Not to be released until 3:00 p.m.
Japan Standard Time on
Wednesday, April 23, 2025.

BOJ Reports & Research Papers

Financial System Report

April 2025

(English translation prepared by the Bank's staff based on the Japanese original)

The total of major banks, regional banks, and *shinkin* banks covered in this *Report* is as follows (as of end-March 2025).

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 61 member banks of the Regional Banks Association of Japan (regional banks I) and the 36 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 2025.

Financial System Research Division,
Financial System and Bank Examination Department, Bank of Japan
post.bsd1@boj.or.jp

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 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 2025 issue

Banks have been setting loan and deposit interest rates, taking into account changes in market interest rates that reflect the Bank of Japan's decisions to raise the policy interest rate and changes in market projections of interest rates. This *Report* provides updates on the impact of changes in the interest rate environment on banks, households, and firms. In addition, this *Report* examines developments in default rates of borrower firms, given that while Japan's economy has recovered moderately, default rates have been higher than before the pandemic, especially among firms whose profits have been improving only at a slow pace. Furthermore, with the increase in banks' real estate-related loans continuing, this *Report* analyzes the background to the rise in real estate prices.

Uncertainty has heightened in global financial markets regarding the formulation of trade and other economic policies in each jurisdiction. In addition, it has been pointed out in recent years that portfolio adjustments in the foreign non-bank financial intermediary (NBFI) sector, primarily investment funds that have been increasing their presence in domestic and foreign financial markets, are becoming more likely to contribute to the amplification of fluctuations in asset prices in Japan. This *Report* examines the implications of stress caused by global factors and its effects in terms of Japan's financial stability, including an analysis of the characteristics of the financial activities of the foreign NBFI sector.

Contents

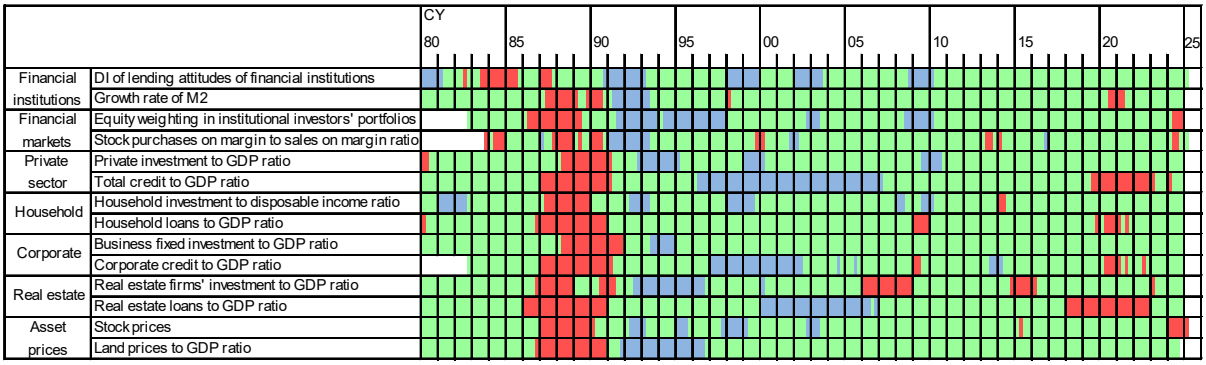
I. Executive summary: Stability assessment of Japan's financial system

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

In the loan market, financial intermediation has continued to function smoothly as firms' demand for loans has continued to rise and banks' lending stance has remained active. Under such circumstances, no major financial imbalances have been seen in current financial activities.

Japanese banks have sufficient capital bases and stable funding bases to withstand stress similar to the global financial crisis that causes a major correction in financial markets and the real economy at home and abroad and other stress events such as one where the materialization of geopolitical risks and other factors triggers a global surge in prices, and foreign interest rates rise further. However, since the beginning of April, financial markets at home and abroad have fluctuated significantly, while uncertainty has heightened regarding the formulation of trade and other economic policies in each jurisdiction, geopolitical risks, and developments in global financial markets. Financial institutions need to be vigilant against the materialization of various risks. From a long-term perspective, if the structural decline in firms' loan demand reflecting the shrinking population and other factors continues, depending on the supply and demand balance in the loan market, banks' profitability and loss-absorbing capacity could decline, and this could lead to a contraction of financial intermediation activities or an overheating, such as excessive search for yield. From the perspective of maintaining stability in Japan's financial system, close attention is warranted on future developments in the financial system, while examining both overheating and contraction risks (Chart I-1).

Chart I-1: Heat map

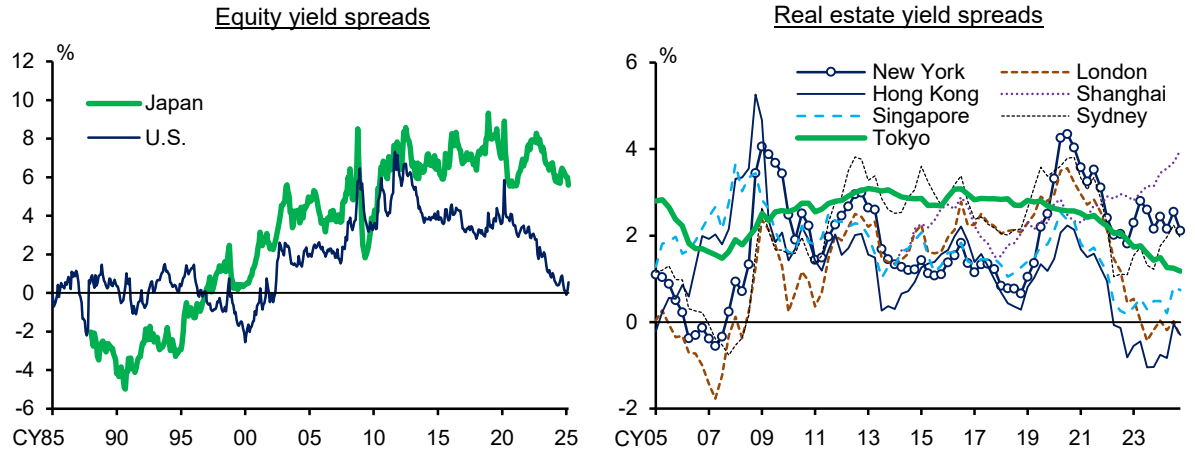


Note: See Chart V-1-1.

Developments in asset prices → Chapters II, IV-B, and V-A

The heat map as of the end of March shows that *stock prices* and *equity weighting in institutional investors' portfolios* have been "red," which signals an upward deviation from the trend, since 2024 (Chart I-1). Price-earnings (P/E) ratios remained at their historical average and equity risk premiums in terms of yield spreads have generally been flat and there is no sign of significant overheating in terms of stock valuations (left panel of Chart I-2). Since early April, stock prices have been fluctuating substantially as uncertainty has been heightening regarding, for example, the effect on global economic and financial conditions of the trade policy in each jurisdiction. Considering that Japanese banks have a certain amount of market risk associated with stockholdings, developments in asset prices warrant attention.

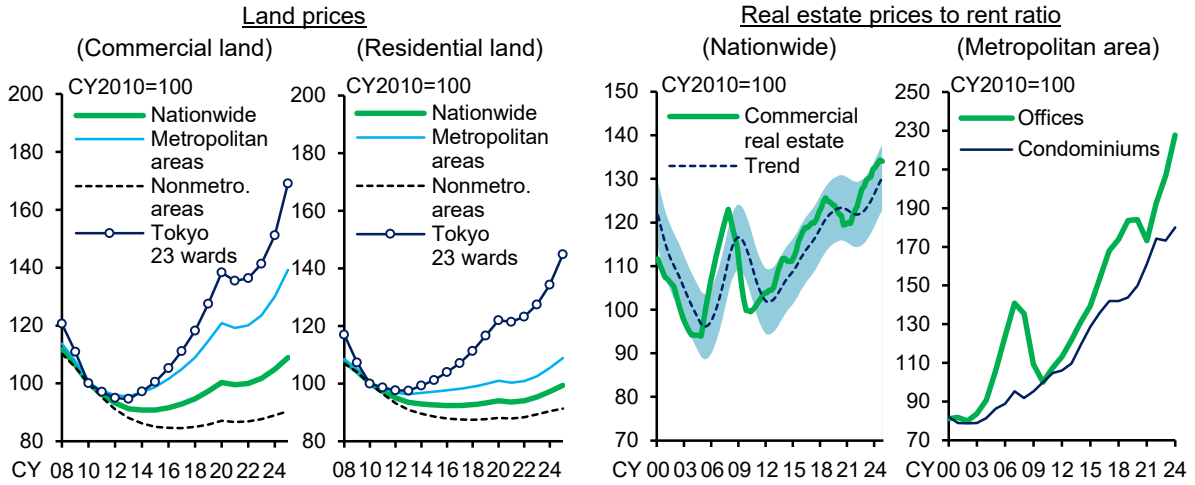
Chart I-2: Risk premiums in the asset markets



Note: Yield spreads are calculated as expected returns minus 10-year government bond yields. See Charts V-1-3 and V-1-11.

Real estate prices have been rising, particularly in major metropolitan areas (Chart I-3). Rises in property prices are led by robust property demand with the economy recovering moderately and by supply factors due to the effects of the surge in material costs and labor shortages. In addition, increases in large-scale land transactions for asset-holding and resale purposes, increases in transactions of condominiums for investment, and a recovery in acquisitions of commercial real estate by foreign investors seem to have contributed to a rise in real estate prices. Under these circumstances, the commercial real estate prices to rent ratio has continued to rise and expected returns and risk premiums on real estate investment have been declining (right panel of Chart I-2). Given that banks' real estate-related exposures have been on an uptrend, developments in real estate prices continue to warrant attention.

Chart I-3: Developments in the real estate market



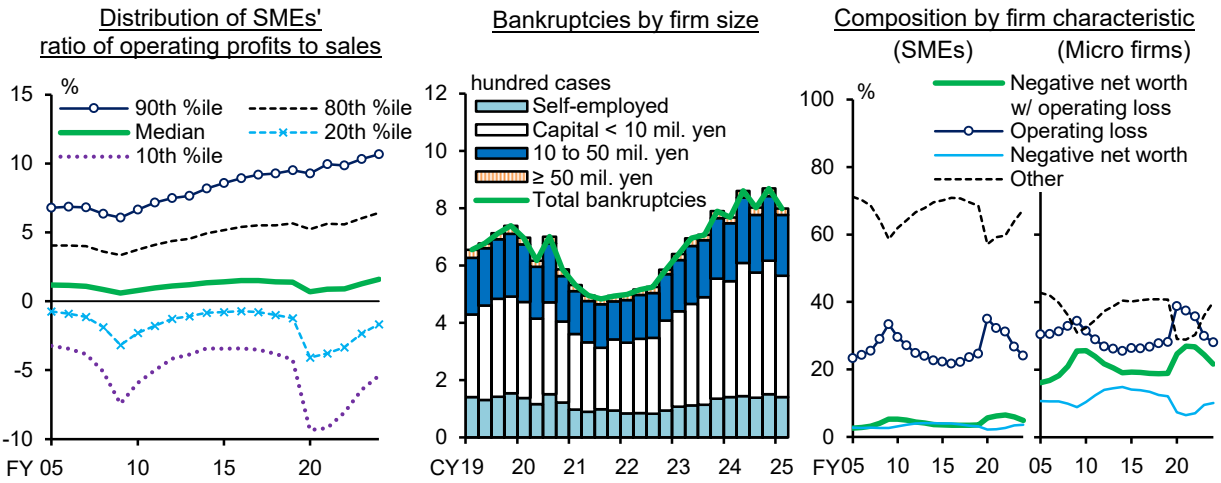
Note: In the right-hand charts, "Trend" for nationwide is calculated using the 3-year backward moving averages, the shaded area indicates the root mean square of the deviation from the trend, and the data for metropolitan area covers Tokyo. See Charts V-1-6, V-1-7, and V-1-8.

Corporate bankruptcies and defaults → Chapter IV-A and Box 1

Amid the continuing moderate economic recovery, corporate profits in Japan have been improving on the whole (left panel of Chart I-4). However, compared to large firms, the pace of increase in corporate profits of small and medium-sized enterprises (SMEs) has been slow. In addition, although SMEs' ratio of operating profits to sales has been improving overall, its distribution shows

that the skew of the distribution to the downside seen since the pandemic has remained. Against this background, the importance of business improvement support activities for firms by banks is growing.

Chart I-4: Firms' financial positions and developments in bankruptcies



Note: See Charts IV-1-4, IV-1-5, and IV-1-6.

There has recently been a slowdown in the rise in bankruptcies and defaults (middle panel of Chart I-4). Looking in detail at the financial characteristics of SMEs and micro firms that defaulted, more than half of those firms are making operating losses with negative net worth or are making operating losses; however, the share of financially vulnerable firms has recently been declining, approaching the pre-pandemic level (right panel of Chart I-4). However, it is necessary to pay attention to heightened uncertainty regarding trade policy in each jurisdiction and geopolitical risks. Depending on future developments, global financial and economic activity could be affected significantly, leading to a deterioration in firms' financial positions. Banks need to closely monitor the effect of these potential stresses.

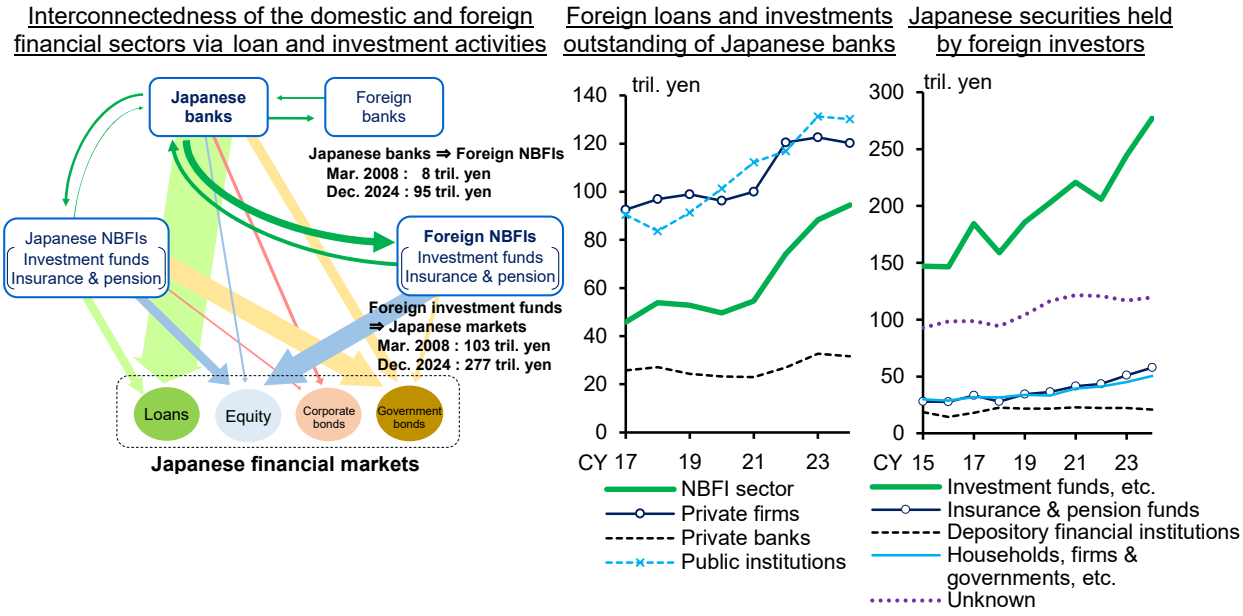
The domestic and foreign non-bank financial intermediary (NBFI) sector's growing presence in Japan and banks' exposure to the NBFI sector → Chapters III-B, IV-B, V-B, VI-B, and Boxes 3 and 4

In Japan, where depository financial institutions are dominant in financial intermediation, the share of financial assets held by the domestic NBFI sector has been at about 30 percent, lower than the case in foreign jurisdictions. However, given the increasing trend in banks' exposure to the foreign NBFI sector with a focus on the investment fund sector, and in investments in Japanese stocks and bonds by foreign NBFIs, primarily investment funds, the links between (1) Japanese banks and financial markets and (2) the foreign NBFI sector have strengthened (Chart I-5).

Looking at the correlation between the returns on the securities portfolios of Japanese banks and global investment funds, for an increasing number of banks, their portfolios have become much more correlated with those of investment funds since the global financial crisis (left panel of Chart I-6). This suggests that Japan's financial system may have become more susceptible to fluctuations in global financial markets and the influence of the foreign NBFI sector, both directly and indirectly. As a result, Japan's financial markets and Japanese banks' financial positions are likely to be more susceptible to, for example, a stress event in the global financial environment that could lead to portfolio adjustments on a global basis by foreign investment funds with vulnerabilities in their

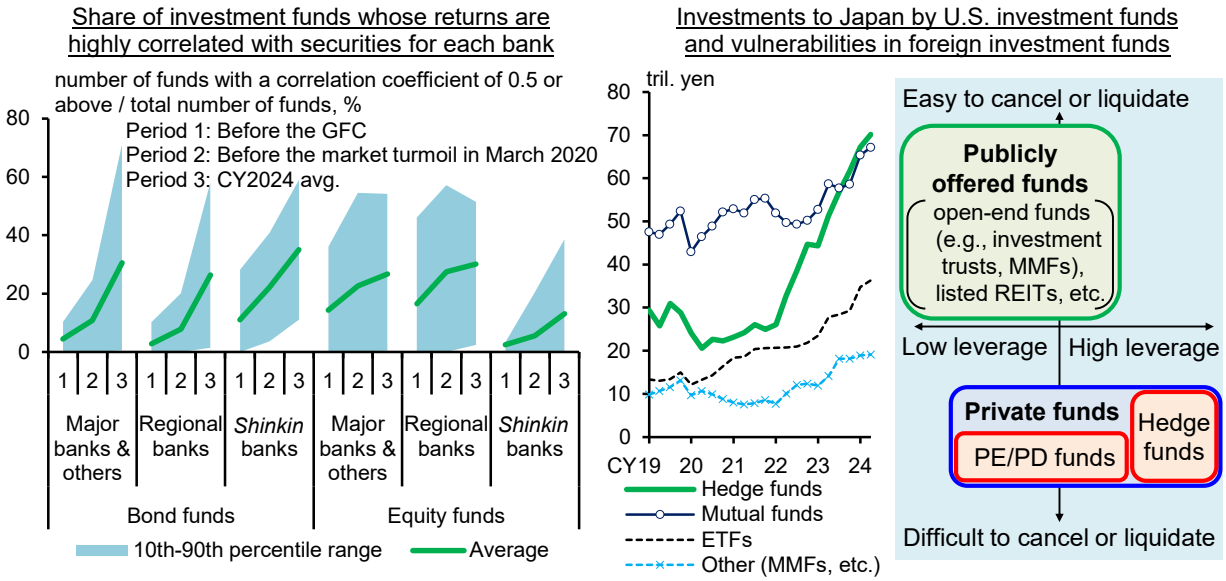
liability structure and leverage (right panel of Chart I-6). Keeping these points in mind, banks need to identify and manage risks associated with securities holdings.

Chart I-5: Linkages between the Japanese financial sector and the foreign NBFI sector



Note: Direction and width of arrows in the left-hand chart indicate the outstanding amount of loans and investments between the sectors and to the respective markets (as of December 2024). Some data are omitted due to data limitations. See Charts V-2-2, V-2-3, and V-2-5.

Chart I-6: Influence of foreign investment funds on Japanese banks



Note: In the left-hand chart, correlation coefficients between returns on each bank's securities portfolios and various investment funds are calculated, and the share of funds with a correlation coefficient of 0.5 or above is calculated for each bank. See Charts V-2-4, V-2-5, and V-2-6.

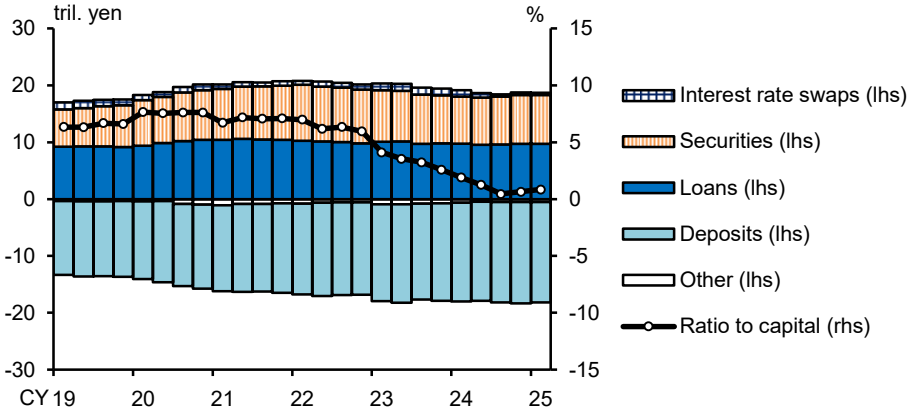
Banks', firms', and households' resilience to rising interest rates → Chapters III-A, IV, V-A, VI, and Box 2

Regarding developments in lending rates since the previous *Report*, banks' average contract interest rates on new loans and discounts have been rising for both long-term and short-term ones, due to rises in market interest rates and short-term prime rates, both of which serve as base rates.

Interest rates on ordinary and time deposits have both seen moderate increases. Many banks have recently raised interest rates on ordinary deposits to around 0.2 percent. The pass-through to loan and deposit interest rates could differ across banks due, for example, to differences in the timing of their interest rate renewals and their competitive environment and business strategies; thus, there is some uncertainty regarding the effects of changes in market interest rates on banks' profits. However, as seen in the past, increases in lending rates in response to an increase in market interest rates have tended to exceed increases in deposit rates; therefore, over a somewhat longer term, rising interest rates are likely to boost banks' profits in general.

Banks' resilience to rising interest rates has improved compared to a while ago. Yen interest rate risk in the banking book (IRRBB) relative to banks' capital has remained low and banks overall have sufficient loss-absorbing capacity (Chart I-7). The amount of yen interest rate risk on the asset side (loans and securities) and the liability side (deposits) is more or less in balance. Regarding banks' rebalancing of yen-denominated bondholdings, banks overall have maintained a cautious stance toward interest rate risk-taking.

Chart I-7: Interest rate risk in the banking book

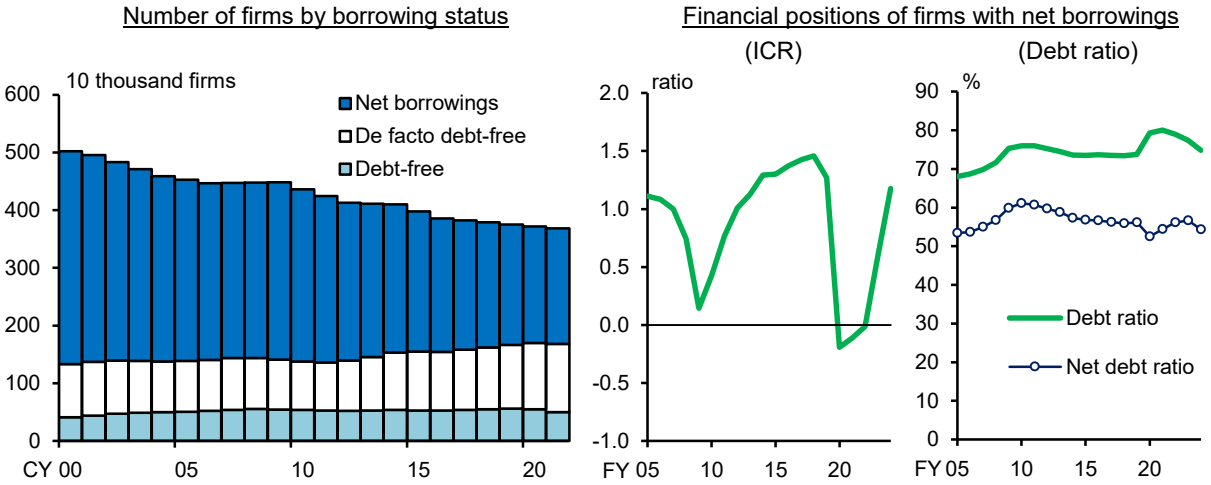


Note: Shows yen interest rate risk in terms of the 100 BPV. See Chart VI-1-12.

Firms' resilience to rising interest rates has generally been improving, reflecting the recovery in their profits, in addition to a rising trend in the number of de facto debt-free firms (left panel of Chart I-8). Regarding firms with their borrowings exceeding their cash and deposit holdings, the interest coverage ratio (ICR) -- which represents a firm's interest payment capacity -- is increasing overall and their leverage ratios have generally been declining as repayment of loans obtained during the pandemic has progressed (right panel of Chart I-8). However, given that the rise in default rates due to a decline in the ICR following a deterioration in the economic and financial environment could change in a nonlinear fashion, depending on the level of leverage and the amount of on-hand liquidity, the credit management of financially vulnerable firms continues to warrant attention.

Turning to households' resilience to rising interest rates, there has been an increase in the number of households with housing loans among younger age groups, for which the debt servicing ratio (DSR) -- the ratio of annual repayments to annual income -- tends to be high. However, young households have experienced relatively high wage increases recently, and even from a somewhat longer-term perspective, their repayment burden is likely to gradually decline since increases in income are likely to continue as their salary climbs up along the wage curve. Moreover, households' net worth will increase if real estate prices rise after the purchase of their homes, improving their actual ability to repay. That said, it warrants attention that the situation may change if a recession causes a simultaneous decline in incomes and housing prices.

Chart I-8: Firms' resilience to rising interest rates



Note: "Net borrowings" are firms with a positive amount of interest-bearing debt less holdings of cash and deposits. In the right-hand charts, "ICR" is the ratio of the sum of operating profits and interest income to interest payments, "Debt ratio" is the ratio of total borrowings to total assets, and "Net debt ratio" is the ratio of total borrowings less on-hand liquidity to total assets. See Charts IV-1-8 and IV-1-9.

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

II. Risks observed in financial and capital markets

- Looking back at developments during the second half of fiscal 2024, market sentiment in global financial markets continued to improve through around mid-February 2025, but turned cautious thereafter, mainly reflecting weaker-than-expected U.S. economic indicators and heightened concerns over trade policy in each jurisdiction.[1]
- Japanese financial markets, meanwhile, were generally stable. Stock prices were more or less flat over the second half of fiscal 2024, weighed down by concerns over trade policy in each jurisdiction, despite being backed by such factors as firms' solid business performance. Long-term interest rates, while following the increases in U.S. and European interest rates, rose significantly, reflecting the policy interest rate hike by the Bank of Japan as well as progress in market participants' expectations for future policy interest rate hikes.
- Uncertainty about the outlook for financial markets has further increased recently. In domestic and foreign financial markets, there have been phases since the beginning of April when stock prices fell substantially and market sentiment became more cautious, amid heightened concerns over the impact of trade policy in each jurisdiction and the growing tensions over such policy. As a result, market participants have been paying increased attention to uncertainties surrounding policy conduct in each jurisdiction and the outlook for the global economy. Market participants have also continued to pay attention to geopolitical risks and developments in major high-tech stocks. In this situation, attention should continue to be paid to the possibility that global financial conditions could tighten through such factors as sharp repricing of risky assets and a deterioration in the dollar funding environment.

This chapter summarizes the developments in domestic and foreign financial markets during the second half of fiscal 2024 and outlines risks in the outlook for financial and capital markets taking account of market fluctuations since the beginning of April.

A. Global financial markets during the second half of fiscal 2024

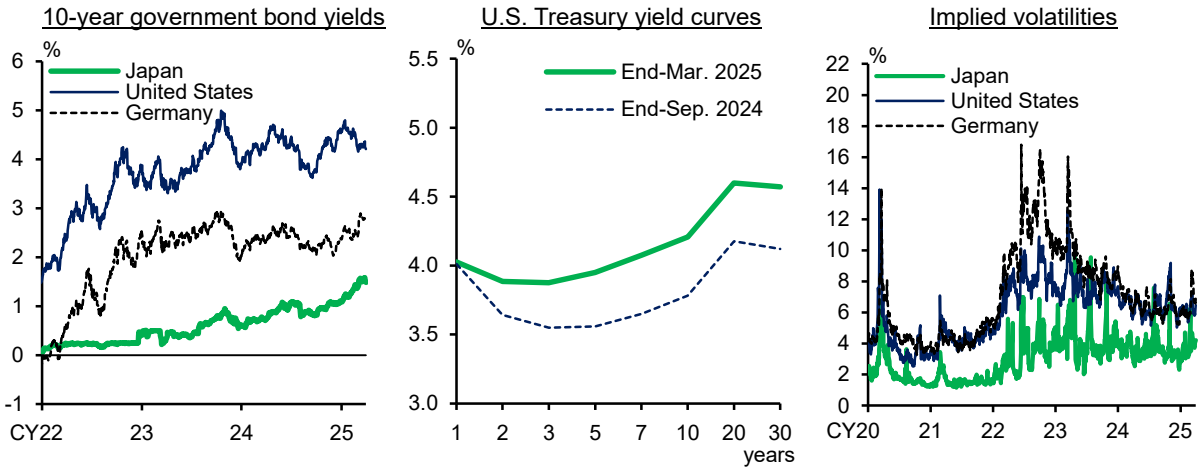
Looking back at developments during the second half of fiscal 2024, market sentiment in global financial markets continued to improve through around mid-February 2025, but turned cautious thereafter, mainly reflecting weaker-than-expected U.S. economic indicators and heightened concerns over trade policy in each jurisdiction.

U.S. and European bond markets

U.S. long-term interest rates increased over the second half of fiscal 2024; the yields increased significantly through the beginning of 2025, mainly due to concerns about potential deterioration in fiscal balance, although they subsequently declined, mainly reflecting weaker-than-expected economic indicators (Chart II-1-1). The yield curve for U.S. Treasuries also shifted upward across a wide range of maturities. European long-term interest rates increased in tandem with U.S. interest rates; thereafter, they increased further in early March, as vigilance against a deterioration in supply and demand conditions in sovereign bonds heightened on the back of developments regarding a rise in defense expenditure. Meanwhile, implied volatilities of government bond futures remained at high levels in both the United States and Germany.

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

Chart II-1-1: Bond markets

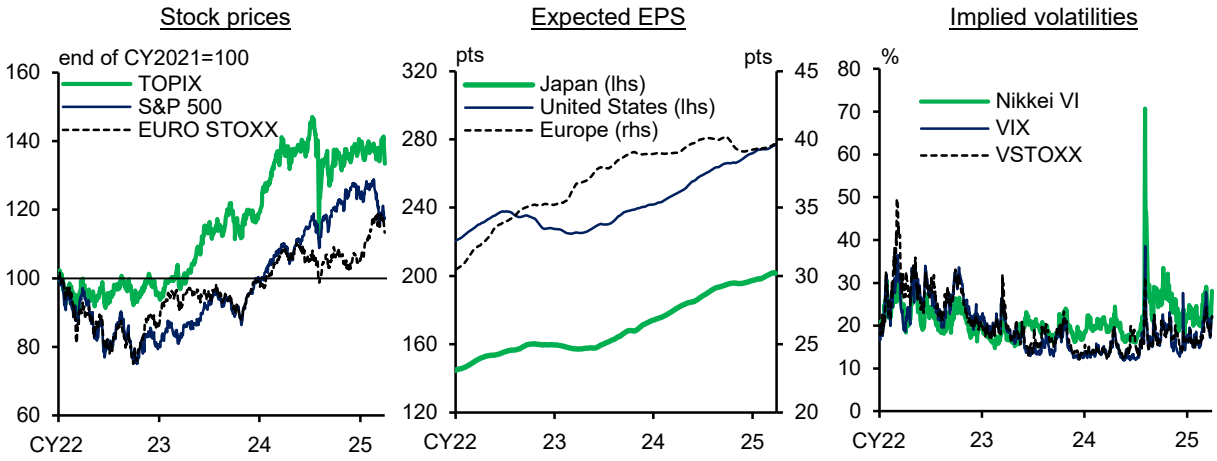


Note: In the right-hand chart, implied volatilities are calculated from options on government bond futures. Latest data for the left- and right-hand charts are as of end-March 2025.
Source: Bloomberg.

U.S. and European stock markets

U.S. stock prices declined over the second half of fiscal 2024; they increased through around mid-February 2025, mainly reflecting expectations for expansionary fiscal policies and deregulation, but subsequently turned to a decline, mainly reflecting weaker-than-expected economic indicators and heightened concerns over trade policy (Chart II-1-2). Expected earnings per share (EPS) for U.S. firms rose, mainly led by major high-tech stocks, owing to market expectations for a spread of generative artificial intelligence (AI) and other new technologies. European stock prices increased, mainly reflecting heightened expectations for an improvement in firms' business performance, backed by expectations for policy interest rate cuts by the European Central Bank. Meanwhile, implied volatilities of U.S. and European stock prices were generally below 20, a level regarded as a critical mark, through around mid-February, but subsequently rose to a level above 20.

Chart II-1-2: Stock markets

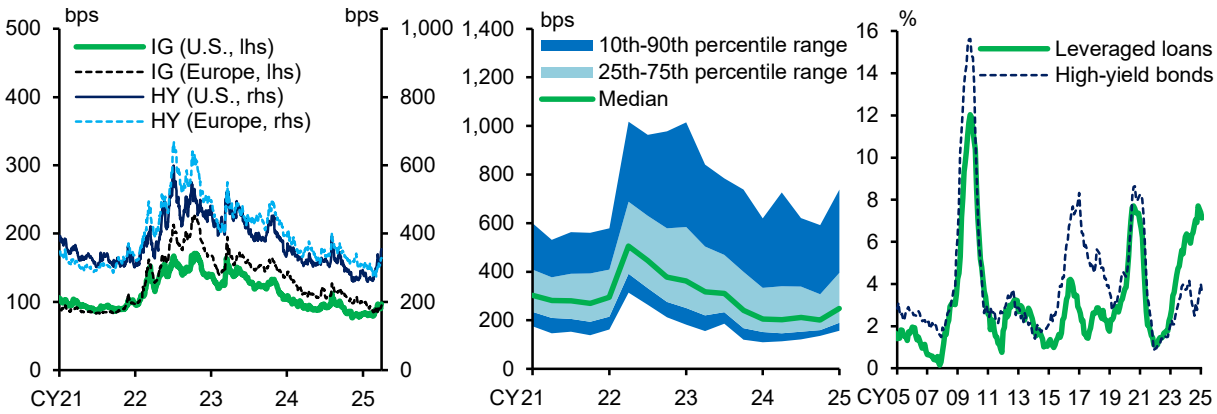


Note: 1. In the middle chart, the data for Japan, the United States, and Europe indicate expected EPS for the next 12 months of the TOPIX, the S&P 500, and the EURO STOXX, respectively. 4-week backward moving averages.
2. Latest data as of end-March 2025.
Source: Bloomberg; LSEG.

U.S. and European credit markets

Looking at credit spreads on U.S. corporate bonds, those on investment-grade bonds were more or less flat over the second half of fiscal 2024. Those on high-yield bonds widened over the second half of fiscal 2024; they narrowed mainly due to expectations for U.S. expansionary fiscal policies, but subsequently widened after mid-February with market sentiment becoming cautious (left panel of Chart II-1-3). On the other hand, credit spreads on European corporate bonds narrowed slightly amid an increase in European stock prices. Looking at the distribution of credit spreads on U.S. high-yield bonds by issue, spreads on some of these bonds remained wide, mainly due to the cumulative effects of the high interest rate environment, although the overall level of spreads remained low (middle panel of Chart II-1-3). In addition, the default rates of high-yield bonds turned to a rise, reflecting the deterioration in the financial conditions of issuing firms in the high interest rate environment. The default rates of leveraged loans, which are floating interest rate products, also continued to rise (right panel of Chart II-1-3).

Chart II-1-3: Corporate bond markets



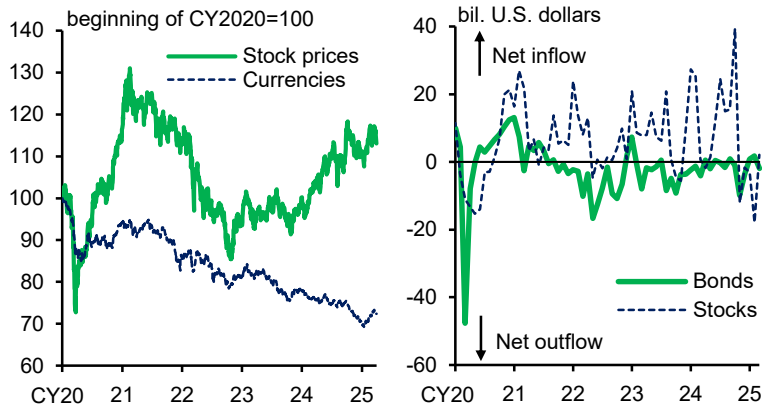
Note: 1. In the left-hand chart, "IG" and "HY" indicate investment-grade bonds and high-yield bonds, respectively. Latest data as of end-March 2025.
2. The middle chart is based on data by issue. Latest data as of end-March 2025.
3. The right-hand chart indicates trailing 12-month default rates. Latest data as of February 2025.
Source: ICE Data Indices, LLC; Moody's.

Emerging markets and international commodity markets

Stock prices in emerging markets declined, mainly due to vigilance against trade policy in each jurisdiction. Currencies in emerging markets declined, amid the dollar's appreciation against the background of an increase in U.S. interest rates (Chart II-1-4). Looking at net flows of emerging market funds, bond funds saw net outflows, reflecting the increase in U.S. interest rates. Equity funds saw net inflows through autumn 2024, mainly due to expectations for economic stimulus measures by the Chinese government; however, they subsequently saw net outflows, mainly due to vigilance against trade policy in each jurisdiction.

In international commodity markets, prices of crude oil were more or less flat over the second half of fiscal 2024; although they temporarily increased through the beginning of 2025, due to expectations for an increase in demand arising from the severe winter weather in the United States, prices of crude oil subsequently declined, mainly due to weaker-than-expected U.S. economic indicators (Chart II-1-5).

Chart II-1-4: Emerging markets



Note: 1. In the left-hand chart, "Stock prices" and "Currencies" indicate the MSCI EM Local Index and the J.P. Morgan EMCI Index, respectively.
2. Latest data for the left- and right-hand charts are as of end-March 2025 and March 2025, respectively.
Source: Bloomberg; EPFR; Haver Analytics.

Chart II-1-5: Crude oil prices

Note: WTI crude oil futures. Latest data as of end-March 2025.
Source: Bloomberg.

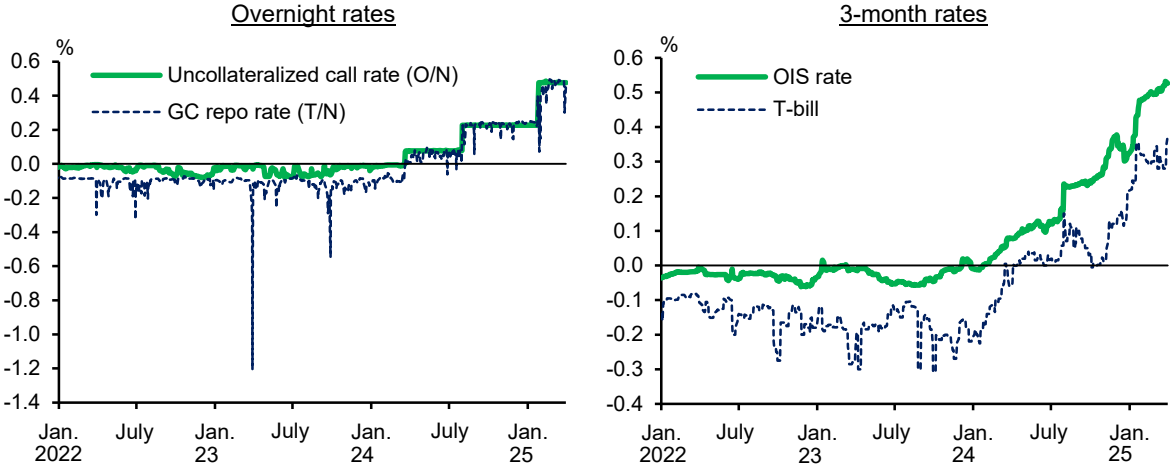
B. Japanese financial markets during the second half of fiscal 2024

Japanese financial markets were generally stable during the second half of fiscal 2024. Stock prices were more or less flat over the second half of fiscal 2024, weighed down by concerns over trade policy in each jurisdiction, despite being backed by such factors as firms' solid business performance. Long-term interest rates rose significantly, following the increases in U.S. and European interest rates and reflecting the policy interest rate hike by the Bank as well as progress in market participants' expectations for future policy interest rate hikes.

Short-term money markets

Regarding overnight interest rates, the uncollateralized call rate (O/N) was around 0.25 percent, and was subsequently around 0.5 percent, reflecting the change in the guideline for money market operations in January 2025 (left panel of Chart II-2-1). The GC repo rate (T/N) fluctuated, reflecting the size of the needs for securities companies to finance their bond inventories, but generally moved in tandem with the uncollateralized call rate.

Chart II-2-1: Short-term interest rates



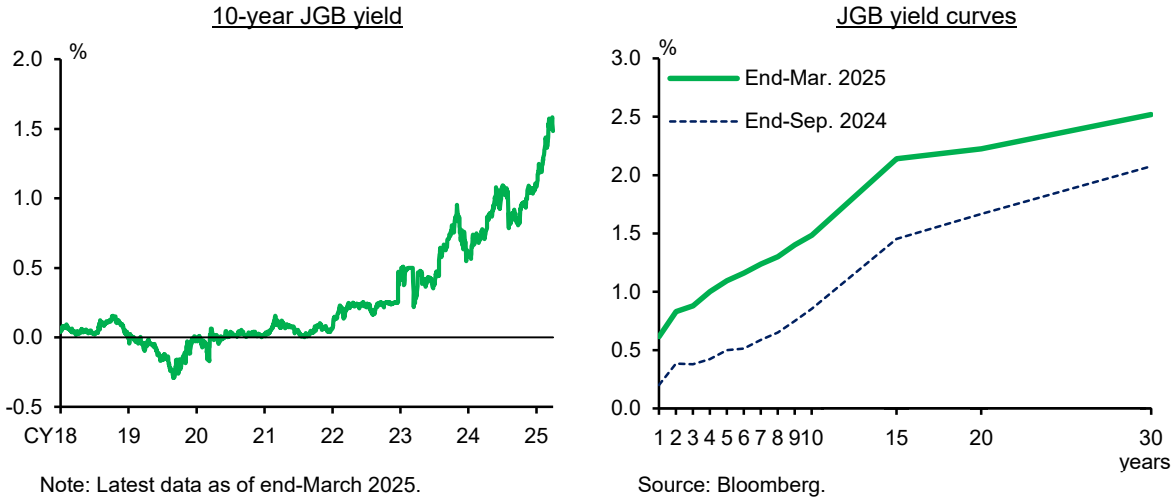
Note: Latest data as of end-March 2025.
Source: Bloomberg; Japan Bond Trading; JSDA; BOJ.

With regard to term interest rates, the 3-month overnight index swap rate rose, reflecting the policy interest rate hike by the Bank as well as progress in market participants' expectations for future policy interest rate hikes (right panel of Chart II-2-1). Yields on 3-month T-bills also increased, although they remained at relatively low levels, mainly due to demand from domestic and foreign investors.

Japanese government bond (JGB) markets

Long-term interest rates, while following the increases in U.S. and European interest rates, rose significantly, reflecting the policy interest rate hike by the Bank as well as progress in market participants' expectations for future policy interest rate hikes (Chart II-2-2). The yield curve for JGBs shifted upward. In the meantime, the implied volatility of JGB futures was at a high level, albeit with fluctuations (Chart II-1-1).

Chart II-2-2: JGB markets



Note: Latest data as of end-March 2025.
Source: Bloomberg.

Source: Bloomberg.

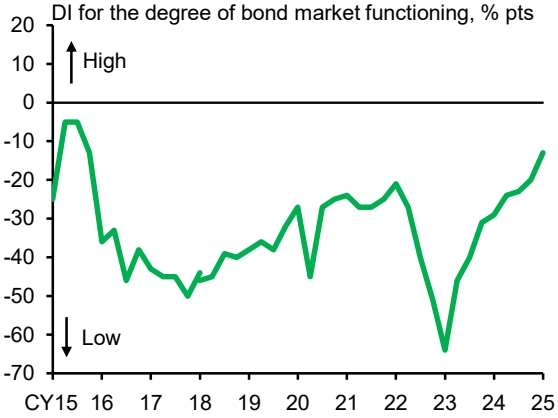
Liquidity and functioning of JGB markets

The liquidity and functioning of JGB markets continued to improve from a significantly low level.[2] According to the *Bond Market Survey*, the diffusion index for the degree of bond market functioning from the surveyed institutions' viewpoint improved to the level seen in the November 2015 survey, despite remaining negative (Chart II-2-3). Looking at liquidity indicators in JGB markets, transaction volume for cash JGBs increased (Chart II-2-4). Bid-ask spreads of newly issued bonds as well as market depth and resiliency in the JGB futures market continued to improve from a significantly low level, although they temporarily deteriorated in line with a rise in volatility (Charts II-2-4 and II-2-5).

That said, it is not straightforward to assess these indicators in the short term, because they tend to be volatile and are affected by such factors as developments in foreign markets. Bearing this in mind, close attention should continue to be paid to future developments in the liquidity and functioning of JGB markets, including the impact of the Bank's reduction in its JGB purchases.

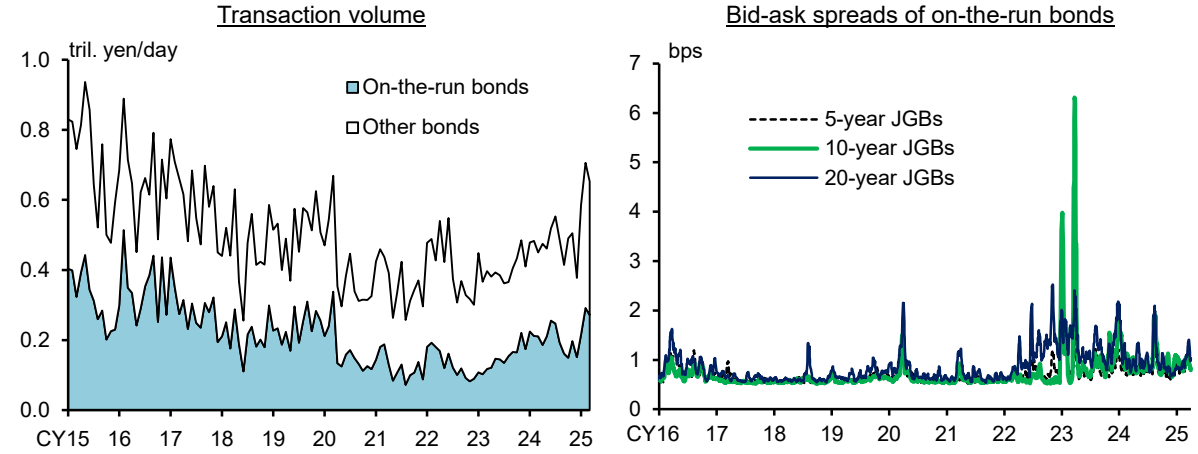
[2] See "Liquidity Indicators in the JGB Markets" on the Bank's website. The Financial Markets Department of the Bank generally updates and releases liquidity indicators of the JGB markets on a quarterly basis.

Chart II-2-3: Bond market survey



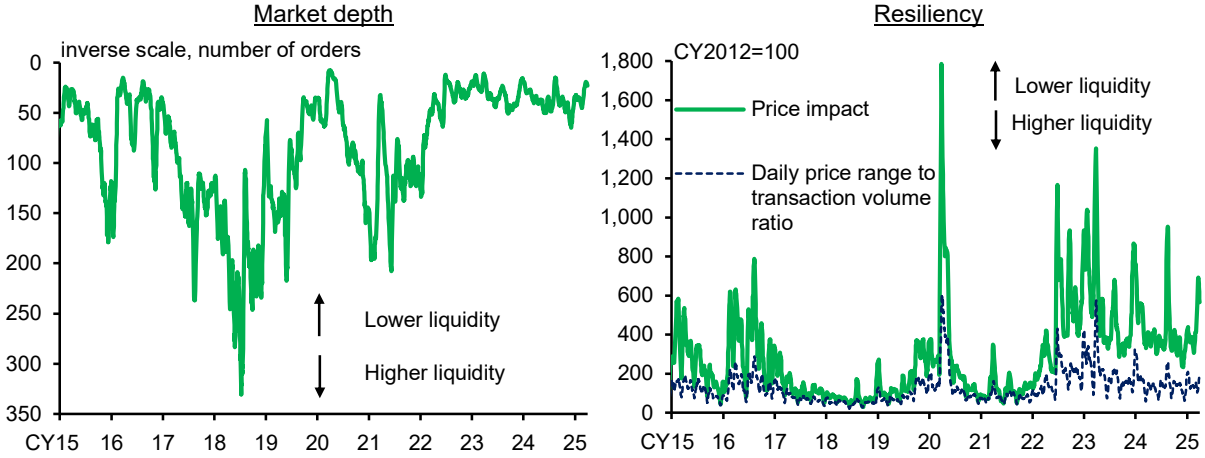
Note: 1. Based on the proportion of responding institutions selecting a given choice, the DI is calculated as follows: DI for the degree of current bond market functioning = "high" - "low."
2. The data from February 2018 onward cover major institutional investors. Latest data are based on the February 2025 survey.
Source: BOJ.

