



**BOJ**  
*Reports & Research Papers*

# Financial System FSR report



BANK OF JAPAN  
OCTOBER 2019

The total of major banks, regional banks, and *shinkin* banks covered in this *Report* is as follows (as at end-September 2019).

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; Shinsei Bank; and Aozora Bank. Regional banks comprise the 64 member banks of the Regional Banks Association of Japan (Regional banks I) and the 39 member banks of the Second Association of Regional Banks (Regional banks II). *Shinkin* banks are the 249 *shinkin* banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as at end-September 2019.

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## Objective of the *Financial System Report*

The Bank of Japan publishes the *Financial System Report* semiannually with the objective of assessing the stability of the financial system and facilitating communication with concerned parties on relevant tasks and challenges in order to ensure such stability. The *Report* provides a regular assessment of the financial cycle and the resilience of financial institutions against stress, and analyzes the potential vulnerabilities of the financial system from a macroprudential perspective. Within a macroprudential framework, institutional designs and policy measures are devised based on analyses and assessments of risks in the financial system as a whole, taking into account the interconnectedness of the real economy, financial markets, and financial institutions' behavior, in order to ensure the stability of the overall financial system.

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. Moreover, the Bank 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 an important input for the Bank in assessing risks in economic and price developments from a medium- to long-term perspective.

## Features of and motivations behind the October 2019 issue of the *Report*

This October 2019 issue of the *Report* provides analyses with a particular focus on the following three areas.

First, this issue provides an analysis and assessment of potential risks and vulnerabilities associated with the overseas exposure of Japanese banks. The motivation is that financial institutions, particularly major banks, have increased overseas lending and overseas credit investment such as leveraged loans and collateralized loan obligations (CLOs) since the global financial crisis, and accordingly have increased connectedness with overseas.

Second, this issue provides an analysis of developments in operating efficiency of regional financial institutions, its difference among institutions by type of banks, and their factors. The analysis takes into account regional financial institutions' efforts to improve operating efficiency under the continued decline in profitability in recent years, such as overhead cost savings and increases in net non-interest income. Based on the results of this analysis, the section for stress testing in this issue conducts medium- to long-term simulation and stress testing that assumes the realization of the tail event in the medium term, taking into account the effects of further improvement in operating efficiency on profitability going forward.

Third, this issue outlines the background behind the rise in credit costs and the related outlook, given that financial institutions' credit cost ratios have recently started to rise, particularly for regional financial institutions, although levels have remained low.

In terms of the structure of the *Report*, this issue newly includes a chapter that comprehensively examines domestic and overseas financial vulnerabilities (Chapter IV). Also, in the assessment of various risks, this issue includes a new section regarding the risks that have become increasingly important in recent years, such as those associated with cybersecurity, anti-money laundering, and digitalization (Section F of Chapter V), in addition to the regular assessment of credit risk, market risk, and liquidity risk.

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## I. Executive summary

### *Developments in financial intermediation*

Financial intermediation has been active in both the loan and securities markets on the back of monetary easing by the Bank of Japan. Domestic loans outstanding have been growing at around 2 percent annually, exceeding the economic growth rate, as loan interest rates have been hovering near historically low levels. In the CP and corporate bond market, fund-raising by large firms has been increasing as issuance rates have hovered at extremely low levels. In global financial markets, stock prices have shown some instability reflecting concerns about a global economic slowdown and geopolitical uncertainties. Meanwhile, long-term interest rates have declined significantly, mainly driven by heightened expectations for monetary easing in the United States and Europe, and credit spreads have remained tight, reflecting investors' search for yield. Against this background, Japanese financial institutions have maintained a moderate uptrend in their overseas exposure.

### *Examination of financial cycle and financial vulnerabilities*

Under these financial intermediation activities, the expansion in the financial cycle has continued; however, financial and economic activities as a whole have shown no signs of overheating observed during the bubble period in the late 1980s.

That said, attention should continue to be paid to the accumulation of vulnerabilities under the continued expansion in the financial cycle. On the domestic front, the *total credit to GDP ratio* has continued to rise. Although the ratio remains lower than in the bubble period, the upward deviation from its trend is getting close to the scale in that period. Meanwhile, loans to low-return borrowers with narrow profit margins have been increasing. Credit costs remain low but have recently started to rise, particularly for regional financial institutions. As the background behind the increase in credit costs, recent evidence suggests (1) a delay in business restructuring of low-performing firms that have received protracted support from financial institutions and (2) some slackening of loan screening and credit risk management by financial institutions in the process of increasing their lending in recent years. The outstanding amount of real estate loans has been increasing and has surpassed the level seen during the bubble period; moreover, the deviation of the *real estate loans to GDP ratio* from its trend has marked a record high for the post-bubble period. So far, Japan's real estate market as a whole cannot be judged as experiencing overheating; however, there is the possibility of a build-up of risks that are different from those observed during the bubble period, such as the increase in long-term lending to rental properties amid the declines in population and number of firms. On the one hand, the increase in domestic credit has supported a trend of economic expansion. On the other hand, the above vulnerabilities could build up pressure on balance sheet adjustments and thereby amplify downward pressure on the economy in the event of a future negative shock, should the higher economic growth remain unrealized in a longer-term.

With respect to international finance, as the overseas exposures of Japanese banks increase, Japan's financial system, including banks' foreign currency funding condition, is becoming more susceptible to the effects of overseas financial cycles. Notably, in recent years, Japanese banks, particularly major banks, have increased their investment in leveraged loans to borrowers who have low creditworthiness, as well as in collateralized loan obligations (CLOs) backed by these loans. The overall credit quality of the overseas loan portfolio has remained high, and most of the CLOs that the banks hold are AAA-rated tranches. However, attention should be paid to a risk of a decline in ratings and market prices of CLOs in the case of a sudden change in economic and market conditions, since borrowers of leveraged loans are vulnerable to deterioration in business conditions and an easing in lending standards for these loans has continued in recent years.

## *Stability of the financial system*

Japan's financial system has been maintaining stability on the whole. Financial institutions, despite the above-mentioned vulnerabilities, generally have strong resilience in terms of both capital and liquidity with respect to tail events like the onset of the global financial crisis.

However, financial institutions' profitability, particularly that of domestic deposit-taking and lending activities, has continued to decline. This seems to be not only due to the prolonged low interest rate environment but also, from a longer-term perspective, due to structural factors such as the secular decline in loan demand associated with the shrinking population and the decline in the potential growth rate. Against this backdrop, major financial institutions have expanded their global activities and pursued group-wide strategies to provide comprehensive financial services, resulting in an increase in their systemic importance. Regional financial institutions have been actively taking risks in domestic lending and securities investment. However, as they have not been able to secure adequate returns relative to the risks involved, their capital adequacy ratios have continued to decline moderately. Should this situation persist, loss-absorbing capacity in the event of stress would decrease, and downward pressure on the real economy through a weakening of the financial intermediation function could intensify.

## *Challenges for financial institutions*

The analyses highlight the following four business challenges that financial institutions need to address. First, financial institutions should strengthen efforts to raise their profitability. Specifically, they need to (1) enhance their capacity to provide more attractive financial services such as solution-related services for firms and services supporting households' wealth accumulation, (2) keep their loan interest rates commensurate with the risks involved and increase their non-interest income, and (3) review their expense structure. In order to maintain sufficient stress resilience into the future through an improvement in core profitability, financial institutions, while making necessary investment for strategic purposes, need to further promote measures to improve operating efficiency, which they have already been working on in recent years. To strongly promote these efforts, mergers and alliances can be effective options. Second, financial institutions should enhance their risk management in areas where they have actively increased their risk taking. Regional financial institutions need to strengthen their risk management for lending to middle-risk firms and the real estate industry and also for investment in securities such as investment trust products. Major financial institutions need to address risks associated with overseas investment and lending, as well as the resultant increase in foreign currency funding. Major financial institutions also need to improve their business management on a global and group-wide basis. Third, financial institutions should adapt to digitalization. Financial institutions need to develop strategies to exploit the potential gains offered by digital technology and establish frameworks for cybersecurity management and anti-money laundering controls while taking strategic risk into account. Finally, financial institutions should implement appropriate capital policies. They need to clarify capital policies, including those pertaining to sufficient capital levels, dividend payout plans, and the effective use of unrealized gains on securities, and they also need to improve communication with shareholders and a wide range of other stakeholders. The Bank of Japan will support the aforementioned efforts by financial institutions through on-site examinations and off-site monitoring, and will also closely monitor the impact on the financial system of financial institutions' various forms of risk taking from a macroprudential perspective. The Bank will also hold discussions with the relevant parties in order to prepare an institutional framework for the financial system that will serve as an important element for financial institutions in meeting their structural challenges.

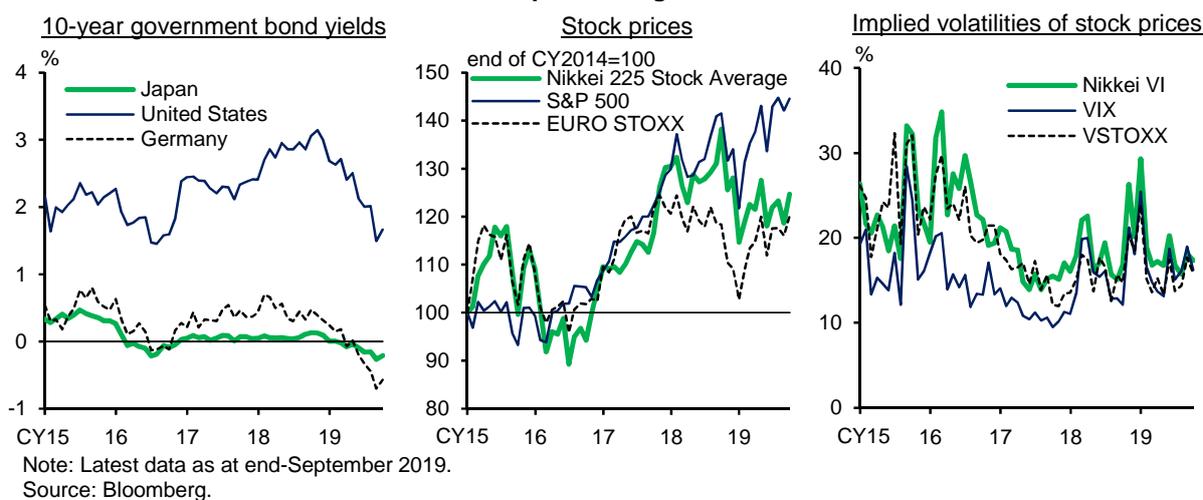
## II. Risks observed in financial markets

This chapter summarizes the developments in financial markets within Japan and abroad, mainly during the first half of fiscal 2019, and examines the risks observed.<sup>1</sup>

### A. Global financial markets

In global financial markets, U.S. and European stock prices have fluctuated somewhat significantly due in part to growing concerns about future developments in the global economy, as there have been heightened uncertainties over U.S.-China trade tensions and the political situation in Europe. Under these circumstances, U.S. and European long-term interest rates have declined, driven by heightened expectations for monetary easing in major advanced countries. In credit markets, such as corporate bond markets, credit spreads have generally remained tight, reflecting investors' persistent search for yield. In emerging markets, capital outflow pressure has been limited on the whole, but markets in some economies have shown volatile price movements such as large declines in stock prices and substantial depreciations of home currencies. Attention should be paid to the risk that prices of assets such as stocks and credit products will be adjusted, if concerns about a global economic slowdown escalate as heightened uncertainties remain over U.S.-China trade tensions and the political situation (Chart II-1-1).

**Chart II-1-1: Developments in global financial markets**



### U.S. and European risky assets

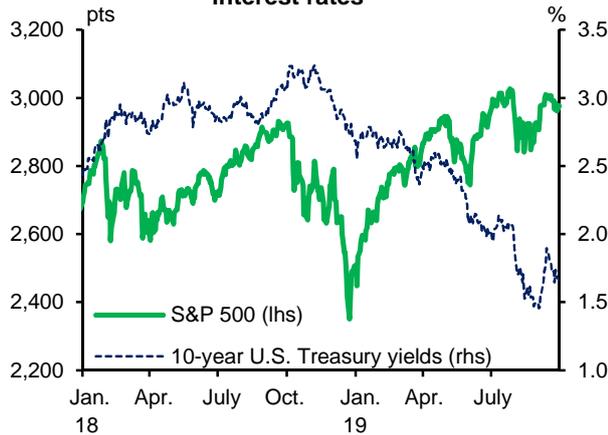
U.S. and European stock prices temporarily fluctuated significantly due mainly to concerns about U.S.-China trade tensions. However, they have generally remained high, reflecting the decline in long-term interest rates that has been driven by heightened expectations for monetary easing in the United States and Europe (Charts II-1-1 and II-1-2). The expected earnings per share (EPS) for U.S. and European firms suggest that EPS growth for the United States has slowed down relative to the previous year, whereas the EPS level for Europe has remained unchanged (Chart II-1-3). This reflects the prolonged global deterioration in business confidence, particularly in

<sup>1</sup> In Japan, the fiscal year starts in April and ends in March of the following year.

manufacturing. Under these circumstances, U.S. and European price earnings (P/E) ratios, which are stock price valuation indicators, have continued to exceed their long-term average (Chart II-1-4).

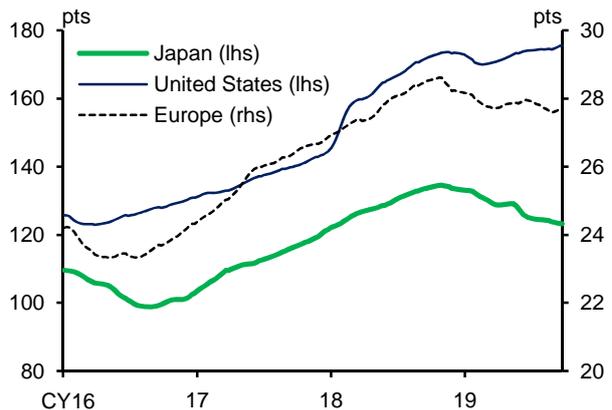
In U.S. and European credit markets, credit spreads, particularly for speculative-grade corporate bonds (high-yield bonds), temporarily widened due to increased vigilance over U.S.-China trade tensions. However, they have generally remained tight, reflecting investors' persistent search for yield amid declining long-term interest rates (Chart II-1-5).

**Chart II-1-2: U.S. stock prices and long-term interest rates**



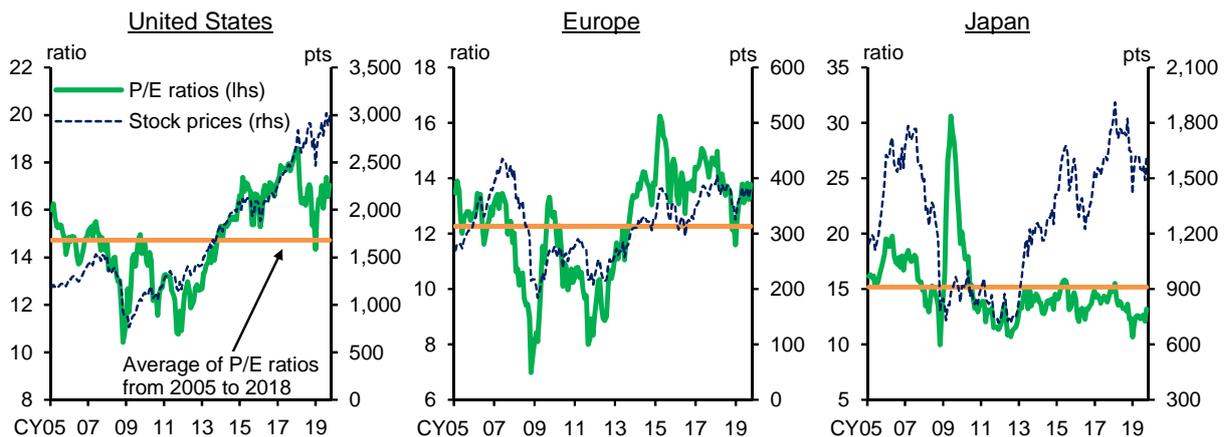
Note: Latest data as at end-September 2019.  
Source: Bloomberg.

**Chart II-1-3: Expected EPS**



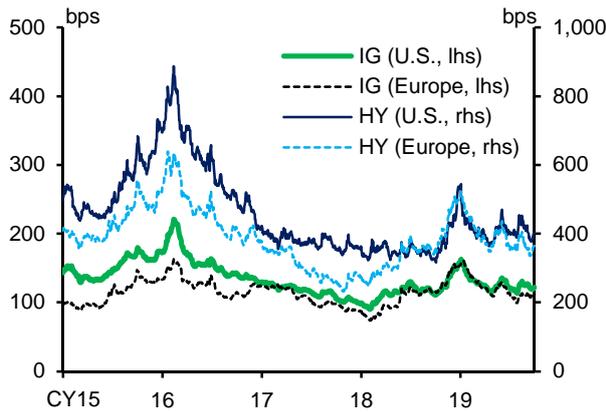
Note: 1. "Japan," "United States," and "Europe" indicate expected EPS for the next 12 months of the TOPIX, the S&P 500, and the EURO STOXX, respectively. 4-week backward moving averages.  
2. The latest data for the "United States" are as at September 25, 2019 and the latest data for "Japan" and "Europe" are as at September 24, 2019.  
Source: Datastream from Refinitiv.

**Chart II-1-4: Stock prices and valuation**



Note: 1. "Stock prices" indicates the S&P 500 for the United States, the EURO STOXX for Europe, and the TOPIX for Japan. "P/E ratios" is calculated using expected EPS for the next 12 months.  
2. Latest data as at September 2019.  
Source: Datastream from Refinitiv.

**Chart II-1-5: Credit spreads on U.S. and European corporate bonds**

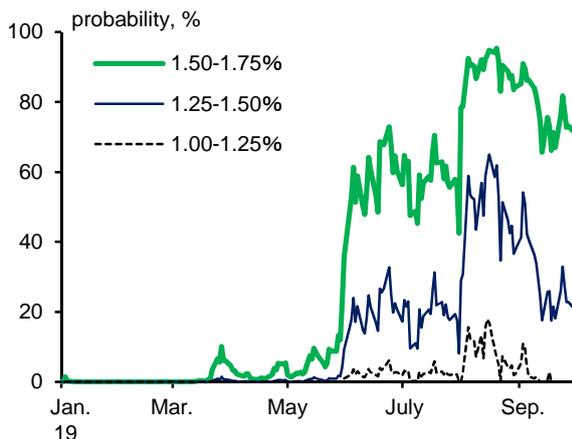


Note: 1. Calculated by ICE Data Indices. "IG" and "HY" indicate investment-grade corporate bonds and high-yield bonds, respectively.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg.

*U.S. and European long-term interest rates*

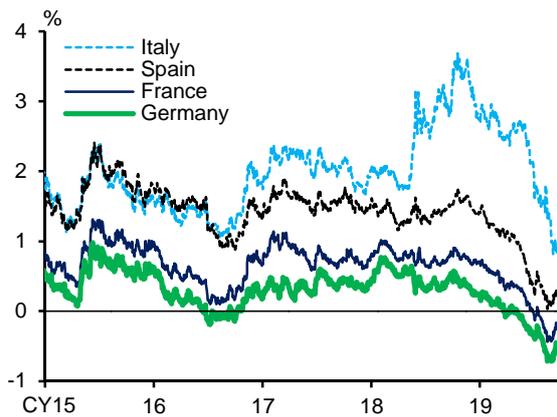
In the United States, long-term interest rates have declined, mainly driven by heightened expectations for monetary easing by the Federal Reserve (FRB), with growing concerns over U.S.-China trade tensions and future developments in the global economy (Chart II-1-2). Meanwhile, the FRB cut its policy rate in both July and September 2019, by 25 basis points in each case. Concerns over possible prolongation of U.S.-China trade tensions and weakness in some economic indicators have led markets to price in further rate cuts by the FRB (Chart II-1-6). In Europe, including the peripheral European countries, long-term interest rates have declined, mainly due to heightened expectations for monetary easing by the European Central Bank (ECB), which cut its policy rate (deposit facility rate) in September 2019 by 10 basis points (Chart II-1-7). Japanese investors -- mostly banks and life insurance companies -- have increased their investments in European bonds, including those issued by peripheral countries, as the return on yen-hedged European bonds is higher than that on yen-hedged U.S. Treasuries (Charts II-1-8 and II-1-9).

**Chart II-1-6: Market expectations for U.S. policy rate cuts**



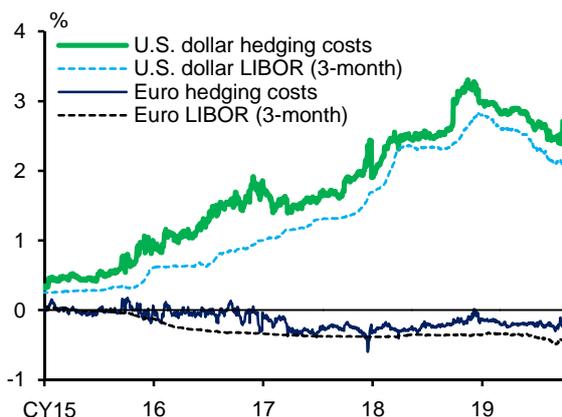
Note: 1. The chart shows the probability that the federal funds (FF) target range (1.75-2.00% as at end-September 2019) will fall in or below a particular territory after the policy decision at the FOMC meeting in December 2019. The probability is calculated using FF futures rates.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg.

**Chart II-1-7: 10-year European government bond yields**



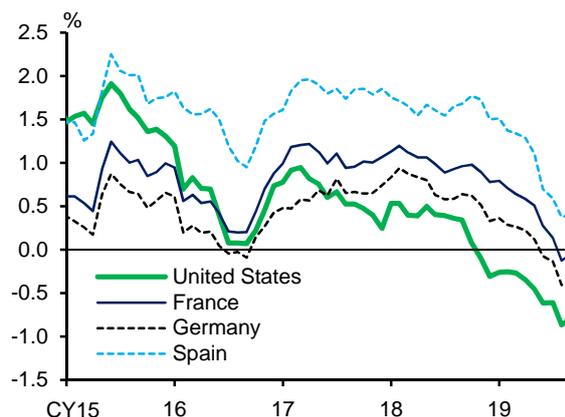
Note: Latest data as at end-September 2019.  
 Source: Bloomberg.

**Chart II-1-8: Foreign currency hedging costs**



Note: 1. "U.S. dollar hedging costs" and "Euro hedging costs" indicate FX swap-implied U.S. dollar and euro rates (3-month), respectively.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg.

