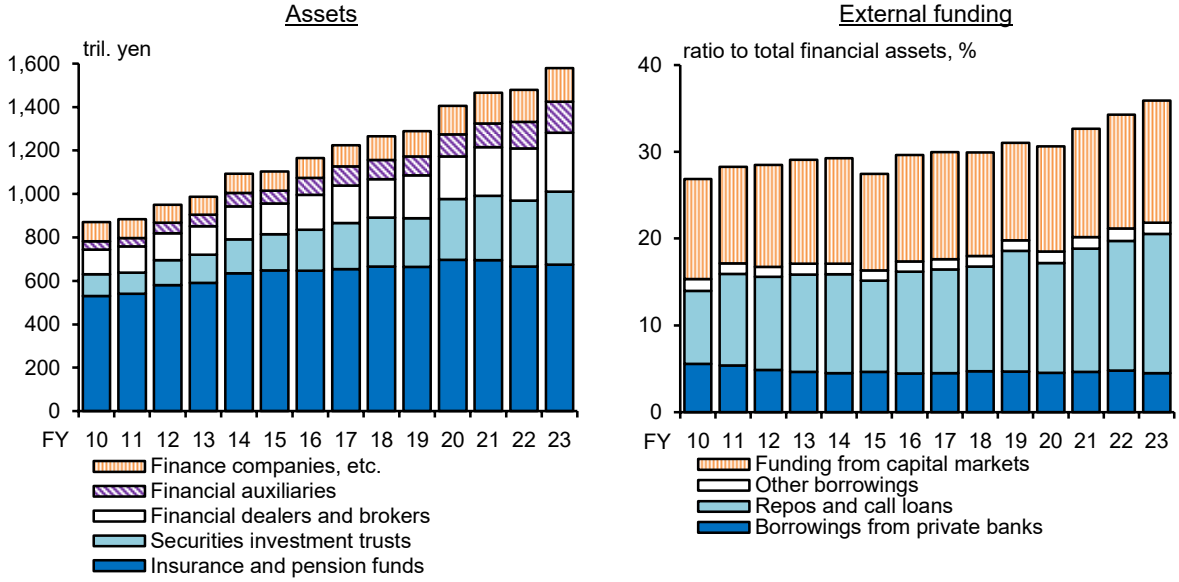


Note: 1. Covers major banks, Japan Post Bank, and a central organization of financial cooperatives.
2. "Real estate funds" excludes publicly traded REITs. Latest data as of end-September 2023.
Source: BOJ.

B. Financial intermediation by the non-bank financial sector

In Japan, where depository financial institutions are still dominant in financial intermediation, the share of financial assets held by non-bank financial intermediaries (NBFIs) has remained at about 30 percent.[13] However, assets under management held by NBFIs have remained on an uptrend

Chart III-2-1: Balance sheets of Japan's NBFIs



Note: "Financial auxiliaries" includes financial holding companies, stock exchanges, and financial instruments exchanges. "Finance companies, etc." includes finance companies, securities finance companies, and the Resolution and Collection Corporation. Latest data as of end-December 2023.
Source: BOJ.

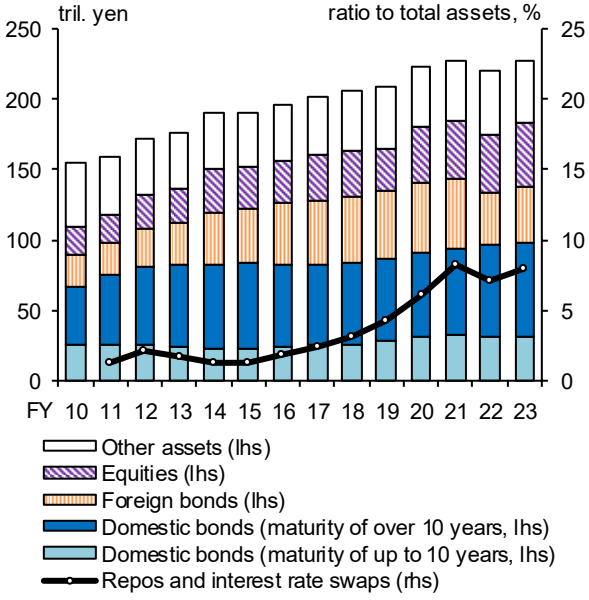
[13] The share of financial assets held by each entity in the financial system in Japan (globally) is 30 percent (47 percent) for NBFIs, 48 percent (40 percent) for depository financial institutions, 15 percent (8 percent) for central banks, and 7 percent (5 percent) for public financial institutions (figures are as of end-2022). In line with the definition of the Financial Stability Board (FSB), NBFIs here include all financial institutions that are not depository financial institutions, central banks, or public financial institutions.

(Chart III-2-1). Life insurance companies and financial dealers and brokers have continued to conduct repo transactions. The increase in assets under management and the resultant expansion in market funding have contributed to an increase in the interconnectedness between NBFIs and banks in Japan.

Insurance companies and pension funds

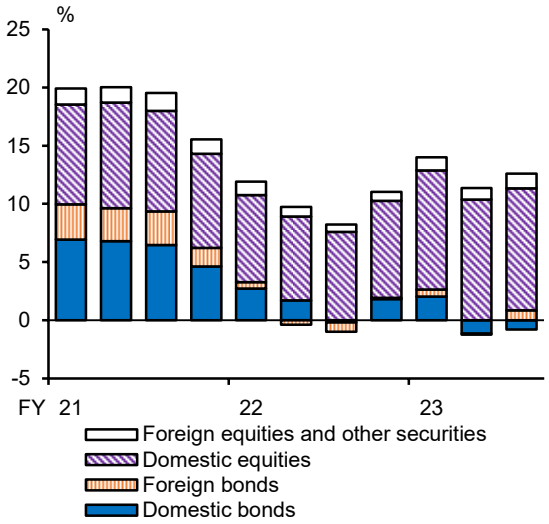
Life insurance companies have continued to invest in super-long-term JGBs with a view to reducing the duration gap between assets and liabilities (Chart III-2-2). They have invested in super-long-term bonds using premium income as well as repo funding and interest rate swaps. Against this background, their average economic value-based solvency margin ratio (ESR) has been above 200 percent. In addition, they have a certain level of cash and deposits as reserves for claims.

Chart III-2-2: Investment assets outstanding among life insurance companies



Note: 1. Covers nine major life insurance companies. Based on general accounts.
2. Interest rate swaps indicate net positions calculated based on notional amounts.
3. Latest data as of end-September 2023.
Source: Published accounts of each company.

Chart III-2-3: Valuation gains/losses among life insurance companies



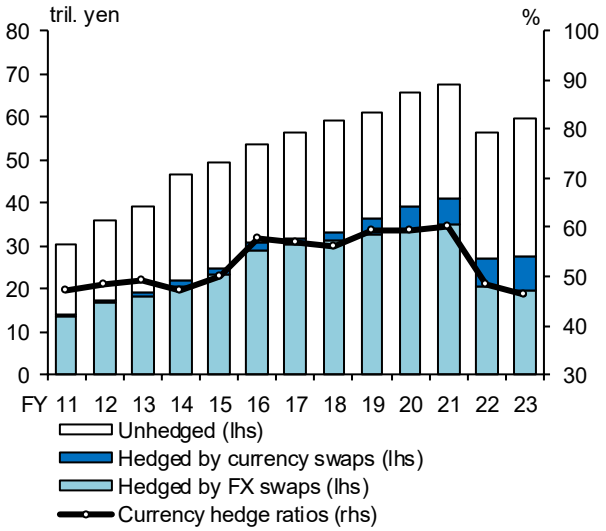
Note: Shows the ratio of valuation gains/losses on securities holdings, which excludes trading securities. Covers four major life insurance companies. Latest data as of end-2023.
Source: Published accounts of each company.

Recently, life insurance companies' valuation gains/losses on yen-denominated bondholdings have turned negative, reflecting the rise in domestic interest rates (Chart III-2-3). However, their securities holdings overall have continued to register substantial net valuation gains. Valuation gains on stockholdings have expanded on the back of rising stock prices, and valuation losses on foreign bondholdings have been limited even with the rise in foreign interest rates.[14] As for foreign

[14] Life insurance companies' financial soundness amid the rise in interest rates has been a subject of debate worldwide. In particular, the increase in valuation losses on securities holdings as well as the rise in surrender of savings insurance policies and the resultant liquidity burden have been highlighted. Regarding valuation losses on securities holdings, in Japan, the composition of insurers' assets is such that valuation gains on stockholdings exceed valuation losses on bondholdings (Chart III-2-3). Moreover, under the current system, bonds that are managed so that changes in the market value of assets and liabilities due to interest rate fluctuations are matched are classified as policy-reserve-matching bonds and are allowed to be excluded from mark-to-market valuation. With regard to surrender, sales of savings insurance policies such as yen-denominated single-premium policies had been limited in Japan from 2016, when long-term interest rates fell substantially, since this made it difficult to secure the assumed rate of return.

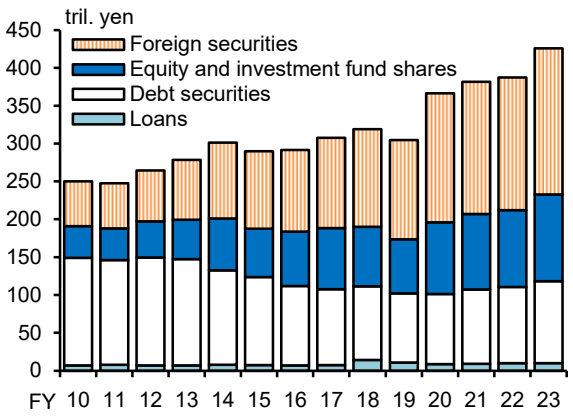
bond positions, life insurance companies have reduced their holdings of currency-hedged foreign bonds, partly because foreign currency funding costs, including hedging costs, have remained high (Chart III-2-4). Their foreign bond positions have been under downward pressure from inverted foreign yield curves.

Chart III-2-4: Currency hedge ratios among life insurance companies



Note: Covers nine major life insurance companies.
Estimated based on general accounts.
"Unhedged" includes foreign bonds earmarked for foreign currency-denominated insurance.
Latest data as of end-September 2023.
Source: Published accounts of each company.

Chart III-2-5: Investment assets outstanding among pension funds



Note: Covers pension funds and public pensions.
Latest data as of end-December 2023.
Source: BOJ.

Corporate pension funds have maintained their cautious investment stance without depending on leverage, with many of them having secured net assets in excess of policy reserves. The Government Pension Investment Fund (GPIF), which is in charge of managing the assets of public pension funds such as employees' pension funds and the national pension fund, has been rebalancing its portfolio (Chart III-2-5).[15] This is in line with the basic portfolio allocation, which determines the fund's portfolio share of each asset class from the perspective of safe and efficient asset management over a long-term investment horizon.

Investment funds

Investment funds' assets under management, especially those of securities investment trusts, have continued to increase on the back of inflows of funds from households (Chart III-2-6). With the introduction of the new Nippon Individual Savings Account (NISA) program this year, inflows of funds into eligible financial products have been increasing. Meanwhile, the assets under management of leveraged private funds have increased (see Box 3).

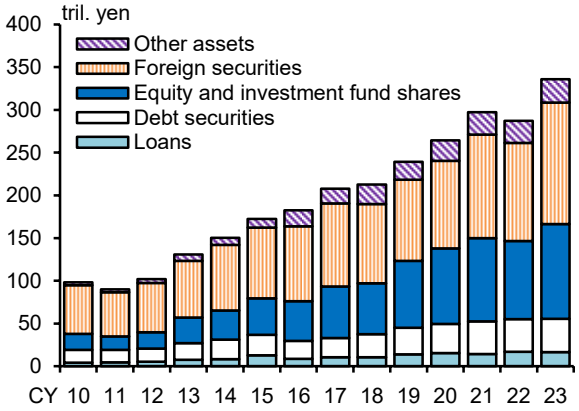
Finance companies

Loans outstanding of finance companies such as money lenders have been on an uptrend (Chart

[15] Japan's pension funds primarily follow simple investment strategies consistent with the policy asset mix or the basic portfolio allocation instead of strategies that make use of leverage, such as liability-driven investment strategies. For details, see Ito, Y., Kasai, Y., Todoroki, R., Toyoda, A., and Horie, R., "Corporate Pension Funds' Investment Strategies and Financial Stability: Lessons from the Turmoil in the UK Gilt Market," *Bank of Japan Review Series*, no. 2023-E-3, March 2023.

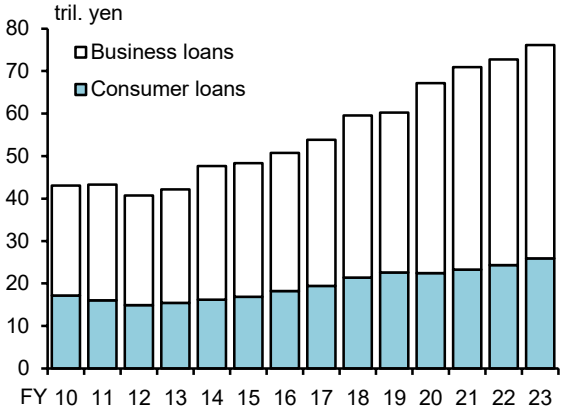
III-2-7). By type of loans, business loans by finance companies, just like those by banks, have increased on the back of the recovery in economic activity. As for consumer loans, the use of credit cards in online shopping and small loans via smartphones have increased. Yet, despite the rise in loans, finance companies' credit costs have been limited. According to the fiscal 2022 survey of the Japan Financial Services Association, 60 percent of loans extended by these finance companies are fixed-rate loans.

Chart III-2-6: Investment assets outstanding among investment trusts



Note: Latest data as of end-December 2023.
Source: BOJ.

Chart III-2-7: Loans outstanding among finance companies

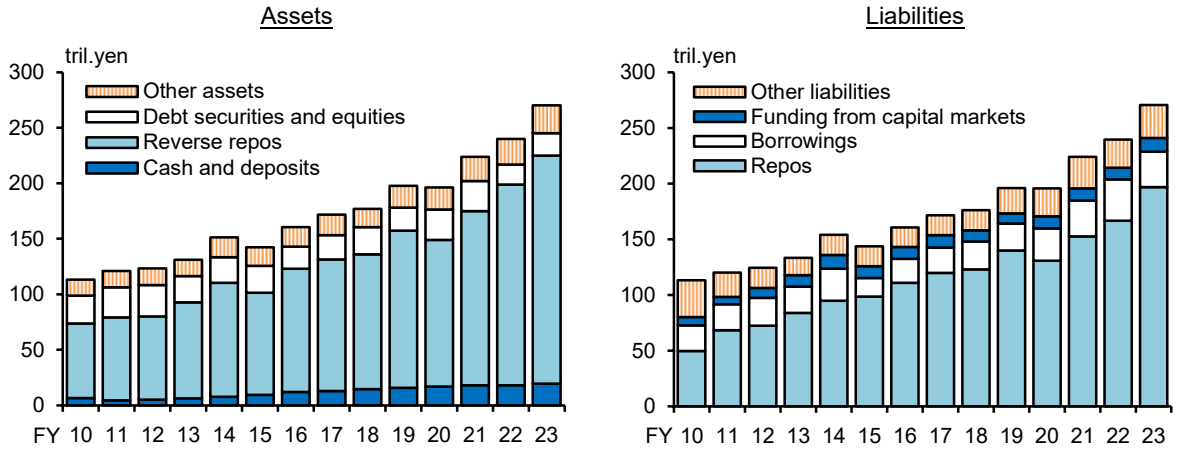


Note: "Business loans" includes loans to governments. Latest data as of end-December 2023.
Source: BOJ.

Financial dealers and brokers

Financial dealers and brokers' positions have expanded, mainly reflecting the increase in short-term repo transactions on both the asset and liability sides (Chart III-2-8).[16] This reflects an increase in brokerage of arbitrage transactions by Japanese securities companies and *tanshi* companies (money market brokers) between short-term money market transactions and current account deposits at the Bank of Japan. It also reflects an increase in repo transactions by foreign securities companies' branches in Japan to broker JGB transactions to meet their headquarters'

Chart III-2-8: Balance sheets of financial dealers and brokers



Note: "Equities" includes investment fund shares. Latest data as of end-December 2023.
Source: BOJ.

[16] For details on off-balance-sheet transactions of financial dealers and brokers, see Inoue, S., Miki, S., and Gemma, Y., "The Japanese Yen Interest Rate Swap Market Observed from OTC Derivative Transaction Data: The Impact of COVID-19," *Bank of Japan Review Series*, no. 2021-E-3, September 2021.

demand for JGBs as collateral. Recently, there have also been repo transactions by foreign investors to invest in yen-denominated bonds. In most of these transactions by financial dealers and brokers, there is no duration mismatch between their assets and liabilities.

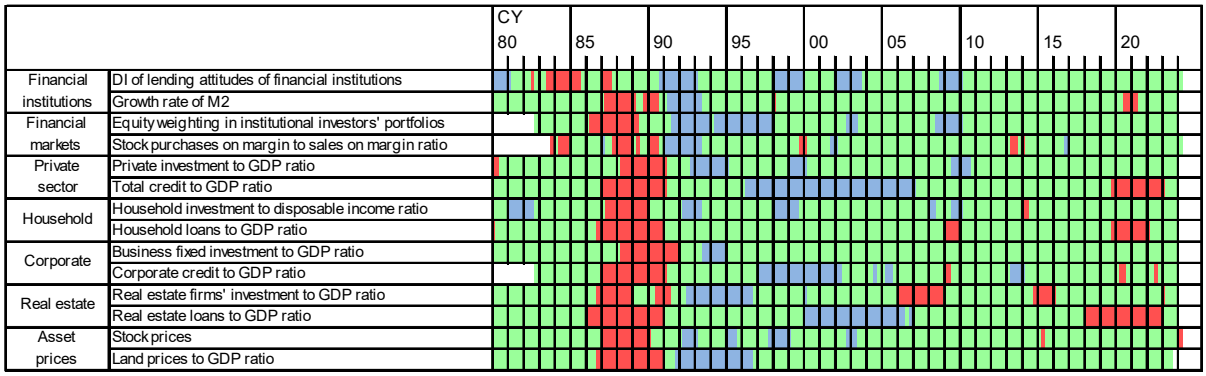
C. Financial cycle

As confirmed in the preceding sections, financial intermediation has continued its smooth functioning in Japan. This section examines whether this financial intermediation and the resultant increase in private debt have led to a buildup of financial imbalances that could cause a significant downturn in future economic activity.

1. The financial cycle and risks to economic growth

A heat map and the financial gap are used to assess whether the current phase of the financial cycle shows any signs of overheating or contraction. The heat map depicts whether various Financial Activity Indexes (FAIXs) point to an overheating or contraction of activity using the bubble period in the late 1980s for reference, indicating financial conditions in three different colors (Chart III-3-1).[17] The latest heat map shows that the *stock prices* indicator has turned "red," which signals an overheating (as will be described later). However, 13 out of the 14 FAIXs are "green," which signals neither an overheating nor a contraction, unchanged from the previous issue of the *Report*.

Chart III-3-1: Heat map



Note: The latest data for "DI of lending attitudes of financial institutions," "Stock purchases on margin to sales on margin ratio," and "Stock prices" are as of the January-March quarter of 2024. Those for "Land prices to GDP ratio" and the other indexes are as of the July-September quarter of 2023 and the October-December quarter of 2023, respectively.
Source: Bloomberg; Cabinet Office; Japan Real Estate Institute; Ministry of Finance; Tokyo Stock Exchange; BOJ.

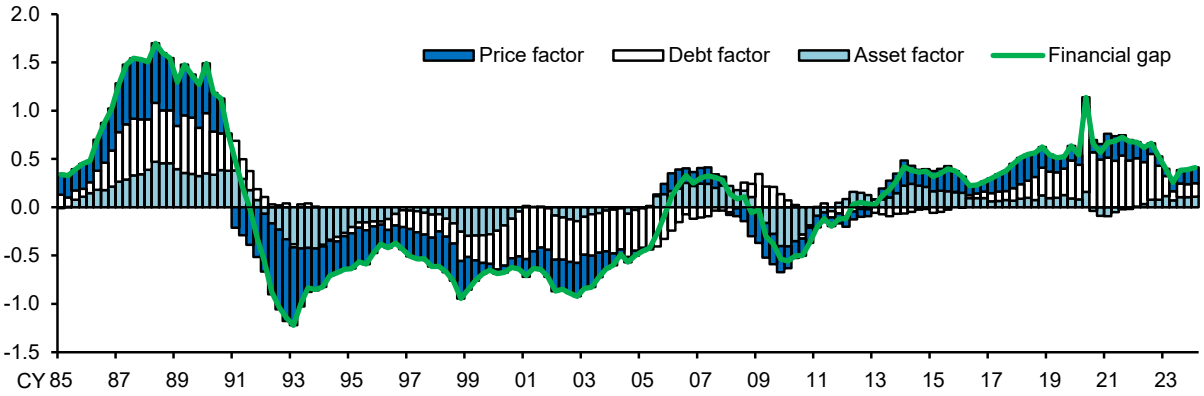
Next, the financial gap -- a summary measure of the 14 FAIXs -- is examined to quantify changes in the financial cycle. It is calculated as the weighted average of the deviations of the 14 FAIXs from their trends. The positive gap has narrowed recently because the contribution of the "debt factor" to the positive financial gap has become smaller (Chart III-3-2).[18] This is due to the

[17] The heat map in Chart III-3-1 represents a mechanical assessment of whether financial activity is overheating or contracting. Specifically, the colors represent the following: (1) red indicates that an index is above its upper threshold; (2) blue indicates that an index is below its lower threshold; (3) green indicates no signs of either extreme; and (4) white indicates that no data for that period are available. For details on the FAIXs, see Ito, Y., Kitamura, T., Nakamura, K., and Nakazawa, T., "New Financial Activity Indexes: Early Warning System for Financial Imbalances in Japan," Bank of Japan Working Paper, no. 14-E-7, April 2014.

[18] In Chart III-3-2, larger weights are assigned to indexes that have a higher correlation with other indexes in calculating the weighted average of individual FAIXs. The weights vary based on changes in the degree of correlation over time.

rebalancing of private debt and economic activity reflecting the recovery in economic activity after the pandemic. Moreover, the contribution of real investment due to leverage (the "asset factor") and asset price increases such as of stock prices (the "price factor") has remained limited. Thus, no major financial imbalances, such as an overheating or a contraction, can be observed in current financial activities.

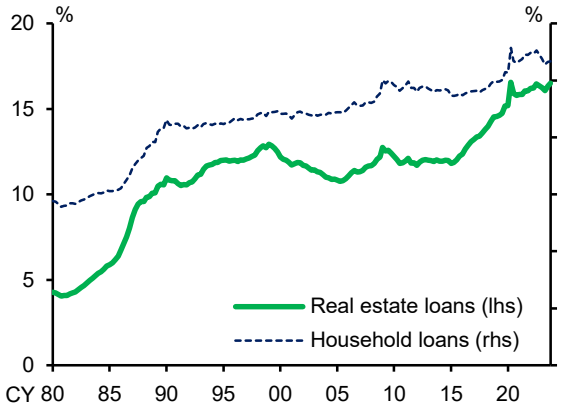
Chart III-3-2: Financial gap



Note: "Asset factor" consists of indexes of fixed investment by the private sector, households, firms, and real estate businesses. "Debt factor" consists of indexes of their debt financing. "Price factor" consists of the remaining indexes. Latest data as of the January-March quarter of 2024 (some indexes are imputed by the previous period's value).
Source: BOJ.

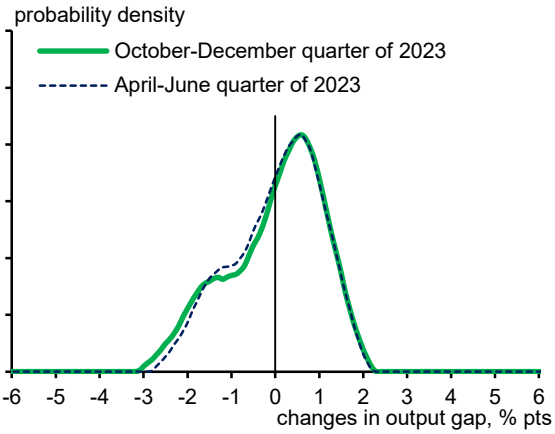
However, some developments warrant attention in the medium to longer term. The current expansionary phase of the financial gap, which has continued since the early 2010s, is the longest on record in the post-bubble period. Among indexes that make up the "debt factor," the *real estate loans to GDP ratio* and the *household loans to GDP ratio* show a buildup of private debt (Chart III-3-3). Looking at "GDP-at-risk" (GaR), which shows risks to GDP growth, the probability distribution of future GDP growth rates over the next three years remains skewed to the left, toward an economic downturn (Chart III-3-4).[19] This pattern suggests that the private debt that has built up

Chart III-3-3: Real estate-related loans to GDP ratio



Note: Latest data as of the October-December quarter of 2023.
Source: Cabinet Office; BOJ.

Chart III-3-4: Risks to future economic growth



Note: Shows the changes in output gap over the next 3 years. Estimated based on output gap, financial gap, and U.S. NFCI for each time point.

[19] GaR applies the value-at-risk (VaR) approach, a method for assessing the risk associated with financial assets, to the GDP growth rate. Specifically, the regression equation used to estimate GaR here is as follows:

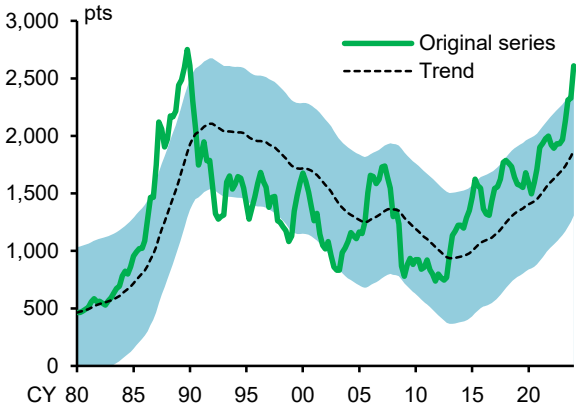
$$\begin{pmatrix}\text{Changes in the output gap}\\ \text{over the next } X \text{ years}\end{pmatrix} = \alpha \begin{pmatrix}\text{Changes in the output gap}\\ \text{from the previous period}\end{pmatrix} + \beta(\text{Financial gap}) + \gamma(\text{U.S. NFCI}) + \delta.$$

For details on the GaR approach, including the underlying rationale, estimation method, and caveats regarding its use, see Section B of Chapter IV and Box 1 of the October 2018 issue of the *Report*.

so far could result in balance sheet adjustment pressures and increase the risk of an economic downturn.

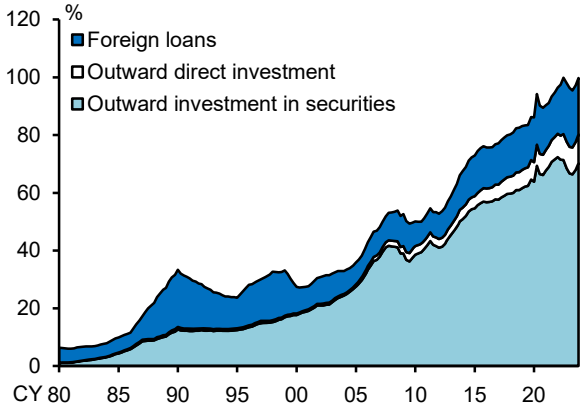
In asset markets, prices of assets have risen. In the real estate market, valuations of some properties seem relatively high (as will be described later). In the stock market, prices have continued to rise (Chart III-3-5). The recent rise in stock prices reflects market expectations for firms' business performance and corporate governance reforms. So far, the contribution of the "price factor" through rising stock prices to the financial gap has been limited; moreover, the uptrend in stock prices has been moderate compared to previous episodes when financial imbalances built up. In addition, valuations of stock prices have remained at their past average. However, it should be noted that if valuations of asset prices rise further in the future, this could exert repricing pressure on assets (see Section B of Chapter II for valuations of stock prices).

Chart III-3-5: Stock prices



Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates 1.5 times the root mean square of the deviation from the trend.
2. Latest data as of the January-March quarter of 2024.
Source: Bloomberg.

Chart III-3-6: External credit to GDP ratio



Note: Covers depository financial institutions and NBFIs. 4-quarter backward moving averages. Latest data as of the October-December quarter of 2023.
Source: Cabinet Office; BOJ.

Meanwhile, the uptrend in the ratio of external credit to GDP has paused (Chart III-3-6). As mentioned earlier, banks have been selective in foreign lending, and the increase in their foreign bondholdings has been limited. However, due to the past increase in external credit, Japan's financial system has become more susceptible to foreign economic and financial conditions through not only the real economic channel but also the financial channel (credit risk and interest rate risk). In particular, inverted foreign yield curves have had a broad impact on Japanese financial institutions' business conditions through changes in foreign asset prices and foreign currency funding costs (see Sections B and D of Chapter IV).

2. The financial cycle and real estate-related markets

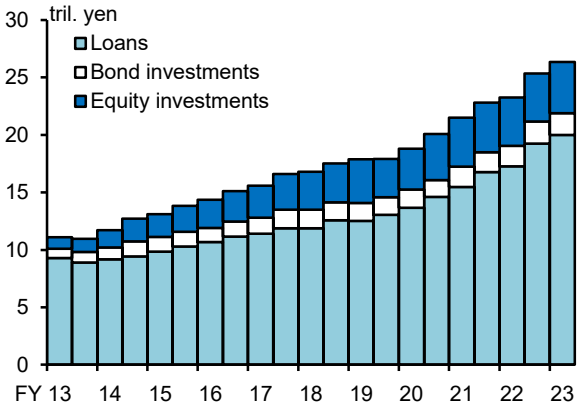
With the expansionary phase of the financial cycle becoming prolonged, real estate-related loans have been at a high level. The outstanding amounts of loans to real estate businesses and housing loans have been near record highs relative to the level of economic activity. The following examines developments in real estate-related lending and the current situation of real estate-related markets.

Risk of a correction in the real estate transaction market

To begin with, liabilities and assets of real estate businesses, as well as real estate prices, are examined. On the liability side, the *real estate loans to GDP ratio* has remained high at its historical

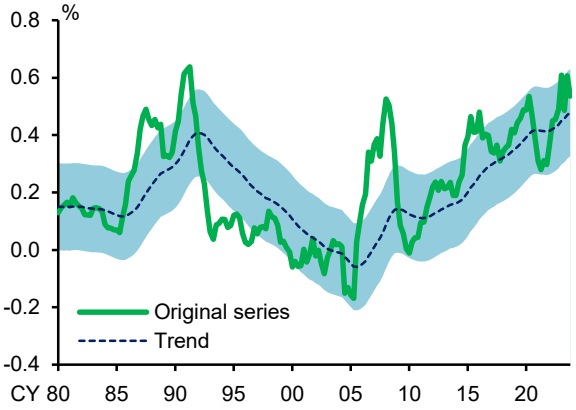
peak range (Chart III-3-3). Japanese banks' lending to and investment in real estate investment funds -- not only non-recourse loans but also bond investments and equity investments -- have continued to increase (Chart III-3-7). The number of banks with real estate-related exposure has also been on the rise, in terms of both loans and securities investment (see Sections A and B of Chapter IV for loans and securities investment, respectively).

Chart III-3-7: Loans and investments to real estate investment funds



Note: "Loans" indicates non-recourse loans. The chart covers major, regional, and *shinkin* banks.
Source: BOJ.

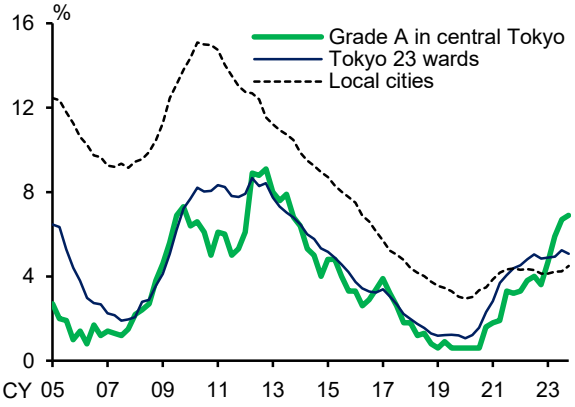
Chart III-3-8: Real estate firms' investment to GDP ratio



Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as of the October-December quarter of 2023.
Source: Cabinet Office; Ministry of Finance.

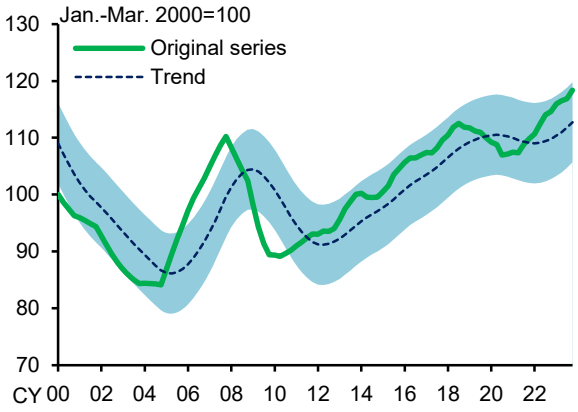
On the asset side, the *real estate firms' investment to GDP ratio* has been at a high level (Chart III-3-8). Urban redevelopment projects by major real estate developers, including the construction of offices and commercial facilities, have led to active investment by real estate firms. While vacancy rates for office buildings have been low in Japan as a whole, they have been at relatively elevated

Chart III-3-9: Office vacancy rates



Note: 1. Vacancy rates are calculated as the ratio of the vacant area to the total leasable area.
2. "Grade A" covers the buildings with a large floor area and an age of 15 years or less. "Local cities" indicates the average rates of 5 local major cities.
3. Latest data as of the October-December quarter of 2023.
Source: Sanko Estate Co., Ltd.

Chart III-3-10: Commercial real estate prices to rent ratio

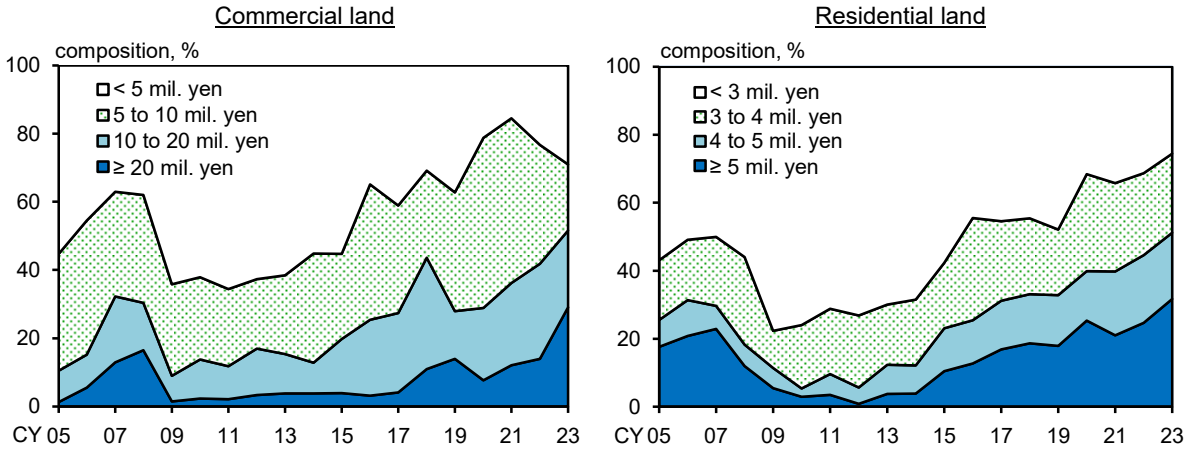


Note: 1. "Trend" is calculated using 3-year backward moving averages. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as of the October-December quarter of 2023.
Source: Ministry of Land, Infrastructure, Transport and Tourism; BOJ.

levels in central Tokyo, reflecting a large supply of office buildings mainly in Tokyo (Chart III-3-9).[20] By grade, vacancy rates for grade A office buildings -- office buildings with the highest grade -- have risen further.

In terms of prices, the *commercial real estate prices to rent ratio* in Japan as a whole has been above the level seen in the mini-bubble period (Chart III-3-10).[21] This tendency is particularly pronounced in commercial areas in central Tokyo. In some limited areas, transactions in higher price ranges have been increasing, and valuations of some properties seem relatively high (Chart III-3-11).[22] A similar tendency can also be observed in residential areas and apartments in central Tokyo. The recent rise in apartment prices is due both to supply-side factors, such as increases in land purchasing costs and construction costs, as well as demand-side factors, such as demand by foreign investors for investment purposes.

Chart III-3-11: Distribution of transaction prices



Note: Shows the composition of transaction prices per unit of land in the 5 central wards of Tokyo, based on Ministry of Land, Infrastructure, Transport and Tourism, "Real Estate Transaction-price Information." Latest data as of January-September 2023.
Source: Ministry of Land, Infrastructure, Transport and Tourism.

Looking at the supply-demand balance in the real estate transaction market, foreign investors, who had been active in acquiring real estate in Japan, became net sellers in the second half of 2023 for the first time in four years (Chart III-3-12). Among foreign investors, no significant change has been seen in the purchasing stance of institutional investors -- insurance companies, pension funds, and sovereign wealth funds, which are expected to hold real estate for a long time. However, there have been some cases where foreign funds have sold investment properties in Japan as part of their global portfolio rebalancing. The main sellers through the first half of 2023 were U.S. investment

[20] The increase in vacancy rates for office buildings since the last bottom in 2020 is 4.0 percentage points for the 23 wards of Tokyo as opposed to 1.5 percentage points for local cities (Sapporo, Sendai, Nagoya, Osaka, and Fukuoka). In the same period, vacancy rates for grade A office buildings in central Tokyo (Chiyoda, Chuo, Minato, Shinjuku, and Shibuya wards) have risen by 6.3 percentage points.