Chart II-2-4: Liquidity indicators in JGB cash market



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 2025.
2. The right-hand chart indicates the average of bid-ask spreads of inter-dealer transactions with a 1-second frequency. Bid-ask spreads are calculated only for time periods in which both best-bid and best-ask prices were submitted. 10-day backward moving averages. Latest data as of end-March 2025.
Source: Japan Bond Trading; QUICK.

Chart II-2-5: Liquidity indicators in JGB futures market

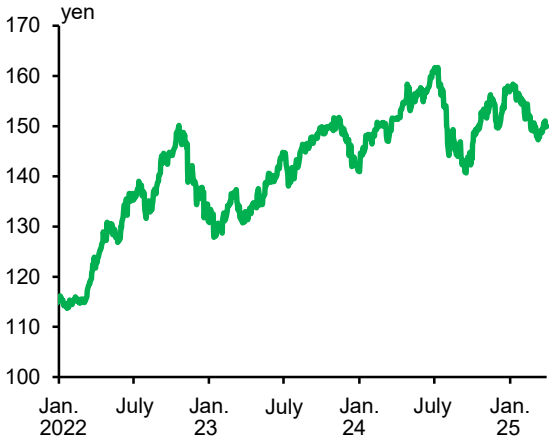


Note: 1. The left-hand chart indicates the number of orders for JGB futures at the best-ask price with a 1-minute frequency (median for each business day). 10-day backward moving averages. Latest data as of end-March 2025.
2. In the right-hand chart, "Price impact" is the average price impact with a 5-minute frequency. "Daily price range to transaction volume ratio" is a daily price range (difference between the highest and the lowest prices) divided by transaction volume. 10-day backward moving averages. Latest data as of end-March 2025.
Source: Nikkei Inc., "NIKKEI NEEDS"; Osaka Exchange; QUICK.

FX, stock, and credit markets

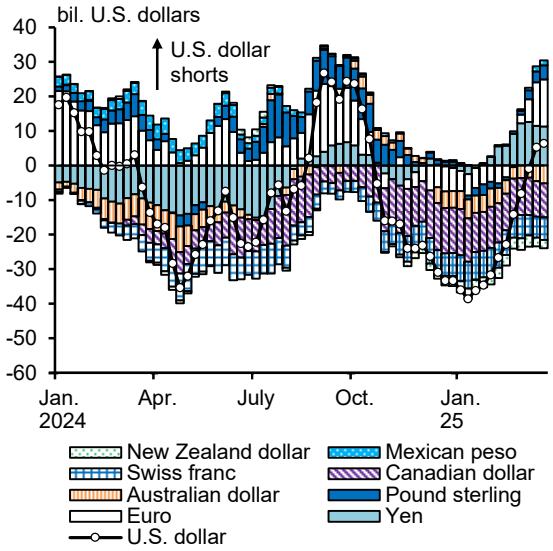
In FX markets, the yen depreciated against the dollar through the beginning of 2025, in tandem with a widening of the yield differential between Japan and the United States. The yen subsequently appreciated against the dollar, with the yield differential starting to narrow (Chart II-2-6). Under these circumstances, looking at futures positions of major currencies against the dollar on the International Money Market (IMM), yen futures positions were net long of late (Chart II-2-7).

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



Note: Latest data as of end-March 2025.
Source: Bloomberg.

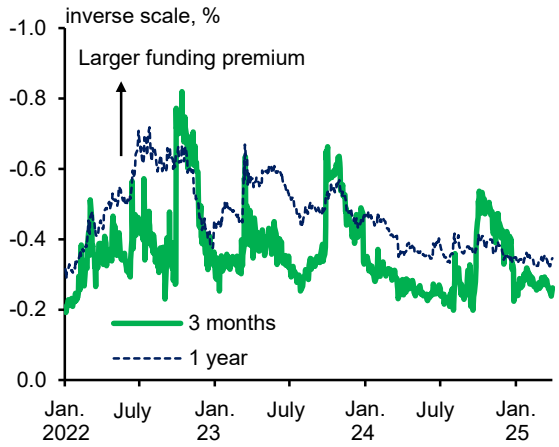
Chart II-2-7: IMM net positions



Note: Indicates the total of non-commercial and non-reportable positions against the U.S. dollar in currency futures transactions. Latest data as of end-March 2025.
Source: Bloomberg.

Dollar funding premiums in the FX swap market were generally at low levels, although they temporarily widened toward the end of 2024 due to funding in view of the year-end (Chart II-2-8).

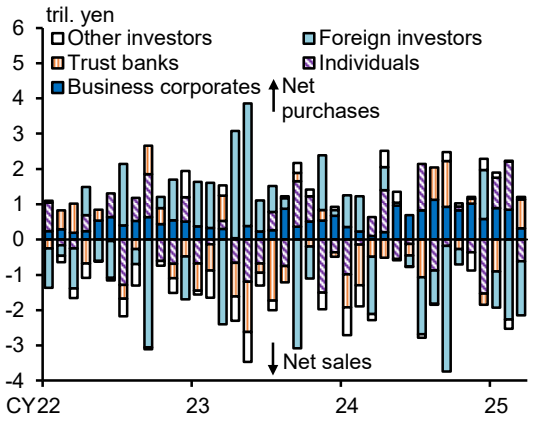
Chart II-2-8: U.S. dollar funding premiums



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 2025.
Source: Bloomberg.

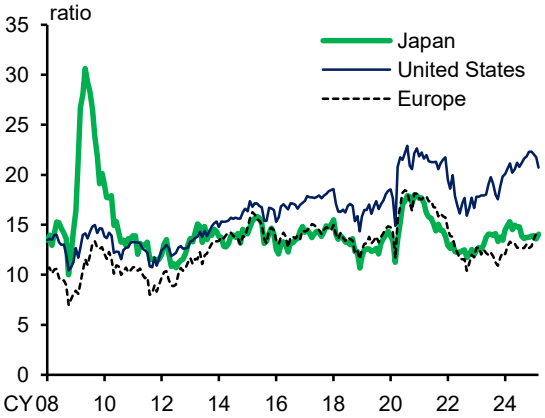
Japanese stock prices were more or less flat over the second half of fiscal 2024, weighed down by concerns over trade policy in each jurisdiction, despite being backed by such factors as firms' solid business performance (Chart II-1-2). In the meantime, while stock buybacks by business corporates continued to be observed, there were cases where foreign investors net sold stocks when market sentiment turned cautious (Chart II-2-9). In addition, price-earnings (P/E) ratios continued to be generally at the historical average level (Chart II-2-10).

Chart II-2-9: 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 2025.
Source: Osaka Exchange; Tokyo Stock Exchange.

Chart II-2-10: P/E ratios

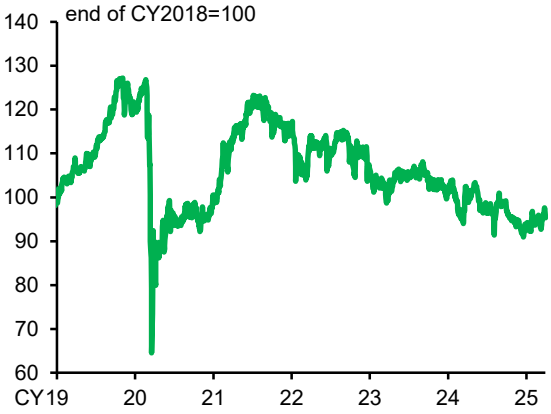


Note: The data for Japan, the United States, and Europe are calculated using expected EPS for the next 12 months of the TOPIX, the S&P 500, and the EURO STOXX, respectively. Latest data as of end-March 2025.
Source: LSEG.

Prices of Japan real estate investment trusts (J-REITs) were more or less flat over the second half of fiscal 2024, weighed down by the significant increase in Japanese interest rates, although there were some purchases in view of their relative undervaluation (Chart II-2-11).

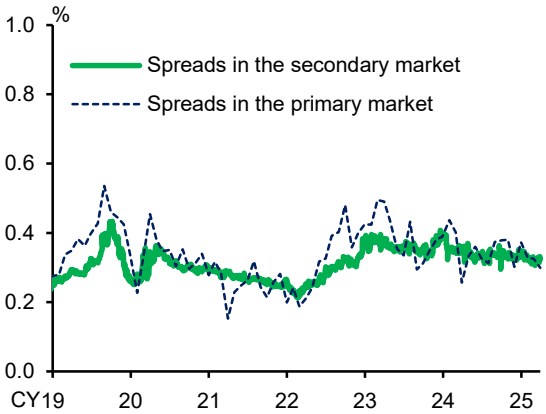
Yield spreads of corporate bonds in both the primary and secondary markets were more or less flat (Chart II-2-12). Issuance rates for CP rose, in tandem with an increase in short-term interest rates.

Chart II-2-11: Tokyo Stock Exchange REIT Index



Note: Latest data as of end-March 2025.
Source: Bloomberg.

Chart II-2-12: 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 2025.
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 2025.
Source: Bloomberg; Capital Eye; I-N Information Systems; JSDA; QUICK.

C. Risks to financial markets

Uncertainty about the outlook for financial markets has further increased recently. In domestic and foreign financial markets, there have been phases since the beginning of April when stock prices fell substantially and market sentiment became more cautious, amid heightened concerns over the impact of trade policy in each jurisdiction and the growing tensions over such policy. As a result, market participants have been paying increased attention to uncertainties surrounding policy conduct in each jurisdiction and the outlook for the global economy. Market participants have also continued to pay attention to geopolitical risks, including the situation in the Middle East and in Ukraine.

In stock markets, there has been vigilance against tensions over trade policy in each jurisdiction as well as the impact of such policy on the global economy. Market participants have also paid attention to developments in investment capital, which has been piled into major high-tech stocks. In bond markets, while some market participants have factored in a decline in interest rates on the back of concerns over a global economic slowdown, attention has also been drawn to the risk that interest rates will remain elevated in the United States, driven by a deterioration in the supply-demand balance of U.S. Treasuries and a reacceleration in inflation, and that this will spill over globally. In credit markets, concerns have heightened over a global economic slowdown, and there remains vigilance against a deterioration in the financial conditions of firms with low credit ratings and those with high leverage ratios, with attention being paid to the possibility that the high-interest rate environment could continue in the United States and Europe. In the U.S. and European real estate industries, attention has continued to be paid to developments in commercial real estate, mainly reflecting elevated vacancy rates for office buildings.

In emerging markets, there have been concerns over the risk that capital outflows from countries with fiscal and financial vulnerability could occur, with attention being paid to the possibilities that trade policy in each jurisdiction will affect global trade developments, and that U.S. interest rates will remain elevated. In international commodity markets, attention needs to be paid to geopolitical factors, including the situation in the Middle East and in Ukraine, as well as uncertainty over developments in the Chinese economy, which have a significant impact on commodity and grain prices.

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

III. Financial intermediation

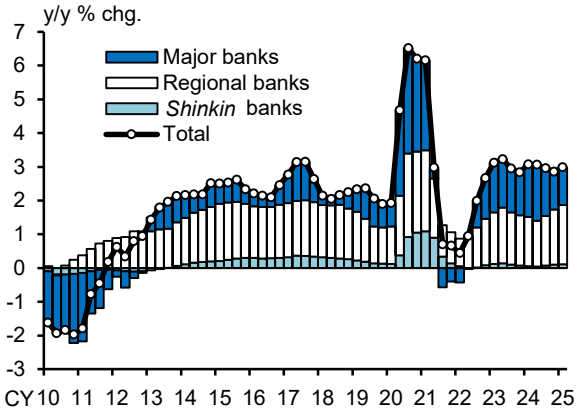
- Financial intermediation has continued to function smoothly in Japan. Despite the increase in domestic lending rates, firms' demand for loans has continued to rise mainly on the back of economic recovery and developments in mergers and acquisitions (M&A) deals. Banks' lending stance has also been active. As for foreign lending, major banks have been selective amid concerns over uncertainties regarding future developments in foreign economies. Meanwhile, banks have been cautious about making securities investment amid concerns over the risk of higher interest rates in Japan.
- Assets under management held by non-bank financial intermediaries (NBFIs) in Japan 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. Life insurance companies have by and large finished making adjustments to comply with new regulations and their accumulation of holdings of super-long-term Japanese government bonds (JGBs) has decelerated.

A. Financial intermediation by the banking sector

1. Loans

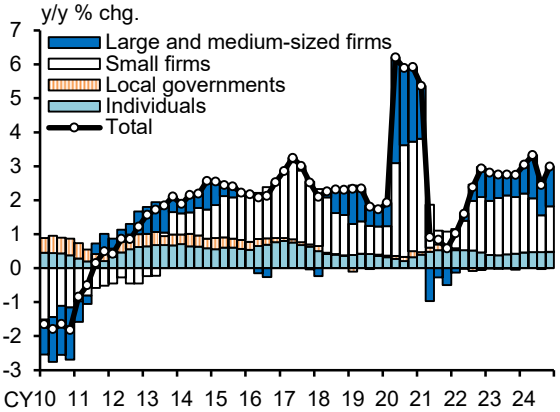
The annual growth rate of domestic loans by privately-owned banks has remained around 3 percent (Chart III-1-1). In addition to an increase in loan demand reflecting M&A deals and demand for real estate-related loans, demand for working capital amid the recovery in economic activity has been rising. Downward pressure stemming from repayments on effectively interest-free and unsecured loans (so-called zero-zero loans) on the outstanding amount of loans by regional and *shinkin* banks has been abating. Loans to both large and medium-sized firms and small firms have continued to increase (Chart III-1-2).

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



Note: Latest data as of 2025/Q1 (January-February).
Source: BOJ.

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

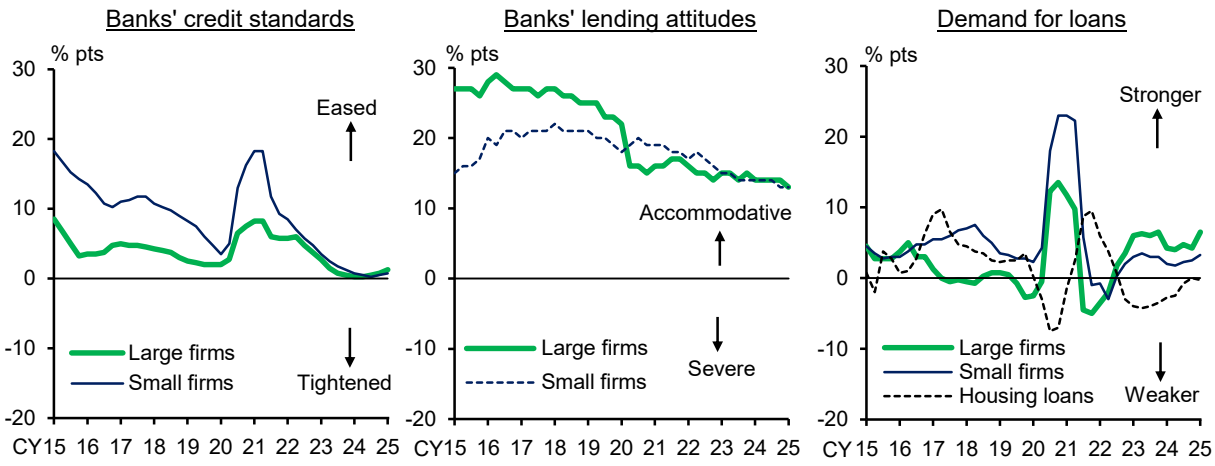


Note: Loans to banks and insurance companies are excluded. Latest data as of 2024/Q4.
Source: BOJ.

Meanwhile, banks' lending stance continues to be active. 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). Firms' demand for loans as perceived by banks has also continued to rise (right panel of Chart III-1-3).

Chart III-1-3: Loan-related DIs

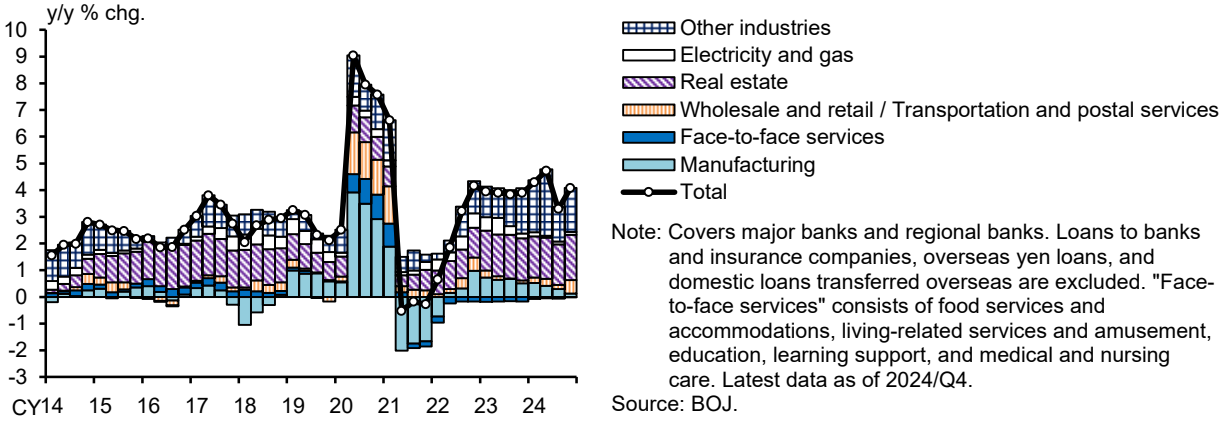


Note: 1. The left- and right-hand charts show 4-quarter backward moving averages. Latest data as of 2025/Q1 (January survey).
2. Latest data for the middle chart are as of 2025/Q1 (March survey).
Source: BOJ.

Loans by type of borrower

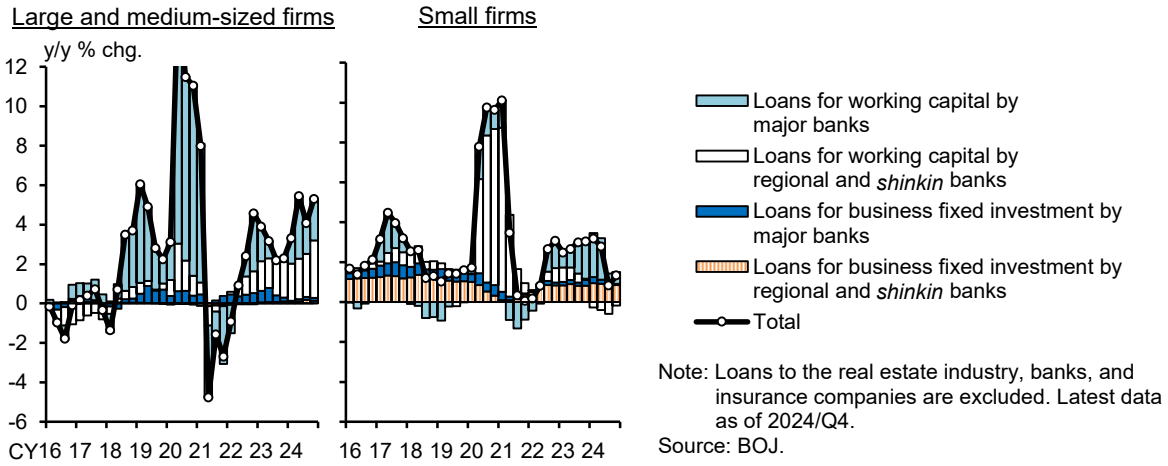
Loans to real estate businesses have continued to increase and loans to a wide range of other sectors, such as financial services providers (including SPCs that aim to acquire stocks for M&As), construction, and information and communications, have increased (Chart III-1-4; construction and information and communications are included in "other industries"). For loans to businesses other than real estate, funding demand has been strong as a result of corporate actions such as M&As, on the back of the need for firms to restructure reflecting changes in the business environment. Such loans include leveraged buyout (LBO) finance, in which the future cash flow of the acquired firm is used for loan repayment. Loans for working capital, particularly to large and medium-sized firms, have continued to accelerate (Chart III-1-5). A rise in funding demand related to M&A deals has partly contributed to the increase in loans for working capital. Meanwhile, loans for business fixed investment have continued to increase, especially for small firms. In addition to renewal investment amid 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 2024/Q4.
Source: BOJ.

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

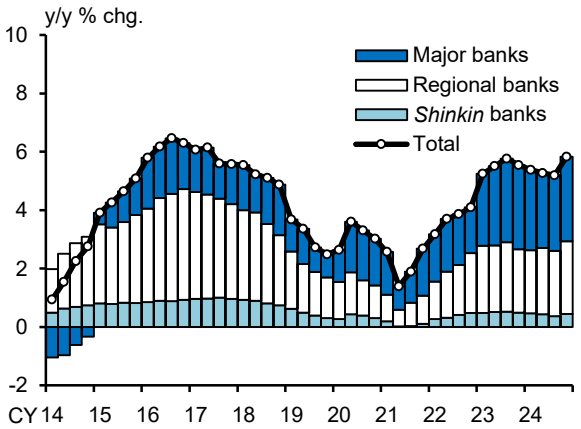


Note: Loans to the real estate industry, banks, and insurance companies are excluded. Latest data as of 2024/Q4.
Source: BOJ.

Real estate-related loans

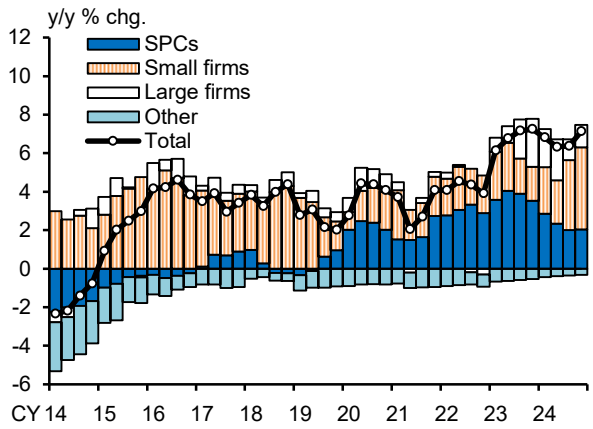
Loans to real estate businesses have continued to grow at a relatively high rate at both major and regional banks (Chart III-1-6). At major banks, loans to real estate investment trusts (REITs), which have seen an increase in private placements (included in "small firms" in Chart III-1-7), to real estate investment funds with relatively high lending margins ("SPCs" in the chart), and to major real estate developers (included in "large firms" in the chart) have continued to increase. Major banks have met solid demand for funds while managing credit exposures cautiously, based on current real estate market conditions and past periods of market stress, and paying attention to developments in interest rates and foreign exchange rates.

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



Note: Latest data as of 2024/Q4.
Source: BOJ.

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



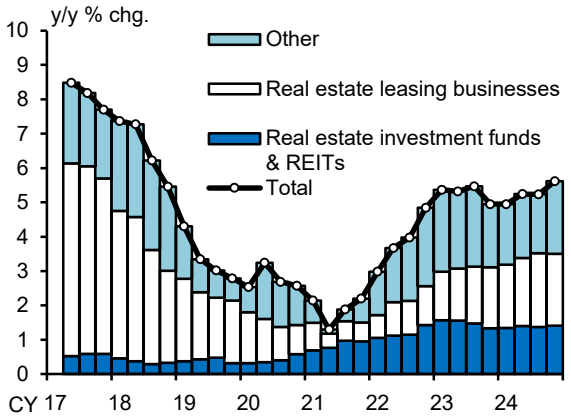
Note: "Small firms" includes REITs. Latest data as of 2024/Q4.
Source: BOJ.

At regional banks, loans to real estate investment funds, and non-residential real estate leasing businesses (included in "other" in Chart III-1-8) have continued to show relatively high growth, reflecting an increase in financing demand due to the construction of new leasing properties such as office buildings and logistics facilities.[3] In addition, the increase in loans to real estate leasing

[3] 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.

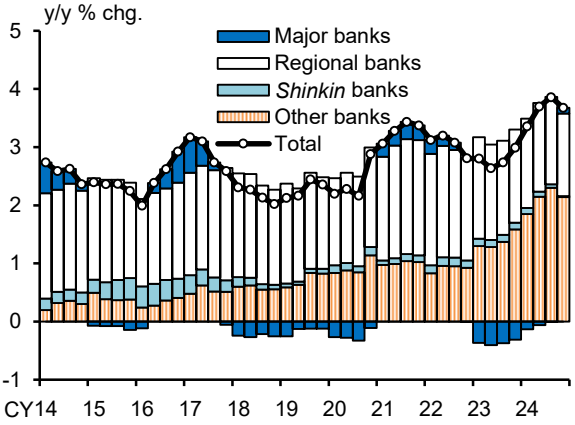
businesses has also reflected a rise in demand for rental housing due to heightened housing prices. Regional banks have been meeting demand for funds while being more selective in providing loans.

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 2024/Q4.
Source: BOJ.

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



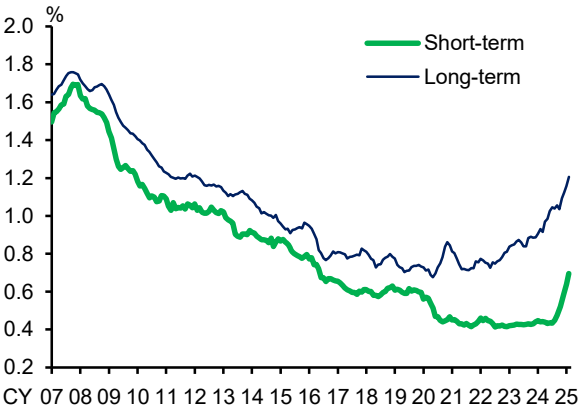
Note: "Other banks" covers domestically licensed banks but excludes major banks and regional banks. Latest data as of 2024/Q4.
Source: BOJ.

Housing loans, which account for a large share of loans to individuals, have continued to rise, at a rate of around 3.5 percent (Chart III-1-9). On the demand side, 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 of housing loans has continued to be led by internet-only banks (included in "other banks" in the chart), which are focusing on providing housing loans through offering preferential interest rates. In addition, the outstanding amount of loans at major banks has started to increase. At regional banks, the pace of increase in the outstanding amount has decelerated.

Lending rates

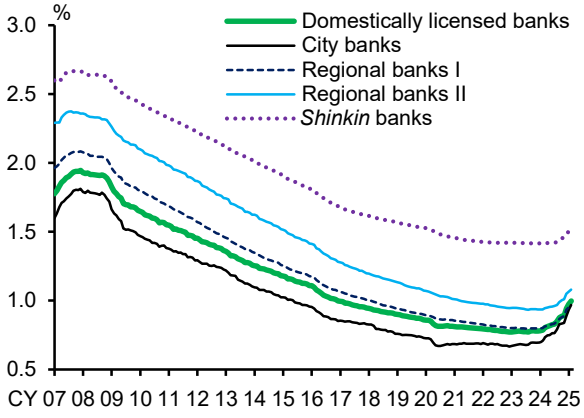
Banks' average contract interest rates on new loans and discounts have been rising for both long-term and short-term ones, due to rises in market interest rates and short-term prime rates, both of which serve as base rates (Chart III-1-10). The size of the increase in interest rates on loans outstanding has been relatively substantial for major banks, among which market rate-linked loans

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 2025.
Source: BOJ.

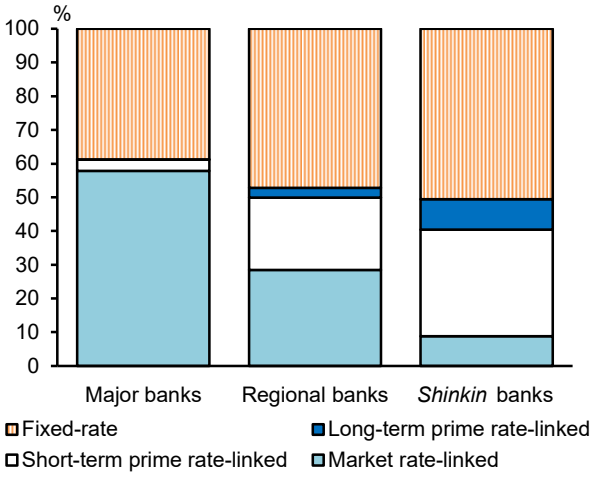
Chart III-1-11: Average contract interest rates on outstanding loans and bills discounted



Note: Latest data as of February 2025.
Source: BOJ.

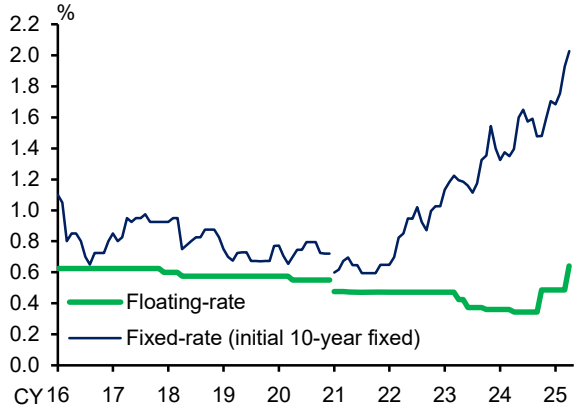
account for a large share of their lending. Interest rates on loans outstanding have recently also been rising for regional banks and *shinkin* banks, for which short-term prime rate-linked loans account for a large share of their lending (Charts III-1-11 and III-1-12). Meanwhile, interest rates on floating-rate housing loans, which account for the majority of new housing loans, and interest rates on new fixed-rate housing loans have both been rising in tandem with reference rates such as short-term prime rates (Chart III-1-13).

Chart III-1-12: Composition of corporate loans outstanding by interest rate type



Note: Data as of end-September 2024.
Source: BOJ.

Chart III-1-13: Interest rates on housing loans

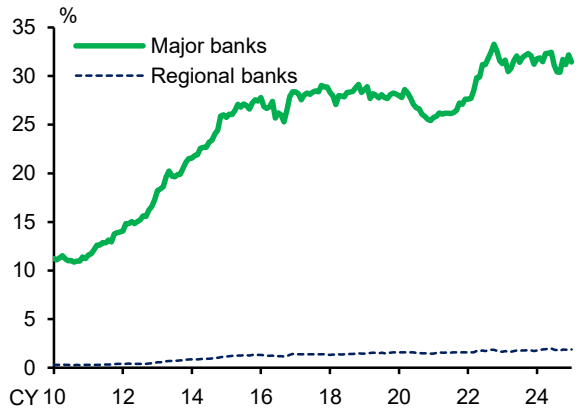


Note: Shows medians of some major banks (preferential rates are taken into account). Covers loans with administrative fees from 2021 and those with guarantee fees up to 2020. Latest data as of April 2025.
Source: Published accounts of individual banks.

Foreign loans

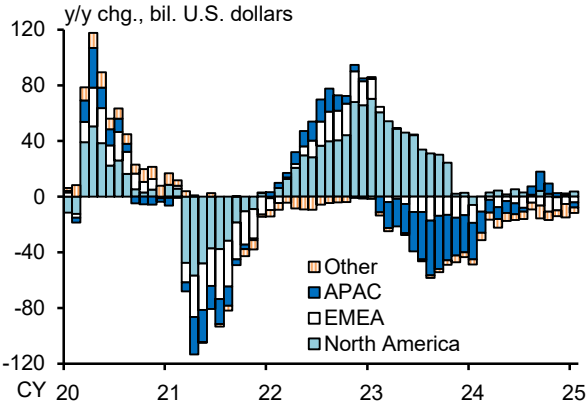
With foreign loans accounting for over 30 percent of their loan portfolios, major banks are susceptible to foreign financial and economic conditions (Chart III-1-14). Against this background, major banks have been selective in their foreign lending (Chart III-1-15).

Chart III-1-14: Share of foreign loans in total loans



Note: On a non-consolidated basis. Latest data as of end-January 2025.
Source: BOJ.

Chart III-1-15: Foreign loans outstanding of the three major banks by region



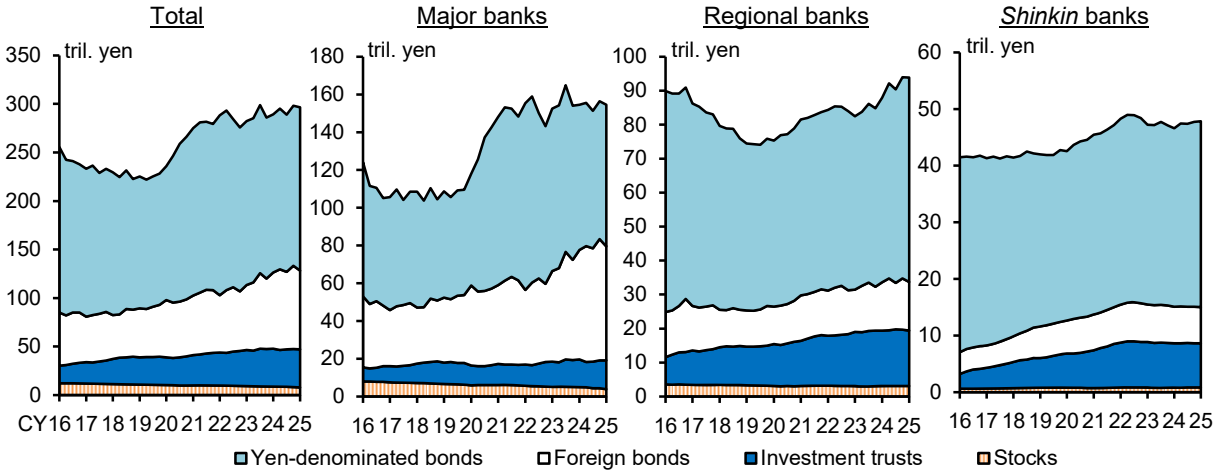
Note: Latest data as of end-January 2025.
Source: BOJ.

On the demand side, with policy interest rates being cut in many regions, loan demand has been recovering somewhat. On the supply side, lending by major banks has been under downward pressure reflecting reviews of and consequent reductions in loans to low-return borrowers as well as concerns over geopolitical risks and uncertainties regarding foreign economies.

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-1-16). As for foreign securities investment, some banks have been increasing their holdings with an eye on the timing of future policy interest rate cuts.

Chart III-1-16: Outstanding amount of securities among banks



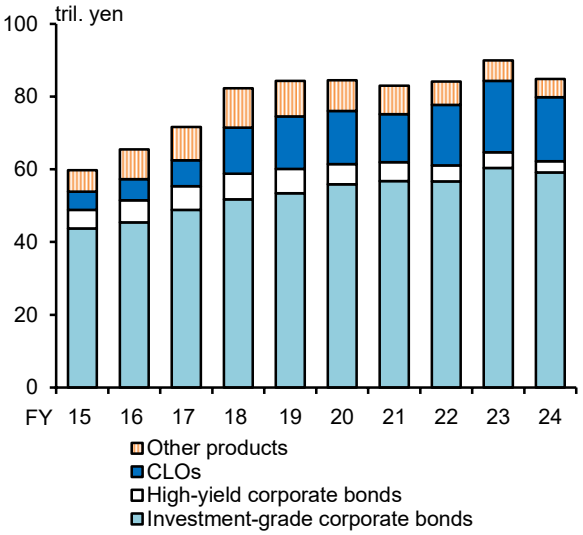
Note: 1. "Investment trusts" includes domestic and foreign investment, and some securities other than investment trusts.
2. "Stocks" is based on the outstanding amount on a book value basis and excludes foreign stocks.
3. The data are the sum of figures for domestic and foreign branches, with the exception of those for major banks' "Stocks," which are figures for domestic branches. Latest data as of 2025/Q1 (end-February).
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 higher interest rates. They have continued with interest rate hedging by purchasing inverse mutual funds, for which net asset values increase when interest rates rise. Although they have maintained a more cautious stance toward investing in foreign bonds than a while ago, based on the expectation that foreign interest rates will fall, some banks have accumulated holdings of foreign bonds with the aim of obtaining capital gains. Some have sold securities with low investment yields and have purchased securities with higher yields instead. 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 been increasing their holdings of yen-denominated bonds, led by regional banks. However, amid concerns over the risk of higher interest rates, both regional and *shinkin* banks have shortened the duration of their yen-denominated bondholdings by holding back investments in the longer-term zone. Some banks have accumulated holdings of held-to-maturity bonds, which are not subject to mark-to-market valuation. Meanwhile, regional and *shinkin* banks' foreign bond holdings have remained more or less unchanged. Holdings of investments in domestic real estate funds with the aim of improving investment yields have been at a more elevated level than in the past.

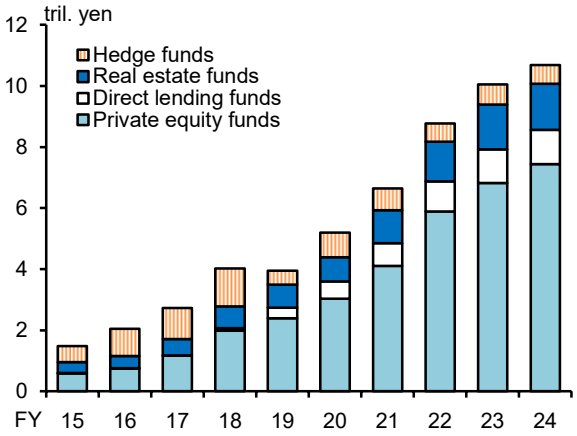
Banks have also been cautious about taking risks in foreign credit products. They have reduced positions in high-yield bonds to curb market credit risk, and the outstanding amount of collateralized loan obligations (CLOs), which banks had preferred with a view to containing the risk of negative interest margins, has been declining (Chart III-1-17). On the other hand, large financial institutions have increased their alternative investment holdings, such as private equity holdings, in order to diversify risk (Chart III-1-18).

Chart III-1-17: 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 2024.
Source: BOJ.

Chart III-1-18: Foreign alternative investment

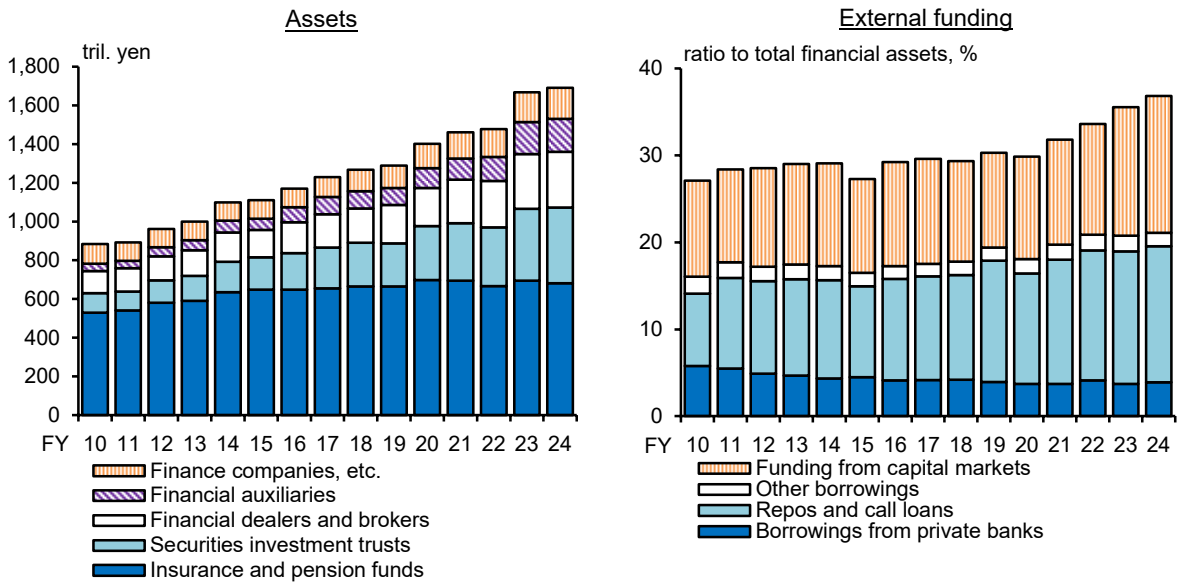


Note: 1. Covers major banks, Japan Post Bank, and a central organization of financial cooperatives.
2. "Real estate funds" excludes publicly traded REITs. Latest data as of end-September 2024.
Source: BOJ.

B. Financial intermediation by the NBFI sector

In Japan, where depository financial institutions are still dominant in financial intermediation, the share of financial assets held by NBFIs has remained at about 30 percent. However, assets under management held by NBFIs, especially those held by investment funds and financial dealers and brokers, have remained on an uptrend (Chart III-2-1; see Section B of Chapter V on the increased presence of NBFIs, including foreign ones, in Japan's financial system and the risks posed).

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

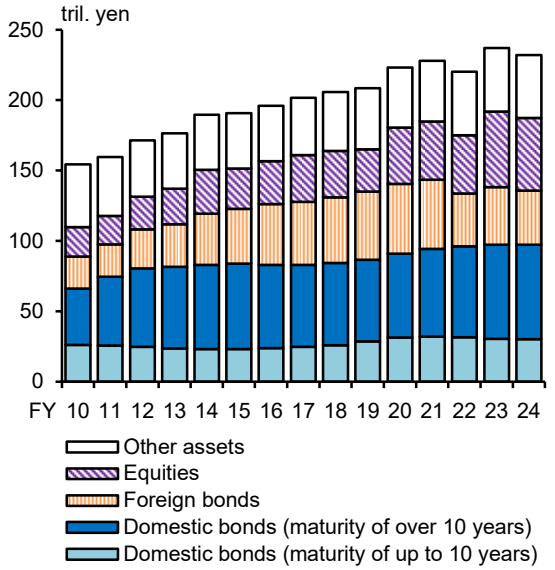


Note: "Financial auxiliaries" includes financial holding companies, stock exchanges, and financial instruments exchanges. "Finance companies, etc." includes finance companies, securities finance companies, and the Resolution and Collection Corporation. Latest data as of end-December 2024.
Source: BOJ.

Insurance companies and pension funds

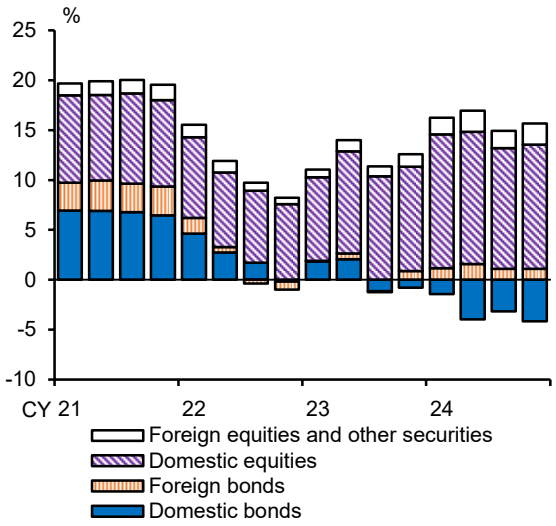
Life insurance companies' outstanding amount of investment assets has been more or less unchanged. Their asset composition shows that the accumulation of holdings of super-long-term JGBs has decelerated, with companies having by and large finished making adjustments to comply with the introduction of economic value-based solvency margin ratio (ESR) regulations scheduled for fiscal 2025 (Chart III-2-2). Meanwhile, their average 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. Latest data as of end-September 2024.
Source: Published accounts of individual companies.

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



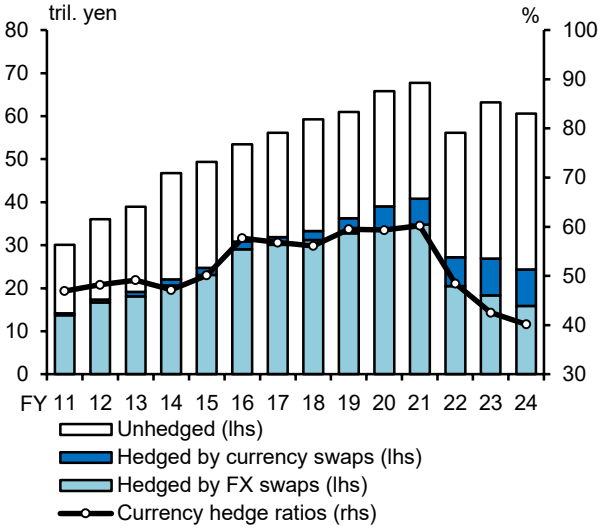
Note: Shows the ratio of valuation gains/losses on securities holdings, which excludes trading securities. Covers four major life insurance companies. Latest data as of end-December 2024.
Source: Published accounts of individual companies.

Looking at life insurance companies' valuation gains/losses on securities investment as of the end of 2024, their securities holdings overall have continued to register substantial net valuation gains (Chart III-2-3). Although life insurance companies' valuation losses on yen-denominated bondholdings have been increasing, reflecting the rise in domestic interest rates, their valuation gains on stockholdings have remained at high levels on the back of rising stock prices. They have also been able to make valuation gains on foreign bondholdings on a yen basis even as foreign interest rates have risen, due partly to the effects of the yen's depreciation.[4] As for foreign 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; holdings of unhedged foreign bonds have decreased slightly on the whole, reflecting a cautious

[4] Life insurance companies' financial soundness amid the rise in interest rates has been the 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. 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 since 2016, when long-term interest rates fell substantially, as this made it difficult to secure the assumed rate of return.

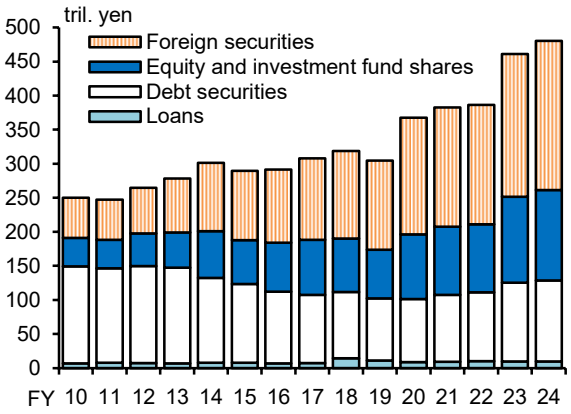
stance among some life insurance companies with regard to accumulating such bonds (Chart III-2-4).

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 2024.
Source: Published accounts of individual companies.

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



Note: Covers pension funds and public pensions.
Latest data as of end-December 2024.
Source: BOJ.

The Government Pension Investment Fund (GPIF), which is responsible for 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).[5] 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. 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. Looking at developments in investment assets, the share of alternative investments has been rising in recent years.[6]

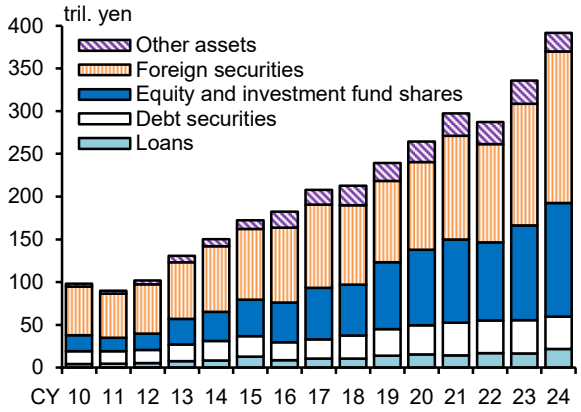
Investment funds

Investment trusts' assets under management, especially those of stocks and foreign securities, have continued to increase in a situation where inflows of funds from households have been seen (Chart III-2-6). With the introduction of the new Nippon Individual Savings Account (NISA) program last year, inflows of funds into eligible financial products have been increasing. In addition, the assets under management of leveraged private equity funds and real estate funds have increased (Chart III-2-7).

[5] 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.

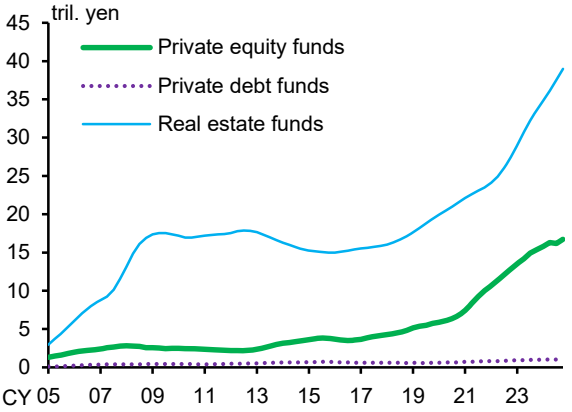
[6] Among alternative investments, private fund markets have been growing in recent years, especially in the United States and Europe, although the size of the market in Japan is limited. For details of developments in Japanese banks' and domestic institutional investors' exposure to foreign private funds, see Box 3 in this *Report*.

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



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

Chart III-2-7: Investment assets outstanding among alternative funds

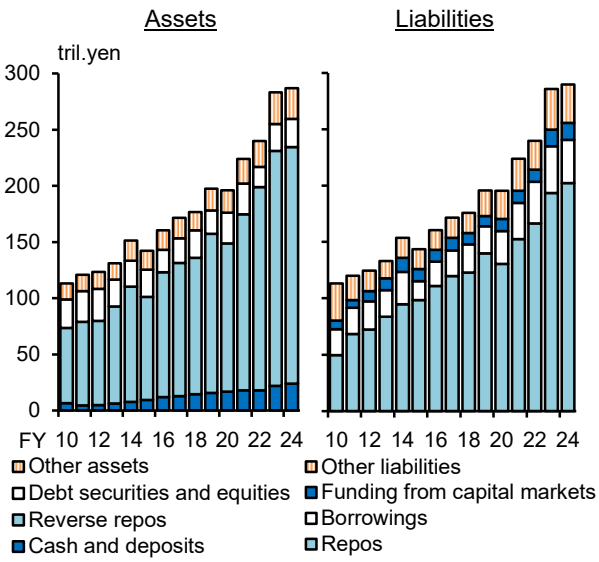


Note: "Private equity funds" and "Private debt funds" are based on Preqin's research (AUM-based). 4-quarter backward moving averages. Latest data as of 2024/Q4.
Source: Preqin; Sumitomo Mitsui Trust Research Institute.