**Chart II-1-9: Yields on yen-hedged foreign government bonds**

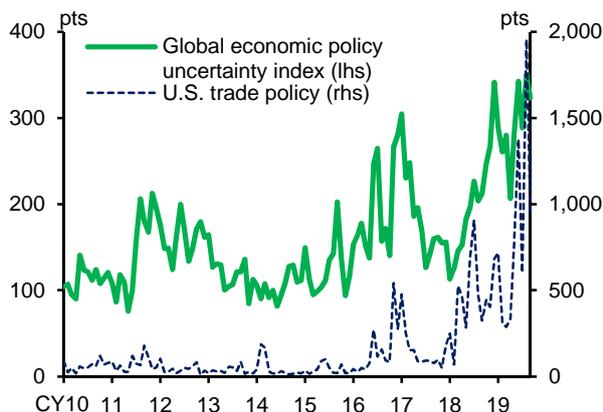


Note: 1. "United States" indicates 10-year U.S. Treasury yields after subtracting U.S. dollar hedging costs (3-month). "France," "Germany," and "Spain" indicate corresponding 10-year government bond yields after subtracting euro hedging costs (3-month).  
 2. Monthly average. Latest data as at September 2019.  
 Source: Bloomberg.

*Heightened uncertainties over the global political situation*

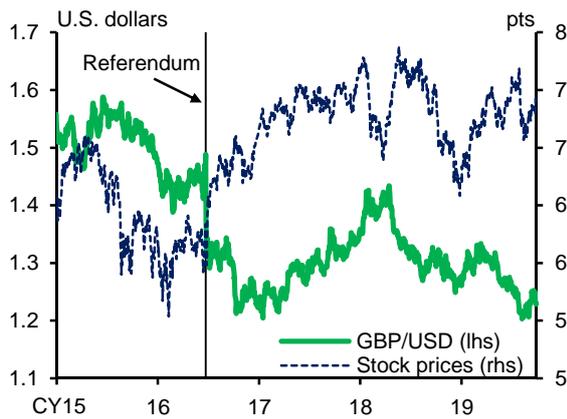
Global financial markets have been experiencing somewhat high volatility because of the heightened global political uncertainties over U.S.-China trade tensions and negotiations on the United Kingdom's exit from the European Union (EU) (Chart II-1-10). Specifically, in the context of U.S.-China trade tensions, in May and August 2019, vigilance rapidly increased over U.S. tariff hikes on China and China's retaliatory measures, leading to a global plunge in stock prices. The many uncertainties over negotiations on the United Kingdom's exit from the EU have not been resolved. Under these circumstances, the British pound has depreciated and vigilance against its further depreciation has remained elevated (Charts II-1-11 and II-1-12).

**Chart II-1-10: Global economic policy uncertainty index**



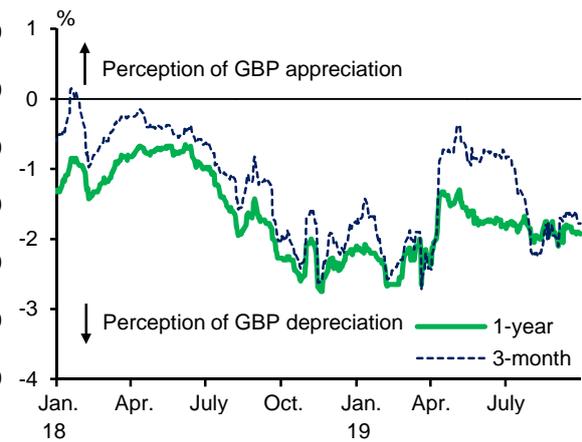
Note: 1. "Global economic policy uncertainty index" quantitatively measures the extent of uncertainty people perceive based particularly on the amount of coverage in major newspapers relating to uncertainties regarding economic policy and on the dispersions in economists' outlooks on economic activity and prices. "U.S. trade policy" specifically measures uncertainty regarding U.S. trade policy.  
 2. Latest data as at September 2019.  
 Source: Economic Policy Uncertainty.

**Chart II-1-11: GBP and U.K. stock prices**



Note: "Stock prices" indicates the FTSE 100. Latest data as at end-September 2019.  
Source: Bloomberg.

**Chart II-1-12: GBP/USD risk reversals**

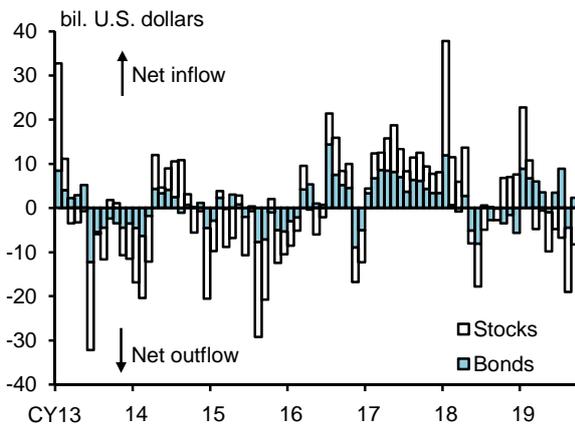


Note: Latest data as at end-September 2019.  
Source: Bloomberg.

**Emerging markets**

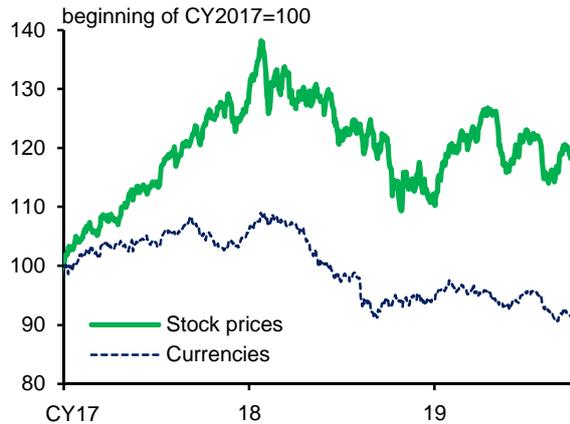
In emerging markets, capital outflow pressure has been limited on the whole, with the United States and other economies starting to cut their policy rates (Charts II-1-13 and II-1-14). By country and region, however, many Asian countries, including China and South Korea, have experienced declines in stock prices and depreciations of their currencies, fueled by U.S.-China trade tensions and a deterioration of business confidence in manufacturing. Some other emerging market economies have also exhibited volatile movements, including significant declines in stock prices and large depreciations of their currencies (Chart II-1-15). Attention should be paid to the possibility that capital outflow pressure will elevate primarily on some emerging market economies that have structural vulnerabilities if political uncertainties rapidly heighten, as well as if expectations for monetary easing in advanced countries abate.

**Chart II-1-13: Net flows in emerging market funds**



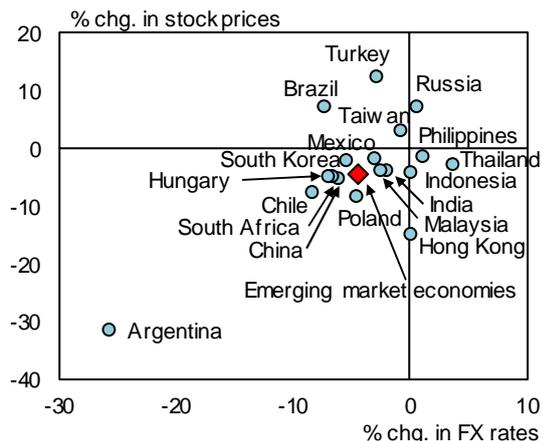
Note: Latest data as at September 2019 (up to September 25, 2019).  
Source: EPFR Global; Haver Analytics.

**Chart II-1-14: Stock prices and currencies in emerging markets**



Note: 1. "Stock prices" indicates the MSCI EM Local Index.  
"Currencies" indicates the J.P. Morgan EMCI Index.  
2. Latest data as at end-September 2019.  
Source: Bloomberg.

**Chart II-1-15: Changes in FX rates and stock prices in emerging market economies**

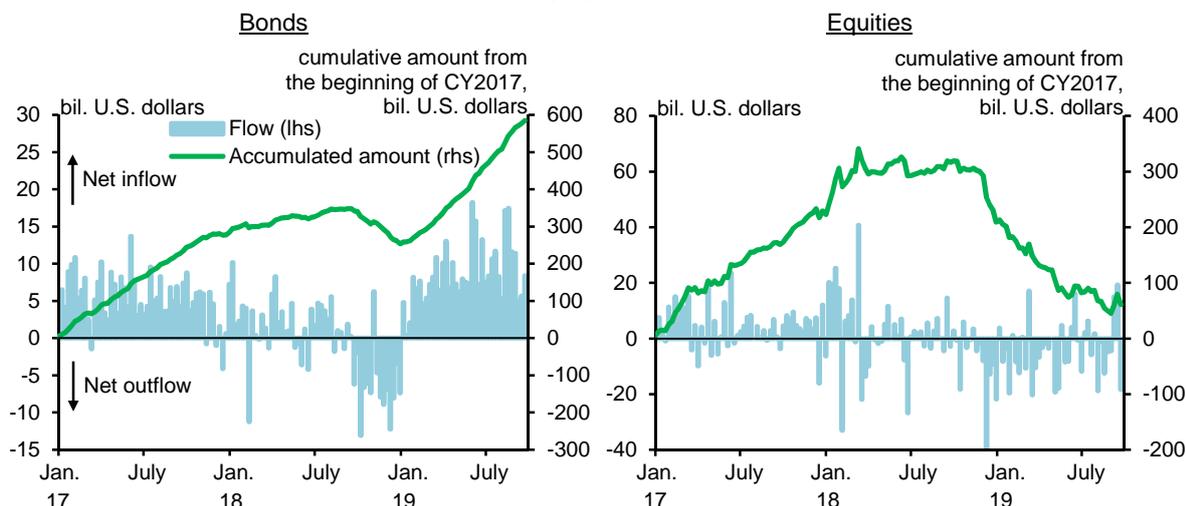


Note: 1. Changes in FX rates and stock prices of 18 emerging market economies from April 1, 2019.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg.

*Elevated prices of risky assets*

As described above, in global financial markets, long-term interest rates have declined, driven by heightened expectations for monetary easing in major advanced countries; concurrently, prices of risky assets such as stocks have generally remained high but with some volatility. A detailed examination of bond and equity fund flows to advanced countries during the same period reveals a contrast between them. While bond funds have tended to experience net inflows since the beginning of 2019 due to heightened expectations for monetary easing in major advanced countries, equity funds have tended to experience net outflows (Chart II-1-16). Market participants point out that the recent rise in stock prices, particularly in the United States, has been led by capital inflows from "fast money" investors, whereas "real money" investors, including institutional investors, have held back and many participants are remaining vigilant against significant adjustments in stock prices going forward.

**Chart II-1-16: Bond and equity fund flows to advanced countries**

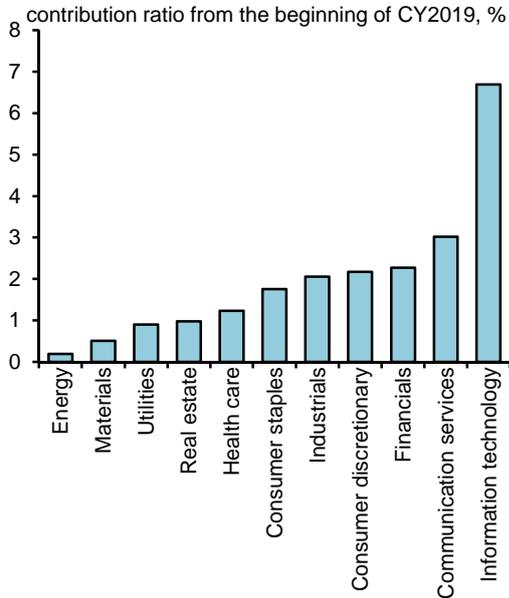


Note: Latest data as at September 2019 (up to September 25, 2019).  
 Source: EPFR Global; Haver Analytics.

A decomposition of recent U.S. stock price growth by sector highlights the disproportionately large contribution of the IT sector (Chart II-1-17). Furthermore, software-related stocks with relatively robust EPS have been a major driving force, despite growing concerns about U.S.-China trade tensions. On the other hand, the stock price growth of semiconductor-related stocks has not been

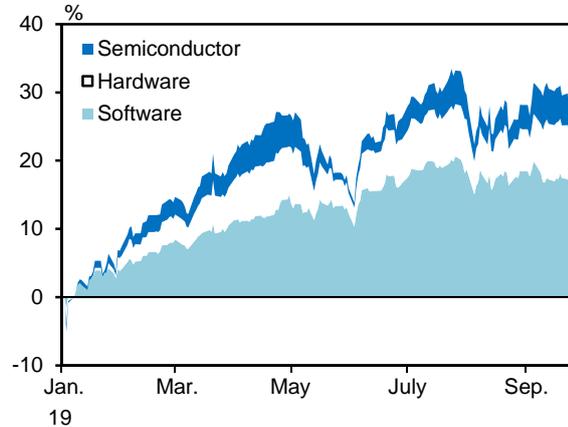
accompanied by an increase in EPS and some market participants point to signs of overheating led by bullish expectations (Charts II-1-18 and II-1-19). Attention should be paid to whether elevated stock prices will be accompanied by improvements in corporate earnings in due course.

**Chart II-1-17: Decomposition of S&P 500 growth by sector**



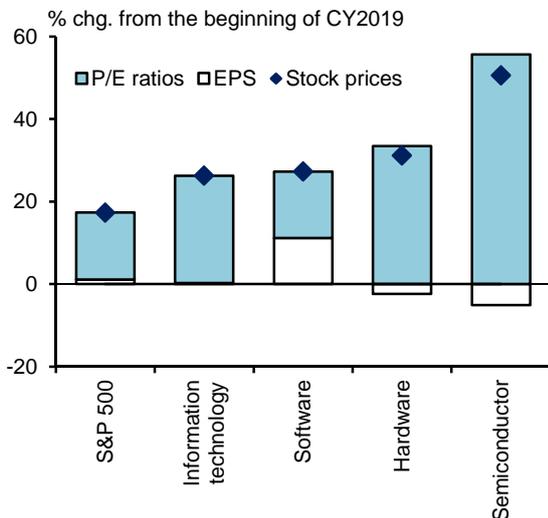
Note: Latest data as at September 25, 2019.  
Source: Bloomberg.

**Chart II-1-18: Decomposition of the S&P 500 IT sector**



Note: Accumulated contribution to the S&P 500 IT sector from the beginning of 2019. Latest data as at September 25, 2019.  
Source: Bloomberg.

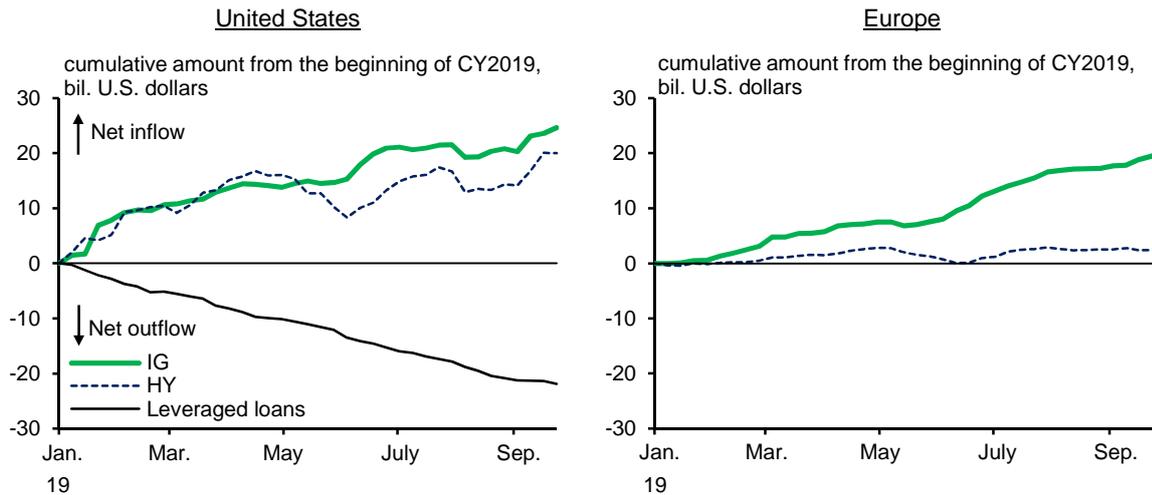
**Chart II-1-19: Decomposition of changes in stock prices in the S&P 500 IT sector**



Note: 1. "EPS" indicates expected EPS for the next 12 months.  
"P/E ratios" is calculated using expected EPS for the next 12 months.  
2. Latest data as at September 25, 2019.  
Source: Datastream from Refinitiv.

As mentioned above, U.S. and European credit markets have been buoyed by investors' persistent search for yield amid declining interest rates. Fund flows into credit markets indicate that leveraged loans, with their diminishing attractiveness as floating-rate products, have experienced net outflows, whereas investment-grade corporate bonds and high-yield bonds in both the United States and Europe have continued to see net inflows (Chart II-1-20).

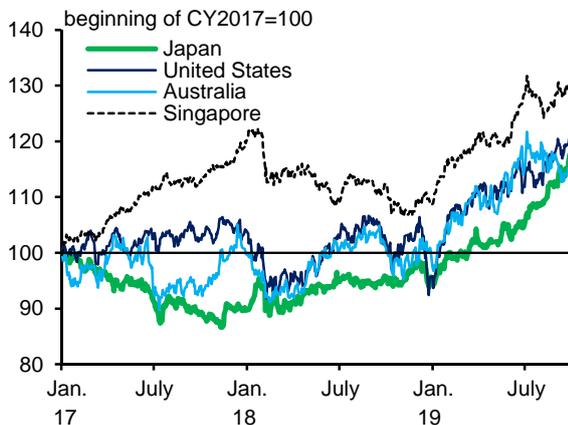
**Chart II-1-20: Flows of credit product funds to the United States and Europe**



Note: 1. "IG" and "HY" indicate investment-grade corporate bonds and high-yield bonds, respectively.  
 2. Latest data as at September 25, 2019.  
 Source: EPFR Global; Haver Analytics.

In the real estate investment trust (REIT) market, REIT prices have continued to rise in many countries, some of which have exceeded historical highs (Chart II-1-21). This is because yield spreads (i.e., dividend yields subtracted by government bond yields) have widened due to the global decline in interest rates, and market participants have preferred REITs as defensive instruments with concerns about political uncertainties. However, some market participants point to signs of overheating in the real estate market amid the accommodative financial environment.

**Chart II-1-21: REIT Indices**



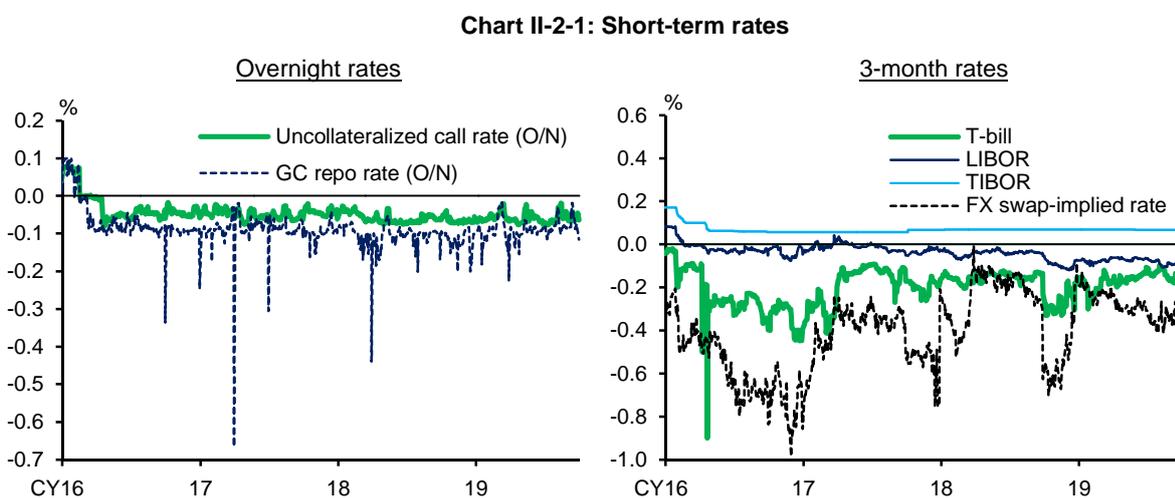
Note: 1. "Japan," "United States," "Australia," and "Singapore" indicate the TSE REIT Index, the FTSE NAREIT All Equity REIT Index, the S&P/ASX 200 A-REIT Index, and the FTSE Straits Times Real Estate Investment Trust Index, respectively.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg.

## B. Japanese financial markets

In Japanese financial markets, both short- and long-term interest rates have generally been stable during the first half of fiscal 2019 as the Bank of Japan continues with Quantitative and Qualitative Monetary Easing (QQE) with Yield Curve Control. Japanese stock prices have fluctuated somewhat significantly due in part to growing concerns about future developments in the global economy.

### Short- and long-term interest rates

Short-term interest rates, on both overnight and term instruments, have been in negative territory on the whole (Chart II-2-1). The size of the negative premium on FX swap-implied yen rates has remained smaller than before for the most part, although they temporarily declined at the end of September 2019 for products maturing beyond the year-end. Meanwhile, it is becoming highly probable that LIBOR -- a representative interest rate benchmark for term instruments -- will be permanently discontinued after the end of 2021, and market participants and other relevant parties have been working together to prepare for the discontinuation.<sup>2</sup>



Note: 1. In the left-hand chart, the horizontal axis indicates the starting date of transaction settlement. "GC repo rate (O/N)" up to April 27, 2018 indicates the T/N rate.

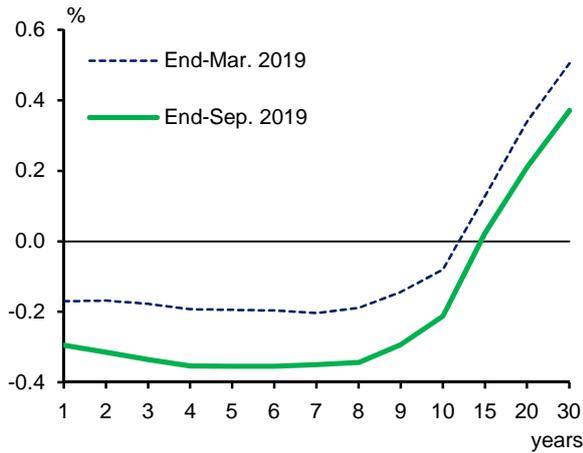
2. In both charts, the latest data are as at end-September 2019.

Source: Bloomberg; Japan Bond Trading; JSDA; BOJ.

Under QQE with Yield Curve Control, the shape of the yield curve for JGBs has been in line with the current guideline for market operations, in which the short-term policy interest rate is set at minus 0.1 percent and the target level of 10-year JGB yields is around 0 percent. Long-term interest rates of a wide range of maturities have declined in tandem with the decline in overseas interest rates. This decline reflects stronger risk aversion by investors and heightened expectations for policy rate cuts in the United States and Europe (Charts II-2-2 and II-2-3).