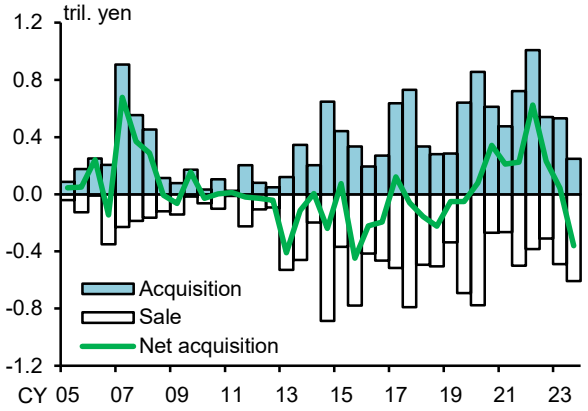
[21] The FAIXs, such as the *land prices to GDP ratio*, are designed so that they signal "red" for the bubble period in the late 1980s (Chart III-3-1). In contrast, for the *commercial real estate prices to rent ratio* in Chart III-3-10, the trend and threshold are set so that the ratio signals "red" for the so-called mini-bubble period in 2007.

[22] The rents for grade A offices in central Tokyo under new contracts have been weak compared to those for other offices, as they have fallen by 40 percent since 2020 (according to Sanko Estate).

Land prices have shown only small fluctuations across Japan. Thus, there is currently no overheating in the *land prices to GDP ratio* (Chart III-3-1). According to the Land Value LOOK Report released by the Ministry of Land, Infrastructure, Transport and Tourism, among the major cities in Japan, no cities saw an increase of more than 6 percent in land prices compared to three months earlier (as of January 2024). However, a relatively high increase in land prices has been seen in some areas that are popular among foreigners.

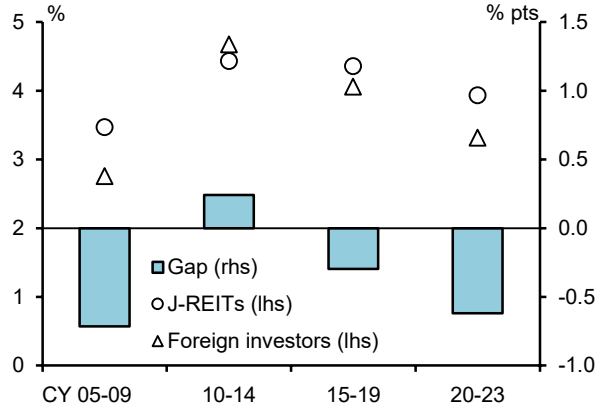
funds that had incurred losses in the U.S. real estate market. The properties sold by U.S. funds were then acquired by other foreign investment funds, such as Asian funds, and by foreign institutional investors.

Chart III-3-12: Real estate transactions by foreign investors



Source: Japan Real Estate Institute.

Chart III-3-13: Gap in yield spreads

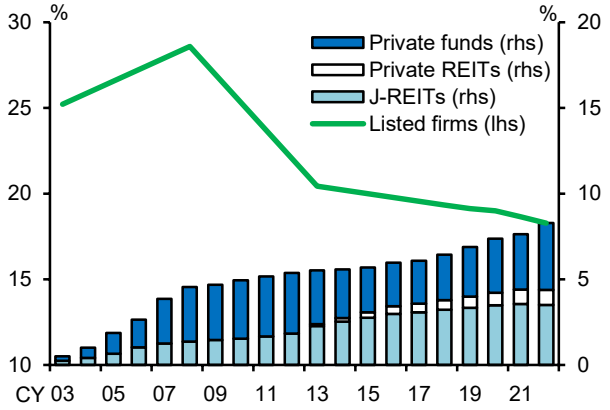


Note: Covers Tokyo. The bars show the yield spreads of foreign investors minus those of J-REITs.
Source: Ministry of Finance; Nikkei Business Publications, Inc., "Nikkei Real Estate Market Report DEAL SEARCH."

From the second half of 2023, however, there have also been some cases where investment funds other than U.S. funds have become sellers; for example, to lock in gains against the background of expectations for higher interest rates. Since acquisition prices of investment properties in central Tokyo held by foreign investment funds are relatively high, yield spreads (the difference between property yields and JGB yields) of these properties are below those of properties held by domestic investors such as J-REITs (Chart III-3-13). The rebalancing behavior of these foreign investment funds could have a considerable impact on Japan's real estate market.

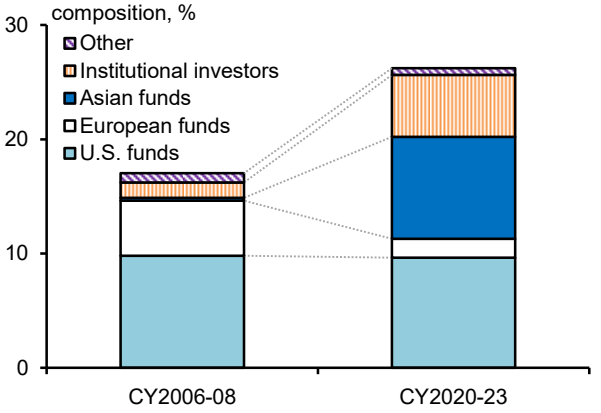
In the structure of Japan's real estate transaction market, some changes have been seen since the mini-bubble period, when the market last experienced a correction. One of the changes is that listed firms have shifted their real estate holdings off-balance-sheet (Chart III-3-14). Many of the properties that listed firms moved off-balance-sheet to improve their capital efficiency are being taken over by various real estate investment funds. As a result, an increasing number of office

Chart III-3-14: Real estate holdings by type of entity



Note: Shows the ratios to land and buildings held by the private sector (excl. households). The data for "Listed firms" from 2019 are estimated values. Latest data as of 2022.
Source: Cabinet Office; Ministry of Land, Infrastructure, Transport and Tourism; Sumitomo Mitsui Trust Research Institute; The Investment Trusts Association, Japan.

Chart III-3-15: Composition of investors



Note: Shows the share of real estate acquisition amount by foreign investors.
Source: Japan Real Estate Institute; Nikkei Business Publications, Inc., "Nikkei Real Estate Market Report DEAL SEARCH."

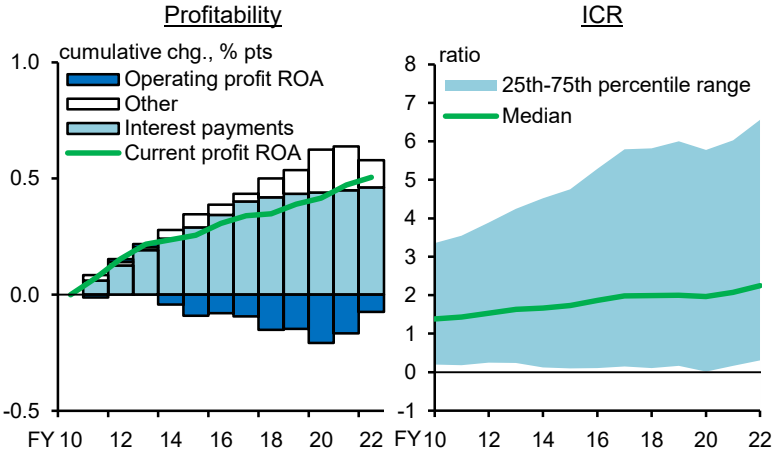
buildings could be directly affected by the transactions of real estate investment funds, especially in metropolitan areas.

Moreover, the market presence of foreign investors, such as investment funds and institutional investors, has been increasing (Chart III-3-15). The investment behavior of foreign investment funds, which trade investment properties in a relatively short period, could be either a factor that reduces the risk of a correction in Japan's real estate market or a factor that destabilizes the market. Close attention should therefore continue to be paid to the possible impact of changes in the U.S. and other foreign real estate markets on Japan's real estate market via foreign investment funds that diversify their investment globally. Against this background, one of the assumptions in the macro stress testing in this *Report* is that there is a repricing of commercial real estate in some limited metropolitan areas triggered by a correction in foreign real estate markets (see Section B of Chapter V).

Profitability in the real estate leasing market

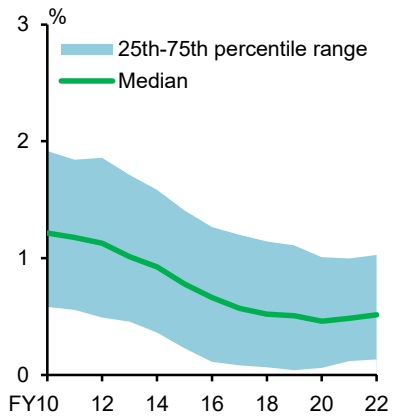
In the real estate leasing market, the rise in fixed assets held by real estate leasing businesses and the corresponding increase in borrowings from regional and *shinkin* banks have continued. The impact of the low interest rate environment on this expansion in real estate leasing businesses is not small. Looking at real estate leasing businesses' financial conditions, their current profits have increased, reflecting the decline in the interest payment burden (Chart III-3-16). This suggests that there has been an increase in real estate leasing businesses with a relatively low resilience to a decline in income or higher interest rates.

Chart III-3-16: Financial condition of real estate leasing businesses



Note: 1. Covers small and medium-sized leasing businesses.
2. The left-hand chart shows the cumulative changes in the median of current profit ROA from fiscal 2010.
3. The right-hand chart shows the distribution of ICR (ratio of operating profits to interest payments).
Source: CRD Association.

Chart III-3-17: Profitability of loans to real estate businesses



Note: Shows the distribution of banks' profitability. Profitability is calculated as: interest rates for loans – overhead ratios for the domestic business – Japanese yen funding costs.
Source: Teikoku Databank; BOJ.

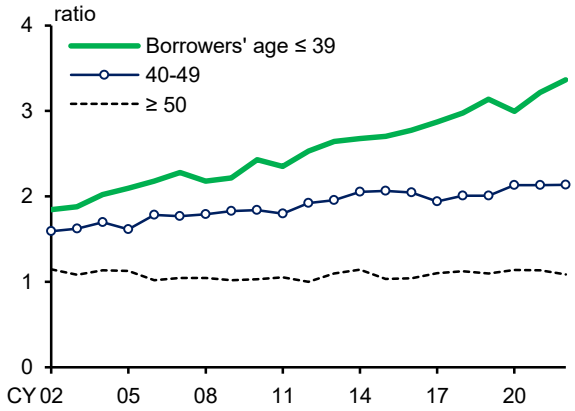
Some real estate leasing businesses may find it difficult to continue repaying loans without raising rent when their loans come up for refinancing in the future. This is partly because long-term loan interest rates have risen somewhat (see Section A of this chapter). In fact, the interest coverage ratios (ICRs) of some of these businesses, which represent their interest payment burden, are already less than one. Meanwhile, among banks lending to these businesses, some have seen a decline in their loan profitability due to past lending at low interest rates (Chart III-3-17). Further, some others are unlikely to see an improvement in loan profitability in the future because they

increased long-term fixed-rate lending. Banks need to further enhance the effectiveness of their credit management, such as tightening the control of limits on loans to the real estate industry if necessary.

Repayment burden of housing loans

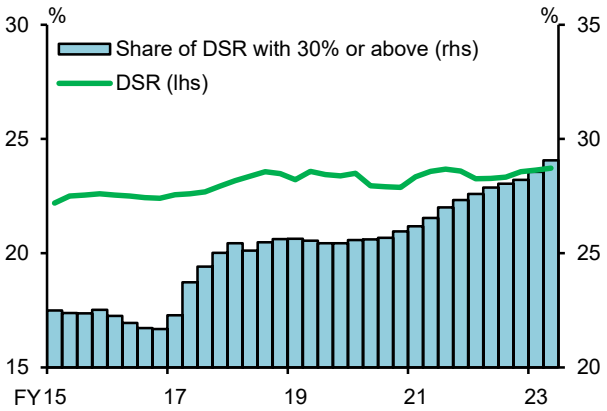
The outstanding amount of housing loans, which account for the largest part of household debt, has continued to increase (Chart III-1-9). The loan-to-income (LTI) ratio -- the ratio of borrowers' loans outstanding to their annual income -- has risen, especially for younger households, partly because lending standards have been eased amid intensified lending competition among banks (Chart III-3-18). Looking at the debt servicing ratio (DSR) -- the ratio of annual repayments to annual income at the time of loan origination -- the share of housing loans with a DSR of 30 percent or above has continued to rise (Chart III-3-19). For some banks, the share of such housing loans is significantly above the average for banks overall (which is slightly less than 30 percent), suggesting that the number of household borrowers with a relatively low resilience to a decline in income or higher interest rates has been increasing.

Chart III-3-18: LTI of housing loans



Note: Covers two-or-more-person households with liabilities. Latest data as of 2022.
Source: Ministry of Internal Affairs and Communications.

Chart III-3-19: DSR of housing loans



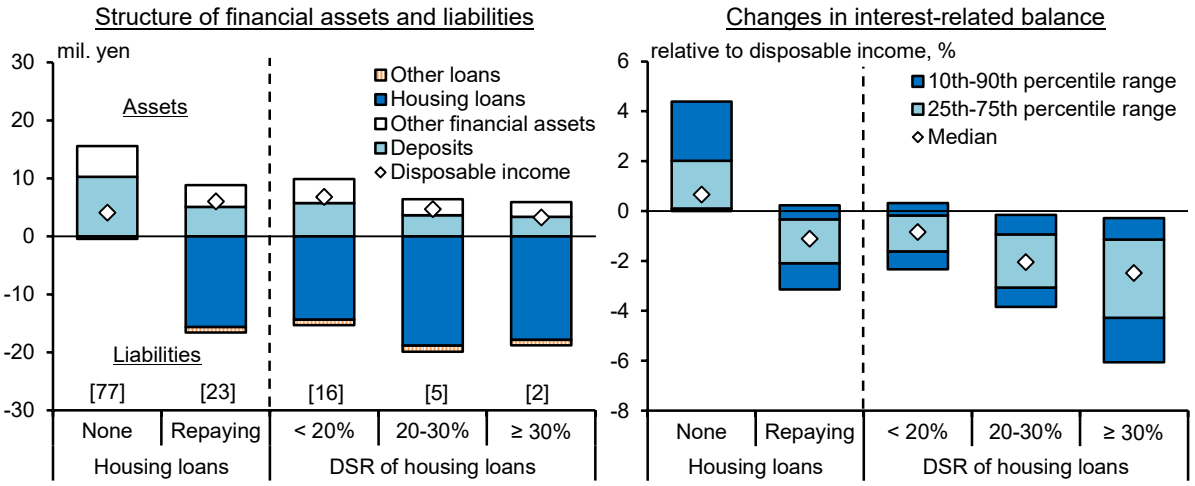
Note: Covers major, regional, and *shinkin* banks. 4-quarter backward moving averages. Latest data as of the July-September quarter of 2023.
Source: BOJ.

It should be noted that the channels through which stress affects the housing loan market differ depending on the type of stress assumed. In particular, the channels in the case of a rise in interest rates are complex. From the perspective of lender banks, a rise in interest rates may lead to changes in interest rate risk in the banking book. This is because borrowers with floating-rate housing loans may accelerate the payment of principal, while borrowers with fixed-rate housing loans may curtail the early payment of principals. Regarding floating-rate loans with equal principal and interest payments, which many borrowers have opted for, a rise in interest rates does not lead to a discontinuous increase in principal and interest payments by households in most cases because of rules to prevent drastic changes in payments such as the "5-year rule" and the "125 percent rule" (see Box 2). That said, an increase in the interest payment burden could lead to an increase in the probability of default in the future.

From the perspective of household borrowers, the rules to prevent drastic changes in payments mean that the increase in principal and interest payments will be limited in the short term; the payment burden will be partially offset by the increase in interest income from deposits and other assets held by households. However, the impact on households will vary depending on the structure of assets and liabilities and the type of housing loan of each household. Estimates of the impact of a 1 percentage point increase in short-term interest rates show that the deterioration in

the interest-related balance for households with a low DSR would be limited to less than 1 percent of their disposable income (Chart III-3-20).[23] For households with a high DSR, however, it would be nearly 3 percent of their disposable income.

Chart III-3-20: Financial assets and liabilities of households by DSR



Note: 1. The left-hand chart shows the averages per household. Figures in brackets indicate the share of households.
2. Interest-related balance in the right-hand chart includes principal payments of housing loans.
Source: Ministry of Internal Affairs and Communications.

From a macro perspective, in the household sector, interest-related assets substantially exceed liabilities. An improving economy and the resulting rise in interest rates can be expected to lead to an improvement in household income and in the interest-related balance. Moreover, household income is likely to be supported by tax breaks on housing loans. That said, there is considerable heterogeneity in household finances. Households with a high DSR are less resilient to higher interest rates, as the share of households with few disposable income and financial assets is larger among them than among household borrowers as a whole. Banks offering housing loans with a high DSR therefore need to thoroughly screen housing loan applications and subsequently monitor loans carefully by, for example, examining developments in the income environment, taking into account that borrowers' debt repayment capacity may deteriorate.

[23] Chart III-3-20 presents estimates of changes in the interest-related balance per household for a rise in short-term interest rates by 1 percentage point, based on microdata from the 2019 National Survey of Family Income, Consumption and Wealth. The main assumptions are as follows: For interest payments, (1) the share of floating-rate loans is assumed to be 100 percent for housing loans and 35 percent for other loans such as consumer loans. (2) For all loan interest rates, the pass-through of changes in short-term interest rates is 100 percent. (3) For simplicity, the 5-year rule is not taken into account. For interest income, (4) the pass-through of interest rate changes is assumed to be 40 percent for demand deposits, 80 percent for time deposits, and 100 percent for bonds. (5) The share of time deposits coming up for interest rate renewal during the estimation period (i.e., within one year) is assumed to be a uniform 80 percent.

IV. Risks faced by financial institutions

- The quality of banks' domestic and foreign loan portfolios has been maintained. In Japan, corporate profits have been on a recovery trend on the whole. Meanwhile, the profits of some firms have continued to be sluggish. There have also been some cases where large credit costs have been recorded on common loan exposures across banks. With regard to foreign loans, banks have continued to be selective in their lending stance. However, the credit risk of loans to some large borrowers has been rising.
- Banks have been rebalancing their securities portfolios. Reflecting such rebalancing behavior, valuation losses on securities holdings have declined and banks' resilience to rising interest rates has been on an improving trend. However, the securities have registered net valuation losses at many banks. Moreover, from a long-term perspective, the number of banks that hold real estate-related exposures, such as REITs and bonds issued by investment corporations, has been increasing.
- Banks have loss-absorbing capacity that is commensurate with interest rate risk in the banking book (IRRBB) for yen. The duration gap of banks' yen balance sheets has been shrinking on the whole. However, there is uncertainty over the interest rate pass-through for loans and deposits. The pass-through rates are affected by the supply and demand balance and the competitive environment in the loan and deposit markets, as well as relationships with customers.
- Banks have sufficient yen funding liquidity, which mainly consists of small retail deposits. As for foreign currency, they have maintained stable funding by using a combination of medium- and long-term market funding and the acquisition of sticky corporate deposits. It should be noted that there is uncertainty over the future funding environment. Banks need to continue to work toward establishing stable funding bases.
- In addition to these risks, banks need to continue to properly manage risks related to digital technologies and climate-related financial risks.

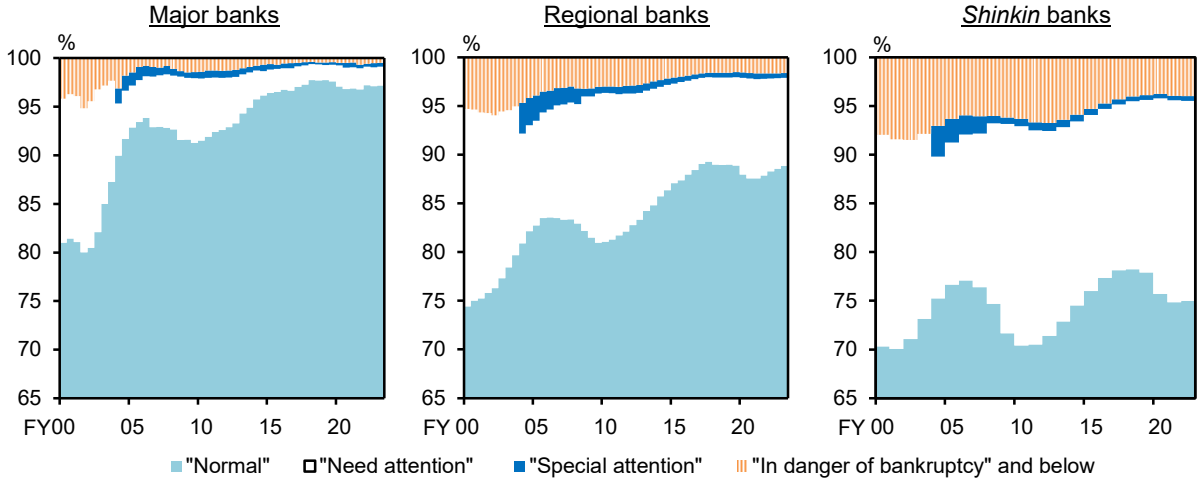
A. Credit risk

The credit risk posed to banks has remained low. Looking at loans by borrower classification, the shares of "normal" loans have stayed high, and the shares of borrowers classified as "in danger of bankruptcy" and below have remained at historically low levels (Chart IV-1-1). There has been no marked change in estimates of unexpected losses since the previous issue of the *Report* (Chart IV-1-2).[24] While loss levels have remained somewhat elevated for major banks, the ratios of unexpected losses to capital stand at around 40 percent for major banks, 30 percent for regional banks, and 10 percent for *shinkin* banks. The quality of banks' domestic and foreign loan portfolios has been maintained.

However, there is a large degree of heterogeneity in firms' financial conditions. In Japan, the number of corporate bankruptcies and defaults has increased even though economic activity has

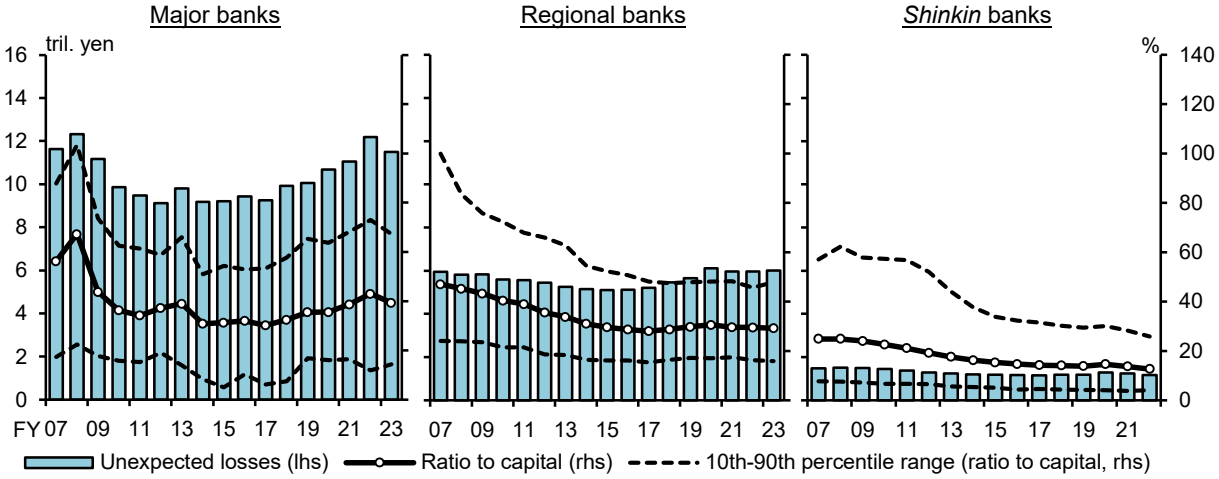
[24] Unexpected losses in Chart IV-1-2 are defined as the difference between the maximum amount of losses on loans that could occur with a confidence level of 99 percent within a year and the amount of losses that occur on average in a year (expected losses). The calculation is based on the actual default rate from fiscal 2005 to each point in time. The loss given default is assumed to be equal to the average ratio of unsecured loans to borrowers that need "special attention" or are "in danger of bankruptcy."

Chart IV-1-1: Breakdown of domestic and foreign loans by borrower classification



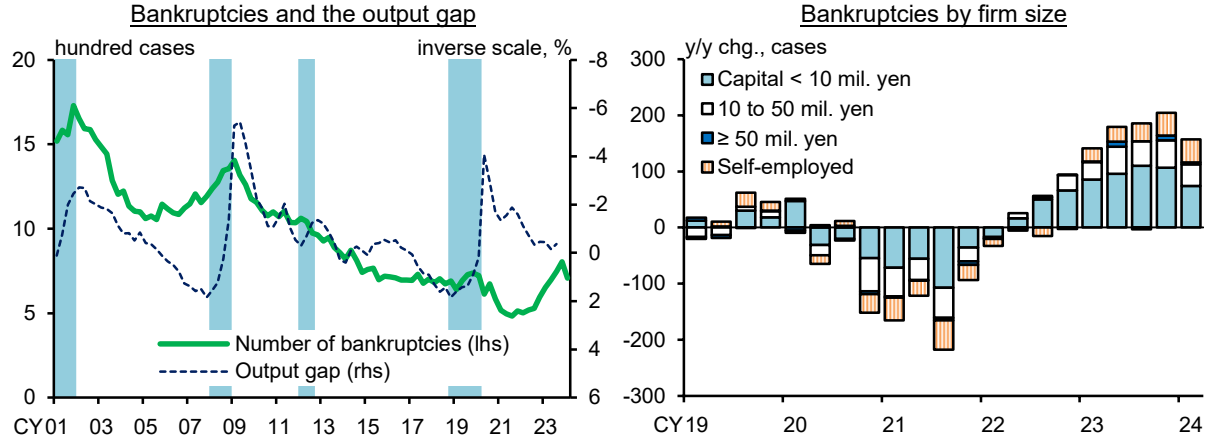
Note: "Need attention" indicates "Need attention excluding special attention" from fiscal 2004. The latest data for major and regional banks are as of end-September 2023 and those for *shinkin* banks are as of end-March 2023.
Source: BOJ.

Chart IV-1-2: Unexpected losses of domestic and foreign loans



Note: See footnote 24. "Ratio to capital" is calculated using CET1 capital for internationally active banks from fiscal 2012 onward, core capital for domestic banks from fiscal 2013 onward, and Tier 1 capital for all others (excl. the transitional arrangements). The charts cover credit that is subject to self-assessment. The latest data for major and regional banks are as of end-September 2023 and those for *shinkin* banks are as of end-March 2023.
Source: BOJ.

Chart IV-1-3: Number of corporate bankruptcies



Note: The shaded areas in the left-hand chart indicate recession phases. The data for "Number of bankruptcies" are quarterly averages. The latest data for "Number of bankruptcies" are as of Jan.-Feb. 2024 and those for "Output gap" are as of Jul.-Sep. 2023. The data for the right-hand chart are quarterly averages. Latest data as of Jan.-Feb. 2024.
Source: Teikoku Databank; Tokyo Shoko Research; BOJ.

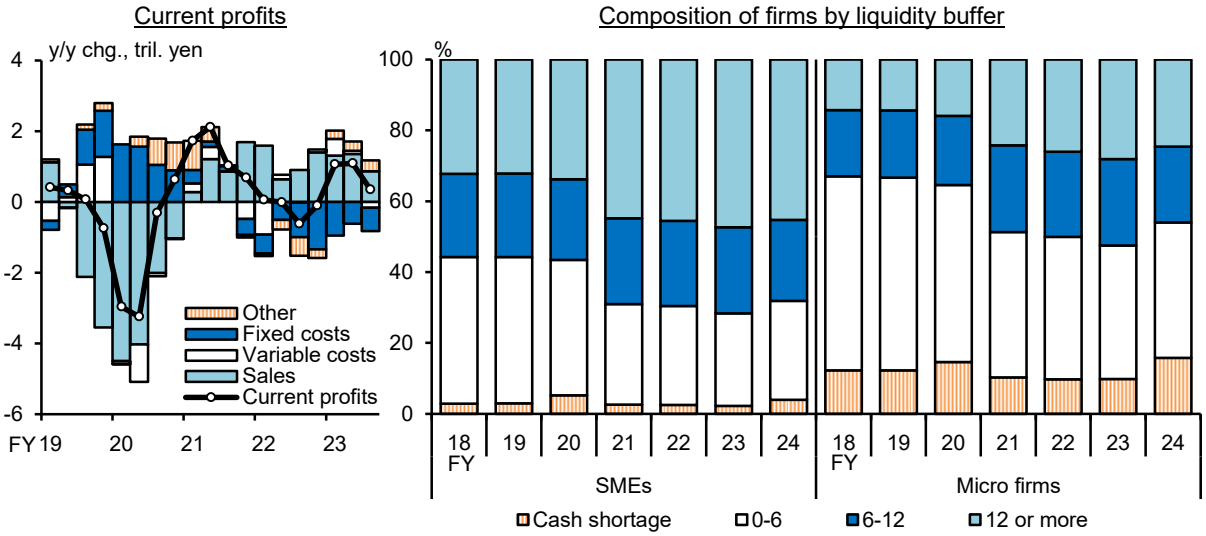
been on a recovery trend (Chart IV-1-3). With the labor market tightening, there have been bankruptcies resulting from labor shortages. Overseas, the quality of banks' overall loan portfolios has been maintained, but some loans have been downgraded. This section examines the potential credit risk faced by banks stemming from the heterogeneity in firms' financial conditions.

1. Domestic credit risk

Increase in bankruptcies amid an improving economy

Firms' financial conditions have been improving, and firms as a whole are fairly resilient to stress. Their sales have been on a recovery trend as economic activity has continued to improve (left panel of Chart IV-1-4). Sales have increased by more than fixed costs, such as labor costs. Both large firms and small and medium-sized enterprises (SMEs) expect their sales to continue increasing in fiscal 2024.[25]

Chart IV-1-4: SMEs' financial conditions



Note: 1. The left-hand chart covers SMEs. The data are 2-quarter backward moving averages. Latest data as of the October-December quarter of 2023.
2. Liquidity buffer in the right-hand chart is calculated as the ratio of cash reserves (the sum of liquid assets at the beginning of each year and net operating cash flow during the year) to monthly average administrative expenses. The data for fiscal 2024 are estimated values.
Source: CRD Association; Ministry of Finance; BOJ.

Against this background, many firms have continued to secure ample cash reserves (the sum of liquid assets at the beginning of each fiscal year and net operating cash flow during the year). Among SMEs, the share of firms with a high liquidity buffer remains elevated (right panel of Chart IV-1-4).[26] However, there is a large degree of heterogeneity in firms' financial conditions. Estimates

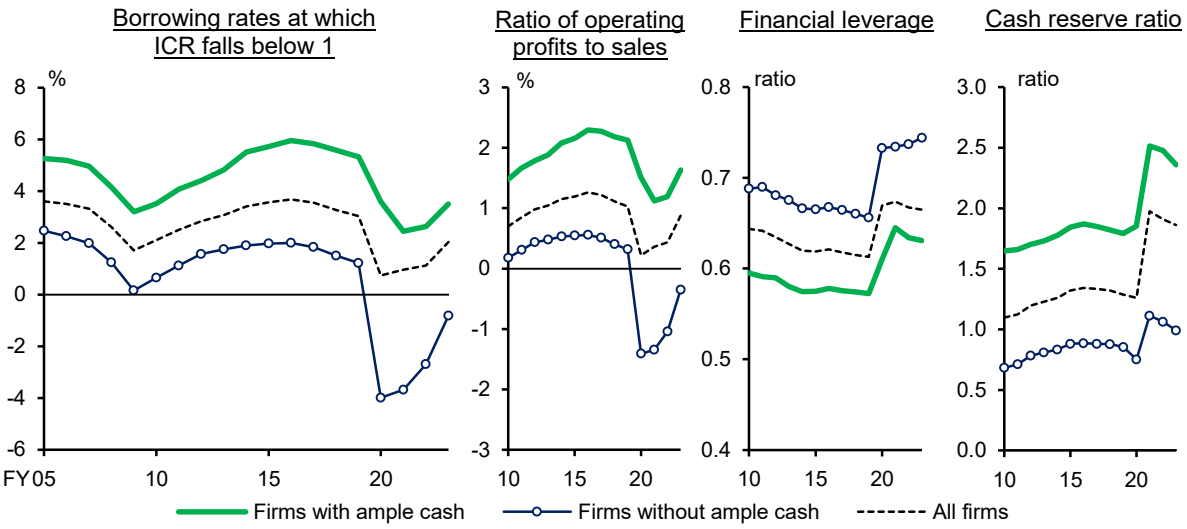
[25] According to the March 2024 *Tankan* (Short-Term Economic Survey of Enterprises in Japan), firms continue to expect increases in sales in fiscal 2024, as in the previous year.

[26] Unless otherwise noted, the analysis in the right panel of Chart IV-1-4 and the subsequent charts cover firms contained in the CRD Association's Credit Risk Database for SMEs. The ratio of the number of SMEs (firms with sales of 100 million yen or more) to micro firms (firms with sales of less than 100 million yen) is roughly 1:1. The impact of zero-zero loans is calculated by assuming that the entire increase in borrowing in fiscal 2020 consisted of such loans. Further, (1) a loan period of 8 years, (2) a deferment period of 3 years, and (3) an interest rate paid by firms of 1.5 percent are assumed. Figures for fiscal 2024 in the right panel of Chart IV-1-4 are estimates based on profit forecasts in the *Tankan*.

of the composition of firms by liquidity buffer for fiscal 2024 suggest that the share of firms with a low liquidity buffer may start to rise among micro firms. Recent corporate bankruptcies and defaults appear to have been concentrated among such micro firms without ample cash reserves (right panel of Chart IV-1-3).

This polarization in firms' financial conditions is even more pronounced in their interest payment capacity. Focusing on firms with excess borrowings (i.e., those for which borrowings exceed cash and deposits), the left panel of Chart IV-1-5 shows the results of estimating the level of borrowing interest rates at which the interest coverage ratio (ICR) falls below one for firms with and without ample cash reserves.[27] The former refers to firms with cash reserves equal to half or more of their annual administrative expenses and the latter refers to those with cash reserves of less than half of those expenses. For firms with ample cash reserves, the borrowing rate at which the ICR falls below one is at a high level. This means that even with higher borrowing rates, these firms have sufficient profitability to withstand the interest payment burden. The pace of improvement in the interest payment capacity of these firms temporarily slowed immediately after the start of the pandemic, but their interest payment capacity has returned to an improving trend on the back of improved profits and reduced financial leverage (right three panels of Chart IV-1-5).

Chart IV-1-5: Financial indicators by cash reserves



Note: 1. Financial leverage is the ratio of borrowings to total assets. Cash reserve ratio is the ratio of cash reserves to short-term borrowings.
2. Shows the median values. Covers SMEs with excess borrowings. Latest data as of fiscal 2023.
Source: CRD Association.

Conversely, some of the firms without ample cash reserves likely have already been granted interest rate cuts (left panel of Chart IV-1-5). The profits of these firms have been sluggish, and their financial leverage remains high (right three panels of the chart). Moreover, all of the factors keeping defaults in check have deteriorated -- for instance, their cash reserve ratio has fallen below one. The ability of these firms to retain human resources is weakening. In some cases, the inability to raise wages due to weak profits has led firms to go bankrupt due to a shortage of workers.

Banks need to accelerate their support for borrowers' core business to improve the business conditions of these firms. It is important that banks provide support that is suited to their borrowers' actual condition, including support for existing firms to start new core businesses and support for

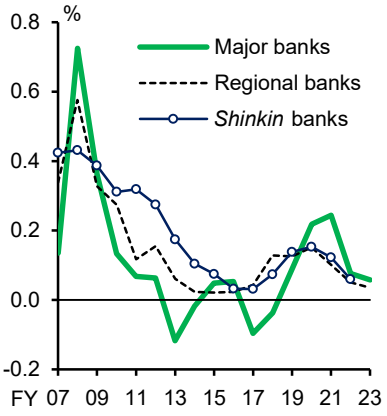
[27] In the estimation shown in the left panel of Chart IV-1-5, the pass-through rate of market interest rates is assumed to be 100 percent for funding rates such as borrowing rates and 50 percent for rates on investments such as deposits.

the closure of the business and business takeovers. Default risk, including the risk of bankruptcies due to labor shortages, tends to be concentrated among small-sized banks, which serve many micro firms. To provide continued support to firms, it is also important that banks have sufficient provisions.

Increase in common exposures

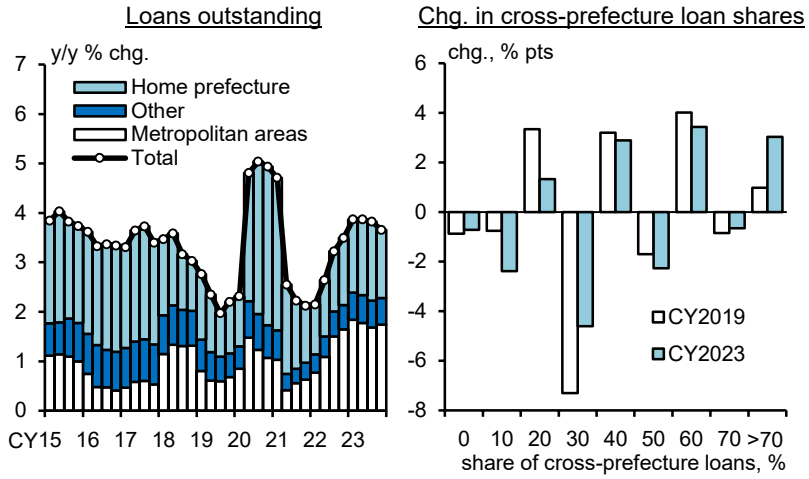
Even with corporate bankruptcies and defaults increasing, banks' credit costs have remained limited (Chart IV-1-6). This is partly because small-sized firms account for the overwhelming majority of recent bankruptcies and defaults (right panel of Chart IV-1-3). Precautionary loan-loss provisioning and credit guarantees have also helped to contain additional credit costs. However, there have been some cases recently where banks have recorded large credit costs on "common exposures," i.e., loans to the same borrowers by multiple banks.