Financial dealers and brokers

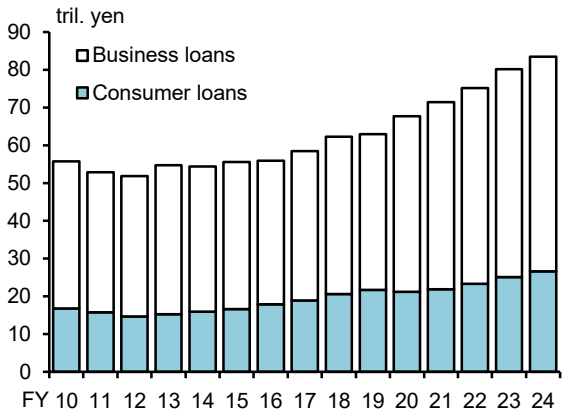
Financial dealers and brokers' positions have expanded, mainly reflecting the increase in short-term repo transactions on both the asset and liability sides (Chart III-2-8).[7] This is because, with transaction activity having increased following the increase in interest rate fluctuations, Japanese securities companies and *tanshi* companies (money market brokers) have carried out repo transactions for inventory financing and have also increased repo transactions to meet the rise in demand from customers who need to borrow bonds. Moreover, there have been repo transactions by foreign securities companies' branches in Japan to broker JGB transactions for foreign investors' investment in yen-denominated bonds and for meeting their headquarters' demand for JGBs as collateral. Although the size of the balance sheets of financial dealers and brokers has increased as a result of these transactions, there is no duration mismatch between their assets and liabilities.

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



Note: "Equities" includes investment fund shares. Latest data as of end-December 2024.
Source: BOJ.

Chart III-2-9: Loans outstanding among finance companies



Note: "Business loans" is loans to firms and governments. Latest data as of end-December 2024.
Source: BOJ.

[7] For details of 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.

Finance companies

Loans outstanding of finance companies such as money lenders has been on an uptrend (Chart III-2-9). 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. Despite the rise in these loans, finance companies' credit costs have been contained.

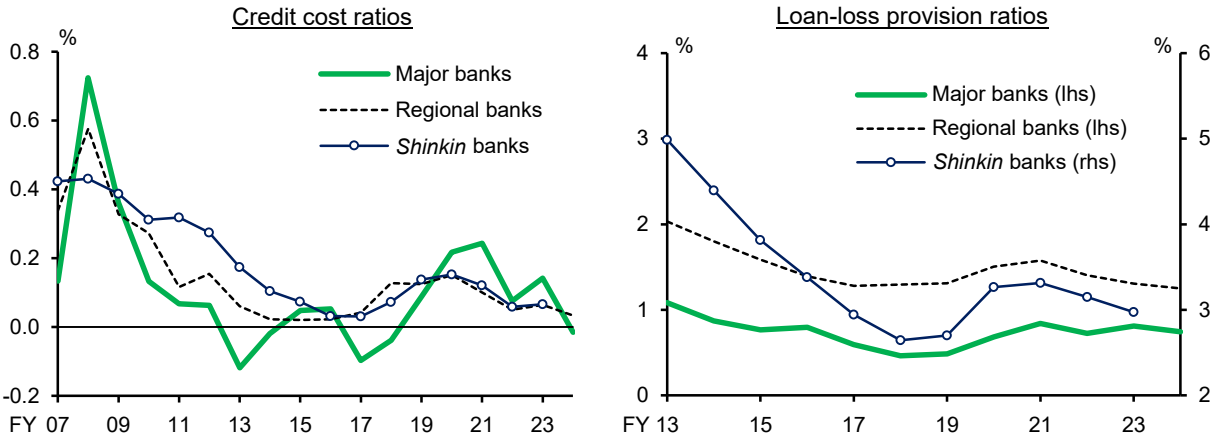
IV. Risks faced by financial institutions

- The quality of banks' domestic and foreign loan portfolios has been maintained. With corporate profits in Japan having been on an improving trend on the whole, the pace of increase in bankruptcies has slowed and credit costs have been limited. Nevertheless, with uncertainty heightening due to trade policy in each jurisdiction, among other factors, depending on future developments, global financial and economic activity could be affected significantly, leading to a deterioration in firms' financial conditions. It is necessary to closely monitor the resulting effects, including those on borrower firms with foreign businesses.
- Banks have maintained a cautious investment stance, particularly toward investment in yen-denominated bonds, and their securities portfolios show that overall interest rate risk has generally been unchanged. Given that banks carry various risk factors, they need to continue to adequately manage market risks.
- 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. With customer channels becoming more digitalized and households' asset choices undergoing changes, banks need to continue to work toward establishing stable funding bases, while paying attention to changes in the funding environment.

A. Credit risk

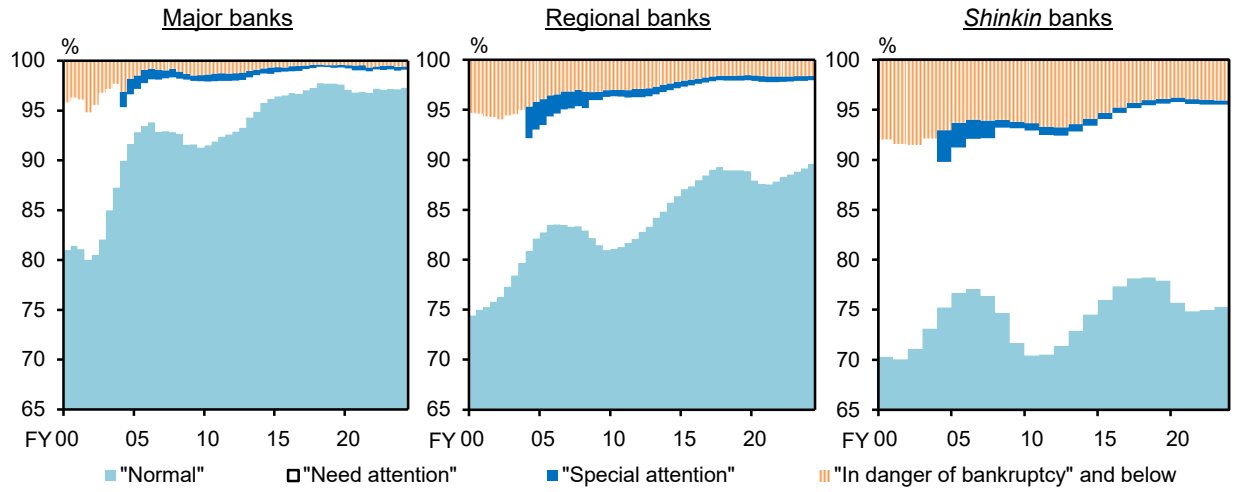
Banks' credit cost ratios have remained low (Chart IV-1-1). Looking at loans by borrower classification, the shares of "normal" loans have stayed high, and the shares of borrowers classified as "in danger of bankruptcy" and below have remained at historically low levels (Chart IV-1-2). The ratios of unexpected losses to capital have been contained (Chart IV-1-3). The quality of banks' domestic and foreign loan portfolios has been maintained.

Chart IV-1-1: Credit cost ratios and loan-loss provision ratios by type of bank



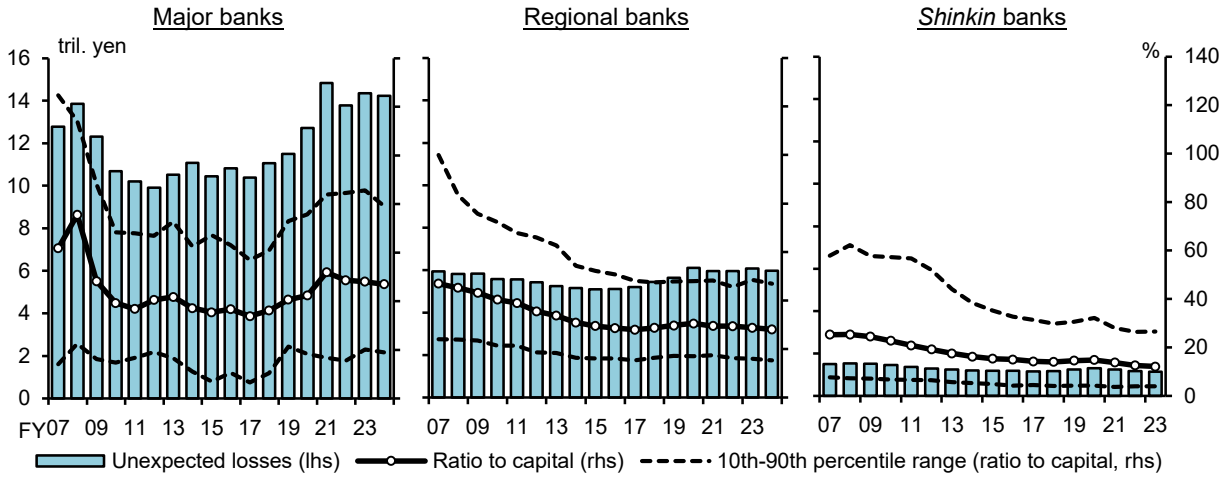
Note: 1. The latest data for major and regional banks are as of the first half of fiscal 2024 and those for *shinkin* banks are as of fiscal 2023.
2. The left-hand chart covers domestic and foreign loans. The right-hand chart shows loan-loss provision ratios for unsecured loans.
Source: BOJ.

Chart IV-1-2: Composition of loans by borrower classification



Note: The latest data for major and regional banks are as of the first half of fiscal 2024 and those for *shinkin* banks are as of fiscal 2023. "Need attention" indicates "Need attention excluding special attention" from fiscal 2004.
Source: BOJ.

Chart IV-1-3: Unexpected losses by type of bank



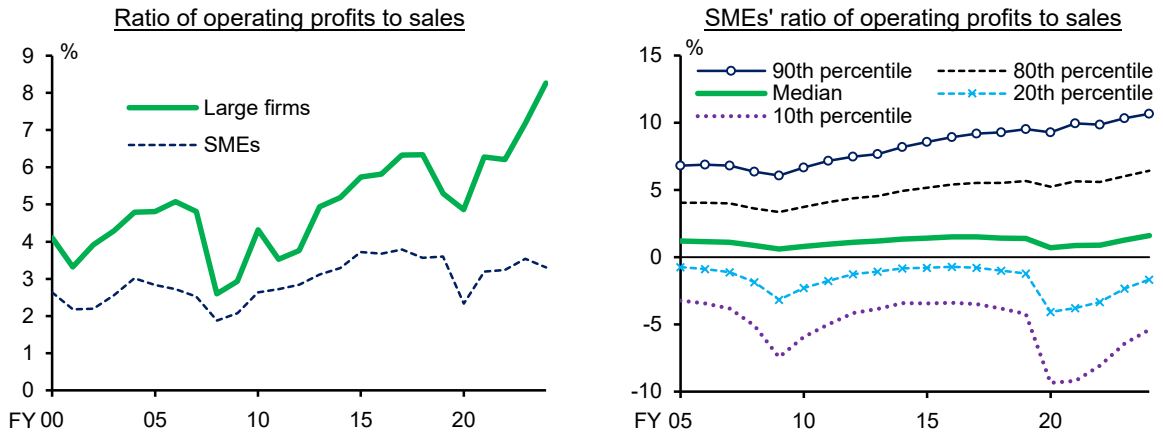
Note: Unexpected losses are the difference between the maximum amount of losses with a 99 percent confidence level and expected losses. "Ratio to capital" is calculated using CET1 capital for internationally active banks from fiscal 2012 onward, core capital for domestic banks from fiscal 2013 onward, 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 the first half of fiscal 2024 and those for *shinkin* banks are as of fiscal 2023.
Source: BOJ.

1. Domestic credit risk

Developments in corporate bankruptcies

Amid the continuing moderate economic recovery, corporate profits in Japan have been improving on the whole (Chart IV-1-4). However, compared to large firms, the pace of increase in corporate profits of small and medium-sized enterprises (SMEs) has been slow. In addition, the distribution of SMEs' ratio of operating profits to sales shows that there are a considerable number of firms whose pace of improvement in corporate profits has been slower than that of SMEs overall and whose operating profits have been negative. As a result, the skew of the distribution to the downside seen since the pandemic has remained, although there are signs of improvement.

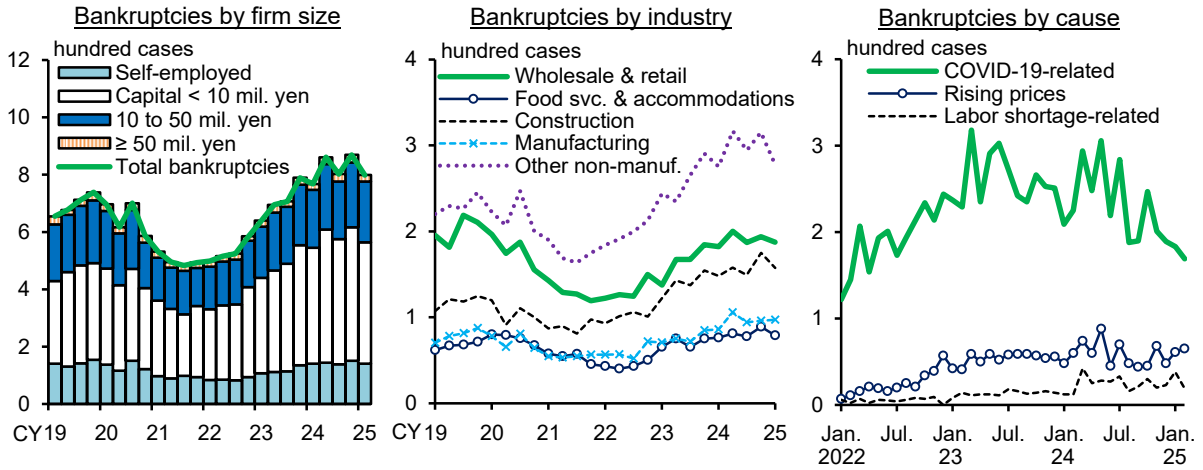
Chart IV-1-4: Firms' financial conditions



Note: The left-hand chart is based on the Financial Statements Statistics of Corporations by Industry, and the latest data are as of fiscal 2024 (April-December). The right-hand chart is based on the CRD, and the latest data are as of fiscal 2024 (April-September). SMEs in the right-hand chart are firms with capital of 100 million yen or less and sales of 100 million yen or more.
Source: CRD Association; Ministry of Finance.

Corporate bankruptcies have been increasing since the second half of 2022. In terms of firm size, the increase has particularly been among small-sized firms, while in terms of industry, it has particularly been among firms in the non-manufacturing sector, including the wholesale and retail industry. However, the pace of increase in corporate bankruptcies has been slowing down recently (Chart IV-1-5). The number of bankruptcies due to the pandemic, which had been increasing, has started to decline recently.

Chart IV-1-5: Developments in corporate bankruptcies

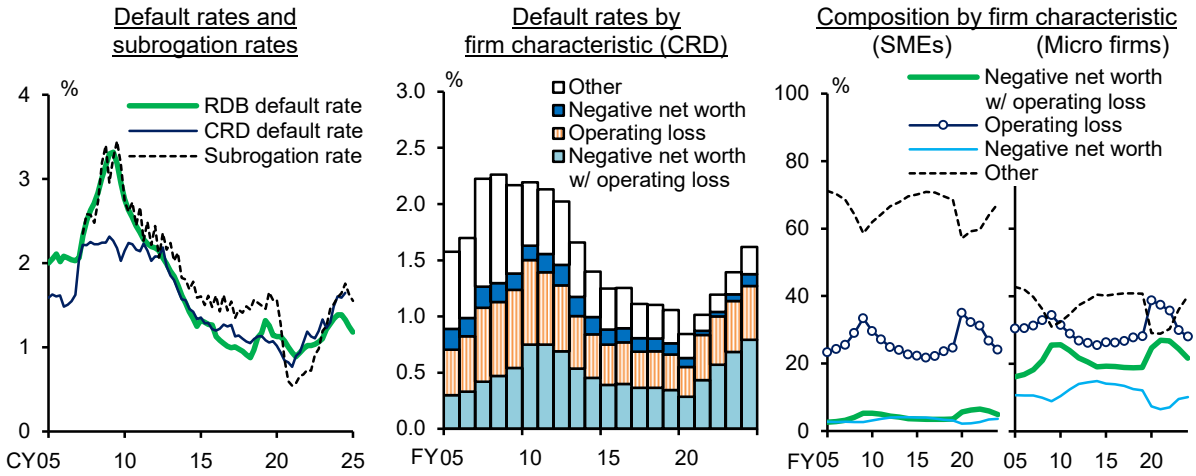


Note: The latest data for the left-hand and middle charts are as of 2025/Q1 (January-February average), and those for the right-hand chart are as of February 2025. In the right-hand chart, multiple choices were allowed regarding the causes of bankruptcy.
Source: Teikoku Databank; Tokyo Shoko Research.

While indicators of default rates generally increased after the pandemic, some have recently pointed to a slowdown in the rise of default rates or a decline (Chart IV-1-6; see Box 1 for details of the financial conditions and developments in the default rates of zero-zero loan recipients). In fact, looking in detail at the financial conditions of firms that defaulted indicates that more than half of those firms are firms that are either making operating losses with negative net worth or are making operating losses; however, with the economy recovering moderately, the share of such firms has been declining. This likely contributed to the slowdown in the rise of default rates. However, examining firms' financial conditions by industry shows that the share of firms that are making operating losses with negative net worth is high in the food services and accommodation

industry. Particularly, the share in the food services industry remains higher than before the pandemic. If firms continue to make operating losses, their leverage will rise and cause a rise in the risk of firms having negative net worth. The share of such firms has also been rising among those in food services (Chart IV-1-7).

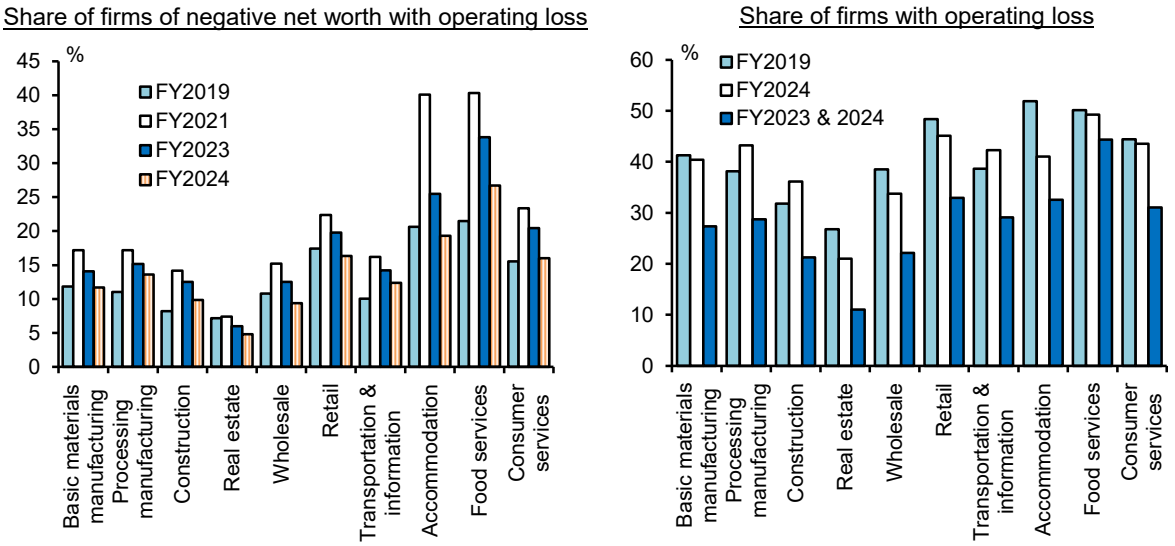
Chart IV-1-6: Developments in default rates



Note: 1. In the left-hand chart, the latest data for "RDB default rate" are as of 2025/Q1 (January), those for "CRD default rate" are as of 2024/Q3, and those for "Subrogation rate" are as of 2025/Q1 (January-February). The latest data for the middle and right-hand charts are as of fiscal 2024 (April-September).
2. RDB default rate is based on the classification "in danger of bankruptcy." CRD default rate is based on the number of defaults (downgrades to "special attention" or below, etc.) in the past twelve months. The data for subrogation rate are based on staff calculations and are annualized values.
3. CRD data covers firms with capital of 100 million yen or less, of which SMEs are firms with sales of 100 million yen or more, while the rest are micro firms.

Source: CRD Association; Japan Federation of Credit Guarantee Corporations; The Risk Data Bank of Japan.

Chart IV-1-7: Firm characteristics by industry



Note: Covers SMEs and micro firms (firms with capital of 100 million yen or less).
Source: CRD Association.

Despite these developments in the number of bankruptcies and defaults, banks' credit cost ratios have remained at a low level. Likely reasons are that many of the firms that have gone bankrupt or have defaulted are small, that banks have built up precautionary loan-loss provisions, and that some loans are covered by credit guarantees.

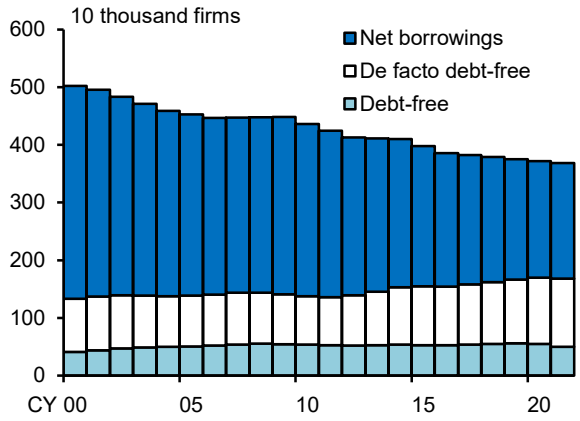
Although the pace of increase in bankruptcies has slowed and credit costs have been limited, as

noted above, it is necessary to pay close attention to uncertainty heightening recently regarding trade policy in each jurisdiction and geopolitical risks. Depending on future developments, global financial and economic activity could be affected significantly, leading to a deterioration in firms' financial conditions. With regard to the magnitude, persistence, and potential transmission channel of these stresses, given that this is an unprecedented case, banks need to closely monitor the effects without any preconception.

Firms' resilience to rising interest rates

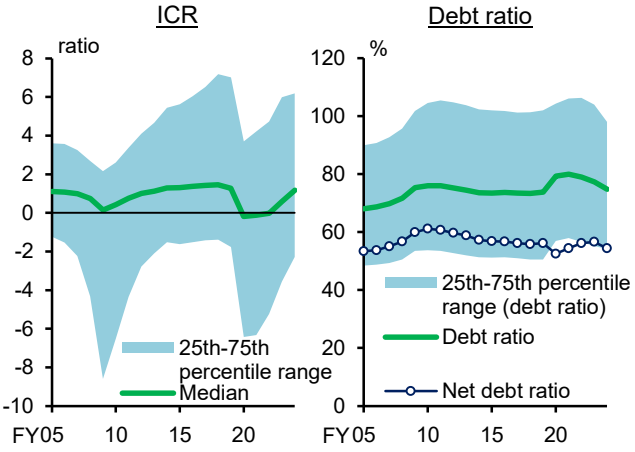
Looking at Japan's corporate sector as a whole, the number of de facto debt-free firms is rising as a trend, while the number of firms with borrowings exceeding cash and deposit holdings is decreasing (Chart IV-1-8). In addition, with corporate profits continuing to improve, the interest coverage ratio (ICR) -- which represents a firm's interest payment capacity -- of firms with borrowings exceeding cash and deposit holdings is increasing overall (Chart IV-1-9). Moreover, as a result of progress in the repayment of loans, including precautionary borrowings obtained during the pandemic, firms' debt ratios have declined, as have their net debt ratios, which subtracts on-hand liquidity from debt.[8]

Chart IV-1-8: Number of firms by borrowing status



Note: Shows the number of privately owned establishments (single unit establishments and head offices) from the "Economic Census for Business Frame/Business Activity" ("Establishment and Enterprise Census" up to CY2006). Decomposed using the shares for each year based on data from the Teikoku Databank. "De facto debt-free" indicates firms with cash and deposits equal to or more than their interest-bearing debt.
Source: Ministry of Internal Affairs and Communications; Teikoku Databank; The Small and Medium Enterprise Agency.

Chart IV-1-9: Financial conditions of firms with net borrowings



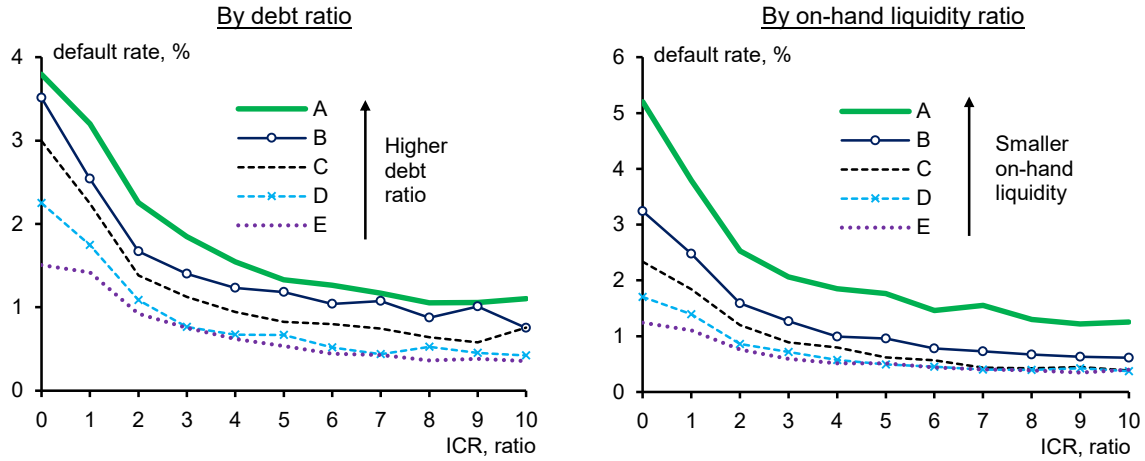
Note: 1. Firms with net borrowings are those with a positive amount of interest-bearing debt less holdings of cash and deposits. Covers SMEs and micro firms (firms with capital of 100 million yen or less).
2. "ICR" is the ratio of the sum of operating profits and interest income to interest payments. "Debt ratio" is the ratio of total borrowings to total assets. "Net debt ratio" is the ratio of total borrowings less on-hand liquidity to total assets.
3. Latest data as of fiscal 2024 (April-September).
Source: CRD Association.

However, the pace of recovery in profits varies, and the default rates of firms with high leverage and firms with limited on-hand liquidity tend to be higher than those of firms with low leverage and firms with ample on-hand liquidity, even if they have the same ICR (Chart IV-1-10). Moreover, for highly leveraged firms, the default rates tend to change in a more nonlinear fashion and more substantially around an ICR of one compared with firms that are not highly leveraged. This nonlinearity can also be found in the relationship between interest rates and actual default rates. Ignoring the effect of economic recovery on lowering the probability of default, estimating changes in the probability of default if interest rates were raised mechanically shows that firms with high

[8] Among liquid assets, on-hand liquidity is defined as the sum of cash, deposits, and short-term securities.

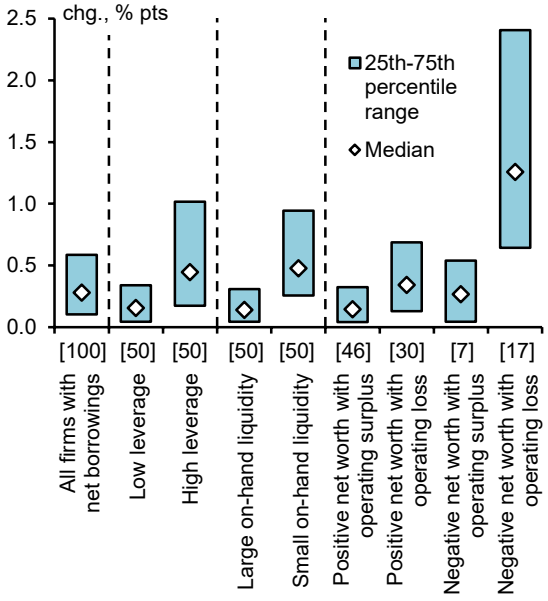
leverage and firms with limited on-hand liquidity tend to be particularly sensitive to rising interest rates (Chart IV-1-11).[9] Even in the event of such a rise in interest rates, the increase in the

Chart IV-1-10: Relationship between ICR and actual default rates



Note: 1. Covers SMEs and micro firms (firms with capital of 100 million yen or less) with net borrowings from fiscal 2004 to 2023.
2. The default rate is calculated based on the annual number of defaults (downgrades to "special attention" or below, etc.).
3. Firms are divided into 5 equally weighted groups based on their debt ratios or their ratios of on-hand liquidity to total assets.
Source: CRD Association.

Chart IV-1-11: Sensitivity of probability of default to interest rates



Note: 1. A probability of default (PD) model is estimated for each firm category, and sensitivity (change in the PD) to a 1 percentage point increase in long- and short-term interest rates is estimated for each firm. Shows the changes in PD from (a) estimates using data for fiscal 2023 to (b) estimates assuming a 1.0 percentage point increase in interest rates for short-term borrowings and floating-rate long-term borrowings, and a 0.5 percentage point increase in deposit interest rates. The estimation period for the PD model is from fiscal 2003 to 2022.
2. Covers SMEs and micro firms (firms with capital of 100 million yen or less) with net borrowings. "High" and "Low" leverage is based on the median debt ratio. "Large" and "Small" on-hand liquidity is based on the median ratio of on-hand liquidity to total assets.
3. Figures in brackets indicate the shares of respective firm categories.
Source: CRD Association; BOJ.

[9] The probability of default was estimated using a default model that explicitly takes into account changes in individual firms' on-hand liquidity during the fiscal year. The dependent variable of the model is a dummy variable representing whether a firm defaults over the next year. A default indicates that a firm has met one of the following conditions within one year for the first time: (1) being delinquent for three months or longer, (2) being downgraded to "special attention" or below, or (3) being subject to subrogation by a credit guarantee corporation. Explanatory variables are the short-term cash surplus/shortage ratio (ratio of the sum of on-hand liquidity at the beginning of each year and net operating cash flow during the year to total assets), the financial leverage (borrowings/total assets), the borrowing interest rate, and the kinked ICR. The estimation period is from fiscal 2003 to fiscal 2022, and the estimation covers SMEs and micro firms with capital of 100 million yen or less. For details of the probability of default model and explanatory variables, see Box 4 of the October 2020 issue of the *Report*.

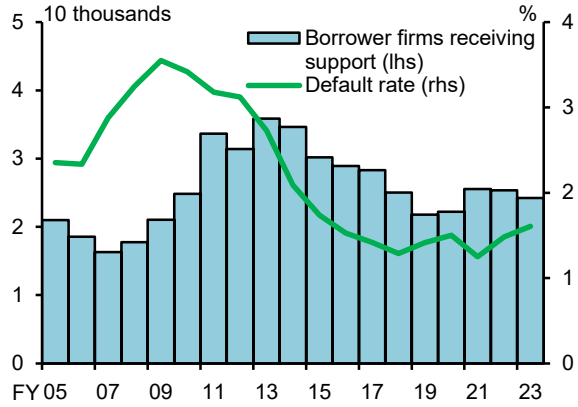
Note that the standard ICR ((operating profits + interest and dividends received) / interest payments) suffers from the technical problem that if the numerator -- i.e., operating profits + interest and dividends received -- is negative, then an increase in the denominator -- i.e., interest payments -- reduces the extent to which the ICR is negative, implying an improvement in the ICR. Therefore, in the analysis here, the kinked ICR is used, which does not suffer from this problem.

probability of default would be limited when looking at firms with borrowings exceeding cash and deposit holdings as a whole. Nevertheless, the credit management of financially vulnerable firms continues to warrant attention.

Developments among firms receiving support to improve their business

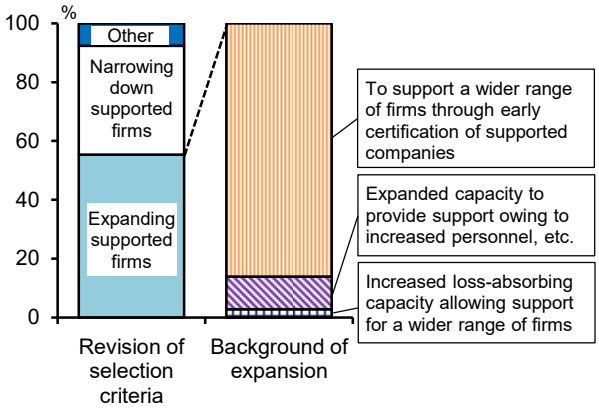
With corporate bankruptcies and defaults exceeding pre-pandemic levels, the importance of business improvement and revitalization support activities for firms by banks is growing.[10] While the number of firms receiving such support from regional banks peaked after the global financial crisis and had subsequently been on a downward trend, it started to increase again due in part to efforts to expand the number of recipient firms following the outbreak of the pandemic (Charts IV-1-12 and IV-1-13).

Chart IV-1-12: Number of borrower firms receiving business improvement support by regional banks



Note: "Default rate" covers all regional banks I borrowers (based on the classification "in danger of bankruptcy").
Source: Regional Banks Association of Japan.

Chart IV-1-13: Regional banks' policies for selecting firms receiving business improvement support



Note: Based on results of a questionnaire on business, risk management, etc. conducted in fiscal 2024. Shows the revision policies and background of the revision for regional banks that have revised their selection criteria in fiscal 2023 or plan to do so in fiscal 2024.
Source: BOJ.

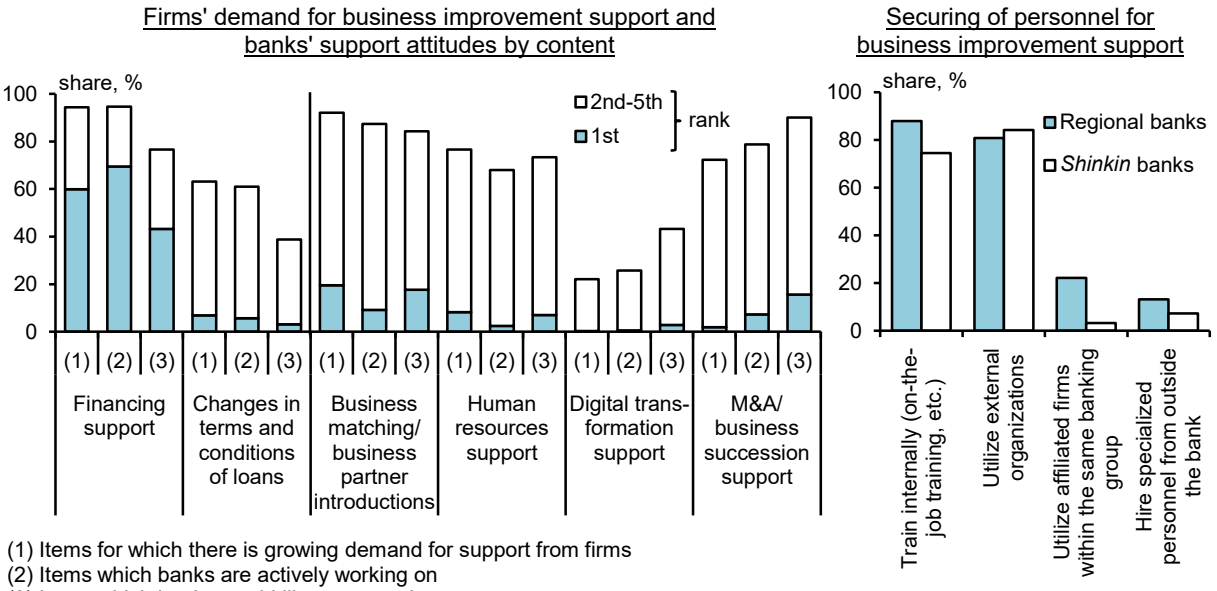
In addition to providing financing support, regional and *shinkin* banks are proactively working on a wide range of support services for which there is strong demand among their client firms, such as business matching services, business partner introductions, and human resources support (left panel of Chart IV-1-14). Banks' commitment and early and fundamental support likely has a substantial impact on the finances of firms receiving business improvement support. By extracting firms receiving business improvement support from a corporate financial database based on whether the data cell on firm's attributes contains expressions such as "business improvement support" and "improvement plan," a considerable number of supported firms show greater improvement in their operating profits to sales ratio, compared with non-supported firms (firms with similar financial conditions that did not receive support), although significant variations exist in the outcome (Chart IV-1-15).[11] Furthermore, the results suggest that the smaller the number of

[10] See, for instance, the Financial Services Agency (FSA), "Situation and Challenges for Regional Banks to Provide Better Services for Their Corporate Clients," June 2024 (available in Japanese). Furthermore, in March 2024, the Ministry of Economy, Trade and Industry, the FSA, and the Ministry of Finance formulated a document on comprehensive measures to support business revitalization, and requested banks to further support firms' business improvement and revitalization in a proactive manner.

[11] Even in an academic research, out-of-court debt workouts that accompany, for example, drastic debt restructuring are likely to lead to improvements in business performance after the workouts, due to the resolution of debt overhang and the reduction of moral hazard. For details, see Honda, T., Ono, A., Uesugi, I., and Yasuda, Y., "Anatomy of Out-of-court Debt Workouts for SMEs," *RIETI Discussion Paper Series*, 23-E-088, December 2023.

financial institutions that firms transact with, the greater is the improvement in their finances. It is important for banks to continue to appropriately assess borrowers' business conditions and provide support that addresses the root of their issues early. Moreover, they should also proceed with establishing and improving frameworks for providing business support, including with regard to attracting and retaining human resources (right panel of Chart IV-1-14).

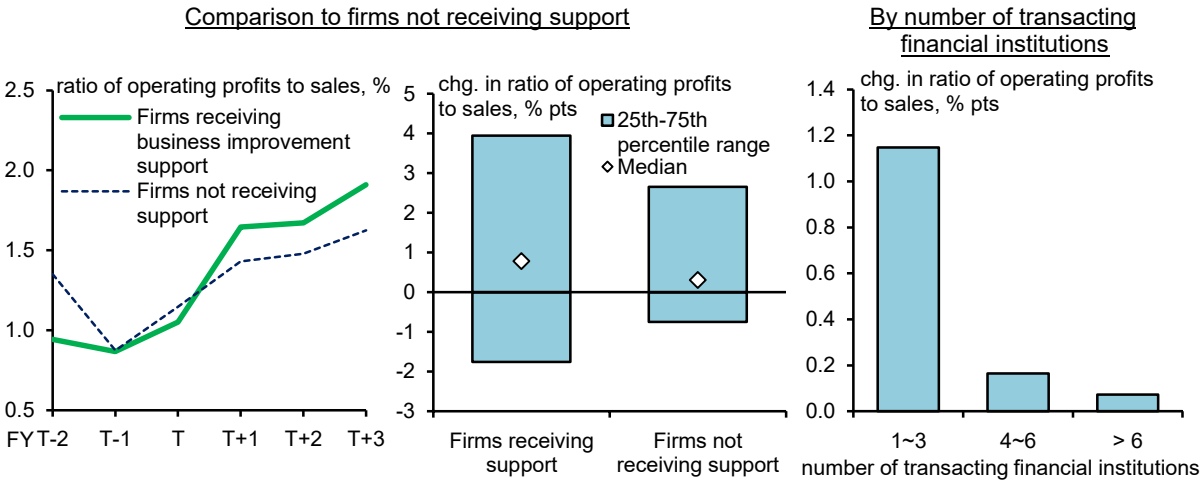
Chart IV-1-14: Challenges in enhancing the effectiveness of business improvement support



(1) Items for which there is growing demand for support from firms
(2) Items which banks are actively working on
(3) Items which banks would like to strengthen

Note: Shows results of a questionnaire on business, risk management, etc. conducted in fiscal 2024 (covers regional and *shinkin* banks). In the left-hand chart, banks chose the top 5 items regarding (1) to (3), ranked in order of relevance. The left-hand chart shows the shares of banks that chose each item as either their 1st or 2nd-5th choice among valid responses. The right-hand chart represents the percentage of valid responses among surveyed banks.
Source: BOJ.

Chart IV-1-15: Changes in financial conditions of firms receiving business improvement support

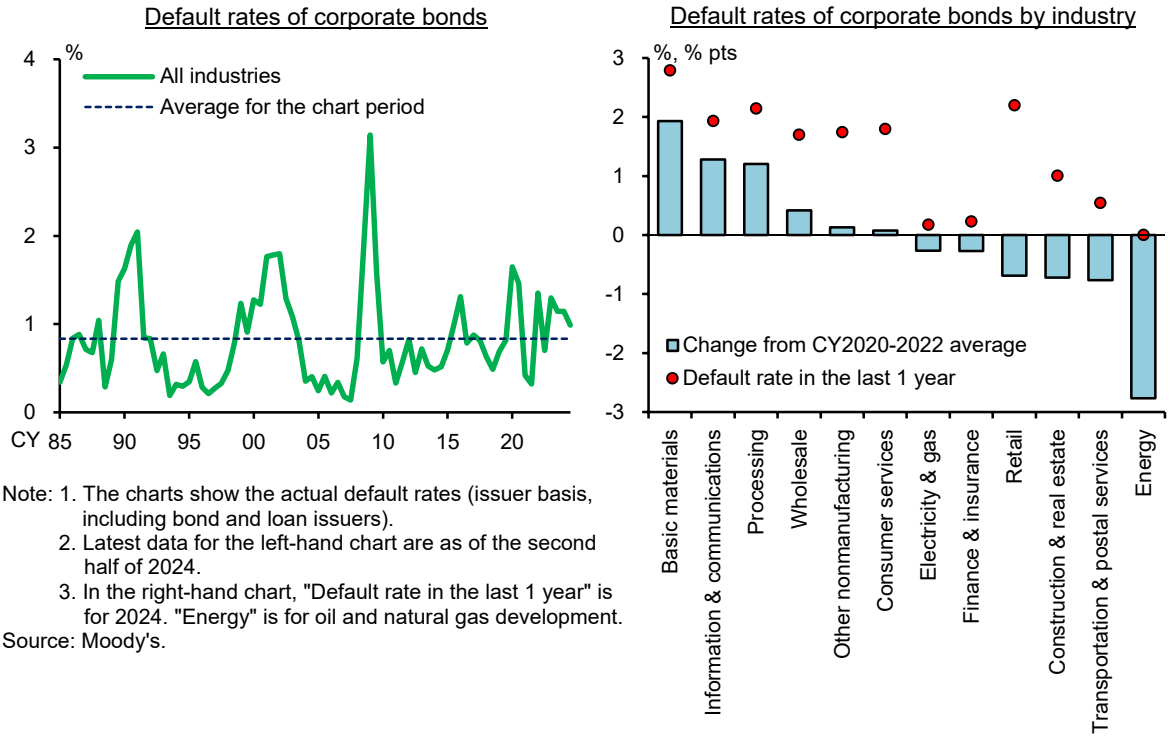


Note: 1. "Firms not receiving support" (i.e., the control group) are selected as firms in the same industry, of the same size, and with a similar ratio of operating profits to sales in the fiscal year prior to the start of the support as "Firms receiving business improvement support" (i.e., the treatment group). The sample period is from fiscal 2001 to 2021. "T" represents the fiscal year in which the business improvement support began for firms receiving support (for firms not receiving support, "T" represents the same fiscal year as that for the corresponding support-receiving firm).
2. The middle and right-hand charts show the degree of improvement in ratio of operating profits to sales 3 years after the start of the business improvement support (i.e., "T+3").
Source: Teikoku Databank.

2. Foreign credit risk

Corporate bond default rates overseas have declined slightly from the last half-year and have generally been at past average levels (Chart IV-1-16). By industry, compared with default rates during the pandemic, the rates have declined in the retail and the transportation and postal services industries, which had temporarily been severely affected by the pandemic, while they have increased in the basic materials and information and communications industries.

Chart IV-1-16: Default rates of corporate bonds

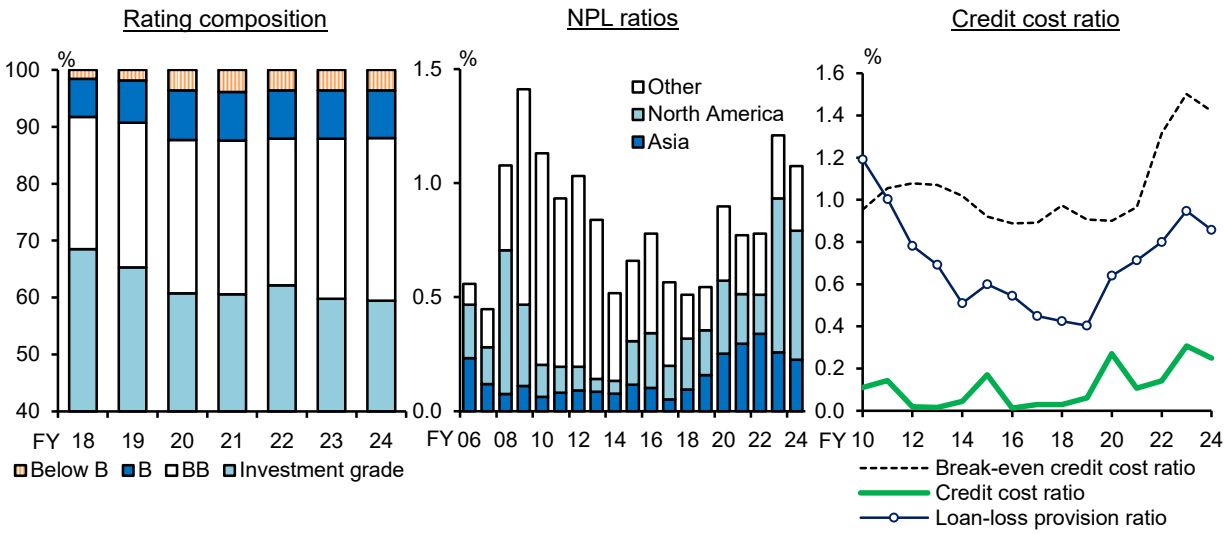


Note: 1. The charts show the actual default rates (issuer basis, including bond and loan issuers).
2. Latest data for the left-hand chart are as of the second half of 2024.
3. In the right-hand chart, "Default rate in the last 1 year" is for 2024. "Energy" is for oil and natural gas development.
Source: Moody's.

Under these circumstances, Japanese banks' foreign credit risk has remained low (Chart IV-1-17). Non-performing loan (NPL) ratios and credit cost ratios have declined, and the share of investment grade loans has remained high. Loan-loss provision ratios have been at relatively high levels, partly due to an increase in loan-loss provisions reflecting the correction in the U.S. real estate market and forward-looking loan-loss provisioning. The break-even credit cost ratio of banks' international business (net interest income on foreign loans/foreign loans outstanding) remains relatively high, and even if considerable credit costs were to be incurred, they could be absorbed by net interest income. However, with uncertainty heightening regarding the formulation of trade and other economic policies in each jurisdiction and geopolitical risks, banks need to be highly vigilant in managing risks, especially those associated with loans to low-rated borrowers and large loans.

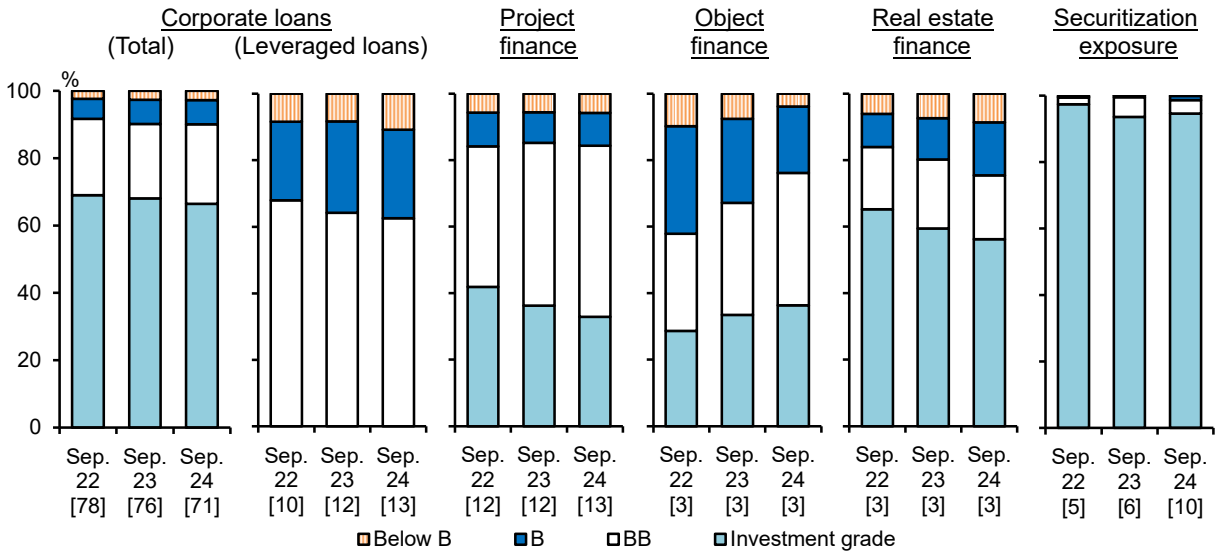
The composition of foreign loans' credit ratings by type of product shows that the quality of banks' foreign loan portfolios has been maintained on the whole (Chart IV-1-18). Investment grade loans have continued to account for almost 70 percent of corporate loans overall, and the effects of increases in firms' interest payments due to past interest rate rises in the United States have been limited so far. The share of investment grade loans in object finance loans has risen due to an improvement in aircraft-related demand. On the other hand, the rating composition of leveraged loans, which entail relatively high risk, project finance loans, and real estate financing (non-recourse loans) have deteriorated slightly. Banks need to continue to carry out cautious risk management for these loans, including from the perspective of resilience to rising interest rates.