<sup>2</sup> On July 2, 2019, the Cross-Industry Committee on Japanese Yen Interest Rate Benchmarks released the "Public Consultation on the Appropriate Choice and Usage of Japanese Yen Interest Rate Benchmarks" ([http://www.boj.or.jp/en/paym/market/jpy\\_cmte/index.htm/](http://www.boj.or.jp/en/paym/market/jpy_cmte/index.htm/)). The committee includes members from financial institutions, institutional investors, and non-financial corporates, and the Financial Markets Department of the Bank of Japan serves as the secretariat. Market participants and interest rate benchmark users are required to prepare for the permanent discontinuation of LIBOR, taking into account the contents of the public consultation and the deliverables based on the results of the public consultation (which will be released later). Meanwhile, since such preparations will be necessary not only for the yen but for other LIBOR currencies, including the U.S. dollar and the euro, due attention should also be paid to overseas initiatives.

**Chart II-2-2: JGB yield curves**



Source: Bloomberg.

**Chart II-2-3: 10-year JGB yields**



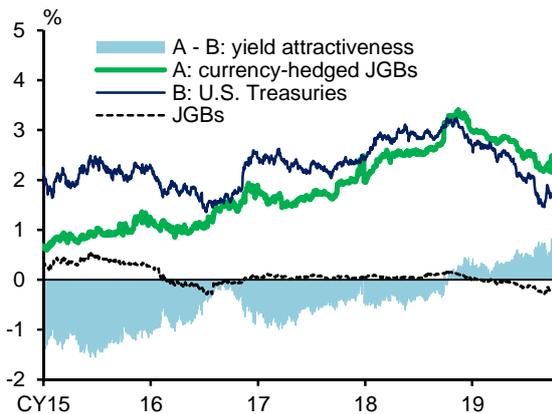
Note: Latest data as at end-September 2019.  
Source: Bloomberg.

### Liquidity and functioning of JGB markets

Some indicators suggest a deterioration in JGB market liquidity, which coincide with the volatility spikes in global financial markets. However, transaction volume for cash JGBs has remained somewhat larger.<sup>3</sup> Under these circumstances, the latest *Bond Market Survey* (August 2019) shows that the diffusion index for the degree of bond market functioning from the viewpoint of the surveyed institutions has remained deep in negative territory, despite improving somewhat compared with 2018.<sup>4</sup>

Meanwhile, from the perspective of foreign investors, the relative yield attractiveness of JGBs has remained elevated once foreign currency hedging costs are taken into account (the FX-swap implied yen rate from the U.S. dollar) (Chart II-2-4). Against this background, the investment demand of foreign investors has risen, particularly for medium-term and long-term JGBs (Chart II-2-5).

**Chart II-2-4: Attractiveness of 10-year JGB yields for foreign investors**

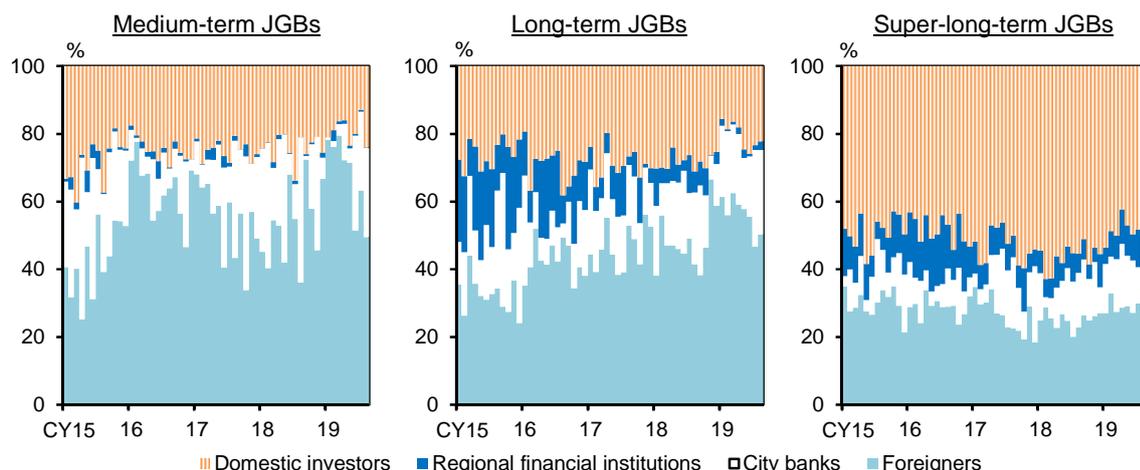


Note: 1. "Currency-hedged JGBs" is calculated using the FX swap-implied yen rate from the U.S. dollar (3-month).  
2. Latest data as at end-September 2019.  
Source: Bloomberg.

<sup>3</sup> For details, see the Bank of Japan's website (<http://www.boj.or.jp/en/paym/bond/index.htm/#p02>). The Financial Markets Department of the Bank of Japan updates and releases liquidity indicators of the JGB markets on a quarterly basis.

<sup>4</sup> For details, see the Bank of Japan's website (<http://www.boj.or.jp/en/paym/bond/index.htm/#p01>).

**Chart II-2-5: Foreign investors' presence in the JGB market**



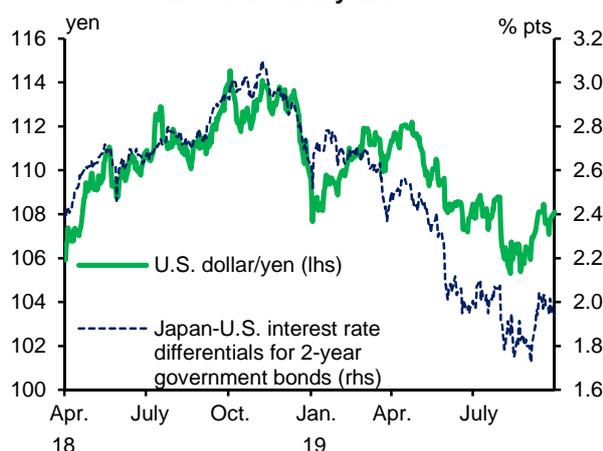
Note: 1. The proportion of each investor's share in dealer-to-client transactions. The data cover city banks, regional financial institutions, domestic investors (life and non-life insurance companies, trust banks, financial institutions for agriculture and forestry, investment trusts, and mutual aid associations of government agencies), and foreigners. Other institutions (governments, the BOJ, Japan Post Bank, Japan Post Insurance, business corporations, other financial institutions, etc.) are excluded from the data.  
 2. Latest data are as at August 2019.

Source: JSDA.

### FX markets and stock markets

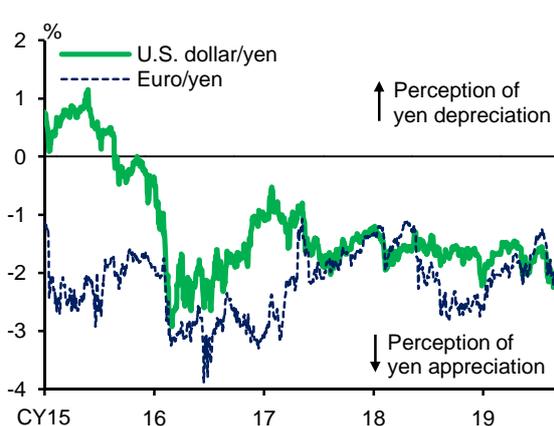
In FX markets, the yen has appreciated against the U.S. dollar, reflecting the narrowing of interest rate differentials between Japan and the United States due to the policy rate cuts in the United States, and the deterioration of risk appetite owing to U.S.-China trade tensions (Chart II-2-6). Risk reversals have continued to suggest an increased vigilance on the part of the market regarding the yen's appreciation (Chart II-2-7).

**Chart II-2-6: Japan-U.S. interest rate differentials and U.S. dollar/yen rates**



Note: Latest data as at end-September 2019.  
 Source: Bloomberg.

**Chart II-2-7: Risk reversals**

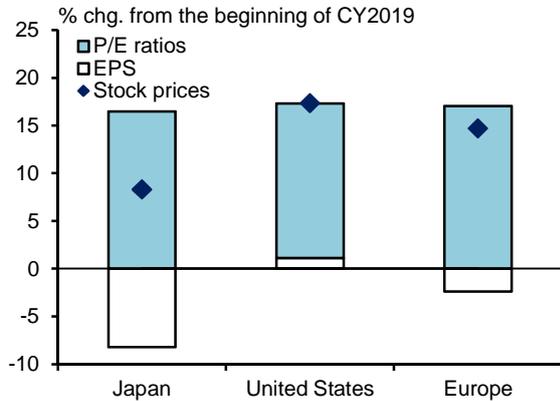


Note: Deviation between implied volatilities (1-year) of yen put and call options. Latest data as at end-September 2019.  
 Source: Bloomberg.

Japanese stock prices have fluctuated somewhat significantly, reflecting developments in U.S.-China trade tensions (Charts II-1-1 and II-1-4). Japanese stocks have underperformed those in other major countries since the beginning of 2019. The background for the underperformance includes the following considerations: (1) the stock index is susceptible to the global retreat in manufacturing since its share of manufacturing, which has a relatively high dependency on

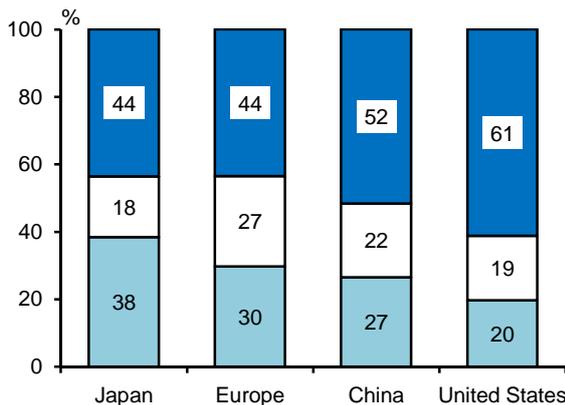
external demand, is larger than that in other countries, and (2) expected EPS, in particular, has declined due in part to the yen's appreciation reflecting the narrowing of interest rate differentials between Japan and abroad (Charts II-2-8 and II-2-9). The trading volume of stocks by investor type suggests that foreign investors have been net sellers on the whole (Chart II-2-10). Meanwhile, credit spreads on corporate bonds have widened as JGB yields have declined, although views on firms' credit risks have remained generally unchanged (Chart II-2-11).

**Chart II-2-8: Decomposition of changes in stock prices**



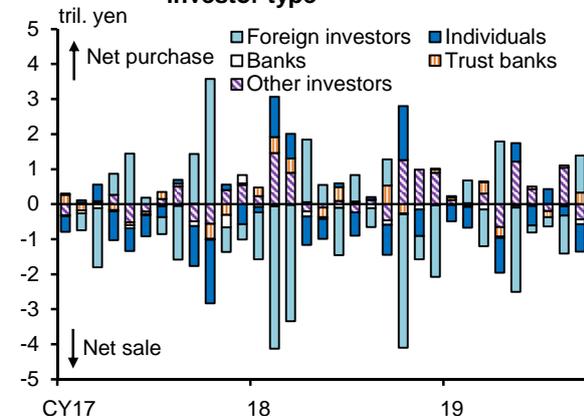
Note: 1. Japan, the United States, and Europe indicate the TOPIX, the S&P 500, and the EURO STOXX, respectively.  
 2. "EPS" indicates expected EPS for the next 12 months. "P/E ratios" is calculated using expected EPS for the next 12 months.  
 3. The latest data for the United States are as at September 25, 2019 and the latest data for Japan and Europe are as at September 24, 2019.  
 Source: Datastream from Refinitiv.

**Chart II-2-9: Manufacturing share in stock price indices**



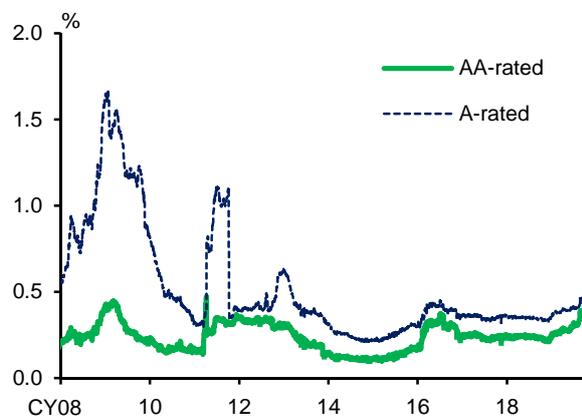
Note: 1. Japan, Europe, China, and the United States indicate the TOPIX, the EURO STOXX, the Shanghai Stock Exchange Composite Index, and the S&P 500, respectively.  
 2. "Manufacturing (foreign demand)" indicates capital goods; automobiles & components; materials; semiconductors & semiconductor equipment; and technology hardware & equipment from among the 24 industry groups in the Global Industry Classification Standard. "Manufacturing (domestic demand)" indicates consumer durables & apparel; food, beverage & tobacco; household & personal products; pharmaceuticals, biotechnology & life sciences; and energy.  
 3. Latest data as at end-September 2019.  
 Source: Bloomberg.

**Chart II-2-10: Japanese stock investments by investor type**



Note: The sum of net investments in cash and futures stock markets. Latest data as at September 2019.  
 Source: Osaka Exchange; Tokyo Stock Exchange.

**Chart II-2-11: Credit spreads on corporate bonds**



Note: 1. Yield spreads of corporate bonds with remaining maturity of 3 or more years but less than 7 years over government bonds. Rated by R&I.  
 2. Latest data as at end-September 2019.  
 Source: Bloomberg; JSDA.

### III. Examination of financial intermediation

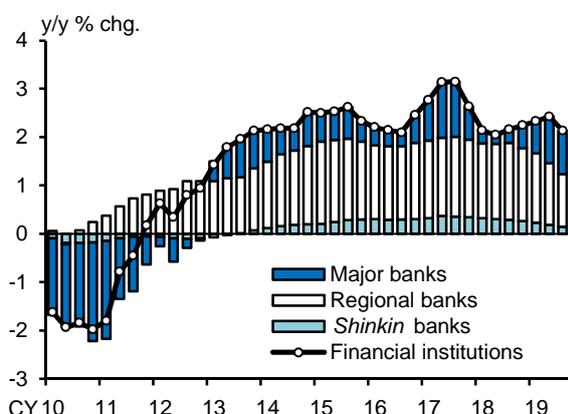
This chapter examines developments in financial intermediation, mainly based on information that was available in the first half of fiscal 2019. It first provides a detailed assessment of financial intermediation by financial institutions (i.e., banks and *shinkin* banks), and then outlines financial intermediation by institutional investors (i.e., life insurance companies, pension funds, and securities investment trusts). Finally, it describes developments in investment in financial assets and funding activities by the private non-financial sector (i.e., firms and households).<sup>5</sup>

#### A. Financial intermediation by financial institutions

##### 1. Domestic loans

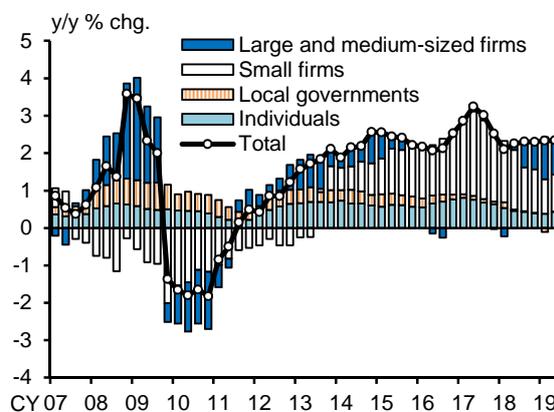
Japan's economy has been on a moderate expanding trend, and financial institutions' domestic loans outstanding have been growing at around 2 percent annually (Charts III-1-1 and III-1-2). By type of bank, the growth rate of major banks' loans outstanding, particularly merger and acquisition (M&A) related loans, has recently increased. On the other hand, the pace of increase in loans outstanding by regional banks, especially real estate loans, has recently slowed somewhat. The lending stance of financial institutions has remained active (Chart III-1-3). Demand for funds, especially by small firms, has kept increasing, although some loan officers have reported a slowdown in demand (Chart III-1-4).

**Chart III-1-1: Domestic loans outstanding among financial institutions**



Note: Latest data as at the July-September quarter of 2019.  
Source: BOJ, "Principal figures of financial institutions."

**Chart III-1-2: Loans outstanding among financial institutions by type of borrower**



Note: Loans to banks and insurance companies are excluded. Latest data as at end-June 2019.  
Source: BOJ.

##### *Developments in loans by type of borrower*

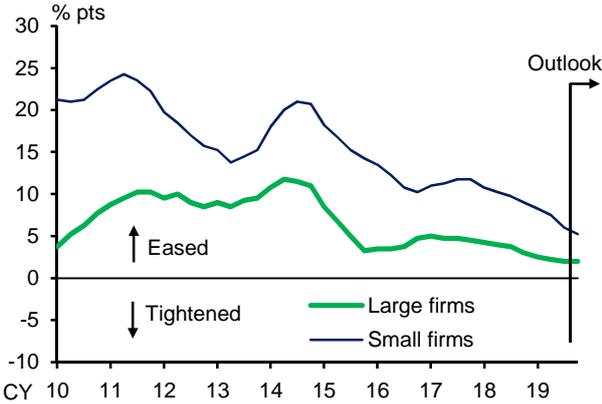
Loans to firms have continued to drive the growth of total loans (Chart III-1-2). While loans to individuals have also continued to increase, their pace has been slowing. Loans to local governments have been essentially flat.

Loans to firms have increased for a wide range of industries, such as manufacturing, although the

<sup>5</sup> For the balance sheets of financial institutions, see "Financial Results of Japan's Banks for Fiscal 2018," *Financial System Report Annex Series*, September 2019.

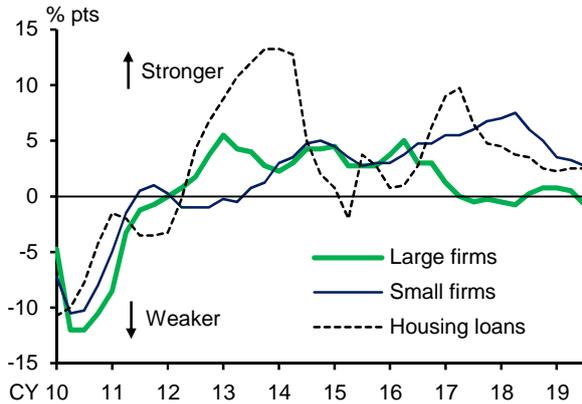
growth in real estate loans has slowed somewhat (Chart III-1-5). Breaking down loans other than those to real estate firms by firm size, loans to large firms have shown higher growth since fiscal 2018 for working capital, reflecting an increase in loans related to large-scale M&A deals, while they have not changed notably for business fixed investment, except for firms in the electricity and gas industries etc., reflecting the ample internal funds of large firms (Chart III-1-6).<sup>6</sup> Loans to small firms, especially those for business fixed investment, have also continued to increase amid the prolonged economic expansion.

**Chart III-1-3: DI of credit standards**



Note: 1. Based on the proportion of responding financial institutions selecting each given choice, the DI is calculated as follows:  
 $DI = \text{"considerably eased"} + 0.5 * \text{"somewhat eased"} - 0.5 * \text{"somewhat tightened"} - \text{"considerably tightened."}$   
 2. 4-quarter backward moving averages. Latest data as at July 2019.  
 Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

**Chart III-1-4: DI of demand for loans as perceived by financial institutions**



Note: 1. Based on the proportion of responding financial institutions selecting each given choice, the DI is calculated as follows:  
 $DI = \text{"substantially stronger"} + 0.5 * \text{"moderately stronger"} - 0.5 * \text{"moderately weaker"} - \text{"substantially weaker."}$   
 2. 4-quarter backward moving averages. Latest data as at July 2019.  
 Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

As to loans to individuals, housing loans have continued to grow at around 2 percent annually (Chart III-1-7). This growth has been driven by regional banks, whereas major banks have continued to decrease such loans outstanding, reflecting their strategy of focusing on more profitable segments. The annual growth rate of card loans has remained negative, reflecting financial institutions' review of marketing strategies and their tightening of screening procedures (Chart III-1-8).<sup>7</sup>

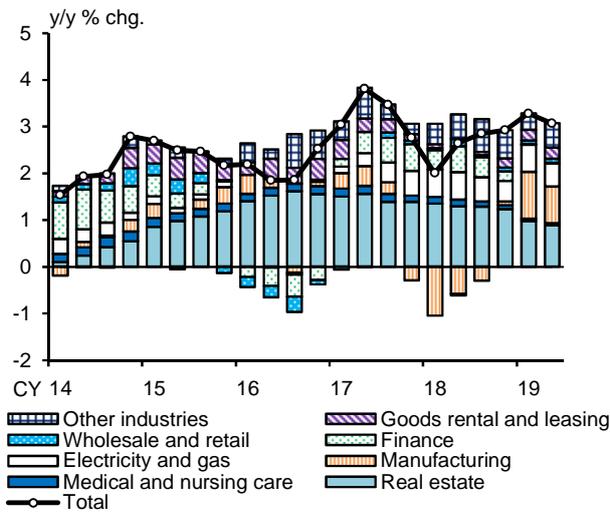
*Developments in loans extended by regional financial institutions*

The rate of increase in regional banks' loans to firms has recently slowed somewhat, with increases continuing to be mainly driven by non-Tokyo domestic branches, whereas growth in loans by Tokyo branches has also decelerated recently, as a result of a greater focus on more profitable segments (Chart III-1-9).

<sup>6</sup> M&A-related loans are classified as loans for working capital. In some statistics, loans to holding companies of large firms, including M&A-related loans, are included in loans to small firms because, for example, these companies have only a small number of regular employees. This seems to be one reason that the fluctuation of major banks' loans to small firms for working capital has been large since fiscal 2017.

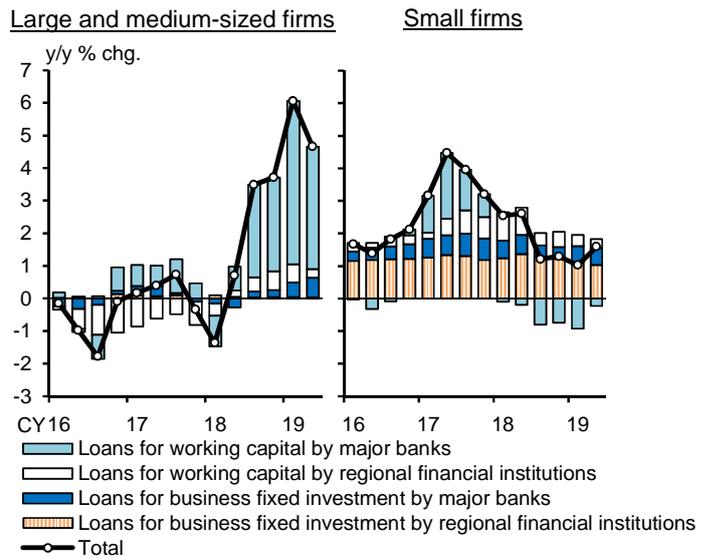
<sup>7</sup> As at end-June 2019, of the outstanding amounts of loans to individuals, housing loans account for about 91 percent, card loans for about 3 percent, and other types of loans for about 6 percent.