Chart IV-1-6: Credit cost ratios



Note: Covers domestic and foreign loans. The latest data for major and regional banks are annualized values for the first half of fiscal 2023 and those for *shinkin* banks are as of fiscal 2022.
Source: BOJ.

Chart IV-1-7: Loans by region



Note: 1. "Metropolitan areas" in the left-hand chart indicates Tokyo, Aichi, and Osaka. Latest data as of December 2023.
2. The right-hand chart shows the changes in the distribution of banks by share of cross-prefecture loans (lending outside their home prefectures) from 2015.
3. Covers regional banks.
Source: BOJ.

When banks have common exposures, their loan portfolios are more likely to be synchronized in the event of a shock. When common exposures are large, the impact on the financial system potentially can be large. With banks taking an active lending stance, common exposures in lending have been increasing in recent years. The following examines developments in such common exposures and their risks.

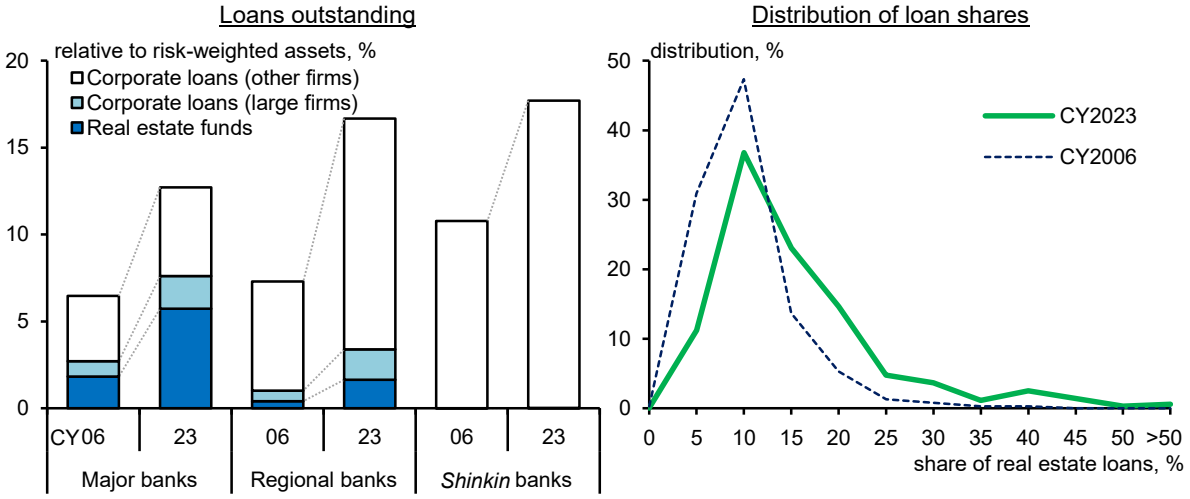
Underlying the increase in common exposures is the increase in lending by primarily regional non-main banks. As the number of firms and population in their own operating base (i.e., the area where their head office is located) have declined, banks have been focusing on so-called "cross-prefecture" lending, partly taking advantage of opportunities for co-financing loans and loan auctions in regions where lending opportunities are relatively more favorable (Chart IV-1-7).[28] Recently, the extension of pandemic-related loans by each bank across wide areas has also

[28] In the left panel of Chart IV-1-7, (1) loans within the prefecture where a bank's head office is located are classified under "home prefecture," (2) loans in the three major metropolitan cities (Tokyo, Aichi, and Osaka) by banks whose head office is not located in one of these areas are classified under "metropolitan areas," and (3) loans in regions other than (1) and (2), such as in prefectures neighboring the prefecture in which the head office of a bank is located, are classified under "other."

contributed to the increase in cross-prefecture lending. Looking at loan developments by region shows that cross-prefecture lending has increased not only in the three major metropolitan areas, but also in other regions. At some regional banks, the share of cross-prefecture lending exceeds 50 percent of their lending.

One example of cross-prefecture lending is real estate loans by regional banks' branches in Tokyo. Metropolitan areas are brimming with large-scale redevelopment projects, and funding demand by major developers and real estate funds has been growing. In response, not only banks in metropolitan areas but also those in regional areas have been actively meeting such funding demand through corporate loans and non-recourse loans to funds. As a result, the number of banks with a high share of real estate loans in their total loans has been increasing, especially among regional banks (Chart IV-1-8).

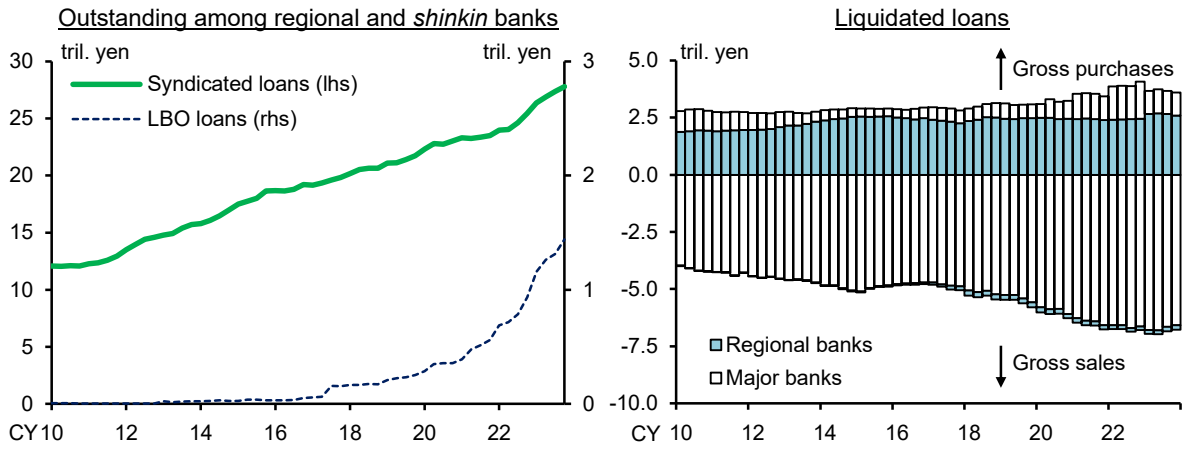
Chart IV-1-8: Real estate loans



Note: Covers real estate loans (excluding house and room leasing by households) of major, regional, and *shinkin* banks. Data as of end-September.
Source: BOJ.

The increase in syndicated loans, which are often recorded as loans by Tokyo branches, has also contributed to the increase in cross-prefecture lending (Chart IV-1-9). Traditionally, syndicated loans of regional banks were made by participating in syndicates where the arrangers were major banks. Meanwhile, there has been an increase recently in the number of syndicated loans for local

Chart IV-1-9: Syndicated loans



Note: 1. The left-hand chart covers regional and *shinkin* banks. "LBO loans" includes bilateral loans. Latest data as of December 2023.
2. The right-hand chart covers normal loans (including bilateral loans). Latest data as of December 2023.
Source: BOJ.

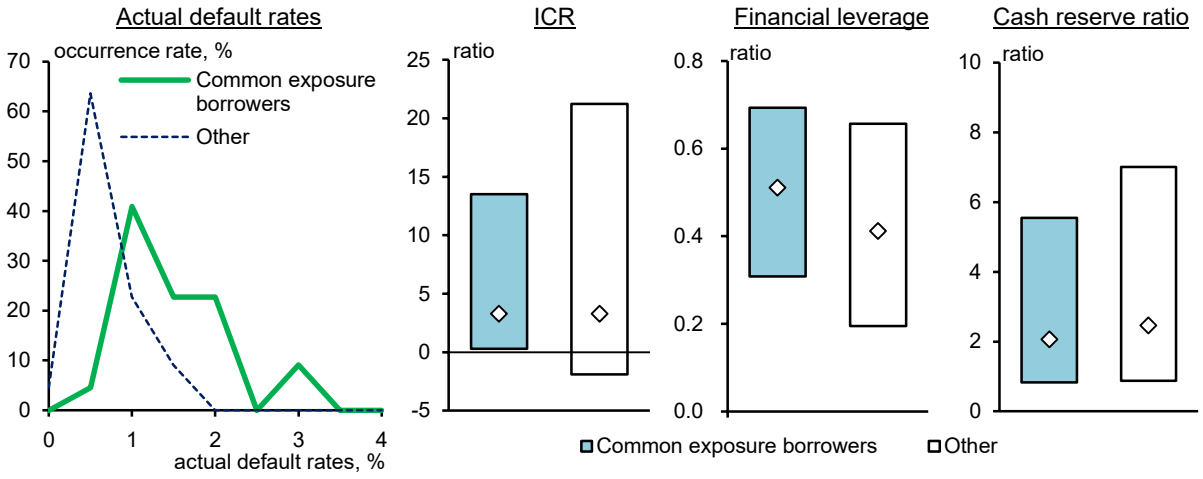
infrastructure firms arranged by regional banks, where, for example, regional banks form alliances with other regional banks. There have also been cases where the above-mentioned real estate loans have been extended in the form of syndicated loans.

Another reason for the increase in syndicated loans is the growing demand for leveraged buyout (LBO) loans, reflecting the increased activity in the LBO market. In addition, loan receivables have been transferred and dispersed from major banks to multiple regional and *shinkin* banks through the liquidation of loan receivables by major banks. This diversification of lending forms has also contributed to the increase in common loan exposures.[29]

Default risk of common exposures

Looking at developments so far, the actual default rate among borrower firms that represent common loan exposures (referred to as "common exposure borrowers" hereafter) is high on average. The left panel of Chart IV-1-10 defines common exposure borrowers as SMEs that have received loans from five or more banks, including at least one bank outside the prefecture, and shows the distribution of actual default rates for such borrowers and other SMEs. The chart indicates that the actual default rates of common exposure borrowers are considerably higher than those of other SMEs. In financial terms, this difference in actual default rates is largely due to the difference in leverage (right three panels of the chart). While there is no significant difference between the two groups of firms in terms of their ICRs or cash reserve ratios, the financial leverage of common exposure borrowers is relatively high.

Chart IV-1-10: Financial conditions of common exposure borrowers



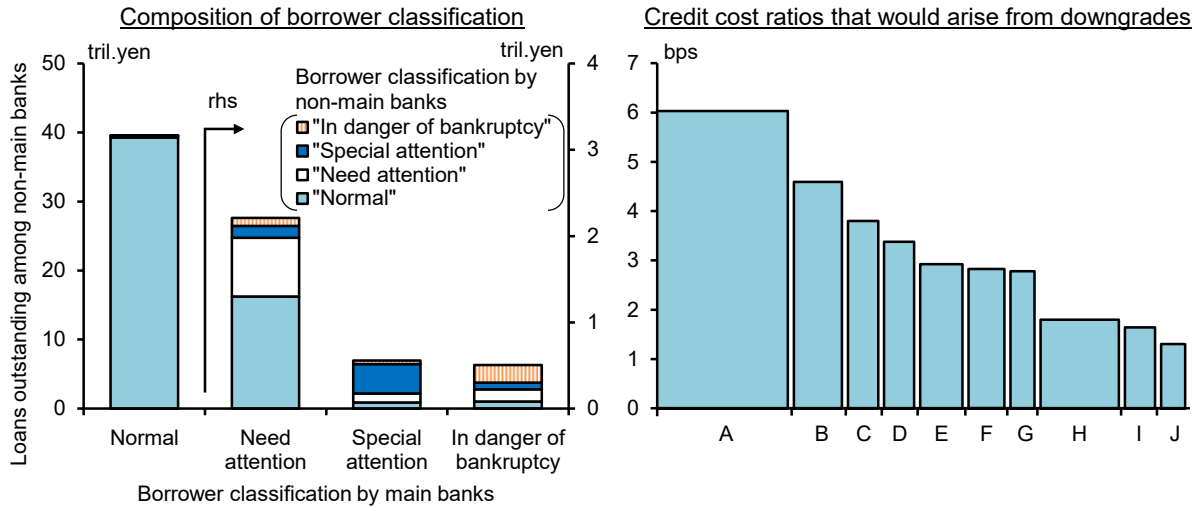
Note: 1. The vertical axis in the left-hand chart shows the occurrence rate from fiscal 2001 to 2022 for each actual default rate. Actual default rates are defined as the ratio of SMEs that meet one of the following conditions within one year for the first time: (1) being delinquent for 3 months or longer, (2) being downgraded to "in danger of bankruptcy" or below, or (3) being subject to subrogation by a credit guarantee corporation.
2. The right three charts show the medians (markers) and 25th-75th percentile ranges (bands) of SMEs for each financial indicator. Financial leverage is the ratio of borrowings to total assets. Cash reserve ratio is the ratio of cash reserves to short-term borrowings. The charts cover the period from fiscal 2018 to 2023.
Source: CRD Association; Teikoku Databank.

In general, it is difficult for banks to obtain monitoring information on borrower firms for which they are not the main banks, compared to borrower firms for which they are the main banks. Even though such firms have multiple banks as creditors, debt governance is unlikely to operate

[29] Common exposures to credit risk are increasing not only through the lending channel but also through the channel of investments in corporate bonds. Some recent defaults involved a large number of banks through both loans and investments in corporate bonds.

effectively due to this information gap. Moreover, the information gap can also lead to uncertainty in banks' determination of borrower classifications. In fact, there are some discrepancies between main and non-main banks' borrower classifications of the same firm (left panel of Chart IV-1-11).[30] For instance, some of the loans to borrowers that main banks have downgraded to "special attention" or "in danger of bankruptcy" continue to be classified as loans to "normal" or "need attention" borrowers by non-main banks.

Chart IV-1-11: Borrower classification mismatches for common exposure borrowers



Note: 1. The left-hand chart shows the loans outstanding among non-main banks by main banks' borrower classification.
2. The right-hand chart shows the estimated average credit cost ratios of banks if common exposure borrowers with borrower classification mismatches were downgraded until the mismatches are eliminated. Shows the top 10 borrowers with the highest estimated credit cost ratios among those classified as "special attention" or below by at least one bank.
3. Covers all large borrowers of major, regional, and *shinkin* banks. Data as of end-March 2023.
Source: BOJ.

If a non-main bank downgrades a borrower to the same category as a main bank, this may give rise to considerable credit costs. The right panel of Chart IV-1-11 shows the estimated credit cost ratios that would arise from such downgrading of the borrower classification of each common exposure borrower. Each bar in the chart corresponds to a common exposure borrower (firms A to J ranked high in terms of their credit cost ratios). The width of the bars represents the number of banks that would incur credit costs from loans to these firms, while the height of the bars represents the average credit cost ratio faced by these banks. If one of these common exposure borrowers were to experience a problem in its business, multiple banks would be affected simultaneously, even if it was an idiosyncratic shock for such a firm. It should be noted that such default risk tends to be concentrated in banks with high cross-prefecture lending ratios and relatively low profitability.

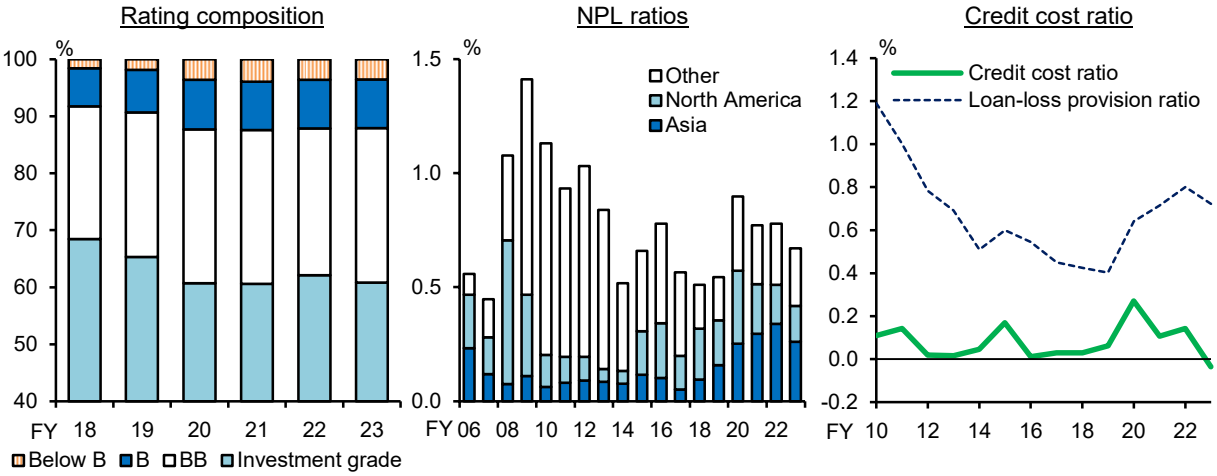
Given the increasing opportunities to extend LBO loans and other loans with risk characteristics that differ from those of regular loans, banks need to make continuous efforts to improve the effectiveness of their credit risk management. In particular, it is essential to minimize information gaps in the credit risk management of common exposure borrowers. One approach would be to reduce information gaps by monitoring main banks' loans to borrowers or by referring to information from external institutions. If these approaches are not effective, another option would be to strengthen loan ceilings for borrowers for which there are information gaps.

[30] The left panel of Chart IV-1-11 shows the loans outstanding among non-main banks to the same borrowers by main banks' borrower classification (shown on the horizontal axis), while the different shaded areas within the bars show the corresponding borrower classifications for those loans assigned by non-main banks (shown on the vertical axis). For example, some loans that main banks classified as being to "normal" borrowers have been conservatively downgraded by non-main banks. Moreover, some loans classified by main banks as being to borrowers "in danger of bankruptcy" are classified by non-main banks as loans to "normal" or "need attention" borrowers.

2. Foreign credit risk

Foreign credit risk has been kept low even amid the global tightening of financial conditions (Chart IV-1-12). The share of investment grade loans has remained high. Downgrades of borrowers due to an increase in firms' interest payment burden have been limited to date. Meanwhile, the increase in non-performing loan (NPL) ratios and credit cost ratios has been limited. Non-performing loans to Asia have started to decline due to the write-off of some real estate loans. Some of the forward-looking loan-loss provisioning has been reversed.

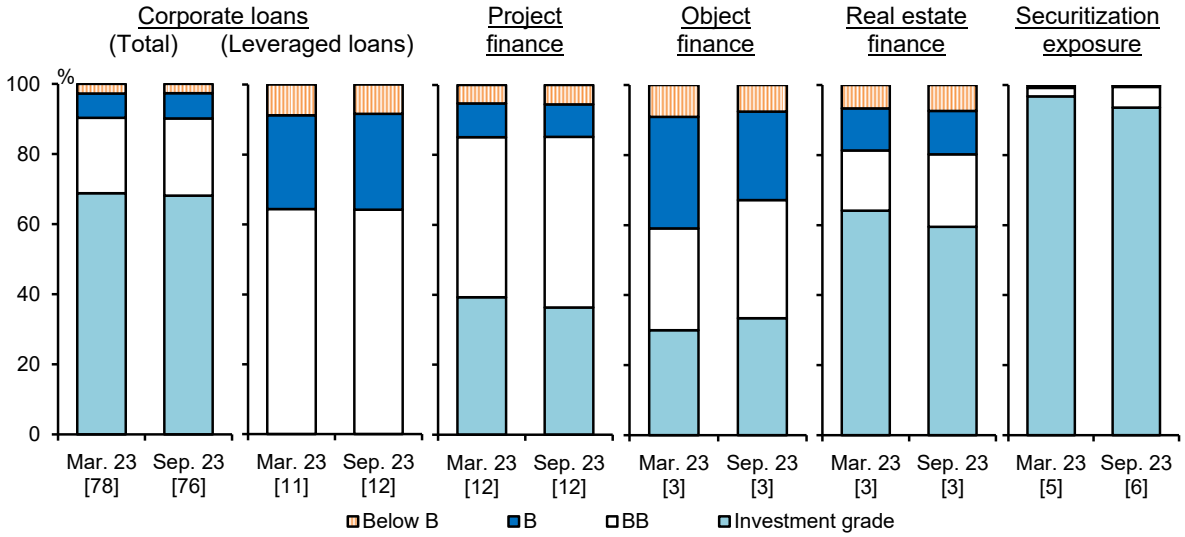
Chart IV-1-12: Credit risk of foreign loans



Note: The left-hand chart covers the three major banks (based on internal ratings of each bank); the middle chart covers the three major banks (on a non-consolidated basis); the right-hand chart covers the international business of the three major banks (on a non-consolidated basis). Latest data as of the first half of fiscal 2023.
Source: Published accounts of each bank; BOJ.

There has been no major change in the credit risk of foreign loans by type of product (Chart IV-1-13). Investment grade loans have continued to account for almost 70 percent of corporate loans on the whole, although the share of non-investment grade loans has risen somewhat. There has been no change in the composition of the credit rating of leveraged loans, which entail relatively high risk. On the whole, the quality of banks' foreign loan portfolios has been maintained.

Chart IV-1-13: Composition of foreign loans' credit rating by type of product



Note: Rating composition of foreign currency-denominated loans. Figures in brackets indicate the share of the respective product types. The charts cover major banks, Japan Post Bank, and a central organization of financial cooperatives.
Source: BOJ.

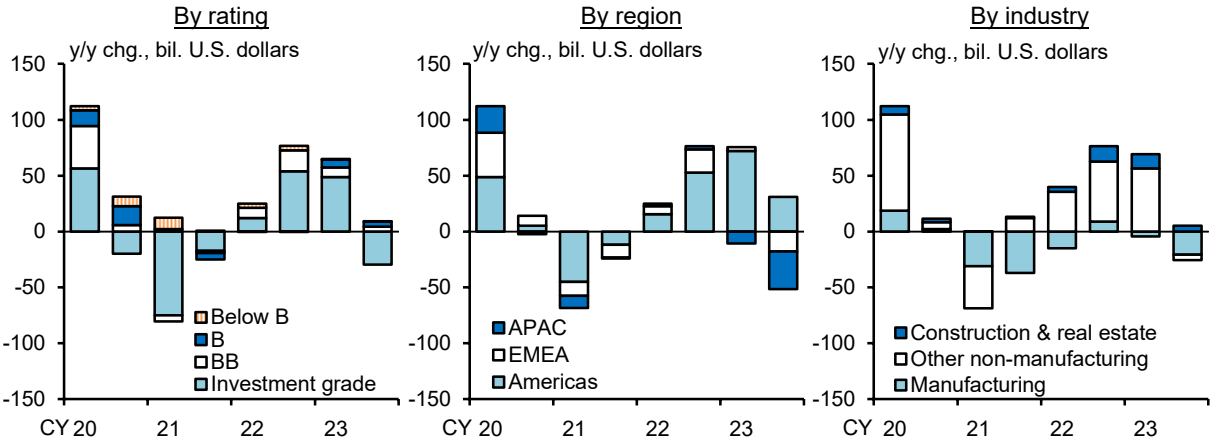
However, uncertainty with regard to the foreign loan market remains high, such as over the cumulative effects of monetary tightening and resultant growing concerns about a slowdown in foreign economies. These changes in the environment have also affected major banks' loan portfolios. As mentioned earlier, the share of investment grade foreign loans has remained high, but there have also been changes in foreign loan risk profiles. This subsection provides an update on the three aspects highlighted in previous issues of the *Report* -- i.e., the composition of loans, lending-deposit interest margins, and large loans.

Reduction in loans to low-return borrowers

There have been changes in the composition of foreign loans both in terms of loan demand and supply. On the demand side, demand for working capital reflecting the rise in raw material input costs and labor costs has been subsiding, due in part to the impact of successive policy rate hikes. The growth pace of loans to North America, which had been the driving force behind increases in foreign loans, has slowed (Chart III-1-13). A decline in loans for working capital has also been observed in other regions.

On the supply side, major banks have been selective in their foreign lending, reviewing and reducing loans to low-return borrowers (Chart IV-1-14). Major banks, which focus on capital efficiency, have recently reduced loans to low-return borrowers that had been included in loans to investment grade borrowers. By region, this reduction has led to a decline in loans to the Europe, Middle East, and Africa (EMEA) and Asia-Pacific (APAC) regions. By industry, it has led to a decline in loans to the manufacturing industry.

Chart IV-1-14: Risk profiles of foreign loans



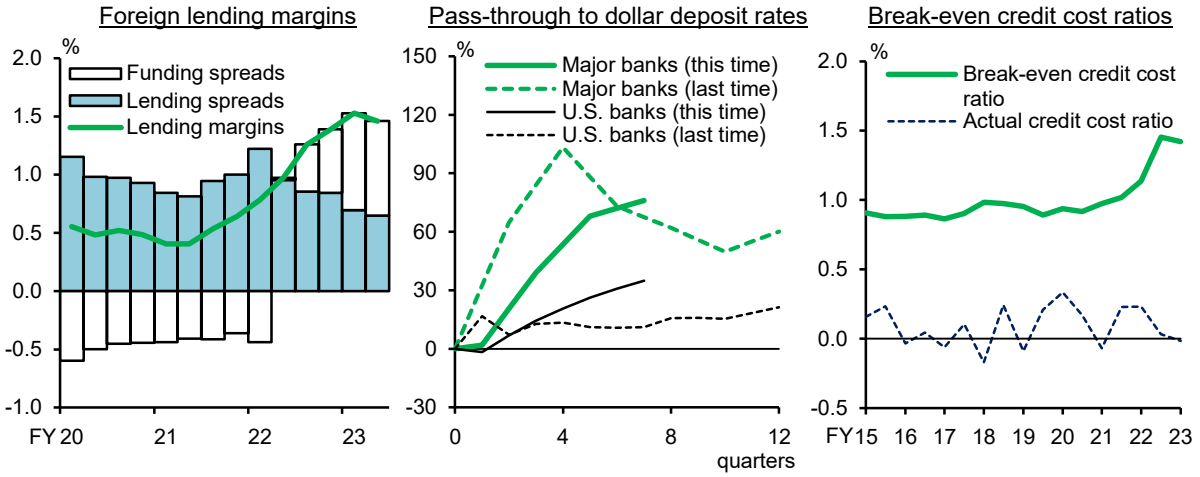
Note: Covers the three major banks (based on internal ratings of each bank). Latest data as of end-September 2023.
Source: BOJ.

Leveling off of improvements in foreign lending margins

Improvements in foreign lending margins linked to the rise in market interest rates have started to level off (left panel of Chart IV-1-15). Funding spreads (base rates minus funding interest rates), a component of lending margins, have started to narrow recently. One reason is that the interest rate pass-through to deposit funding, which had been kept relatively low, is approaching the level observed the last time interest rates rose (middle panel of Chart IV-1-15). The increase in funding through medium- to long-term FX and currency swaps aimed at maintaining funding stability is also a factor that exerts downward pressure on funding spreads. Meanwhile, lending spreads (loan interest rates minus base rates) have continued to narrow. As part of banks' efforts to reduce risks,

the share of loans with a relatively high rating has increased, acting as a factor that exerts downward pressure on the spreads.

Chart IV-1-15: Lending margin-related indicators



Note: 1. In the left-hand chart, funding/lending spreads are the differences between U.S. dollar-denominated funding/lending rates and base rates (3-month T-bill rate), respectively.
2. The middle chart shows the pass-through rates of the 3-month T-bill rate to deposit rates. "0" on the horizontal axis represents the July-September quarter of 2015 for "last time" and the October-December quarter of 2021 for "this time."
3. In the right-hand chart, "Break-even credit cost ratio" is the ratio at which credit costs equal net interest income on loans.
4. The left-hand chart covers major banks (on a non-consolidated basis); the middle and right-hand charts cover the international business of major banks (on a non-consolidated basis).

Source: FFIEC; FRED; BOJ.

When interest rates rise, the higher the pass-through to deposit funding, the higher interest rates on deposits will be, and the more likely lending margins are to shrink. Shrinking lending margins also affect profit buffers, which represent one element of banks' loss-absorbing capacity. The break-even credit cost ratio of banks' international business (net interest income on foreign loans/foreign loans outstanding) remains relatively high (right panel of Chart IV-1-15). Even if considerable credit costs were to be incurred, they could be absorbed by net interest income. However, it should be noted that, if future funding costs increase substantially, banks may no longer be able to absorb credit costs through net interest income.

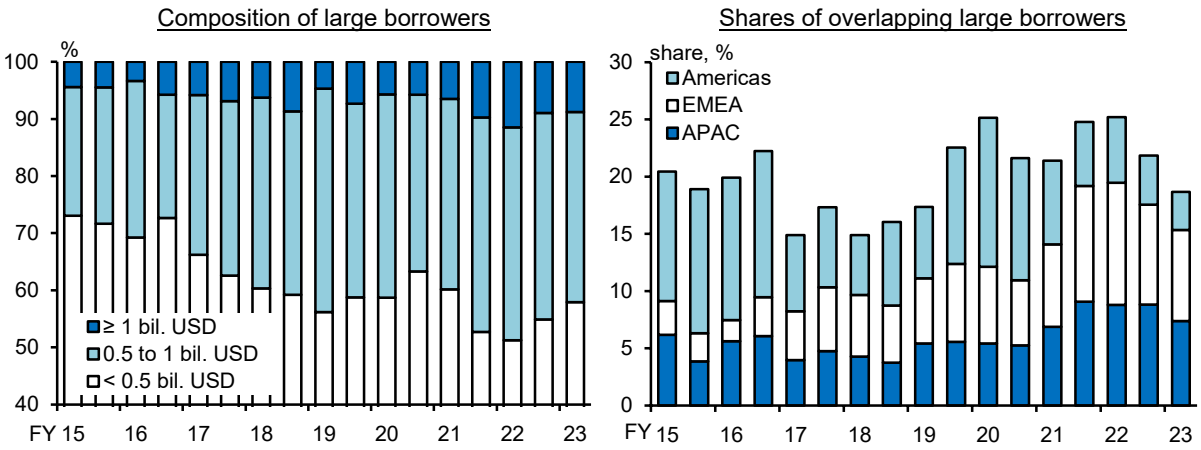
Risks associated with large borrowers

The trend to larger foreign loans has come to a halt. Looking at the loan amount per large borrower, the share of large loans of 1 billion U.S. dollars or more has started to decline (left panel of Chart IV-1-16).[31] The reason is that major banks have been selective in their foreign lending. Moreover, additional borrowing and committed line drawdowns reflecting borrowers' greater demand for working capital have subsided, reining in increases in the loan amount per borrower.

However, existing large loans continue to include common exposures, i.e., loans to borrowers overlapping among major banks. While common exposures have declined in the Americas, they remain at a relatively high level in the EMEA and APAC regions (right panel of Chart IV-1-16). This suggests that the impact of a foreign shock such as the materialization of geopolitical risks on the loan portfolios of major banks is more likely to be synchronized and the impact on the financial system to be greater.

[31] Chart IV-1-16 targets the pre-identified large borrowers of the three major banks. Therefore, the increasing size of large loans strictly refers to the increasing size of large foreign loans, rather than to the increasing size of total foreign loans.

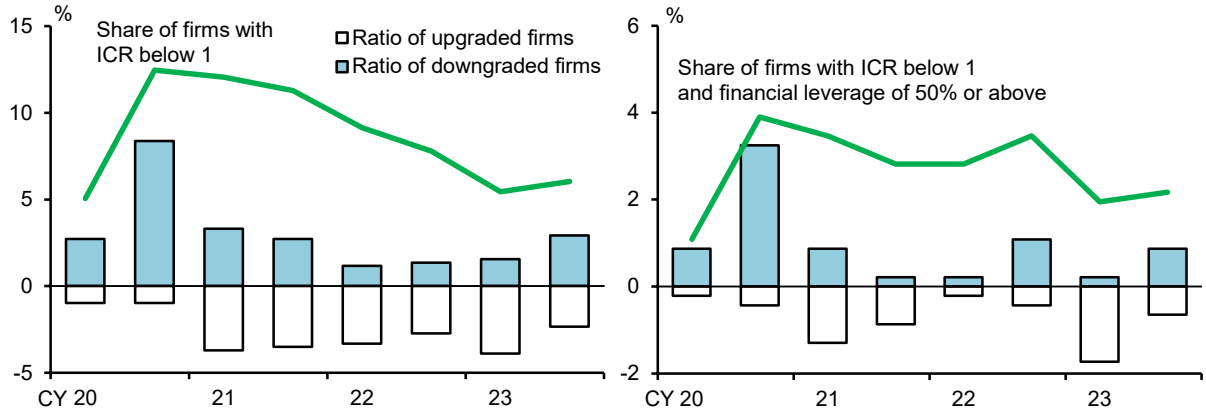
Chart IV-1-16: Foreign large borrowers



Note: 1. The left-hand chart covers the three major banks' large borrowers (non-Japanese firms).
2. The right-hand chart shows the shares of outstanding loans to large borrowers that overlap for all three major banks. Covers the three major banks' large borrowers.
Source: BOJ.

These large borrowers are facing risk of a deterioration in their ICRs. So far, a deterioration in ICRs has been avoided, reflecting strong sales.[32] The share of loans to firms with an ICR below one -- i.e., firms that cannot cover their interest payments with their profits from core business alone -- has been limited (Chart IV-1-17). However, if there is a substantial economic slowdown going forward, putting downward pressure on firms' profits, a deterioration in ICRs is inevitable. Moreover, among firms with an ICR below one, there are some with high financial leverage. It should be noted that firms' probability of default increases non-linearly as their financial leverage increases.[33]

Chart IV-1-17: ICR transition (lhs) and financial leverage transition (rhs)



Note: The solid lines in both charts indicate the shares of these firms among large borrowers. The bars show the contribution to the changes in those shares. Financial leverage is the ratio of interest-bearing debt to total assets. Latest data as of end-September 2023.
Source: S&P Global Market Intelligence; BOJ.

Risks by type of loans

Financing for investment funds, on which major banks have been focusing, accounts for a part of large loans. Major banks have been actively meeting the loan demand of these funds with a view

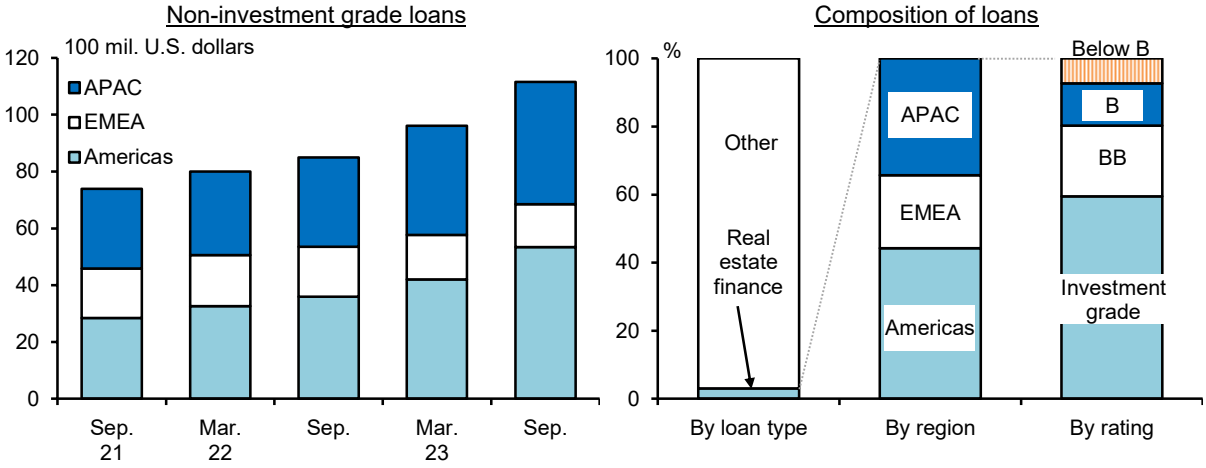
[32] It has been pointed out that firms' preference for long-term fixed-rate funding (i.e., borrowing and bond issuance) during the phase of low interest rates has created a time lag in the impact of policy rate hikes on firms' ICRs.

[33] The probability of default of major banks' foreign borrowers tends to increase non-linearly when their financial leverage (interest-bearing debt/total assets) exceeds 50 percent. For details, see Section B of Chapter IV in the October 2022 issue of the *Report*.

to strengthening their relationships with institutional investors that set up and manage these funds and gaining ancillary business. At present, large loans to investment funds account for 2 percent of major banks' overall foreign loans, and even when smaller loans are included, loans to investment funds account for only 6 percent of total foreign loans. However, the credit risks of investment funds and banks that extend loans to them have been rising, as seen in the increase in the interest payment burden of firms in which these funds invest (see Box 3).

Foreign real estate markets have been experiencing a gradual correction. In the United States, office vacancy rates have been rising since the start of the pandemic (see Box 1). Against this background, non-investment grade loans have increased among major banks' real estate financing (non-recourse loans) in the Americas (Chart IV-1-18). Moreover, banks have been building up precautionary loan-loss provisions in preparation for further corrections in the real estate market. While major banks' real estate financing accounts for only 3 percent of their total foreign loans (of which financing in the Americas accounts for 1 percentage point), banks need to continue to refine their credit risk management, including in their decisions on additional loans and forward-looking management of existing loans.

Chart IV-1-18: Risks associated with real estate finance



Note: 1. The left-hand chart includes estimates. The right-hand chart is as of end-September 2023.
2. Covers major banks and others.
Source: BOJ.

B. Market risk associated with securities investment

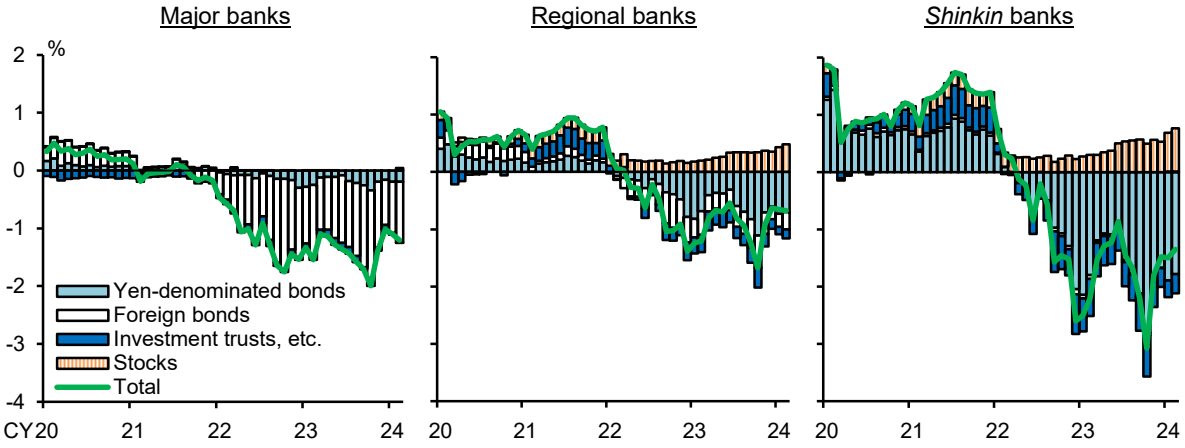
Banks' securities portfolios show that valuation gains/losses on securities holdings (including held-to-maturity securities and excluding strategic stockholdings) have been improving (Chart IV-2-1).[34] In October 2023, the ratio of valuation losses reached its highest peak since 2022, but it subsequently has declined as a result of falling domestic and foreign interest rates, as well as rising stock prices. The continuous rebalancing of interest-rate portfolios also likely has contributed to this situation. However, interest rate products have continued to register net valuation losses.