Chart IV-1-17: Credit costs of foreign loans



Note: 1. Covers the three major banks (on a non-consolidated basis). The left-hand chart is based on internal ratings of each bank.
2. The right-hand chart covers the international business of the three major banks. "Break-even credit cost ratio" is the ratio at which credit costs equal net interest income on loans.
3. Latest data as of the first half of fiscal 2024.
Source: Published accounts of individual banks; BOJ.

Chart IV-1-18: 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.

B. Market risk associated with securities investment

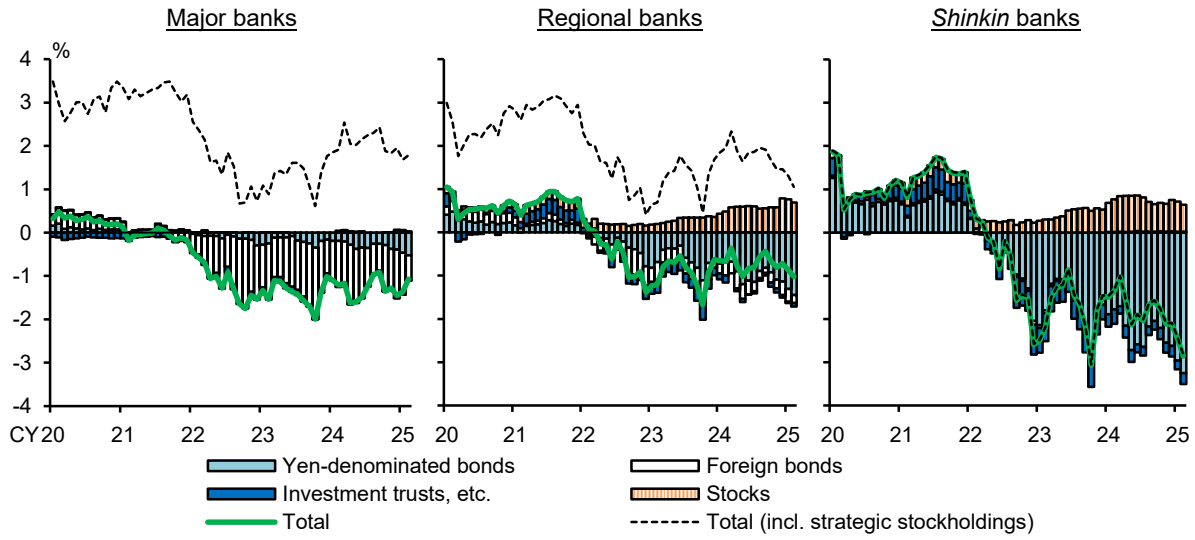
Interest rate risk

Banks' securities portfolios show that, with yen interest rates rising since last autumn, valuation losses on securities had been increasing somewhat as of the end of February (Chart IV-2-1).[12] However, banks' overall interest rate risk-to-capital ratio -- which is calculated by adding the interest

[12] While valuation losses on yen-denominated bonds have increased, the roll-down effect on bondholdings has become more likely to materialize, as the yield curve in the yen-denominated bond market has steepened over the past year. This seems likely to be effective in limiting future valuation losses.

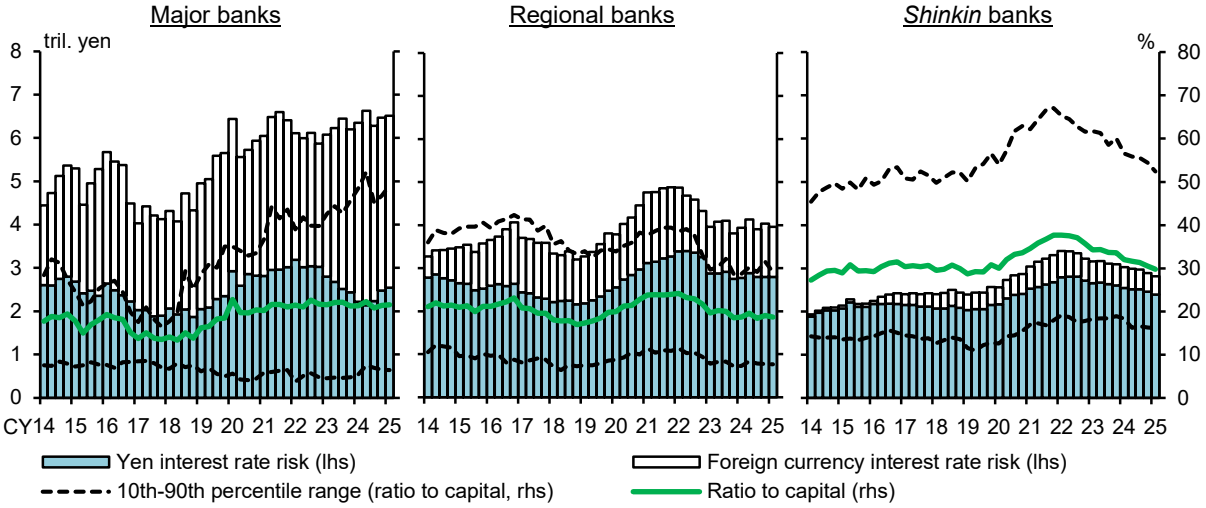
rate risk associated with yen-denominated bonds and that associated with foreign bonds -- has generally been unchanged (Chat IV-2-2). Banks' interest rate risk on yen-denominated bonds as a whole has been suppressed compared to before as holdings of yen-denominated longer-term bonds have declined and some banks have hedged interest rate risk by using interest rate swaps and inverse mutual funds (left panel of Chart IV-2-3). The amount of interest rate risk associated with foreign bonds has been more or less flat (middle panel of Chart IV-2-3). Uncertainty regarding developments in domestic and foreign interest rates has remained high, given that situation regarding trade policy in each jurisdiction and geopolitical risks remain uncertain. Banks will need to manage their interest-rate portfolios appropriately while considering their loss-absorbing capacity based on various assumptions regarding market fluctuations.

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



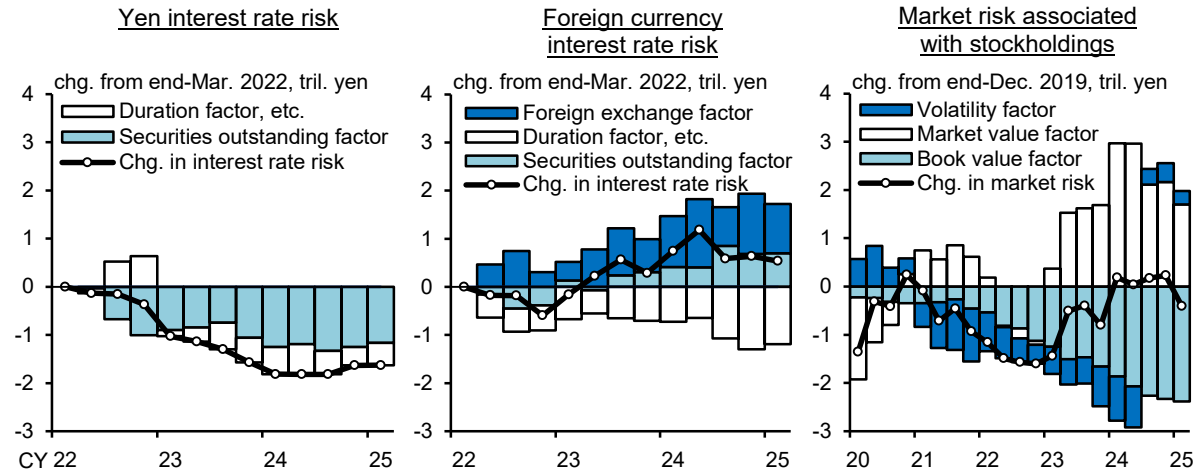
Note: Shows ratios to risk-weighted assets. The contribution of "Stocks" excludes strategic stockholdings. Latest data as of end-February 2025.
Source: BOJ.

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



Note: "Yen interest rate risk" is a 100 BPV and "Foreign currency interest rate risk" is a 200 BPV. Off-balance-sheet transactions and investment trusts outstanding are taken into account (for major banks, only off-balance-sheet transactions in foreign currencies are taken into account). Latest data as of 2025/Q1 (end-February).
Source: BOJ.

Chart IV-2-3: Factors affecting changes in risks associated with securities holdings

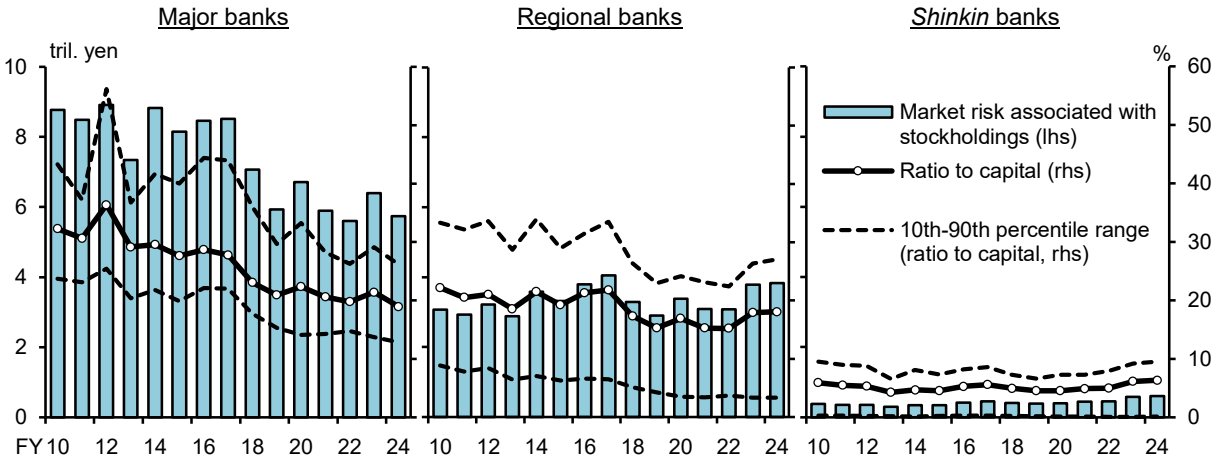


Note: Covers major, regional, and *shinkin* banks. See Charts IV-2-2 and IV-2-4 for details on each risk. "Duration factor, etc." includes the contribution of off-balance-sheet transactions and investment trusts outstanding. Latest data as of 2025/Q1 (end-February).
Source: BOJ.

Market risk associated with stockholdings

Market risk associated with stockholdings has been more or less unchanged (Chart IV-2-4). Recent developments show that while the decline in strategic stockholdings has been containing market risk associated with stockholdings, the rise in stock price volatility has worked in the direction of increasing the market risk (right panel of Chart IV-2-3). For major banks and regional banks, the amount of market risk has been at around 20 percent of their capital. Although the rise in stock prices since 2023 has contributed to the improvement in banks' room for realizing gains, developments in stock prices are highly volatile and could potentially have a non-negligible impact on their balance sheets and profits. Banks therefore need to make an objective assessment of the costs and benefits of stockholdings from various perspectives, such as the risk and return associated with their stockholdings, corporate governance, and regulatory compliance. Furthermore, they need to keep the market risk associated with stockholdings within an appropriate range, in line with their loss-absorbing capacity.

Chart IV-2-4: Market risk associated with stockholdings

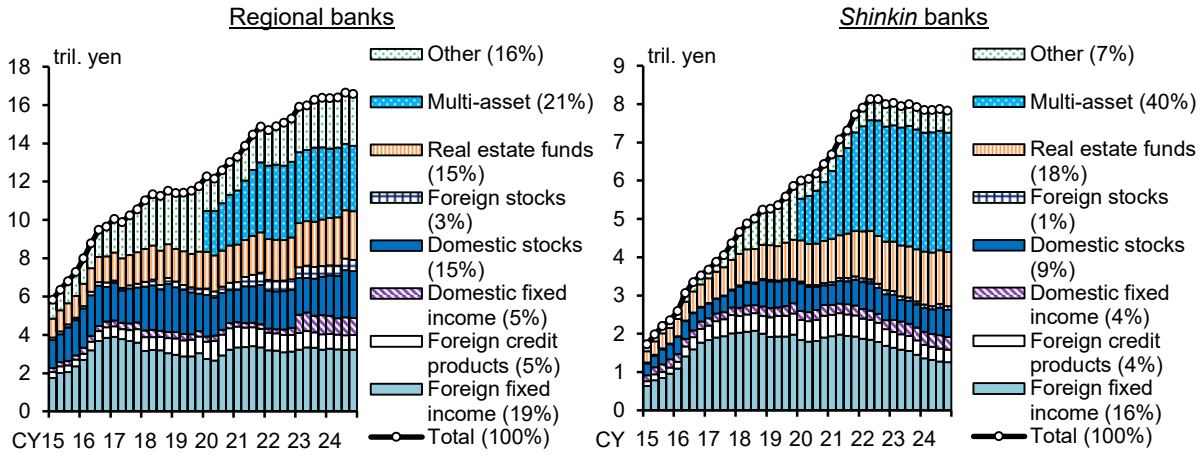


Note: 1. "Market risk associated with stockholdings" is VaR with a 99 percent confidence level and a 1-year holding period, and excludes risk associated with foreign currency-denominated stockholdings. Latest data as of fiscal 2024 (end-February 2025).
2. "Ratio to capital" is calculated using CET1 capital 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.

Diversification in market risks

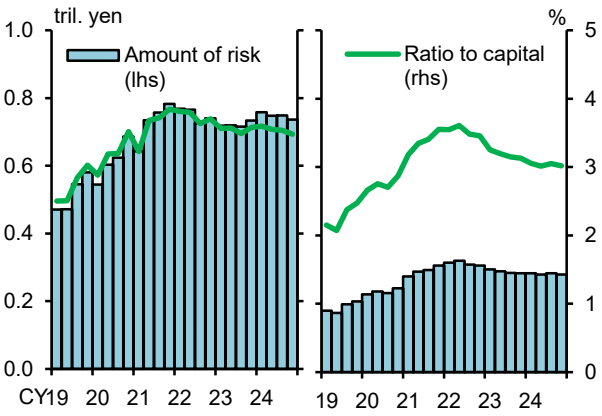
An increasing number of regional and *shinkin* banks have used investment trusts for securities investments under the prolonged low interest rate environment and are exposed to various risk factors (Chart IV-2-5). However, given the significant changes in financial conditions at home and abroad, regional and *shinkin* banks have become more cautious toward taking interest rate risk through multi-asset investment trusts and foreign fixed income investment trusts, and on average they have restrained the amount of risk related to real estate investment funds (Chart IV-2-6).[13]

Chart IV-2-5: Breakdown of outstanding amount of investment trusts, etc.



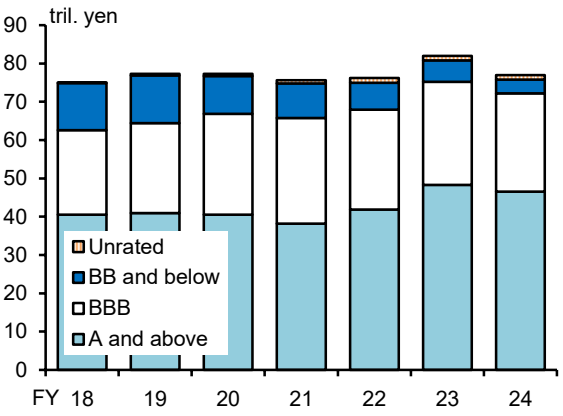
Note: 1. Based on book values. The figures in parentheses indicate the share of the respective product types in the latest period. Latest data as of 2024/Q4.
2. Up to 2019/Q4, "Other" includes "Multi-asset."
Source: BOJ.

Chart IV-2-6: REIT risk



Note: "Amount of risk" is VaR with a 99 percent confidence level and a 1-year holding period. Latest data as of 2024/Q4.
Source: BOJ.

Chart IV-2-7: Foreign credit product investment by rating



Note: Covers major banks, Japan Post Bank, and a central organization of financial cooperatives. Latest data as of end-September 2024.
Source: BOJ.

As for the outstanding amount of investment in foreign credit products, banks have overall been cautious in their risk-taking, preferring products with a high rating (Chart IV-2-7). With uncertainty

[13] On the other hand, there have been increases in investment by some regional and *shinkin* banks in private equity (PE) funds, which invest in stocks of unlisted firms, such as business restructuring and succession funds that invest in regional firms. PE funds are characterized by long-term investments that are difficult to terminate early or sell in the secondary market; however, there is considerable heterogeneity in the investment strategies of PE funds and the life stages of firms that they invest in, and therefore, it is difficult to accurately grasp the mark-to-market value in a timely manner. Banks that intend to make greater investments in PE funds need to put in place risk management structures that take such characteristics into account.

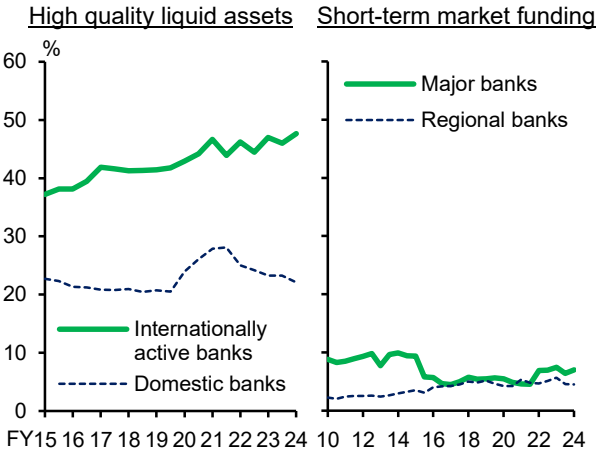
heightening regarding the formulation of economic policy in each jurisdiction and geopolitical risks, banks that engage in foreign credit product investment need to continuously increase the sophistication of their risk management while paying attention to changes in recent economic and price developments and interest rates.

C. Funding liquidity risk

Yen funding liquidity risk

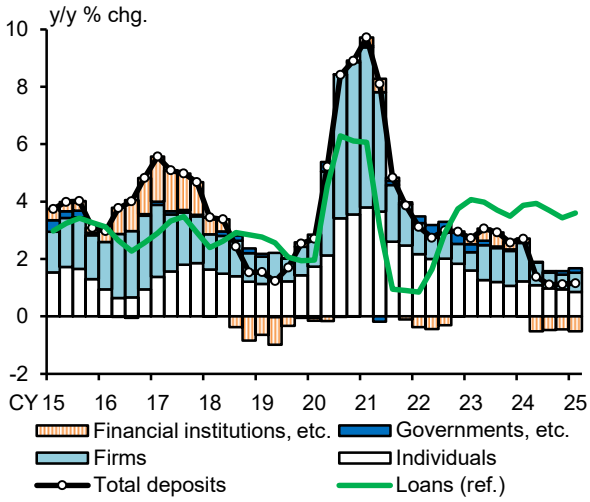
In terms of their yen funding, banks have stable funding bases, mainly backed by small, sticky retail deposits, and have ample liquidity. Deposits outstanding far exceeds loans outstanding, and banks have secured yen funding at low interest rates. Moreover, whereas a large portion of the loan-to-deposit gap is composed of highly liquid assets such as Japanese government bonds (JGBs) and deposits with the Bank, short-term market funding that matures within one month has been limited relative to the amount of total assets (Chart IV-3-1). Banks have secured liquid assets that greatly exceed the amount of fund outflows expected in the event of stress, and on the whole are sufficiently resilient to short-term liquidity stress.

Chart IV-3-1: Liquid asset ratio



Note: 1. Shows ratios to total assets of domestic business. Covers major and regional banks. Latest data as of the first half of fiscal 2024.
2. Data for internationally active banks and major banks are reported by banks. Data for domestic banks and regional banks are estimated using outstanding amounts by financial assets and liabilities, etc.
Source: BOJ.

Chart IV-3-2: Deposits outstanding by type of depositor

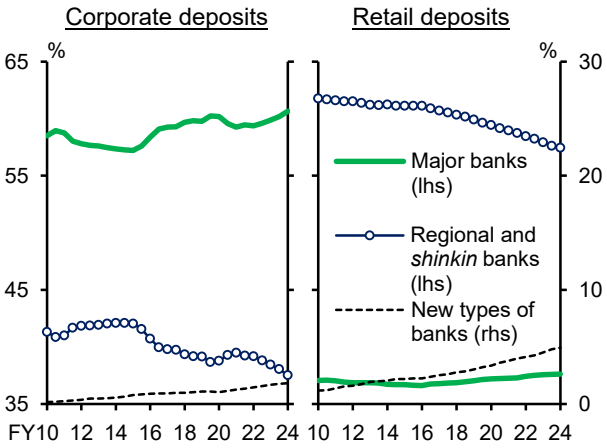


Note: Covers domestically licensed banks and *shinkin* banks. Latest data as of 2025/Q1 (January-February).
Source: BOJ.

Looking at deposits outstanding by type of depositor, deposits from both individuals and firms have continued to grow; however, the pace of increase has decelerated somewhat recently (Chart IV-3-2). While corporate deposits have continued to rise on the back of increased sales, factors such as the withdrawal in government support measures and subsidies and the increase in corporate tax payments have put downward pressure on deposits. The rate of increase in retail deposits has recently been more or less unchanged: while the increase in household spending and the shift to assets under custody exerted downward pressure, retail deposits continued to grow due to continued increases in wages, including winter bonuses. Meanwhile, deposits by financial institutions have declined since short-term market interest rates have turned positive, as insurance companies, etc. have started to withdraw demand deposits to use the funds for market investments.

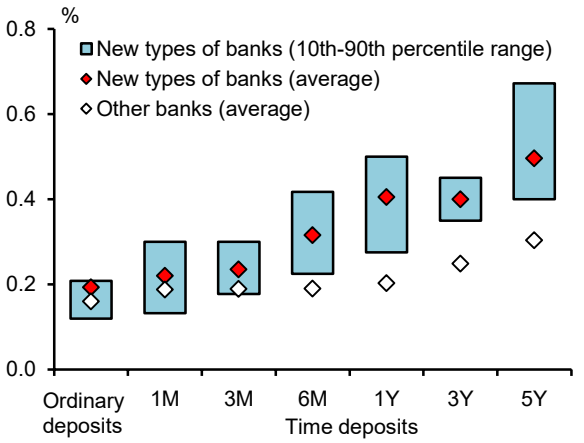
From a somewhat longer-term perspective, it warrants attention that some banks may gradually find it difficult to secure deposits due to structural factors such as demographic changes and the spread of digital channels, depending on the regional characteristics of their customer base and their progress toward digitalization. In fact, reflecting changes in deposit amounts due to population decline and the transfer of inherited deposits, the share of regional banks and *shinkin* banks in total deposits has been declining, while that of major banks has been increasing (Chart IV-3-3). Moreover, with advances in the digitalization of customer services, such as the provision of services through online banking and mobile applications, the share in deposits of internet-only banks, which tend to offer higher deposit interest rates, has been increasing (Chart IV-3-4). Regional banks have also been making efforts to enhance the use of digital channels, for instance, the swift and widespread introduction of mobile applications among many regional banks in around 2017. Regional banks that were quicker to adopt mobile applications appear to have seen faster growth in outstanding deposits (Chart IV-3-5). With the expansion in financial services using digital channels, it is important that banks continue their efforts to secure stable customer bases while improving the convenience of their services.

Chart IV-3-3: Share of deposits by type of bank



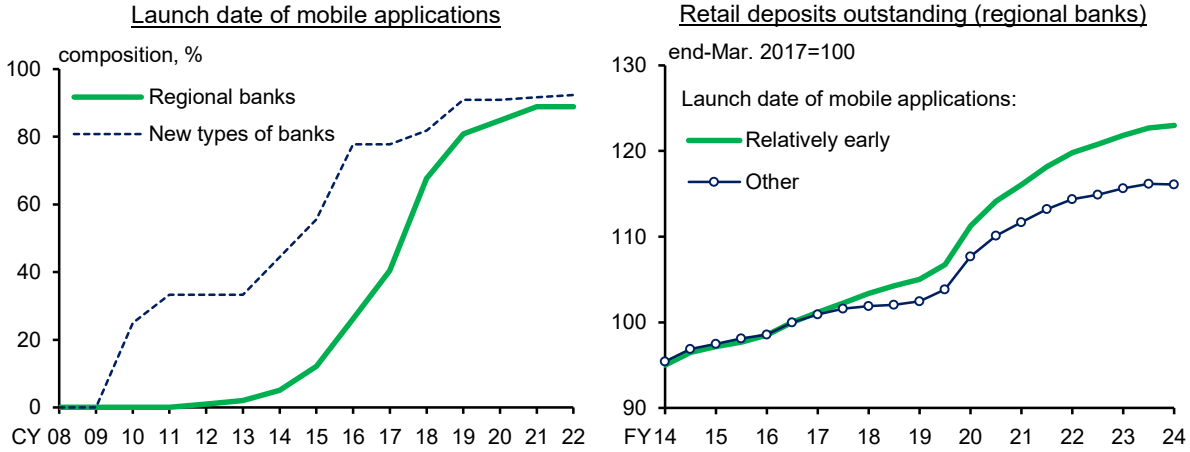
Note: Latest data as of the first half of fiscal 2024.
Source: BOJ.

Chart IV-3-4: Deposit interest rates at new type of banks



Note: Indicates the interest rates posted at banks. Data as of March 2025.
Source: BOJ.

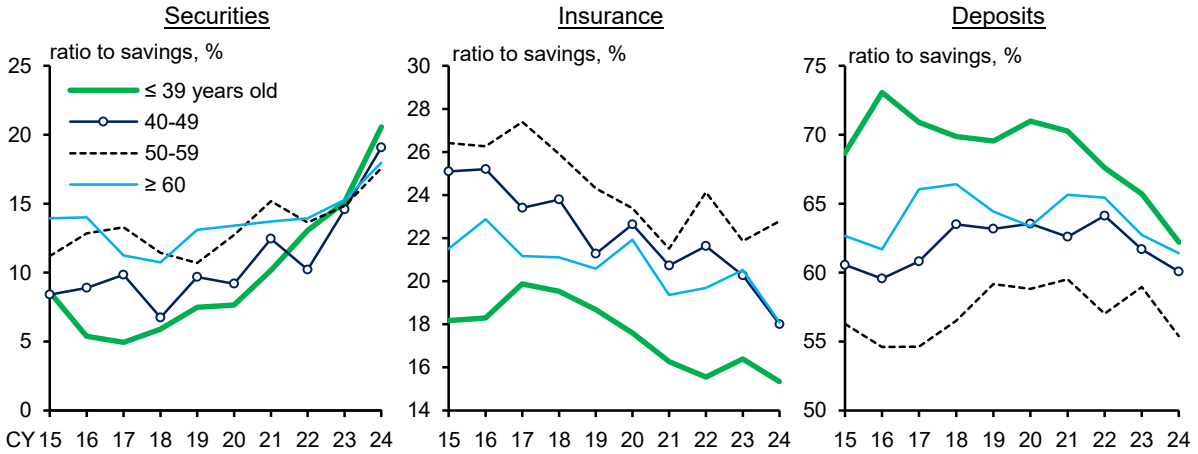
Chart IV-3-5: Provision of services through mobile applications and deposits outstanding



Note: Launch dates of mobile applications are based on a survey by the Bank (as of end-March 2022). For details, see "Provision of Mobile Applications and Management Systems at Financial Institutions -- Based on the results of questionnaire survey --," *Financial System Report Annex Series*, November 2022 (available in Japanese). In the right-hand chart, "Relatively early" refers to the 45 banks that had launched mobile applications by February 2018. Latest data as of the first half of fiscal 2024.
Source: BOJ.

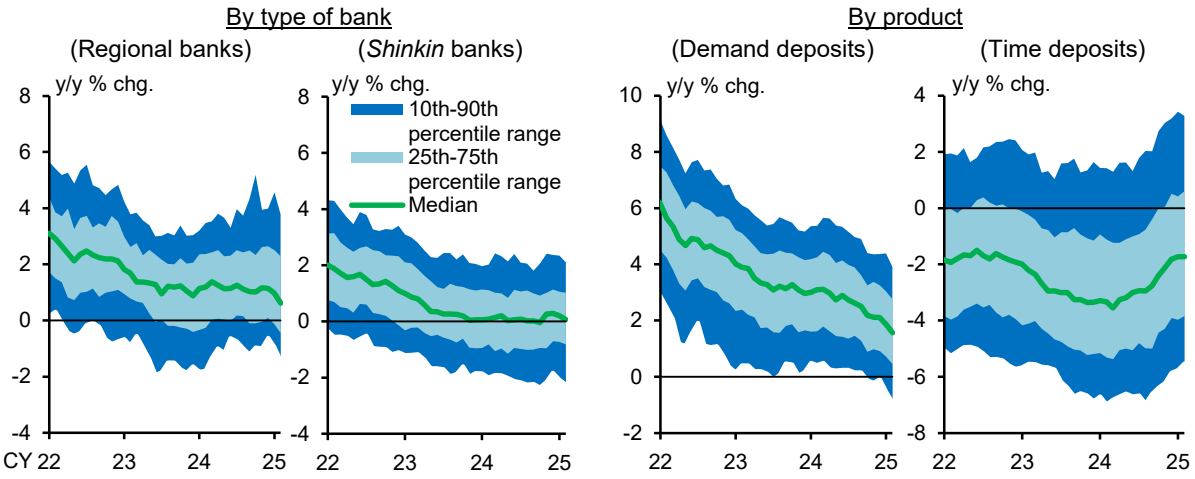
Depending on developments in financial conditions, it is also possible that households' preferences for deposits may change. In fact, since the introduction of the installment-type Nippon Individual Savings Account (NISA) program in 2018, the share of securities holdings in households' overall savings has been on an upward trend, especially among younger households (Chart IV-3-6). Given that the spread of online banking has made it easier to change the composition of assets, it is possible that households might be becoming more sensitive than in the past to yield differentials on assets, and the amount of deposits is prone to change accordingly. Looking at the distribution of year-on-year changes in deposits for regional banks and *shinkin* banks shows that so far there has been no pronounced downward shift; however, attention needs to be paid to the possibility that developments in deposits might differ across individual banks due to differences in their business environment (Chart IV-3-7).

Chart IV-3-6: Assets by age group



Note: Covers two-or-more-person working households. Savings refers to the sum of deposits, securities, insurance (total paid-up), and savings at non-financial institutions (mutual aid associations, etc.). Latest data as of 2024 (January-September).
Source: Ministry of Internal Affairs and Communications.

Chart IV-3-7: Distribution of year-on-year changes in deposits



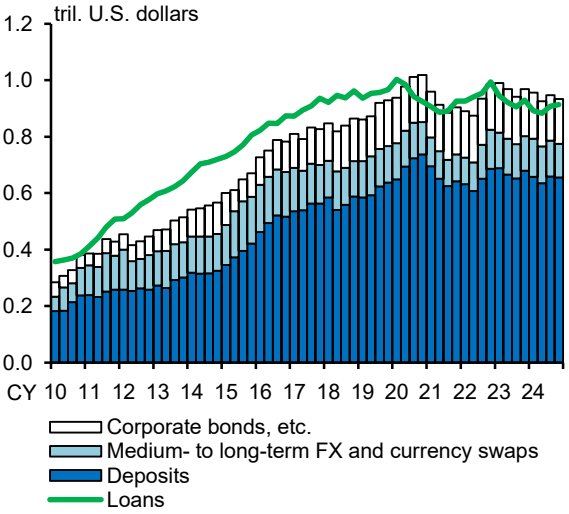
Note: Covers regional and *shinkin* banks. Latest data as of February 2025.
Source: BOJ.

Foreign currency funding liquidity risk

Banks have maintained stable foreign currency funding in view of uncertainty over future financial and economic conditions. 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

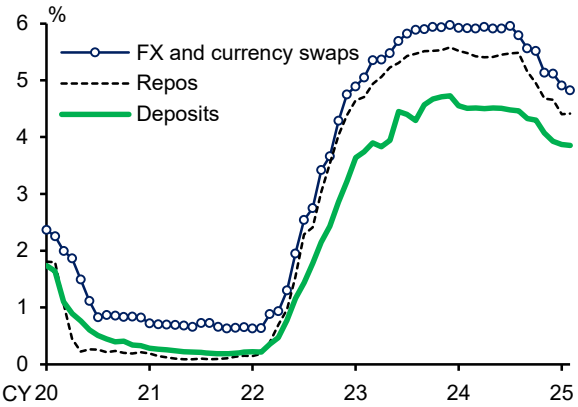
loans (Chart IV-3-8). Meanwhile, dollar funding costs were at a high level, but have declined somewhat since the second half of 2024, following the policy interest rate cut in the United States (Chart IV-3-9).

Chart IV-3-8: 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 2024/Q4.
Source: BOJ.

Chart IV-3-9: Dollar funding cost



Note: Shows the median values. Covers major banks. Latest data as of February 2025.
Source: BOJ.

V. The financial cycle and challenges following changes in the business environment

- 12 out of the 14 Financial Activity Indexes (FAIXs) in the heat map are "green," and the financial gap, which captures the financial cycle, has narrowed compared to a while ago. Although, the pace of increase in stock and real estate prices, from a somewhat longer-term perspective, continues to warrant attention, overall, there are no signs of overheating in asset markets and financial institutions' credit activities.
- Real estate prices have been rising, especially in major metropolitan areas. This is likely due to the substantial rise in construction costs caused by the surge in material costs and labor shortages, as well as expectations of firm demand and rising rents reflecting the gradual recovery of the economy and population inflows into major urban areas. However, since expected returns and risk premiums of commercial real estate have recently been declining, developments in real estate markets continue to warrant attention.
- Although depository financial institutions are dominant in financial intermediation in Japan, the links between (1) the domestic banking sector and financial markets, and (2) the foreign non-bank financial intermediary (NBFI) sector have strengthened. There has been a significant increase in investments and loans by domestic banks in the foreign NBFI sector, especially on investment funds and fund finance. In addition, there has been a marked increase in investments in Japanese stocks and bonds by foreign NBFIs, especially investment funds. As a result, Japan's financial system may have become more susceptible to fluctuations in global financial markets and the influence of foreign investment funds. Keeping these points in mind, banks need to identify and manage risks associated with securities holdings.
- Banks are required to continue to manage effectively risks regarding digital technologies and those related to climate change.

This chapter examines whether there have been significant financial imbalances in the financial system in Japan, paying attention to the interconnectedness between (1) financial markets and the real economy and (2) banks' behavior. It will also summarize the risks and vulnerabilities regarding the NBFI sector and the interconnectedness between Japan's financial system and the NBFI sector, taking into account the recent growing presence of the NBFI sector in Japan and abroad. Finally, it will discuss changes in the business environment that banks are currently facing, such as innovation in digital technologies and climate change initiatives.

A. Domestic financial cycle

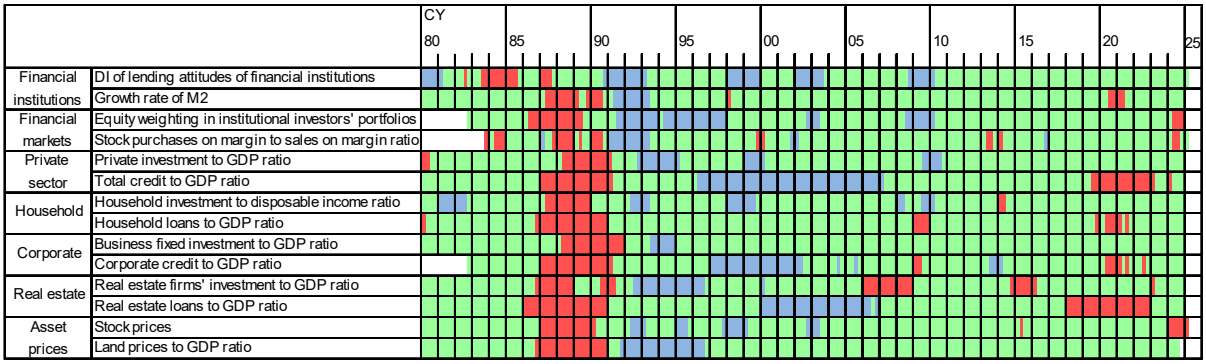
1. The financial cycle and risks to economic growth

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 FAIXs point to an overheating or contraction of activity using the bubble period in the late 1980s as reference, indicating financial conditions in three different colors (Chart V-1-1).[14] The latest heat

[14] The heat map in Chart V-1-1 represents a mechanical assessment of whether financial activity is overheating or

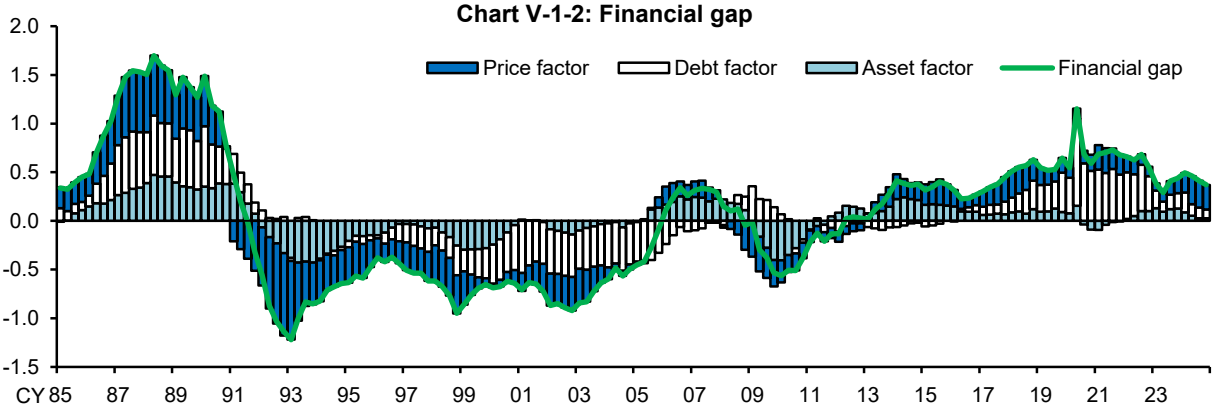
map, as of the end of March, shows that, although 2 of the FAIXs related to the stock market are "red," 12 out of the 14 FAIXs are "green."[15] The financial gap -- a summary measure of the 14 FAIXs that is calculated as the weighted average of the deviations of the 14 FAIXs from their trends -- shows that the gap has remained positive but has become narrower than a while ago (Chart V-1-2).[16] A breakdown of the financial gap shows that the contribution of the "debt factor" has been on a declining trend; this is because, while credit extended by banks, which is the numerator, has continued to increase, nominal GDP, which is the denominator that shows the level of economic activity, has grown at a faster pace. The contribution of the "debt factor" has been low compared to around 2019, before the pandemic. The contribution of real investment (included in "asset factor" in the chart) has remained limited. Thus, no major financial imbalances, such as an overheating or a contraction, have been seen in the current financial activities.

Chart V-1-1: 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 2025/Q1. Those for "Land prices to GDP ratio" and the other indexes are as of 2024/Q3 and 2024/Q4, respectively.
Source: Bloomberg; Cabinet Office; Japan Real Estate Institute; Ministry of Finance; Tokyo Stock Exchange; BOJ.

Chart V-1-2: 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 2024/Q4 (land prices to GDP ratio is imputed by the previous period's value).
Source: BOJ.

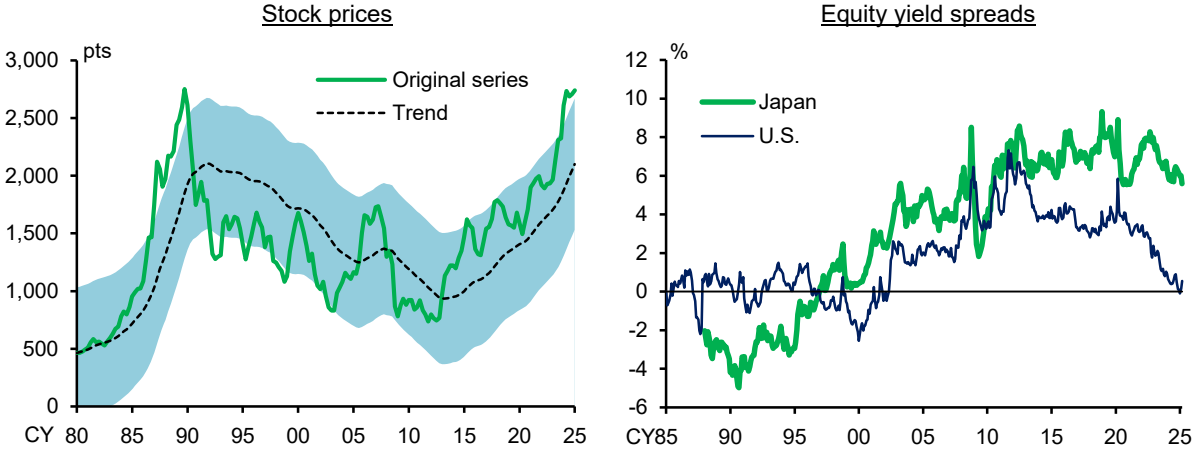
contracting. Specifically, the colors represent the following: (1) red indicates that an index is above its upper threshold; (2) blue indicates that an index is below its lower threshold; (3) green indicates no signs of either extreme; and (4) white indicates that no data for that period are available. For details of 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.

[15] Looking at changes from the previous *Report,* the *stock purchases on margin to sales on margin ratio* was "red" before but most recently has turned "green."

[16] In Chart V-1-2, which shows the financial gap, 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.

However, the pace of increase in the price of assets, from a somewhat longer-term perspective, has continued to warrant attention. As for the stock market, *stock prices* and the *equity weighting in institutional investors' portfolios* in the heat map are "red," and the contribution of asset prices such as stock prices (included in "price factor" in Chart V-1-2) to the positive financial gap has been high (Charts V-1-1, V-1-2, and left panel of Chart V-1-3).[17] Price-earnings (P/E) ratios have remained at their historical average and equity risk premiums in terms of yield spreads, i.e., the difference between expected equity yields and 10-year Japanese government bond (JGB) yields, have generally been flat, despite rising interest rates, and there is no significant overheating in terms of stock valuations (Charts II-2-10 and right panel of V-1-3). However, since early April, stock prices have been fluctuating significantly, with uncertainty heightening regarding, for example, the effects on global economic and financial conditions of trade policy in each jurisdiction. Continued attention is warranted to the possibility of stock prices in Japan being affected when a major correction in market participants' views regarding future developments and an unwinding of their investment positions takes place in international financial markets (see Chapter II and section B of Chapter V for volatility risk in asset prices triggered by adjustments in foreign markets).

Chart V-1-3: Stock market-related indicators



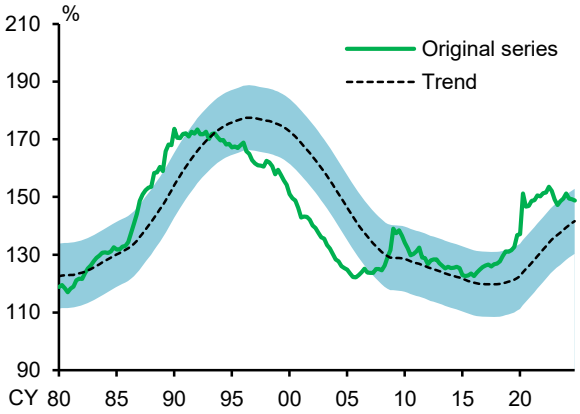
Note: 1. In the left-hand chart, "Trend" is calculated using the one-sided HP filter. The shaded area indicates 1.5 times the root mean square of the deviation from the trend. Latest data as of 2025/Q1.
2. In the right-hand chart, yield spreads are calculated as expected returns minus 10-year government bond yields. Expected return for Japan and the U.S. are based on expected EPS for the next 12 months of the TOPIX and the S&P 500, respectively. Latest data as of end-March 2025.
Source: Bloomberg; Haver Analytics; LSEG; Ministry of Finance.

Furthermore, looking at the developments in the financial gap from a medium- to long-term perspective, the expansionary phase of the gap, which started in the early 2010s, has continued to date. Although *total credit to GDP ratio* has remained within its trend, its uptrend has been continuing, which could result in balance sheet adjustment pressures and increase the tail risk of an economic downturn (Chart V-1-4). Looking at the probability distribution of future GDP growth rates over the next three years using "GDP-at-risk" (GaR) shows that the distribution remains skewed to the left, toward an economic downturn, almost to the same extent as before the

[17] An analysis using data from 17 countries, including the G7 countries, on the degree to which an index in a heat map turning "red" predicts a future banking crisis showed that while *stock prices* on their own did not have high predictive power, their predictive power tended to rise when they signaled "red" at the same time as the *total credit to GDP ratio*. For details, see Box 1 in the April 2021 issue of the *Report*.

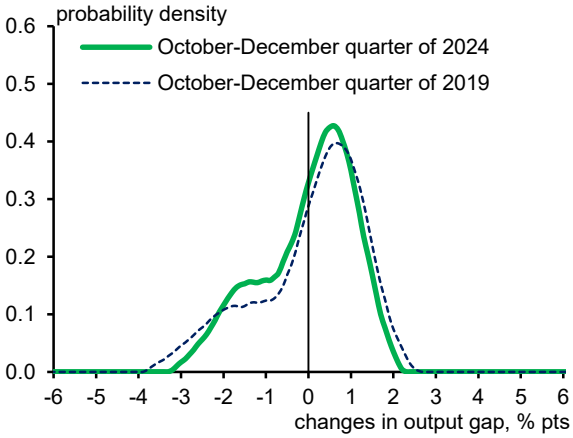
pandemic (Chart V-1-5).[18] As credit continues to increase, whether developments in financial activity deviate significantly from developments in real economic activity continues to warrant attention.

Chart V-1-4: Total credit 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 2024/Q4.
Source: Cabinet Office; BOJ.

Chart V-1-5: Risks to future economic growth



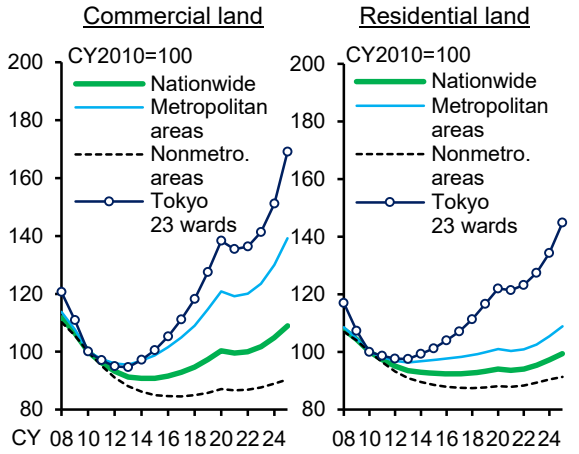
Note: Shows the changes in the output gap over the next 3 years, estimated based on the output gap, the financial gap, and the U.S. NFCI for each time point.

2. Real estate markets and financial system stability

Developments in real estate markets

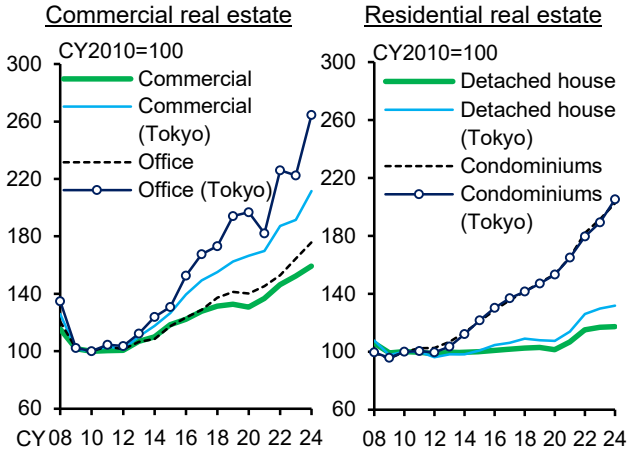
Land prices nationwide in Japan -- both commercial and residential -- have been rising, reflecting economic recovery, and the pace has accelerated in the three major metropolitan areas (Chart V-1-6). However, no such rise has been seen in nonmetropolitan areas. Meanwhile, increases in

Chart V-1-6: Land prices



Note: Data as of January 1 for each year (based on "Land Market Value Publication").
Source: Ministry of Land, Infrastructure, Transport and Tourism.