**Chart III-1-5: Banks' corporate loans outstanding by industry**



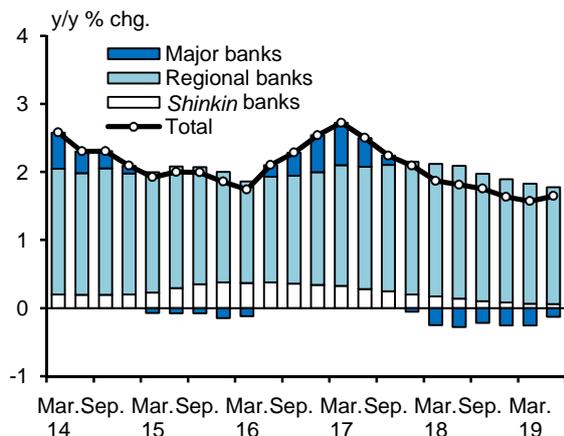
Note: Loans to banks and insurance companies, overseas yen loans, and domestic loans transferred overseas are excluded. Latest data as at end-June 2019.  
Source: BOJ.

**Chart III-1-6: Corporate loans outstanding by type of bank and loan**



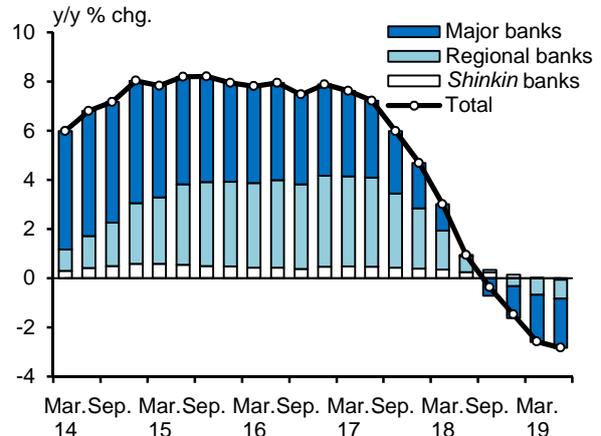
Note: Loans to the real estate industry, banks, and insurance companies are excluded. Latest data as at end-June 2019.  
Source: BOJ.

**Chart III-1-7: Outstanding amount of housing loans among financial institutions**



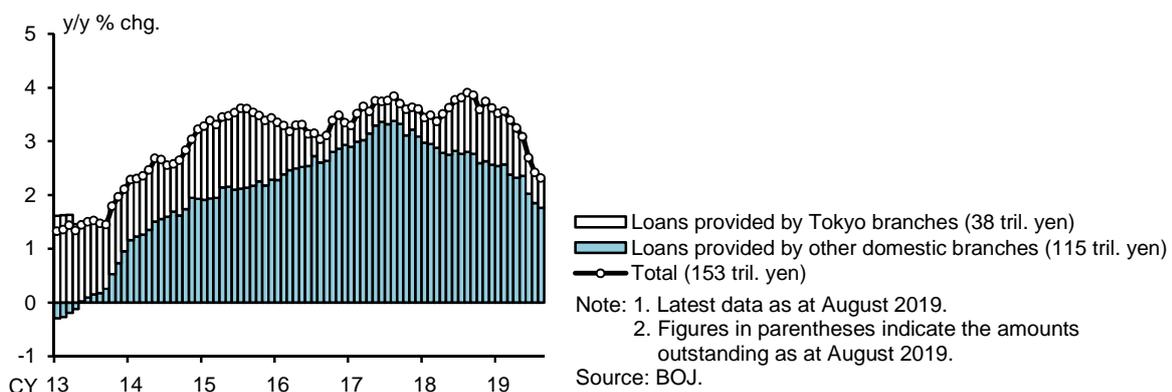
Note: Latest data as at end-June 2019.  
Source: BOJ.

**Chart III-1-8: Outstanding amount of card loans among financial institutions**



Note: Latest data as at end-June 2019.  
Source: BOJ.

**Chart III-1-9: Corporate loans provided by regional banks**

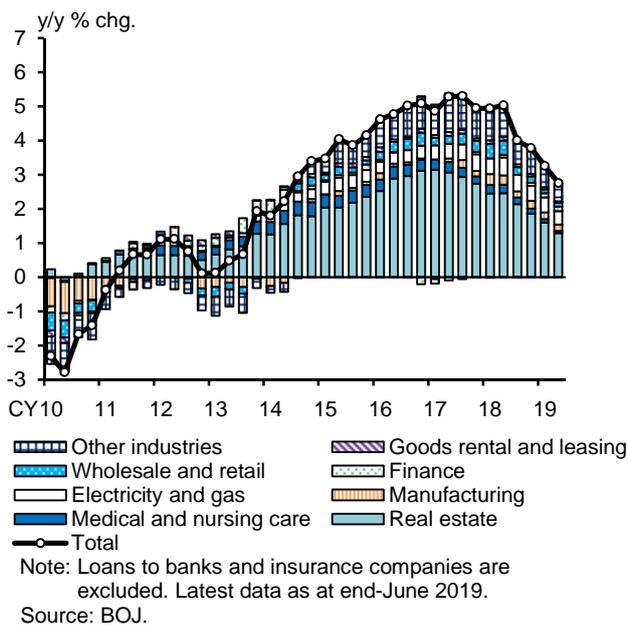


Note: 1. Latest data as at August 2019.  
2. Figures in parentheses indicate the amounts outstanding as at August 2019.

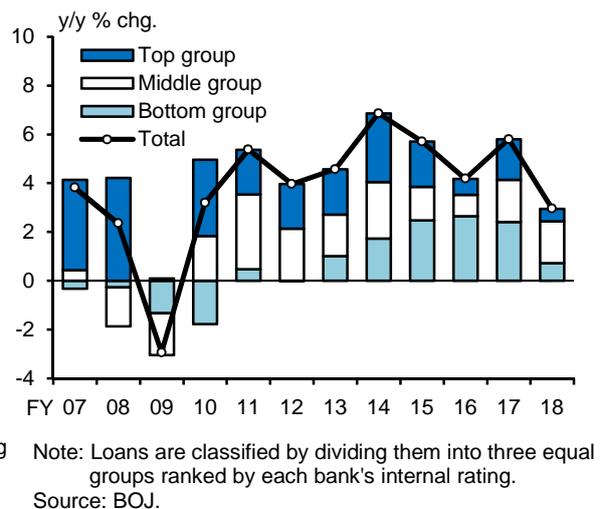
Source: BOJ.

Regional banks' loans to small firms have increased across a wide range of industries, such as real estate, electricity and gas, manufacturing, and medical and nursing care. However, overall growth has slowed, reflecting a slowdown in loan demand mainly due to the decline in the return on the investment in rental properties. In addition, regional banks have recently turned cautious about lending to rental housing businesses, which has accounted for a large share in the growth of loans to small firms, since the banks have become more concerned about their credit concentration in the real estate industry (Chart III-1-10). At the same time, loans to firms with relatively low creditworthiness among "normal" borrowers have continued to increase (Chart III-1-11).

**Chart III-1-10: Regional banks' loans outstanding to small firms by industry**



**Chart III-1-11: Composition of regional banks' loans outstanding to "normal" borrowers**



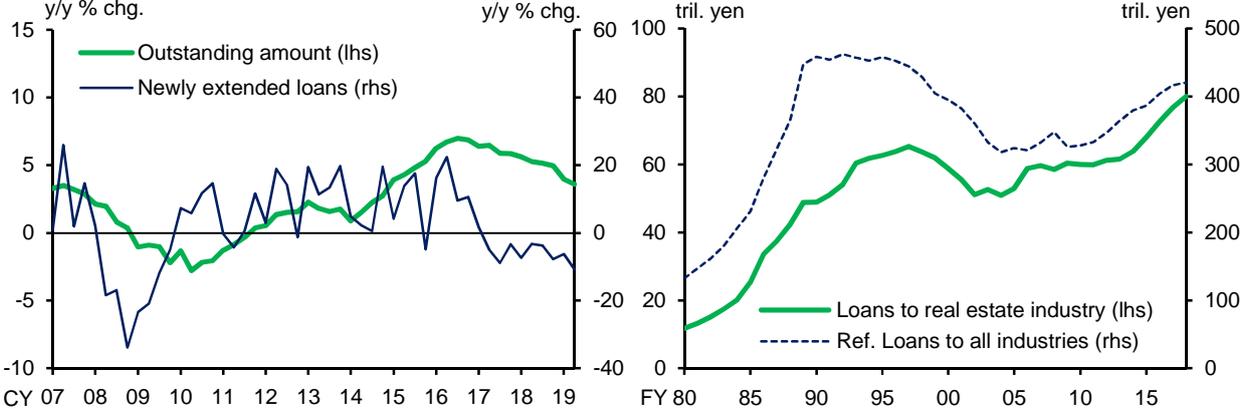
### Developments in real estate loans

The amount of newly extended loans to the real estate industry has been falling year on year since fiscal 2017. As a result, the growth in the outstanding amount of loans to the industry has moderately slowed, but still shows an annual growth rate of slightly less than 4 percent, continuing to exceed the growth rate of loans to all industries, which is around 2 percent (Chart III-1-12). The outstanding amount of real estate loans extended by domestic banks has remained above the level seen during the bubble period in the late 1980s, reaching a record high of approximately 80 trillion yen as at end-June 2019.

Breaking down loans to the real estate industry by type of bank, major banks' loans outstanding have increased, led by lending to small and medium-sized firms, including REITs. However, the growth in major banks' loans to the real estate industry has recently slowed somewhat, reflecting the cautious lending stance of some banks (Chart III-1-13). The slowdown in the growth rate of regional banks' real estate loans outstanding has recently become pronounced, mainly due to a slowdown in loans to rental housing businesses run by individuals and loans to small and medium-sized firms, including asset management companies founded by individuals. On the supply side, the background behind this slowdown is that a growing number of financial institutions have become more prudent in their lending to the real estate industry. On the demand side, investor sentiment has become more cautious due to heightened concerns about a possible

slackening of the rental housing market. Furthermore, the number of referrals from real estate brokers for borrowers to financial institutions has decreased. The slowdown has also become evident for *shinkin* banks.

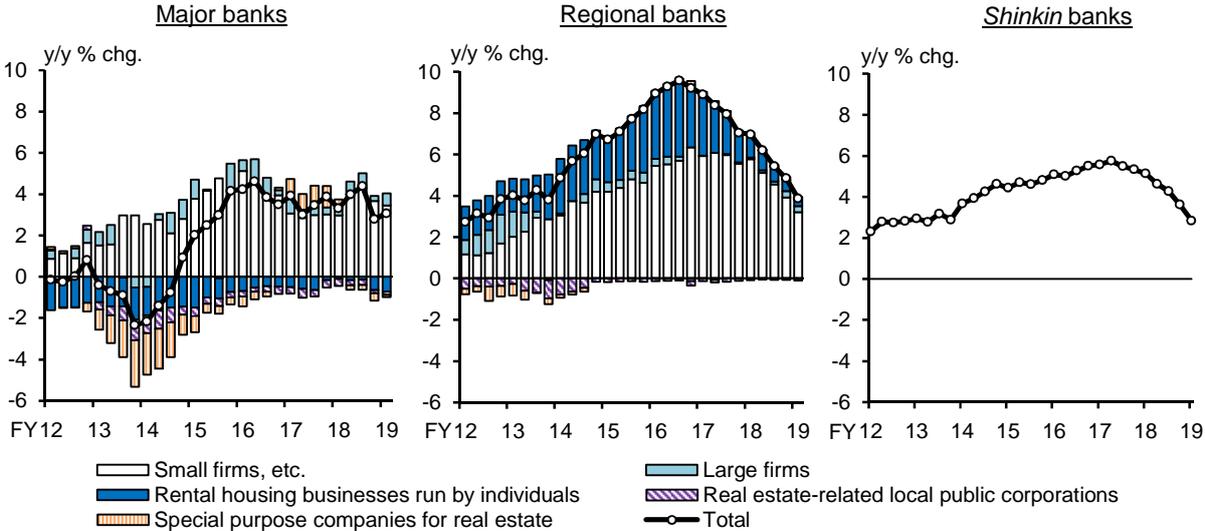
**Chart III-1-12: Real estate loans among financial institutions**



Note: 1. The right-hand chart covers domestic banks only to extend the time scale.  
 2. In the left-hand chart, the latest data for "Outstanding amount" are as at end-June 2019 and the latest data for "Newly extended loans" are as at the April-June quarter of 2019. In the right-hand chart, the latest data are as at end-March 2019.

Source: BOJ.

**Chart III-1-13: Breakdown of real estate loans**



Note: Latest data as at end-June 2019.  
 Source: BOJ.

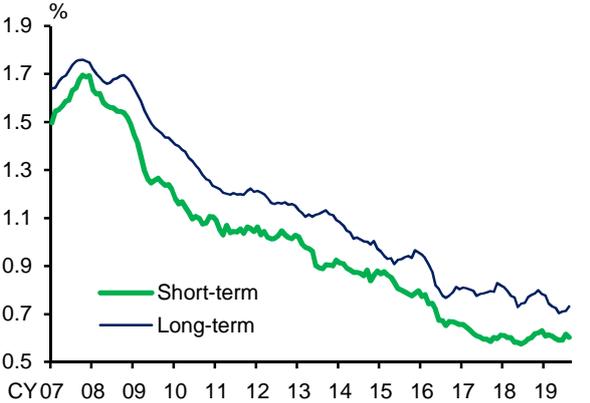
**Developments in loan interest rates**

Financial institutions' average contract interest rates, both short-term and long-term, on new loans and discounts have been hovering around historically low levels (Chart III-1-14). Efforts by financial institutions to extend loans with higher profit margins, such as loans related to M&A deals and those to middle-risk firms, have put upward pressure on loan interest rates. However, downward pressure has also come from a further decline in base rates, such as long-term interest rates, and

the intensified competition among financial institutions.<sup>8</sup>

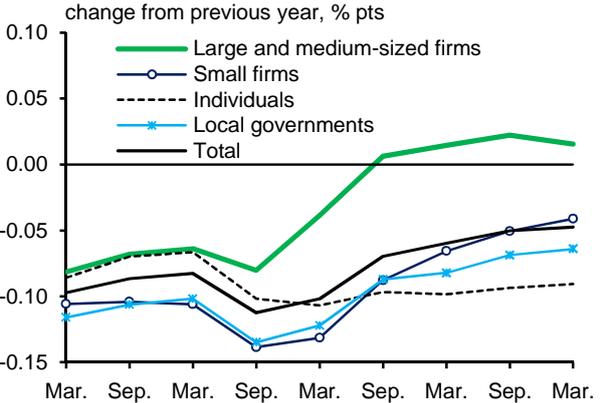
A decomposition of year-on-year changes in regional banks' average interest rates on loans outstanding by type of borrower reveals that changes in interest rates on loans to large and medium-sized firms have remained slightly positive. Interest rates on loans to small firms have continued to decline, but at a somewhat slower pace, reflecting regional banks' focus on loans with higher profit margins (Chart III-1-15). Meanwhile, interest rates on loans to individuals, such as housing loans, and those on loans to local governments have continued to decline.

**Chart III-1-14: Average contract interest rates on new loans and discounts among domestically licensed banks**



Note: 6-month backward moving averages. Latest data as at August 2019.  
Source: BOJ, "Average contract interest rates on loans and discounts."

**Chart III-1-15: Changes in loan interest rates among regional banks by type of borrower**



Note: Based on the outstanding amount of loans at month-end; loans to banks and insurance companies are excluded. Latest data as at end-March 2019.  
Source: BOJ.

## 2. Overseas loans

Overseas loans showed a moderate increasing trend, reflecting Japanese banks' -- in particular major banks' -- focus on both supporting the overseas activities of Japanese firms and expanding their own international business base. However, the pace of growth in these loans has recently slowed. This likely is due to the fact that Japanese financial institutions -- in response to intensified competition with overseas counterparts -- have increased their focus on profitability, even more so than in the past; for example, they are trying to sell loan claims of low-return borrowers and change their loan portfolios by increasing the profit margins of loans instead of increasing the total amount of loans (Charts III-1-16 and III-1-17).

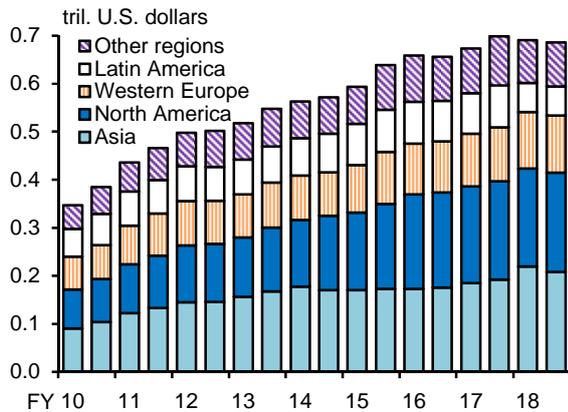
In this context, some banks are working to increase the amount of loans with slightly higher credit risks but with relatively high profit margins, such as loans to firms in the top group of non-investment-grade companies (which corresponds to the middle group of the "normal" loan classification) while also improving their risk management.<sup>9</sup> Reflecting these initiatives, the

<sup>8</sup> In M&A deals, buyer firms, in many cases, provisionally fund the buyout through bridge loans and raise long-term funds by converting these loans into, for example, subordinated loans. Loans related to M&A deals put upward pressure on long-term loan interest rates in particular, due to subordinated loans having relatively high interest rates, since they have longer durations than, as well as being subordinate to, other debt.

<sup>9</sup> The loans include leveraged loans, many of which are structured as syndicated loans arranged by multiple financial institutions. Major banks' engagement in the underwriting of leveraged loans is discussed in more detail in Chapter IV.

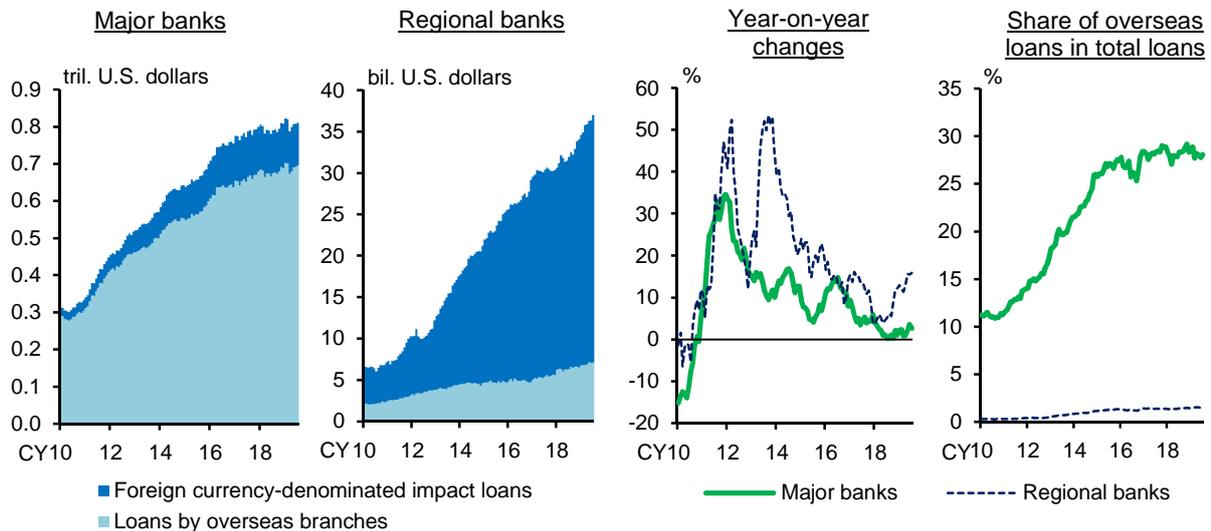
lending margins of Japanese banks have increased, albeit only very moderately (Chart III-1-18).

**Chart III-1-16: Overseas loans outstanding of the three major banks by region**



Source: Published accounts of each bank.

**Chart III-1-17: Overseas loans outstanding among banks**



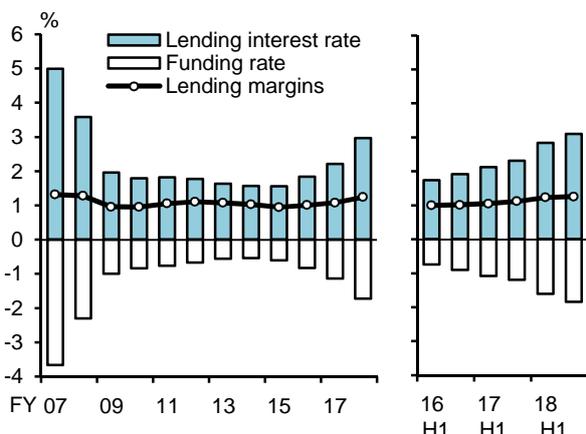
Note: 1. "Loans by overseas branches" includes parts of foreign currency-denominated impact loans in accounts held by overseas branches. "Foreign currency-denominated impact loans" indicates banks' foreign currency-denominated loans to residents.

2. On a non-consolidated basis. Latest data as at end-July 2019.

Source: BOJ.

Furthermore, major banks have also aimed at increasing non-interest income in order to improve their overall profitability. For example, while their fee and commission income related to lending, which is the core of non-interest income, has remained more or less unchanged for several years, due to the slowdown in lending growth, they have been actively engaged in arranging and selling syndicated loans, especially in North America and Europe, and have strived to increase foreign exchange transactions through, for example, transaction banking (Chart III-1-19). Additionally, major banks have expanded their global activities, not only by extending loans through their overseas branches but also by acquiring and investing in overseas local financial institutions and leasing companies (Chart III-1-20).

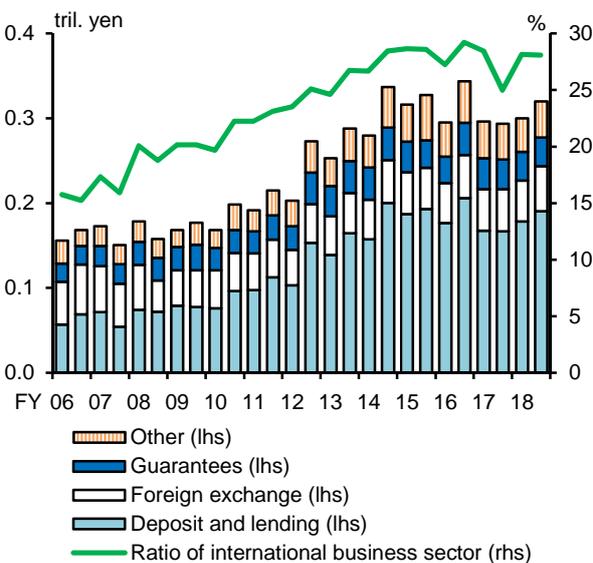
**Chart III-1-18: Lending margin on loans in the international business sector among major banks**



Note: 1. In calculating "Lending margins," interest expenses on interest rate swaps are deducted.  
 2. Semiannual data on the right indicate annualized rates.  
 3. In the left-hand chart, the latest data are as at fiscal 2018.

Source: BOJ.

**Chart III-1-19: Fee and commission income in the international business sector among major banks**



Note: "Ratio of international business sector" is the ratio of fee and commission income of the international business sector to that of all sectors.