Regarding securities investment, the risks associated with market fluctuations and negative interest margins, as well as the risk of valuation losses, continue to warrant close monitoring. In Japan, fluctuations in long-term interest rates have become somewhat larger amid concerns over the risk

[34] In Chart IV-2-1, Japan Post Bank and central organizations of financial cooperatives are excluded from the calculation. The ratio of valuation losses of large financial institutions including them has declined from a little over 3 percent in October 2023 to less than 2 percent recently (as of February 2024).

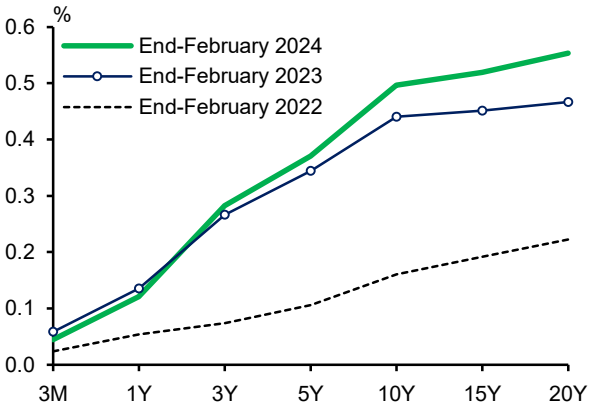
of higher interest rates (see Section B of Chapter II). Under these circumstances, interest rate volatility has risen, especially for the longer-term zone, which exerts upward pressure on the value at risk (VaR) of yen-denominated bonds (Chart IV-2-2). Moreover, stock prices have continued to rise on the back of expectations for firms' business performance and corporate governance reforms. The rise in the market value of stocks exerts upward pressure on the VaR of stocks.

Chart IV-2-1: Valuation gains/losses on securities holdings



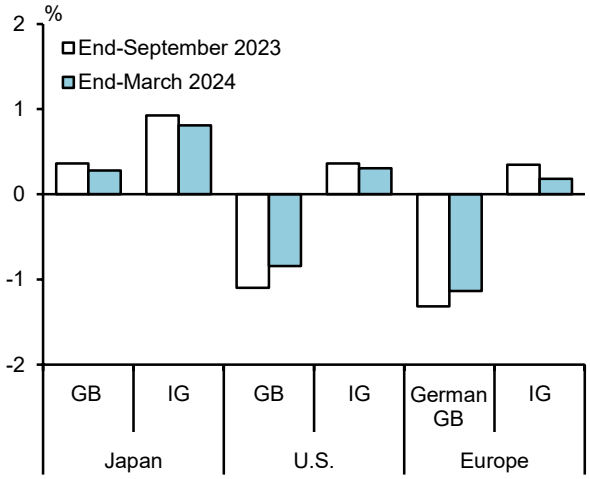
Note: The ratio of valuation gains/losses on securities (including held-to-maturity securities and excluding strategic stockholdings) to risk-weighted assets. Latest data as of February 2024.
Source: BOJ.

Chart IV-2-2: Volatility curves of yen interest rate



Note: Historical volatility of swap rates with the past 1-year observation period.
Source: Bloomberg.

Chart IV-2-3: Bond interest margins by currency



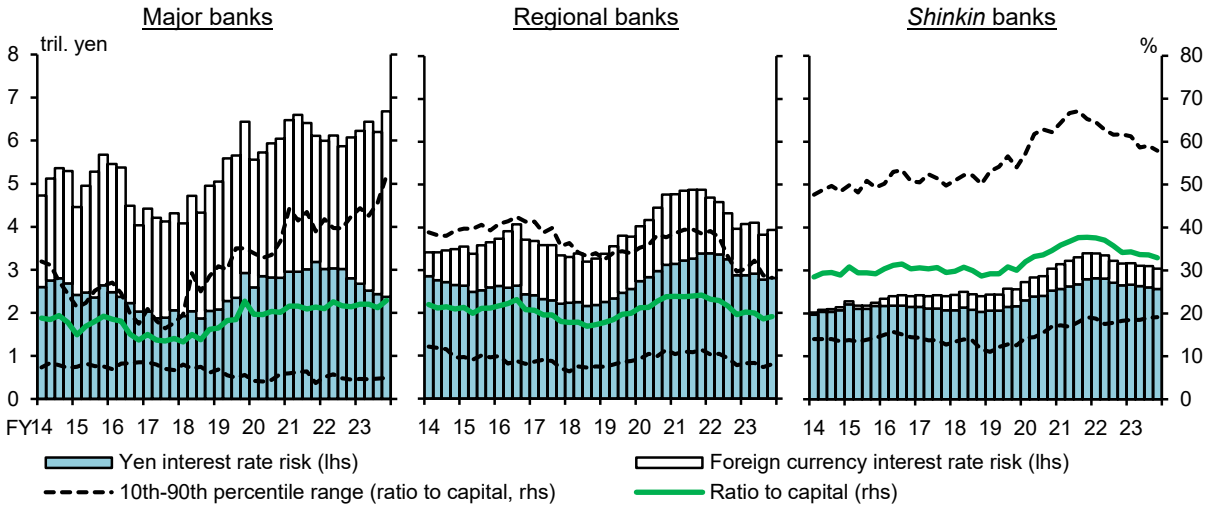
Note: "GB" and "IG" indicate 5-year government bonds and 4- to 6-year investment-grade bonds, respectively. The data for U.S. and Europe take into account the currency hedging costs.
Source: Bloomberg; ICE Data Indices, LLC; LSEG Eikon; QUICK.

In foreign markets, while U.S. and European policy rates have remained high, medium- to long-term interest rates have started to decline ahead of policy rates (see Section A of Chapter II). Against this background, it has remained difficult for banks to maintain positive interest margins on foreign government bond investments (Chart IV-2-3). In addition, higher short-term foreign currency hedging costs have also contributed to this difficulty. This section provides an overview of banks' current market risk profiles.

Shorter durations of yen-denominated bondholdings

Looking at the amount of interest rate risk associated with banks' securities investment -- in terms of the 100 basis point value (BPV) for yen interest rate risk and 200 BPV for foreign currency interest rate risk -- the risks on yen-denominated bonds and foreign bonds have moved in opposite directions, reflecting the market outlook for monetary policy at home and abroad (Chart IV-2-4).[35] While banks have continued to reduce yen interest rate risk, they have increased their foreign currency interest rate risk to previous levels. There has been no marked change in the overall interest rate risk-to-capital ratio, which is around 20 percent for major and regional banks and around 30 percent for *shinkin* banks, but the composition of interest rate risk has been changing.

Chart IV-2-4: Interest rate risk of securities holdings



Note: 1. "Yen interest rate risk" is a 100 BPV and "Foreign currency interest rate risk" is a 200 BPV. Off-balance-sheet transactions are taken into account (excluding yen interest rate risk of major banks). Latest data as of February 2024.
2. "Ratio to capital" is calculated using CET1 capital for internationally active banks and core capital for domestic banks (excluding the transitional arrangements).
Source: BOJ.

Banks are in the process of rebalancing their yen-denominated bond positions. Amid concerns over the risk of higher interest rates, banks have generally become cautious about investing in yen-denominated bonds. All types of banks have shortened the duration of their yen-denominated bondholdings by reducing interest rate risk, especially in the longer-term zone (Chart IV-2-5). Moreover, some banks have raised interest rate hedge ratios by using inverse mutual funds and interest rate swaps to reduce the risk of valuation losses.[36] An increasing number of banks have shifted their portfolios to held-to-maturity bonds without mark-to-market valuations or to repackaged loans backed by yen-denominated bonds (Chart IV-2-6).[37]

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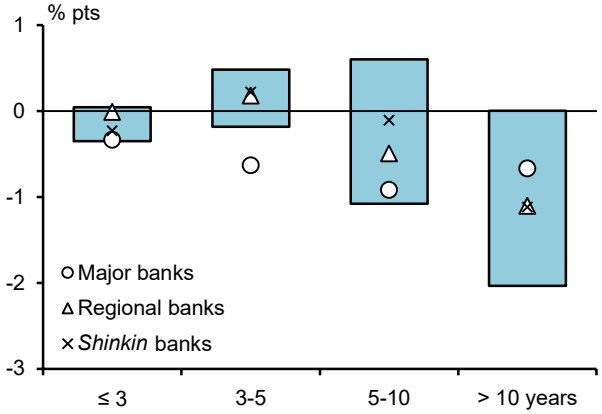
[35] In Chart IV-2-4, upward parallel shifts of 1 percentage point and 2 percentage points are assumed for yen interest rates and foreign currency (dollar and euro) interest rates, respectively, for all maturities, so that they are in line with the Financial Services Agency's public notice about interest rate risk in the banking book (IRRBB). Starting with this issue of the *Report*, to expand the coverage of portfolios, off-balance-sheet transactions (excluding those of major banks) and held-to-maturity securities are included in the calculation of yen interest rate risk and foreign currency interest rate risk, respectively.

[36] Interest rate-related inverse mutual funds are mutual funds that use bond futures as underlying assets and provide the same hedging effect as bond futures. Some banks prefer inverse mutual funds, for which valuation gains/losses fluctuate, to bond futures, for which trading gains/losses are recorded every three months. Banks need to manage basis risk on inverse mutual fund holdings due to price deviations between future and spot prices, as with bond futures. It should also be noted that hedging errors of rebalanced inverse mutual funds can be large due to the compounding effect.

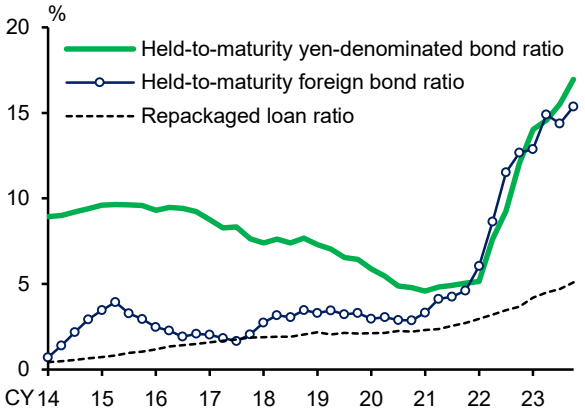
[37] Even for held-to-maturity bonds and repackaged loans with no need for daily mark-to-market valuations, banks

Chart IV-2-5: Changes in yen interest rate risk



Note: 1. Shows the weighted averages for each type of bank (markers) and 25th-75th percentile ranges for total banks (bands) of changes from end-2022 to September 2023 in a 100 BPV of yen interest rate risk as ratios to capital. Covers major, regional, and *shinkin* banks.
2. Ratios to capital are calculated using CET1 capital for internationally active banks and core capital for domestic banks.
Source: BOJ.

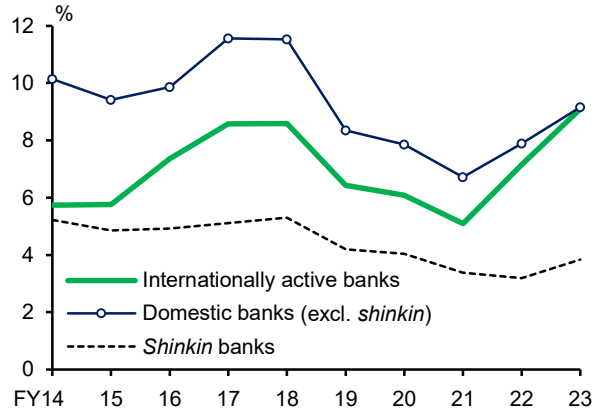
Chart IV-2-6: Ratio of bondholdings without mark-to-market valuations



Note: 1. "Held-to-maturity ratio" refers to the ratios to yen-denominated and foreign bondholdings, respectively. Covers major, regional, and *shinkin* banks.
2. "Repackaged loan ratio" refers to the ratios to yen-denominated bondholdings. Covers regional and *shinkin* banks.
3. Latest data as of December 2023.
Source: BOJ.

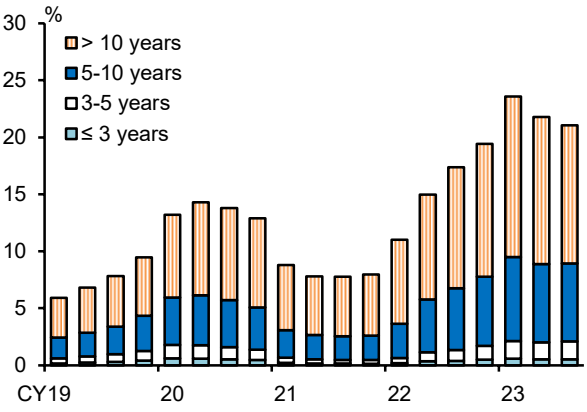
Reflecting such rebalancing behavior, banks' resilience to rising interest rates has been on an improving trend. Here, a simple reverse stress test is conducted to estimate the maximum interest rate on 10-year JGBs at which banks can maintain sufficient loss-absorbing capacity even if the rise in the interest rate increases their valuation losses on securities. The criterion to judge the sufficiency of loss-absorbing capacity is whether banks' capital adequacy ratios on an economic capital basis remain above regulatory levels.[38] For analytical purposes, the economic capital for domestic banks in this exercise takes valuation gains/losses on securities into account in the same manner as that for internationally active banks. The simulation results show that the maximum

Chart IV-2-7: Maximum interest rate at which economic capital is maintained



Note: Shows the maximum level of 10-year JGB yields at which capital adequacy ratios on an economic capital basis remain above the regulatory level. Latest data as of February 2024.
Source: Ministry of Finance; BOJ.

Chart IV-2-8: VaR associated with yen-denominated bondholdings



Note: Shows the ratio of VaR (with a 99 percent confidence level and a 1-year holding period) to capital. Covers regional and *shinkin* banks. Latest data as of September 2023.
Source: BOJ.

still need to manage the risk of negative interest margins. Attention should be paid to the risk of impairment losses regarding held-to-maturity bonds and to the creditworthiness of swap counterparties with regard to repackaged loans.

[38] In the estimation, upward parallel shifts of the yield curve at each point in time are assumed. Further, potential management actions by banks in response to a rise in interest rates are not taken into account.

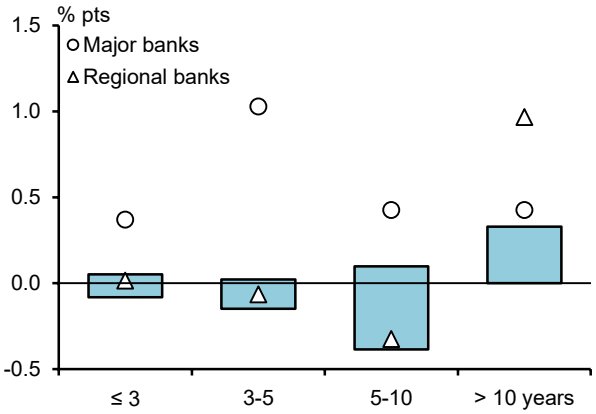
interest rate, which had followed a declining trend under the low interest rate environment, has been increasing recently (Chart IV-2-7). This implies that even if interest rates were to rise, banks would maintain a reasonable level of economic capital.

However, even though banks' interest rate risk in terms of the 100 BPV has fallen, it remains at a high level (Chart IV-2-4). When interest rates fluctuate and the amount of risk in terms of VaR increases, it may become difficult for banks to adjust their positions in a flexible manner (Chart IV-2-8). Moreover, even domestic banks, which are not required to include changes in the valuation of bondholdings in their regulatory capital requirements, face the risk of a decrease in the amount of dividends distributable to shareholders.[39] Banks need to appropriately manage their interest rate portfolios while understanding in advance how their loss-absorbing capacity will change in response to conceivable market fluctuations.

Longer durations of foreign bondholdings

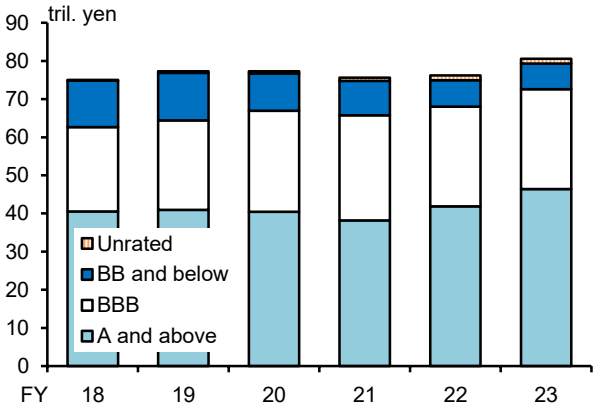
The amount of interest rate risk in foreign bond positions is returning to previous levels. Given the view that the policy rate hike cycle in the United States and Europe is likely in its final phase, banks are becoming mindful of the risk of falling behind in reinvestment. Reinvestment into foreign bonds focuses mainly on the longer-term zone, where banks until recently had substantially reduced the amount of risk (Chart IV-2-9). In addition, some major banks have been building positions in the short- and medium-term zones with the aim of obtaining capital gains.

Chart IV-2-9: Changes in foreign currency interest rate risk



Note: 1. Shows the weighted averages for each type of bank (markers) and 25th-75th percentile ranges for total banks (bands) of changes from end-2022 to September 2023 in a 200 BPV of foreign currency interest rate risk as ratios to capital. Covers major and regional banks.
2. Ratios to capital are calculated using CET1 capital for internationally active banks and core capital for domestic banks.
Source: BOJ.

Chart IV-2-10: Foreign credit product investment



Note: Covers major banks, Japan Post Bank, and a central organization of financial cooperatives. Latest data as of September 2023.
Source: BOJ.

In restoring their foreign bond positions, some banks are using held-to-maturity bonds, like in their investment in yen-denominated bonds (Chart IV-2-6). This tendency is more pronounced among banks seeking stable profits rather than capital gains on their bondholdings. Moreover, there are also some banks that have accumulated credit products (Chart IV-2-10). Banks are avoiding low-rated products with high market credit risk and instead prefer products with a high rating of A or

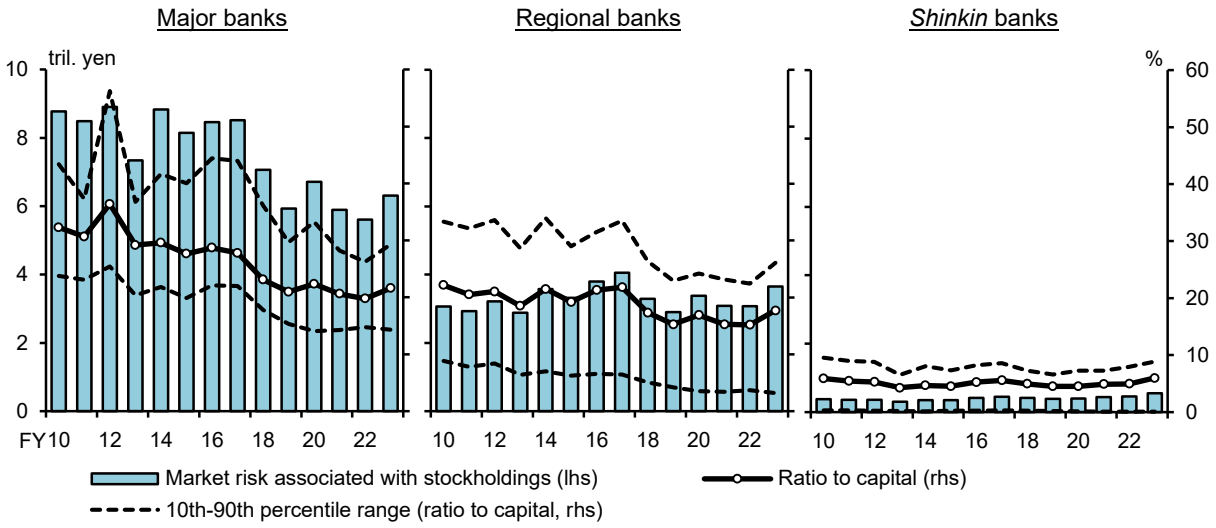
[39] The regulatory capital of domestic banks does not take changes in the market value of available-for-sale securities into account. On the other hand, the amount of dividends distributable to shareholders, which determines the upper limit of dividends, takes valuation losses on available-for-sale securities into account.

above. However, with foreign interest rates remaining high, banks need to be vigilant with regard to the risk of a deterioration in the financial condition of the firms in which they invest, just as in their foreign lending, as highlighted in the previous section.

Elevated market risk associated with stockholdings

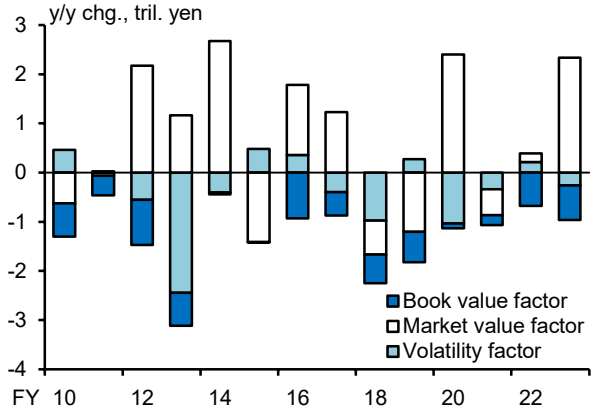
The pace of decline in market risk associated with stockholdings has decelerated. For major banks and regional banks, the amount of market risk remains high at around 20 percent of their capital (Chart IV-2-11). While the realization of gains on stocks and the continued decline in strategic stockholdings have reduced market risk, the increase in the market value of stocks on the back of rising stock prices has increased market risk (Chart IV-2-12). Depending on future developments in stock prices, market risk could increase even more also through a rise in market volatility.

Chart IV-2-11: Market risk associated with stockholdings



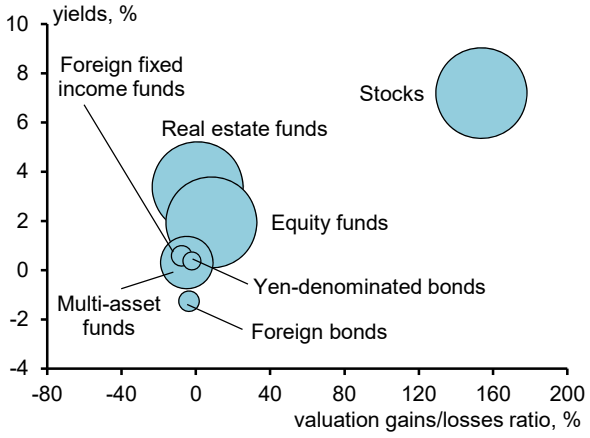
Note: 1. "Market risk associated with stockholdings" is VaR with a 99 percent confidence level and a 1-year holding period, and excludes risk associated with foreign currency-denominated stockholdings. Latest data as of February 2024.
2. "Ratio to capital" is calculated using CET1 capital for internationally active banks from fiscal 2012 onward, core capital for domestic banks from fiscal 2013 onward, and Tier 1 capital for all others (excl. the transitional arrangements).
Source: BOJ.

Chart IV-2-12: Factors affecting market risk associated with stockholdings



Note: Market risk associated with stockholdings is VaR with a 99 percent confidence level and a 1-year holding period, and excludes risk associated with foreign currency-denominated stockholdings. The chart covers major, regional, and *shinkin* banks. Latest data as of February 2024.
Source: BOJ.

Chart IV-2-13: Yields and valuation gains/losses ratio by product



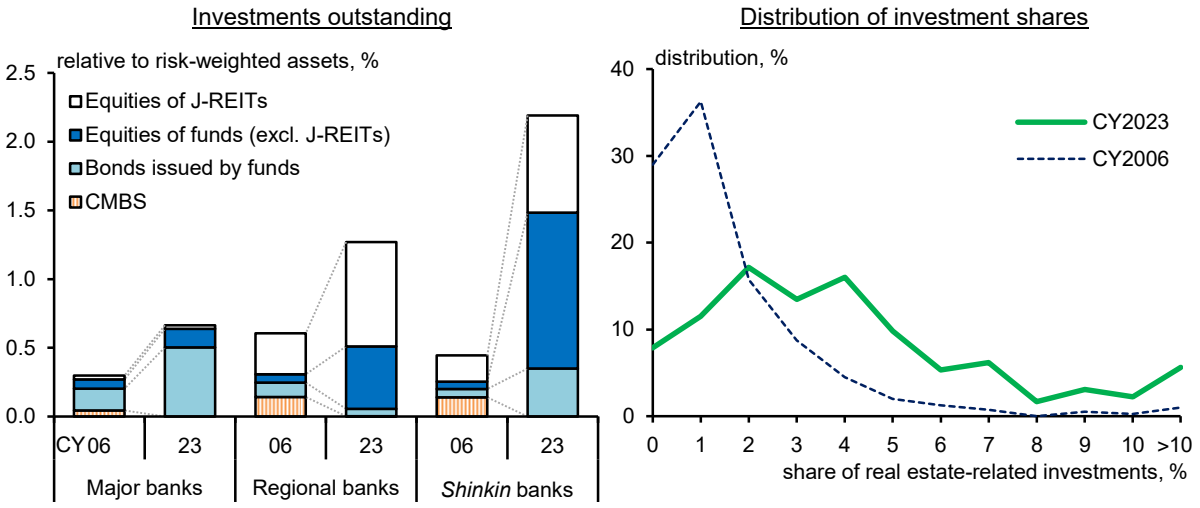
Note: "Yields" indicates those accrued by interest and dividends (adjusting funding costs) as of 2023. The data for "valuation gains/losses ratio" are as of end-2023. The size of each circle indicates the level of risk weighting. The chart covers regional banks.
Source: BOJ.

The level of banks' stockholdings is still sufficiently high to potentially have a substantial impact on their balance sheets and profits. That said, a variety of the banks' strategic stockholdings have relatively high dividend yields and valuation gains (Chart IV-2-13). Stockholdings can therefore boost the performance of banks' securities investment through dividend income and gains on sales. Banks need to make an objective assessment of the costs and benefits of stockholdings from various perspectives and keep the market risk associated with stockholdings within an appropriate range, in line with their loss-absorbing capacity.

Diversification in market risks

With the prolonged low interest rate environment in Japan, banks' securities investments have covered financial products other than interest rate products and stocks. One example is financial products related to real estate. Real estate-related exposure in banks' securities investments often takes the following two forms (left panel of Chart IV-2-14).

Chart IV-2-14: Real estate-related securities investment



Note: Covers major, regional, and *shinkin* banks. Data as of end-September.
Source: BOJ.

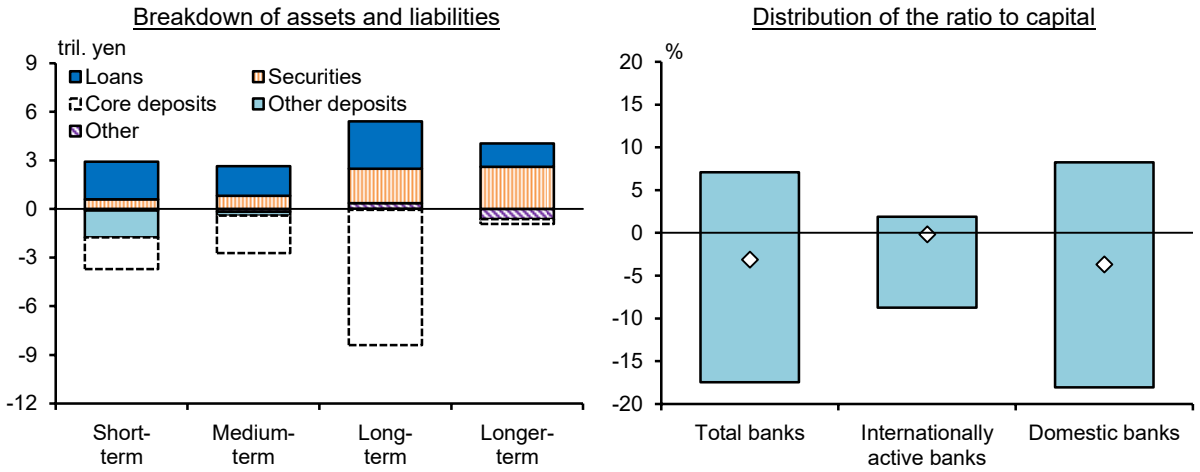
The first is equity investments in J-REITs and publicly or privately placed real estate funds. The risk associated with such investments is that their unit prices fall as the prices of properties held by REITs and funds decline or as their rental income declines. The second form of real estate-related exposure is investments in bonds issued by investment corporations. These also carry the risk of a decline in the price of the bond if rental income from the property that is the source of interest payments declines.

Such real estate-related investments are now used by a wide range of banks (right panel of Chart IV-2-14). Until the mini-bubble period in the mid-2000s, the share of real estate-related exposures in the securities investment of regional and *shinkin* banks with such exposures was limited. Recently, however, the share of regional and *shinkin* banks with real estate-related exposures exceeding 5 percent of their total securities holdings has reached as high as 20 percent. As many regional and *shinkin* banks have increased their equity investment in funds with exposures to real estate in the metropolitan areas, even banks based in local areas have become more susceptible to the real estate market in metropolitan areas through these market exposures.

C. Interest rate risk in the banking book

Interest rate risk in the banking book (IRRBB) for yen (in terms of the 100 BPV; taking core deposits into account) has remained low (Chart IV-3-1).[40] Looking at banks as a whole, yen interest rate risk is generally in balance between assets (loans and securities) and liabilities (deposits). Moreover, the interest rate risk-to-capital ratio of individual banks is negative for half of all banks.[41] This means that, for many banks, a rise in interest rates will have a positive impact on their financial conditions when their interest rate-related assets and liabilities come up for renewal.

Chart IV-3-1: Interest rate risk



Note: 1. The left-hand chart shows a 100 BPV as of end-September 2023. "Short-term" refers to 3 years or less; "Medium-term" refers to 3 to 5 years; "Long-term" refers to 5 to 10 years; "Longer-term" refers to over 10 years.
2. The right-hand chart shows the medians (markers) and 10th-90th percentile ranges (bands) of a 100 BPV as ratios to capital as of end-September 2023. Ratios to capital are calculated using Tier 1 capital for internationally active banks and core capital for domestic banks.
3. Covers all banks (excluding *shinkin* banks).
Source: BOJ.

However, there is uncertainty over the stickiness of deposits, which is the basis for these risk assessments.[42] Moreover, there is heterogeneity in the amount of interest rate risk across banks and bank types, and therefore the impact of interest rate changes on profits differs among banks. Against this background, this section examines the heterogeneity in the duration structure of banks' assets and liabilities and resultant differences in the degree to which banks' profits improve in response to higher interest rates.

1. Changes in the duration gap

In terms of banks' yen balance sheets, the duration gap -- the difference between repricing schedules of interest payments for assets and liabilities (not taking core deposits into account) -- has been shrinking recently, especially for major and regional banks (Chart IV-3-2). For all types of banks, the duration of securities in the long-term and longer-term zones has shortened somewhat. This is because banks have reduced investment in bonds with longer maturities, which entail higher

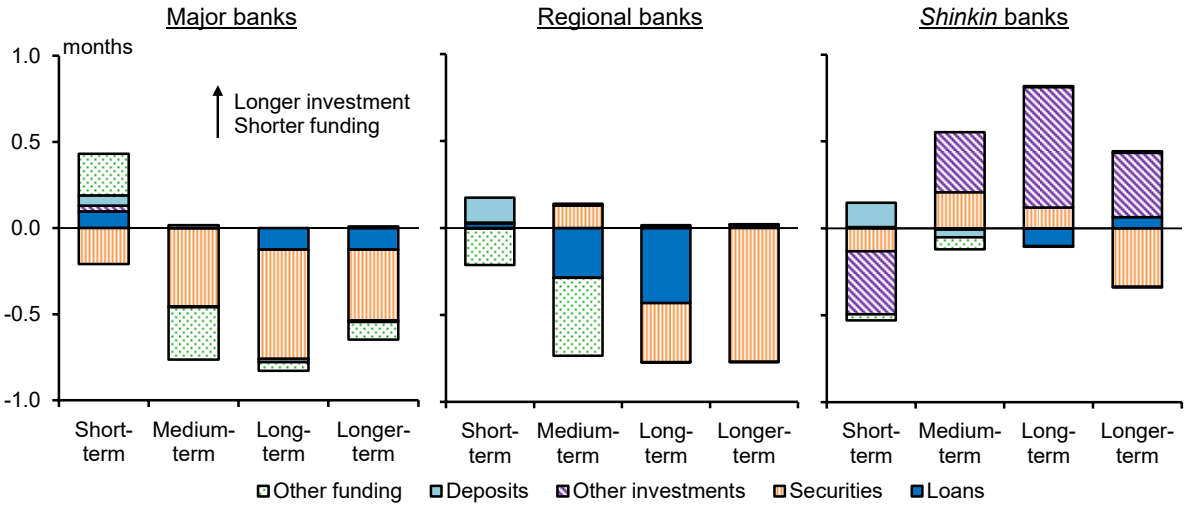
[40] Of deposits that contractually have no maturity and can be withdrawn at any time, such as ordinary deposits, core deposits refer to sticky deposits, which are actually not withdrawn and remain in an account for a long time. In general, core deposits are less sensitive to interest rate changes and the residual maturity composition of core deposits is longer for some banks than others.

[41] The supervisory thresholds are 15 percent (relative to Tier 1 capital) for internationally active banks and 20 percent (relative to core capital) for domestic banks.

[42] For details on the stickiness of deposits, see Box 2 in the October 2023 issue of the *Report*.

interest rate risk, amid concerns over the risk of higher interest rates (see Section B). In addition, the duration of funding in the medium-term zone ("other funding" in the chart) for major and regional banks has become longer. This reflects banks' longer-term funding using the Bank of Japan's fund-provisioning measure to stimulate bank lending and funds-supplying operations against pooled collateral.

Chart IV-3-2: Changes in duration by maturity



Note: 1. Shows the contribution to changes in the duration gap from end-2022 to end-September 2023.
2. "Short-term" refers to 3 years or less; "Medium-term" refers to 3 to 5 years; "Long-term" refers to 5 to 10 years; "Longer-term" refers to over 10 years.
Source: BOJ.

Meanwhile, *shinkin* banks' risk taking has differed from that of major and regional banks. *Shinkin* banks have preferred long-term fixed-rate transactions with their central organization as an alternative to bond investment, which entails the risk of valuation losses, since such transactions do not need to reflect mark-to-market valuations. As a result, some of the interest rate risk associated with securities has shifted to interest rate risk associated with transactions with the organization ("other investments" in the chart). Reflecting such interest rate risk taking specific to *shinkin* banks, their duration gap has widened somewhat.

2. Link between the duration structure and interest rate risk

The impact of interest rate changes on banks' financial conditions is determined by (1) the shape of the yield curve, (2) the interest rate pass-through to investment and funding products, and (3) banks' balance sheet structure (the duration gap between assets and liabilities). These factors affect profits and the market value of bonds through changes in funding rates, such as interest rates on deposits, in investment yields on loans and securities, and in discount rates for mark-to-market accounting. The previous issue of the *Report* showed that the effect of rising interest rates on banks' profits differs depending on the combination of the shape of the yield curve and the interest rate pass-through to deposits.[43] This *Report* provides an overview of the impact of different balance sheet structures on banks' profits (income on loans and securities and cost on deposits) through a simulation that compares the current situation with the previous phase of policy rate hikes in 2006-2007.

Using the duration structure of banks' assets and liabilities in fiscal 2006 and today, the simulation

[43] See Section C of Chapter IV in the October 2023 issue of the *Report* for the impact of the shape of the yield curve and the interest rate pass-through on banks' financial conditions.

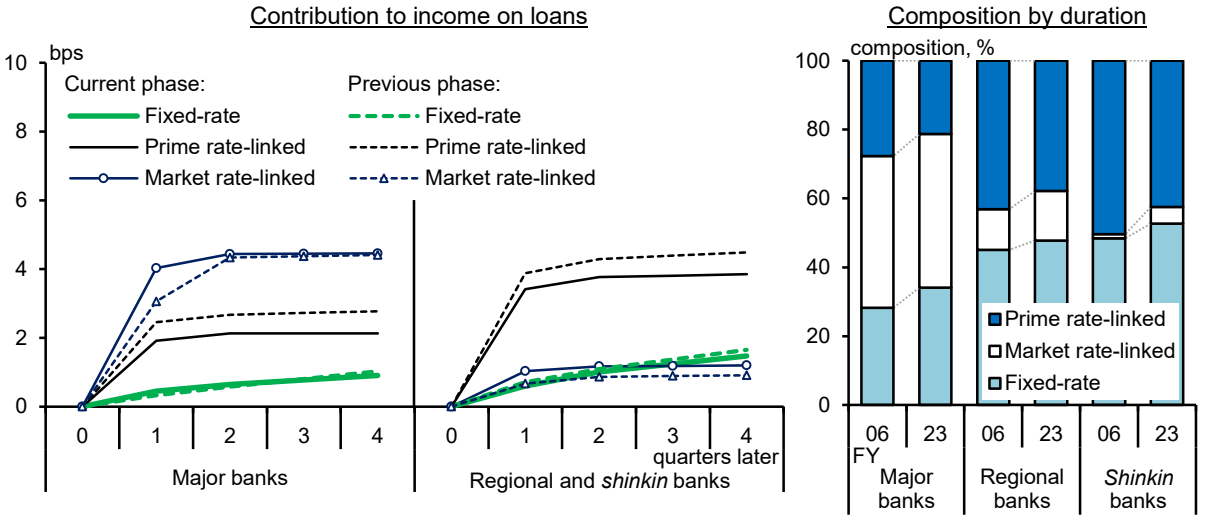
assumes a uniform rise in market interest rates for all maturities of 0.1 percentage points. Further, the interest rate pass-through to each investment and funding product is assumed to be the same as that during the previous phase of policy rate hikes.[44] Employing these assumptions, the following examines how differences in duration structures affect banks' profits. While the simulation in the previous issue of the *Report* focused on the medium- to long-term impact of interest rate rises, the simulation in this *Report* focuses on the short-term impact.