Chart V-1-7: Real estate transaction prices



Source: Ministry of Land, Infrastructure, Transport and Tourism.

[18] 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:

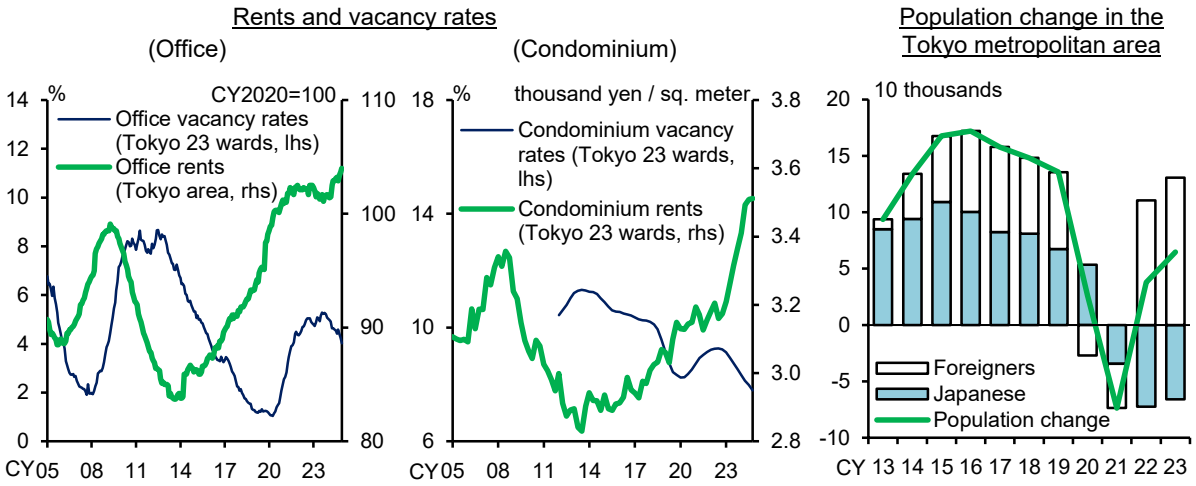
$$\begin{pmatrix}\text{Changes in the output gap}\\ \text{over the next } X \text{ years}\end{pmatrix} = \alpha \begin{pmatrix}\text{Changes in the output gap}\\ \text{from the previous period}\end{pmatrix} + \beta(\text{Financial gap}) + \gamma(\text{U.S. NFCI}) + \delta.$$

For details of 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*.

real estate transaction prices have been more pronounced than those in land prices. Specifically, in the case of commercial real estate transactions, prices of office buildings in the Tokyo metropolitan area have seen notable increases, while in the case of residential real estate transactions, condominium prices have been rising substantially in Japan as a whole (Chart V-1-7).

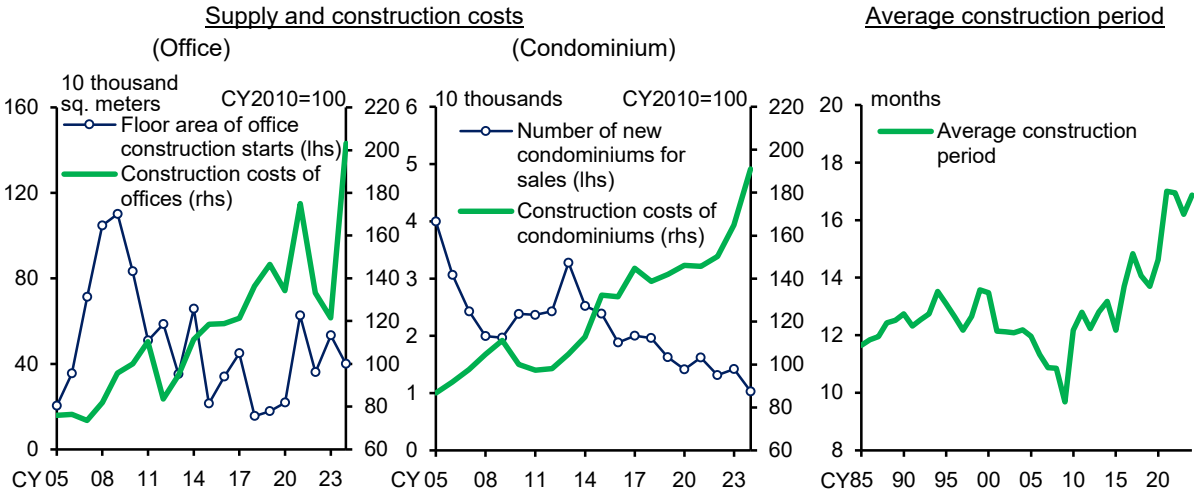
These increases in real estate prices likely are driven by both supply and demand factors. Vacancy rates of office buildings have begun to decline and rents have been rising further recently as the economy recovers moderately following the pandemic (Chart V-1-8). As for housing prices, the inflow of population to major urban areas, which had temporarily slowed, has picked up again, suggesting that demand for housing, especially in the Tokyo metropolitan area, may continue to rise. As a result, vacancy rates have fallen and rents for condominiums have been rising recently. This suggests that demand is contributing to the rise in real estate prices. On the other hand, a lack

Chart V-1-8: Demand for real estate



Note: Latest data for the left-hand and middle charts are as of December 2024 and 2024/Q4, respectively. "Office rents" is based on the Services Producer Price Index. "Condominium rents" indicates the average rents under new contracts released by the Real Estate Information Network for East Japan. The right-hand chart is based on demographic changes from January 1 to December 31 of each year.
Source: Ministry of Internal Affairs and Communications; Real Estate Information Network for East Japan; Sanko Estate Co., Ltd.; TAS Corp.; BOJ.

Chart V-1-9: Construction cost and new supply

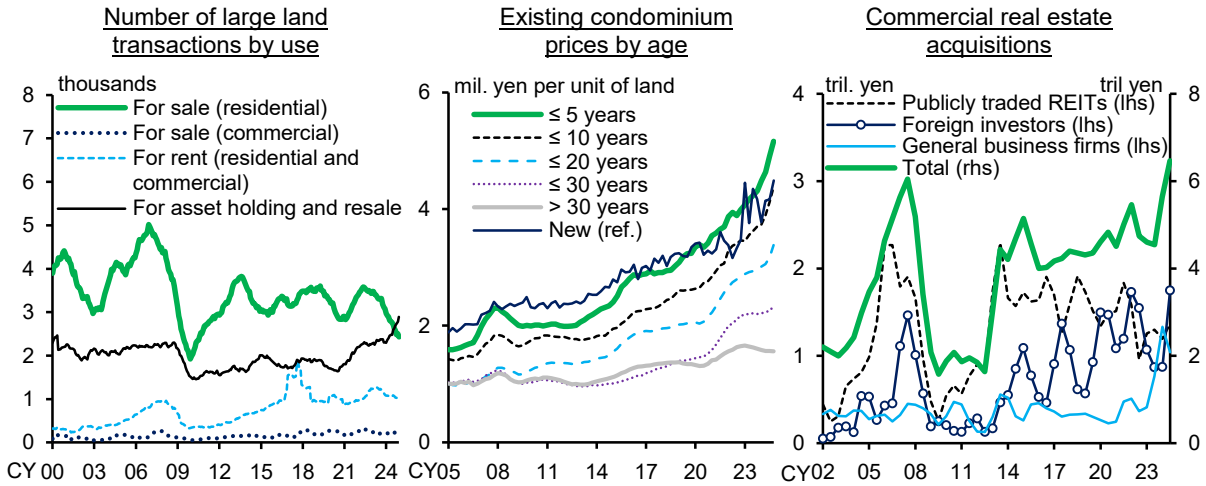


Note: 1. The left-hand and middle charts cover Tokyo. The data for construction costs are estimated construction costs per floor area of construction starts. Offices are for business use and condominiums are for residence whose structures are steel reinforced concrete or reinforced concrete.
2. In the right-hand chart, the data are calculated as the ratio of construction works permitted but not started to construction works executed, based on the "Current Survey of Orders Received for Construction (Big 50 Constructors)."
3. Latest data as of 2024.
Source: Ministry of Land, Infrastructure, Transport and Tourism; Real Estate Economic Institute.

of supply despite robust demand may also be contributing to the price rises. In recent years, the sharp rise in construction costs and delay in construction projects due to the surge in material costs and labor shortages may have curtailed supply through a deterioration in the profitability of new projects and the revision of project plans (Chart V-1-9). In fact, construction starts as measured by floor area and the number of new properties for sale have fallen below the level during the mini-bubble period in the mid-2000s.

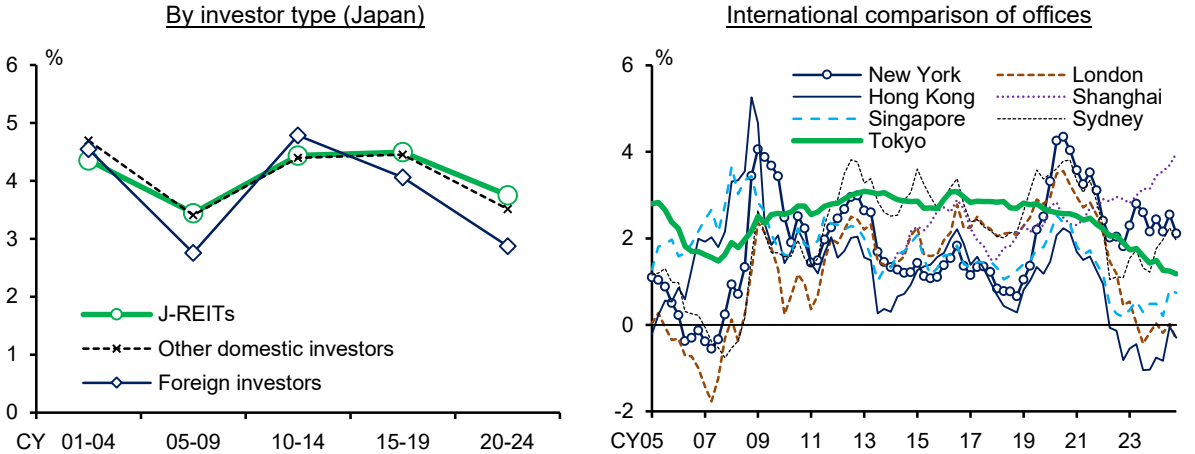
Real estate prices reflect not only current supply and demand, but also expectations about the pace of future rent increases and investment demand in anticipation of price rises. In this context, while large-scale land transactions for sale or rental purposes are decreasing, those for asset-holding and resale purposes are on the rise (left panel of Chart V-1-10). And in the case of existing condominiums, with the supply of new condominiums continuing to decline, transaction prices have

Chart V-1-10: Real estate transaction environment



Note: 1. Latest data for the left-hand chart are as of December 2024. Shows annualized values (sums for the past one year). Covers land transactions over 2,000 square meters in urbanization promotion areas, over 5,000 square meters in city planning areas, and over 10,000 square meters outside of city planning areas.
2. Latest data for the middle chart are as of 2024/Q4. Shows the distribution inventory prices of existing condominiums and the launch prices of new condominiums.
3. Latest data for the right-hand chart are as of the second half of 2024. Shows annualized values (sums for the past one year).
Source: Japan Real Estate Institute; Ministry of Land, Infrastructure, Transport and Tourism; Tokyo Kantei.

Chart V-1-11: Real estate yield gap

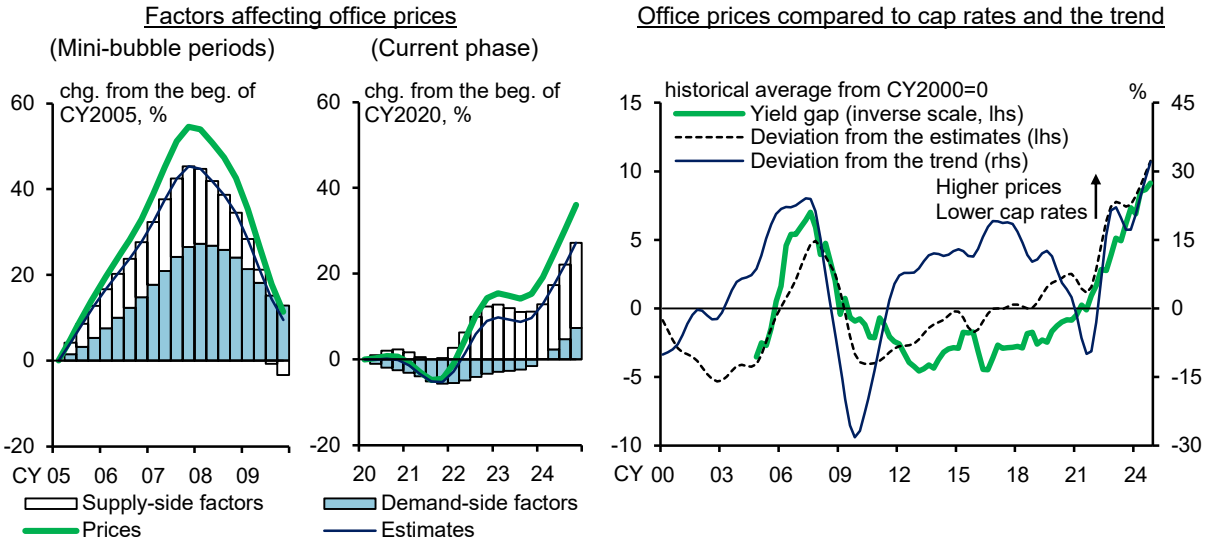


Note: Yield gaps are calculated as cap rates minus 10-year government bond yields for each country or region. The data for cap rates in the left-hand chart are appraisal cap rates, etc. for individual real estate transactions in Tokyo (surveyed by Nikkei DEAL SEARCH), averaged by investor type. Those in the right-hand chart are cap rates of Grade-A office buildings in each city (surveyed by JLL). Latest data for the right-hand chart are as of 2024/Q4.
Source: Haver Analytics; JLL; Ministry of Finance; Nikkei Business Publications, Inc., "Nikkei Real Estate Market Report DEAL SEARCH."

been rising substantially, particularly those for relatively new properties, which likely reflects demand for investment properties (middle panel of Chart V-1-10). Moreover, acquisitions of commercial real estate by foreign investors have been recently recovering, and transaction values have remained at a high level (right panel of Chart V-1-10). Although institutional investors that assume long-term ownership have a rising share among foreign investors, foreign investors' yield expectations overall are lower than those of domestic investors, and it has been pointed out that the number of acquisitions by foreign investors of projects with low yields is increasing, based on the speculation of short-term rises in real estate values (Chart V-1-11). Due to these factors, the expected returns on commercial real estate and real estate risk premiums (property yields minus 10-year government bond yields) have declined, with some pointing out that valuations seem relatively high.

Chart V-1-12 shows the results of estimations to gauge the contribution of supply and demand factors to rises in office prices in recent years in the Tokyo metropolitan area.[19] The estimation results suggest that, with demand recently recovering from the weakness following the outbreak of the pandemic, the rise in prices since around 2022 has been driven mainly by supply factors. This is in contrast to the mini-bubble period, when the main factors affecting price fluctuations were demand factors.

Chart V-1-12: Analysis of the rise in office prices during the current phase



Note: 1. The left-hand charts show the decomposition based on the estimates of a structural VAR with 5 variables; office prices, vacancy rates, rents, construction starts, and construction costs in Tokyo. The sample period is from 1990/Q2 to 2024/Q4.
2. The right-hand chart shows the deviations of office prices to rent ratio in Tokyo from the estimates (based on the sum of demand-side and supply-side factors) and that from the trend using 3-year backward moving averages. Scales for the yield gap (offices in Tokyo) are inverted and normalized by the standard deviation of "Deviation from the estimates." Latest data as of 2024/Q4.

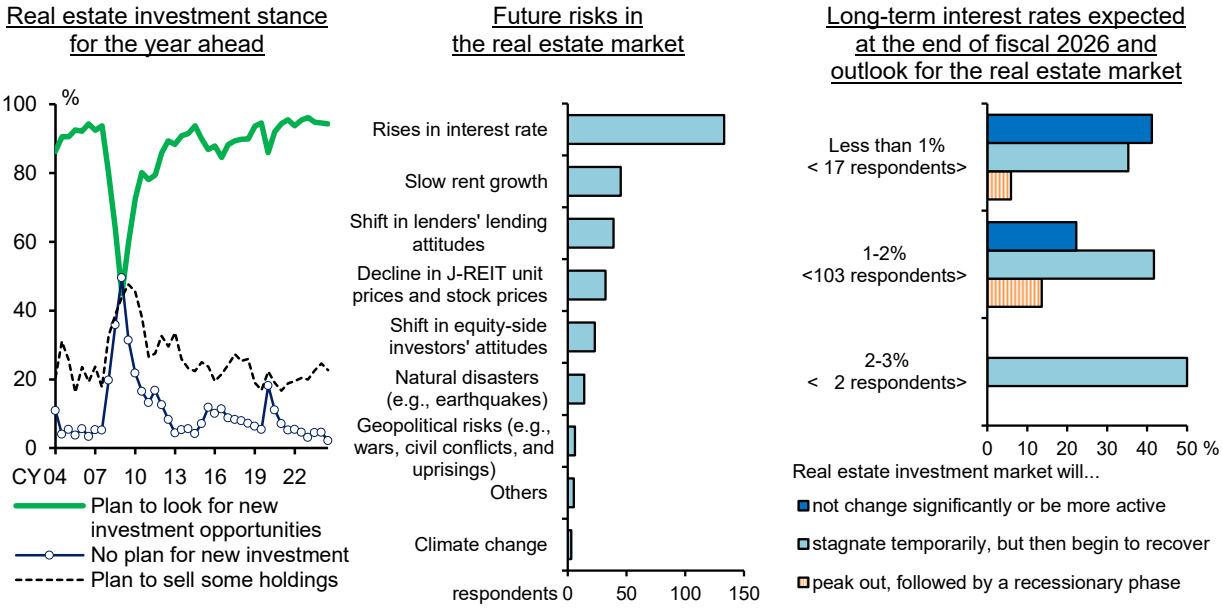
Source: JLL; Miki Shoji Co.; Ministry of Finance; Ministry of Land, Infrastructure, Transport and Tourism; BOJ.

While the estimation results should be viewed with considerable latitude, along with the fact that the yield gap has been declining for real estate investors and the price-to-rent ratio has deviated upward from its trend recently, the price deviation from what can be explained by demand and

[19] Specifically, a structural VAR model using the following five variables is estimated: real estate prices (office prices in Tokyo), vacancy rates (vacancy rates for office buildings in five central wards of Tokyo), rents (office rent index for the Tokyo area), office supply (construction starts as measured by the floor area of offices in Tokyo), and construction costs (construction cost deflators for non-residential and non-wooden building). Sign restrictions are imposed to identify each of the demand and supply factors. Demand factors point to the effects of a shock in which prices rise in line with the decline in vacancy rates and the increase in construction starts. Supply factors indicate the effects of a shock in which prices rise in line with the increase in construction costs and the decline in construction starts.

supply factors based on the estimation results (i.e., the deviation of prices to rent ratio from the estimates in the right panel of Chart V-1-12) is contributing to prices being above the historical average. Although the majority of real estate market participants believe that the real estate market will continue to perform well, it is necessary to continue to carefully monitor whether there will be any changes in the future investment stance of market participants if the market environment turns out to be significantly different from investors' expectations (Chart V-1-13).

Chart V-1-13: Real estate investment stance of market participants

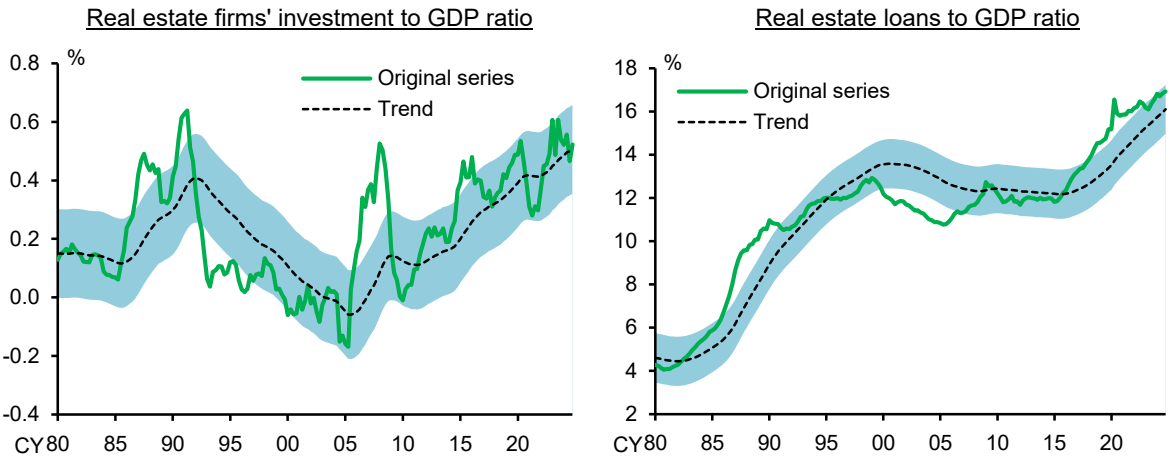


Note: Based on "The Japanese Real Estate Investor Survey," which is a survey of real estate investors (asset managers, banks, developers, etc.). Data are based on the October 2024 survey. The vertical axis in the right-hand chart shows the level of long-term interest rates expected at the end of fiscal 2026. Figures in brackets indicate the number of respondents. The chart shows the share of respondents to the question, "How will the real estate investment market change if the expected interest rates are realized?" by the level of expected interest rates. The shares of respondents who answered "cannot answer at this time" or "other" are not shown.
Source: Japan Real Estate Institute.

Real estate market conditions and implications for financial system stability

With regard to real estate-related FAIXs in the heat map, while the *real estate firms' investment to GDP ratio* has remained in line with the trend, the *real estate loans to GDP ratio*, although continuing to signal "green," is close to turning "red" (Chart V-1-14).

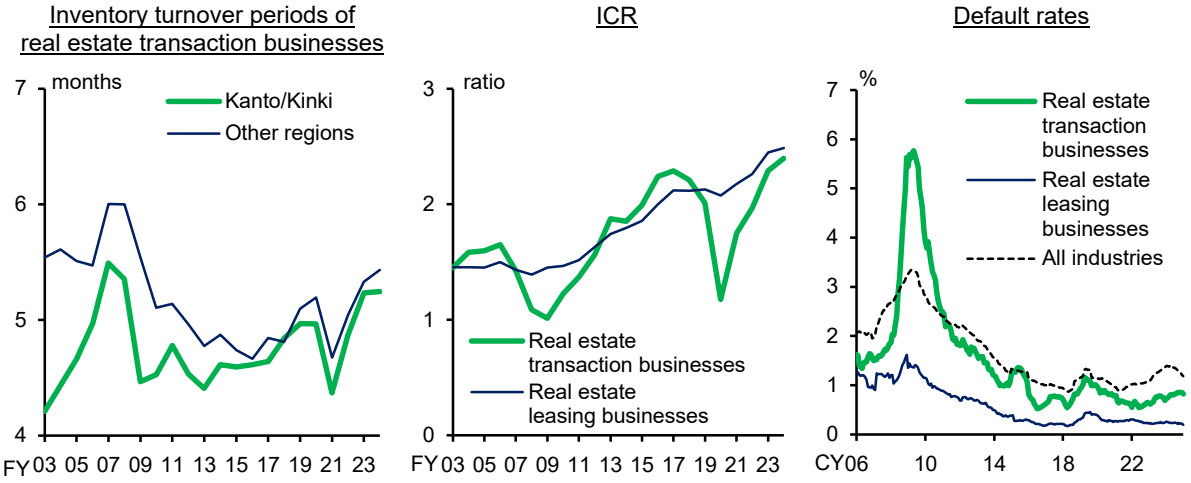
Chart V-1-14: Real estate-related indicators



Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded areas indicate the root mean square of the deviation from the trend.
2. Latest data as of 2024/Q4.
Source: Cabinet Office; Ministry of Finance; BOJ.

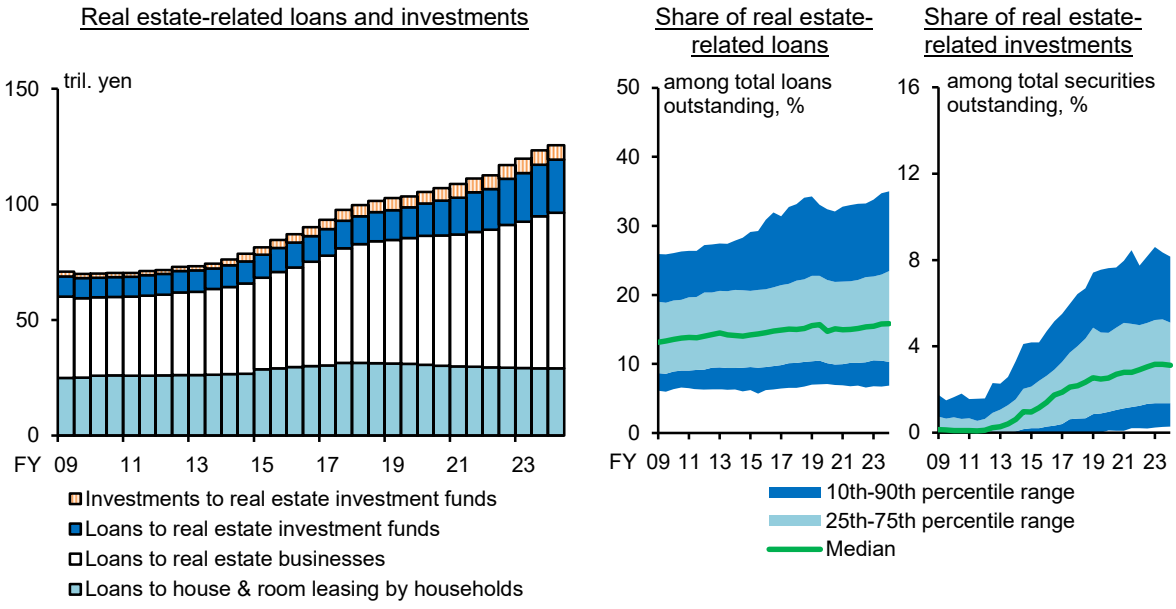
However, looking at the financial conditions of firms in the real estate industry -- the borrowers of these real estate-related loans -- indicates that although inventory levels at real estate transaction businesses are somewhat high, they are low compared to the mini-bubble period, and interest coverage ratios (ICRs), which represents borrowers' interest payment capacity, have remained high both among real estate leasing businesses and real estate transaction businesses. Moreover, default rates have remained low (Chart V-1-15). Even when assuming a shock that causes a large adjustment in commercial real estate prices in metropolitan areas, the economic losses for

Chart V-1-15: Financial conditions of real estate businesses



Note: 1. In the left-hand and middle charts, the latest data (fiscal 2024) are data covering the twelve-month period through September 2024. Shows the median of each firm group or region, based on the CRD. Covers SMEs. Inventory turnover period is the ratio of inventory assets to sales. ICR is the ratio of the sum of operating profits and interest income to interest payments.
2. In the right-hand chart, latest data are as of January 2025. Default is based on the classification "in danger of bankruptcy."
Source: CRD Association; The Risk Data Bank of Japan.

Chart V-1-16: Loans and investments to real estates by banks

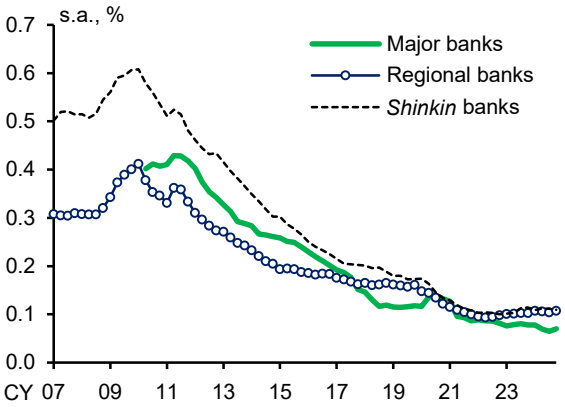


Note: Covers major, regional, and *shinkin* banks. Latest data as of the first half of fiscal 2024. In the left-hand chart, "Loans to real estate businesses" excludes loans to house and room leasing by households and SPCs, etc.
Source: BOJ.

Japanese banks are likely to be limited on an aggregate basis.[20] That said, investment in and lending to the real estate industry and real estate funds continue to trend upward, and banks' real estate lending and investment ratios have increased; therefore, conditions in the real estate market continue to warrant close attention (Chart V-1-16).

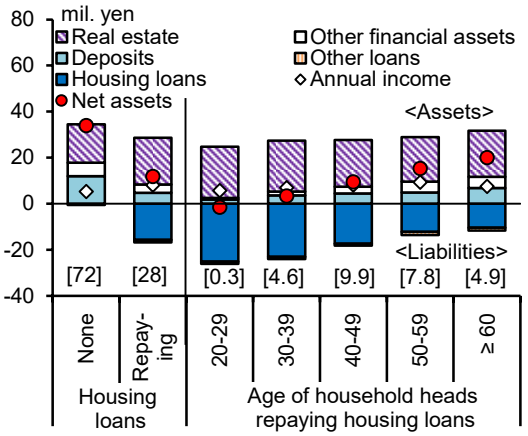
Turning to households' resilience to rising interest rates, delinquency rates of housing loans have remained essentially unchanged even as interest rates have started to rise (Chart V-1-17; see Box 2 for an analysis of housing loan default rates using loan-level data). As shown in the previous issue of the *Report*, there has been an increase in the number of households with housing loans among younger age groups, for which the debt servicing ratio (DSR) -- the ratio of annual repayments to annual income -- is generally high. However, young households have experienced relatively high wage increases recently, and from a somewhat longer-term perspective, their repayment burden is likely to gradually decline since increases in income are likely to continue as their salaries climb up along the wage curve. Moreover, households' net worth will increase if real estate prices rise after the purchase of their homes, improving their actual ability to repay (Chart V-1-18). That said, it warrants attention that the situation may change if a recession causes a simultaneous decline in incomes and housing prices.

Chart V-1-17: Delinquency rates of housing loans



Note: Delinquency rates are the share of loans overdue by three months or more among loans outstanding. Latest data as of December 2024.
Source: BOJ.

Chart V-1-18: Assets and liabilities of households with housing loans by age group



Note: Based on microdata from the 2019 National Survey of Family Income, Consumption and Wealth. Covers households with home ownership and shows the averages per household. Figures in brackets indicate the share of each group among households with home ownership. "Real estate" indicates the sum of housing and residential land assets.
Source: Ministry of Internal Affairs and Communications.

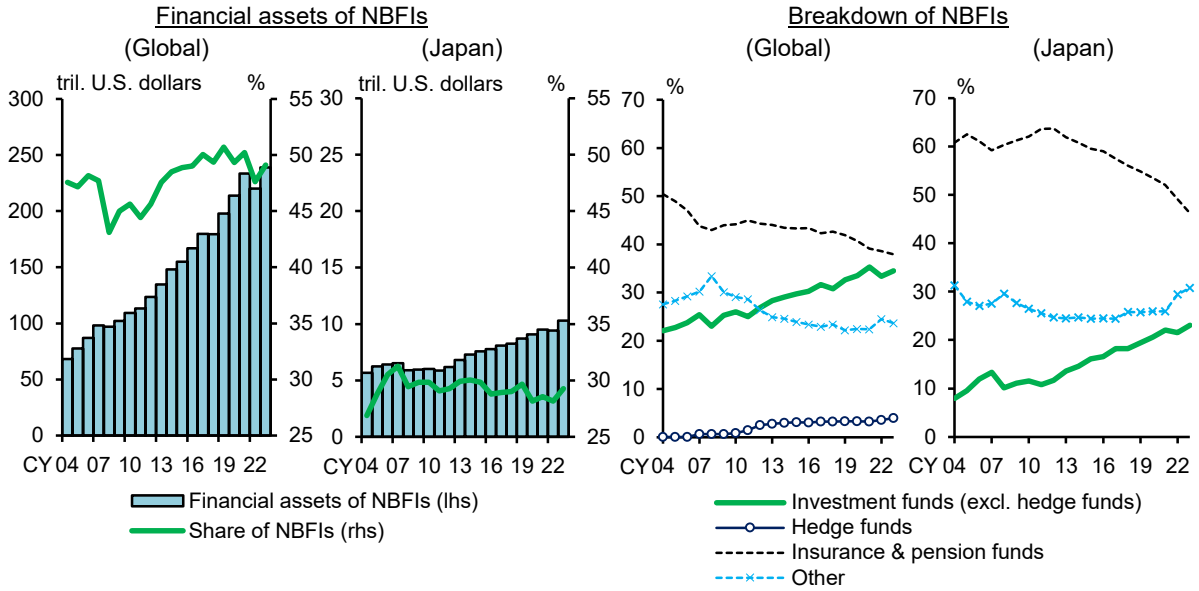
B. Risks related to the domestic and foreign NBFI sectors and implications for financial stability

The amount of financial assets held by NBFIs in the global financial sector has been on an increasing trend, mainly due to the increase in the share of investment funds (Chart V-2-1). The share of financial assets held by NBFIs in the financial sector declined temporarily after the global financial crisis, due to a decrease in their financial intermediation activities, including through

[20] For details, see the April 2024 issue of the *Report*, which presents stress testing assuming a repricing of commercial real estate in some limited metropolitan areas triggered by a correction in foreign real estate markets to simulate banks' economic losses (credit costs as well as valuation and realized losses on securities) in Japan. The exposure of Japanese banks to foreign commercial real estate markets is limited (see, for example, Box 1 in the October 2023 issue of the *Report*).

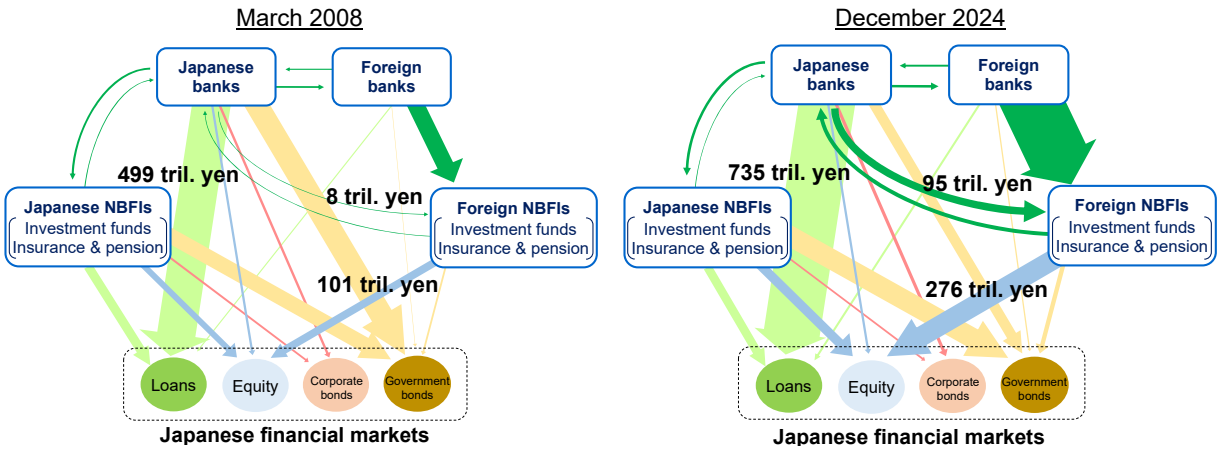
securitized products, but rose again thereafter and has been at around 50 percent since then. In Japan, where depository financial institutions are dominant in financial intermediation, the share of financial assets held by the domestic NBFI sector since the global financial crisis has remained unchanged at about 30 percent. However, for the foreign NBFI sector, its links with the domestic banking sector and financial markets have strengthened (Chart V-2-2).

Chart V-2-1: Asset size of the NBFI sector



Note: Latest data as of 2023. The Financial Stability Board (FSB) defines NBFIs as various types of financial entities, composed of all financial institutions that are not depository financial institutions, central banks, or public financial institutions. The share in the left-hand chart indicates the share of NBFIs among the financial sector. The right-hand chart shows the share of each sector among NBFIs. "Other" includes financial dealers and brokers and finance companies.
Source: FSB; BOJ.

Chart V-2-2: Interconnectedness of the domestic and foreign financial sectors via loan and investment activities



Note: Direction and width of arrows indicate the outstanding amount of loans and investments between the sectors and to the respective markets. Due to data limitations, loans and investments from foreign banks to foreign NBFIs only cover cross-border amounts, and direct linkages between domestic and foreign NBFIs are omitted. Loans are to households, non-financial firms, and governments.
Source: BIS; IMF; BOJ.

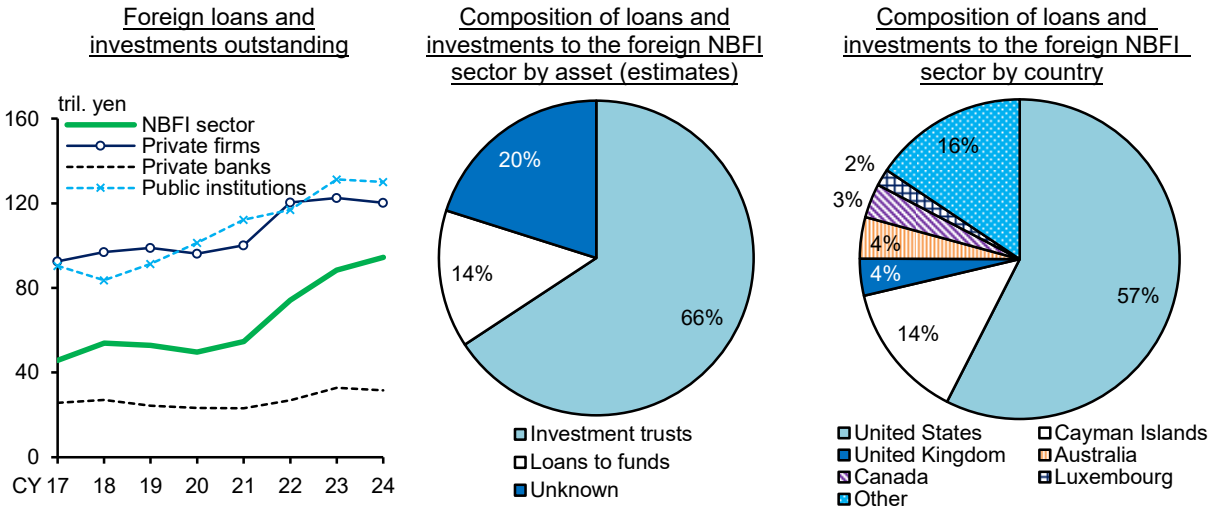
In terms of the asset holdings of the financial sector, including the domestic and foreign NBFI sectors, a comparison of interconnectedness of various entities today and at the time of the financial crisis shows three notable features. First, there has been a significant increase in investments and loans by domestic banks in the foreign NBFI sector. This suggests that Japan's

financial system may have become more susceptible to fluctuations in global financial markets and the influence of foreign investment funds. Second, there has been a marked increase in investments in Japanese stocks and bonds by the foreign NBFI sector, primarily investment funds, and its presence in Japan's financial markets, including through off-balance-sheet transactions in futures markets, has been on an upward trend. This suggests that Japan's asset prices have become more susceptible to developments in foreign NBFIs that operate globally. Third, although investment funds in the domestic NBFI sector, similar to their foreign counterparts, have seen an increase in their assets under management, no strengthening in the degree of interconnectedness can be observed in terms of the extension of credit to domestic economic entities or borrowing from domestic banks. This suggests that the spread of risks from the domestic NBFI sector to domestic banks is relatively small. The following provides an overview of how the strengthening links between the foreign NBFI sector and the domestic financial sector could affect Japan's financial system.

Domestic banks' exposure to the foreign NBFI sector

Under the continued low interest rate environment in Japan, Japanese banks have been incorporating relatively high-yield foreign assets into their securities portfolios. Moreover, investments and loans in the foreign NBFI sector have been increasing, mainly through investment trusts and loans to investment funds (Chart V-2-3; see Box 3 for details of the exposure of Japanese financial institutions, including institutional investors, to foreign private funds).

Chart V-2-3: Foreign loans and investments outstanding of Japanese banks

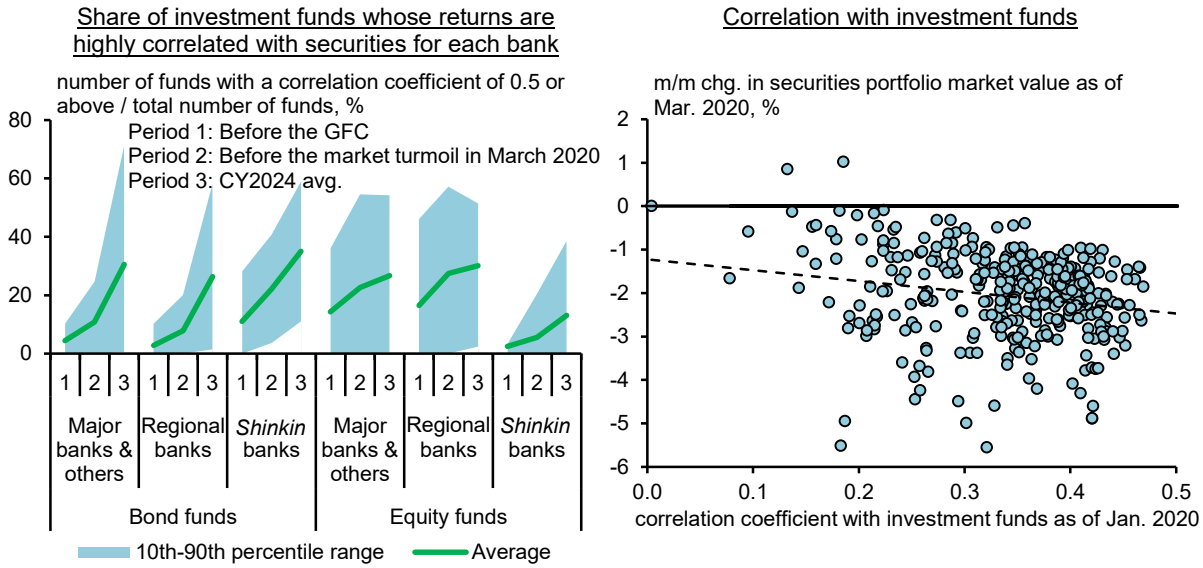


Note: Based on BIS International Consolidated Banking Statistics (CBS). Excludes trust banks. MBS investments by major banks and others are excluded from "NBFI sector" and included in "Public institutions." Data for the middle and right-hand charts are as of September 2024 and December 2024, respectively.
Source: U.S. Department of the Treasury; BOJ.

This means that Japanese banks are more susceptible to changes in foreign financial conditions through direct channels such as valuation gains/losses on securities and credit costs on loans to foreign investment funds. In addition to such direct channels, it is useful to measure the correlation between the returns on the securities portfolios of Japanese banks and global investment funds in order to comprehensively examine the linkages that arise from the similarities in lending and investment portfolios between Japanese banks and foreign investment funds. Doing so suggests that the number of banks whose portfolios are highly correlated with those of many investment

funds has been on an increasing trend since the global financial crisis (left panel of Chart V-2-4).[21] During the market turmoil in March 2020, when redemption rates of global investment funds increased sharply, banks with higher correlation coefficients immediately prior to the market turmoil tended to experience larger valuation losses on securities during the turmoil (right panel of Chart V-2-4). Comparing figures for 2024 with those at that time shows that the number of banks whose portfolios are highly correlated with those of bond funds has further increased. This suggests that attention is warranted on the fact that shocks to foreign financial markets or the foreign NBFI sector are likely to propagate to Japanese banks more widely than in the past.

Chart V-2-4: Correlations between returns on banks' securities portfolios and investment funds



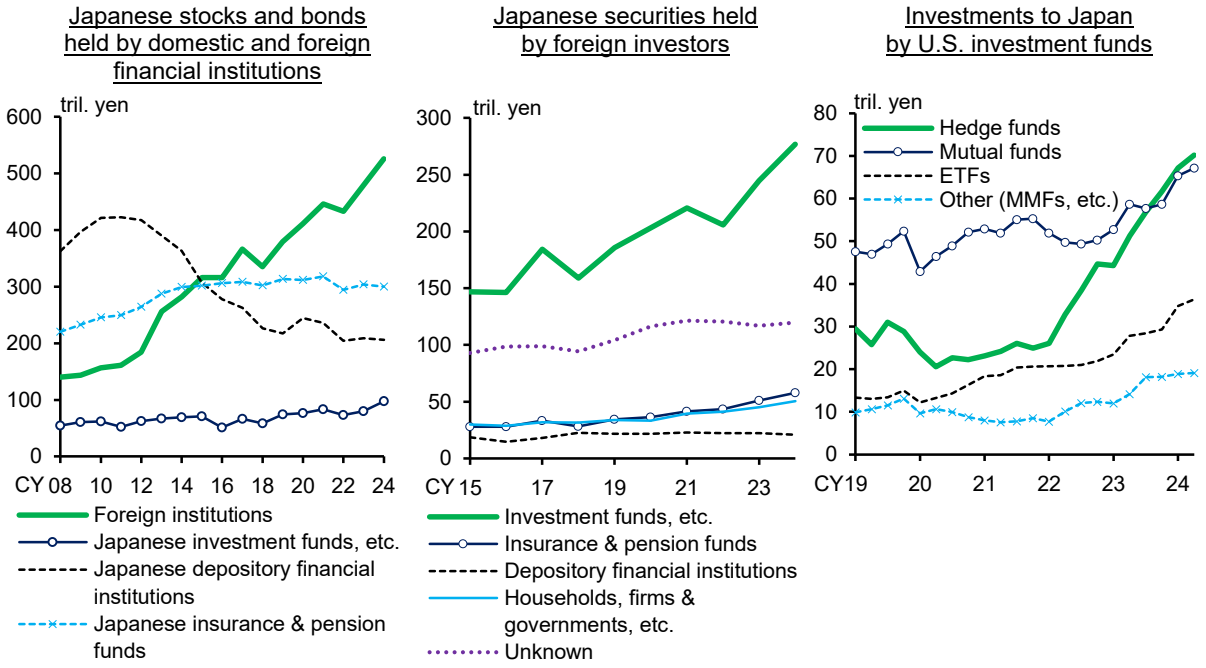
Note: 1. In the left-hand chart, correlation coefficients between returns on each bank's securities portfolios and investment funds (about 50 types of open-ended funds categorized by investment region and product) are calculated, and the share of funds with a correlation coefficient of 0.5 or above is calculated for each bank.
2. Period 1 is from January 2005 to January 2007. Period 2 is from January 2018 to January 2020. Period 3 is from January 2024 to December 2024.
3. "Correlation coefficient with investment funds" in the right-hand chart indicates the average of correlation coefficients across all investment funds for each bank.
Source: EPFR Global; Haver Analytics; BOJ.

The foreign NBFI sector's growing presence in Japan's financial market and its impact

The outstanding balance of inward securities investment by the foreign NBFI sector has also continued to increase gradually, so that foreign NBFIs have come to have a marked presence in the stock and government bond markets in Japan (left panel of Chart V-2-5). A breakdown shows that investment funds, etc. account for a large share (middle panel of Chart V-2-5). Looking at the amount of investment in Japan by U.S. investment funds shows that, in addition to investment trusts (open-end funds, etc.), which have had a constant significant presence, investment by hedge funds, which conduct a large amount of off-balance-sheet transactions such as futures and options, has also rapidly increased since 2022 (right panel of Chart V-2-5).

[21] The correlation here is estimated using a Dynamic Conditional Correlation (DCC)-GARCH model, and is the same portfolio overlap measure considered in Chapter IV in the October 2021 issue of the *Report*. For more details of the increased interconnectedness between the domestic and foreign financial systems, see Box 5 in the April 2021 issue of the *Report*.

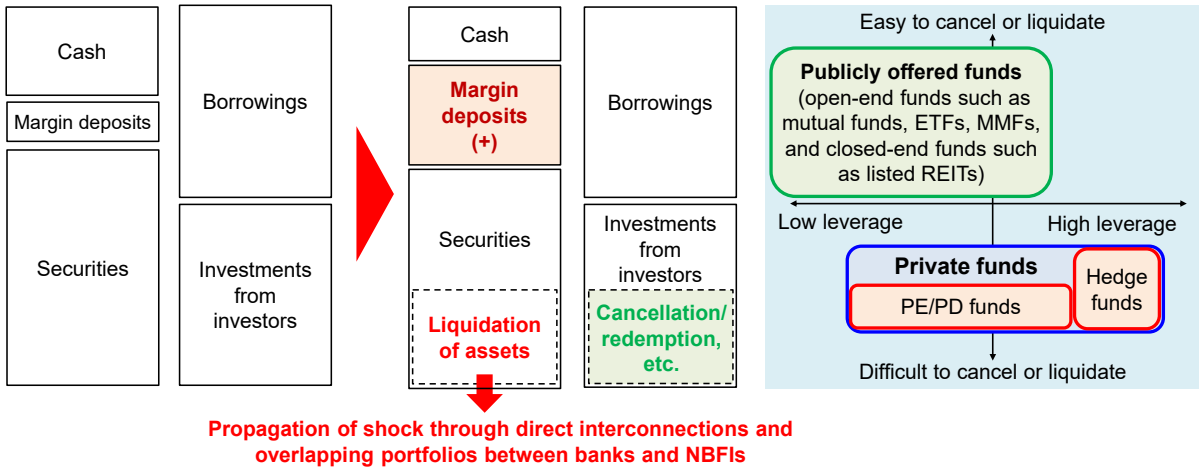
Chart V-2-5: Presence of foreign investors in Japanese financial markets



Note: 1. In the middle chart, the outstanding amounts of Japanese securities held by each foreign sector are estimated using the sectoral outward securities investment data for each country and region compiled by the IMF. "Investment funds, etc." includes financial dealers and brokers and finance companies.
2. In the right-hand chart, the data for "Hedge funds" are gross market exposure including derivative positions. Latest data as of 2024/Q2.
Source: IMF; SEC; BOJ.