Source: BOJ.

**Chart III-1-20: Recent examples of major overseas acquisitions and investments by major financial groups**

	Time of announcement	Country	Outline
Mizuho Bank	Feb. 2015	United States	Acquisition of North American asset portfolios from RBS
	Sep. 2015	United States	Share purchase of an asset management company, Matthews Asia
MUFG Bank	Jan. 2015	Thailand	Integration of Bangkok branch with Bank of Ayudhya
	Jan. 2016	Philippines	Share purchase of Security Bank
	Jan. 2016	Cambodia	Acquisition of Hattha Kaksekar Limited by Bank of Ayudhya
	Dec. 2017	Indonesia	Share purchase of Bank Danamon. An increase in its shareholding ratio in Aug. 2018.
	Jan. 2019	Indonesia	Merger of Bank Danamon and Bank BNP, whose shareholders include MUFG's consolidate subsidiary ACOM
	Mar. 2019	Germany	Acquisition of the aviation finance division from DVB Bank
	Apr. 2019	Indonesia	Additional share purchase of Bank Danamon, making it a consolidate subsidiary of MUFG and MUFG Bank
Sumitomo Mitsui Banking Corporation	Mar. 2015	Hong Kong	Additional share purchase of the Bank of East Asia
	Apr. 2015	Colombia	Share purchase of Financiera de Desarrollo Nacional S.A. An increase in its shareholding ratio in Jan. 2018.
	June 2015	Europe	Acquisition of European asset portfolios from General Electric Group
	Aug. 2015	Cambodia	Additional share purchase of ACLEDA Bank
	Oct. 2015	Indonesia	Share purchase of automotive finance companies of Sumitomo Corporation Group
	Dec. 2016	United States	Acquisition of American Railcar Leasing LLC
	Aug. 2018	Indonesia	Merger of PT Bank Tabungan Pensiunan Nasional Tbk (BTPN) and PT Bank Sumitomo Mitsui Indonesia
	Jan. 2019	Indonesia	Additional share purchase of BTPN, making it a consolidate subsidiary of SMBC Group
Mitsubishi UFJ Trust and Banking Corporation	Aug. 2019	United Kingdom	Acquisition of an asset management company, TT International
	Feb. 2016	United States	Acquisition of an overseas fund management company, Capital Analytics II LLC
	Jul. 2016	United States	Acquisition of an overseas fund management company, Rydex Fund Services, LLC
Sumitomo Mitsui Trust Bank	Oct. 2018	Australia	Acquisition of asset management companies, subsidiaries of Colonial First State Group
	Dec. 2015	United States	Share purchase of a freight railcar operating leasing company in North America, a subsidiary of Marubeni
	Feb. 2017	Vietnam	Share purchase of BIDV Financial Leasing Company
	Nov. 2017	United States	Share purchase of an investment bank, GreensLedge Holdings LLC

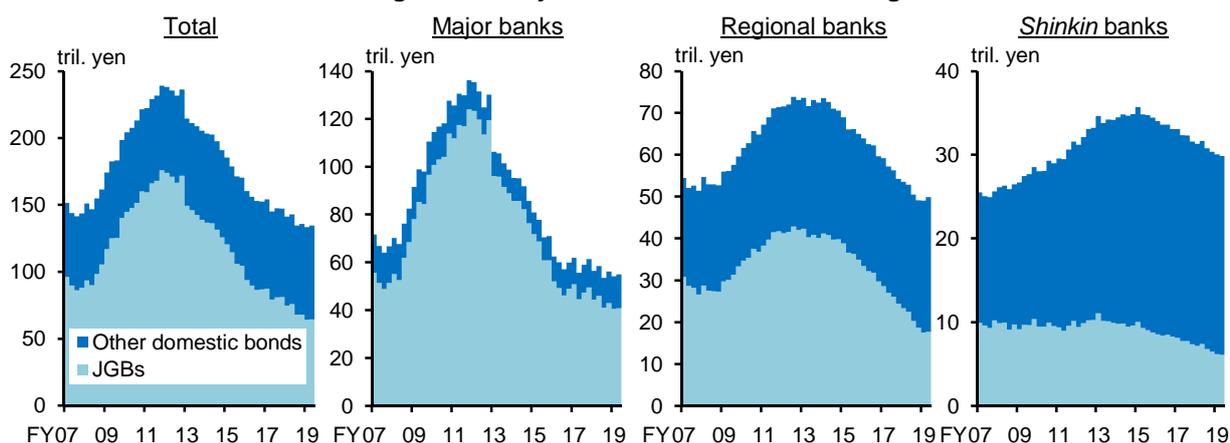
Source: Published accounts of each bank.

### 3. Securities investment

The outstanding amount of financial institutions' yen-denominated bond investment has continued to follow a moderate declining trend under the Bank of Japan's large-scale JGB purchases, partly because long-term interest rates have recently been in negative territory. The outstanding amount of foreign bond investment has increased somewhat, particularly at major banks, amid the decline in U.S. and European interest rates. Meanwhile, the outstanding amounts of investment trust products and overseas credit products have continued to follow an upward trend. Financial institutions as a whole have maintained an active stance toward risk taking in securities investment, particularly in investment trusts, although some financial institutions have increased their purchases of inverse mutual funds and exchange-traded funds (ETFs).

Financial institutions' holdings of yen-denominated bonds, including JGBs, municipal bonds, and corporate bonds, have continued to decrease moderately, led by the decline in JGB holdings (Chart III-1-21). Because financial institutions require a certain amount of yen-denominated bonds in order to secure net interest income, keep their current account deposit balances at the Bank of Japan from increasing, and meet demand for collateral, they have been working to increase investments in super long-term JGBs and yen-denominated bonds other than JGBs, both of which are showing positive yields. Despite this effort, they are finding it difficult to reinvest the proceeds from redemptions amid the further decline in interest rates.

**Chart III-1-21: Outstanding amount of yen-denominated bonds among financial institutions**



Note: The data are the sum of figures for domestic and overseas branches, based on the outstanding amount at month-end. Latest data as at end- August 2019.

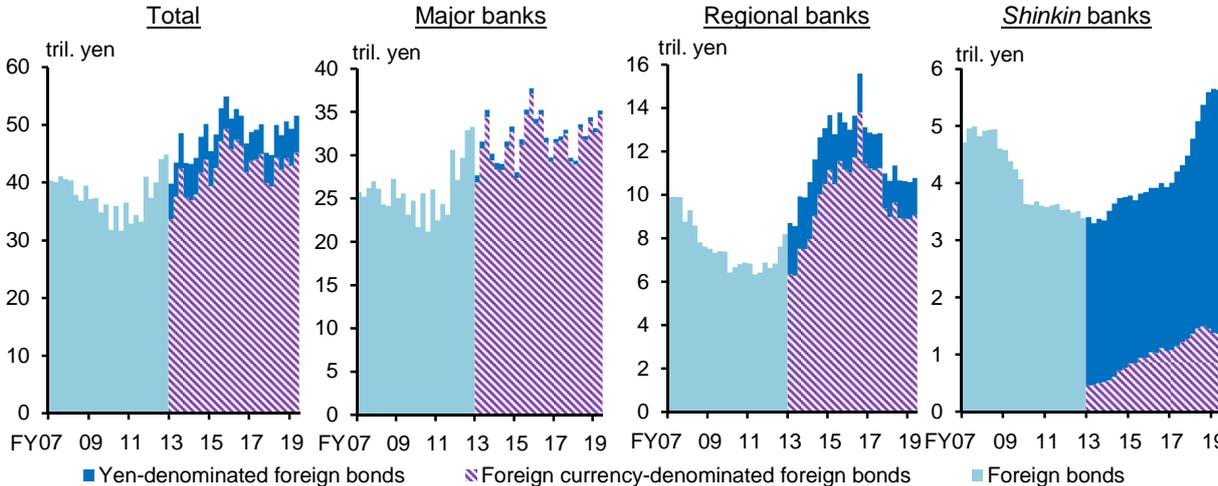
Source: BOJ.

Holdings of foreign bonds (calculated in yen terms) have recently increased somewhat for major banks, whereas they have been more or less unchanged for regional banks (Chart III-1-22). Many financial institutions have maintained sufficient holdings to ensure gains from foreign bond investment, despite some bond sales aimed at locking in gains with U.S. and European interest rates declining. Major and regional banks have continued to invest mainly in currency-hedged foreign bonds, though there has been some investment in currency-unhedged ones. *Shinkin* banks have steadily increased their holdings of foreign bonds, in particular those denominated in yen that have positive yields.

Financial institutions' holdings of investment trusts have continued to follow an increasing trend (Chart III-1-23). Major banks have continued to hold a large amount of stock investment trusts, but the current increase in major banks' holdings of investment trusts seems to have been driven

mainly by an increase in inverse mutual funds and ETFs.<sup>10</sup> Some major banks have accumulated such assets to manage unrealized gains/losses on their bondholdings and their strategic stockholdings, that is, stockholdings for the purpose of maintaining business ties with firms. Regional financial institutions have continued to increase their holdings of investment trusts, such as those backed by a variety of risky assets -- including domestic and foreign interest-bearing bonds, corporate bonds, REITs, and foreign stocks -- and multi-asset investment trusts that include risky assets in their portfolios.

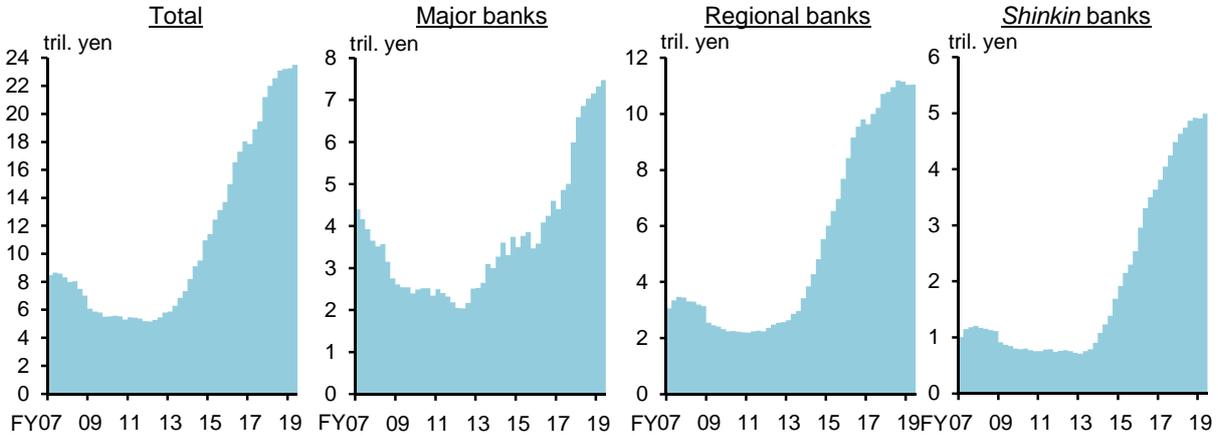
**Chart III-1-22: Outstanding amount of foreign bonds among financial institutions**



Note: 1. "Foreign bonds" is the sum of figures for "Foreign currency-denominated foreign bonds" and "Yen-denominated foreign bonds." The data up to March 2010 are figures for foreign securities.  
 2. The data are the sum of figures for domestic and overseas branches, based on the outstanding amount at month-end. Latest data as at end-August 2019.

Source: BOJ.

**Chart III-1-23: Outstanding amount of investment trusts among financial institutions**



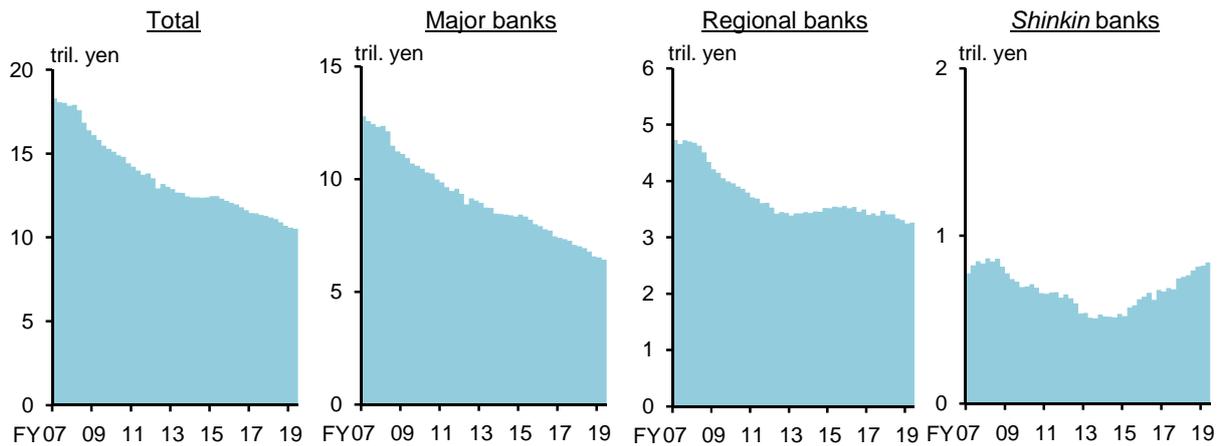
Note: 1. The data include some securities other than investment trusts.  
 2. The data are the sum of figures for domestic and overseas branches. The data for domestic branches are based on the average outstanding amount. The data for overseas branches are based on the outstanding amount at month-end. Latest data as at end-August 2019.

Source: BOJ.

As major banks and regional banks have continued to reduce their strategic stockholdings, their outstanding amounts of stockholdings have been following a gradual downward trend (Chart III-1-24). In contrast, the stockholdings of *shinkin* banks have continued on a moderate increasing trend, due to their more active pure investment.

<sup>10</sup> Major banks' holdings of inverse mutual funds and ETFs account for about 50 percent of their total investment trust holdings.

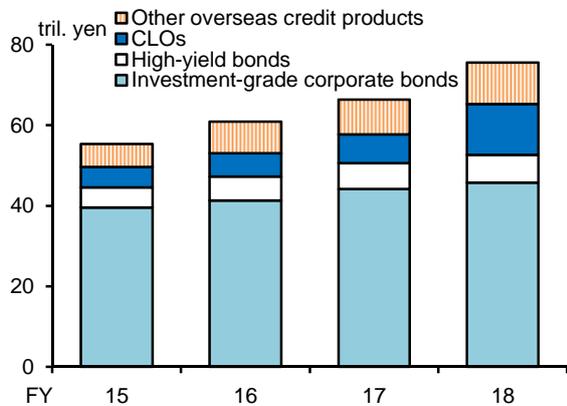
**Chart III-1-24: Outstanding amount of stockholdings among financial institutions**



Note: 1. Based on the outstanding amount on a book value basis at month-end. The data exclude foreign stockholdings.  
 2. The data for major banks are figures for domestic branches and the data for other banks are the sum of figures for domestic and overseas branches. Latest data as at end-August 2019.  
 Source: BOJ.

Depository institutions with large shares of securities investment in their assets, such as Japan Post Bank and central organizations of financial cooperatives, have generally continued to shift their investments from JGBs to overseas risky assets. Against this background, investment in overseas credit products by financial institutions as a whole, including by these depository institutions, has mainly focused on investment-grade corporate bonds, but growth in investments in, for example, highly rated tranches of collateralized loan obligations (CLOs) and bank loan funds has been increasing (Chart III-1-25).<sup>11,12</sup>

**Chart III-1-25: Outstanding amount of overseas credit product investment among major banks and other financial institutions**



Note: 1. Covers major banks, Japan Post Bank, and a central organization of financial cooperatives.  
 2. AAA-rated tranche accounts for 99 percent of CLO tranches held by the above institutions.  
 Source: BOJ.

<sup>11</sup> CLOs are securitized products backed by leveraged loans.

<sup>12</sup> Bank loan funds are investment products that invest in loan obligations, representing loans extended by banks and other financial institutions to firms. In many cases, they invest in non-investment-grade loan obligations.

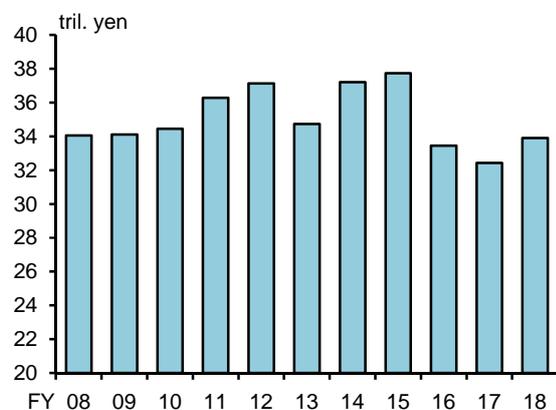
## B. Financial intermediation by institutional investors

### 1. Insurance companies and pension funds

Under the prolonged low interest rate environment, life insurance companies and pension funds have continued to gradually increase their share of investment in foreign-currency denominated assets, which offer relatively high yields.

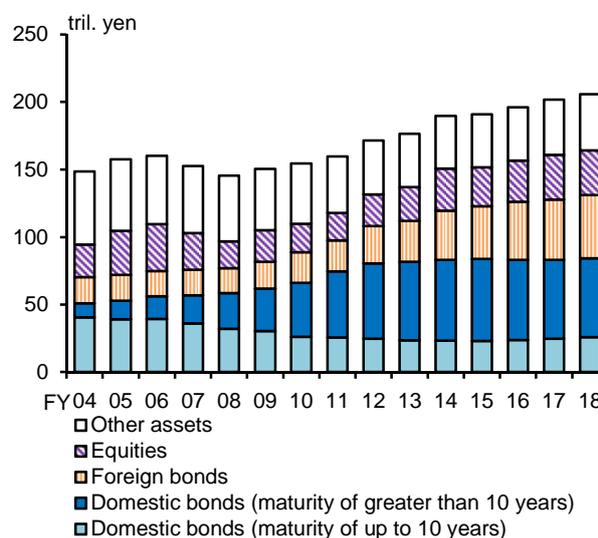
The premium income of life insurance companies, which is the source of funds for their investments, has grown somewhat because of an increase in the sales of protection-type insurance products -- products that both life insurance companies and non-life insurance companies are permitted to sell, such as medical insurance -- that meet new customer needs, as well as in the sales of foreign currency-denominated insurance products (Chart III-2-1). Against this background, life insurance companies have moderately increased their holdings of investment assets (Chart III-2-2). Also, under the prolonged low interest rate environment, insurance companies have shown less appetite for purchasing domestic bonds, which offer low yields, whereas they have continued to increase their investments in foreign bonds and investment funds, which offer relatively high yields. About 70 percent of insurance companies' foreign bond portfolios comprise currency-hedged foreign bonds. In response to the rise in U.S. dollar hedging costs, life insurance companies have continued to shift their investment in currency-hedged foreign bonds from U.S. Treasuries to bonds that offer relatively high yields -- such as those with high credit ratings among U.S. corporate bonds and agency mortgage-backed securities (MBSs), as well as European sovereign bonds (Chart III-2-3). Some life insurance companies have also increased their purchases of CLOs, which entail relatively high credit risk, but such moves have been limited.

**Chart III-2-1: Premium income among life insurance companies**



Source: The Life Insurance Association of Japan.

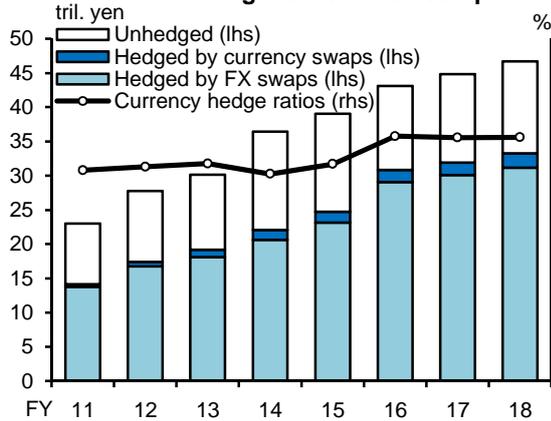
**Chart III-2-2: Investment assets outstanding among life insurance companies**



Note: 1. "Other assets" includes cash and deposits, loans, investment trusts, and real estate.  
 2. Covers nine major life insurance companies. Based on general accounts.  
 Source: Published accounts of each company.

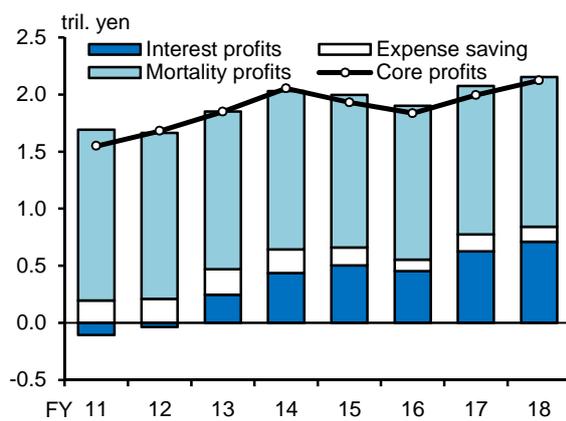
Examining life insurance companies' core profits, which represent their profitability, shows that interest profits (i.e., the difference between actual investment returns and expected investment returns based on interest rates guaranteed to policy holders) have increased moderately, reflecting a growth in stock dividends and an increase in investment in foreign securities (Chart III-2-4).

**Chart III-2-3: Currency hedge ratios for foreign bond investments among life insurance companies**



Note: Covers nine major life insurance companies. Estimated based on general accounts.  
Source: Published accounts of each company.

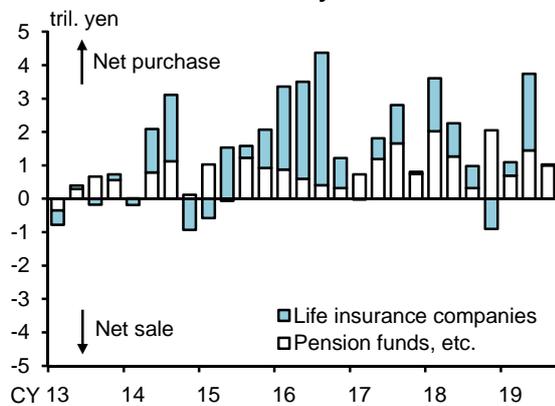
**Chart III-2-4: Core profits among life insurance companies**



Note: Covers four major life insurance companies.  
Source: Published accounts of each company.

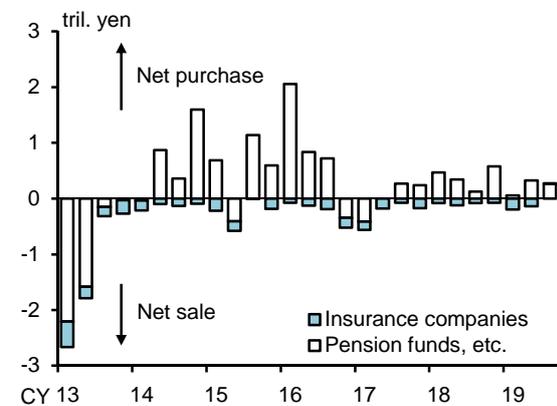
Pension funds have continued to invest in foreign securities and domestic stocks (Charts III-2-5 and III-2-6). Specifically, the Government Pension Investment Fund (GPIF) -- which is in charge of managing the assets of public pension funds such as employees' pension funds and the national pension fund -- has continued its rebalancing in response to market conditions. In doing so, the GPIF has followed the basic portfolio allocation, which determines the portfolio share of each asset class from the perspective of safe and efficient asset management over a long-term investment horizon.<sup>13</sup> Meanwhile, corporate pension funds have essentially maintained their conventionally cautious investment stance.