It should be noted that the simulations in this section are intended to depict the direct effects of interest rate changes and their transmission mechanisms. They do not take into account any management actions by banks in response to rising interest rates, such as adjustment of their positions using interest rate hedging or through loss-cutting. Therefore, the simulation results should not be interpreted as a projection of profits when interest rates rise, but rather as an illustration of the potential upward or downward pressure on profits.

Comparison of yields on the asset side

Charts IV-3-3, IV-3-5, and IV-3-6 present the simulation results for loans, securities, and deposits. They respectively show the contribution of individual products to the income on loans (relative to loans outstanding), the income on securities (relative to securities outstanding), and deposit costs (relative to deposits outstanding) during the first year after the rise in interest rates. One source of income is floating-rate loans, in which both major banks and regional and *shinkin* banks expect an improvement in the short term (Chart IV-3-3). Reflecting differences in the composition of loans, market rate-linked loans make a larger contribution for major banks, while prime rate-linked loans make a larger contribution for regional and *shinkin* banks. That said, for both major banks and regional and *shinkin* banks, the duration of overall loans has increased due to a rise in their long-term fixed-rate loans. As a result, the contribution of prime rate-linked floating-rate loans to the improvement in income in the short term in the current phase is lower than in 2006.

Chart IV-3-3: Simulation results (1) Loans

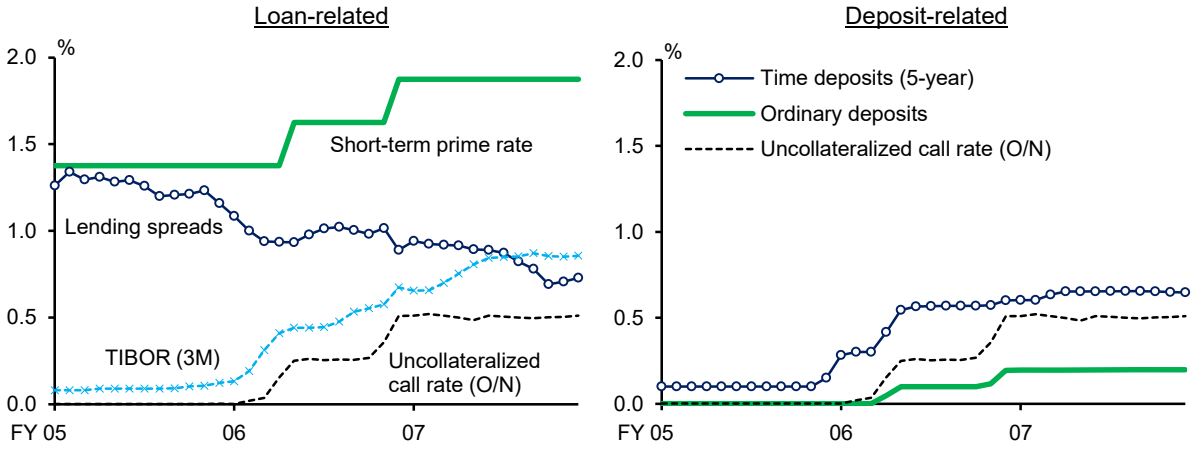


Note: 1. The left-hand chart shows the cumulative changes in the income on loans (relative to loans outstanding) by product. "0" on the horizontal axis represents end-fiscal 2006 for "Previous phase" and end-September 2023 for "Current phase."
2. The right-hand chart compares the composition of outstanding amounts as of end-fiscal 2006 and end-September 2023.
Source: BOJ.

[44] Interest rate pass-through rates are assumed to be as follows. For investments, the pass-through rates for loans (prime rate-linked loans, market rate-linked loans, and fixed-rate loans) and securities are 100 percent. For funding, the pass-through rates are 40 percent for demand deposits and 80 percent for time deposits. These figures are based on the actual interest rate pass-through during the previous phase of policy rate hikes.

During the previous phase of policy rate hikes, the uncollateralized overnight call rate is almost fully passed through to TIBOR and short-term prime rates, the base rates for floating-rate loans (left panel of Chart IV-3-4). However, during the phase of policy rate cuts that followed, the interest rate pass-through to TIBOR and short-term prime rates declined. Moreover, lending spreads tended to be narrower during the previous phase of policy rate hikes. In this context, it should be noted that base rates and lending spreads depend on the balance of supply and demand for loans, the competitive environment, and relationships with customers.

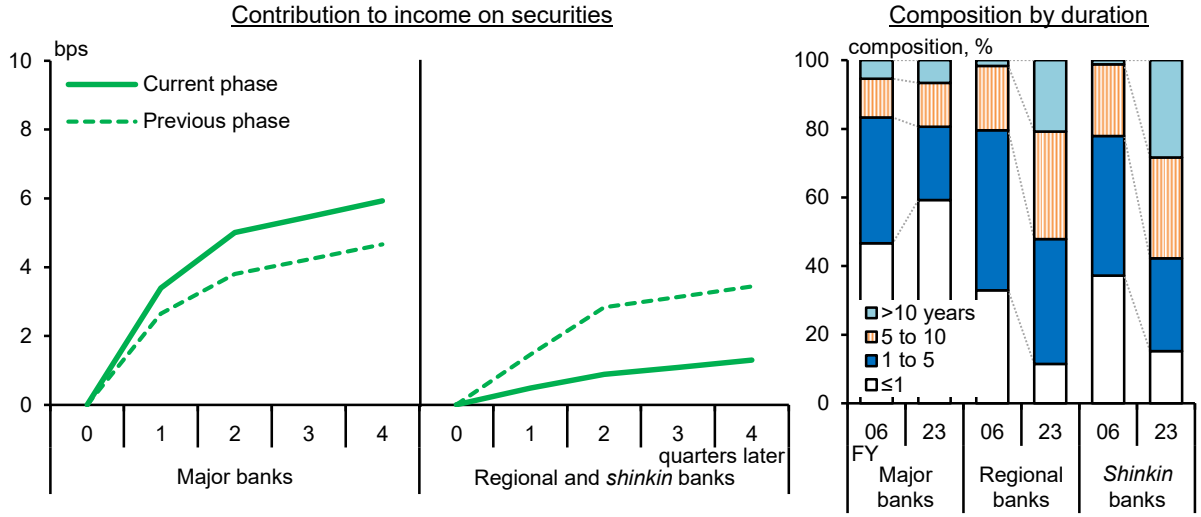
Chart IV-3-4: Interest rates during the previous phase of policy rate hikes



Note: In the left-hand chart, "Lending spreads" refers to the spread between short-term lending rate (3-month backward moving averages) and TIBOR (3M). In the right-hand chart, deposit interest rates indicate the typical rates posted at banks.
Source: Bloomberg; BOJ.

Another source of income is investment in securities. The simulation results indicate that major banks can expect a reasonable improvement in their income within a year of the rise in interest rates (Chart IV-3-5). More than half of their current yen-denominated bond portfolios consists of bonds with a remaining maturity of one year or less, and the contribution of these bonds to income is greater than in 2006. On the other hand, regional and *shinkin* banks, which have increased the duration of their securities holdings, are therefore unlikely to see an improvement in their income in the short term unless they change their portfolios. Therefore, for regional and *shinkin* banks, the

Chart IV-3-5: Simulation results (2) Securities



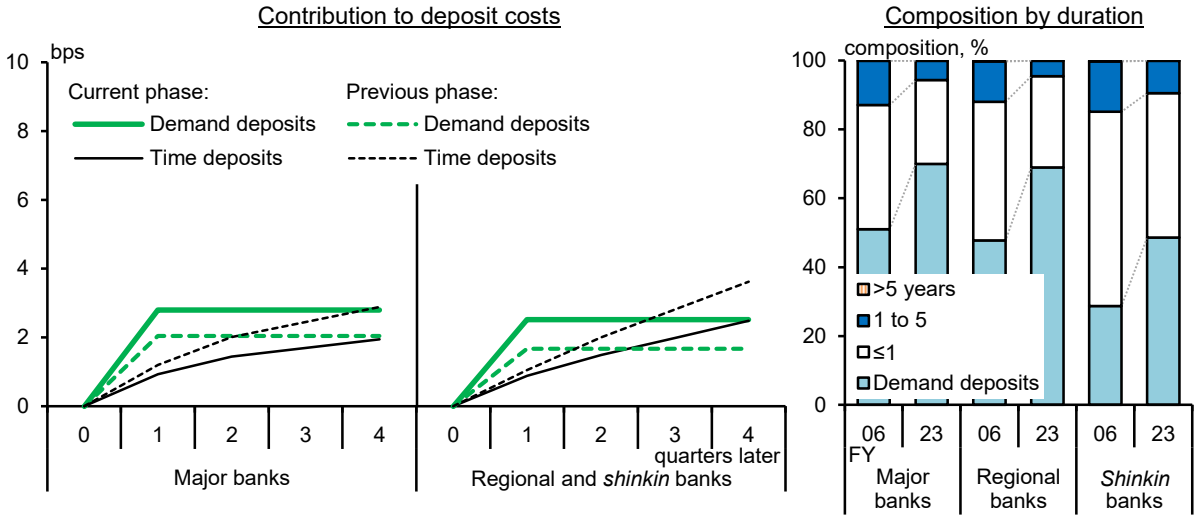
Note: 1. The left-hand chart shows the cumulative changes in the income on securities (relative to securities outstanding). "0" on the horizontal axis represents end-fiscal 2006 for "Previous phase" and end-September 2023 for "Current phase."
2. The right-hand chart compares the composition of outstanding amounts as of end-fiscal 2006 and end-September 2023.
Source: BOJ.

contribution of securities investment to income on securities, which was already not large in 2006, is even smaller during the current phase.

Comparison of yields on the liability side

On the liability side, the contribution of demand deposits to deposit costs in the current phase is larger for both major banks and regional and *shinkin* banks than during the previous phase of policy rate hikes (Chart IV-3-6). Assuming that the interest rate pass-through is unchanged from 2006, as demand deposits have increased, the larger deposit costs likely put downward pressure on profits in the short term. In contrast, the contribution of time deposits to deposit costs is smaller than during the previous phase of policy rate hikes. However, since short-term time deposits make up a larger proportion of their overall deposits at regional and *shinkin* banks, the contribution of time deposits is larger for them than for major banks in the second half of the year following the interest rate rise.

Chart IV-3-6: Simulation results (3) Deposits



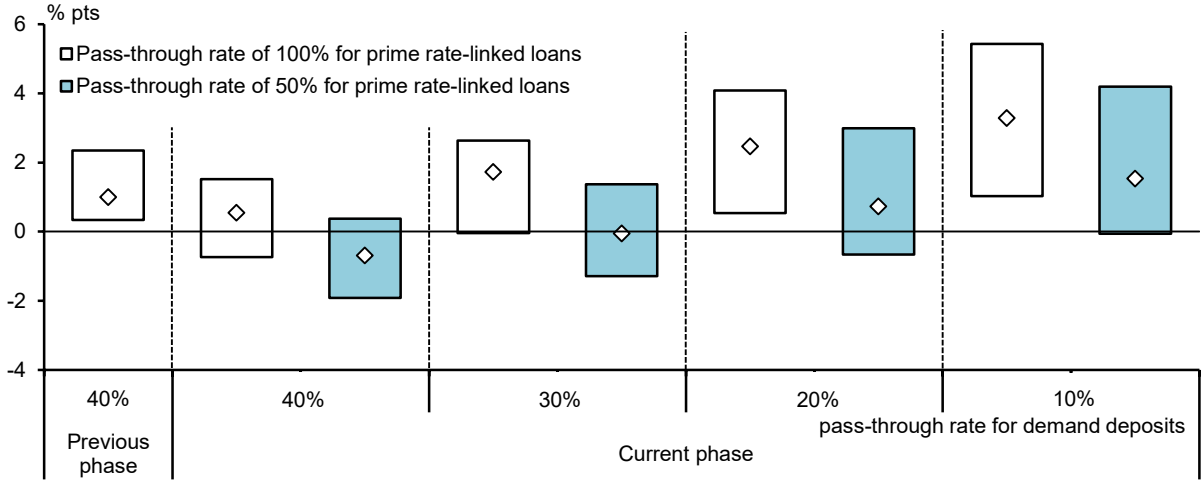
Note: 1. The left-hand chart shows the cumulative changes in the deposit costs (relative to deposits outstanding) by product. "0" on the horizontal axis represents end-fiscal 2006 for "Previous phase" and end-September 2023 for "Current phase."
2. The right-hand chart compares the composition of outstanding amounts as of end-fiscal 2006 and end-September 2023.
Source: BOJ.

The simulation assumes a uniform rise in market interest rates for all maturities. Therefore, deposit interest rates for both demand deposits and time deposits are assumed to rise at the same time. During the previous phase of policy rate hikes, however, interest rates on time deposits rose about six months earlier than those on demand deposits against the backdrop of a gradual steepening of the yield curve (right panel of Chart IV-3-4). The timing of that rise was earlier than increases in the base rate for lending rates. Thus, it is important to note that, when deposit interest rates rise before interest rates on investment products, deposit costs increase first, even if the interest rate pass-through for deposits is lower than that for loans and securities.

It is also important to note that compared to the previous phase of policy rate hikes, banks have larger deposits outstanding relative to their profitability. Even if the interest rate pass-through is unchanged from the previous phase of policy rate hikes, the improvement in the interest income balance when interest rates rise may be lower in the short term than during the previous phase of policy rate hikes. Chart IV-3-7 shows the distribution of changes in the interest income balance -- the income on loans and securities minus deposit costs -- one year after an increase in interest rates based on the simulation results. Assuming the same interest rate pass-through as during the previous phase of policy rate hikes (100 percent pass-through for prime rate-linked loans and 40 percent pass-through for demand deposits), the interest income balance improves by the rise in

interest rates, but the improvement is smaller than during the previous phase as the contribution of deposit costs becomes larger. If the interest rate pass-through for prime rate-linked loans remains low (50 percent pass-through for prime rate-linked loans and 40 percent pass-through for demand deposits), banks' profits are unlikely to improve. Banks could set lower pass-through for demand deposits to curb the downward pressure on the interest income balance, but this would make it difficult for them to secure deposits.

Chart IV-3-7: Simulation results (4) Changes in interest income balance



Note: Shows the distribution of changes in the interest income balance as ratios to domestic net interest income one year after an increase in interest rates. Markers and bands indicate medians and 25th-75th percentile ranges weighted by banks' domestic net interest income, respectively. The pass-through rates for loans other than prime rate-linked loans and securities are 100 percent, and those for time deposits are 80 percent. The chart covers major, regional, and *shinkin* banks.
Source: BOJ.

In sum, the short-term impact of interest rate changes can differ depending on the shape of the yield curve, the level of the interest rate pass-through, and the duration structure. Moreover, deposits may shift across banks if some banks offer higher deposit rates. Similarly, funds may shift across products if investment products offering higher yields, such as MMFs, are introduced. When setting interest rates, banks need to consider the sequence and timing of interest rate revisions and the interest rate pass-through, taking market developments and the competitive environment into account (see Box 4 for interest rate developments before and after the changes in the monetary policy framework in March 2024).

D. Funding liquidity risk

Banks have stable funding bases. However, amid changes in the external environment, there have been changes in deposit markets at home and abroad. Against this background, banks' funding liquidity risk profiles could also change. This section examines Japanese banks' yen and foreign currency funding liquidity risks.

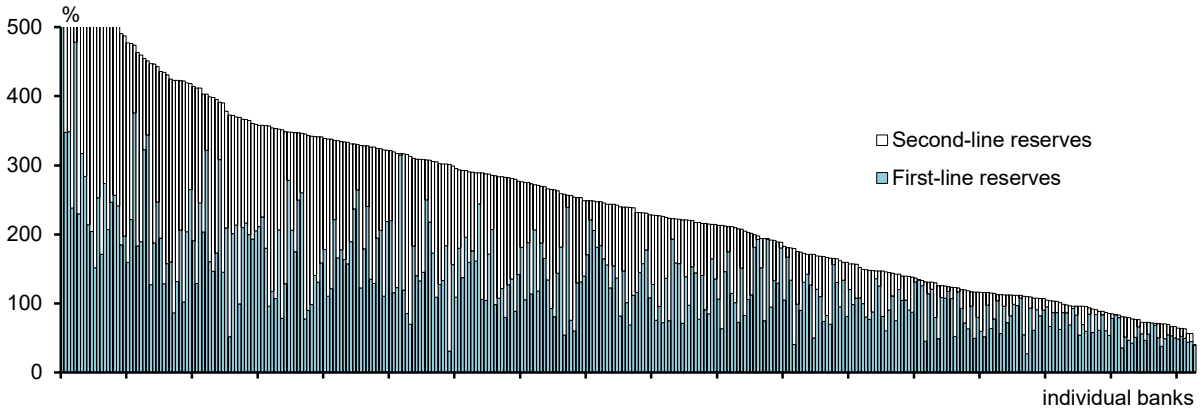
Yen funding liquidity risk

In terms of their yen funding, banks have ample liquidity. For depository financial institutions, the funding base for yen funding is stable retail deposits.[45] Most of these are small deposits that are insured. Moreover, deposits outstanding far exceed loans outstanding. This stable funding base has enabled banks to secure yen funding at low interest rates.

[45] For the composition of banks' deposits, see Section D of Chapter IV in the October 2023 issue of the *Report*.

Another factor contributing to the high stability of funding bases is that a large portion of the loan-to-deposit gap is deposited with the Bank of Japan or invested in highly liquid securities such as JGBs. The level of liquid assets including second-line reserves that can be monetized within a week, such as bonds with high market liquidity, averages more than 250 percent of deposits exceeding the deposit insurance ceiling of 10 million yen (Chart IV-4-1). Moreover, the level of first-line reserves (deposits, unused collateral, etc.) that can be monetized on the same day alone averages more than 130 percent of deposits over 10 million yen. This means that even if uninsured deposits were to be withdrawn in full, banks would still have liquid assets in excess of this amount. Thus, even after taking valuation losses on securities into account, banks are sufficiently resilient to short-term stress.

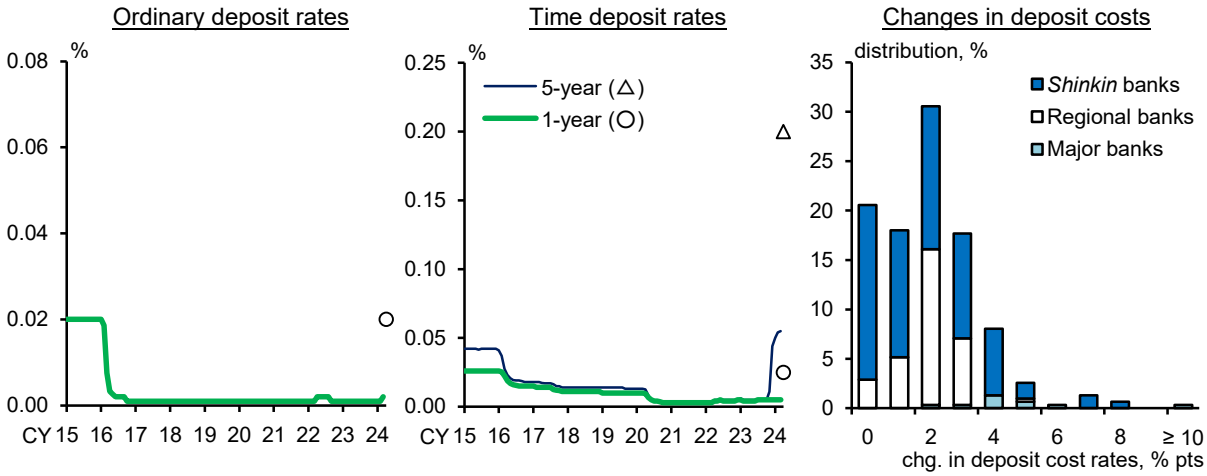
Chart IV-4-1: Liquid asset ratio



Note: Shows the distribution of banks' liquid assets as ratios to retail and corporate deposits (excluding current deposits) of over 10 million yen. Covers regional and *shinkin* banks. Data as of September 2023.
Source: BOJ.

Meanwhile, some changes in the deposit market can be observed. First, since last autumn, many banks have started to raise interest rates on longer-term time deposits (Chart IV-4-2).[46] Moreover, an increasing number of banks have raised interest rates on ordinary deposits since late March this year. As mentioned in the previous section, as demand deposits such as ordinary deposits

Chart IV-4-2: Deposit interest rates



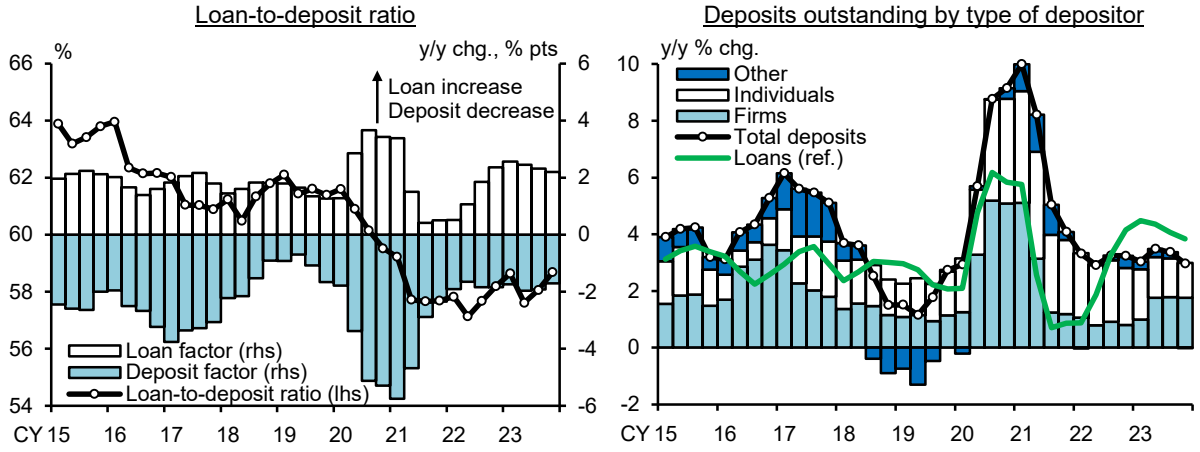
Note: 1. The left-hand and middle charts show the typical interest rates posted at banks. Covers domestically licensed banks, *shinkin* banks, and others (averages) up to March 2024, and covers major, regional, and *shinkin* banks (medians) for April 2024 (markers).
2. The right-hand chart shows the distribution of changes in deposit costs due to the increase in deposit interest rates from October 2023 to April 2024 (after interest rate renewal is reflected in all balances) as ratios to domestic net interest income for fiscal 2022.
Source: Published accounts of each bank; BOJ.

[46] Deposit interest rates as of April 2024 in Chart IV-4-2 are based on information published on banks' websites.

have increased compared to 2006, a rise in interest rates on ordinary deposits tends to be a factor that exerts downward pressure on banks' profits. For some banks that have raised deposit interest rates, deposit costs have increased by a fair amount. The decline in banks' profitability to date likely has also raised the ratio of deposit costs to net interest income.

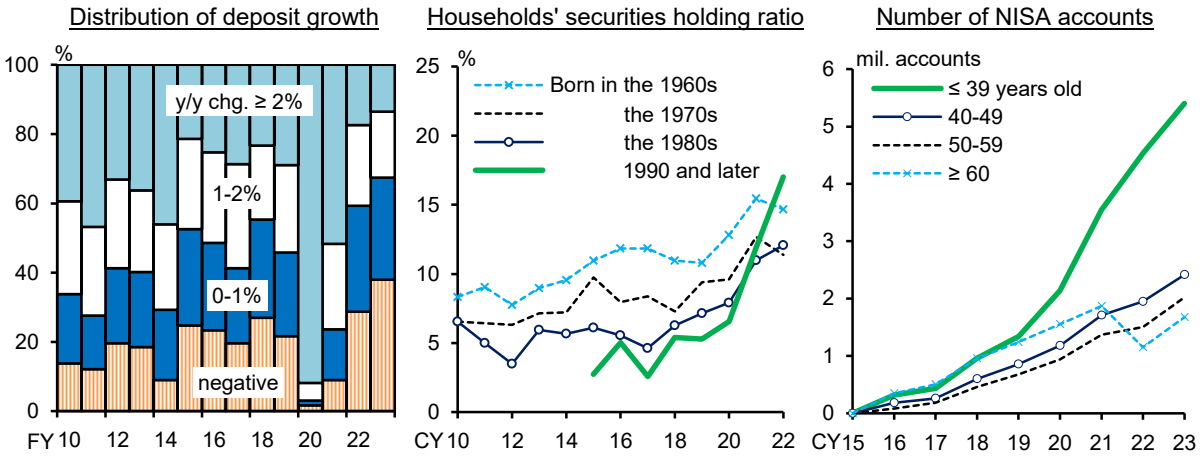
Second, loan-to-deposit ratios, which declined substantially during the pandemic, have been increasing, especially for regional banks (Chart IV-4-3). Looking at deposits outstanding by type of depositor, although deposits from both individuals and firms have continued to grow, their growth rate is slower than that of loans. The pace of growth of retail deposits has decelerated amid the economic recovery after the pandemic. Meanwhile, the amount of increased corporate deposits during the pandemic has decreased in tandem with the amount of corporate loans during the same period due to scheduled repayments or prepayments of pandemic-related loans. Given these developments in deposits, if there is a decline in banks' core deposits -- i.e., deposits regarded as having a relatively long duration -- some banks could see a widening in the duration gap between their assets and liabilities.

Chart IV-4-3: Loan-deposit balance



Note: 1. In the right-hand chart, the bars show the contribution to the year-on-year rates of change in "Total deposits."
2. Covers domestically licensed banks. Latest data as of the October-December quarter of 2023.
Source: BOJ.

Chart IV-4-4: Retail deposits



Note: 1. The left-hand chart shows the distribution of banks. Covers major, regional, and *shinkin* banks. Latest data as of September 2023.
2. The middle chart shows the ratio of securities to savings outstanding by birth year of the household head (estimated values). Covers two-or-more-person households.
3. The right-hand chart shows the cumulative changes from end-2015. "≤ 39 years old" includes Junior NISA. Latest data as of end-September 2023.
Source: Financial Services Agency; Ministry of Internal Affairs and Communications; BOJ.

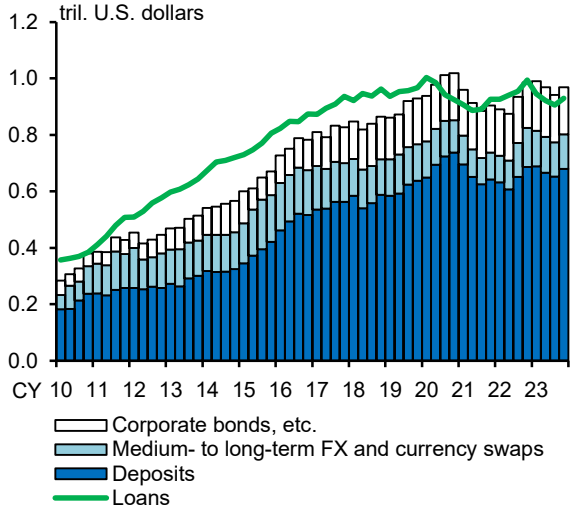
Third, there is considerable heterogeneity across regions and banks with regard to the growth potential of the deposit market (left panel of Chart IV-4-4). Reflecting differences in the business environment such as demographic developments, there are banks that are facing a decline in retail deposits. Many cases have been reported where deposits that were inherited have been transferred from banks in rural areas, where decedents had their accounts, to banks in urban areas, where heirs have their accounts.

Looking ahead, it is possible that households' preference for deposits may change. Regarding the composition of households' financial assets, cash and deposits still account for more than 50 percent of their financial assets, indicating that households still have a high preference for cash and deposits. However, an uptrend in the share of securities in household assets can be observed since the launch of the installment-type NISA program, an individual savings account program, in 2018 (middle panel of Chart IV-4-4). This trend is more pronounced for younger age groups, among which the pace of increase in NISA accounts is faster (right panel of the chart). Under the reformed NISA program that started this year, households' financial asset choices could change further. Banks need to closely monitor the impact of their business environment on their deposit funding.

Foreign currency funding liquidity risk

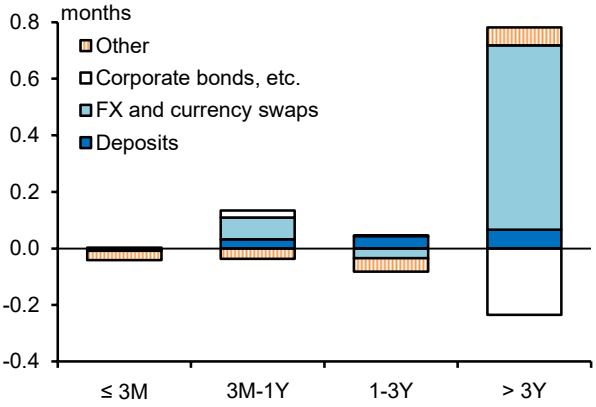
Banks have maintained stable foreign currency funding. Looking at the loan-to-funding gap of major banks -- the difference between the outstanding amount of loans and the outstanding amount of long-term funding, such as through the issuance of corporate bonds, and deposits -- relatively stable funding exceeds their loans (Chart IV-4-5). Against this background, there were no particular problems regarding the first transactions beyond the year-end since the U.S. bank failures in March 2023.

Chart IV-4-5: Loan-to-funding gap among major banks



Note: 1. "Corporate bonds, etc." and "Medium- to long-term FX and currency swaps" indicate funding maturing in over 1 year from end-June 2012 onward, with funding maturing in over 3 months prior to that time.
2. Covers internationally active banks. Latest data as of end-December 2023.
Source: BOJ.

Chart IV-4-6: Changes in duration of foreign currency funding

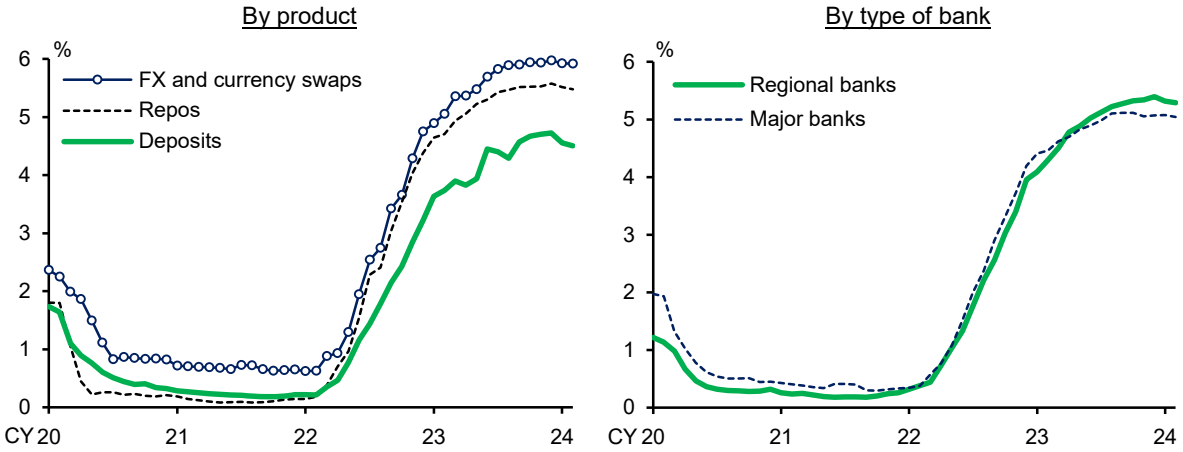


Note: Shows the changes from end-2021 to end-2023 in duration of foreign currency funding by maturity. Covers internationally active banks.
Source: BOJ.

The duration structure of foreign currency funding (taking core deposits into account) has been lengthening (Chart IV-4-6). While the lengthening of the duration of funding helps maintain stable foreign currency funding, it also increases foreign currency funding costs. In particular, market

funding costs tend to rise more than deposit costs (left panel of Chart IV-4-7). In addition, Japanese banks, which are foreign banks in the United States, cannot directly access retail deposits with low funding costs due to restrictions on their business operations. As a result, the proportion of corporate deposits, for which they are often required to pay a premium, is relatively high. During the recent phase of rising interest rates, their funding costs have been relatively high, with the interest rate pass-through for dollar deposits of major banks exceeding that of U.S. banks (Chart IV-1-15).

Chart IV-4-7: Dollar funding cost



Note: Shows the median values. The left-hand chart covers major banks. Latest data as of February 2024.
Source: BOJ.

As highlighted in Section A of this chapter, higher foreign currency funding costs reduce major banks' loss-absorbing capacity through the contraction of their foreign interest margins.[47] The impact of higher funding costs for major banks could also reach domestic regional banks. Regional banks' foreign currency funding counterparties include domestic major banks and securities firms. When major banks' foreign currency funding costs rise, this exerts upward pressure on those of regional banks that obtain foreign currency funding from them (right panel of Chart IV-4-7).

Banks need to ensure a stable foreign currency funding base, taking the costs and risk characteristics associated with each funding means into account. Major banks need to continue their efforts to raise the share of stable funding such as core deposits and long-term market funding. The report released by the Basel Committee on Banking Supervision in response to the turmoil surrounding U.S. and European banks in March 2023 emphasizes the importance of responding promptly in the event of stress and of risk management based on stress testing.[48] Japanese banks should enhance their risk management by refining the assumptions regarding deposit outflows in their stress testing and improving capabilities to detect early signs of the stress.

E. Risks posed by changes in the business environment

1. Risks related to digital technologies

The spread of digital technologies provides banks with opportunities to improve operational efficiency and provide new financial services. At the same time, it also represents a new source of

[47] See Section B of Chapter V in the October 2023 issue of the *Report*.

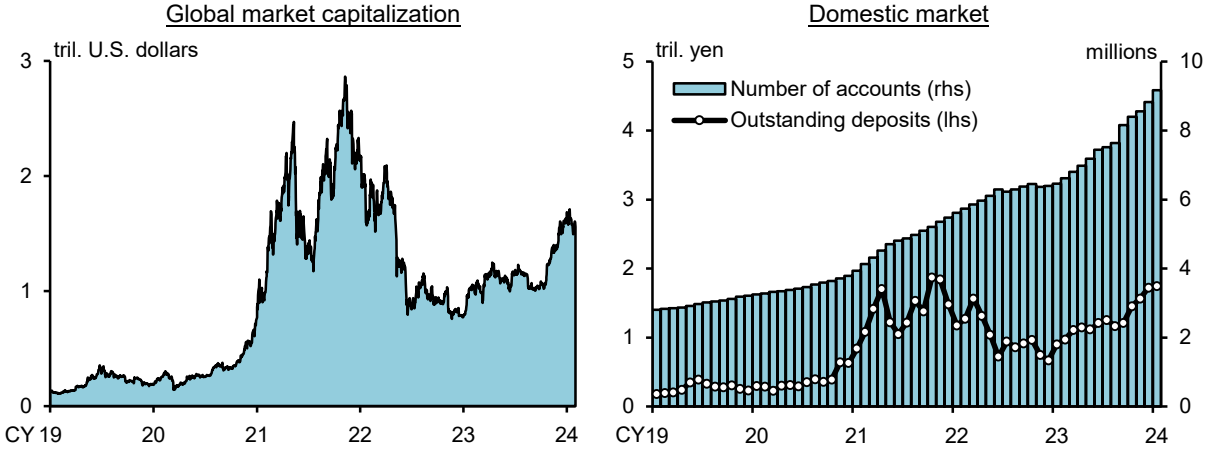
[48] See Basel Committee on Banking Supervision, *Report on the 2023 Banking Turmoil*, October 2023.

risks.[49] Of issues pertaining to these risks, the following describes (1) financial risks associated with crypto-asset transactions, (2) operational resilience, and (3) financial risks accompanying the spread of digital technologies.

Financial risks associated with crypto-asset transactions

Looking at the global crypto-asset market, market capitalization, which had been stagnant for some time, turned to an increase in the second half of 2023 (Chart IV-5-1). The reasons for this include the approval of bitcoin exchange-traded funds (ETFs) by the U.S. Securities and Exchange Commission (SEC) and market expectations for resultant inflows of funds from individual investors. In Japan's crypto-asset market, the outstanding amount of crypto-assets under custody at domestic exchanges has been on the rise. While the size of the crypto-asset market is extremely limited, it is spreading on the back of an increase in the number of retail accounts.

Chart IV-5-1: Crypto-asset markets



Note: Latest data as of January 2024.
Source: Coin Dance; Japan Virtual and Crypto assets Exchange Association.

The linkages between the traditional financial system and the crypto-asset and decentralized finance (DeFi) ecosystem remain limited. The role of crypto-assets in financial services, such as payment services used by firms and households, remains small, and the use of DeFi is also limited. However, the characteristics of the financial risks pertaining to the services provided by this ecosystem are complex and systemic in nature. In particular, the risk characteristics of multifunction crypto-asset intermediaries (MCIs), which provide a wide range of services from the operation of trading platforms to proprietary trading and issuance of crypto-assets, are not very different from those of conventional banks, such as leverage and liquidity mismatch.[50] Identifying and appropriately addressing financial risks associated with the crypto-asset and DeFi ecosystem will encourage sound innovation and contribute to the development of the overall financial system.