As the presence of the NBFI sector has grown, there have been cases abroad in recent years where the NBFI sector has contributed to the amplification of market stress, such as the turmoil in global financial markets in March 2020 and the turmoil in the UK government bond market in September 2022. Although to date there have been no similar instances in Japan where the domestic NBFI sector has amplified market stress, Japan's financial markets and, ultimately, Japanese banks' financial conditions are likely to be more susceptible to a deterioration in the global financial environment that could lead to portfolio adjustments of foreign investment funds with vulnerabilities in their liability structure and leverage (Chart V-2-6).

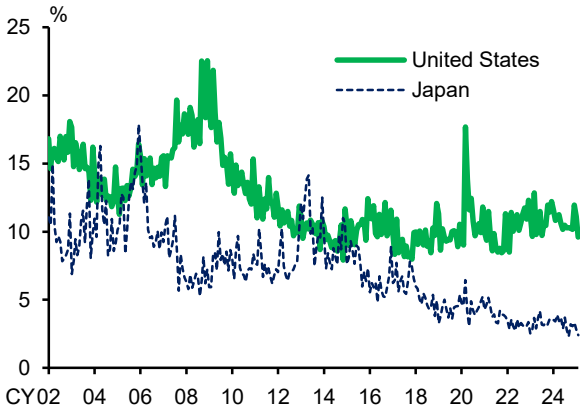
Chart V-2-6: Balance sheet of investment funds in market turmoil



Meanwhile, with regard to open-end funds, it has been pointed out that they may amplify market volatility through the sale of securities holdings prompted by simultaneous and large-scale redemptions by a wide array of investors (Chart V-2-7). During the market turmoil in March 2020, redemption rates temporarily increased globally, particularly for bond funds, reflecting capital

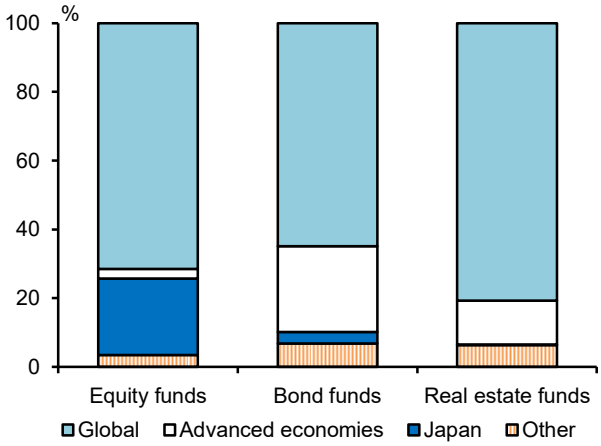
outflow pressures and the need to post additional margin due to the stress-related increase in demand for dollar funds, and Japanese assets were caught in the resulting global sell-off. Foreign open-end funds investing in Japan often invest in multiple regions (Chart V-2-8). For this reason, even in the absence of stress originating from the Japanese markets, there may be redemptions from these funds in the event of global financial and economic changes, which in turn may lead to the sale of assets held in global financial markets, including Japan's financial markets. As a result, global shocks could propagate to Japan (Charts V-2-9 and V-2-10).

Chart V-2-7: Redemption rates of open-end funds



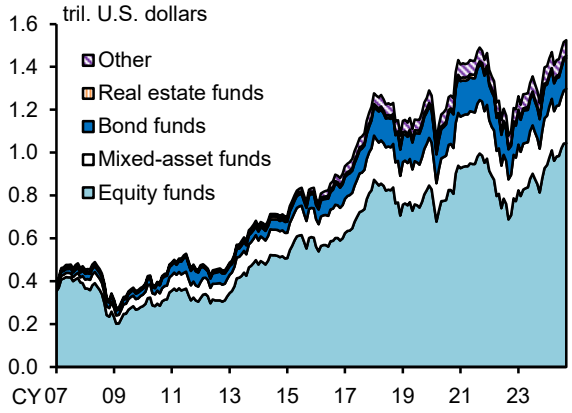
Note: Latest data as of February 2025.
Source: Haver Analytics; ICI; The Investment Trusts Association, Japan.

Chart V-2-8: Investment regions of foreign open-end funds



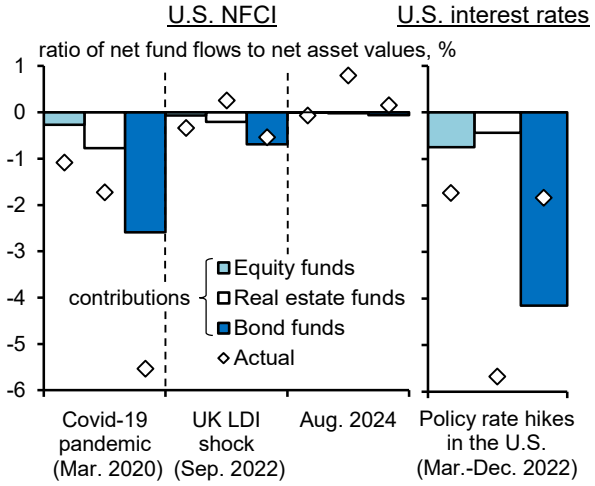
Note: Shows the composition of foreign open-end funds by main investment region (share among Japanese assets held by these funds). "Global" and "Advanced economies" are on a reported basis. "Japan" refers to funds that invest 50% or more of their net asset values in Japan. Data as of September 2024.
Source: LSEG Lipper.

Chart V-2-9: Japanese assets outstanding held by foreign open-end funds (by asset type)



Note: 1. Shows the sum of Japanese asset holdings of individual funds (estimated as net asset values multiplied by the percentage of Japanese asset holdings).
2. "Mixed-asset funds" refers to funds that invest in both equity and bonds. "Real estate funds" refers to funds that invest mainly in REITs.
3. Latest data as of September 2024.
Source: LSEG Lipper.

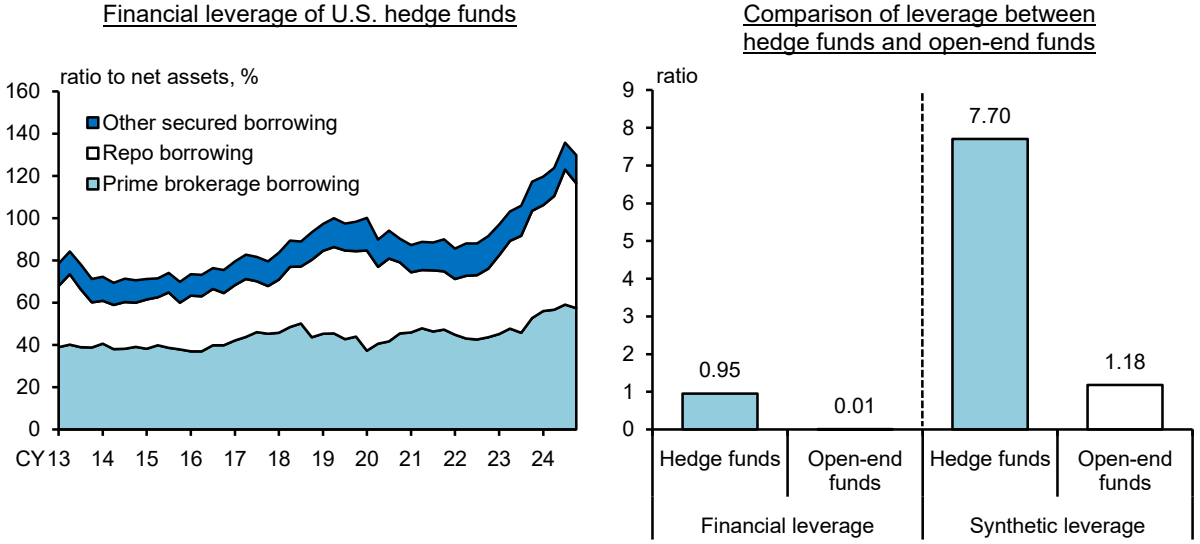
Chart V-2-10: Impact of deterioration in foreign financial conditions on net fund flows to open-end funds investing in Japan



Note: Based on a panel regression using net fund flows as the dependent variable and fund attributes (return, size, and liquidity ratio) and macroeconomic indicators (U.S. short-term interest rates, U.S. NFCI, and U.S. dollar index) as the independent variables, the contribution of each variable to the change in net fund flows from the month preceding each event is calculated. The estimation period is from January 2007 to September 2024. Figures for net asset values are for the month preceding each event. The right-hand chart shows the cumulative values during the period.
Source: Federal Reserve Bank of Chicago; Haver Analytics; LSEG Lipper.

Among private funds, it has been pointed out that highly leveraged funds, particularly hedge funds, could also pose the risk of amplifying asset price fluctuations in the event of stress (Chart V-2-6). Hedge funds tend to raise a large amount of funds through repos and secured borrowing from prime brokers, and therefore tend to have a high level of financial leverage (Chart V-2-11). Some hedge funds also have a high level of leverage on a notional basis by using derivatives such as futures and options. With increased leverage, a sudden fall in asset prices or a sudden rise in volatility could lead to a rapid unwinding of positions as funds are forced to post additional collateral or margin, or violate various internal risk management limits.

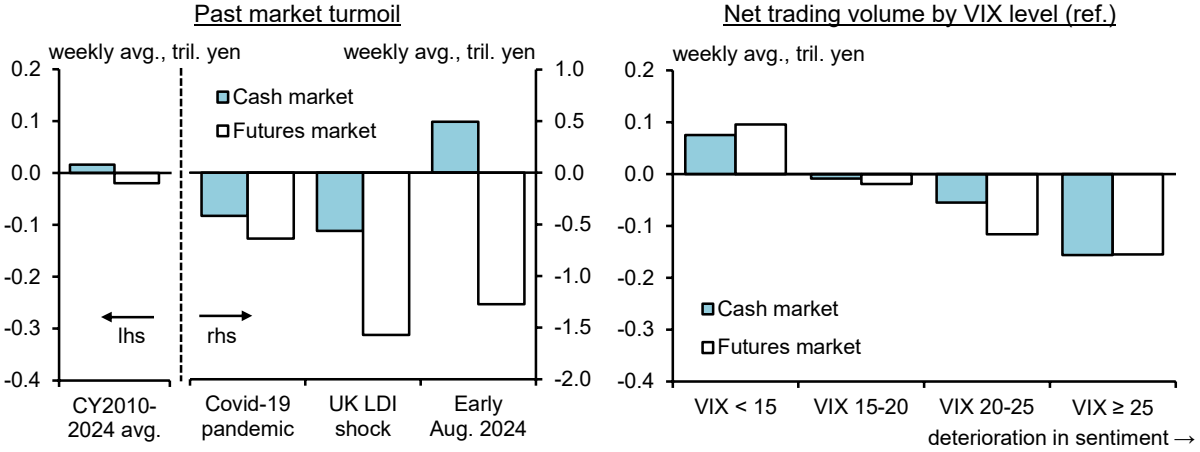
Chart V-2-11: Leverage of hedge funds



Note: 1. Latest data for the left-hand chart are as of 2024/Q4. Data for the right-hand chart are as of 2022.
2. In the right-hand chart, "Financial leverage" is defined as borrowings divided by net asset values. "Synthetic leverage" is defined as gross notional exposure of derivatives divided by net asset values.
Source: IOSCO; OFR.

In Japan, hedge funds are major players in the futures market, where foreign investors account for more than 90 percent of trading volume. Against this background, there has been an increase in the number of episodes in which the unwinding of positions by hedge funds, such as increased short selling of stocks in futures markets, has had a considerable impact on financial markets and

Chart V-2-12: Foreign investors' net trading volume of Japanese stocks by stress event



Note: 1. Data for cash market are net trading volumes in Tokyo Stock Exchange and Nagoya Stock Exchange. Data for futures market are net trading volume in Osaka Exchange.
2. In the left-hand chart, "Covid-19 pandemic" indicates the weeks starting March 2 and March 9, 2020. "UK LDI shock" indicates the week starting September 26, 2022. "Early Aug. 2024" indicates the week starting August 5, 2024. Figures in the right-hand chart are based on weekly data from April 2014 to December 2024.
Source: FRED; Osaka Exchange; Tokyo Stock Exchange.

asset prices in Japan when investors' risk sentiment deteriorated, such as during the heightened volatility seen in August 2024 (Chart V-2-12).[22]

Since the market turmoil in March 2020, discussions on measures and regulations have been making progress on a global level, led by the Financial Stability Board (FSB) and other standard-setting bodies. For example, with regard to open-end funds, in order to prevent a concentration of redemptions during times of stress, the FSB has proposed measures such as making redeeming investors more fully bear the transaction costs associated with redemptions, and some jurisdictions are considering introducing these measures. In addition, with regard to leverage, the FSB in December 2024 published a consultation report on data, methodologies, and policy tools to strengthen responses to, and improve monitoring of, financial stability risks arising from leverage in the NBFI sector. While there remain large gaps in the data to comprehensively understand developments in the NBFI sector, it is necessary to continue to carefully monitor developments in investment in Japan's financial markets by domestic and foreign investment funds and their impact on banks, taking into account these international discussions and regulatory developments.[23,24]

C. Opportunities and risks posed by changes in the business environment

1. Adaption to changes in digital technologies

Cybersecurity measures

The threat of cyberattacks in Japan has continued to increase. The number of ransomware and phishing attacks in Japan and unlawful money transfers through online banking has been at high levels (Chart V-3-1). From the end of 2024 to the beginning of 2025, there were DDoS attacks on major firms in Japan on an unprecedented scale, and there were incidents where disruptions to internet banking at some banks that affected users. Cases of unauthorized access to transaction accounts have been seen in several financial institutions recently, likely through phishing attack.

The Financial Services Agency (FSA) released its "Guidelines for Cybersecurity in the Financial Sector" in October 2024 to strengthen cybersecurity across the financial sector, and presented its basic attitude on the efforts and risk management required by financial institutions.[25,26] In the

[22] For developments in foreign hedge funds' investment by fund strategy, see Box 4.

[23] In response to the materialization of risks posed by open-end funds during the COVID-19 crisis in March 2020, the International Organization of Securities Commissions (IOSCO) published guidance on liquidity management tools for open-end funds in July 2023, while the FSB published a review of its policy recommendations on liquidity mismatches in December 2023, proposing the setting of redemption terms based on the liquidity of assets held and the expanded use of liquidity management tools. Progress in policy responses on these issues varies from country to country. In Japan, redeeming investors are charged a certain amount in retained trust assets to cover the transaction costs associated with redemptions.

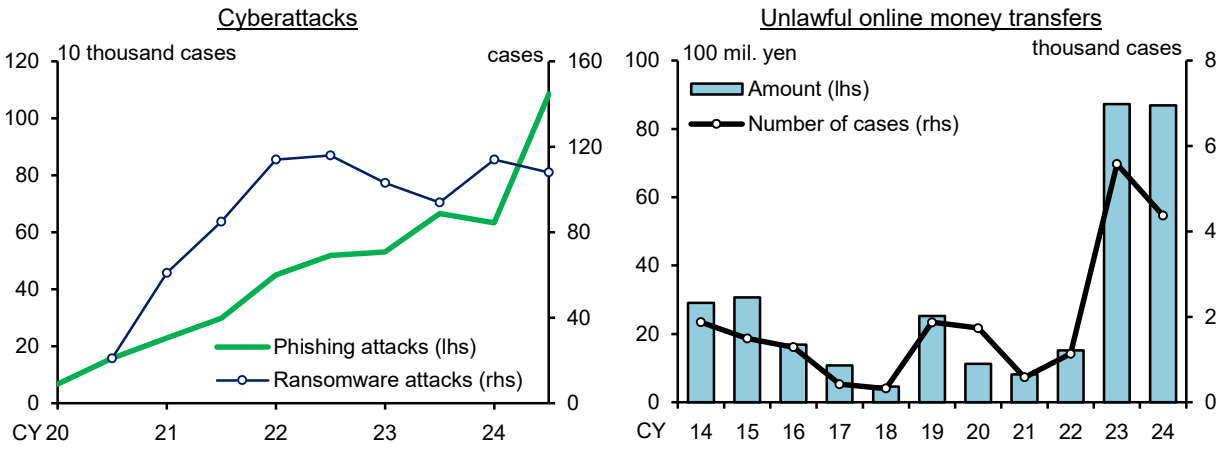
[24] It should also be noted that the number of exchange traded funds (ETFs) incorporating cryptoassets and hedge funds trading cryptoassets is increasing. While cryptoasset-related exposures in the traditional financial system currently are extremely limited, there is a high degree of uncertainty about future developments, with some countries tightening and others relaxing regulations, and it has become necessary to consider the possibility that transactions in the NBFI sector of cryptoassets could affect the stability of financial markets and the financial system. For details, see FSB, *The Financial Stability Implications of Multifunction Crypto-asset Intermediaries*, November 2023.

[25] The FSA has been making various efforts to promote cybersecurity in the financial sector, such as, in 2022, establishing "Policies for Strengthening Cybersecurity in the Financial Sector (ver. 3.0)" (available in Japanese), and in 2023, conducting the "Financial Industry-wide Cybersecurity Exercise (Delta Wall VIII)."

[26] The "Guidelines for Cybersecurity in the Financial Sector" targets a wide range of institutions, including not only

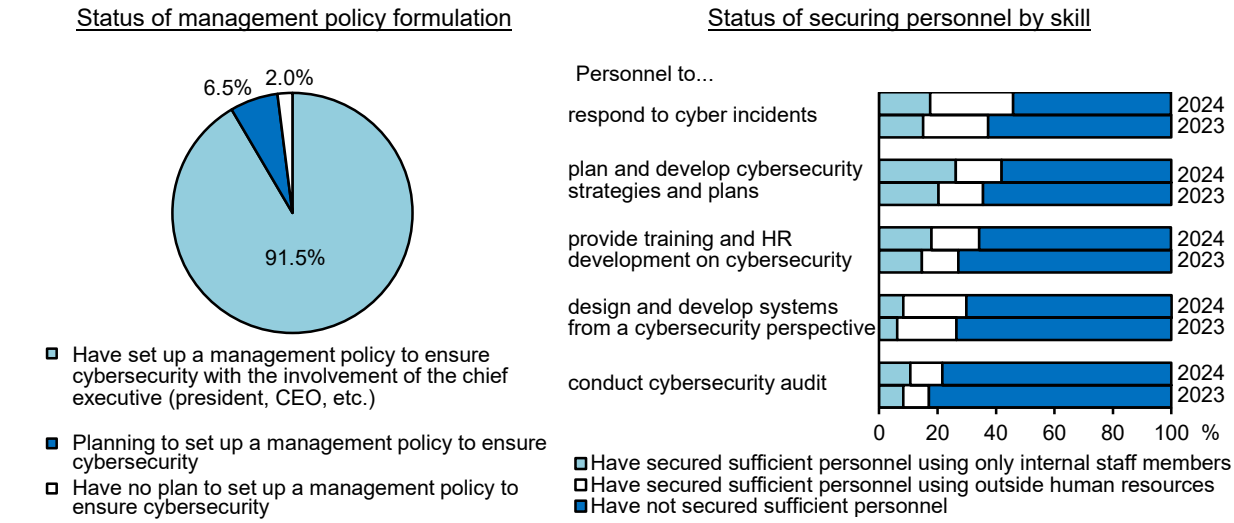
cybersecurity self-assessment for regional financial institutions (FY2024) -- a survey conducted annually by the FSA and the Bank -- 90 percent of regional financial institutions that responded to the survey indicated that they had formulated policies for the management of cybersecurity and had made progress since the previous survey in recruiting and retaining cybersecurity personnel. The survey thus showed that regional financial institutions had made steady efforts toward enhancing cybersecurity (Chart V-3-2).[27] However, recruiting and retaining personnel continues to be a challenge, and financial institutions have recently stepped up the recruitment of cybersecurity personnel (Chart V-3-3).

Chart V-3-1: Number of cyber-related attacks in Japan



Note: Latest data for the left-hand chart are as of the second half of 2024. The data for "Ransomware attacks" start from the second half of 2020.
Source: Council of Anti-Phishing Japan; National Police Agency.

Chart V-3-2: Cybersecurity self-assessment

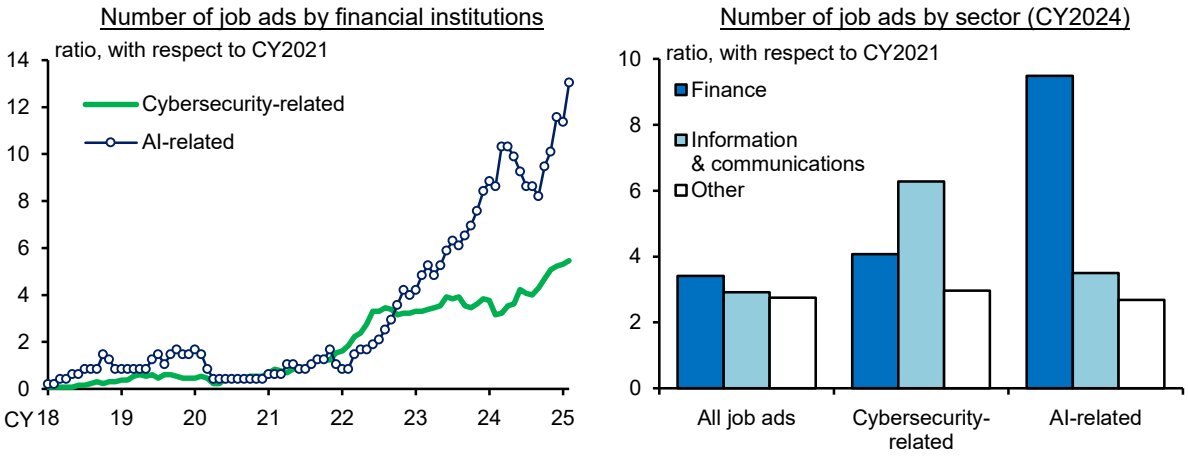


Note: Covers regional financial institutions. The data are based on "Cybersecurity Self-Assessment" conducted by the Bank of Japan and the Financial Services Agency in July-August 2024. "2023" in the right-hand chart indicates the result of the same survey conducted in July-August 2023.
Source: BOJ & Financial Services Agency.

banks and securities companies but also funds transfer businesses and cryptoasset exchange service providers, and outlines the "basic measures" and "desirable measures" required of these institutions in terms of establishing governance risk management structures, identifying and preventing risks, and detecting, responding to, and recovering from risks, and managing third-party risks. However, the guidelines do not require all financial institutions to take the same approach, but rather to take a risk-based approach that depends on the size and characteristics of individual financial institutions.

[27] The self-assessment for fiscal 2024 covered 99 regional banks, 254 *shinkin* banks, and 143 *shinkumi* banks.

Chart V-3-3: Number of digital-related job advertisements



Note: Shows the number of job ads posted on a major private job board. "Cybersecurity-related" and "AI-related" are defined as job ads that include the word "cybersecurity" or "AI" in the skill requirements, respectively. Latest data for the left-hand chart are as of February 2025.
Source: HRog Co., Ltd.

Adaption to new technologies

Recently, the use of generative artificial intelligence (AI) is rapidly becoming widespread and is expected to be used in a wide range of businesses by banks. Use cases would include improving the efficiency of existing operations, given the enormous volume of information banks handle in conducting their business, as well as providing high-value-added financial services that meet the needs of individual customers.[28] Against this background, banks are actively recruiting AI personnel (Chart V-3-3). However, with the use of generative AI expanding, banks must also be sufficiently aware of the risks posed by generative AI. Specifically, it is known that there is a risk that the answers given by generative AI to users' questions may be biased or false (i.e., AI may "hallucinate"), and that the use of new cyberattack methods, such as prompt injection, may increase as generative AI becomes more widespread. Moreover, since providers of large-scale data processing services such as generative AI tend to be concentrated in a few external companies (third parties), the possibility that risks originating from third parties may spread to the entire financial system warrants attention. In addition, it has been pointed out that the use of the same generative AI services by a wide range of financial institutions could increase market volatility due to greater synchronization in transactions and pricing. It is important to continue to deepen our understanding of the links between generative AI and financial risks, taking into account discussions among international organizations and financial authorities around the world.

Moreover, since the security of currently widely used public key cryptography may be compromised in the future if quantum computing technology becomes viable, discussions on the transition to post-quantum cryptography (PQC) have begun, both in Japan and abroad. In September 2024, the

[28] With regard to the opportunities and risks for the financial sector posed by recent digital innovation, see Section E of Chapter IV in the October 2024 issue of the *Report* and discussions at the workshop held in January 2025 hosted by the Center for Advanced Financial Technology of the Bank of Japan's Financial System and Bank Examination Department titled "Digitalization and the Future of Japan's Financial Services." For details of the workshop, see the following webpage. https://www.boj.or.jp/en/finsys/c_aft/aft250417a.htm. According to a survey of banks conducted by the Bank in 2024, about 30 percent responded that they were already using generative AI. The figure rises to about 60 percent if those currently trialing generative AI are included, and to about 80 percent if those considering trialing or using generative AI are included. For details, see "Use and Risk Management of Generative AI by Japanese Financial Institutions -- Based on the results of questionnaire survey --," *Financial System Report Annex Series,* October 2024.

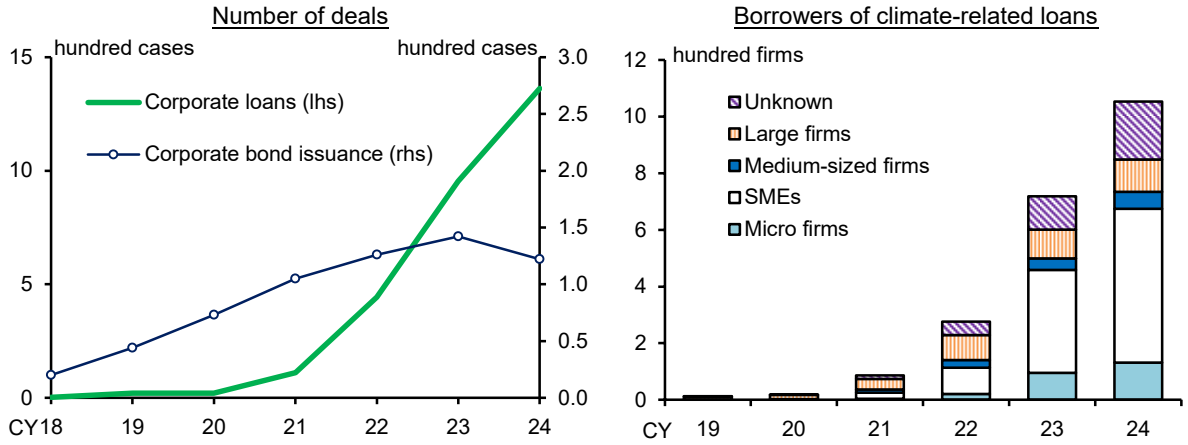
G7 Cyber Experts Group (CEG), recognizing that quantum computing potentially offers both benefits and risks to the financial system, released a statement recommending (1) monitoring the development of quantum computers, (2) promoting cooperation between the public and private sectors, and (3) starting discussions on addressing the potential risks that quantum computing may pose to existing encryption methods.[29] In Japan, the FSA has taken the lead in holding discussions with a wide range of stakeholders on recommendations, challenges, and issues when considering the transition to PQC, and released a report in November 2024.[30] Banks need to take these discussions into consideration as they proceed with the transition to PQC.

2. Climate-related financial risks

Climate change can threaten the stability of the financial system through climate-related financial risks -- i.e., physical and transition risks. Financial institutions need to enhance their ability to grasp the impact of climate-related financial risks in a forward-looking manner and proceed with efforts to support decarbonization of the economy from the financial side using knowledge gained so far.

Under these circumstances, origination of climate-related loans and investments in Japan has been increasing, mainly in the form of corporate loans (left panel of Chart V-3-4). In addition to loans to large firms, which started to increase earlier, climate-related loans are now increasing among SMEs (right panel of Chart V-3-4). Banks have taken a wide range of initiatives to reduce greenhouse gas emissions, such as developing organizational structures and medium- to long-term transition plans and providing support for their clients' responses to climate change.

Chart V-3-4: Climate-related loans and investments



Note: The right-hand chart aggregates borrowers of green loans and sustainability-linked loans and uses borrower-specific data from the common data platform to identify firm size ("Large firms" are firms with capital of more than 1 billion yen; "Medium-sized firms" from 100 million to 1 billion yen; "SMEs" from 10 million to 100 million yen; "Micro firms" less than 10 million yen).
Source: JPX Market Innovation & Research, Inc., "ESG Bond Information Platform"; JSDA; Ministry of Economy, Trade and Industry; Ministry of the Environment; Published accounts of individual companies; BOJ.

[29] For details, see "G7 Cyber Expert Group Statement on Planning for the Opportunities and Risks of Quantum Computing," September 2024. The G7 CEG was established in 2015 with approval of the G7 Finance Ministers and Central Bank Governors Meeting, with a view to promoting cybersecurity in the financial sector and building partnerships among the G7 members. Members of the CEG include financial authorities from the G7 countries and the European Union. From Japan, the Bank of Japan, the FSA, and the Ministry of Finance are participating.

[30] See the report of the study group on responses to post-quantum cryptography by deposit-taking financial institutions released by the FSA in November 2024 (available in Japanese).

With regard to addressing climate change issues related to the financial system, the Bank has also been pushing ahead with various measures. Recently, the Bank, together with the FSA, has been conducting a scenario analysis on major banks, with a view to identifying short-term transition risks. 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. In addition, the Bank will conduct research and analysis, as well as continue its 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.

VI. Resilience of the financial system

- Looking at banks' loss-absorbing capacity shows that the capital of major banks, regional banks, and *shinkin* banks well exceeds regulatory requirements. Their profitability as a whole has remained on an improving trend over the past few years. It should be noted, however, that factors such as the structural decline in domestic loan demand have continued to exert downward pressure on profitability in recent years.
- Banks' amount of yen interest rate risk on the asset and liability sides is more or less in balance. Banks on the whole are resilient enough to withstand rising interest rates. They have maintained a cautious stance toward interest rate risk-taking.
- Given banks' financial bases and risk profiles, this chapter examines the resilience of the financial system against tail risks regarding global financial and economic activity. As in the previous *Report*, examination is conducted under two downside scenarios: a "rises in foreign interest rates" scenario, which assumes foreign interest rates remain higher for longer, and a "financial stress" scenario, which assumes stress similar to the global financial crisis. Based on the results, it can be judged that the stability of Japan's financial system is maintained even under these stress events. As background to this, it can be pointed out that, since the global financial crisis, banks have enhanced their resilience, mainly through accumulating capital, and that borrower firms' financial bases have remained robust on the whole.
- Since the beginning of April, financial markets at home and abroad have fluctuated significantly, while uncertainty has heightened regarding the formulation of trade and other economic policies in each jurisdiction, geopolitical risks, and developments in global financial markets. Financial institutions need to be vigilant against the materialization of various risks.

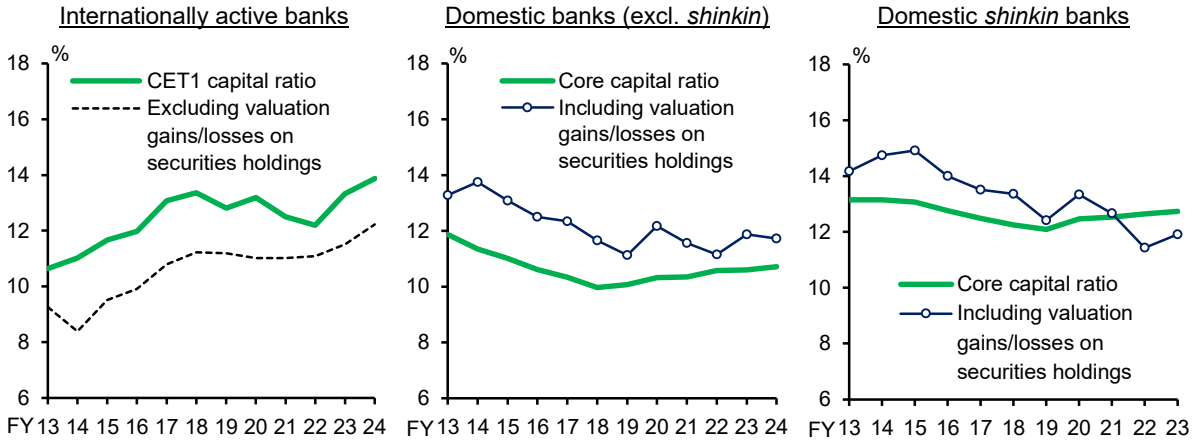
A. Banks' capacity to absorb losses

1. Capital adequacy and loss-absorbing capacity

Capital

Banks have maintained sufficient capital. In the first half of fiscal 2024, 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 (Chart VI-1-1). Valuation gains/losses on securities holdings, which are not included in the regulatory capital for domestic banks, can function as a capital buffer when taking valuation gains/losses on all investment securities into account. In recent years, many banks have registered growing valuation gains on their stockholdings and rising valuation losses on their bondholdings. Against this background, *shinkin* banks, for which stocks account for a small share of assets and yen-denominated bonds for a large share, have seen valuation losses on their securities holdings overall, but the impact on the capital buffer has been limited. Banks have sufficient capital bases overall, which will enable them to continue with risk-taking.

Chart VI-1-1: Capital adequacy ratios

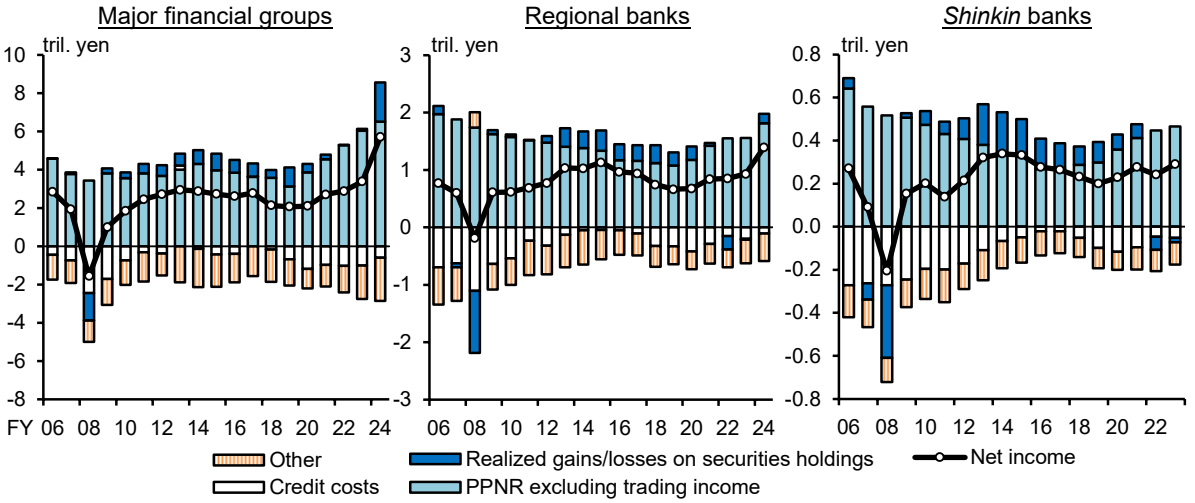


Note: The latest data for internationally active banks and domestic banks (excl. *shinkin*) are as of the first half of fiscal 2024, and those for domestic *shinkin* banks are as of fiscal 2023.
Source: Published accounts of individual banks; BOJ.

Banks' profitability

Banks' net income has remained on an uptrend, with major financial groups and regional banks registering substantial increases in net income in the first half of fiscal 2024 (Chart VI-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 (the effects of rising interest rates on banks' profitability will be described later).[31]

Chart VI-1-2: Net income



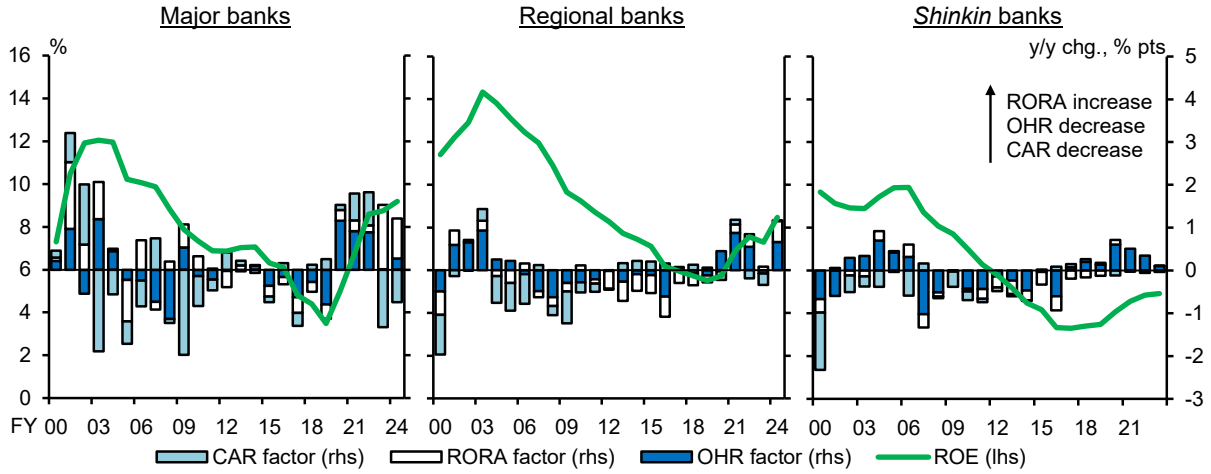
Note: 1. From fiscal 2012, profits and losses from investment trusts due to cancellations are excluded from "PPNR excluding trading income" and included in "Realized gains/losses on securities holdings."
2. "Major financial groups" covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Group, 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 2024, and those for *shinkin* banks are as of fiscal 2023.
Source: Published accounts of individual banks; BOJ.

Return on risk-weighted assets (RORA; gross operating profits from core business excluding trading income/risk-weighted assets), which shows their investment efficiency, has pushed down

[31] Banks' break-even credit cost ratios, which represent credit costs that can be absorbed by PPNR excluding trading income in a single fiscal year relative to loans outstanding, have also been improving, and banks' PPNR excluding trading income will likely act as a profit buffer when short-term credit costs increase.

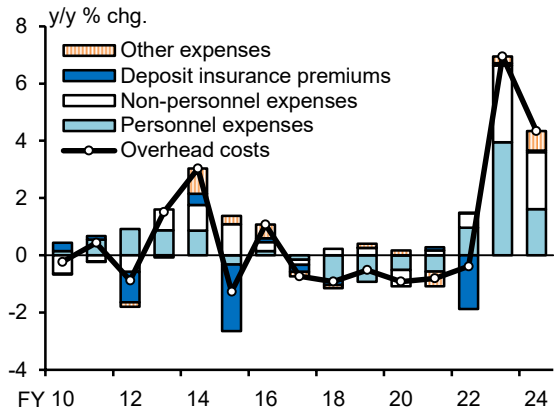
banks' return on equity (ROE) based on PPNR excluding trading income for a long period as the difference between loan and deposit interest rates, i.e., the loan-deposit spread, has been on a declining trend in a situation where structural factors such as a decline in domestic loan demand has been seen and the low interest rate environment has been prolonged (Chart VI-1-3).[32] In recent years, banks' ROE based on PPNR excluding trading income has been rising -- mainly due to improvements in their overhead ratios (OHRs) (= overhead costs/gross operating profits), which represent operating efficiency, and most recently, their RORA has also been improving, especially at major banks. That said, most recently, overhead costs have been pushed up by increases in non-personnel expenses, including costs related to investment in computer systems, as well as increases in personnel expenses, especially among major banks (Chart VI-1-4). Banks need to continue to make efforts to increase productivity -- for example by upgrading their capital equipment through investment in digital resources -- and to improve their core profitability by making effective use of limited business resources.

Chart VI-1-3: ROE based on PPNR excluding trading income



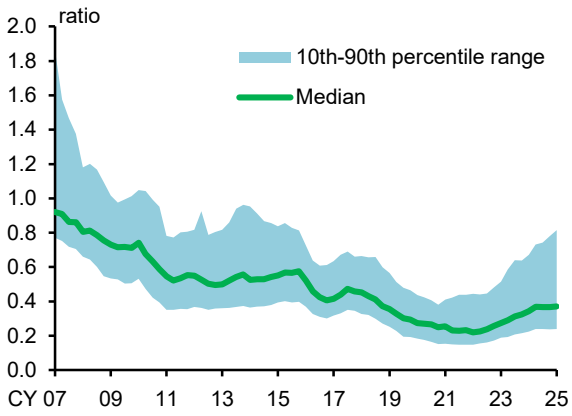
Note: From fiscal 2012, profits and losses from investment trusts due to cancellations are excluded. The latest data for major and regional banks are annualized values for the first half of fiscal 2024, and those for *shinkin* banks are as of fiscal 2023.
Source: BOJ.

Chart VI-1-4: Banks' overhead costs



Note: Covers major and regional banks. "Non-personnel expenses" excludes deposit insurance premiums. Latest data as of the first half of fiscal 2024.
Source: BOJ.

Chart VI-1-5: P/B ratios of listed banks



Note: 4-quarter backward moving averages of values at the end of each quarter. Latest data as of 2025/Q1.
Source: S&P Global Market Intelligence.

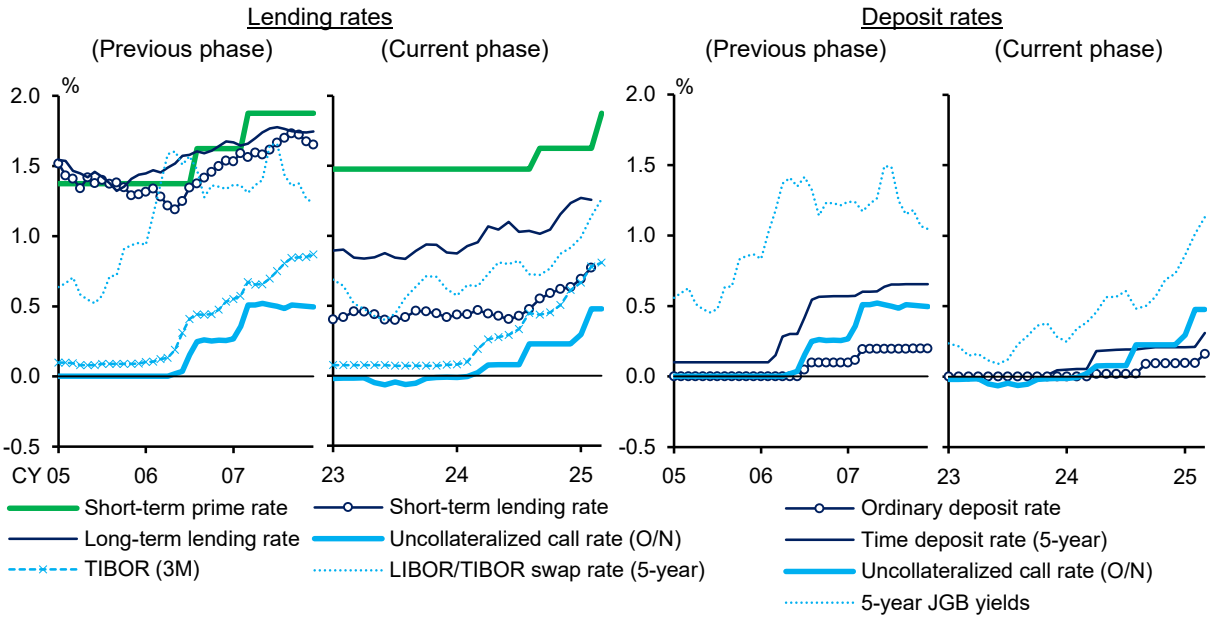
[32] In Chart VI-1-3, changes in ROE based on PPNR excluding trading income are decomposed into the contribution of (1) the RORA factor (gross operating profits from core business excluding trading income/risk-weighted assets), (2) the OHR factor (PPNR excluding trading income/gross operating profits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

Meanwhile, listed banks' price-to-book (P/B) ratios, which are considered to reflect market participants' somewhat longer-term perspective on banks' profitability, have generally been rising recently due to the higher interest rates (Chart VI-1-5). However, the median P/B ratio has remained below 0.5 as banks, especially regional financial institutions, face structural changes such as the shrinking population and declining loan demand in the region. Under these circumstances, it is desirable for banks to formulate their capital policies, including policies on profit distribution, taking into account the balance between profitability and loss-absorbing capacity over a somewhat longer time horizon.

2. Rising interest rates and banks' core profitability

As discussed in Section A of Chapter III, lending rates have continued to rise moderately since the last *Report* in October 2024 (Chart VI-1-6). In the deposit market, interest rates on ordinary deposits were raised to around 0.1 percent during last autumn, and many banks have recently raised them to around 0.2 percent. Interest rates on time deposits have seen moderate increases. As seen in the past, increases in lending rates in response to an increase in market interest rates have tended to exceed increases in deposit rates. Therefore, over a somewhat longer term, rising interest rates are likely to boost banks' profits, although the short-term impact may differ by type of bank, reflecting differences in the volume of investments and loans subject to interest rate renewal.[33]

Chart VI-1-6: Lending and deposit rates (compared to the previous phase of policy rate hikes)

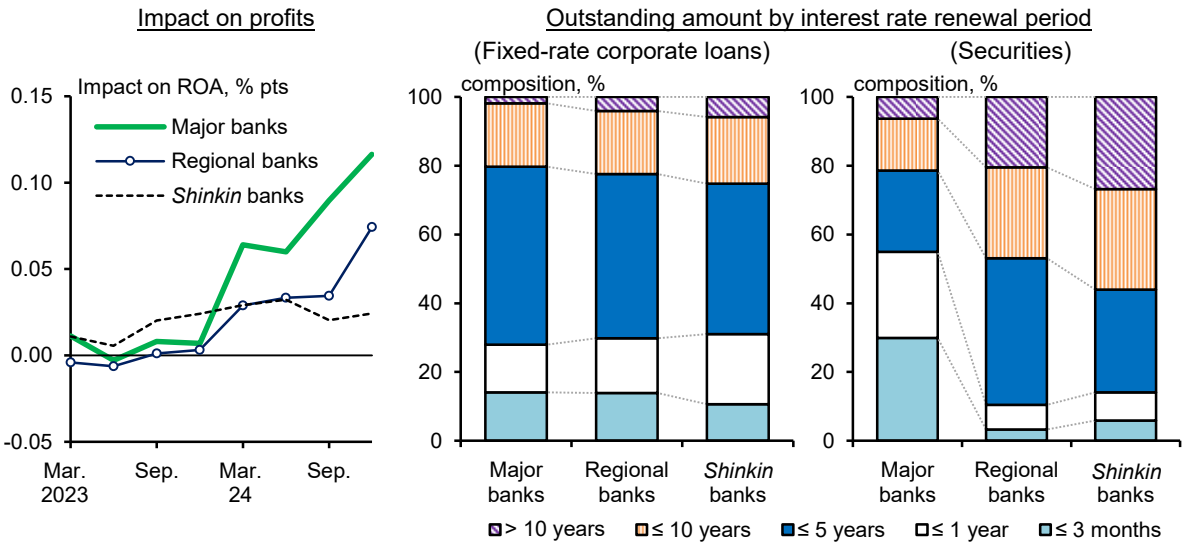


Note: 1. Lending rates indicate average contract interest rates on new loans and discounts (3-month backward moving averages). Deposit rates indicate the typical rates posted at banks. "LIBOR/TIBOR swap rate" indicates the LIBOR swap rate for the previous phase and the TIBOR swap rate for the current phase.
2. The latest data for market rates, short-term prime rates, and deposit rates are as of March 2025. Those for lending rates are as of February 2025.
Source: Bloomberg; Haver Analytics; Ministry of Finance; BOJ.

[33] See Chart IV-4-6 in the previous *Report* for the effects of rising yen interest rates on the PPNR excluding trading income by type of bank over the following one, three, and five years.

Examining the impact of the rise in yen interest rates to date reveals that as interest rate renewals of financial assets held by banks proceed, their lending margins and margins on securities investments improve, leading to an increase in profits (Charts VI-1-7 and III-1-12). However, the pass-through to loan and deposit interest rates could differ across banks due, for example, to differences in their competitive environment and business strategies; therefore, if market interest rates rise further, it is possible that differences in the degree to which banks raise their deposit and lending interest rates will become more pronounced. The following examines the factors that determine banks' interest rate pass-through.