**Chart III-2-5: Medium- and long-term foreign bond investments by institutional investors**



Note: 1. "Pension funds, etc." indicates trust accounts of banks and trust banks.  
2. Latest data as at July-August 2019.  
Source: Ministry of Finance.

**Chart III-2-6: Stock investments by institutional investors**



Note: 1. "Pension funds, etc." indicates banking and trust accounts of trust banks.  
2. Latest data as at July-August 2019.  
Source: Tokyo Stock Exchange.

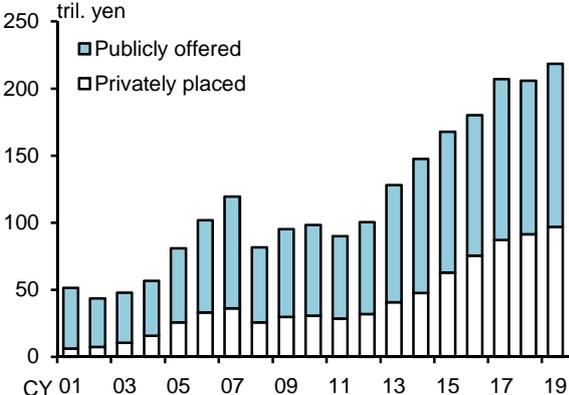
## 2. Securities investment trusts

The outstanding amounts of both publicly offered and privately placed investment trusts have been increasing, reflecting both the increase in market values due to rises in stock prices and the

<sup>13</sup> The GPIF is one of the largest institutional investors in the world, with total assets of 159 trillion yen as of end-June 2019. The assets are managed both externally and internally.

inflow of funds (Chart III-2-7). By type of holder, banks' holdings of investment trusts have continued to increase (Chart III-2-8).

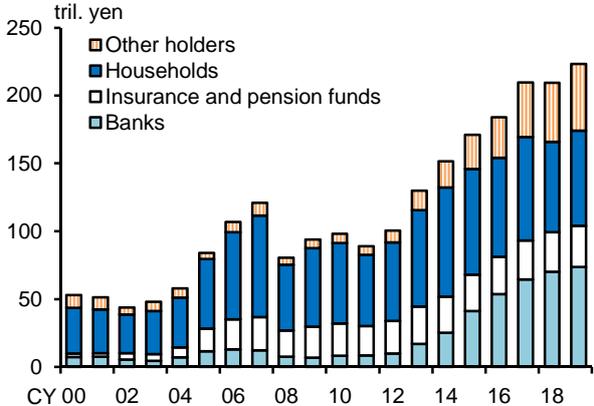
**Chart III-2-7: Assets among investment trusts**



Note: 1. Includes publicly offered REITs (from 2007) and privately placed REITs (from 2013).  
 2. The latest data for REITs are as at end-July 2019 and the latest data for other assets are as at end-August 2019.

Source: The Investment Trusts Association, Japan.

**Chart III-2-8: Outstanding amount of investment trusts by type of holder**



Note: Latest data as at end-June 2019.  
 Source: BOJ, "Flow of funds accounts."

The asset size of privately placed investment trusts has been approaching that of publicly offered investment trusts. Notable features of privately placed investment trusts are that their *de facto* buyers are limited to banks and institutional investors, such as life insurance companies, and that their costs, such as sales costs, are lower than those of publicly offered investment trusts. Investment assets held by privately placed investment trusts consist mainly of foreign sovereign bond ladder funds and investment-grade corporate bonds.<sup>14</sup> However, some privately placed investment trusts have recently shifted their funds from U.S. bonds to European bonds in response to the rise in U.S. dollar hedging costs. In addition, although the share in portfolios remains marginal, their investment assets include non-investment-grade corporate bonds and hedge fund-type assets, both of which entail relatively high risks.

**C. Investment in financial assets and funding activities by the private non-financial sector**

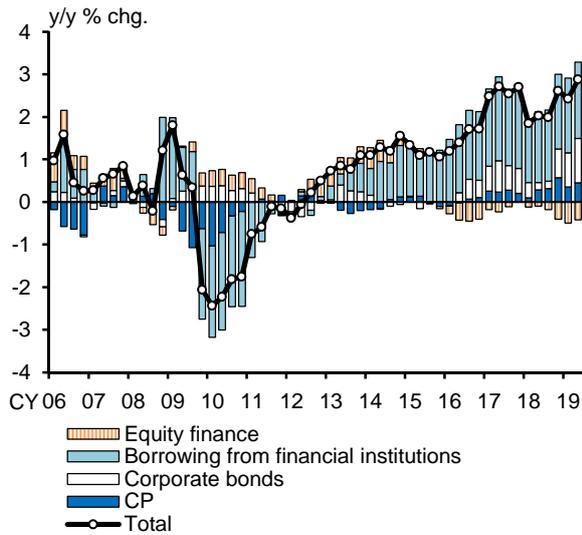
Against the backdrop of the abovementioned financial intermediation services provided by financial institutions and institutional investors, this section outlines developments in investment in financial assets and funding activities by the private non-financial sector, i.e., firms and households.

**1. Corporate sector**

The total volume of firms' funding has been growing at an annual rate of 2.5 to 3 percent (Chart III-3-1). While this growth has been mainly led by an increase in borrowing from financial institutions reflecting the demand for funds to be used for business fixed investment and M&A deals, funding through the issuance of corporate bonds and CP has also increased markedly.

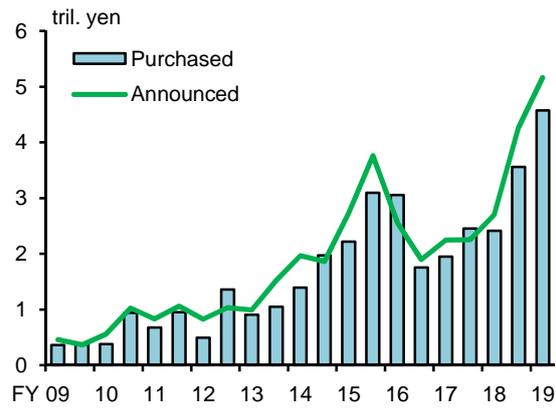
<sup>14</sup> Ladder funds are funds that allocate equal proportions to bonds with different maturities in their portfolios.

**Chart III-3-1: Outstanding amount of firms' funding**



Note: 1. "Equity finance" indicates net changes in the book values of shares and other equities of private nonfinancial corporations.  
 2. "Borrowing from financial institutions" excludes borrowing by banks and insurance companies. "CP" and "Corporate bonds" cover those issued by ordinary industrial corporations.  
 3. Latest data as at end-June 2019.  
 Source: I-N Information Systems; JASDEC; BOJ.

**Chart III-3-2: Amount of stock buybacks**



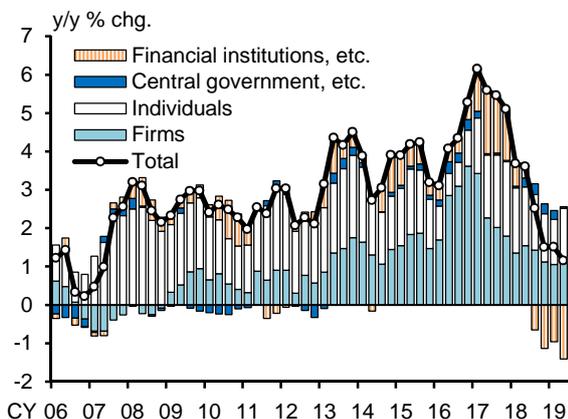
Note: The data include stocks listed on the domestic stock exchanges. Based on the announcement date. Latest data as at the first half of fiscal 2019.  
 Source: I-N Information Systems.

Firms have continued to issue corporate bonds in order to raise funds for refinancing, business fixed investment, and M&A deals because issuance rates in the corporate bond market have been hovering at extremely low levels. Some firms have raised super long-term funds by issuing corporate bonds that mature in, for example, 50 years. Firms have also increased the issuance of CP, which mainly reflects the growing demand for working capital.

In contrast, equity financing through the stock market has remained lackluster (Chart III-3-1). This is due to issuers' preference for low-interest debt financing, such as bank loans, CP, and corporate bonds. It is also because both investors and firms have been scrutinizing firms' capital efficiency and their payouts to shareholders more closely. Under these circumstances, announced and executed stock buybacks by firms have remained at a high level (Chart III-3-2).

At the same time, deposits in the corporate sector have continued to increase at a slower pace (Chart III-3-3).

**Chart III-3-3: Deposits outstanding by type of depositor**

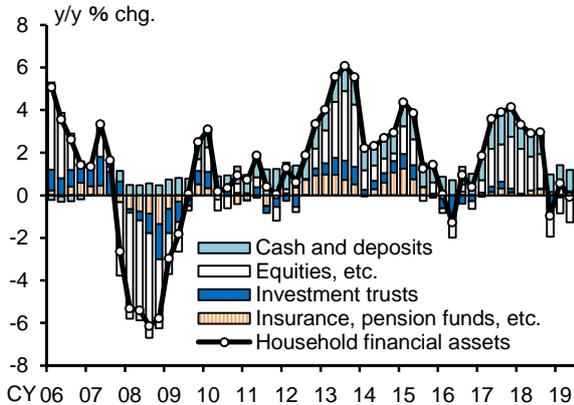


Note: 1. Covers domestically licensed banks. "Financial institutions, etc." includes NCDs.  
 2. Latest data as at the April-June quarter of 2019.  
 Source: BOJ.

## 2. Household sector

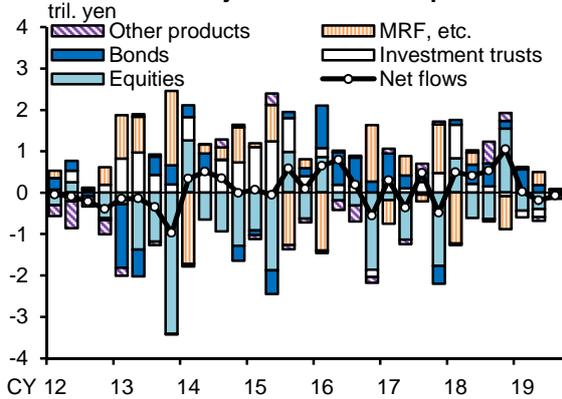
Households have maintained a cautious investment stance overall. The outstanding amount of cash and deposits in household assets has increased despite the extremely low interest rates on deposits (Charts III-3-3 and III-3-4). Regarding equities, the household sector registered a net outflow of funds due to sales aimed at locking in gains amid recovery in stock prices and a reduction in position sizes before the long holiday period from end-April through early May. Since the holiday period, U.S. stock prices have been at historically high levels, leading to a net flow of funds into foreign equities (Chart III-3-5). In addition, inflows of funds to Nippon Individual Savings Accounts (NISAs) and individual-type defined contribution pension plan (iDeCo) accounts have been steady, resulting in an improvement in households' accessibility to investment in risky assets.

**Chart III-3-4: Amount of household assets**



Note: Latest data as at end-June 2019.  
Source: BOJ, "Flow of funds accounts."

**Chart III-3-5: Capital flows by product among major securities companies**



Note: 1. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes bond investment trusts.  
2. Covers retail customers' assets held at 17 major securities companies that hold current accounts at the BOJ. Latest data as at July-August 2019.  
Source: BOJ.

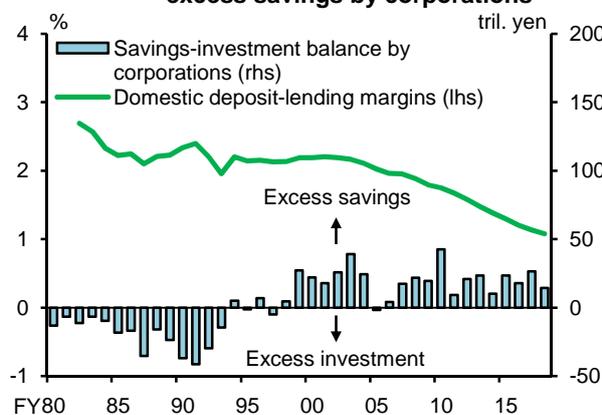
## IV. Examination of financial vulnerabilities

This chapter examines vulnerabilities of Japan's financial system based on the developments in financial intermediation described in Chapters II and III. It first summarizes vulnerabilities in the domestic and international financial aspects and then provides a detailed description for each aspect.

### A. Summary

Looking at the external environment surrounding Japanese financial institutions, accommodative financial conditions have generally been maintained globally, due in part to monetary easing in the United States and other countries, although there are strong concerns in global financial markets about political uncertainty and the possibility of a global economic slowdown.

**Chart IV-1-1: Deposit-lending margins among domestically licensed banks and excess savings by corporations**

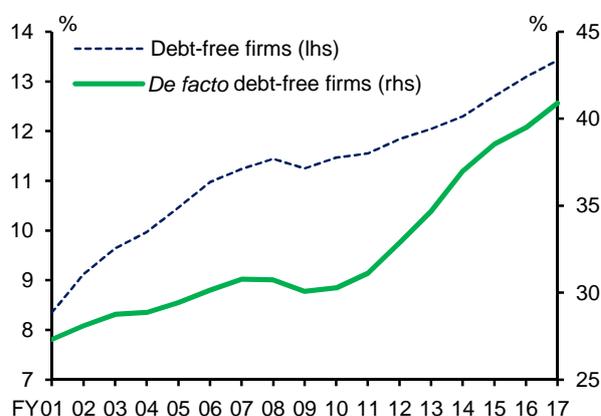


Note: 1. "Savings-investment balance by corporations" covers private nonfinancial corporations. "Domestic deposit-lending margins" covers regional banks.

2. Latest data as at fiscal 2018.

Source: BOJ.

**Chart IV-1-2: Share of debt-free firms**



Note: 1. "Debt-free firms" is defined as firms without borrowings. "De facto debt-free firms" is defined as firms whose cash and deposits exceed their total amount of borrowings.

2. Covers small firms.

Source: Teikoku Databank.

Japan's financial conditions have also remained accommodative. As discussed in Chapter III, financial intermediation has been functioning smoothly. However, the profitability of financial institutions' domestic deposit-taking and lending activities, which form the core of financial intermediation functions, has continued to decline. This decline in profitability is not only due to the prolonged low interest rate environment but also, from a longer perspective, due to some structural factors such as the decline in the potential growth rate caused in part by the shrinking population and the resultant secular decline in loan demand. In fact, the narrowing of financial institutions' deposit-lending margins started at the end of the 1990s, when the chronic excess savings in the corporate sector began due in part to the decline in growth expectations (Chart IV-1-1). This structural change in the savings and investment balance has led to a rise in the share of debt-free firms and therefore a continued slackening of loan demand (Chart IV-1-2). Such challenges for financial institutions have been greater in regions with a more pronounced population decline.<sup>15</sup>

<sup>15</sup> For the relationship between regional characteristics such as demographic changes and deposit-lending margins, see, among others, Box 4 in the October 2016 issue of the *Report*.

Against this backdrop, Japanese financial institutions have become more active in risk taking in order to secure profits. Major banks, aiming at higher profits and growth, have expanded their global activities and pursued group-wide strategies to provide comprehensive financial services while also continuing to engage in overseas lending, overseas credit investment, and M&A related activities. On the other hand, regional financial institutions, whose business is mainly driven by domestic activities, have increased domestic lending, particularly to middle-risk firms and rental housing businesses. Regarding securities investment, a growing number of regional financial institutions, in their search for yield, have also increased their investment in domestic and overseas investment funds and structured products. Going forward, in view of the recent upturn in credit costs, regional financial institutions may further increase risk taking on securities investment as a means of securing profits.

With such behavior by financial institutions in mind, the major vulnerabilities of Japan's financial system can be summarized as follows.

First, in terms of the international financial aspects, major banks have generally maintained high-quality portfolios as they have grown their overseas exposures. However, attention should be paid to the possibility that credit risk and market risk could increase. Major banks are connected to overseas financial institutions more tightly due to an expansion of their global activities. Regional financial institutions have also increased securities investment that entails risks associated with overseas interest rates, stock prices, exchange rates, credit, etc. Therefore, Japan's financial system has become more susceptible to potential shocks originating abroad, such as substantial adjustments in asset prices in global financial markets. In addition, reflecting the increase in the overseas exposure of major banks, it remains as an important task for them to strengthen their foreign currency funding bases in order to ensure stable funding liquidity in U.S. dollars and other currencies.

Next, in terms of the domestic financial aspects, attention should continue to be paid to the vulnerabilities associated with loans to middle-risk firms and the real estate industry, particularly the loans extended by regional financial institutions. Credit costs of lending to middle-risk firms, although still at low levels, have started to increase. The margins for this type of lending are not large enough to cover through-the-cycle credit costs, and many of the borrowers are in a weak financial condition. Therefore, vigilance is required regarding the potential impact of an increase in credit costs on the profits of financial institutions during a future economic downturn. Lending to the real estate industry has increased, particularly to rental housing businesses, making it necessary to carefully examine, for example, whether the already accumulated amount of loans has become excessive relative to future demand for rental housing, given that the population continues to decline and the number of households will also decline. Moreover, the downtrends in the profitability and capital adequacy ratios of regional financial institutions have continued. The longer these trends continue, the greater will be the possible negative impacts on financial institutions' business and their financial intermediation function in the future.

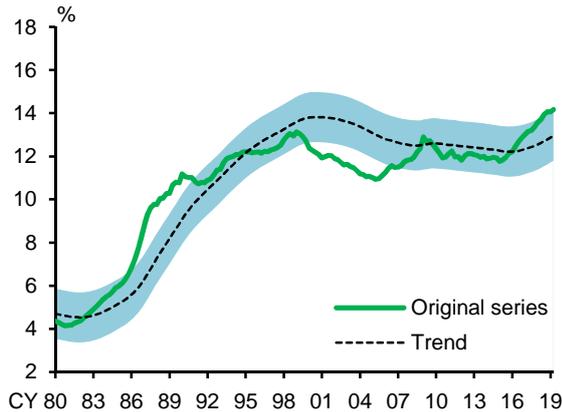
Meanwhile, under the fast-moving global trend toward digitalization, there is a rapid increase in the use of mobile interfaces and a wider use of open application programming interfaces (APIs), artificial intelligence (AI), and cloud computing in Japan's financial services sector.<sup>16</sup> These digital

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<sup>16</sup> An API is an interface in which a specific program is operated by another program. In the financial services sector, an API provided by a bank to fintech firms in order to allow them access to its computer system with the agreement of its users is called an "open API." For details, see, among others, Keisuke Nakamura, "Use of Open APIs in the Financial Sector: Its Effects on Cybersecurity and Countermeasures," *Bank of Japan Review Series*, no. 18-J-3, June 2018 (available only in Japanese).

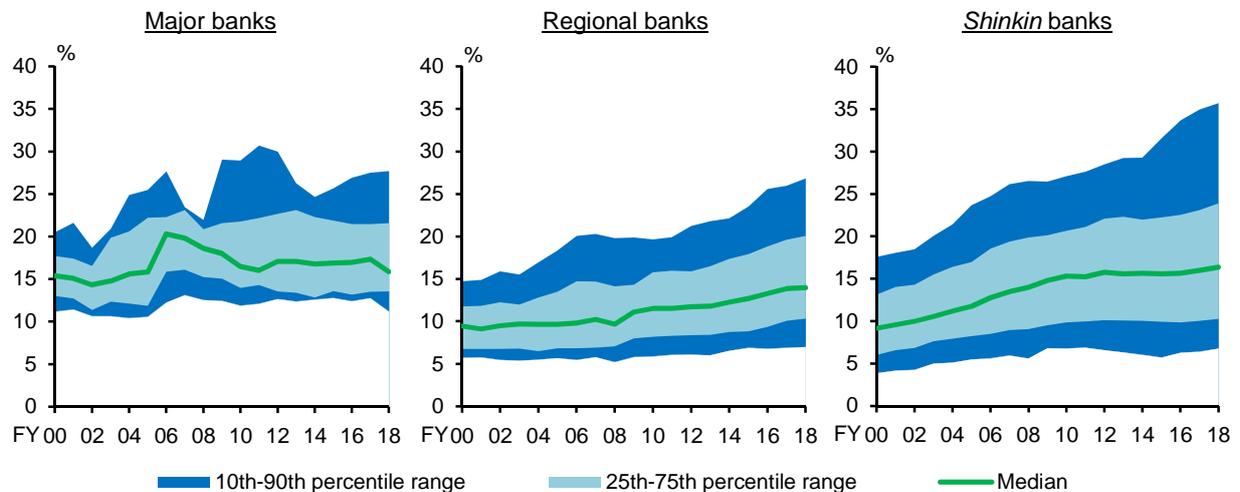


Chart IV-2-2: Real estate loans to GDP ratio



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. 4-quarter backward moving averages.  
 Latest data as at the April-June quarter of 2019.  
 Source: Cabinet Office, "National accounts"; BOJ, "Loans and bills discounted by sector."

Chart IV-2-3: Ratio of real estate loans to total loans

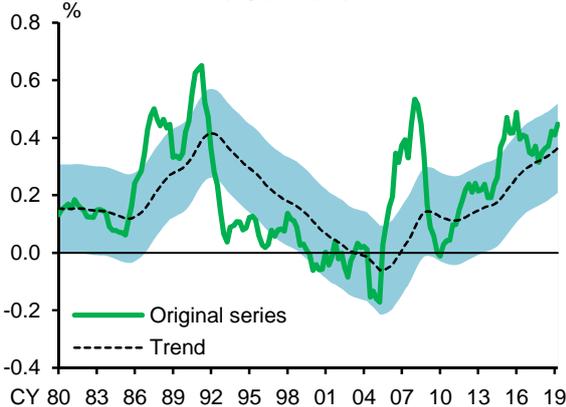


Note: Latest data as at end-March 2019.  
 Source: BOJ.