Operational resilience

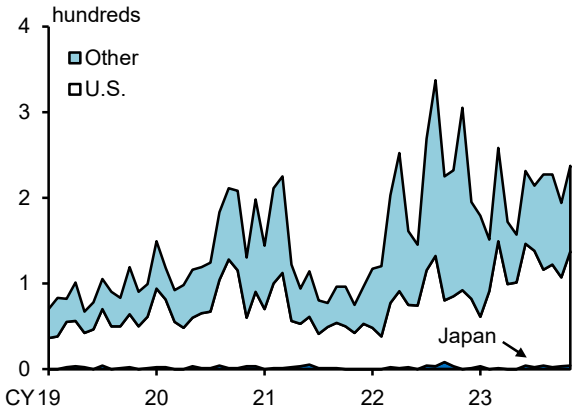
Banks need to continue to enhance their cyber resilience while referring to the basic elements of

[49] For business risks associated with digitalization, see Financial System and Bank Examination Department, "Digital Transformation of Japanese Banks," *Bank of Japan Review Series*, no. 2021-E-2, May 2021.

[50] For details, see Financial Stability Board, *The Financial Stability Implications of Multifunction Crypto-asset Intermediaries*, November 2023.

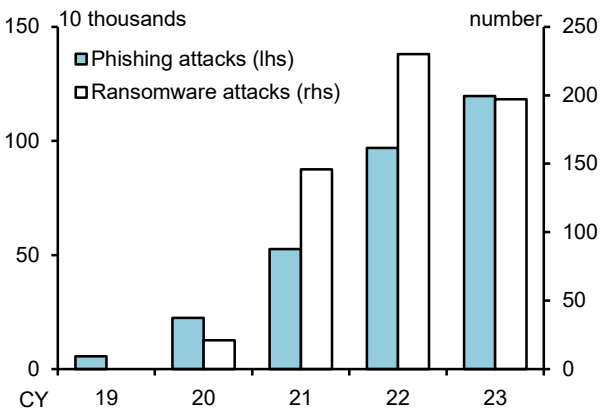
security measures.[51] Although the number of cyberattack cases confirmed in Japan has been minimal compared to the number of cases seen abroad, the number of ransomware and phishing attacks has increased (Charts IV-5-2 and IV-5-3). In addition to frontline defense measures, it is important to take multi-layered cybersecurity measures based on the "zero-trust" approach that assumes the intrusion of threats. Banks are expected to work on strengthening not only their own cybersecurity but also that of their financial groups as a whole, including subsidiaries.

Chart IV-5-2: Number of global cyberattacks



Note: Latest data as of November 2023.
Source: University of Maryland CISSM Cyber Attacks Database.

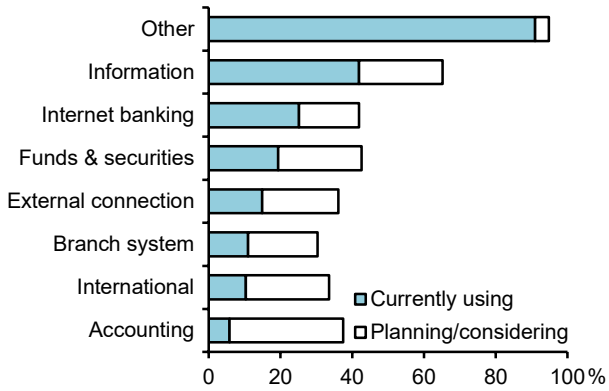
Chart IV-5-3: Number of attacks in Japan



Note: The data for "Ransomware attacks" start from the second half of 2020.
Source: Council of Anti-Phishing Japan; National Police Agency.

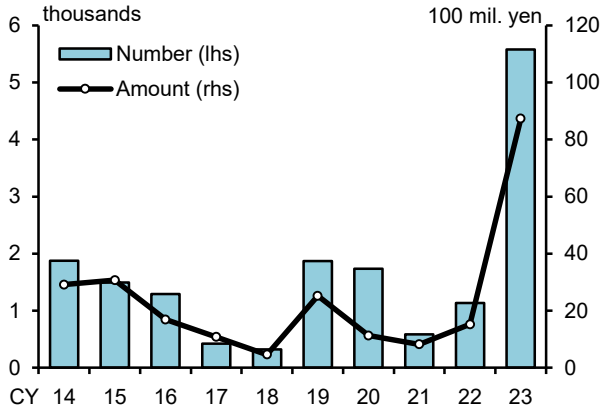
Banks also need to manage outsourcee companies. On the back of the spread of digital technologies, the presence of outsourcee companies (third parties) in financial infrastructure management and bank operations has been increasing. For example, a rising number of regional banks have been jointly using accounting systems. The use of cloud services provided by vendors has also become widespread, especially for information systems (Chart IV-5-4).

Chart IV-5-4: Cloud service usage



Note: Covers 155 banks that hold current accounts at the BOJ.
Source: BOJ.

Chart IV-5-5: Unlawful money transfers



Source: National Police Agency.

The operational failure of the Zengin System in October 2023 once again highlighted the importance of third-party risk management. With the increase in outsourcing, banks that use outsourcing are facing an increasing number of contacts with outsourcee companies not only in

[51] The basic elements of security measures consist of (1) "identification" of information assets to be protected, (2) "prevention" against cyberattacks, (3) "detection" of threats, (4) "response" after threats are detected, and (5) "recovery" of affected functions. For details, see National Institute of Standards and Technology, *The NIST Cybersecurity Framework (CSF) 2.0*, February 2024.

their systems divisions but also in divisions using those systems, and therefore they need to secure specialized staff urgently. It is important for banks to reduce third-party risks by managing vendors in charge of system development and operations, referring to guidelines released by the Financial Stability Board (FSB).[52] The Bank of Japan will encourage banks to improve their operational resilience.[53]

Financial risks accompanying the spread of digital technologies

While the spread of digital technologies in financial services increases convenience, it also gives rise to new challenges. Unlawful money transfers via online banking marked a record high last year (Chart IV-5-5). Reasons for this increase likely include the sophistication of phishing attacks and the widespread use of transfer services via smartphones.

Herd behavior through social media and online banking could also give rise to sudden changes in banks' liquidity risk and interest rate risk. The U.S. bank failures in March 2023 were characterized by "digital bank runs," meaning that deposits were withdrawn at a much faster speed than would have been possible via teller windows at bank branches. In addition, as it is now possible to apply to change the terms of housing loans online, it is conceivable that floating-rate loans can be switched to fixed-rate loans in a short period of time, resulting in changes in banks' interest rate risk profiles. In discussing risk management in the digital era, different factors than in the past need to be taken into account.

There has been widespread use of artificial intelligence (AI) and machine learning in financial services and practices. In particular, the recent progress in generative AI is expected to contribute to the sophistication of financial services and efficiency of financial practices. While AI provides these opportunities, it could lead to new risks and magnify existing risks. For instance, outcomes generated by scoring models that are trained mainly in a period of low interest rates, low volatility, and low default rates in recent years may entail some kind of biases.[54] It remains important to aim to strike an appropriate balance between risks and opportunities when using AI, while closely keeping an eye on international discussions, technological developments, and its applicability to financial practices.

2. Climate-related financial risks

To support the transition to decarbonization on the financial front, banks are expected to make climate-related loans and investments.[55] The ratio of climate-related loans and investments to the

[52] See Financial Stability Board, *Enhancing Third-Party Risk Management and Oversight: A toolkit for financial institutions and financial authorities*, December 2023.

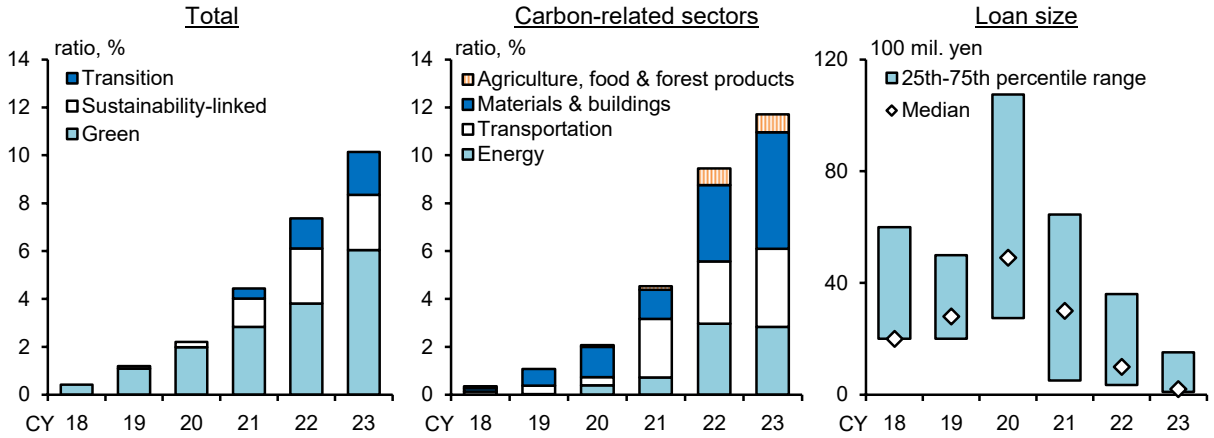
[53] In fiscal 2024, the Bank, in cooperation with the Financial Services Agency, will continue to examine the status of major banks' cybersecurity management frameworks and implement a self-assessment survey on regional and *shinkin* banks' cybersecurity management frameworks.

[54] There is a wide range of other challenges, such as the interpretability of the "black box" aspect of machine learning models, privacy of data used for machine learning, the possibility that transactions using AI algorithms will increase market volatilities, and information security and cybersecurity associated with the use of AI and machine learning models. For details, see Financial Stability Board, *Artificial Intelligence and Machine Learning in Financial Services: Market developments and financial stability implications*, November 2017.

[55] Typical examples of climate-related loans and investments include (1) green finance, i.e., financing for projects that contribute to decarbonization, (2) sustainability-linked finance, i.e., financing for entities that are engaged in initiatives that contribute to decarbonization, and (3) transition finance, i.e., financing where the use of funds and the initiatives of entities contribute to step-by-step decarbonization.

amount of new loans for fixed investments and publicly-offered domestic corporate bond issuance has been on an uptrend, driven especially by green finance (Chart IV-5-6). Furthermore, among the four sectors to which carbon-related assets are tied, where financial conditions are considered to be susceptible to the impact of climate-related financial risks -- i.e., physical and transition risks -- the use of climate-related loans and investments has been expanding at about the same pace as among sectors overall.[56] Meanwhile, the size of each climate-related loan is becoming smaller. This reflects the recent rise in such loans to SMEs, in addition to loans to large firms, which started to increase earlier. Efforts to support decarbonization have also been made in areas other than the climate-related loans and investments, as seen in the opening of the carbon credit market on the Tokyo Stock Exchange in October 2023.

Chart IV-5-6: Climate-related loans and investments



Note: The left-hand and middle charts show the ratio to the total amount of new loans for fixed investments and publicly-offered domestic corporate bond issuance. The right-hand chart shows the distribution of the amount per loan for which values are disclosed.
Source: JPX Market Innovation & Research, Inc., "ESG Bond Information Platform"; JSDA; Ministry of Economy, Trade and Industry; Ministry of the Environment; Published accounts of each company; BOJ.

Efforts toward addressing climate-related financial risks are underway, in line with the FSB Roadmap for Addressing Climate-related Financial Risks. In the area of disclosures, the Basel Committee on Banking Supervision (BCBS) has deliberated on disclosure standards for banks' climate-related financial risks from the perspective of bank supervision. In BCBS standards proposed in a public consultation released in November 2023, it is suggested that banks disclose

Chart IV-5-7: Disclosure standards proposed by BCBS

Overview of disclosure template	
Qualitative information	
	Governance, strategy (incl. transition plan and scenario analysis), risk management
	Transition risk, physical risk, concentration risk
Quantitative information	
	Exposures and financed emissions (emissions associated with loans and investments) by sector
	Exposures subject to physical risks by region
	Real estate exposures by energy efficiency level
	Emission intensity by sector (sectoral breakdown of emission intensity per physical output)
	Facilitated emissions (emissions associated with banks' capital markets/financial advisory activities) by sector

Source: BCBS.

[56] The middle panel of Chart IV-5-6 focuses on the four non-financial sectors covered in the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD): (1) energy; (2) transportation; (3) materials and buildings; and (4) agriculture, food, and forest products. However, due to data constraints, the aggregate results should be interpreted with some latitude.

financed emissions -- the amount of greenhouse gas emissions of firms that banks lend to or invest in -- and information with higher granularity than suggested by standards set by the International Sustainability Standards Board (ISSB) (Chart IV-5-7).[57] These ambitious disclosure standards reflect the BCBS's aim to improve risk assessment of banks by encouraging information disclosure. In Japan, the Sustainability Standards Board of Japan (SSBJ) aims to finalize domestic disclosure standards by the end of fiscal 2024 that are in line with the standards set by the ISSB.

With regard to addressing climate change issues related to the financial system, the Bank of Japan will also push ahead with various measures. On the financial front, the Bank will conduct research and analysis, as well as engage in in-depth dialogue with banks regarding (1) the identification and management of climate-related financial risks, (2) measures to enhance the quality and quantity of disclosure, and (3) engagement with corporate customers in pursuit of decarbonization. Moreover, the Bank will encourage banks to develop their climate scenario analyses in line with their size and characteristics, taking into account international discussions on regulations, supervision, and risk management related to climate-related financial risks (see Box 5 for the latest scenario analysis).

[57] Regarding the calculation and disclosure of financed emissions, the Glasgow Financial Alliance for Net Zero (GFANZ) released a document in December 2023 on methodologies for quantifying the decarbonization contribution of transition finance activities. In addition, the Net-Zero Banking Alliance (NZBA) has proposed metrics for assessing the emission reductions from transition finance.

V. Resilience of the financial system

- With regard to loss-absorbing capacity, banks' capital exceeds regulatory requirements. Their profitability has been on an improving trend, although it remains low. Loan-loss provision ratios have been relatively high. However, room for realizing gains on securities holdings varies across types of banks. It is important for banks to ensure loss-absorbing capacity that is commensurate with macro-economic and financial conditions as well as their business models.
- Given banks' loss-absorbing capacity, macro stress testing is conducted under two downside scenarios: a "financial stress scenario," which assumes stress similar to the global financial crisis, and an "inverted yield curve +1 scenario," which assumes a correction in the domestic and foreign real estate markets in a situation where foreign yield curves become and stay substantially inverted.
- Based on the results of the macro stress testing, it can be judged that the stability of Japan's financial system is maintained even under these stress events. However, some banks, even though they have the capital to withstand a one-time shock, would find it difficult to restore their capital once it is impaired. Moreover, even if a real estate market correction occurs only in the metropolitan areas, it could affect a wide range of banks.

A. Banks' capacity to absorb losses

Ahead of the macro stress testing in the next section, this section examines banks' loss-absorbing capacity from various perspectives.

1. Capital adequacy and loss-absorbing capacity

Capital

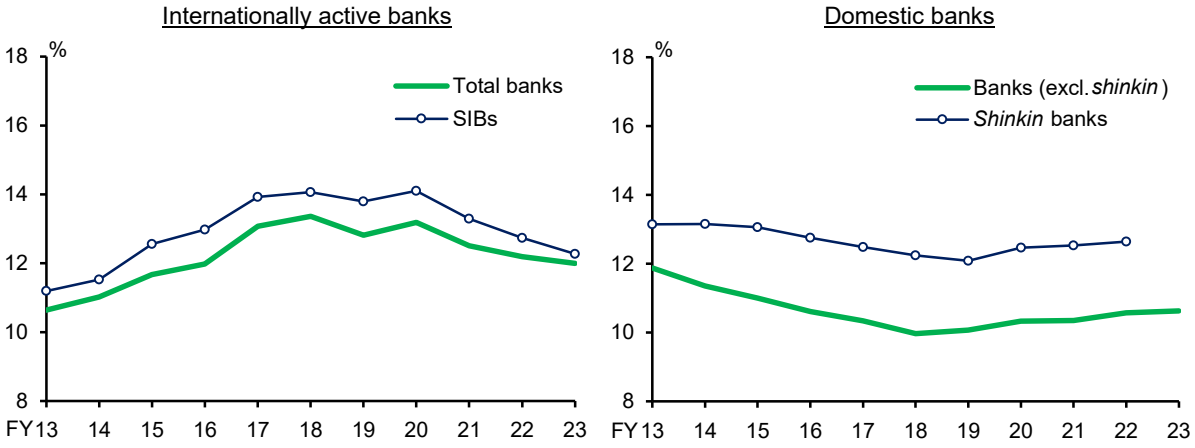
Banks have maintained sufficient capital. Both the common equity Tier 1 (CET1) capital ratio of internationally active banks and the core capital ratio of domestic banks substantially exceeded the regulatory requirements in the first half of fiscal 2023 (Chart V-1-1).[58] Banks have sufficient capital bases overall, which will enable them to continue with risk-taking.

Some regional banks adopted the finalized Basel III regulations early, from the end of March 2023. Moreover, internationally active banks and domestic banks that use the internal models approach started to apply the regulations from end-March 2024, while the remaining banks, i.e., domestic banks that use the standardized approach, will start applying them from end-March 2025. In the finalized package of the regulations, there are factors that increase capital adequacy ratios, such as the lower risk weight for corporate exposures, while there are also factors that decrease those ratios, such as the introduction of the output floor and the higher risk weight for stockholdings. That

[58] Internationally active banks and domestic banks are required to maintain a CET1 capital ratio of 4.5 percent and a core capital ratio of 4 percent, respectively. Internationally active banks are also required to meet capital buffer regulations, including the requirement of a capital conservation buffer of 2.5 percent, a countercyclical capital buffer of 0 to 2.5 percent, and a capital buffer for global systemically important banks (G-SIBs) of 1 to 2.5 percent or domestic systemically important banks (D-SIBs) of 0.5 percent.

said, banks will likely be able to address the change without delay, as the output floor and the risk weight will be raised in a phased manner.[59]

Chart V-1-1: Capital adequacy ratios

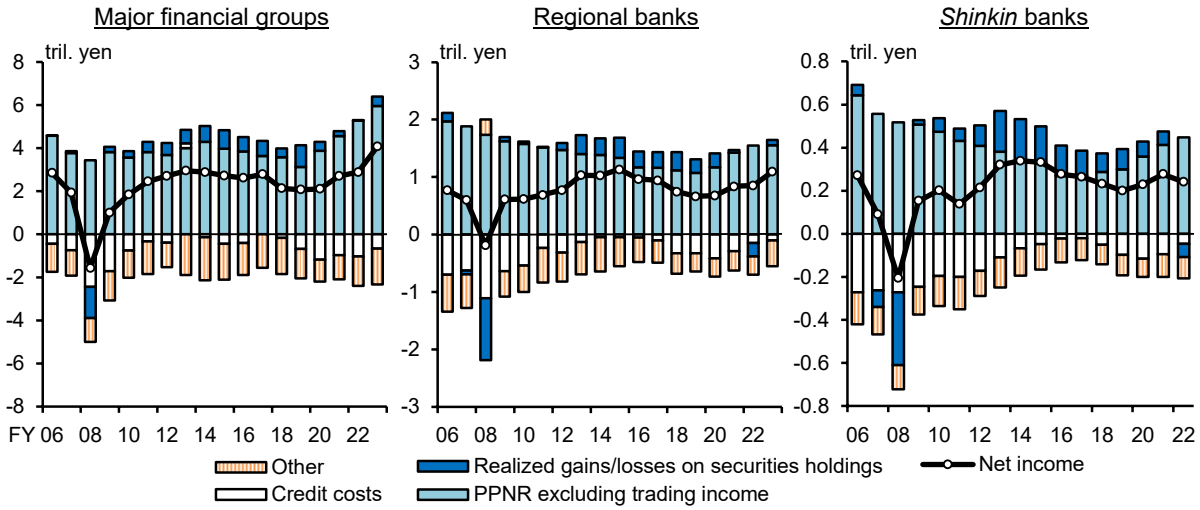


Note: 1. The left-hand chart shows the CET1 capital ratio of internationally active banks; the right-hand chart shows the core capital ratio of domestic banks. In principle, on a bank group basis. The transitional arrangements are taken into consideration.
2. The latest data for internationally active banks, SIBs, and domestic banks (excl. *shinkin*) are as of end-September 2023 and those for *shinkin* banks are as of end-March 2023.
Source: Published accounts of each company; BOJ.

Profit buffers

Banks' net income has remained on an uptrend (Chart V-1-2). Losses such as credit costs have been limited, and pre-provision net revenue (PPNR) excluding trading income, which shows banks' core profitability, has continued to improve. At major financial groups in particular, there is a substantial contribution of the improvement in foreign loan-related net interest income by banks on

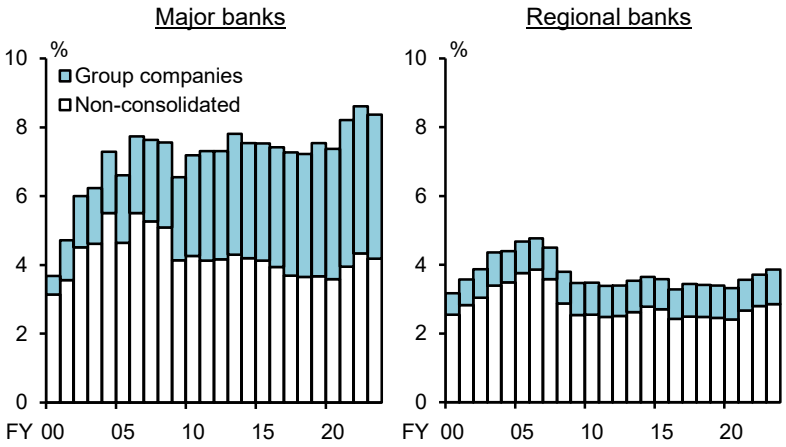
Chart V-1-2: Net income



Note: 1. From fiscal 2012, profits and losses from investment trusts due to cancellations are excluded from "PPNR excluding trading income" and included in "Realized gains/losses on securities holdings."
2. Major financial groups cover Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, SBI Shinsei Bank, and Aozora Bank.
3. The latest data for major financial groups and regional banks are annualized values for the first half of fiscal 2023 and those for *shinkin* banks are as of fiscal 2022.
Source: Published accounts of each bank; BOJ.

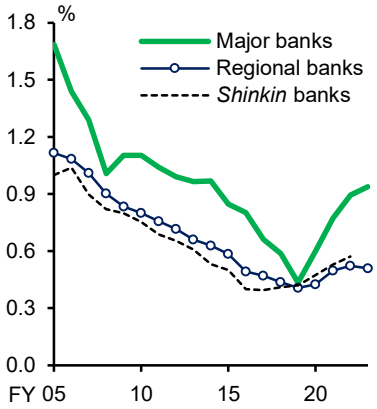
[59] The output floor will be increased from the initial 50 percent to 72.5 percent. The risk weight for stockholdings will be increased from the initial 100 percent to 250 percent.

Chart V-1-3: ROE based on net fees and commissions



Note: Latest data are annualized values for the first half of fiscal 2023.
Source: BOJ.

Chart V-1-4: Break-even credit cost ratios



Note: The latest data for major and regional banks are annualized values for the first half of fiscal 2023 and those for *shinkin* banks are as of fiscal 2022.
Source: BOJ.

a non-consolidated basis and in credit card settlement services by group companies to PPNR excluding trading income (Chart V-1-3). Turning to regional and *shinkin* banks, the improvement in profits of consulting subsidiaries has made a positive contribution to PPNR excluding trading income at some regional banks.

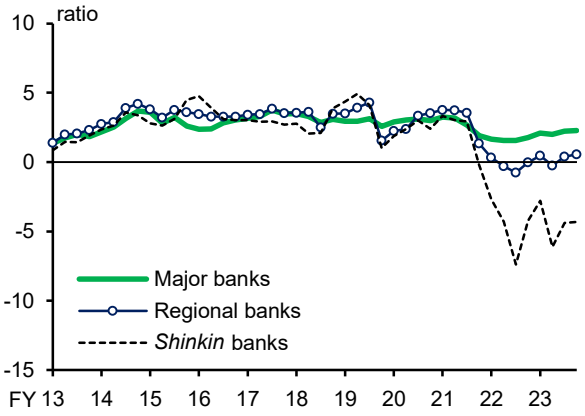
On the back of the improvement in PPNR excluding trading income, break-even credit cost ratios (PPNR excluding trading income/loans outstanding) have also improved (Chart V-1-4). The break-even credit cost ratio represents credit costs that can be absorbed by PPNR excluding trading income in a single fiscal year, relative to loans outstanding. The higher the ratio, the greater banks' capacity to absorb losses. While the capital adequacy ratio represents banks' loss-absorbing capacity on a stock basis, the break-even credit cost ratio captures their short-term loss-absorbing capacity on a flow basis (i.e., on the basis of their profits). However, among banks for which core profitability has continued to stagnate, some have seen only a slow improvement in their break-even credit cost ratios.

Room for realizing gains

Valuation gains/losses on securities holdings, which are not included in the regulatory capital for domestic banks, can function as a capital buffer on an economic value basis. As seen in Section B of Chapter IV, valuation losses on bondholdings have declined recently and valuation gains on stockholdings have increased. Against this background, the "room for realizing gains" -- defined as net valuation gains/losses on securities holdings (including strategic stockholdings and excluding held-to-maturity securities) divided by the past average of PPNR excluding trading income -- has been improving moderately, especially among major and regional banks for which stocks account for a large share of their assets (Chart V-1-5). However, it has remained negative for *shinkin* banks for which yen-denominated bonds account for a large share of their assets.

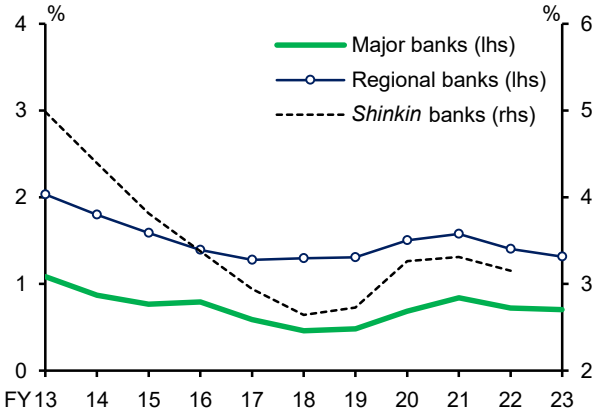
Looking at banks' loss-absorbing capacity overall, their capital exceeds regulatory requirements and their profit buffers have improved. Loan-loss provision ratios for unsecured loans have been relatively high in the past few years (Chart V-1-6). However, room for realizing gains on securities holdings, which can be used to offset losses in a relatively flexible manner, varies across types of banks.

Chart V-1-5: Room for realizing gains



Note: 1. Room for realizing gains (median values) = valuation gains/losses on securities holdings / PPNR excl. trading income and profits/losses on fund cancellations (3-year backward moving averages).
2. The latest data are calculated with valuation gains/losses as of end-February 2024 and PPNR excl. trading income as of fiscal 2022.
Source: BOJ.

Chart V-1-6: Loan-loss provision ratios of banks



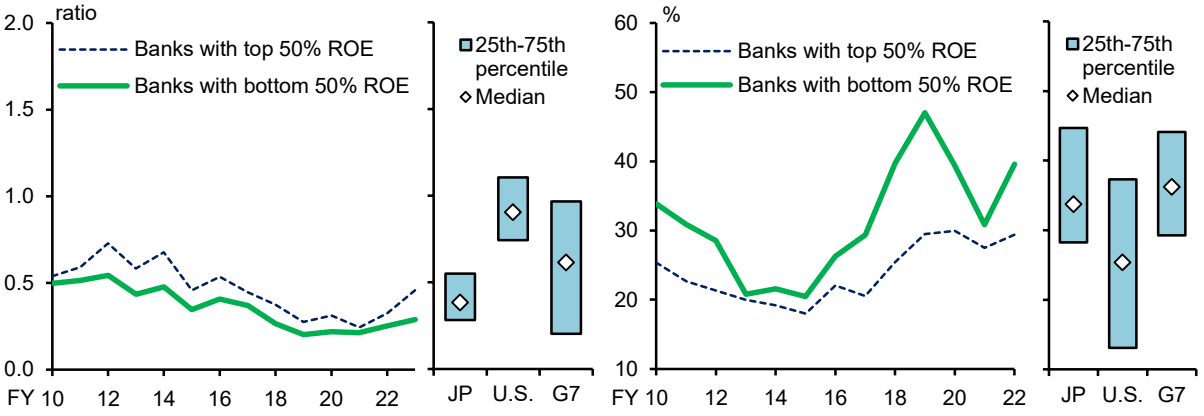
Note: 1. Loan-loss provisions are compared to unsecured loan amounts.
2. The latest data for major and regional banks are as of end-September 2023 and those for *shinkin* banks are as of end-March 2023.
Source: BOJ.

2. Capital policies based on capital bases and profitability

Banks' stock prices and capital policies

The price-to-book (P/B) ratios of listed banks have long been below one (left panel of Chart V-1-7). This is not very different from the situation abroad: few banks in other countries have recorded P/B ratios that consistently exceed one, partly because banks in all jurisdictions are under regulations and supervisions in view of financial stability. However, even in comparison with banks abroad, the P/B ratios of Japanese banks are relatively low. Against this backdrop, Japanese banks have been increasing dividends and raising their dividend payout ratios in an effort to improve their market valuation (right panel of the chart).

Chart V-1-7: P/B ratios (lhs) and dividend payout ratios (rhs) of listed banks



Note: 1. The line charts show the median values of Japanese banks. The horizontal axes for the left- and right-hand charts indicate fiscal year-end and fiscal year, respectively.
2. Distributions in the left-hand chart are based on end-March 2024, and those in the right-hand chart are based on the average over the last three years. "G7" excludes Japan and the U.S.
Source: S&P Global Market Intelligence.

The tendency to raise dividend payout ratios has also been observed among banks with low loss-absorbing capacity such as low profitability. Some of these banks with low loss-absorbing capacity

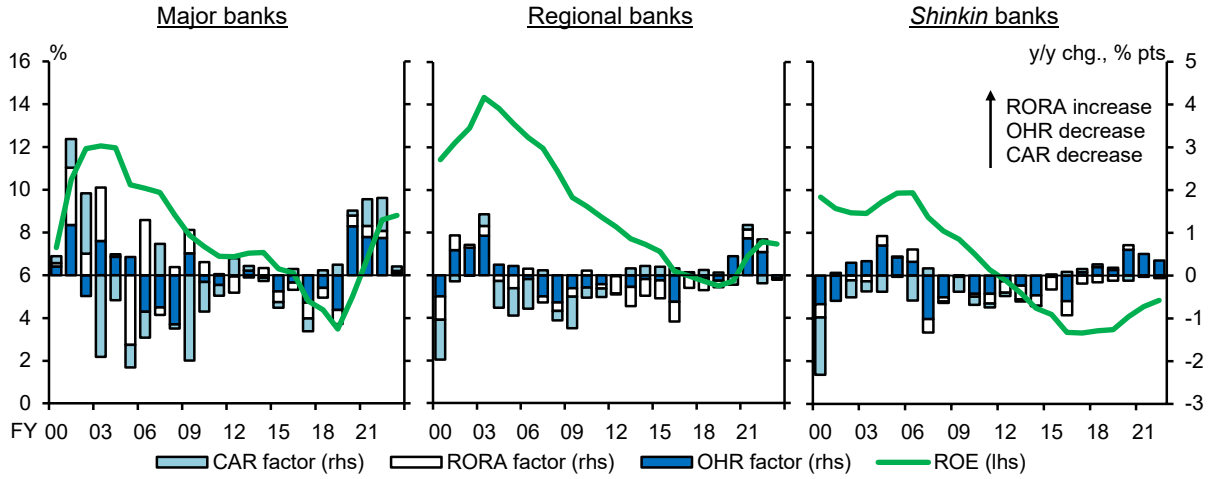
are even returning more of their capital to shareholders than other banks. In general, a low P/B ratio signals one of two things regarding how shareholders evaluate the bank. The first is that shareholders think that the bank holds more capital to sustain their business model than is necessary. The second is that shareholders are concerned about the future prospects of the business model, such as weak core profitability. If the former is the case, returning capital to shareholders is a viable option, but in the latter case, doing so may be counterproductive.[60] Instead, the better option would be to boost capital and strengthen the business model. The distribution of profits in banks' capital policies -- whether profits are paid out to shareholders or retained as internal reserves -- should be based on their capital bases and profitability.

Toward sustainable financial services

To perform financial intermediation activities and provide settlement services into the future, banks need to maintain sufficient capital bases and at the same time secure stable profitability. To this end, it is essential for banks to achieve a virtuous cycle in which they accumulate retained earnings by securing a certain level of profits and use such earnings to provide high-quality financial services. With this virtuous cycle, banks will be able to provide financial services in a sustainable and stable manner.

As mentioned earlier, banks have sufficient loss-absorbing capacity. However, this does not guarantee that they will continue to have sufficient capacity into the future (as for banks' resilience, see the stress testing assuming a financial stress scenario in the next section). Although banks' return on equity (ROE) based on PPNR excluding trading income has recently started to increase, it remains at a historically low level at regional and *shinkin* banks (Chart V-1-8).[61] If the improvement in banks' core profitability and capital accumulation were to stall, financial intermediation could be impaired due to a decline in banks' loss-absorbing capacity. Moreover,

Chart V-1-8: ROE based on PPNR excluding trading income



Note: From fiscal 2012, profits and losses from investment trusts due to cancellations are excluded. The latest data for major and regional banks are annualized values for the first half of fiscal 2023 and those for *shinkin* banks are as of fiscal 2022.
Source: BOJ.

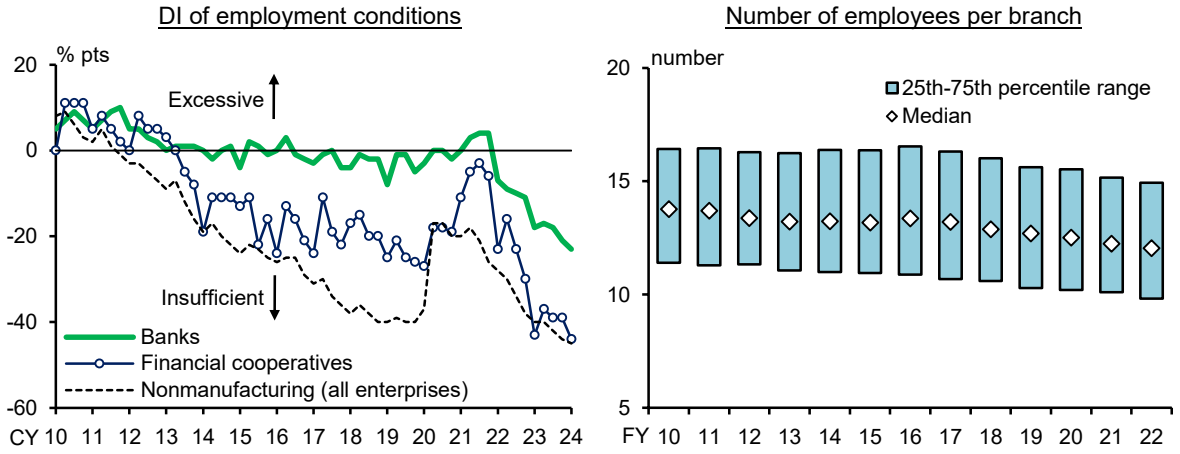
[60] Even banks with low loss-absorbing capacity have tended to raise their dividend payout ratios in recent years. As a result, no significant difference can be observed in the total payout ratios of individual banks regardless of their capital levels. For details on the relationship between banks' total payout ratios and loss-absorbing capacity, see Section A of Chapter V in the April 2023 issue of the *Report*.

[61] In Chart V-1-8, changes in ROE based on PPNR excluding trading income are decomposed into the contribution of (1) the RORA factor (gross operating profits from core business excluding trading income/risk-weighted assets), (2) the OHR factor (PPNR excluding trading income/gross operating profits from core business excluding trading income), and (3) the CAR factor (the inverse of the capital adequacy ratio).

vulnerabilities in the financial system could increase through excessive search for yield. Amid such risks of a contraction or overheating in banks' activities, it is important for banks to establish stable profitability.

In order for banks to provide financial services sustainably, it is necessary to ensure sufficient human resources. In this context, addressing staff shortages has become an important management issue for banks (Chart V-1-9). There are banks that are facing shortages not only of specialized personnel to deal with new fields, but also of client relations personnel at branches to deal with traditional fields, and of personnel at headquarters to deal with business and risk management tasks. Banks need to make efforts to increase productivity per employee -- for example by increasing capital equipment through investment in digital resources -- and to select and focus on priority areas in order to make effective use of limited business resources.

Chart V-1-9: Banks' employment conditions



Note: 1. The latest data for the left-hand chart are as of March 2024.
2. The right-hand chart covers regional and *shinkin* banks.
Source: BOJ.

B. Macro stress testing

This section comprehensively examines the stability of the financial system using macro stress testing, which aims to dynamically examine the resilience of the financial system and the impact on financial intermediation under specific hypothetical stress events.[62,63]

In this *Report*, the stress testing assumes two downside scenarios: a "financial stress scenario" and an "inverted yield curve +1 scenario." The "financial stress scenario" assumes acute stress, such as the global financial crisis, and has been examined regularly. The "inverted yield curve +1 scenario" is used to examine the impact that stress stemming from a continued global tightening of financial conditions would have on the domestic real estate market. As described in Chapter IV, an increasing number of banks hold real estate-related exposures in both their loans and securities investments. If the commercial real estate market, where valuations of some properties seem relatively high, were to enter a phase of correction, even a correction limited to the metropolitan

[62] The simulation utilizes the Financial Macro-econometric Model (FMM) developed by the Financial System and Bank Examination Department of the Bank. For the basic structure of the model, see Abe, N., Chikamatsu, K., Kanai, K., Kawasumi, Y., Munakata, K., Nakayama, K., Okuda, T., and Takano, Y., "The Financial Macro-econometric Model (FMM, 2022 Version)," *BOJ Reports & Research Papers*, March 2023.