Chart VI-1-7: Impact of rising domestic interest rates on banks' profits



Note: 1. The left-hand chart presents an estimate of the impact of changes in yields from end-2022 on ROA based on PPNR excluding trading income, using data on balances and yields of yen interest rate assets and liabilities (by instrument) at the end of each quarter. The latest data as of end-December 2024 are extended estimates using related data.
2. Data for the right-hand chart are as of end-September 2024.
Source: BOJ.

Lending rates

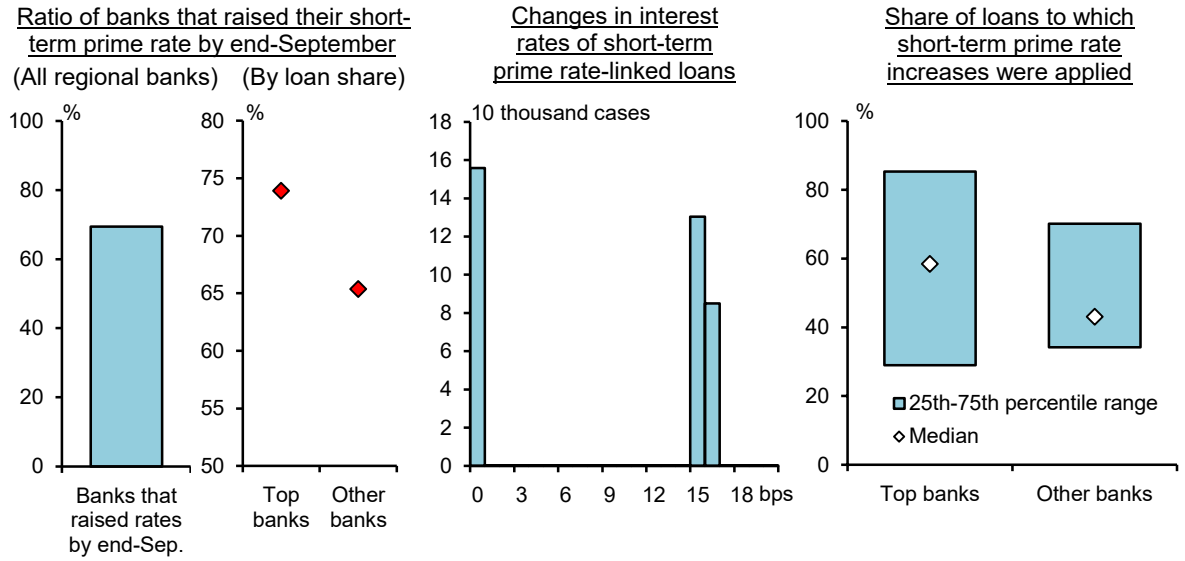
The pass-through to lending rates overall differs among banks. For example, it is higher for major banks, for which a large share of loans consists of market rate-linked loans, while it is lower for regional and *shinkin* banks, for which a large share of loans consists of fixed-rate loans or prime rate-linked loans. That said, banks' competitiveness and the competitive environment they face are also likely to affect the pass-through to some extent.

Using micro data on lending rates (for regional banks[34]) to examine the degree to which changes in market interest rates are reflected in short-term prime rate-linked loans shows that, as of the end of September 2024, about 70 percent of regional banks had reflected the July policy interest rate hike in their short-term prime rates, with the top banks in each prefecture leading the way in raising rates; moreover, the size of the increase in interest rates at banks that raised their prime rates was around 15 basis points for almost all borrowers (Chart VI-1-8).[35]

[34] The analysis uses granular data from the common data platform, a new data collection and management framework between the Financial Services Agency (FSA) and the Bank of Japan. For now, data are collected from member banks of the Regional Banks Association of Japan only. For details of the common data platform and analyses using the data, see Boxes 1 and 2 in this *Report* and Box 4 in the previous *Report*.

[35] Subsequently, as of the end of December 2024, almost all regional banks had raised their short-term prime rates, and such increases appear to be increasingly being applied to lending rates as well.

Chart VI-1-8: Increases in short-term prime rates and their pass-through

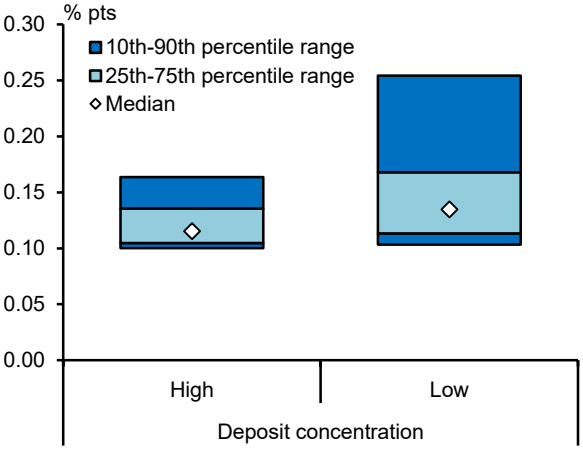


Note: 1. In the left- and right-hand charts, top banks are defined as regional banks with the highest loan share in their home prefecture.
2. The middle and right-hand charts cover regional banks I that raised their short-term prime rates by end-September 2024. Floating-rate loans for which the interest rate did not change from end-December 2023 to end-June 2024 are extracted as short-term prime rate-linked loans. Among such loans, those for which interest rates changed from end-June 2024 to end-September 2024 are identified as loans to which rate increases were applied.
Source: Published accounts of individual banks; BOJ.

Deposit interest rates

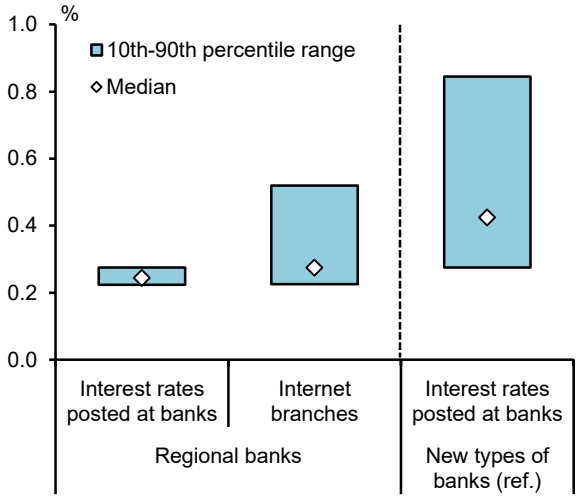
The pass-through of recent interest rate rises to ordinary deposit interest rates is currently around 40 percent, similar to the pass-through observed during the previous phase of rising interest rates. The pass-through to time deposits has also been rising, albeit with a lag. Examining the link between the degree of bank concentration in regional deposit markets (measured in terms of the market share of the top banks) and the degree of increases in time deposit rates shows that although, overall, differences in interest rate increases due to differences in concentration are not large, there is greater variation in interest rates set by banks with their head offices located in regions with a relatively low concentration, such as metropolitan areas (Chart VI-1-9).

Chart VI-1-9: Changes in time deposit rates and deposit market concentration



Note: Shows the changes in time deposit rates (newly contracted, weighted averages using outstanding amounts by maturity) from the beginning of 2023 to February 2025. Covers major, regional, and *shinkin* banks. "Deposit concentration" is grouped based on the share of the top three banks in each bank's home prefecture as of September 2024.
Source: BOJ.

Chart VI-1-10: Time deposit rates (1-year) for internet branches among regional banks



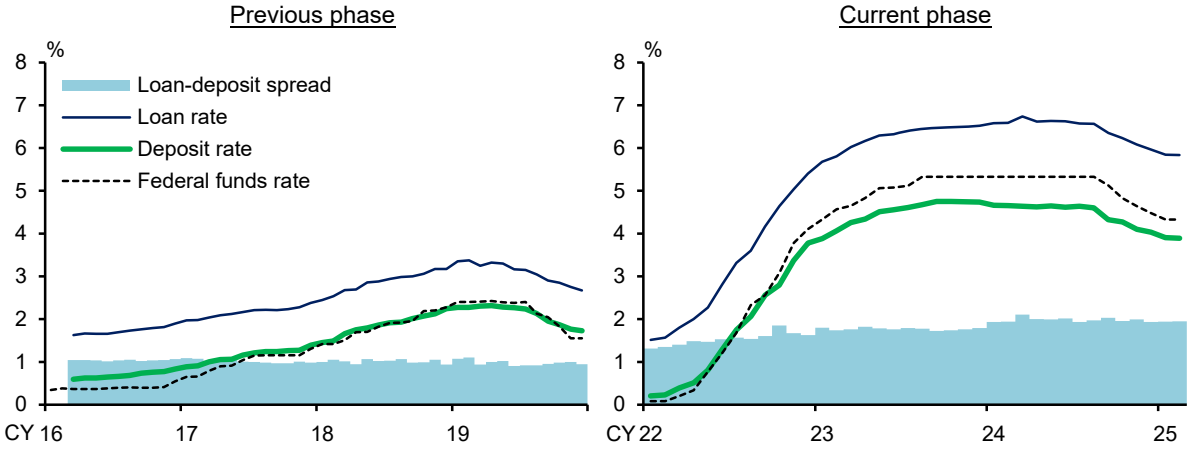
Note: Regional banks cover 40 banks whose time deposit rates for internet branches are available on their website. Data as of end-March 2025.
Source: Published accounts of individual banks.

In addition, internet-only banks, whose share of deposits has been increasing, tend to offer higher interest rates on time deposits, while some regional financial institutions are similarly offering higher interest rates at their internet branches (Chart VI-1-10). It is conceivable that these higher deposit interest rates to some extent reflect the strong efforts being made to acquire deposits and the low costs of managing accounts. From a broader perspective, banks need to formulate deposit acquisition strategies that take into account in their management strategies the importance of this new competitive area and the impact on their core profitability, such as the extent to which the new competitive area allows them to attract customers while ensuring profitability, and what challenges it poses to banks in securing stable deposits.

Foreign loan and deposit interest rates

Looking at foreign currency-denominated deposits and loans, interest rates on dollar-denominated loans at major banks had been rising in line with the substantial rise in market interest rates, as the majority of their loans are floating-rate loans; however, they have started to decline due to the interest rate cuts in the United States since last autumn (Chart VI-1-11). Deposit interest rates have been declining as well, and the loan-deposit spread has remained more or less unchanged.

Chart VI-1-11: Foreign loan-deposit interest rates (compared to the previous phase of policy rate hikes)



Note: "Loan/Deposit rate" and "Loan-deposit spread" are weighted averages of major banks. Latest data as of February 2025.
Source: FRED; BOJ.

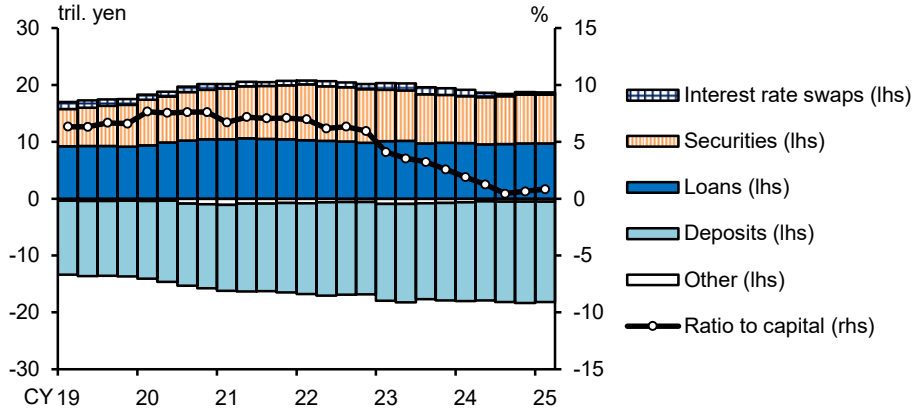
3. Rising interest rates and banks' resilience

Yen interest rate risk in the banking book (IRRBB, in terms of the 100 BPV) relative to banks' capital has remained low and banks overall have sufficient loss-absorbing capacity, as will be discussed in section B of this Chapter (Chart VI-1-12). The amount of yen interest rate risk on the asset side (loans and securities) and the liability side (deposits) is more or less in balance.

On the asset side, looking at banks' rebalancing of yen-denominated bondholdings shows that while some banks have been increasing their holdings of yen-denominated bonds, banks overall have maintained a cautious stance toward interest rate risk-taking, shortening the duration of yen-denominated bondholdings and actively using interest rate swaps transactions (Charts III-1-16 and VI-1-13). Banks with relatively low resilience to rising interest rates have tended to continue to decrease their outstanding amount of yen-denominated bondholdings and to shorten their duration. Moreover, mindful of possible further rises in interest rates, a growing number of banks have

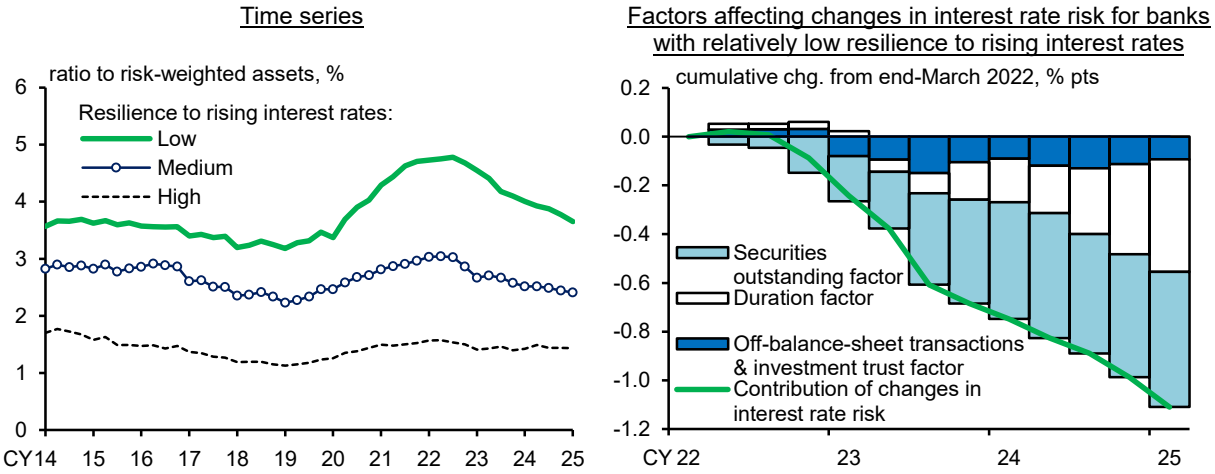
recently been increasing their holdings of held-to-maturity bonds or raising loans backed by yen-denominated bonds, neither of which are subject to mark-to market valuation (Chart VI-1-14).[36]

Chart VI-1-12: Interest rate risk in the banking book



Note: Shows yen interest rate risk in terms of the 100 BPV at the end of each quarter. Latest data as of 2025/Q1 (end-February). From 2024/Q4, "Securities" is estimated based on monthly data of the amount of interest rate risk, and "Loans" and "Deposits" are estimated based on monthly data of the outstanding amounts.
Source: BOJ.

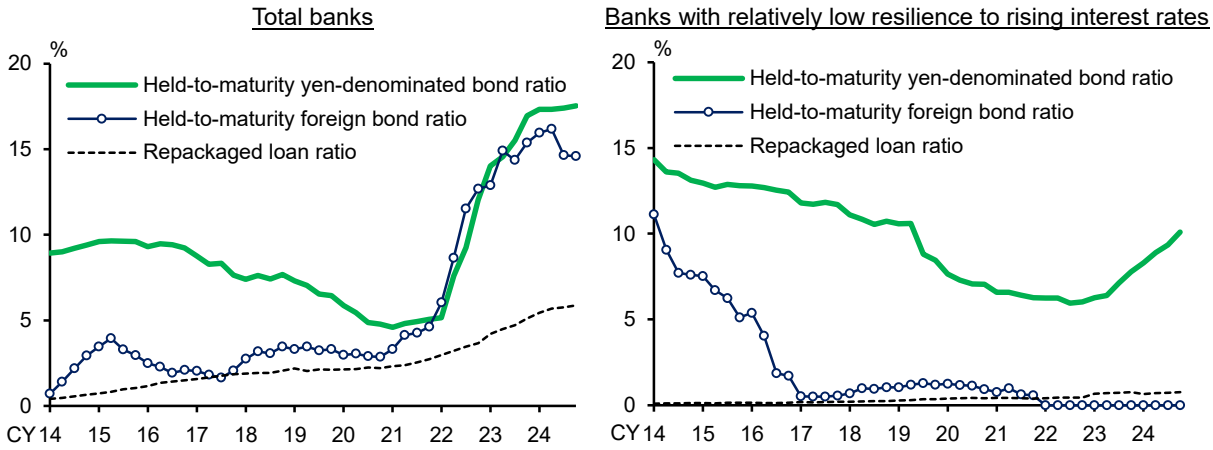
Chart VI-1-13: Interest rate risk of securities holdings of banks by resilience to rising interest rates



Note: 1. Indicates the ratio of yen interest rate risk (100 BPV) to risk-weighted assets. "Resilience to rising interest rates" classifies banks into three groups based on "the level of long-term interest rates at which the required capital adequacy ratios are maintained when valuation gains/losses on all investment securities are taken into account" as of end-March 2022 (see the October 2024 issue of the *Report* for details of the estimation method).
2. Covers regional and *shinkin* banks. Latest data as of 2025/Q1 (end-February).
Source: BOJ.

[36] The interest rate risk on held-to-maturity bonds and loans is considered part of the interest rate risk in the banking book, similar to that of other bonds. That being said, when bonds are classified as held-to-maturity, valuation losses are not recorded in accounting, which makes banks' capital and distributable profits less susceptible to short-term interest rate fluctuations; however, it is important to note that this classification limits their use as a liquidity buffer in the event of stress. In addition, due to the complex product characteristics of some structured receivables, banks need to establish a risk management framework tailored to their specific risk profiles.

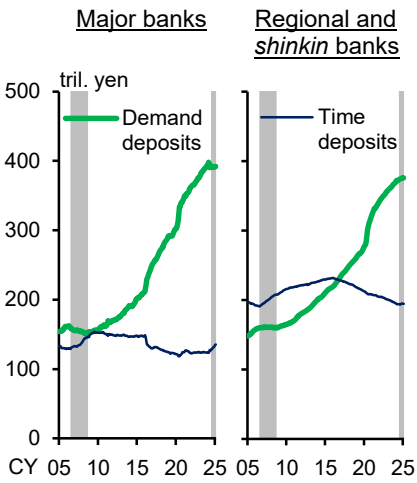
Chart VI-1-14: Ratios of bondholdings not subject to mark-to-market valuation



Note: 1. "Held-to-maturity ratio" in the left-hand chart covers major, regional, and *shinkin* banks. "Repackaged loan ratio" (ratio to yen-denominated bondholdings) covers regional and *shinkin* banks.
2. In the right-hand chart, "Banks with relatively low resilience to rising interest rates" is based on the classification in Chart VI-1-13.
3. Latest data as of 2024/Q4.
Source: BOJ.

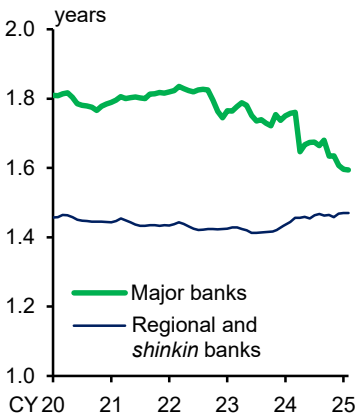
On the liability side, looking at developments in deposits outstanding indicates that the growth in demand deposits has stalled since 2024, while time deposits have started to rise, reversing the downward trend seen since 2016 (Chart VI-1-15). Developments in the average maturity of time deposits show mixed trends recently: whereas the average maturity at major banks has declined due to an increase in corporate time deposits with a short maturity, it has slightly increased at regional and *shinkin* banks, where retail deposits account for a large share of the total (Chart VI-1-16).

Chart VI-1-15: Deposits outstanding



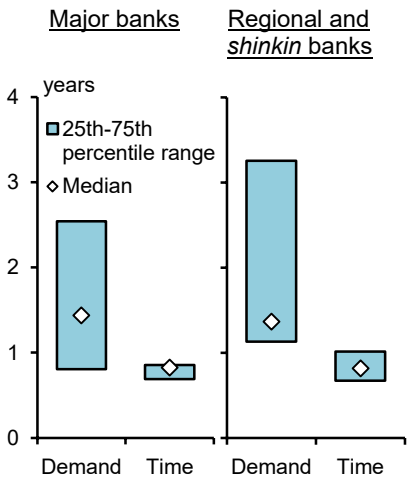
Note: Seasonally adjusted. "Time deposits" includes CDs. The shaded areas indicate the phases of policy rate hikes. Latest data as of February 2025.
Source: BOJ.

Chart VI-1-16: Average maturity of time deposits



Note: Shows the weighted averages of maturities at the time of deposit. Latest data as of February 2025.
Source: BOJ.

Chart VI-1-17: Duration of demand and time deposits



Note: Data as of end-September 2024.
Source: BOJ.

Although there may be a shift to longer-maturity time deposits as the interest rate environment changes, at present, the duration of demand deposits, including core deposits, is regarded to be significantly longer than that of time deposits. Therefore, in terms of the duration of deposits overall,

there is some possibility that the downward effect of the decline in demand deposits will outweigh the upward effect of the shift within time deposits (Chart VI-1-17).[37] Banks need to adjust their amount of interest rate risk on the investment side to match their capacity to absorb losses in response to changes in the duration gap between assets and liabilities.

B. Macro stress testing

This section examines comprehensively whether banks have sufficient loss-absorbing capacity, using macro stress testing assuming specific stress events.[38,39]

The stress testing assumes two downside scenarios: a "rises in foreign interest rates" scenario, and a "financial stress" scenario. The rises in foreign interest rates scenario assumes a slowdown in foreign economies and rises in foreign interest rates, which reflect a global surge in prices triggered by the materialization of geopolitical risks and other factors. The financial stress scenario assumes stress of the same magnitude as that observed at the time of the global financial crisis, and is used in the *Report* on a regular basis.

Moreover, based on the risks surrounding the NBFI sector at home and abroad and the implications for financial stability discussed in Section B of Chapter V, the last part of this section presents an exploratory analysis that builds on the financial stress scenario but additionally takes into account the amplification of shocks via investment funds.

The 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

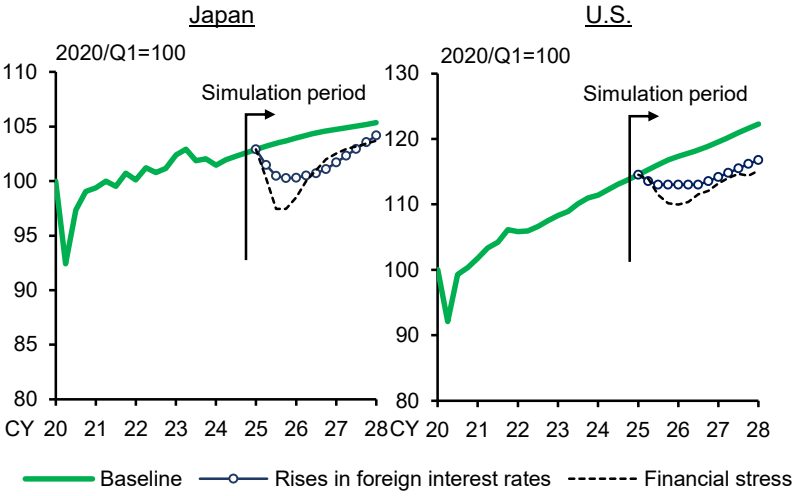
The baseline scenario assumes that Japan's economy keeps growing as foreign economies continue to grow moderately, based on the average of forecasts by several research institutions and market expectations as of January 2025 (Chart VI-2-1). As for financial variables, it is assumed that all of the currently 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 move in line with the forward rate curve at the end of January 2025, and short-term yen interest rates are assumed to reach slightly more than 1 percent at the end of the simulation period (Chart VI-2-2). It is assumed that other financial variables (stock prices, crude oil prices, exchange rates, and various credit spreads) are unchanged from their levels at the end of January 2025.

[37] Moreover, with regard to factors that affect the duration of demand deposits, it is important to note that, as mentioned above, the interest rate pass-through to deposit interest rates could change depending on financial conditions, and that the stickiness of deposits could change as a result of structural changes in the economy and financial environment, as described in Section C in Chapter IV of this *Report*.

[38] 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.

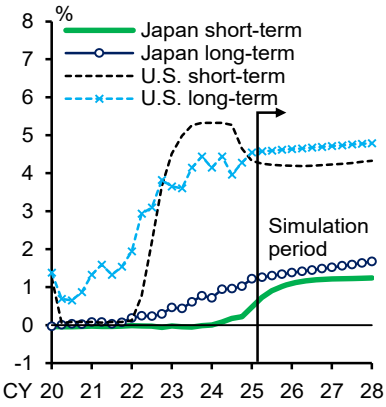
[39] The stress testing targets 107 banks and 247 *shinkin* banks. The simulation period is from the October-December quarter of 2024 through the January-March quarter of 2028. For the main economic and financial variables of the assumed scenarios, refer to the "Scenario Tables" on the Bank's website.

Chart VI-2-1: GDP



Note: Indexed so that real GDP in 2020/Q1 is set as 100.
Source: BEA; Cabinet Office; IMF; Japan Center for Economic Research.

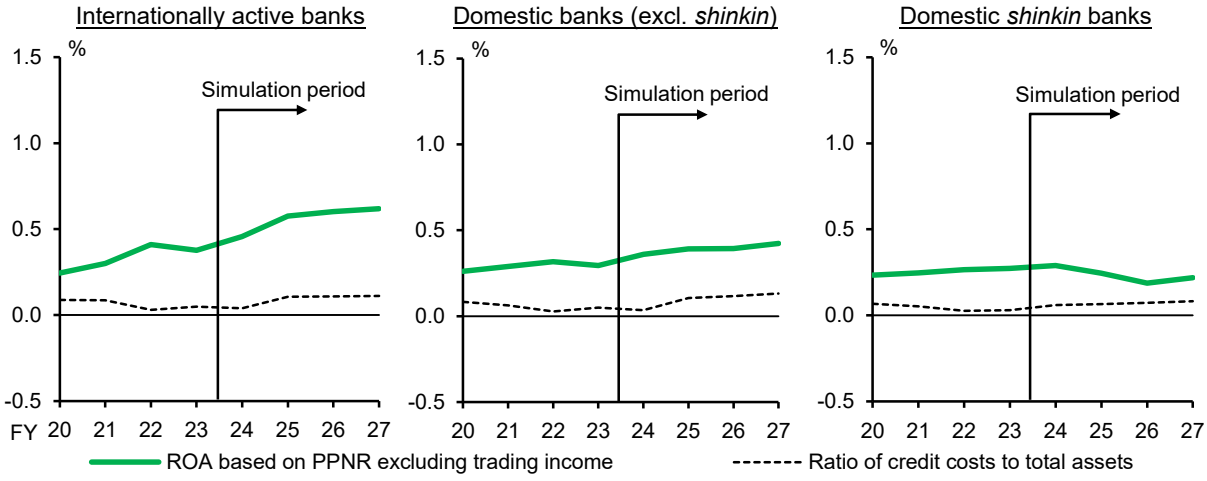
Chart VI-2-2: Interest rates



Note: 1. Interest rates through the simulation period are based on the forward rate curve derived from the yield curve.
2. Short-term rates are overnight rates. Long-term rates are 10-year yields.
Source: FRB; Haver Analytics; Ministry of Finance.

The simulation results indicate that the PPNR excluding trading income of both internationally active banks and domestic banks (excluding *shinkin* banks) increases due to the economic recovery and improved interest margins reflecting rising interest rates (Chart VI-2-3). Compared with those banks, domestic *shinkin* banks, whose investment assets have a relatively longer duration, start to see an improvement in their PPNR excluding trading income with some delay. In addition, while all types of banks experience an increase in credit costs reflecting factors such as the rise in loans outstanding, this increase is limited compared to their PPNR excluding trading income. Capital adequacy ratios at the end of the simulation period (as of end-fiscal 2027) are overall sufficiently above regulatory requirements for all types of banks (Chart VI-2-4).[40]

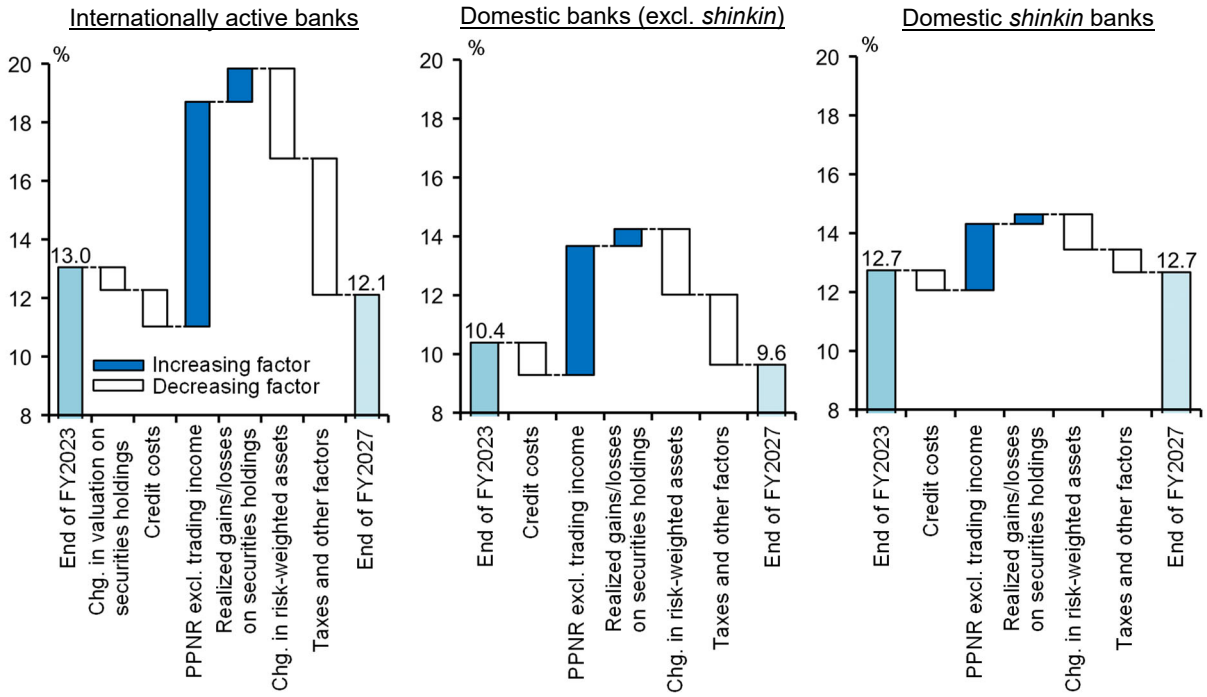
Chart VI-2-3: PPNR excluding trading income and credit costs: Baseline



Note: Shows the average values by type of bank.

[40] The introduction of the capital floor as a part of the finalization of Basel III will increase risk-weighted assets at banks using the internal ratings-based (IRB) approach and will effectively lower the capital adequacy ratios of internationally active banks and domestic banks (excluding *shinkin* banks). The capital floor ensures that the amount of risk-weighted assets calculated using the IRB approach does not fall below a certain percentage (floor) of risk-weighted assets calculated using the standardized approach. The percentage for the capital floor will be gradually raised until the end of fiscal 2028, so that the impact will be greater in the latter half of the simulation period (i.e., risk-weighted assets will increase). For internationally active banks, which will be particularly affected by these changes, the capital adequacy ratio at the end of fiscal 2027 will be reduced by about 2 percentage points. The simulations here do not take into account management actions by banks in response to the increase in risk-weighted assets.

Chart VI-2-4: Decomposition of capital adequacy ratio: Baseline



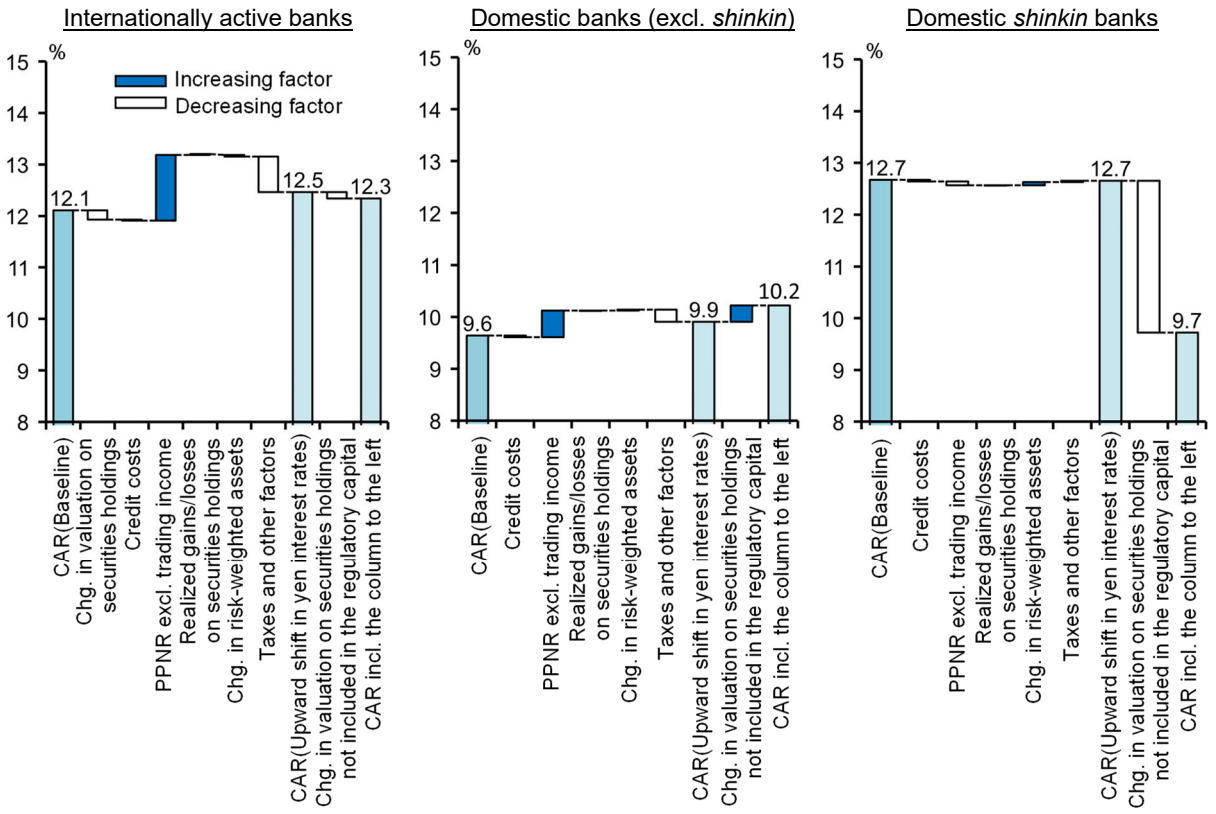
Note: Indicates the contribution of each factor to the difference between the capital adequacy ratios at end-fiscal 2023 and the end of the simulation period (as of end-fiscal 2027) under the baseline scenario.

Next, as in the previous issue of the *Report*, a sensitivity analysis is conducted assuming that there is a parallel upward shift of 1 percentage point in yen interest rates only, compared to the baseline scenario. The result indicates that for all types of banks the average capital adequacy ratios are almost identical to those in the baseline scenario and remain sufficiently above regulatory levels (Chart VI-2-5).[41] Although the impact of the upward shift in yen interest rates differs by type of bank, overall, the impact of the increase in credit costs is small, so that the increase in PPNR excluding trading income boosts capital adequacy ratios. Looking at changes in capital adequacy ratios taking into account valuation gains/losses on all investment securities shows that in response to the upward shift in yen interest rates, these capital adequacy ratios, just like the capital adequacy ratios on a regulatory capital basis, remain sufficiently above regulatory levels on average for all types of banks.[42]

[41] It is assumed that in the April-June quarter of 2025, there is a 1 percentage point parallel upward shift in short- and long-term interest rates from the baseline scenario, and interest rates remain 1 percentage point above the baseline scenario until the end of the simulation period. Meanwhile, economic variables regarding the domestic and foreign economies and financial variables other than yen interest rates are the same as in the baseline scenario. In addition, management actions by banks in response to a rise in interest rates are not taken into account.

[42] Specifically, all securities are evaluated on a mark-to-market basis, regardless of whether they are held to maturity or whether they are included in regulatory capital.

Chart VI-2-5: Decomposition of capital adequacy ratio: Sensitivity analysis, upward shift in yen interest rates



Note: 1. CAR represents capital adequacy ratio.
2. Indicates the contribution of each factor to the difference, at the end of the simulation period (as of end-fiscal 2027), between the capital adequacy ratios under the baseline scenario and the scenario of the upward shift in yen interest rates.
3. "CAR (Baseline)" and "CAR (Upward shift in yen interest rates)" are the capital adequacy ratios for regulatory capital. "CAR incl. the column to the left" is the ratio for capital taking valuation gains/losses on all investment securities into account under the scenario of the upward shift in yen interest rates.

2. Rises in foreign interest rates scenario

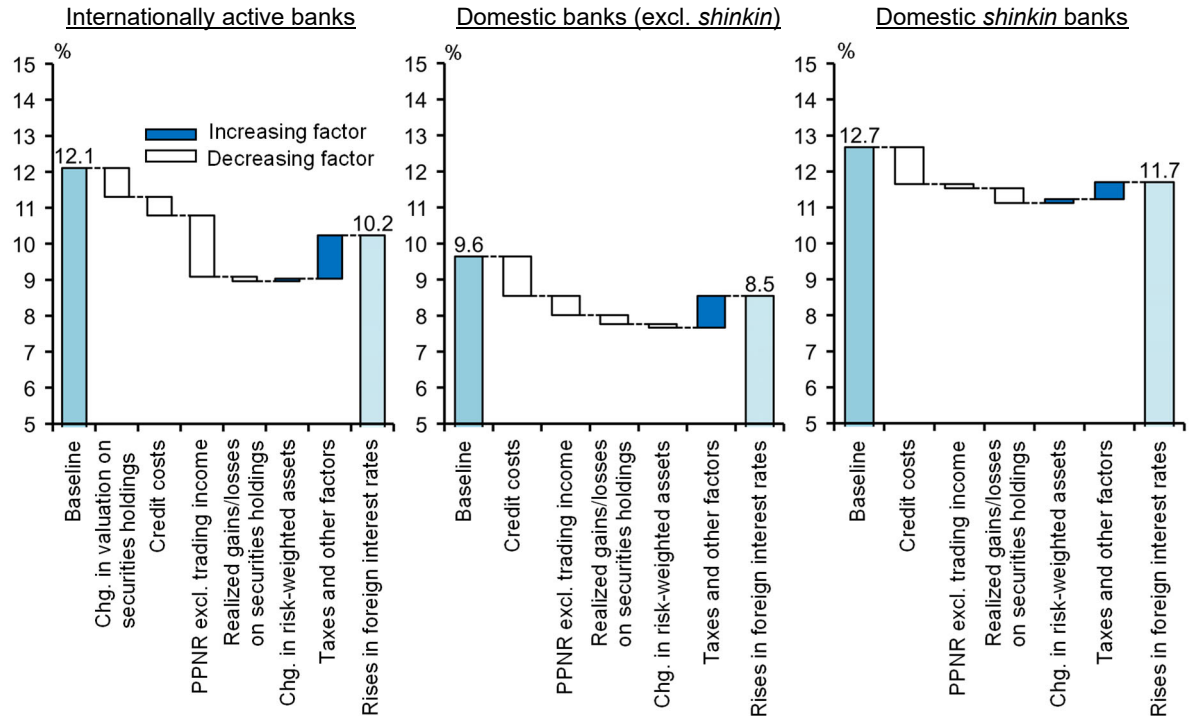
The rises in foreign interest rates scenario assumes a slowdown in foreign economies and rises in foreign short- and long-term interest rates, which reflect a global surge in prices triggered by the materialization of geopolitical risks and other factors. Specifically, as in the previous issue of the *Report*, it is assumed that the U.S. federal funds rate becomes 2 percentage points higher than in the baseline scenario after the April-June quarter of 2025. The interest rate remains high for one year before decreasing moderately toward the end of the simulation period. U.S. long-term interest rates are assumed to be 1 percentage point higher than in the baseline scenario and remain high throughout the simulation period, indicating that interest rates for all maturities are assumed to rise. Similarly, interest rates for all maturities in Europe are assumed to remain elevated, like those in the United States.

Turning to the real economy, both the U.S. and European economies are assumed to decelerate due to the increase in prices and interest rates (Chart VI-2-1). The growth rate of the U.S. economy is assumed to turn slightly negative in the first half of fiscal 2025 and remain zero thereafter for one year. It is assumed that prices of risky assets fall as the real economy deteriorates, and crude oil prices rise to the peak marked before the global financial crisis. Japan's economy slows down due to the deterioration in foreign economies and in the terms of trade.

The simulation results indicate that capital adequacy ratios at the end of fiscal 2027 are lower than in the baseline scenario for all types of banks (Chart VI-2-6). First, the ratios are pushed down by

a decrease in foreign net interest income and hence a decline in PPNR excluding trading income due to rising foreign currency funding costs, mainly among internationally active banks with high foreign exposures. In addition, credit costs increase for all types of banks due to a deterioration in corporate profits through rising raw material costs and a deterioration in economic activity. However, capital adequacy ratios overall 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 interest rates remaining higher for longer.

Chart VI-2-6: Decomposition of capital adequacy ratio: Rises in foreign interest rates



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 2027) under the baseline scenario and the rises in foreign interest rates scenario.

3. Financial stress scenario

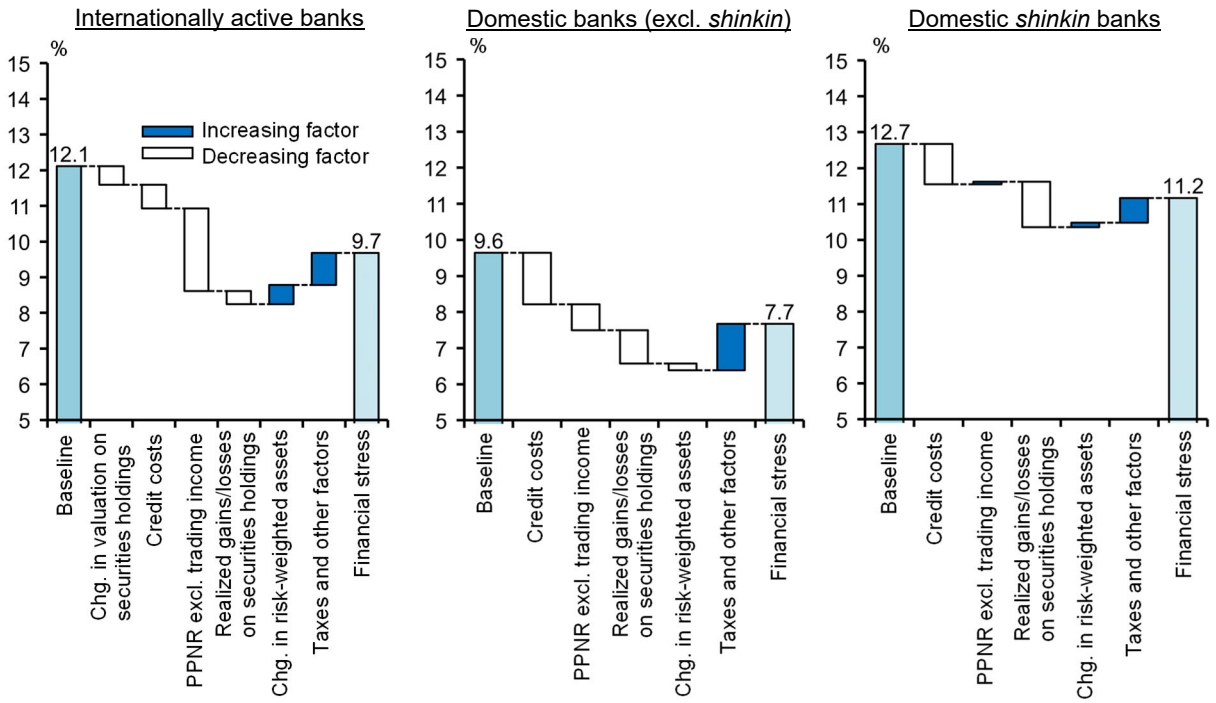
The financial stress scenario assumes that global financial markets experience a negative shock in the April-June quarter of 2025, comparable to that during the global financial crisis. Regarding financial variables, it is assumed that, with prices of risky assets plummeting and domestic and foreign interest rates declining to record low levels, the yen appreciates in foreign exchange markets.[43] In addition, Japan's economy decelerates, 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 2027 are substantially lower than in the baseline scenario (Chart VI-2-7). The decrease in capital adequacy ratios reflects a decline in interest margins due to the fall in interest rates (a decline in PPNR

[43] In past issues of the *Report*, the financial stress scenario, following the experience of the market turmoil in March 2020, assumed somewhat more severe stress than during the global financial crisis, including the ad hoc assumption that spreads on foreign high-rated bonds would also rise significantly. This *Report* instead presents an exploratory analysis, described below, to consider the mechanisms through which a shock exacerbated by the non-bank financial sector could have a broader impact. To avoid the rise in spreads on high-rated bonds in the exploratory analysis being excessive, the financial stress scenario in this *Report* assumes an increase similar to that during the global financial crisis.

excluding trading income), an increase in credit costs resulting from the deterioration in the economic environment, and a decline in the prices of risky assets (a deterioration in both valuation and realized gains/losses on securities holdings). Nevertheless, 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 substantial and acute stress.

Chart VI-2-7: 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 2027) under the baseline scenario and the financial stress scenario.

4. Evaluation of the resilience of the financial system

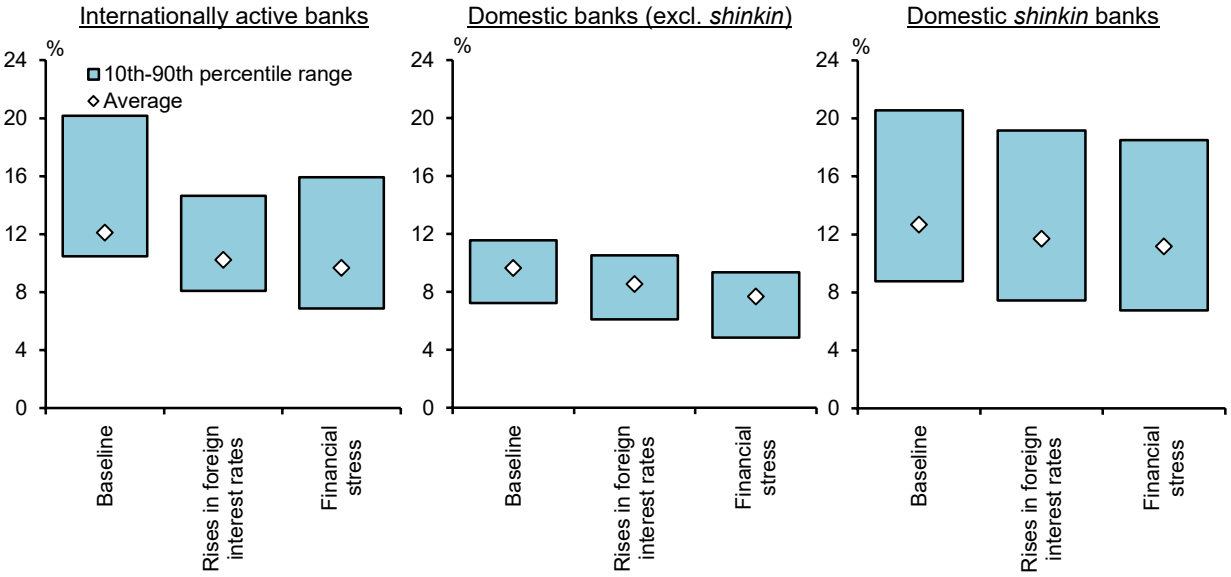
The results of the macro stress testing indicate that Japanese banks on the whole are resilient to potential stress such as a resurgence of global inflation and a further rise in foreign interest rates, or a situation similar to the global financial crisis with substantial and acute adjustments in financial markets and a deterioration in foreign economies occurring at the same time (Chart VI-2-8).[44] These results reflect the fact that banks have increased their resilience by increasing their capital since the global financial crisis, and borrower firms overall have maintained robust financial bases even after the pandemic.

Since the beginning of April, financial markets at home and abroad have fluctuated significantly, while uncertainty has heightened regarding the formulation of trade and other economic policies in each jurisdiction, geopolitical risks, and developments in global financial markets. Under these circumstances, the results of the macro stress testing imply that even under a certain stress, functioning of financial intermediation in Japan will be maintained. However, future developments, including trade policy in each jurisdiction, are highly uncertain. Furthermore, the effects of these developments on global financial markets and the real economy are very uncertain, including their

[44] 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. Systemically important banks are required to maintain additional capital buffers, which are 1.0 to 1.5 percent in the case of global systemically important banks, and 0.5 percent for domestic systemically important banks.

magnitude, extent, and persistence, since similar stress has not occurred globally, at least in recent years. Banks must assess appropriately the various risks they face, taking into account future developments.

Chart VI-2-8: Distribution of capital adequacy ratios



Note: The markers and bands indicate the averages and the 10th-90th percentile ranges of capital adequacy ratios at the end of the simulation period (as of end-fiscal 2027), respectively.