The *real estate loans to GDP ratio*, which turned "red" in the previous issue of the *Report*, has remained "red." As seen in Chapter III, an increasing number of financial institutions, regional financial institutions in particular, have become cautious about extending new loans to the real estate industry. However, because loans to rental housing businesses, which had been increasing at a fast rate, have long durations, the outstanding amount of real estate loans has continued to grow at a faster rate than total bank loans, so the *real estate loans to GDP ratio* has also been rising (Chart IV-2-2). Moreover, while the share of real estate loans in the total amount of loans has been largely unchanged on the whole, it exceeds 30 percent at some regional financial institutions, which suggests that heterogeneity in this share has continued to increase (Chart IV-2-3). In contrast, the *real estate firms' investment to GDP ratio* and the *land prices to GDP ratio* are still in the "green" zone, and there is no large upward deviation from the trend (Charts IV-2-4 and IV-2-5). Based on a wide range of other relevant information, including information on real estate transaction volumes and prices, as well as developments in real estate-related finance, Japan's real estate market cannot, as a whole, be judged as experiencing overheating driven by overly optimistic growth expectations as in the bubble period. That said, unlike in the bubble period, when most of the loans were for financing large-scale real estate transactions, the recent increase in total real estate loans is mainly driven by loans for medium- to long-term investments to earn rental income such as REITs, real estate investment funds, and rental housing businesses run by individuals. In this regard, the previous issue of the *Report* pointed out the following vulnerabilities posed by the recent developments in real estate loans: (1) small firms and individuals, which have

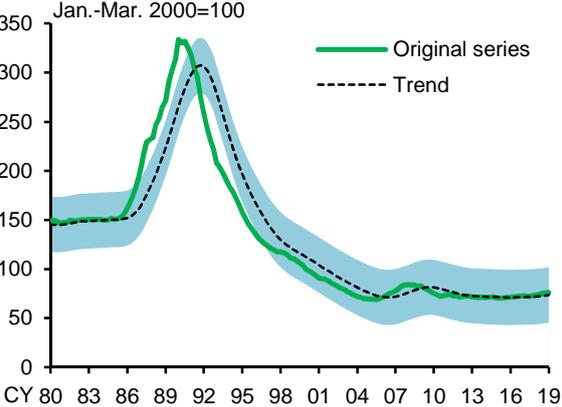
both been major borrowers of real estate loans in recent years, are exposed to a common medium- to long-term risk of a rise in vacancy rates due to the declines in population and number of households; (2) the financial institutions that have been active in extending real estate loans tend to have relatively low capital adequacy ratios; and (3) financial institutions, regional financial institutions in particular, have also increased their equity-type investment in REITs and other real estate investment funds. Developments in the real estate market continue to warrant close monitoring from a broad perspective, including the possibility of a build-up of imbalances that cannot necessarily be captured by a tool such as the heat map, which is aimed at detecting signs of bubble-like overheating.

**Chart IV-2-4: Real estate firms' investment to GDP ratio**



Note: 1. Covers large firms in the real estate industry.  
 2. "Original series" = (business fixed investment [including land investment] + inventory investment) / nominal GDP. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.  
 3. 4-quarter backward moving averages. Latest data as at the April-June quarter of 2019.  
 Source: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry."

**Chart IV-2-5: Land prices to GDP ratio**

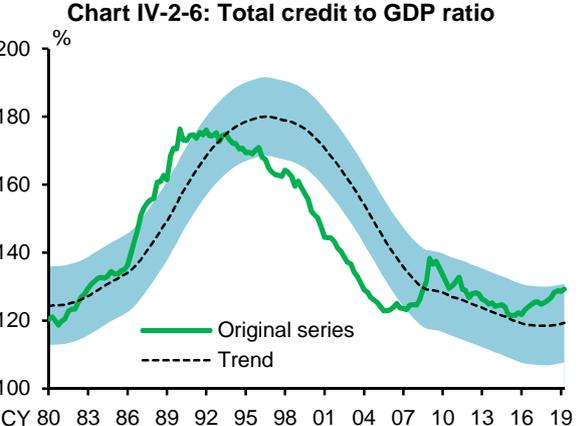


Note: 1. Land prices indicate urban land price index of six large city areas (average of all categories of land use).  
 2. "Trend" is calculated using 3-year backward moving averages. The shaded area indicates the root mean square of the deviation from the trend.  
 3. Latest data as at the January-March quarter of 2019.  
 Source: Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index."

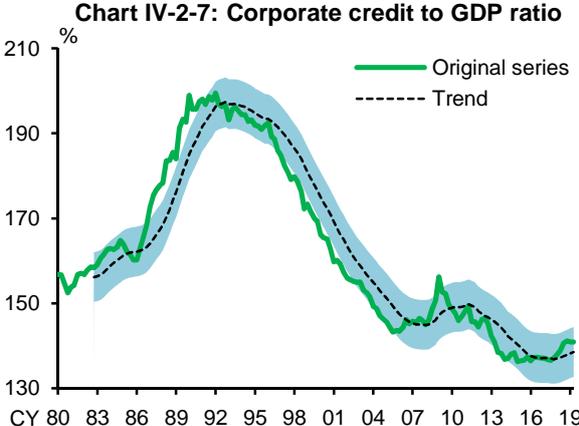
Among the FAIXs that are currently in the "green" zone, there are some that are getting closer to "red." For example, the *total credit to GDP ratio*, although lower than in the bubble period, has deviated upward from its trend and is getting close to its upper threshold because the outstanding amounts of not only bank loans but also corporate bonds and CP issued have increased against the background of highly accommodative funding conditions (Chart IV-2-6). Under these circumstances, the *corporate credit to GDP ratio* is also getting closer to its upper threshold and the *DI of lending attitudes of financial institutions* has remained at the highest level since the bubble period amid the prolonged low interest rate environment and the intensified competition among financial institutions (Charts IV-2-7 and IV-2-8).

These developments in lending-related FAIXs that signal levels close to overheating are attributable to the increase in lending to middle-risk firms, as well as the aforementioned developments in real estate loans. In recent years, regional financial institutions, facing the secular decline in loan demand, have increased their lending to firms with relatively weak financial conditions. Since loans to such firms with relatively low creditworthiness are extended at low interest rates, due to the intensified competition among financial institutions, loans to "low-return borrowers," for which through-the-cycle profitability is difficult to guarantee, have been on an

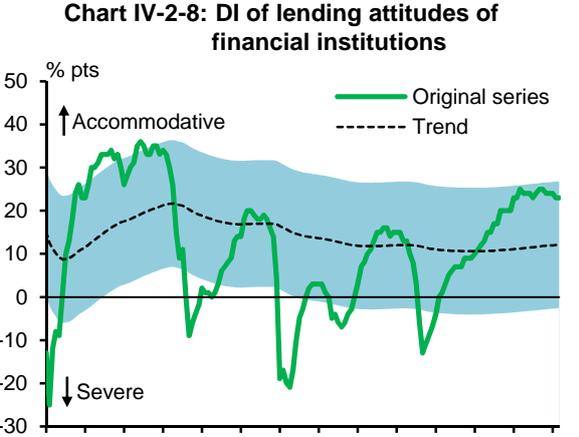
increasing trend (Chart IV-2-9).<sup>18</sup> Lending to middle-risk firms includes lending intended to give financial support to low-performing firms in order to address the business challenges of these firms. However, if these firms fail to make the planned improvement to their business performance, then credit costs could increase sharply when a negative shock such as an economic downturn or a rise in interest rates hits, since the interest payment capacity of these firms is generally low.



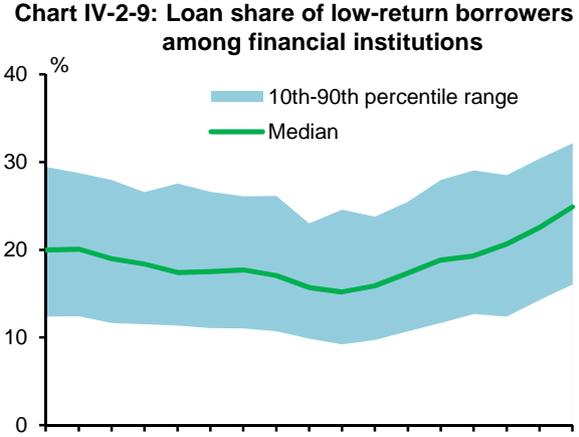
**Chart IV-2-6: Total credit to GDP ratio**  
 Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.  
 2. 4-quarter backward moving averages. Latest data as at the April-June quarter of 2019.  
 Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."



**Chart IV-2-7: Corporate credit to GDP ratio**  
 Note: 1. "Trend" is calculated using 3-year backward moving averages. The shaded area indicates the root mean square of the deviation from the trend.  
 2. 4-quarter backward moving averages. Latest data as at the April-June quarter of 2019.  
 Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."



**Chart IV-2-8: DI of lending attitudes of financial institutions**  
 Note: 1. "Original series" is based on all firm sizes and all industries. "Trend" is calculated from the historical average. The shaded area indicates the root mean square of the deviation from the trend.  
 2. Latest data as at the July-September quarter of 2019.  
 Source: BOJ, "Tankan."



**Chart IV-2-9: Loan share of low-return borrowers among financial institutions**  
 Note: 1. The figures in the chart indicate share of loans to low-return borrowers among all loans to small firms.  
 2. Covers major banks and regional financial institutions.  
 Source: Teikoku Databank.

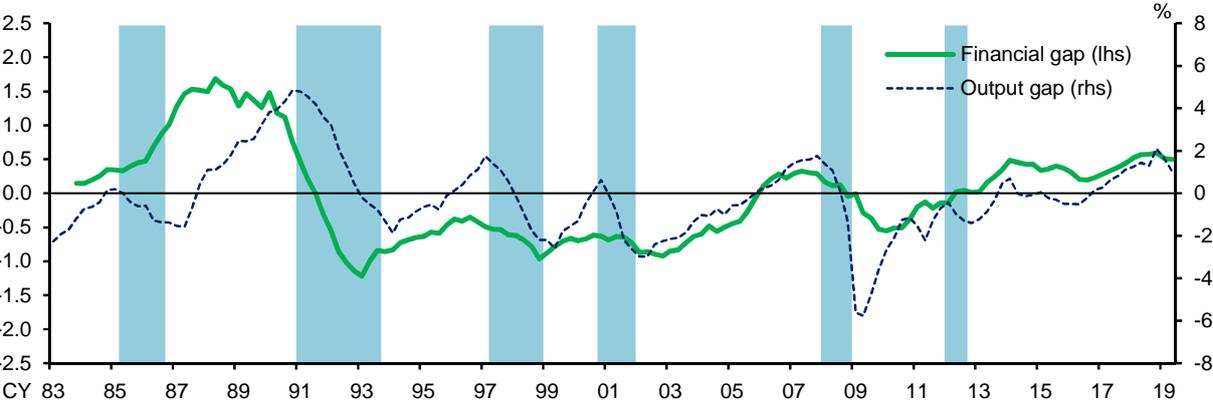
As described, the FAIXs in the created heat map that signal overheating or levels close to overheating are seen in areas where financial institutions have been active in risk taking. Going forward, it is necessary to carefully examine whether some shift of FAIXs in the direction of overheating occurs, as well as whether the total number of FAIXs signaling overheating increases.

<sup>18</sup> For a detailed definition of loans to low-return borrowers and the background behind the increase in the loan share of low-return borrowers, see Chapter VI in the April 2018 issue of the *Report*.

## 2. Financial gap and risks to economic growth (GDP-at-risk)

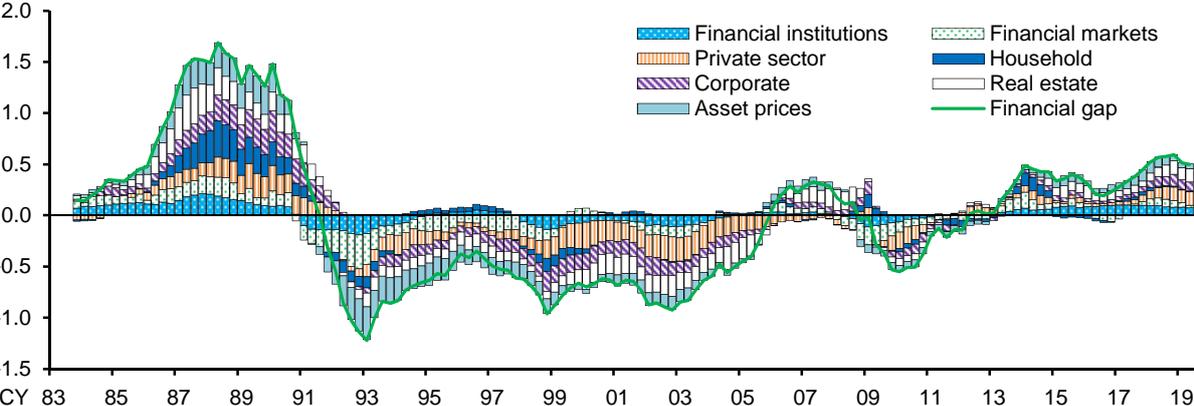
This next section quantitatively assesses the phases of the financial cycle by using the "financial gap," which is constructed by calculating the weighted average of the deviation rates of individual FAIXs in the heat map from their trends.<sup>19</sup> The positive financial gap has fallen somewhat compared to 6 months ago (Chart IV-2-10). This is mainly attributable to temporary factors such as the decline in stock prices from the end of 2018 to early 2019 and the reactionary fall in business fixed investment. The core features of the recent developments in the financial gap have remained unchanged from the previous issue of the *Report*, namely (1) the level of the financial gap remains near the highest level of the post-bubble period; (2) the current phase has marked the longest period of a positive financial gap since the burst of the bubble economy; and (3) a wide range of FAIXs are in positive territory (Chart IV-2-11).

Chart IV-2-10: Financial gap and output gap



Note: Latest data as at the April-June quarter of 2019. The shaded areas indicate recession phases.  
Source: BOJ.

Chart IV-2-11: Decomposition of financial gap



Note: 1. The decomposition is based on the seven categories in the heat map (Chart IV-2-1).  
2. Latest data as at the April-June quarter of 2019.  
Source: BOJ.

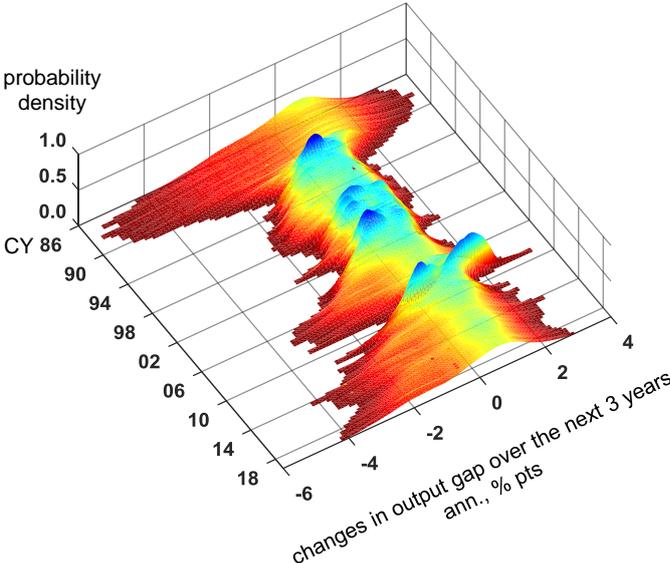
Finally, the extent to which developments in the financial gap may pose a risk to the real economy from a somewhat longer-term perspective is examined, using the "GDP-at-risk" (GaR) approach. In

<sup>19</sup> In calculating the weighted average of the 14 FAIXs, greater weights are given to indexes with higher correlations with other indexes. These weights are time-varying with changes in correlations among the indexes. For details of the calculation method, see Yves S. Schöler, Paul P. Hiebert, and Tuomas A. Peltonen, "Characterising the Financial Cycle: A Multivariate and Time-Varying Approach," European Central Bank Working Paper Series, no. 1846, September 2015.

general, the more significantly the financial gap deviates from its trend in the direction of overheating, the more likely it is to have an asymmetric negative impact on future economic activity through an unwinding of financial activities that are excessive relative to the economy's growth potential. GaR is a tool that gauges such risks by a simple measure, namely the future probability distribution of GDP growth, based on the relationship between the financial gap and the output gap observed in the past.<sup>20</sup> GaR has been widely used internationally in recent years.<sup>21</sup>

The estimated probability distribution of GDP growth over the next 3 years has exhibited a fatter tail on the downside in recent years, although this tail is not as fat as during the bubble period, as indicated in the previous issue of the *Report*. This change in the shape of the distribution is mainly due to the fact that the positive financial gap has been expanding. Such inference is also confirmed by the fact that the probability distribution of GDP growth shows a fatter tail on the downside when financial vulnerabilities are taken into account than when they are not (Charts IV-2-12 and IV-2-13).

**Chart IV-2-12: Financial vulnerabilities and risks to economic growth over the next 3 years (GaR)**



Note: The chart presents the time series of probability distributions of annualized changes in output gap over the next 3 years at each point in time.

These results indicate that while the recent expansion in the financial cycle has supported a trend of moderate expansion of the economy, it has also led to an increase in the downside tail risk to economic growth from a somewhat longer-term perspective by building up pressure on balance sheet adjustments on the back of the cumulative effect of low interest rates. If a rise in the growth and profitability of Japan's corporate sector cannot be achieved in the future, downward pressure on the economy in the event of a negative shock could intensify more than expected through a feedback loop between the real economy and the aforementioned financial vulnerabilities.

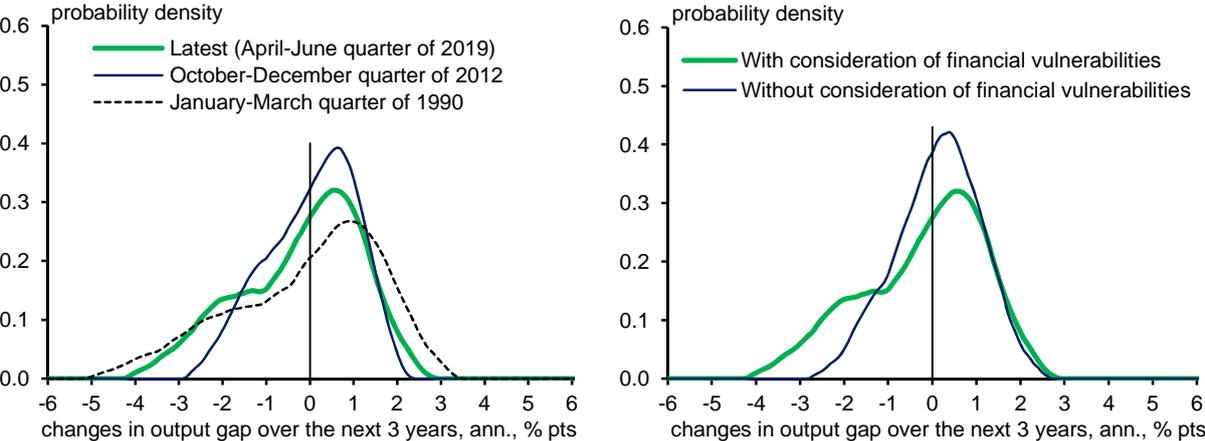
It should be noted that GaR focuses solely on estimating the risk to economic growth arising from a build-up of financial imbalances and does not take other risk factors into account. Needless to say, it does not represent the Bank of Japan's outlook for future GDP growth. In the use and

<sup>20</sup> To estimate GaR, the channel through which the fluctuations in overseas financial conditions affect Japan's domestic economy, as observed during the global financial crisis, is also taken into account. Specifically, the indicator used for overseas financial conditions is the National Financial Conditions Index published by the Federal Reserve Bank of Chicago.

<sup>21</sup> For details on GaR, including the underlying concept and specific estimation method, see Chapter IV and Box 1 in the October 2018 issue of the *Report*.

interpretation of the financial gap and GaR, the following caveats are warranted. First, the financial gap and GaR contain non-negligible measurement error. Second, GaR relies on limited time-series data, which contain only a small number of tail events in the estimation sample. Third, GaR only shows estimation results based on past data; it does not explicitly model a mechanism through which an escalation of overheating in financial activity leads to balance-sheet adjustment pressure. Therefore, the financial gap and GaR should be regarded as subject to a considerable margin of error.

**Chart IV-2-13: Comparison of risks to economic growth by period**



Note: The distributions in the right-hand chart are as of the April-June quarter of 2019.

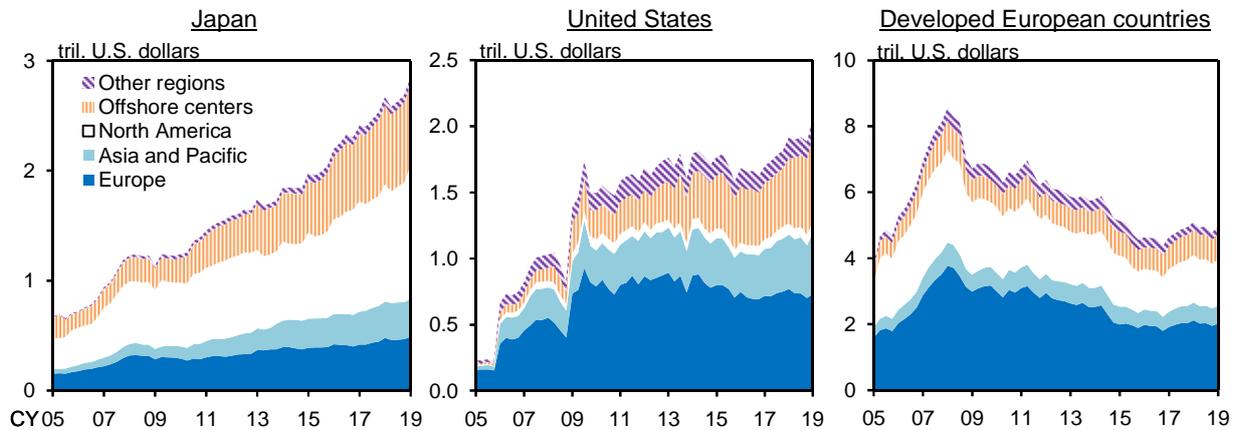
**C. Vulnerabilities in international financial activities**

The heat map and the financial gap discussed in the previous section are tools used mainly to assess vulnerabilities in domestic financial activities. On the other hand, the main issues regarding vulnerabilities in international financial aspects, as summarized in Section A of this chapter, are as follows: (1) the increased overseas exposure of major banks through overseas lending and credit investment, (2) the resultant increase in the need for foreign currency funding, and (3) investment by regional financial institutions in securities entailing overseas risks. It is becoming more important to examine whether the various risks associated with the active overseas investment and lending by Japan's financial institutions create vulnerabilities in Japan's financial system.

This section mainly examines the first issue by employing analyses new to this *Report* (the remaining two issues are discussed in Chapter V). The size of the expansion in the overseas exposure of Japanese banks since the global financial crisis is considerably larger than that for U.S. and European financial institutions. The BIS consolidated banking statistics confirm this trend: the foreign claims of Japanese banks (on the non-bank private sector) have increased substantially for all regions since the global financial crisis. This trend evidently differs from U.S. banks, whose foreign claims have remained almost unchanged, and European banks, whose foreign claims have been following a downward trend (Chart IV-3-1). The increase in the foreign claims of Japanese banks is likely attributable to the fact that, compared to U.S. and European financial institutions, their risk-taking capacity was not significantly impaired by the global financial crisis because its negative impact on their financial soundness was less severe (Chart IV-3-2). In recent years, however, the increase in the share of Japanese banks in foreign claims has stalled

as international competitive pressure has resumed, reflecting the recovery of financial soundness of overseas financial institutions, particularly the U.S. banks (Chart IV-3-3).<sup>22</sup>

**Chart IV-3-1: Foreign claims by nationality of financial institutions and by counterparty region**



Note: 1. Covers foreign claims on non-bank private sector (on an ultimate risk basis). The same coverage applies to Chart IV-3-3.