[63] The stress testing targets 109 banks and 247 *shinkin* banks. The simulation period is from the October-December quarter of 2023 through the January-March quarter of 2027. For the main economic and financial variables for and simulation results of the assumed scenarios, refer to the "Scenario Tables" on the Bank's website.

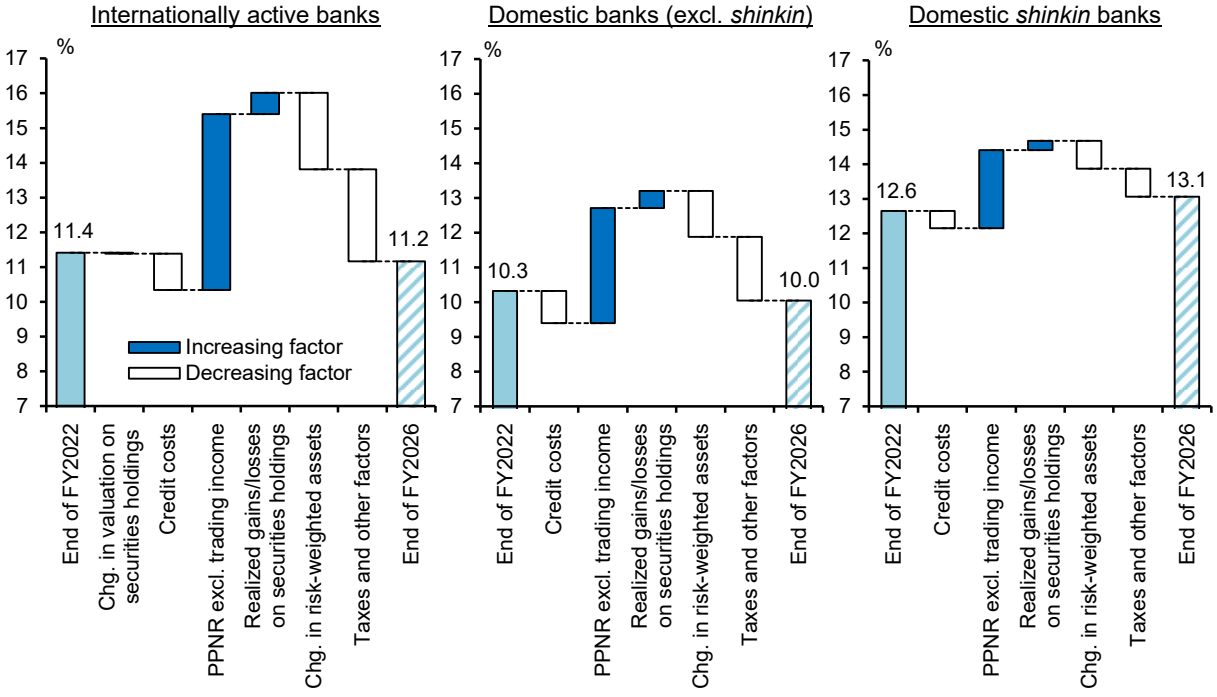
areas would likely have a broad impact on Japan's financial system through direct and indirect channels.

These downside scenarios are hypothetical and designed to effectively examine the resilience of the financial system. They represent neither the Bank of Japan's outlook for the future economic and financial environment, asset prices, and policy conduct nor the likelihood of the outcome.

1. Baseline scenario

The baseline scenario assumes that Japan's economy recovers as foreign economies continue to recover moderately, based on average forecasts by several research institutions and market expectations as of January 2024.[64] As for financial variables, it is assumed that all of the currently available information on the outlook for the domestic and foreign economies is appropriately priced in by financial markets. The baseline scenario assumes that market interest rates rise moderately in Japan and decline moderately overseas in line with the forward rate curve in January 2024. It is assumed that other financial variables (stock prices, crude oil prices, exchange rates, and various credit spreads) are unchanged from their levels in January 2024. There are no significant differences from the growth rates of the domestic and foreign economies assumed in the baseline scenario in the previous issue of the *Report*. Long-term domestic interest rates at the end of the simulation period are assumed to be about 0.4 percentage points higher than those assumed in the previous *Report*.

Chart V-2-1: Decomposition of capital adequacy ratio: Baseline



Note: 1. Indicates the contribution of each factor to the difference between the capital adequacy ratios at end-fiscal 2022 and the end of the simulation period (as of end-fiscal 2026) under the baseline scenario.
2. The left-hand chart shows the CET1 capital ratio of internationally active banks. The middle and right-hand charts show the core capital ratio of domestic banks. The transitional arrangements for domestic banks are taken into consideration.

[64] Of the policy measures implemented since the start of the pandemic, the baseline scenario assumes that zero-zero loans are repaid over a period of five years from fiscal 2023 as in previous issues of the *Report*. Specifically, it is assumed that firms start to pay interest from fiscal 2023, which lowers their ICRs. The same assumptions are made in the two downside scenarios.

The simulation results indicate that capital adequacy ratios at the end of fiscal 2026 -- the end of the simulation period -- are sufficiently above the regulatory requirements for all types of banks (Chart V-2-1). However, compared to the previous *Report*, there are changes in the factors affecting banks' capital. In terms of factors boosting capital, the increase in PPNR excluding trading income is larger than in the previous *Report* for all types of banks reflecting the rise in domestic interest rates and assuming the past average interest rate pass-through. The increase is most pronounced for internationally active banks, for which the duration gap between assets and liabilities is small.[65]

At the same time, changes in risk-weighted assets, as well as taxes and other factors, make a larger negative contribution to capital than in the previous *Report*. The former is due to the increase in the yen-denominated value of foreign risk-weighted assets due to the depreciation of the yen at the beginning of the simulation period, while the latter is due to the higher amount of taxes and dividends paid reflecting higher profits. These effects are more pronounced for internationally active banks. Meanwhile, the contribution of credit costs on loans to firms and households is about the same as in the previous *Report*.

2. Financial stress scenario

The financial stress scenario assumes that global financial markets experience a negative shock in the April-June quarter of 2024 comparable to that during the global financial crisis. Regarding financial variables, it is assumed that, with domestic and foreign interest rates declining to record low levels, prices of risky assets plummet and the yen appreciates in foreign exchange markets.[66] Regarding economic variables, Japan's economy decelerates endogenously in the model, reflecting the substantial repricing in financial markets and a slowdown in foreign economies similar to that seen during the global financial crisis.

The simulation results indicate that capital adequacy ratios at the end of fiscal 2026 are substantially lower than in the baseline scenario (Chart V-2-2). The decrease in capital adequacy ratios reflects a decline in interest margins due to the fall in interest rates (decline in PPNR excluding trading income), an increase in credit costs resulting from the economic downturn, and a decline in the prices of risky assets (a deterioration in both valuation and realized gains/losses on securities holdings). That said, capital adequacy ratios remain above regulatory levels on average for all types of banks. It can therefore be assessed that banks have sufficient capital to withstand such acute stress.

However, it is possible that banks would need quite some time to restore their severely impaired capital. On this point, additional simulations were conducted to examine how much time banks require to accumulate sufficient retained earnings to restore their capital to the original level before the stress event. The results show that, due to the decline in core profitability, more banks take a longer time to restore their capital than in the previous phase of policy rate hikes in fiscal 2006 (Chart V-2-3).[67] In fact, some banks need nearly 10 years to restore their capital. It is important to

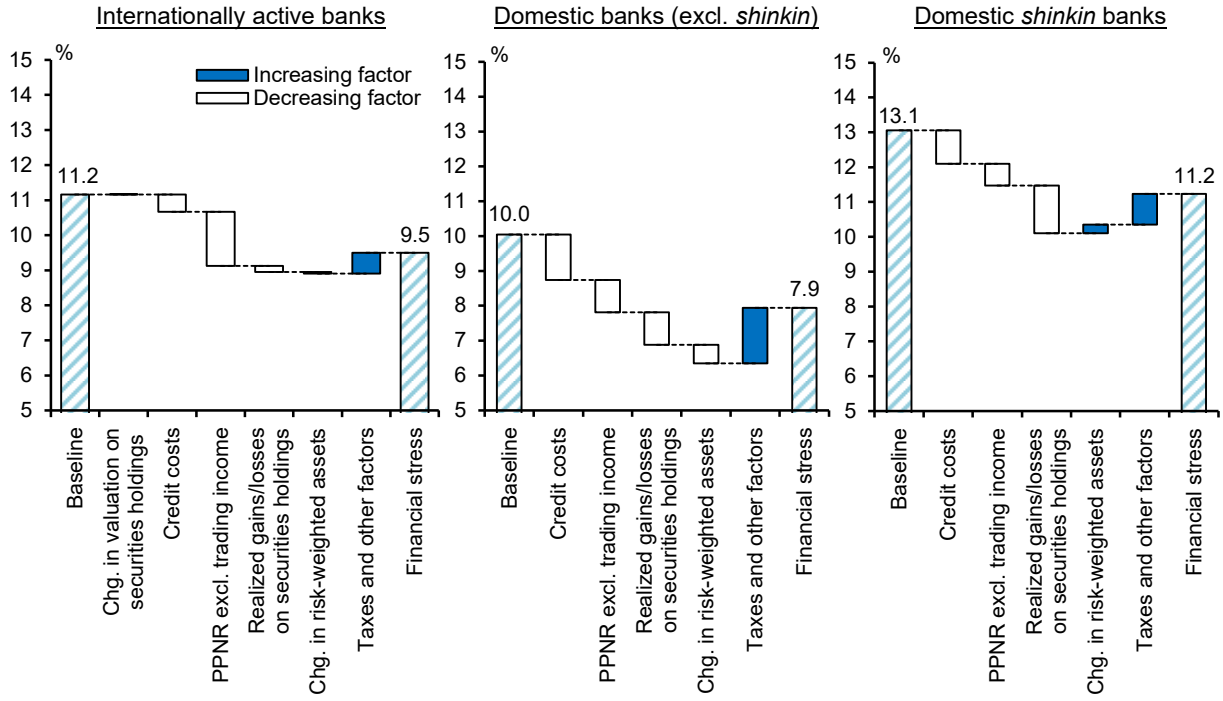
[65] For details on the relationship between the duration gap and net interest income during a phase of rising interest rates, see Section C of Chapter IV in the October 2023 issue of the *Report*.

[66] Regarding U.S. corporate bonds and securitized products, it is assumed that the pass-through rate of spreads on low-rated bonds to spreads on high-rated bonds rises to the same level as at the time of the market turmoil in March 2020.

[67] The vertical axes in Chart V-2-3 represent the period it would take banks to make up the decline in capital under the financial stress scenario through the accumulation of retained earnings. The pace of the accumulation of retained earnings is assumed to be determined by banks' PPNR excluding trading income as of fiscal 2006 and under the baseline scenario, respectively. The effective tax rates and dividend payout ratios are the same as in the simulation of the baseline scenario.

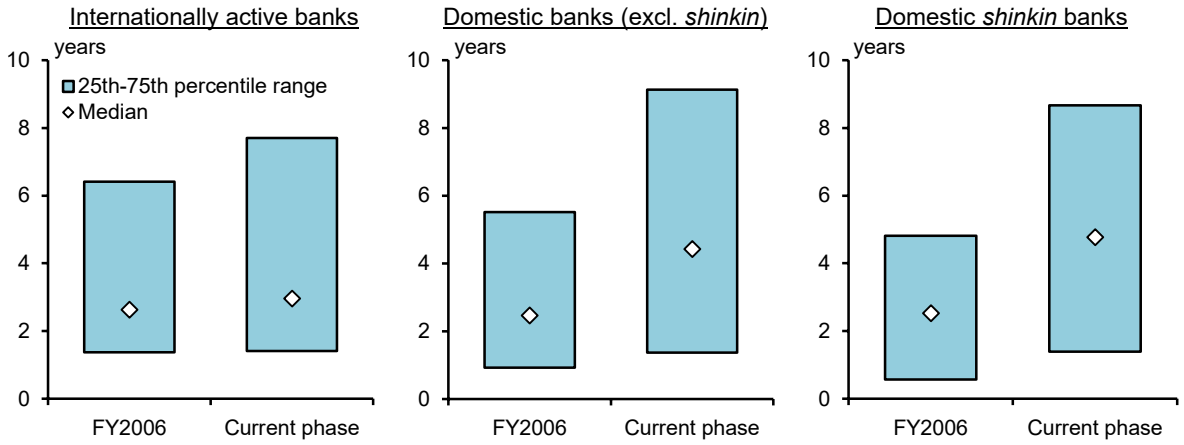
note that some banks, even though they have the capital to withstand a one-time shock, would find it difficult to restore their capital once it is impaired.

Chart V-2-2: Decomposition of capital adequacy ratio: Financial stress



Note: Indicates the contribution of each factor to the difference between the capital adequacy ratios at the end of the simulation period (as of end-fiscal 2026) under the baseline scenario and the financial stress scenario.

Chart V-2-3: Time needed to restore capital



Note: The vertical axes show the time that banks need to restore their capital.

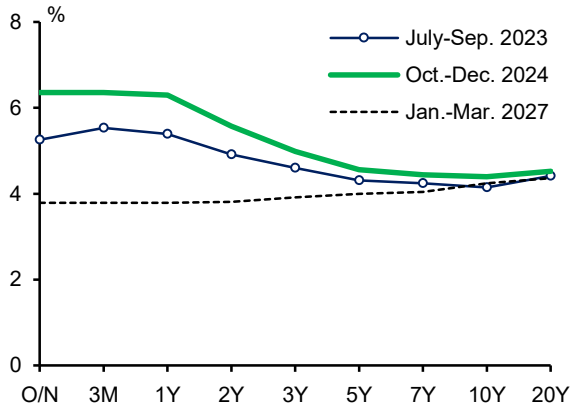
3. Inverted yield curve +1 scenario

Inverted yield curve scenario

The inverted yield curve +1 scenario combines the "inverted yield curve scenario" used in previous issues of the *Report* and a "real estate shock scenario" assuming a correction in the domestic and foreign real estate markets. Starting with the inverted yield curve scenario, this assumes that yield curves in the United States and Europe become further inverted and remain so for a prolonged period (Chart V-2-4). Specifically, as in the previous issue of the *Report*, it is assumed that the U.S.

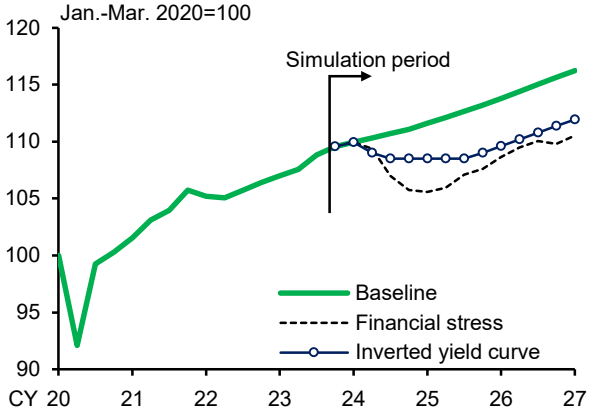
federal funds rate is 2 percentage points higher than in the baseline scenario and remains high for one year before decreasing toward the end of the simulation period. The interest rates for other maturities are assumed to be formed in line with the pure expectations hypothesis and move in a manner consistent with developments in policy rates. Yields remain substantially inverted for most of the simulation period, with market interest rates, especially in the short-term zone, remaining high. Similarly, yield curves in Europe are assumed to remain inverted, like those in the United States.

Chart V-2-4: U.S. yield curves



Source: FRB.

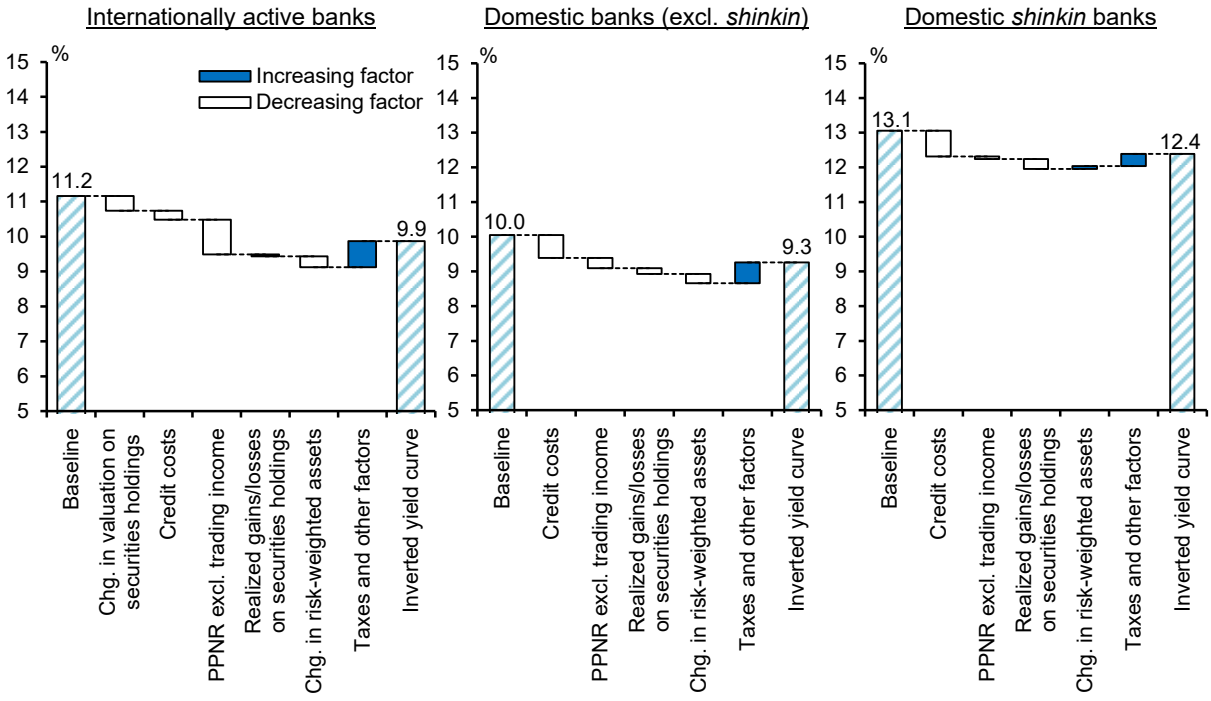
Chart V-2-5: U.S. GDP



Source: BEA; IMF.

Turning to the real economy, both the U.S. and European economies are assumed to decelerate. The growth rate of the U.S. economy is assumed to turn slightly negative in the first half of fiscal 2024 and remain zero thereafter for one year (Chart V-2-5). It is assumed that crude oil prices rise and prices of risky assets fall as the real economy deteriorates. In the model, Japan's economy slows down endogenously due to the rise in foreign interest rates and deterioration in foreign economies.

Chart V-2-6: Decomposition of capital adequacy ratio: Inverted yield curve



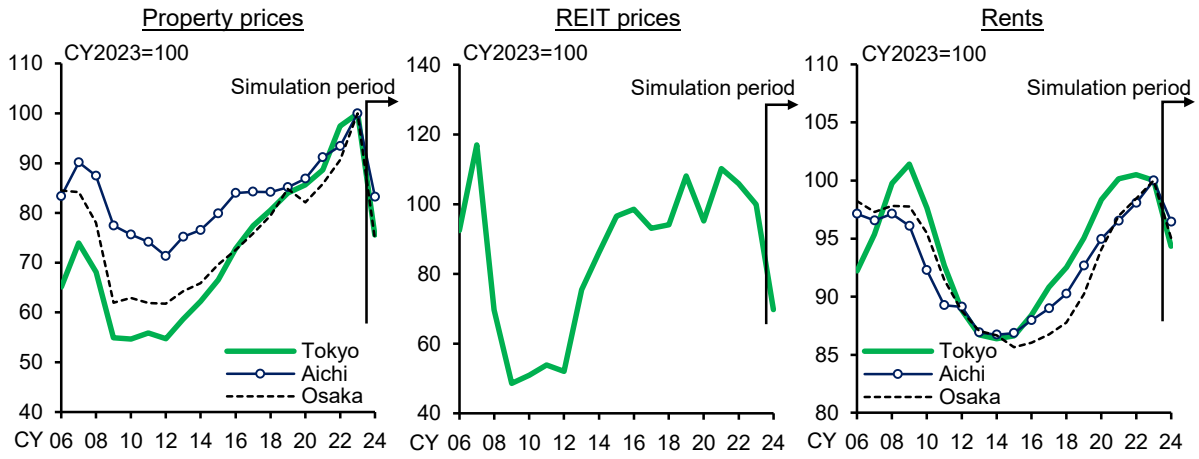
Note: Indicates the contribution of each factor to the difference between the capital adequacy ratios at the end of the simulation period (as of end-fiscal 2026) under the baseline scenario and the inverted yield curve scenario.

The simulation results indicate that capital adequacy ratios at the end of fiscal 2026 are lower than in the baseline scenario for all types of banks (Chart V-2-6). The ratios are pushed down by a decrease in foreign net interest income (decline in PPNR excluding trading income) due to rising foreign currency funding costs. However, the decrease in capital adequacy ratios is relatively modest compared to the financial stress scenario. Overall, the ratios remain above the regulatory requirements throughout the simulation period. It can be judged that the stability of the financial system as a whole is maintained even with foreign yield curves remaining substantially inverted for a prolonged period.

Real estate shock scenario

If the stress phase assumed in the inverted yield curve scenario lasts and foreign real estate markets enter a severe correction phase, foreign real estate funds with a globally diversified portfolio may be forced to rebalance their portfolios on a global basis and sell investment properties in Japan (see Box 1 for risks in the U.S. real estate market). Against this background, the real estate shock scenario additionally assumes that office market prices (property prices, REIT prices, and rents) in the three major metropolitan areas decline significantly triggered by fire sales by foreign real estate funds (Chart V-2-7).[68] Note that the correction in the real estate market is assumed to be limited to the commercial real estate markets of the three major metropolitan areas. It is not assumed that the real estate market correction spreads to other regions or affects the real economy or other financial variables.

Chart V-2-7: Office market prices

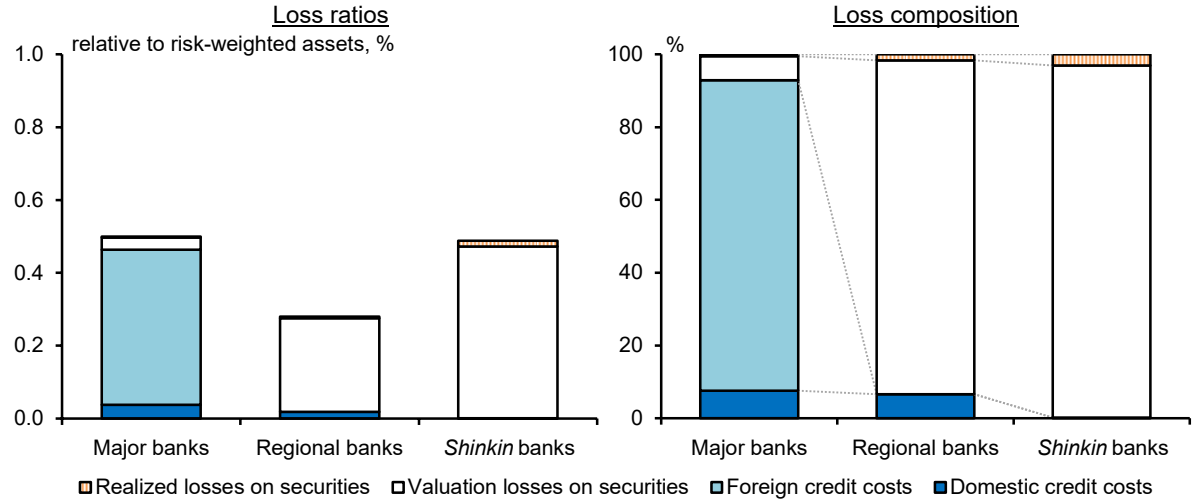


Note: The left-hand chart shows the Japan Commercial Property Price Index. The middle chart shows the Tokyo Stock Exchange REIT Index. The right-hand chart shows the Services Producer Price Index (office space rental).
Source: Haver Analytics; Ministry of Land, Infrastructure, Transport and Tourism; BOJ.

The simulation results show that the additional economic losses (domestic and foreign credit costs as well as valuation and realized losses on securities) due to the real estate shock are limited on a macro basis (Chart V-2-8). The economic loss ratio relative to risk-weighted assets by type of bank is only 0.5 percent for major banks and *shinkin* banks and 0.3 percent for regional banks. It can be judged that, even if the impact of tighter global financial conditions spilled over to the domestic real estate market, the stability of the financial system as a whole would be maintained.

[68] For the rates of decline in property prices and rents, the bottom 5 percentile points on year-on-year changes since the mid-1980s are used. For REIT prices, the rate of decline immediately after the outbreak of the pandemic is used. The decline in property prices and REIT prices is assumed to be directly due to foreign funds' adjustments of their positions. The assumed decline in rents is consistent with the immediate downward revision of rents so that capitalization rates fall to their historical averages.

Chart V-2-8: Economic losses from the real estate shock



Note: Shows economic loss ratios for the first year of the real estate shock scenario. "Valuation losses on securities" includes impairments.

The type of economic loss for banks caused by a deterioration in the office market differs by type of bank per the following three channels. The first channel is through lending to large real estate businesses (corporate loans to large firms). Real estate transaction businesses suffer from the decline in property prices, while real estate leasing businesses suffer from the decline in rents. The deterioration in business conditions and the resultant increase in funding costs increase the probability of default of loans to real estate businesses.[69] Moreover, the deteriorating conditions for real estate businesses also have a similar impact on construction companies, with which they have strong transaction relationships. Losses through this channel are concentrated among banks that extend large loans in the metropolitan areas (including cross-prefecture loans).

The second channel is through loans to real estate funds (non-recourse loans). The increase in the loan-to-value (LTV) ratios due to the deterioration in the office market gives rise to credit costs in loans to real estate funds. For simplicity, in the simulation, all loans with LTV ratios over 100 percent are subject to loan-loss provisions.[70] Losses through this channel are also concentrated among banks that extend large loans in the metropolitan areas. As noted in Section A of Chapter IV, there has been an increase in cases where real estate loans are provided in the form of syndicated loans. This means that the real estate shock spreads simultaneously to all banks participating in those loan syndicates. In addition, major banks engaged in real estate financing abroad need to make additional loan-loss provisions, although they have already made substantial provisions.

The third channel is through REITs and other securities investments. Reflecting the deterioration in the office market, the share prices of publicly placed funds fall. Moreover, the value of privately placed funds without market prices falls by a similar margin as publicly placed funds. Similarly, the prices of REIT bonds also fall. All of these lead to valuation losses on securities held by banks. In addition, the simulation assumes that funds with loans due for refinancing within one year go bankrupt because they cannot obtain funding from banks or sponsors. Losses through this channel

[69] The increase in funding costs was set in line with the increase during the global financial crisis (slightly more than 0.2 percentage points).

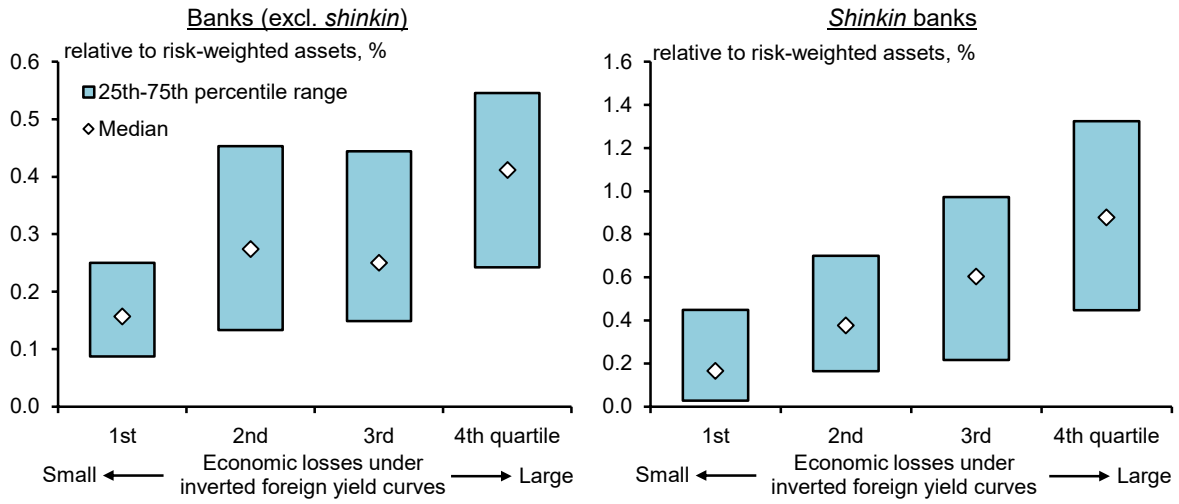
[70] Due to data constraints, LTV ratios of the real estate funds in a loan portfolio of a bank do not differ from those of other banks. For domestic loans, only the difference in the LTV ratio of publicly placed funds from that of privately placed funds is considered. For foreign credit costs, a strong assumption is made that all U.S. real estate financing by major banks results in a total loss.

are concentrated among *shinkin* banks.[71] *Shinkin* banks, which have been diversifying their investment in securities to maintain investment yields, are vulnerable to the impact of the real estate shock via both privately and publicly placed funds. Some suffer impairment losses due to widening valuation losses as a result of the real estate shock.

The real estate shock and banks' loss-absorbing capacity

The economic losses that arise under the real estate shock scenario tend to be concentrated in specific banks. Dividing banks and *shinkin* banks into quartiles in terms of their economic loss ratios (relative to risk-weighted assets) under the inverted yield curve scenario, Chart V-2-9 shows additional economic losses for each quartile as a result of the real estate shock. The chart indicates that the economic losses as a result of the real estate shock tend to be greater for banks with a higher economic loss ratio under the inverted yield curve scenario. The economic loss ratio for *shinkin* banks in the fourth quartile is much higher than the average for *shinkin* banks overall (Chart V-2-8).

Chart V-2-9: Distribution of economic loss ratios



Note: For each quartile of economic loss ratios under the inverted yield curve scenario, shows the medians (markers) and 25th-75th percentile ranges (bands) of economic loss ratios for the first year of the real estate shock scenario.

The fourth quartile in both panels in the chart contains many banks with relatively low profitability. Due to their relatively weak local business bases, these banks have been increasing their foreign interest rate-related exposures, such as foreign bonds and foreign bond investment trusts, in order to maintain their investment yields. At the same time, domestically, they have expanded their real estate-related exposures through cross-prefecture lending and investment in securities. As a result, they are sensitive to stresses such as foreign interest rates remaining high and the real estate shock. Furthermore, their low profitability makes it difficult for them to absorb such shocks through their profits, even if the shocks are limited.

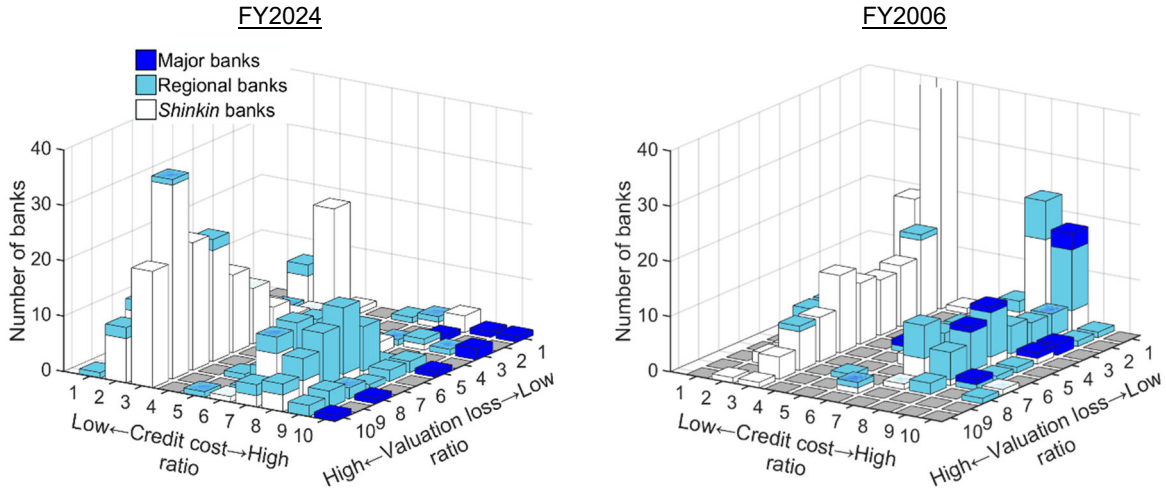
The real estate shock and banks' stress resilience

As noted above, the composition of economic losses in the event of a real estate shock differs by

[71] In the simulation, securities with a valuation loss of more than 50 percent of the book value are treated as impaired. Moreover, with regard to funds that fail to obtain refinancing, equity investments in funds that become insolvent are treated as total losses. The bonds of those funds are assumed to incur realized losses, which are calculated based on the ratio of the excess liability to the total asset of those insolvent funds.

type of bank (Chart V-2-8). However, looking at banks individually, not a few banks suffer relatively large economic losses as a result of both loan credit costs and valuation losses on securities (left panel of Chart V-2-10).[72] This indicates that there are a certain number of banks with real estate-related exposures in the metropolitan areas via both loans and securities investments. In other words, there are banks that have concentration risk in their combined loan and securities investment portfolios.

Chart V-2-10: Distribution of banks by type of loss



This concentration risk likely has arisen in the process of banks accumulating real estate-related exposures. The right panel of the chart presents the simulated economic losses associated with a hypothetical real estate shock using banks' real estate-related exposures as of fiscal 2006, the period of the mini-bubble. The panel shows that banks suffering large credit costs would have had only limited valuation losses. Banks suffering large valuation losses would have had only limited credit costs. These simulation results indicate that banks' investment portfolios in fiscal 2006 were more risk diversified than they are today.

Moreover, in 2006, only a limited number of banks could have been affected by the real estate shock. The share of banks that would have suffered sizeable economic losses -- a credit cost ratio or valuation loss ratio of 0.1 percent or more -- in 2006 is only 40 percent compared to 80 percent today. Since then, as the expansionary phase of the financial cycle has become more prolonged, banks have built up real estate-related exposures, resulting in concentration risk with regard to real estate in the metropolitan areas. Many of these exposures are also common exposures among banks. Therefore, even a shock limited to the commercial real estate market in the metropolitan areas could affect a wide range of banks nationwide, regardless of type of bank.

4. Evaluation of the resilience of the financial system

The results of the macro stress testing indicate that Japan's financial system would remain stable even in the event of a certain level of stress. Japanese banks on the whole are resilient to financial stress similar to that experienced during the global financial crisis or complex stress arising from an inverted foreign yield curve and a correction in the domestic and foreign real estate markets. Banks have ample capital and liquidity, which have enhanced the resilience of the financial system

[72] The left panel of Chart V-2-10 shows the number of banks for a particular combination of the credit cost ratio of loans (relative to loans outstanding) and valuation loss ratio of securities (relative to securities outstanding) based on the simulation results for fiscal 2024. The right panel depicts the simulation results for fiscal 2006. The maximum number of banks in a single cell in the right panel is about 80.

as a whole.

However, there is uncertainty about banks' ability to recover in the aftermath of a stress event. Even though they have the capital to withstand a one-time shock, once their capital is impaired, some may find it difficult to restore it. Moreover, even if a real estate market correction occurs only in the metropolitan areas, it could affect a wide range of banks as a result of banks' increased real estate-related exposures. Banks therefore need to be prepared to appropriately manage a variety of risks, including macro risks such as those described in this section.

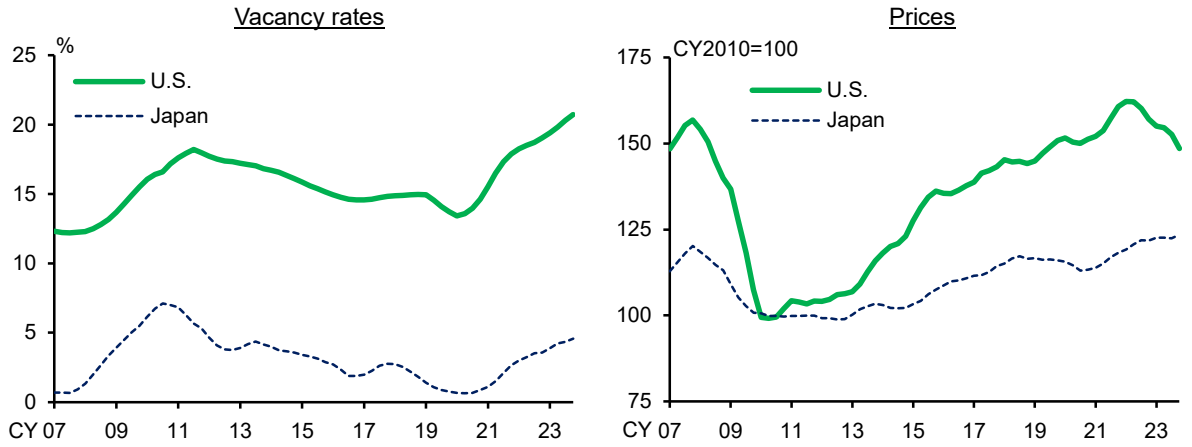
Box 1: U.S. and Japanese commercial real estate markets

A correction in the U.S. real estate market could increase credit costs for Japanese financial institutions (major banks and insurance companies) that provide credit to the U.S. real estate market.[73] In addition, such correction could also affect the Japanese real estate market through rebalancing by real estate funds with globally diversified portfolios. The impact through these channels forms part of the assumptions of the inverted yield curve +1 scenario in the macro stress testing in this *Report*. Thus, developments in the U.S. real estate market are one of the current risk factors for Japan's financial system. This box summarizes the risks in the U.S. office market, with comparisons to Japan.