5. Exploratory analysis in light of the growing presence of domestic and foreign investment funds

Finally, this subsection, taking the financial stress scenario as its point of reference, presents an exploratory analysis examining the impact that a shock similar to the global financial crisis would have on banks' capital adequacy ratio if it were amplified by portfolio adjustments by domestic and foreign investment funds.

At present, there is insufficient data on non-bank entities, such as investment funds, and research on their economic behavior is still ongoing. Moreover, it is difficult to quantify the multi-layered credit and leverage links between these investment funds on the one hand, and insurance, pension funds, and banks on the other. Due to these limitations, the analysis presented here relies on certain assumptions, such as conservative estimates of the inertia of asset prices in response to stress, so that the results should be interpreted with some latitude.

Specifically, it is assumed that foreign investment funds sell assets on a large scale in the April-June quarter of 2025, surpassing the levels seen during the global financial crisis (Chart VI-2-9). (1) As a result of foreign open-end funds selling government bonds on a large scale to secure liquidity, long-term interest rates in Japan and the United States temporarily rise substantially, compared to the financial stress scenario; moreover, spreads on U.S. corporate bonds rise considerably and for a prolonged period due to fire sales of illiquid assets.[45] Furthermore, (2) it is assumed that the deterioration in foreign economies is more severe than in the financial stress

[45] In this scenario, taking into account past stress events such as the outbreak of the COVID-19 pandemic, where long-term government bonds were sold, Japanese and U.S. long-term interest rates become higher than in the financial stress scenario, temporarily but considerably. Subsequently, long-term interest rates are expected to fall to their lowest levels, as in the financial stress scenario, with U.S. interest rates assumed to fall to 0.7 percent and yen interest rates to 0 percent.

scenario due to additional adjustments in financial markets, while the domestic economy slows down due to the deterioration in financial conditions and foreign economies. In addition, (3) it is assumed that Japanese banks' foreign investment fund holdings see additional price declines and that some of their lending exposures to foreign investment funds become impaired. Domestic investment fund holdings see price declines as well, reflecting a deterioration in domestic and foreign financial markets. Meanwhile, the increase in volatility in international financial markets is assumed to worsen the foreign currency funding environment, so that Japanese banks' dollar funding costs also rise further.

Chart VI-2-9: Scenario in exploratory analysis

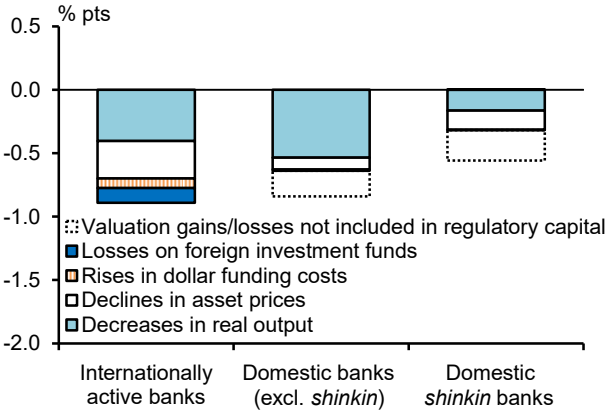
Main variables			Estimation method of additional impacts in the scenario	Additional impacts
Financial variables	10-year U.S. Treasury yield 10-year JGB yield Credit spread on U.S. corporate bonds (BBB)		Estimated based on "1. Increase in the outstanding amount of bonds since the global financial crisis (GFC) "× "2. Share of the amount of assets sold during the GFC" × "3. Estimated w eekly price impact per unit"	+ 0.6%pts + 0.4%pts + 600bps
	U.S. stock price Japanese stock price		Based on the estimated real GDP (see below) and the relationship betw een real GDP and stock prices	About -14% About -12%
	Fund price			
		Fixed income Credit products Real estate funds	Based on the additional impact of yield related to each fund price (fixed income: long-term yields, credit products: credit spread on U.S. corporate bonds, real estate funds: credit spread on CMBS)	About -13% (on average)
		Multi-asset Private equity Hedge funds	Based on the estimated stock prices and the relationship betw een fund prices and stock prices during the GFC	About -7% (on average)
Economic variables	U.S. real GDP Japanese real GDP		Based on the simulation results of macro-econometric models: FRB/US model for the U.S. and FMM model for Japan	About -1% About -1%
Impairment rate of loans	Loans to foreign funds		Based on the default rate of loans to low -rated borrow ers during the GFC	About -10%

Note: 1. "Additional impact" for each variable is the maximum difference between the values under the financial stress scenario and the exploratory analysis.
2. Additional impact on other financial variables, including credit spread on RMBS, CMBS, ABS, and CLO, is also estimated based on the amount sold by investment funds.

The simulation results indicate that while the capital adequacy ratios of internationally active banks would be about 1 percentage point lower than in the financial stress scenario, overall, they would still exceed regulatory levels (Chart VI-2-10). In addition to the greater valuation losses on securities due to the fall in asset prices, the lower capital adequacy ratios reflect losses on lending to and investments in foreign funds, the rise in dollar funding costs, and increased credit costs due to the additional slowdown in the domestic and foreign economies. While the impact on domestic banks (including *shinkin* banks) would be relatively small, they would also be affected to some extent by the slowdown in the domestic economy as well as valuation losses on securities, although these losses on securities are not included in their regulatory capital adequacy ratios.

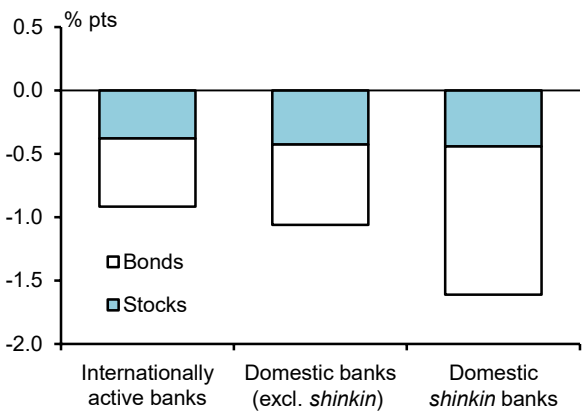
In the short term, valuation losses on securities temporarily increase immediately after the shock, when financial market volatility is at its highest. Valuation losses on securities relative to banks' risk-weighted assets in the April-June quarter of 2025 are about 1 percentage point larger for internationally active banks and domestic banks (excluding *shinkin* banks), and close to 2 percentage points larger for domestic *shinkin* banks than in the financial stress scenario (Chart VI-2-11). However, since banks have sufficient capital, overall they can be assessed as having the financial base sufficient to provide stable financial intermediation even when financial market volatility is at its highest.

Chart VI-2-10: Decrease in capital adequacy ratio compared to the financial stress scenario (as of end-fiscal 2027)



Note: 1. Indicates the contribution of each factor to the difference between the capital adequacy ratios as of end-fiscal 2027 under the financial stress scenario and the exploratory analysis.
2. "Declines in asset prices" represents the change when only financial variables take values assumed for the exploratory analysis. "Rises in dollar funding costs" and "Losses on foreign investment funds" are excluded from "Decline in asset prices."

Chart VI-2-11: Valuation and realized gains/losses on securities holdings when initial shocks hit the model economies (as of the April-June quarter of 2025)



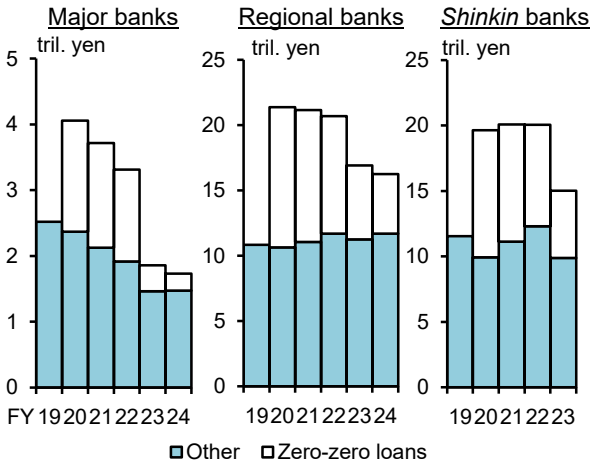
Note: 1. Shows the contribution to the difference between the gains/losses under the financial stress scenario and the exploratory analysis as of 2025/Q2.
2. Gains/losses are valuation and realized gains/losses on bonds and stocks holdings relative to risk-weighted assets. Bonds include held-to-maturity bonds and stocks include investment funds.

Box 1: Financial conditions of firms with effectively interest-free and unsecured loans

This Box examines the financial conditions and defaults of the recipient firms of effectively interest-free and unsecured loans (so called zero-zero loans) using granular data from the common data platform, a novel framework for data collection and management by the Financial Services Agency (FSA) and the Bank of Japan.[46]

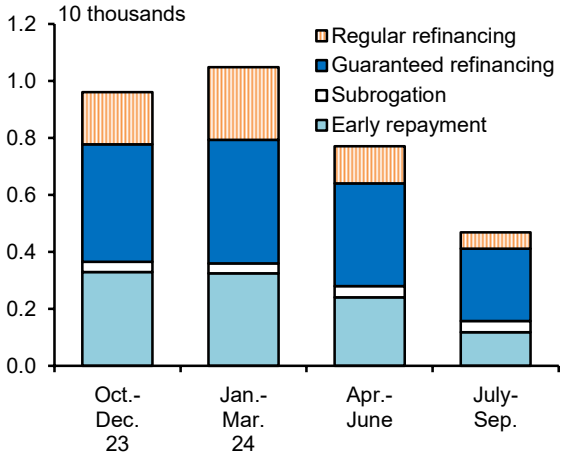
With the initial three-year interest subsidy periods for zero-zero loans extended from May 2020 to March 2021 successively coming to an end, the outstanding amount of guaranteed loans has been declining as a whole since fiscal 2023 (Chart B1-1). The early repayment of zero-zero loans accounts for close to half of the decline in the number of such loans, while refinancing accounts for more than half (Chart B1-2).[47] Looking at the financial conditions of recipient firms shows that those that had repaid their loans early or started using regular loans had relatively favorable financial conditions, while among those with relatively weak financial conditions there were cases of firms that ended up being subject to subrogation. Meanwhile, the financial conditions of firms that had changed to other guaranteed loans were generally the same as those of firms that continued to use zero-zero loans (Chart B1-3).

Chart B1-1: Guaranteed loans outstanding



Note: "Zero-zero loans" for fiscal 2020 is an estimated value. The latest data for major and regional banks are as of the first half of fiscal 2024 and those for *shinkin* banks are as of fiscal 2023.
Source: BOJ.

Chart B1-2: Decreasing factors of zero-zero loans

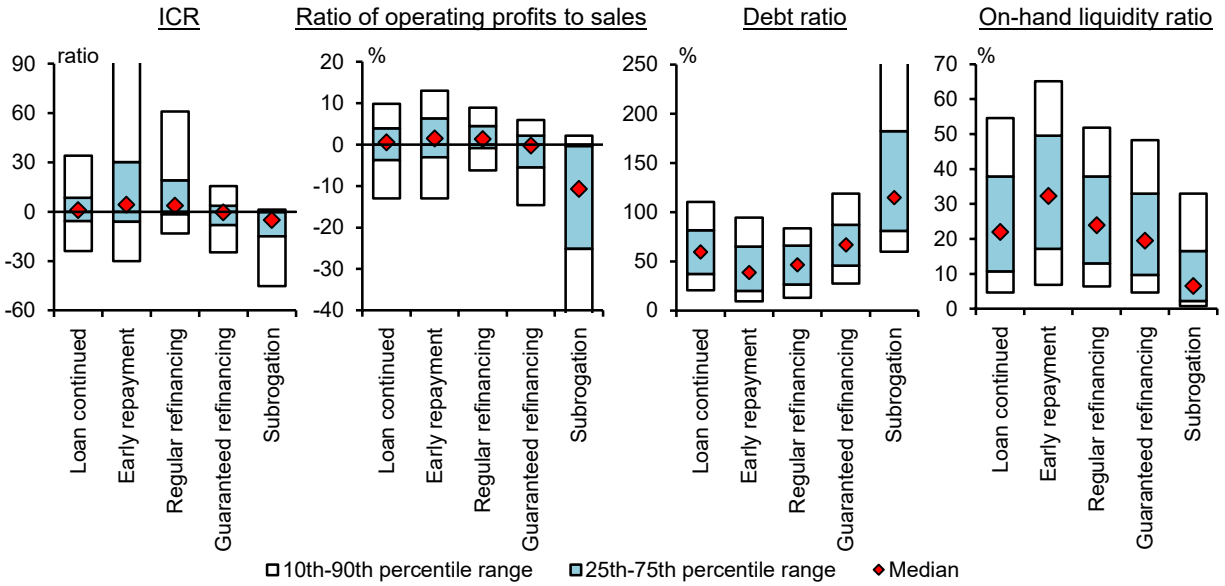


Note: If both guaranteed and regular loans are provided, they are counted as guaranteed refinancing.
Source: BOJ.

[46] For an overview of the common data platform, see, for example, Box 4 of the previous *Report*. The analysis in this *Report* is based on loan data of member banks of the Regional Banks Association of Japan collected since fiscal 2023. The FSA and the Bank plan to begin full-scale data collection, including from major banks and member banks of the Second Association of Regional Banks (regional banks II), from fiscal 2025.

[47] For details of the method to extract zero-zero loans from the common data platform, see Box 4 in the previous *Report.* Loans that were previously identified as zero-zero loans but whose information subsequently became missing, even though they had not yet reached maturity, were classified for each quarter in the following manner: (1) if the recipient firm was subject to subrogation, the loan was regarded as being subject to subrogation; (2) if the firm took out a new loan in that quarter, the loan was classified as having been refinanced with another guaranteed loan or refinanced with a regular loan, depending on whether the new loan was guaranteed or not; and (3) in all other cases, the loan was regarded as having been repaid early.

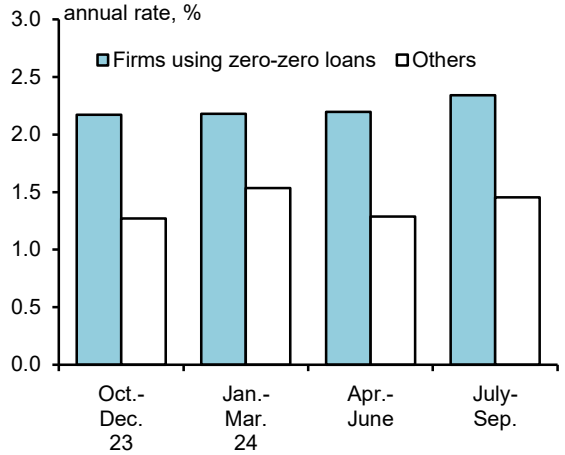
Chart B1-3: Financial conditions of firms with zero-zero loans by repayment status



Note: 1. Debt ratio is the ratio of borrowings to total assets. On-hand liquidity ratio is the ratio of on-hand liquidity to total assets.
2. Covers SMEs with zero-zero loans outstanding from regional banks I as of end-September 2023.
Source: BOJ.

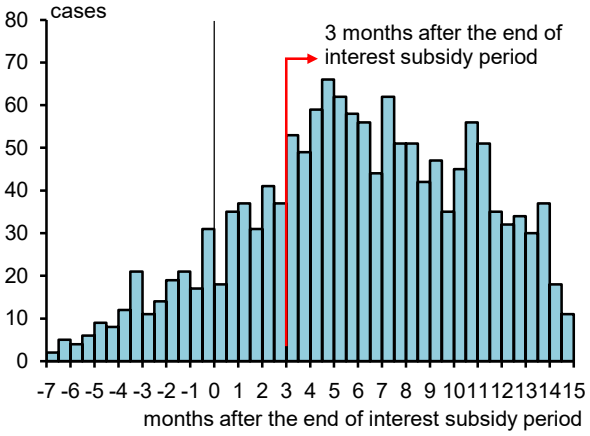
Looking at the defaults of firms that took out zero-zero loans shows that throughout the end of 2023 and 2024 -- the period when loans for which the interest subsidy period ended and the repayment period started were frequently seen -- the default rate was consistently higher than that of firms that did not take out zero-zero loans (Chart B1-4). Looking at the number of subrogation cases by the number of months since the end of the interest subsidy period shows that the number of cases peaks within three to five months after the end of the subsidy period and then declines (Chart B1-5). Given that zero-zero loans whose interest subsidy period came to an end seems to have peaked around spring 2024, the number of firms that gave up on staying in business and became subject to subrogation has likely declined since its peak in the July-September quarter of 2024.

Chart B1-4: Actual default rates of firms using zero-zero loans



Note: Defaults are defined as being downgraded to "special attention" or below.
Source: BOJ.

Chart B1-5: Interest subsidy period and subrogation cases



Note: Covers zero-zero loans from regional banks I at end-September 2023 that were subsequently subrogated.
Source: BOJ.

Box 2: Housing loan default rates

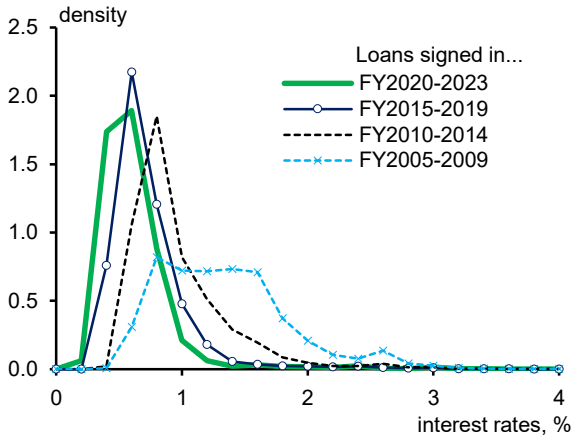
The common data platform provides data on housing loans, including details of the type of interest (floating or fixed), the loan origination date, maturity date, initial loan amount, current balance, interest rate applied, number of months in arrears, and debtor classification (left panel of Chart B2-1).[48] An examination of the distribution of interest rates applied to floating-rate housing loans on the reporting date (March 2024) reveals that there is considerable variation across individual loans. Meanwhile, analyzing the average of the distribution by loan origination period indicates that even though market interest rates on the reporting date are the same, interest rates on more recently extended housing loans are lower than those on housing loans extended earlier, suggesting that the financial environment at the time of loan origination may be affecting the current interest rate applied (right panel of Chart B2-1).

Chart B2-1: Characteristics of housing loans in the common data platform

Basic statistics for housing loans data

Average of loans	Nationwide		Tokyo	
	Loans signed in FY2023	Loans signed in FY2018	Loans signed in FY2023	Loans signed in FY2018
Initial loan amount (mil. yen)	29.86	26.01	41.36	35.72
Initial maturity (years)	31.9	31.1	33.5	32.0
Applied interest rates (fixed-rate, %)	1.20	1.00	1.09	1.05
Applied interest rates (floating-rate, %)	0.69	0.78	0.63	0.75
Monthly principal and interest payments (floating-rate, mil. yen)	0.087	0.080	0.118	0.109
Share of loans overdue by 3 months or more (%)	0.01	0.06	0.00	0.09
Loans outstanding (total amount, tril. yen)	5.90	4.59	0.23	0.13
Sample size (total, 10 thousands)	20.0	21.0	0.56	0.44

Distribution of applied interest rates



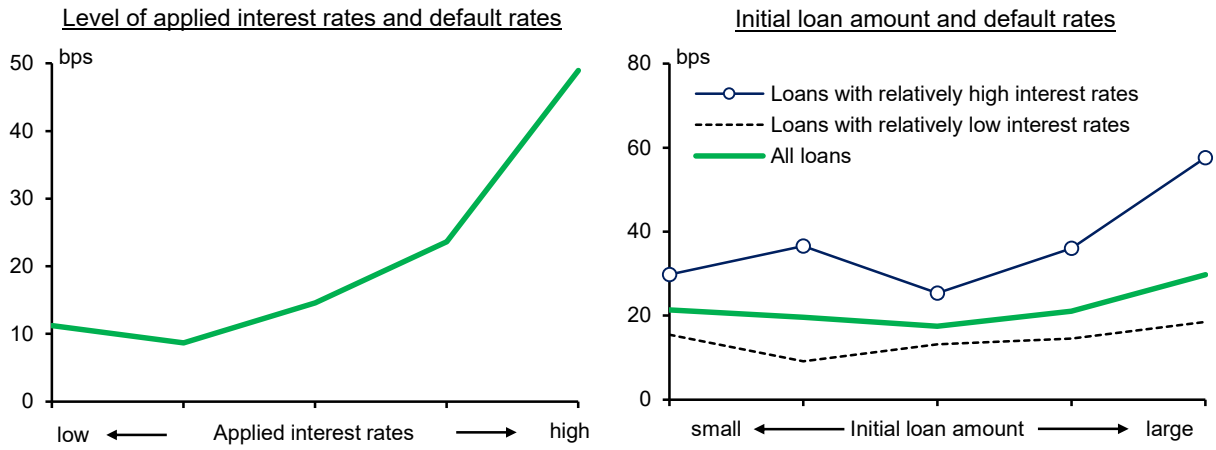
Note: 1. Data as of end-March 2024.
2. In the left-hand table, "Share of loans overdue by 3 months or more" indicates the share among total loans outstanding.
3. The right-hand chart covers floating-rate housing loans.
Source: BOJ.

Looking at the relationship between interest rates and default rates shows that the higher the interest rate applied, the higher the default rate, suggesting that, as a result of risk management by banks, interest rates reflect borrowers' risk at the time they take out their housing loan (Chart B2-2).[49] In terms of the loan amount at the time of loan origination, the default rate tends to be higher the greater the loan amount. Moreover, dividing housing loans into those with interest rates above and below the average interest rate of all loans disbursed during the same period shows that the positive relationship between the loan amount and default rate is more clearly observed in the high-interest group. This group likely includes borrowers whose creditworthiness was relatively low at the time of loan disbursement.

[48] Housing loans are defined as loans that are recorded as "housing loans" in the "loan type" or "exposure classification" column. However, for banks for which housing loans cannot be identified using this method (20 of the 61 banks with valid responses), consumer loans with an initial loan amount of 5 million yen or more are deemed to be housing loans.

[49] In the analysis in this Box, "default rates" represents the number of housing loans identified as having defaulted (loans either overdue by 3 months or more, or have been downgraded to "in danger of bankruptcy" or below) in March 2024, among housing loans that were not identified as having defaulted at the end of December 2023.

Chart B2-2: Applied interest rates / initial loan amount and default rates



Note: 1. Covers floating-rate loans with an initial loan amount of 10 million yen or more that were originated between FY2015 and FY2019 and had not defaulted as of end-December 2023. Defaulted loans are defined as those either overdue by 3 months or more, or have been downgraded to "in danger of bankruptcy" or below. Groups in the left- and right-hand charts are based on quintiles of applied interest rates and the initial loan amount, respectively.
2. In the right-hand chart, loans are classified as "Loans with relatively high/low interest rates" if their applied interest rates are higher/lower than the average applied interest rates originated by the same bank in the same year.
Source: BOJ.

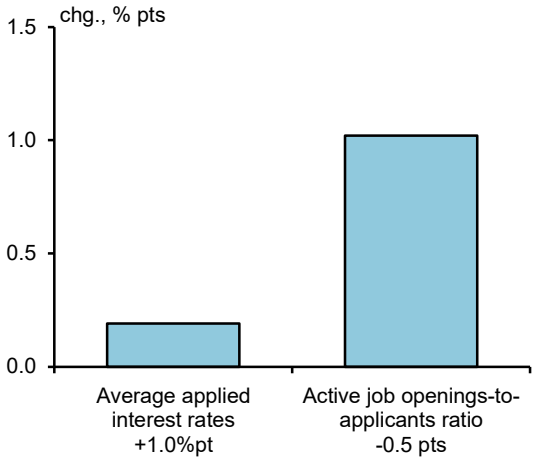
The left panel of Chart B2-3 presents the estimation results of a probability of default model constructed using data from the common data platform. They show that there is a statistically significant positive relationship between the interest rate charged and probability of default, both for the interest rate component unaffected by borrower characteristics (the average interest rate applied by the year the loan was originated) and the component reflecting differences in borrower creditworthiness (the deviation from the average interest rate applied). Regarding the initial loan amount, the probability of default tends to be higher for borrowers with a relatively large loan

Chart B2-3: Estimation results of housing loans default rate model

Estimation results

Dependent variable: 1=default, 0=non-default		Model 1	Model 2	Model 3
Values of previous quarter	Average applied interest rates in the year of origination (%)	0.61 ***	0.61 ***	0.55 ***
	× Dummy for initial loan amount above median	-	-0.00	-0.00
	× Dummy for the deterioration of job openings	-	-	0.17 **
	Deviation from average applied interest rates (borrowers' creditworthiness factors, %pts)	0.47 ***	0.34 ***	0.27 **
	× Dummy for initial loan amount above median	-	0.41 **	0.41 **
	× Dummy for the deterioration of job openings	-	-	0.17
	Number of years after origination	-0.04 ***	-0.04 ***	-0.04 ***
	Dummy for "Need attention"	4.26 ***	4.25 ***	4.25 ***
Changes in the active job openings-to-applicants ratio from the previous period		-3.48 **	-3.45 **	-
Dummy for cross-prefecture lending		0.42 ***	0.42 ***	0.42 ***
Constant / Bank dummies		Yes	Yes	Yes
Pseudo R-squared		0.20	0.20	0.20
Sample size		1,410,616	1,410,616	1,410,616

Sensitivity to interest rates and business cycles



Note: 1. Shows the estimation results of a default rate model (logit model) using housing loan data from the common data platform. Covers floating-rate housing loans outstanding as of March 2024. Defaulted loans are defined as those either overdue by 3 months or more, or have been downgraded to "in danger of bankruptcy" or below for the first time. Average applied interest rates indicates the sample average of loan interest rates by bank and the year of origination as of March 2024. The data for "Dummy for initial loan amount above median" are based on the right-hand chart of Chart B2-2 (i.e., 26 million yen).
2. The right-hand chart shows the average changes in the probability of default of each loan, based on the estimation results of model 1 in the left-hand chart.
Source: BOJ.

amount and low creditworthiness.[50] On the other hand, the probability of default tends to decrease with the number of years since the loan origination date, suggesting that borrowers' repayment capacity improves as their income increases as they move up along the wage curve. Finally, the results indicate that the probability of default is also affected by the regional economic environment: the worse the active job openings-to-applicants ratio in a particular region, the higher is the probability of default for loans to that region, and the higher is the sensitivity of the probability of default to the interest rate.

The results of this analysis should be interpreted with some latitude, since they are based on cross-sectional data that do not include past periods of economic downturn or rising interest rates; however, the impact of the component of the interest rate applied unaffected by borrower characteristics can be interpreted as capturing the sensitivity to the lending rate faced by the average borrower, while the impact of changes in the active job openings-to-applicants ratio can be interpreted as capturing the sensitivity to economic conditions. Under these assumptions, a 1 percentage point interest rate increase in the economy overall is estimated to raise the probability of default by about 20 basis points, while a deterioration in the active job openings-to-applicants ratio to the same level as during the global financial crisis (about -0.5 points) would raise it by about 100 basis points (right panel of Chart B2-3).

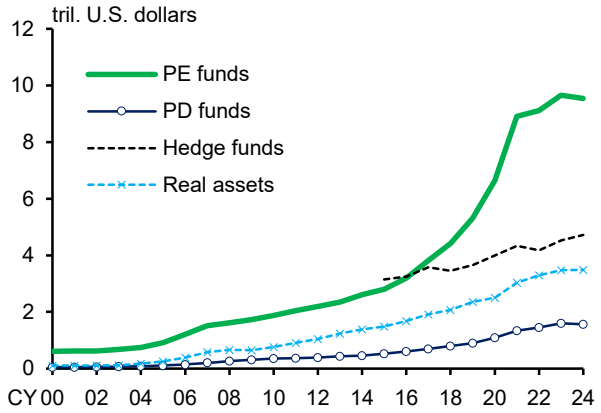
These results also indicate that if the economy continues to recover and the active job openings-to-applicants ratio improves as a result, the negative impact of rising interest rates will be mitigated accordingly. In addition, in the near term, the existence of rules to prevent drastic change in payments for housing loans, such as the "5-year rule" and the "125 percent rule," will likely work to mitigate the impact of rising interest rates. However, given that there are risks associated with individual borrower characteristics, banks need to continue to conduct careful credit screening and subsequent monitoring, such as follow-up assessment of the income situation of borrowers.

[50] As with corporate loans, banks are expanding their "cross-prefecture" lending (lending to borrowers residing in prefectures other than the one in which the bank's head office is located) for housing loans. The estimation results show that cross-prefecture loans are associated with a slightly higher probability of default, suggesting that such loans include borrowers with a relatively high probability of default.

Box 3: Japanese financial institutions' exposure to foreign private funds

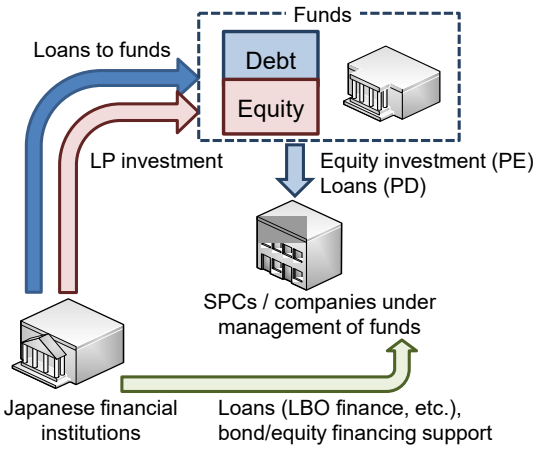
A private fund raises funds through private offerings, mainly of individuals and institutional investors, and then manages these funds. Other than hedge funds, they include private equity (PE) funds that invest in unlisted and privately held firms, and private debt (PD) funds that provide loans to such firms. Among private fund markets, PE and PD fund markets have grown over time, primarily in the United States, serving as a complement or alternative to traditional financial intermediation (Chart B3-1).[51] This Box provides an overview of developments in Japanese banks' and domestic institutional investors' exposure to foreign PE and PD funds.

Chart B3-1: Assets under management in private funds



Note: Based on Preqin data. "Real assets" includes real estate, infrastructure, and natural resources. Latest data as of 2024 (June).
Source: Preqin.

Chart B3-2: Relationship of Japanese financial institutions with private funds

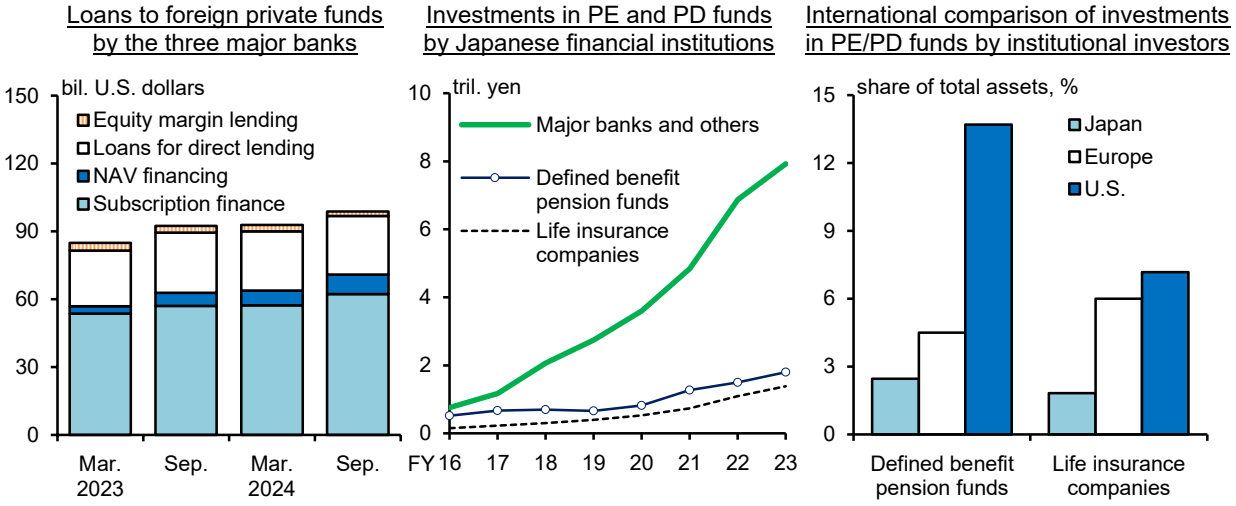


Japanese financial institutions' exposure to foreign investment funds can be broadly divided into (a) loans to funds and (b) limited partnership (LP) investments in funds (Chart B3-2). Although the proportion of such loans in total loans is still low, Japanese financial institutions, particularly major banks, have focused on lending to large U.S. funds, aiming to improve the profitability of their foreign loans and secure ancillary transactions (such as supporting fund affiliates in raising bonds and stocks) (left panel of Chart B3-3). Major banks and others have been increasing their investment in funds (Chart III-1-18), and as for domestic institutional investors, defined benefit pension funds have been increasing their holdings of alternative assets, especially assets with low liquidity, through LP investments, and have been increasing their investment in PE funds recently (middle panel of Chart B3-3). Japanese life insurance companies have also expanded their investment in foreign private funds as part of their alternative investments.[52] However, compared with Europe and the United States, the degree of investments in PE and PD funds by domestic institutional investors is generally limited (right panel of Chart B3-3).

[51] For more details of the growth of PE and PD markets, including those in Japan, and Japanese banks' investment and lending behavior, see Chapter III (Charts III-1-18 and III-2-7) and Section B of Chapter IV in this *Report*, and Box 3 of the April 2024 issue of the *Report*. See also, 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. 24-E-1, April 2024.

[52] In recent years, as acquisitions of life insurance companies by private equity funds have increased, particularly in the United States, there have been cases of Japanese life insurance companies investing in and partnering with such private equity-owned life insurance companies. In addition, there have been instances in which insurance contracts have been transferred (ceded) to private equity-owned reinsurance companies (often based in Bermuda). It has been pointed out that a relatively high share of investments of such private equity-owned life insurance companies and reinsurance companies consists of illiquid assets.

Chart B3-3: Loans and investments of Japanese financial institutions to private funds



Note: 1. The left-hand chart shows loan exposures (including commitment lines) to private funds in the Americas.
2. Latest data for the middle chart and data for the right-hand chart are as of end-March 2024 for Japan, and those for Europe and the U.S. are as of end-December 2023. "Defined benefit pension funds" indicates corporate pension funds for Japan and Europe, and state and local pension funds for the U.S. Data for "Life insurance companies" in Japan are based on data of three listed companies (missing data are estimated using linear interpolation, etc.).
Source: EIOPA; Equable Institute; NAIC; Pension Fund Association; Published accounts of individual companies; BOJ.

Thus, Japanese financial institutions have various links with foreign PE and PD funds through their investment and lending. At present, there is no materialization of risks, as the default rates of firms affiliated with these funds remain low. However, given the large amount of floating-rate borrowing and the past rise in interest rates in the United States, which may have reduced these firms' interest payment capacity, some have argued that corporate defaults are being postponed due to easing of lending conditions.[53] It is becoming even more important to gain a comprehensive understanding of such lending and investment in order to assess the risks and interconnections between foreign PE and PD funds and individual entities in Japan's financial system.

[53] For example, there has been an increase in payment in kind (PIK) loans (loans in which interest payments can be deferred until maturity and then repaid in a lump sum) whose purpose is to ease short-term interest burden.

Box 4: Developments in investment by foreign hedge funds in Japan's financial markets

This box aims to provide an overview of foreign hedge funds' exposure to Japan, including their off-balance-sheet transactions, mainly using data reported to the U.S. Securities and Exchange Commission (SEC). Understanding developments in hedge funds is not straightforward, as off-balance-sheet transactions are sometimes excluded from statistical sources, and because a breakdown of hedge fund data as a separate sector is frequently lacking.[54] Moreover, hedge funds employ a range of strategies, which, generally speaking, can be broadly divided into directional strategies that involve speculating market trends and positioning investments accordingly, and arbitrage strategies that aim to make a profit through arbitrage transactions regardless of the market's direction (upward or downward) (Chart B4-1).[55] The SEC data are useful in that they cover these aspects.

Chart B4-1: Main investment strategies of hedge funds

	Investment strategy	Overview	Impact on market
Directional	Macro	Based on macroeconomic scenarios, funds seek investment opportunities to pursue profits from price distortions and trends in the equity, bond, currency, and commodity markets of various countries.	Large impact on market prices due to aggressive position takings.
	CTA (Managed futures)	Funds invest in various countries' futures markets. A typical strategy is the trend-following type, which trades based on price trends.	Trend-following type strategy may amplify trends.
	Long-short equity	Funds aim to earn profits by taking long and short positions among stocks. In some cases, positions may be biased in one direction or another depending on the market direction.	Impact on market depends on position bias; can be market-neutral.
Arbitrage	Relative value	Funds mainly make arbitrage trades based on curve distortions and under/overvaluation of bonds (cash, futures, and swaps).	Have large but delta-neutral positions, resulting in limited market impact.
Real money (ref.)		Funds basically invest in cash markets over the long term with little leverage.	Long-term asset holding contributes to market stability to some extent.

Note: Based on the following reports and others: Financial System and Bank Examination Department and Financial Markets Department of the Bank of Japan, "Recent trends of hedge funds," July 2005, and Okawa, R., "Hedge funds in foreign exchange markets: implications for market structure and price formation," *Bank of Japan Review Series*, no. 2015-J-1, January 2015 (both available in Japanese).

Although the exposure[56] to Japan of hedge funds active in the United States remains relatively small, it has been expanding rapidly since 2022 amid a decline in investment in China (left panel of Chart B4-2). Consequently, Japan's share in the total has increased, while China's share has decreased. During the same period, foreign investors' spot and futures trading in the Japanese government bond market has increased, which may reflect the increase in hedge funds' exposure to Japan amid rising yen interest rates (right panel of Chart B4-2).

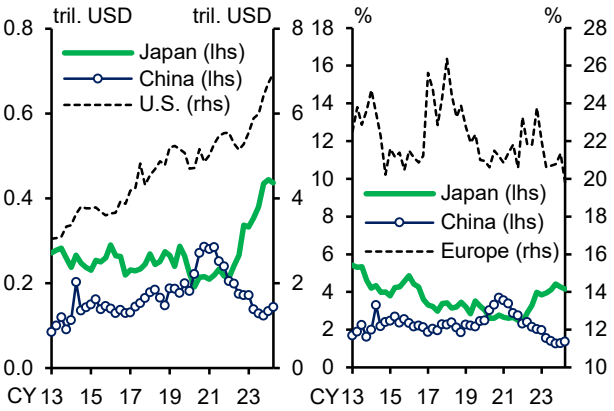
[54] For example, in the case of cross-border transactions, the Balance of Payments Statistics do not record repo transactions, which do not involve a transfer of economic ownership, while in the case of futures transactions, only the profits or losses on sales and purchases are recorded, but not the amount of sales or purchases.

[55] It has been pointed out that in recent years the assets under management of multi-strategy funds, which use a variety of investment strategies, have also been growing.

[56] Total exposure on a gross basis taking derivatives into account.

Chart B4-2: Hedge funds' exposure to Japan

Exposure of U.S. hedge funds by country



Size comparison with fund flows of foreign investors

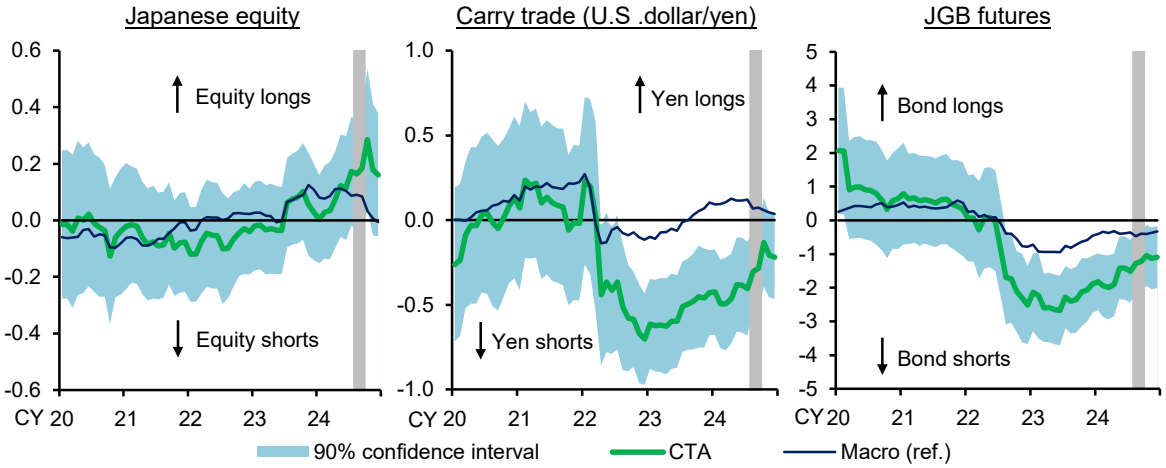
tril. yen

		CY2022	CY2023
Chg. in hedge funds' exposure to Japan		19.7	16.9
Net purchases of foreign investors			
Cash market	Stocks	-0.3	3.1
	JGBs	1.5	10.2
Futures market	Stock indexes	-2.6	3.2
	Long-term JGBs	-2.6	4.4
Chg. in repo outstanding of foreign investors			
Repo market	Reverse repo	11.6	18.5
	Repo	3.7	10.7

Note: 1. In the left-hand chart, the data for China include Hong Kong. Latest data as of 2024/Q2.
2. In the right-hand chart, the data for cash JGBs exclude T-bills.
Source: Japan Securities Dealers Association; Osaka Exchange; SEC; Tokyo Stock Exchange; BOJ.

Next, following previous studies, Chart B4-3 presents the results of an attempt to indirectly measure the exposure of these hedge funds to the Japanese stock, foreign exchange, and other markets by conducting three-year-window rolling estimations of the sensitivity of hedge fund performance indicators to the returns of different financial assets. A positive sensitivity suggests that hedge funds are estimated to build long positions through transactions in financial assets or derivatives, and vice versa. The estimation results suggest that, particularly among Commodity Trading Advisors (CTAs) that employ trend-following strategies, exposure to Japanese stocks, partly as a substitute for Chinese stocks, may have increased after 2022. Meanwhile, although the patterns differ depending on hedge funds' strategies, it appears that positions have been adjusted after observing the volatile markets in August 2024.[57]

Chart B4-3: Sensitivity of hedge fund performance with respect to various assets

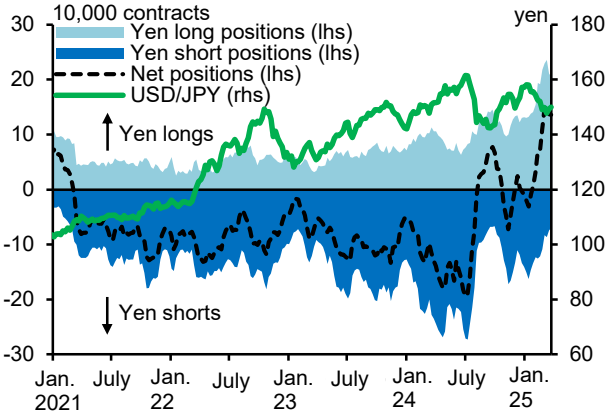


Note: Shows the estimation results of rolling regressions with a 36-month window. The dependent variable is the Hedge Fund Performance Index (investment returns net of fees) by strategy, compiled by BarclayHedge. Independent variables are the S&P 500, the Nikkei 225 Stock Average, the Shanghai Composite Index, the carry trade return index (estimated returns from U.S. dollar long and yen short positions when using currency futures), and the JPX JGB Futures Index. All variables are month-on-month rates of change. The gray shaded areas indicate the period August-September 2024. Latest data as of December 2024.
Source: BarclayHedge; Bloomberg.

[57] The rolling estimation window is set to 36 months, following the previous study (Box C of the September 2024 issue of the BIS Quarterly Review). Therefore, changes in sensitivity may be reflected with a lag, compared with changes in actual positions.

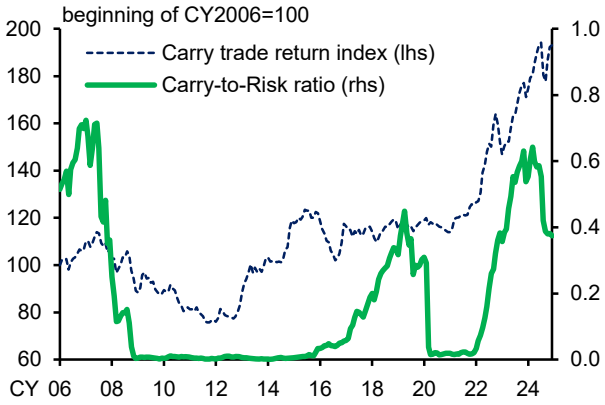
Moreover, regarding the carry trade, the results suggest that while the exposure of macro funds and CTAs had been increasing, it may have decreased after the heightened volatility during the summer of 2024. Examining the positions of speculators, including hedge funds, in currency futures transactions in the International Monetary Market (IMM) reveals that yen net short positions reached a record high in early July 2024, but have since been unwound (Chart B4-4). In fact, the carry-to-risk ratio, which measures the attractiveness of carry trades by comparing the Japan-U.S. three-month interest rate differential to the implied volatility of the dollar-yen exchange rate, has declined mainly due to the decline in interest rate differential between Japan and the United States and heightened volatility. The growth rate of an indicator of the profitability of the carry trade has also slowed (Chart B4-5).[58]

Chart B4-4: IMM yen positions



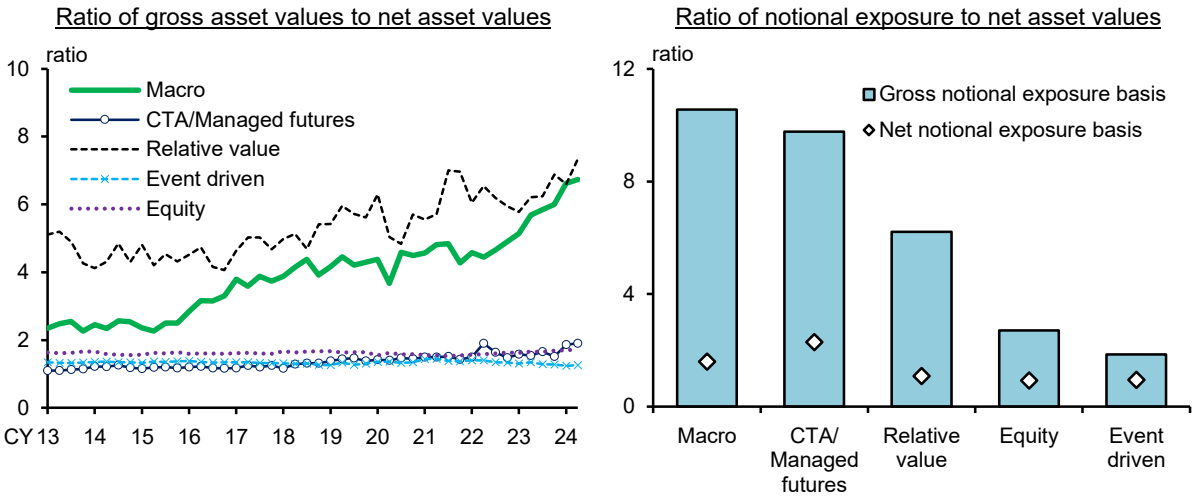
Note: IMM positions indicate the total of non-commercial and non-reportable yen positions against the U.S. dollar in currency futures transactions. Latest data as of end-March 2025.
Source: Bloomberg.

Chart B4-5: Carry trade return indicators



Note: "Carry-to-Risk ratio" is calculated as the U.S.-Japan 3-month interest rate differential divided by the implied volatility of the U.S. dollar/yen rate. Latest data as of December 2024.
Source: Bloomberg.

Chart B4-6: Leverage of U.S. hedge funds by strategy



Note: Latest data for the left-hand chart are as of 2024/Q2. Data for the right-hand chart are averages between January 2013 and March 2019.
Source: Barth, D., Hammond, L., and Monin, P., "Leverage and Risk in Hedge Funds," The Office of Financial Research (OFR) Working Paper Series, February 2020; SEC.

[58] Profits from the carry trade are based on the interest rate differentials and the rate at which the investment currency appreciates or depreciates due to exchange rate fluctuations.

Hedge fund transactions often involve substantial leverage, both on and off the balance sheet (Chart V-2-11). For this reason, when there are sudden changes in markets, hedge funds may have to provide additional collateral, and their net asset value may fluctuate significantly. Thus, attention is warranted on the risk that market volatility may be exacerbated by rapid deleveraging if hedge funds are unable to bear these burdens. Examining hedge funds' financial leverage by strategy indicates that hedge funds employing relative value and macro strategies, which have expanded bond positions through repo financing, tend to have relatively high leverage (Chart B4-6). On a notional basis, including off-balance-sheet transactions, hedge funds employing macro and CTA strategies, which often take directional positions using futures, options, etc., have high leverage ratios. However, on a net notional basis, the leverage ratios of hedge funds employing these strategies are also low, suggesting that it is important to grasp their positions taking hedges 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 consists of common equities and retained earnings, etc. (including accumulated other comprehensive income).

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.