Contrasts between the U.S. and Japanese markets

The U.S. office market is in a correction phase. Compared to the previous *Report*, office vacancy rates have risen further (left panel of Chart B1-1). The increase in the vacancy rates since the start of the pandemic in the United States is almost twice as large as that in Japan. It has been suggested that a fall in demand for offices due to the spread of remote work may have led to a structural upward shift in vacancy rates in the United States. Therefore, a rise in vacancy rates is observed in a wide range of business districts. This contrasts with Japan, where commuter train congestion rates have been rising with the recovery in economic activity.[74] As noted in the main text, the rise in vacancy rates is limited to some parts of central Tokyo where the supply of office buildings has been increasing (see Section C of Chapter III).

Chart B1-1: U.S. and Japanese office markets



Note: 1. The left-hand chart shows 4-quarter backward moving averages. The right-hand chart shows the commercial real estate prices deflated by the CPI in each country.
2. Latest data as of the October-December quarter of 2023.
Source: BIS; FRED; JLL; Ministry of Internal Affairs and Communications; Ministry of Land, Infrastructure, Transport and Tourism.

There is also a contrast in developments in commercial real estate prices (in real terms, deflated by the consumer price index; right panel of Chart B1-1). In the United States, reflecting the deteriorating supply-demand balance, prices have continued to decline nationwide after peaking at the beginning of 2022. Nevertheless, the Federal Reserve's *Financial Stability Report* (October 2023) points out that real estate prices may remain high relative to rents. In Japan, on the other

[73] Japanese major banks and insurance companies' share in U.S. commercial real estate credit is 1 percent each. Moreover, U.S. real estate financing accounts for 1 percent of major banks' foreign lending. For details, see Box 1 of the October 2023 issue of the *Report*.

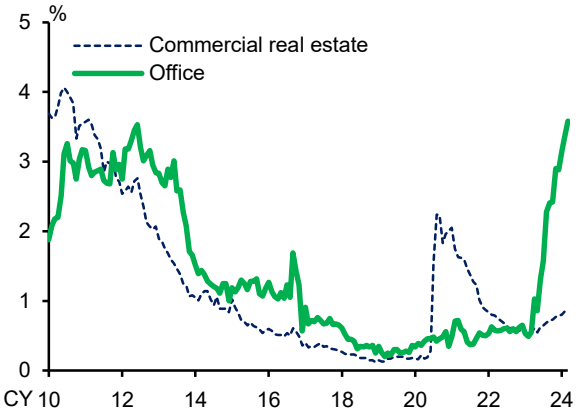
[74] The average train congestion rate in the Tokyo metropolitan area declined to 107 percent in 2020 and rose to 123 percent in 2022 (according to the Ministry of Land, Infrastructure, Transport and Tourism).

hand, prices have continued to rise. However, it is limited to some parts of central Tokyo where there have been notable price increases. Price increases in local areas have been modest.

Spillovers to the U.S. financial system

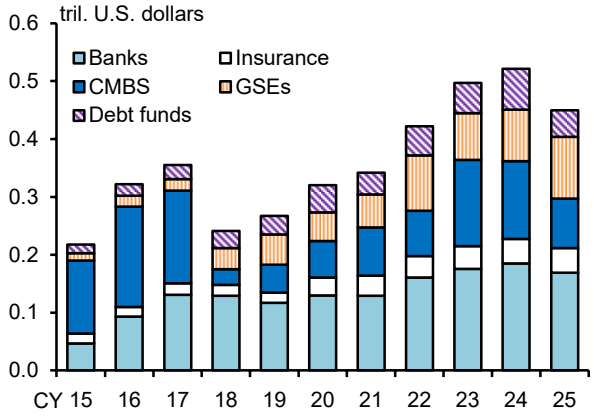
The correction in the U.S. office market is gradually affecting the financial system as well.[75] The delinquency rate of loans for offices has risen further in the United States (Chart B1-2). Office vacancy rates in the United States may continue to rise as lease contracts come up for renewal, and delinquency rates may follow the same uptrend. Moreover, a larger amount of commercial real estate loans is coming up for refinancing than last year (Chart B1-3).

Chart B1-2: Delinquency rates of office loans



Note: Shows the shares of outstanding loans overdue by three months or more in the U.S. Latest data as of March 2024.
Source: Bloomberg.

Chart B1-3: U.S. real estate loans by redemption date



Note: Covers commercial real estate loans in the U.S. The data are based on the survey as of the October-December quarter of 2022.
Source: Newmark.

So far, credit costs in the United States on office loans have been concentrated among large banks, rather than local small and medium-sized banks. Large banks are assessed as being able to keep future additional credit costs in check by making forward-looking loan-loss provisions.[76] On the other hand, it warrants close attention whether small and medium-sized banks, which have been accumulating office loans over the past few years, can avoid them turning into non-performing loans going forward.

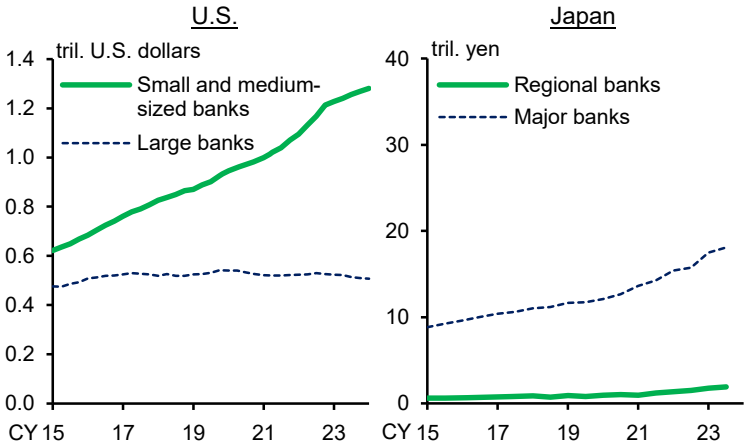
Most of the loans maturing in a few years are loans extended by small and medium-sized banks during the low interest rate period (Chart B1-4).[77] Therefore, delinquencies after refinancing are likely to be concentrated among these small and medium-sized banks. In this case, a vicious cycle might be set in motion if these banks become reluctant to refinance loans due to a decline in the quality of their loan portfolios, making it difficult for the borrowers to complete a large amount of refinancing. This, in turn, could exert even greater downward pressure on market prices as properties that could not be refinanced would be sold in the market (Chart B1-5).

[75] For developments in the U.S. office market and bank lending, see Federal Reserve System, *The Beige Book*, March 2024.

[76] As noted in Section A of Chapter IV, Japanese major banks have been building up precautionary loan-loss provisions for real estate financing in the Americas.

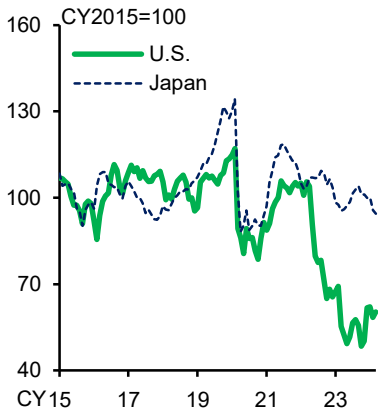
[77] The average term of commercial real estate loans in the United States is estimated to be over six years. For basic statistics on commercial real estate loans in the United States, see Glancy, D., Krainer, J.R., Kurtzman, R.J., and Nichols, J.B., "Intermediary Segmentation in the Commercial Real Estate Market," *Journal of Money, Credit and Banking*, vol. 54(7), pages 2029-2080, October 2022.

Chart B1-4: Office loans



Note: 1. The left-hand chart shows the U.S. commercial real estate (nonfarm nonresidential) loans outstanding. "Large banks" indicates the top 25 banks in terms of domestic assets. Latest data as of February 2024.
2. The right-hand chart shows the loans outstanding to real estate investment funds in Japan. Latest data as of September 2023.
Source: FRB; BOJ.

Chart B1-5: Office REIT prices

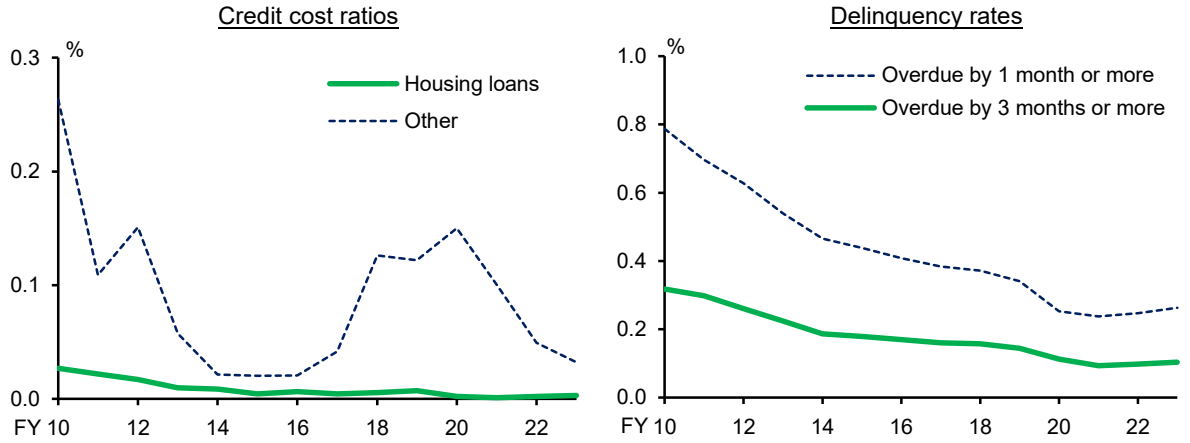


Note: Latest data as of March 2024.
Source: Bloomberg.

Box 2: Credit risk of housing loans

To date, credit costs associated with housing loans have been extremely limited in Japan. Even during the period when employment and income conditions deteriorated after the global financial crisis, the credit cost ratio of housing loans incurred by banks (including credit costs incurred by banks' affiliated guarantee companies) was only a few basis points (left panel of Chart B2-1). Reasons for the low credit costs of housing loans include low delinquency rates and the use of credit guarantees.

Chart B2-1: Credit risk of housing loans



Note: 1. "Housing loans" in the left-hand chart includes banks' affiliated companies' guarantees. Delinquency rates in the right-hand chart are based on the outstanding loans.
2. Covers regional banks. Latest data as of the first half of fiscal 2023.
Source: BOJ.

Regarding low delinquency rates, in the initial screening of housing loan applications, banks specify a stress interest rate that is higher than the actual loan interest rate, in order to take into account the risk that borrowers' debt repayment capacity could deteriorate during the loan period. This has helped to prevent a deterioration in the quality of housing loans even in the wake of the global financial crisis, and the rate of loans that were delinquent for three months or more, which could be downgraded to "need attention," was only about 0.3 percent (right panel of Chart B2-1).[78] Even the rate of loans that were delinquent for one month or more was less than 1 percent. Regarding credit guarantees, nearly 80 percent of housing loans are guaranteed, although the outstanding amount of unguaranteed loans is on the rise, especially among internet-only banks. As a result, even if borrowers were to default, this would shield banks from directly incurring credit costs.[79]

In a future phase of rising interest rates, the following rules to prevent drastic changes in payments would limit discontinuous increases in the principal and interest payment burden for household borrowers. The "5-year rule" and the "125 percent rule" are applied to most of the floating-rate loans with equal principal and interest payments, which many borrowers have chosen.[80] The "5-year

[78] Housing loans are rarely considered for downgrades to "need attention" if they are one month delinquent. In general, they could be downgraded to "need attention" only if they are delinquent for three months or more. Furthermore, if a loan is delinquent for six months or more, it could be subject to subrogation (equivalent to "in danger of bankruptcy").

[79] That said, there are cases where credit guarantees are provided by affiliated guarantee companies within the same banking groups. In such cases, banks bear the credit costs on a consolidated basis. For details, see Section C of Chapter III in the October 2023 issue of the *Report*.

[80] Some major and regional banks have not introduced these rules to prevent drastic changes in payments. Moreover, there are *shinkin* banks -- mainly those offering a small amount of floating-rate loans -- that also have not introduced these rules.

rule" holds the monthly principal and interest payments constant for each 5-year period, even if the loan interest rate rises during this period. For example, as shown in Chart B2-2, if the loan interest rate is raised twice within a 5-year period, interest payments will increase, but part of the principal payment will be postponed. This will keep the principal and interest payment constant.

Chart B2-2: Principal and interest payments under 5-year rule

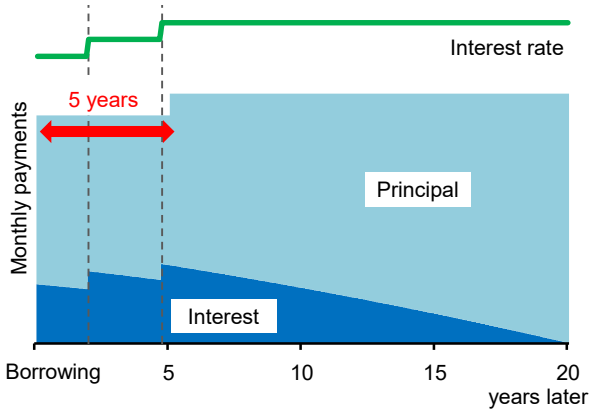
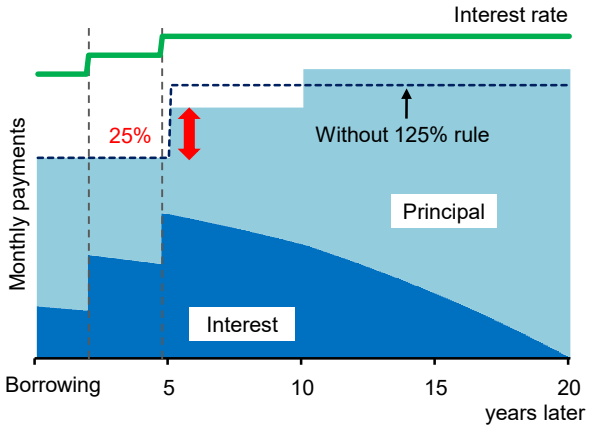


Chart B2-3: Principal and interest payments under 125% rule

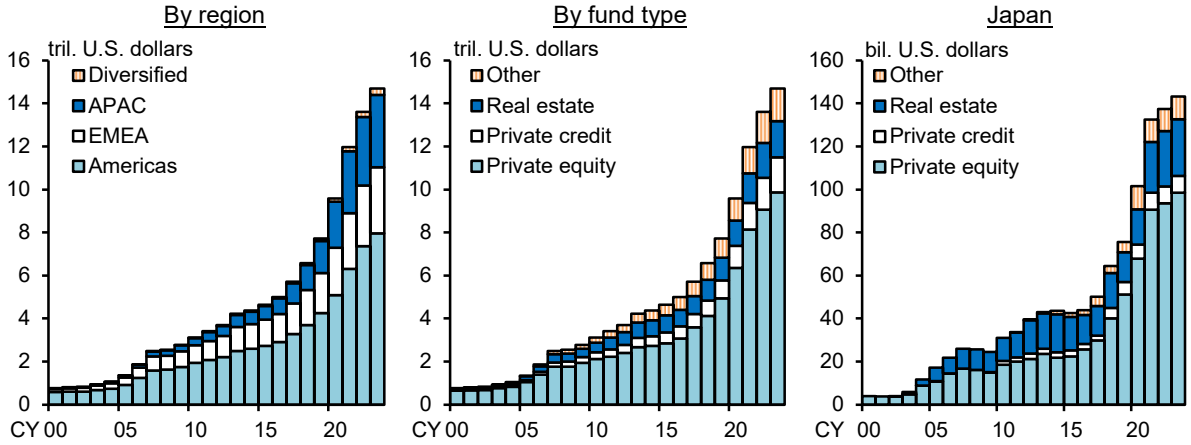


Meanwhile, the "125 percent rule" stipulates that once a 5-year period is up, principal and interest payments in the following five years may not exceed 125 percent of the previous payment amount. As shown in Chart B2-3, even if the loan interest rate rises to a level where principal and interest payments would exceed 125 percent, these payments after the rise in interest payments will increase only in a phased manner under this rule. However, these rules are only intended to curb drastic changes. Under both the "5-year rule" and the "125 percent rule," any decrease in monthly principal payments from the original plan must be paid off by the end of the repayment period.

Box 3: The evolving private fund market

Private funds are a type of non-bank financial intermediary and the term generally refers to funds that make equity investments in firms (private equity funds) or extend loans to them (private credit funds). The private fund market, which plays a role of complementing and substituting for traditional financial intermediation, has been expanding in recent years (Chart B3-1). The size of the market doubled over a decade in the 2010s, and growth has since accelerated, with the size doubling in the last five years. By region, growth in the U.S. market has been particularly pronounced.

Chart B3-1: Assets under management of private funds



Note: The left- and right-hand charts are based on funds' primary investment regions. Latest data as of end-June 2023.
Source: Preqin.

A breakdown of private funds shows that, following private equity funds, which have driven the market expansion to date, the presence of private credit funds has been increasing in recent years. While the private credit market is only about one-fifth the size of the private equity market, it has grown to over 1 trillion U.S. dollars in size in the United States, which is comparable to the syndicated loan and high-yield bond markets. This box provides an overview of the current challenges for private funds, focusing in particular on private credit funds.[81]

Shift from a business model in a low interest rate environment

The low interest rate environment worldwide is pointed out as one of the reasons behind the rapid growth of the private fund market. As the attractiveness of fixed-income investments declined under the low interest rate environment, institutional investors in the search for yield shifted from traditional bond investments to alternative investments, including private funds. Moreover, the borrower firms of private credit funds have placed value on the accessibility of private credit, which likely also has provided an impetus to the market expansion. While borrowing interest rates are higher than those of bank loans, private credit funds have advantages for borrower firms, in that they can respond flexibly in cases where obtaining a bank loan is difficult.[82] These advantages include short loan approval periods and the availability of large loans.

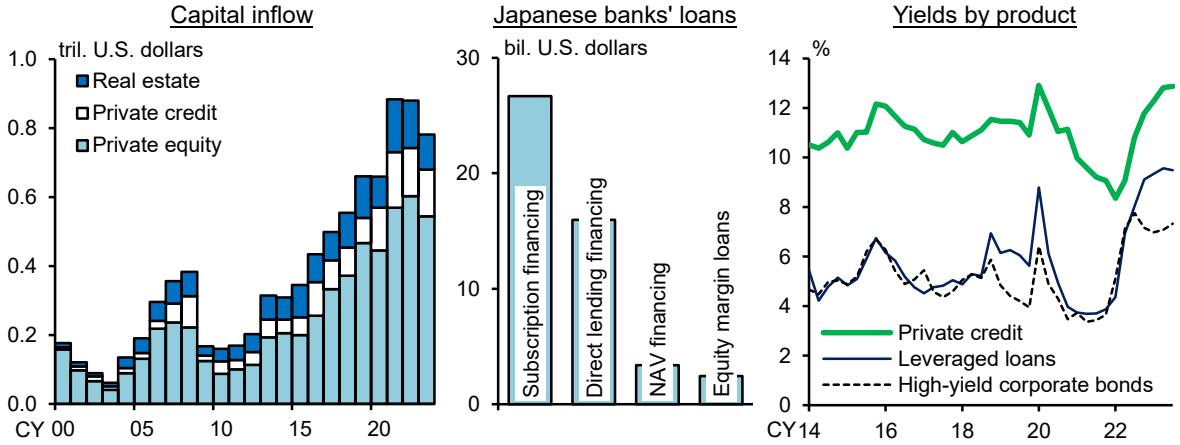
With policy rates remaining high in the United States and Europe, attention will be focused on the sustainability of businesses that expanded rapidly in the low interest rate environment. For example, if

[81] For details, see Kuroda, K., Hasebe, A., Ito, S., and Ikeda, D., "Private Debt Funds: What They Are and Trends under Interest Rate Hikes," *Bank of Japan Review Series*, no. 2024-E-1, April 2024, and Kanaguchi, T., Kawakami, T., Hasebe, A., and Ogawa, Y., "The Overview and Risks of Fund Finance," *Bank of Japan Review Series*, no. 2023-E-5, June 2023.

[82] Banks have withdrawn from lending with high credit risk since the global financial crisis, and it has been pointed out that this has created an opportunity for private funds to step into the market. For details, see International Organization of Securities Commissions, *Thematic Analysis: Emerging Risks in Private Finance*, September 2023.

institutional investors change their investment portfolios, the inflow of funds as alternative investments may taper off. In fact, the increase in inflow of funds, which had been growing continuously, has been peaking out recently (left panel of Chart B3-2). Financial institutions, including Japanese major banks, that provide subscription financing to private funds -- loans to bridge the gap until the funds receive investment capital from investors -- use capital call rights as collateral (middle panel of Chart B3-2). In order to control collection risk, banks need to verify investors' ability to meet capital calls.

Chart B3-2: U.S. private fund market



Note: 1. The left-hand chart shows the amount of capital raised from investors. Latest data as of end-2023.
2. The middle chart shows the three major banks' outstanding loans to funds in the Americas as of end-September 2023.
3. In the right-hand chart, "Private credit" indicates direct lending to firms by funds (including exchange-traded funds). Latest data as of September 2023.
Source: Cliffwater Direct Lending Index; Preqin; S&P Dow Jones Indices; BOJ.

Credit risk of borrower firms leveraged with floating-rate funding

Private credit loans primarily take the form of floating-rate loans. Therefore, the risk of rising interest rates is taken by borrower firms, not lender private funds. Moreover, loan interest rates are generally higher than those of leveraged loans and high-yield bonds (right panel of Chart B3-2). Borrower firms are often leveraged, and in times of rising interest rates, such as those seen recently, the probability of default is likely to be higher than for typical firms.

Banks that provide financing instruments backed by the value of funds' loans to borrower firms or funds' net asset value (NAV), such as in the case of direct lending financing or NAV financing, are exposed to such credit risk. For example, a deterioration in borrower firms' cash flow pledged as collateral is one factor that would increase collection risk. Private credit funds take measures to control credit risk, such as setting strict covenants at the initial screening stage. However, the information disclosure of private funds is generally limited, making monitoring difficult for banks.

Japan's private fund market

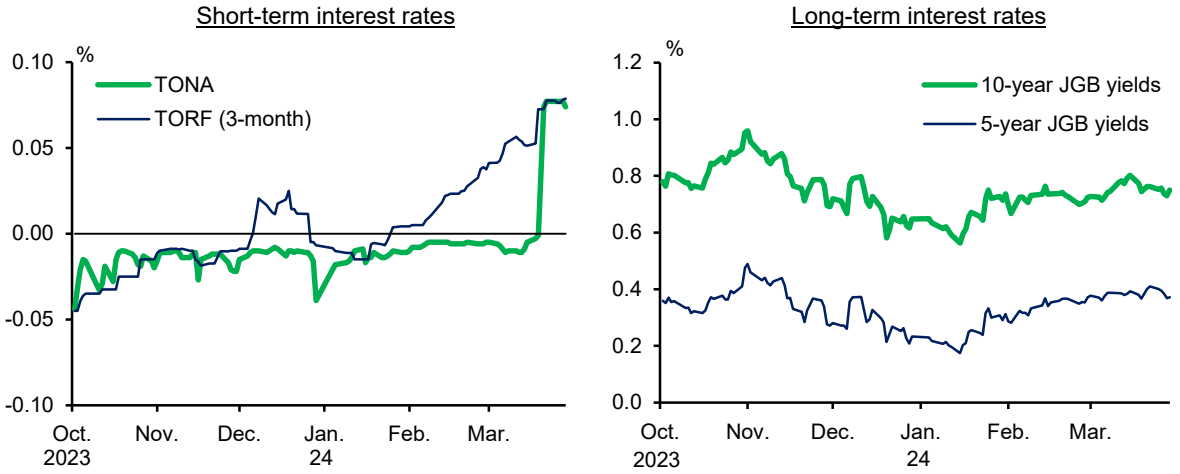
In Japan, the private fund market has also been growing rapidly, although its size is very small. However, its risk characteristics are somewhat different from those of foreign markets. In Japan, private credit accounts for only a small share of the private fund market (Chart B3-1). One factor that hinders the entry of funds into the market is the ease of access to low-interest bank loans, even for firms with relatively low creditworthiness. On the other hand, the share of real estate funds is higher than in other countries. As highlighted in Section A of Chapter IV, not only major banks but also regional banks have exposures to such funds. Attention needs to be paid to the channels through which risks in the real estate market could materialize via financing for such funds.

Box 4: Recent developments in interest rates

In March 2024, the Bank of Japan decided to change its monetary policy framework. In response to this decision, various movements, albeit modest, in a range of interest rate markets have been observed. This box summarizes the changes in market interest rates and lending and deposit rates observed through the beginning of April.

In the money market, the uncollateralized overnight call rate (Tokyo Overnight Average Rate, TONA) has turned positive (Chart B4-1). The 3-month overnight index swap rate (Tokyo Term Risk Free Rate, TORF) has risen moderately since the start of 2024 and has been at the same level as TONA recently. In the bond market, 10-year and 5-year JGB yields have remained flat.

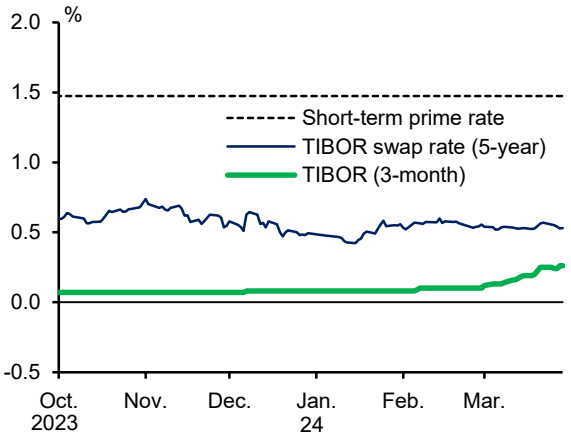
Chart B4-1: Market interest rates



Note: Latest data as of end-March 2024.
Source: Ministry of Finance; QUICK; BOJ.

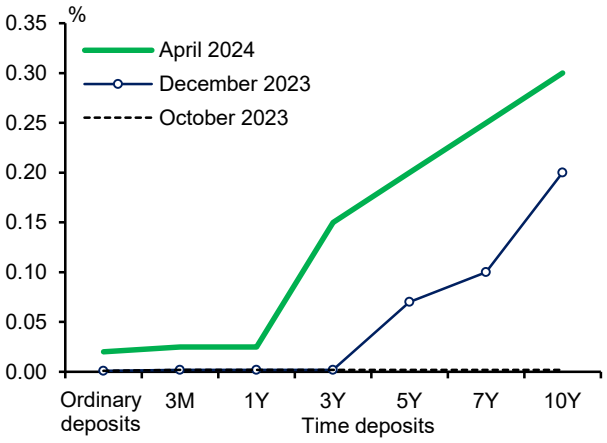
In the loan market, the 3-month TIBOR and TORF, which are the base rates for market rate-linked loans, have risen moderately since the start of 2024 (Chart B4-2). On the other hand, the 5-year TIBOR swap rate, which serves as the base rate for fixed-rate loans, has been flat after rising in 2023. Short-term prime rates, which serve as the base rates for prime rate-linked loans and often are used as reference for floating-rate housing loans and loans to SMEs, are unchanged (see Chart III-1-11 for the latest interest rates on housing loans). The mode of principal banks' short-term prime rates has been flat since January 2009.

Chart B4-2: Loan interest rates



Note: Latest data as of end-March 2024.
Source: Bloomberg; Haver Analytics; BOJ.

Chart B4-3: Deposit interest rates



Note: Indicates the typical interest rates posted at banks. Covers major, regional, and *shinkin* banks. Shows the median values.
Source: Published accounts of each bank; BOJ.

In the deposit market, many banks have raised interest rates for both ordinary and time deposits (Chart B4-3).[83] Since autumn 2023, interest rates on longer-term time deposits have been raised, and after the changes in the policy framework, there have been widespread moves to raise interest rates on ordinary deposits. As of the beginning of April, the share of banks that have raised ordinary deposit interest rates has reached a little over 70 percent. Excluding promotional rate rises, this is the first time that a majority of banks have raised deposit interest rates since fiscal 2006.

While the yield curves for market interest rates and base rates for loans have shifted to flattening, the yield curve for deposit rates has steepened. In other words, the pass-through of TONA to deposit interest rates has been higher in the medium- to long-term zone. As highlighted in the main text, the pass-through rates are affected by the supply and demand balance and the competitive environment in the loan and deposit markets, as well as relationships with customers. For banks, it is important to prepare their business and marketing stance, taking into account developments in the flow of funds following the interest rate increases in the markets.

[83] Deposit interest rates after the policy changes are based on information published on banks' websites. The data cover 345 banks among major, regional, and *shinkin* banks.

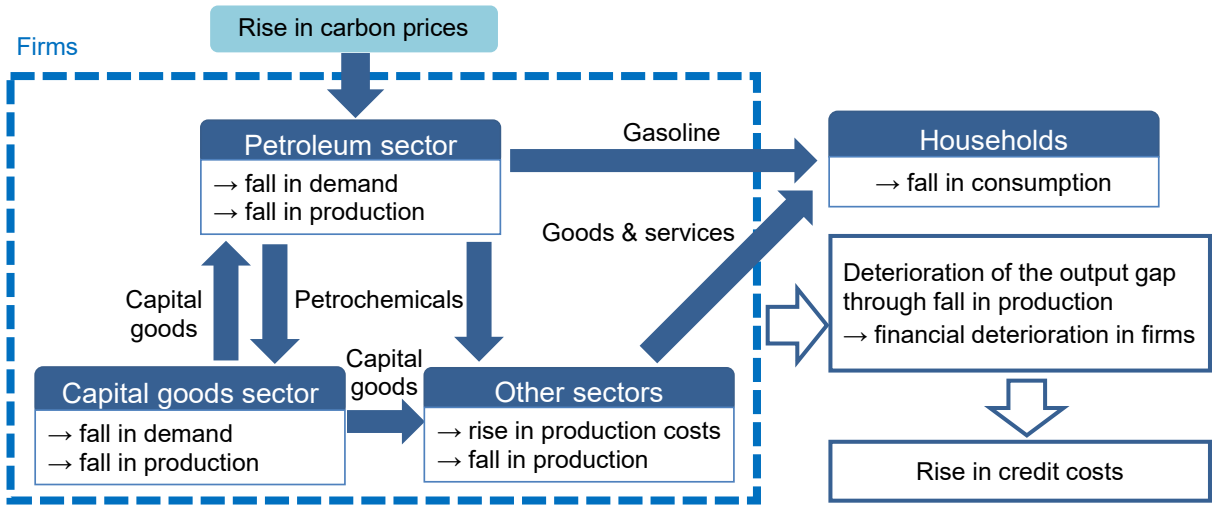
Box 5: Scenario analysis of transition risks

Financial authorities and financial institutions in Japan and abroad are pushing ahead with scenario analysis to quantitatively assess climate-related financial risks. The scenario analysis method predominantly used before was to set the period of analysis as long as several decades and to assume structural changes in the economy and society, such as the introduction of decarbonization technologies and climate change responses by industries and firms. In Japan, in line with Task Force on Climate-related Financial Disclosures (TCFD) recommendations, the three major banks have disclosed the results of their financial impact estimates based on such long-term scenarios in their own TCFD reports. A growing number of regional and *shinkin* banks are also beginning to work on scenario analyses.

With transition finance initiatives gaining momentum, scenario analysis methods are changing. Recent analyses have focused on short-term risks in the transition to "net zero" by assuming short-term scenarios. In line with this trend, the Network for Greening the Financial System (NGFS) has also indicated that it intends to begin developing short-term scenarios.[84] In addition, while a majority of analyses previously focused on greenhouse gas (GHG) intensive sectors, more recent analyses have included other sectors.

Against this background, the Bank of Japan's staff last year conducted a top-down scenario analysis based on a 5-year short-term scenario that takes inter-industry linkages into account.[85] Specifically, as shown in Chart B5-1, assuming various spillover channels, the impact of an increase in carbon prices on banks' credit costs during the transition process was estimated. The analysis assumed that the prices of petroleum and coal products rise as a result of the increase in carbon prices. This in turn reduces the demand for and output of these products, leading to a decline in capital investment in the petroleum sector, which refers to the petroleum and coal products manufacturing sector. At the same time, the impact spreads to other sectors that use these products as production factors. Moreover, the decline in the demand for capital investment leads to a reduction in output in the capital goods sector. If firms are unable to adjust their employment and capital flexibly in response to this decline in production, resulting in excess

Chart B5-1: Spillover channels of a rise in carbon prices



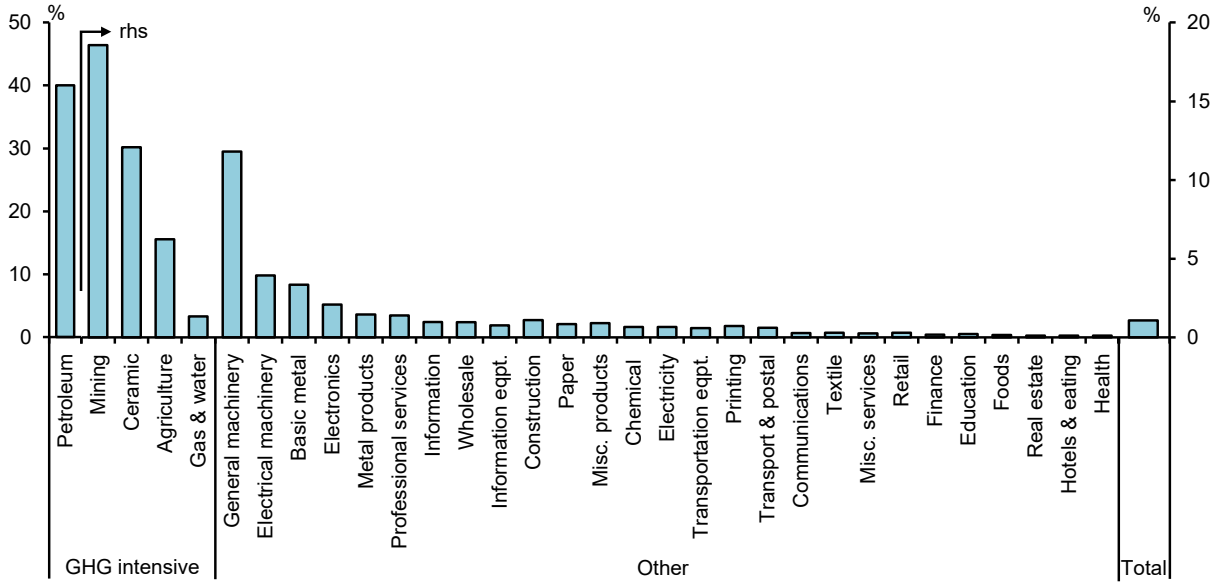
[84] See Network for Greening the Financial System, *Conceptual Note on Short-Term Climate Scenarios*, October 2023.

[85] For details, see Abe, N., Kawasumi, Y., Takano, Y., Naka, T., Hirakata, N., Matsumura, K., and Munakata, K., "Top-Down Scenario Analysis of Climate-Related Financial Risks: Perspective from Time Horizon and Inter-Industry Spillovers," *BOJ Reports & Research Papers*, December 2023.

capacity, the economic environment deteriorates significantly. The deterioration in corporate profits across firms due to the worsening economic environment leads to higher credit costs for banks.

The estimation results show that if firms are unable to adjust employment and capital flexibly in response to the shock of higher carbon prices, transition risks materialize in the form of a fair amount of credit costs (Chart B5-2). Credit costs increase not only in the petroleum sector, in which the shock originates, but also in a wide range of other sectors through inter-industry linkages. In addition, the decline in demand for capital investment pushes up credits costs in the general machinery sector. This suggests that a carbon price shock during the transition process may have second-round effects even on banks with relatively little lending to GHG-intensive sectors, such as the petroleum sector.

Chart B5-2: Credit cost ratios by sector



Note: Shows the difference in credit cost ratios (5-year cumulative total) between the scenarios with and without a rise in carbon prices. The pace of a rise in carbon prices is equivalent to that of the delayed transition scenario in the NGFS phase III scenario for the 5 years from 2030.
Source: BOJ.

Climate-related financial risks are among the most difficult risks to quantify. Analytical methods, including the development of quantitative risk indicators, are in the process of being refined. Moreover, as outlined, the development of short-term scenarios is also underway. The Bank of Japan will continue to support efforts by financial institutions to increase the sophistication of scenario analyses of climate-related financial risks, taking the knowledge gained from its own scenario analyses and international discussions into account.

Glossary

Financial statements of financial institutions

Net income = operating profits from core business + realized gains/losses on stockholdings + realized gains/losses on bondholdings – credit costs ± others (such as extraordinary gains/losses)

Gross operating profits from core business = core gross operating profits = net interest income + net non-interest income

Operating profits from core business = pre-provision net revenue (PPNR) excluding trading income = net interest income + net non-interest income – general and administrative expenses

Net interest income = interest income – interest expenses

Net non-interest income = net fees and commissions + profits on specified transactions + other operating profits – realized gains/losses on bondholdings

Overall gains/losses on stockholdings = realized gains/losses on stockholdings + changes in valuation gains/losses on stockholdings

Realized gains/losses on stockholdings = gains on sales of stocks – losses on sales of stocks – losses on devaluation of stocks

Overall gains/losses on bondholdings = realized gains/losses on bondholdings + changes in valuation gains/losses on bondholdings

Realized gains/losses on bondholdings = gains on sales of bonds + gains on redemption of bonds – losses on sales of bonds – losses on redemption of bonds – losses on devaluation of bonds

Credit costs = loan-loss provisions + write-offs + losses on credit sales – recoveries of write-offs

Credit cost ratio = credit costs / total loans outstanding

Capital adequacy ratios of internationally active banks

Common equity Tier 1 (CET1) capital ratio = CET1 capital / risk-weighted assets

CET1 capital includes common equities and retained earnings.

Tier 1 capital ratio = Tier 1 capital / risk-weighted assets

Tier 1 capital includes CET1 capital and preferred equities that meet certain conditions.

Total capital adequacy ratio = Total capital / risk-weighted assets

Total capital includes Tier 1 capital and subordinated bonds that meet certain conditions.

Capital adequacy ratios of domestic banks

Core capital ratio = core capital / risk-weighted assets

Core capital includes common equities and retained earnings as well as preferred equities that meet certain conditions.