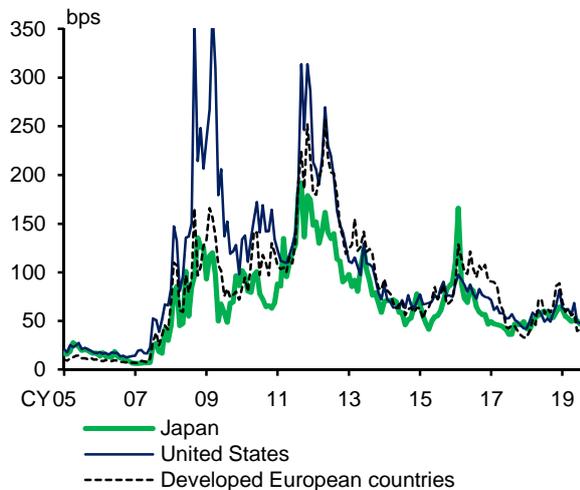
2. "Japan" includes trust accounts.

3. "Developed European countries" includes United Kingdom, France, Germany, and Switzerland. The same coverage applies to Charts IV-3-2 and IV-3-3.

4. Latest data as at end-March 2019.

Source: BIS, "Consolidated banking statistics."

**Chart IV-3-2: Financial institutions' CDS premiums by country**



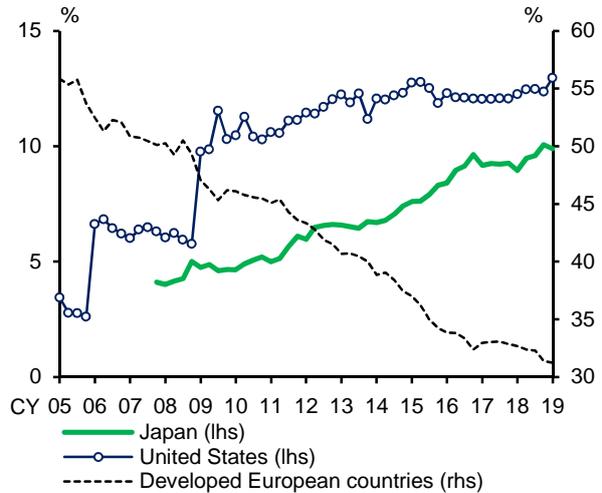
Note: 1. Covers G-SIBs for which data are available.

2. 5-year CDS premiums.

3. The figures in the chart indicate end-month values. Latest data as at end-August 2019.

Source: Bloomberg.

**Chart IV-3-3: Share of global foreign claims by creditor country**



Note: Share = (foreign claims by each creditor country on all countries) / (foreign claims by all creditor countries on all countries). "Japan" excludes trust accounts. Latest data as at end-March 2019.

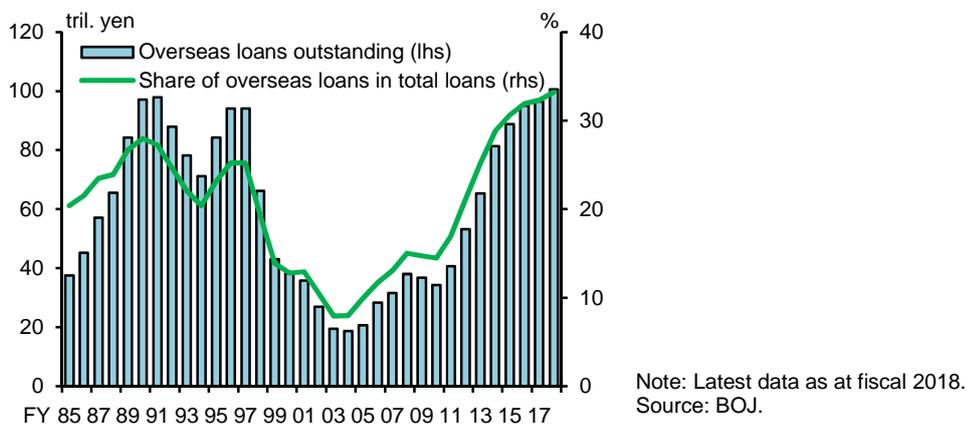
Source: BIS, "Consolidated banking statistics"; BOJ.

<sup>22</sup> One estimation method for comparing the results of consolidated banking statistics in Japan and other countries is to exclude trust-account-based positions under certain assumptions. For details, see Kaori Saito, Kazunori Hiyama, and Kyosuke Shiotani, "International Comparison of the BIS International Banking Statistics: Estimates of the Positions Excluding Trustee Business," *Bank of Japan Review Series*, no. 18-E-2, October 2018.

## 1. Risks associated with overseas lending

Overseas lending by major banks, from a longer-term perspective, has been increasing since the global financial crisis and recently has returned to levels similar to those during the bubble period. Meanwhile, the share of overseas lending in their total lending including domestic lending has reached an historic high (Chart IV-3-4).

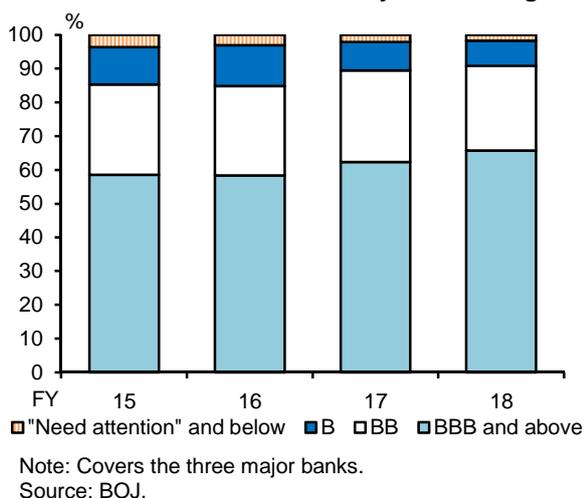
**Chart IV-3-4: Overseas loans outstanding of major banks**



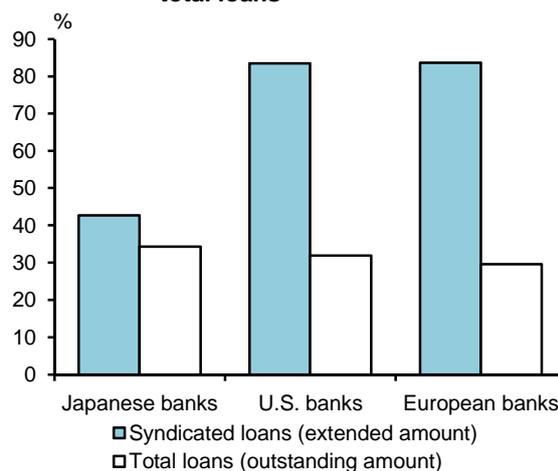
### Developments in credit risk

As seen in Chapter III, Japanese major banks have shifted the primary focus of their overseas lending from expanding its volume to improving profitability. Moreover, with the increased concerns over uncertainty in international financial markets, attention also needs to be paid to how credit risk arises should the global financial environment change substantially. From this perspective, looking at a breakdown of Japanese banks' overseas loans by credit rating, investment-grade loans (BBB and above) account for about 70 percent, indicating that the credit quality of the overall overseas loan portfolio has remained high (Chart IV-3-5).

**Chart IV-3-5: Composition of major banks' overseas loans by credit rating**



**Chart IV-3-6: Non-IG ratio in syndicated loans and total loans**



Recently, however, against the backdrop of intensified competition with overseas financial institutions, as mentioned above, and higher foreign currency funding costs, some financial institutions have increased their lending to firms with relatively higher risk. Regarding syndicated loans, which constitute a major form of lending from Japanese banks to non-Japanese firms in the United States, the amount of syndicated loans underwritten by Japanese banks has steadily increased in recent years. While the share of syndicated loans in the overall overseas credit portfolios of Japanese banks is presumably not high yet, the share of leveraged loans to non-investment-grade firms has also gone up (Chart B1-2).<sup>23</sup> Although Japanese major banks are willing to strengthen their business of originating and distributing syndicated loans with the aim of earning profits while transferring the associated risk off their balance sheets, the size of such business remains small compared to U.S. and European financial institutions. In fact, compared with these overseas institutions, the share of non-investment-grade loans for Japanese major banks differs little between at the time of underwriting and in the stock of loans outstanding. This observation suggests that there has been relatively little progress by Japanese major banks in expanding their redistribution business for non-investment-grade loans in the secondary market after the underwriting of such loans in the primary market (Chart IV-3-6).

### *Increased global financial connectedness through overseas lending*

Major banks' connectedness with overseas financial institutions has increased as a result of the expansion of their overseas activities. This increase in global financial connectedness is driven by (1) an increase in the common exposure between major banks and overseas financial institutions and (2) the fact that the foreign currency funding of major banks is more affected by the actions of overseas financial institutions, the providers of such funding.

Regarding the first point, granular data on the underwriting of syndicated loans indicate that the connectedness with overseas financial institutions has risen. An analysis shows that this is mainly due to the increase in common exposure, i.e., the degree of overlap in borrower categories, between Japanese major banks and overseas global systemically important banks (G-SIBs) for leveraged loans, which have a higher credit risk and thus raise concerns regarding vulnerabilities in a recession period (see Box 1). With the outstanding amount of leveraged loans in global markets increasing rapidly in recent years, it is observed that the leverage of borrowers has been following an upward trend and that there has been a rise in "covenant-lite loans," that is, loans with fewer covenants imposed on the borrower. These developments have led to concerns over the possibility of materializing credit risks and substantially adjusting market prices during an economic downturn.<sup>24</sup> Against this background, attention needs to be paid to the fact that, as a result of the tighter connectedness with overseas financial institutions, Japan's major banks and financial system are becoming more susceptible to the effects of overseas financial cycles. Such effects spread not only through the direct channel from borrowers but also through second-round

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<sup>23</sup> While, generally speaking, "leveraged loans" refers to loans to speculative-grade firms rated BB or below, the exact definition differs depending on, for example, the risk management of individual financial institutions and the supervisory guidelines of national authorities.

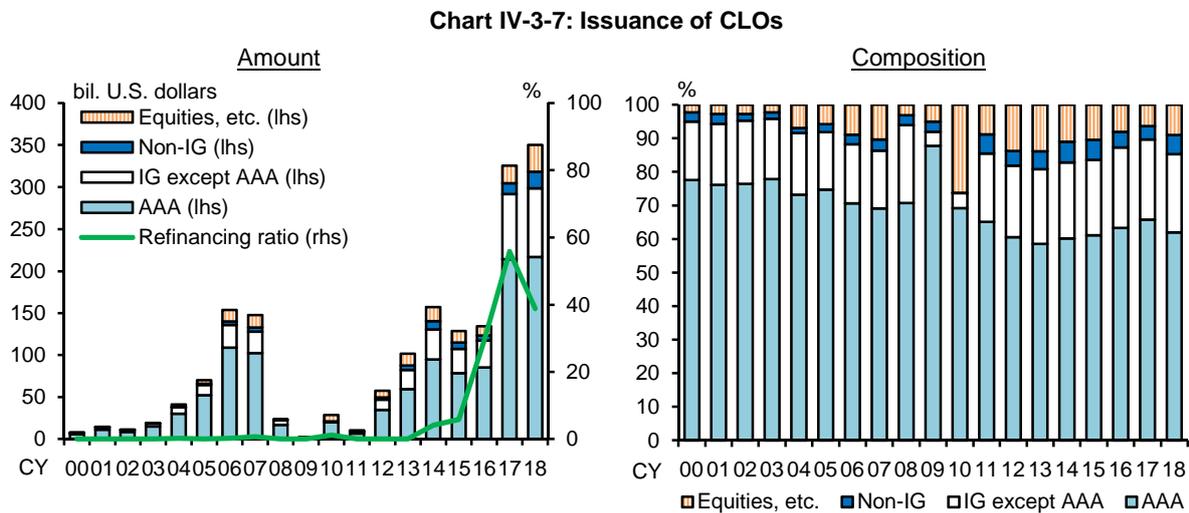
<sup>24</sup> For details, see Chapter II in the April 2019 issue of the *Report* and Sotaro Kankawa, Takuya Sukegawa, and Yoshiya Ogawa, "Recent Development in U.S. Credit Markets," *Bank of Japan Review Series*, no. 19-J-3, March 2019 (available only in Japanese).

spillover effects from decreases in foreign currency provisions by overseas financial institutions whose financial soundness is deteriorated and from fire sales of assets.<sup>25</sup>

## 2. Risks associated with overseas credit product investment

As seen in Chapter III, Japan's financial institutions are active in risk taking in order to secure profit margins by increasing their outstanding investment in overseas credit products such as high-yield bonds and CLOs (Chart III-1-25). However, there are substantial differences across individual financial institutions in their investment stance regarding these financial products and the size and composition of their exposure.

The following provides an overview of developments in and characteristics of the rapidly growing CLO market and summarizes what should be kept in mind related to the increase in such investment by Japanese banks. Unlike high-yield bonds, CLOs, i.e., securitized products backed by leveraged loans, are a floating rate product. The amount of CLOs arranged in 2018 reached a new record, reflecting the increase in investor demand when market participants were concerned about U.S. policy rate hikes (Chart IV-3-7).



Note: 1. "IG" indicates investment-grade.

2. "IG except AAA" and "Non-IG" indicate loans with a rating between AA and BBB and those with a rating below BBB, respectively. "Equities, etc." covers convertible bonds in addition to equities.

3. "Refinancing ratio" indicates ratios of reset or refinance issuance to total issuance.

Source: Bloomberg; Creditflux, "CLO-i."

Against this backdrop, the outstanding amount of CLO investment, especially by some Japanese banks, has increased in recent years. As a result, the CLO investment of Japanese banks currently accounts for about 20 percent of their investment in overseas credit products overall. Moreover, Japanese banks' share of the total outstanding amount in the global CLO market is also considerable, accounting for approximately 15 percent. Most of this investment is in AAA-rated tranches, i.e., tranches with the highest credit rating.<sup>26</sup> Looking at the issuance amount of CLOs

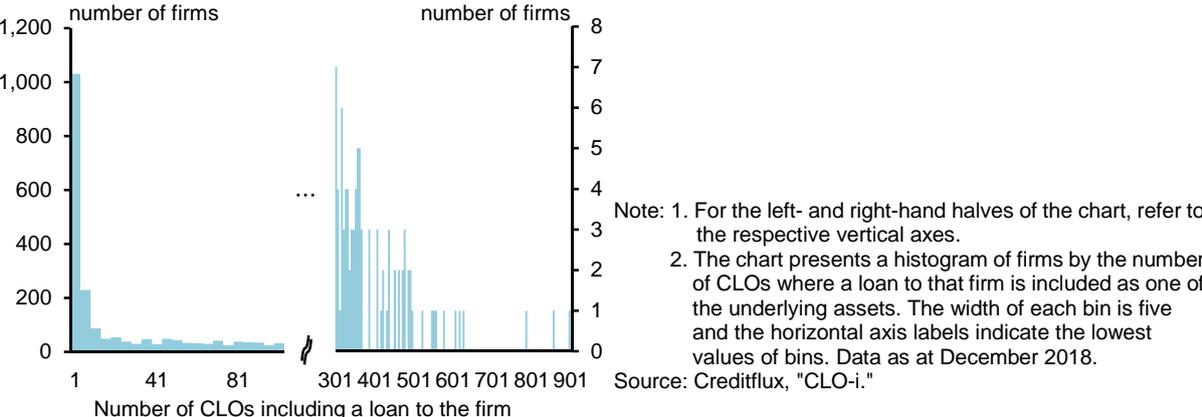
<sup>25</sup> In preparation for the United Kingdom's exit from the EU, Japanese financial institutions have been taking measures in view of the risk of a no-deal Brexit by establishing new local bases in EU countries other than the United Kingdom so as to continue to provide financial services within the EU. Nonetheless, attention should be paid to the fact that there are considerable uncertainties over the possible effects on financial markets associated with the materialization of this risk.

<sup>26</sup> AAA-rated tranches account for 99 percent of CLO tranches held by major banks and other financial institutions.

by rating, the share of AAA-rated tranches is lower than before the global financial crisis, and the share of tranches rated AA or below, which act as a loss absorption buffer, is higher, implying that the robustness of AAA-rated tranches has risen (Chart IV-3-7). Even in the event of a sudden change in the market environment, the risk of default for AAA-rated tranches is basically small. Moreover, Japanese banks with a high exposure to CLOs have taken a number of risk management measures when making their investments, such as conducting an initial screening that includes a close examination of underlying assets and stress testing. Recently, there has been a pause in the increase in the outstanding amount of CLO investment, partly reflecting the decline in the quality of loans in the leveraged loan market. Considering these points, it is likely that the risk entailed in the CLO investment of Japanese banks is subdued on the whole.

However, the following points also warrant attention regarding the CLO market and Japanese banks' investment in CLOs. First, it is necessary to carefully assess the degree of the risk diversification effect from CLOs despite the fact that CLOs are a type of securitized product incorporating multiple leveraged loans and that such securitized products are generally expected to have some risk diversification effect. At the end of 2018, there were about 1,500 different CLOs in the market, incorporating loans to approximately 3,000 firms as underlying assets. Analysis on granular market-wide data indicates that loans to a small number of firms are incorporated in several hundred CLOs.<sup>27</sup> This fact suggests the possibility that the diversification of risk in the CLO investment is not as high as it might appear, due to the overlap of underlying assets (Chart IV-3-8).

**Chart IV-3-8: Distribution of firms issuing underlying loans of CLOs**

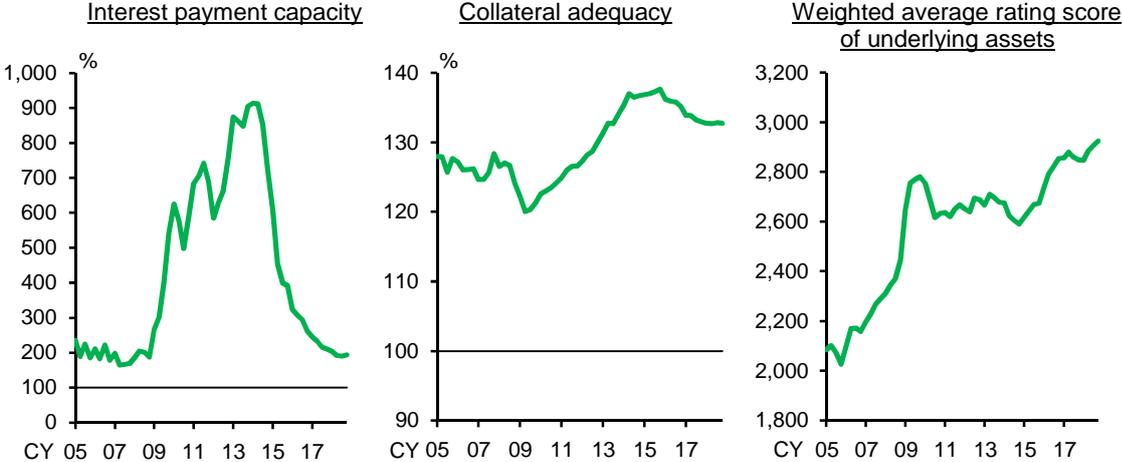


Second, with the recent deterioration in the quality of the underlying leveraged loans, the ratings and market prices of even the AAA-rated CLO tranches held by Japanese banks could fall substantially, if economic and market conditions change substantially through, for example, a recession or substantial adjustment in the prices of credit products. Various indicators for the soundness of the underlying assets of AAA-rated CLO tranches show that the income from the underlying assets currently substantially exceeds the amount of interest payments to AAA-rated tranches and that collateral adequacy ratios, i.e., the collateral value of the underlying asset amount outstanding divided by the AAA-rated tranche amount outstanding, have been declining somewhat but still remain at high levels. On the other hand, the quality of the underlying assets has been deteriorating particularly since the beginning of 2015 (Chart IV-3-9). In addition, although

<sup>27</sup> Another characteristic of the CLO market is that there are several hundred firms whose loans are incorporated in only one CLO. Reflecting these characteristics, the distribution is extremely fat-tailed. See Box 2 for detailed data.

the expected default frequency (EDF) of firms, which is highly correlated with ratings, has been low and stable on the whole, the dispersion across firms has increased and the upper tail of the EDF distribution seems to have widened (Chart IV-3-10).<sup>28</sup>

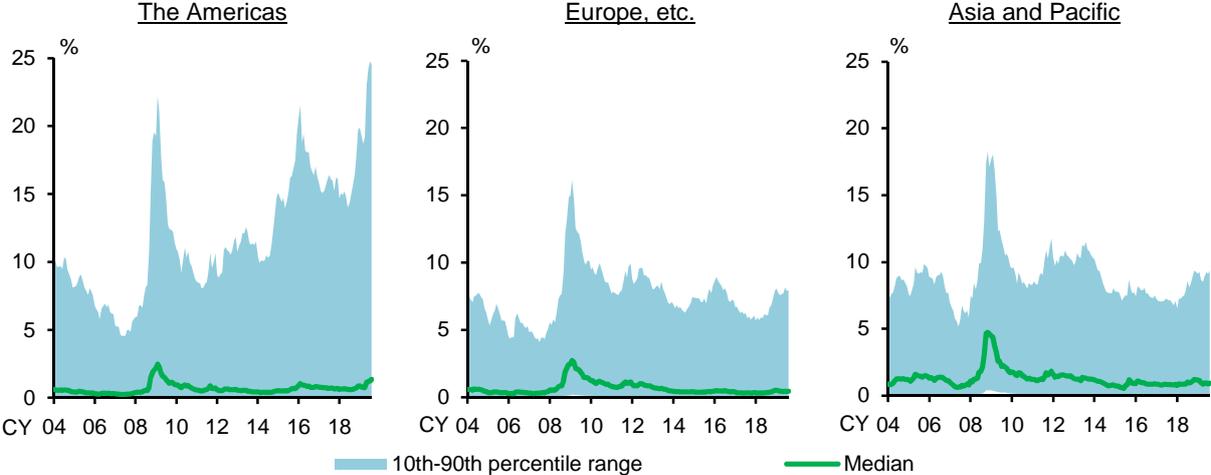
**Chart IV-3-9: Soundness indicators of AAA-rated tranches of CLOs**



- Note: 1. "Interest payment capacity" (median) indicates interest income from underlying loans divided by interest payment to AAA-rated tranches.  
 2. "Collateral adequacy" (median) indicates the ratios of the outstanding of underlying assets to that of AAA-rated tranches.  
 3. An increase in "weighted average rating score of underlying assets" (median) indicates a downgrading of underlying assets.  
 4. Latest data as at the October-December quarter of 2018.

Source: Creditflux, "CLO-i."

**Chart IV-3-10: EDF for firms by region**



- Note: 1. The figures in the chart indicate 1-year EDF.  
 2. "Europe, etc." includes the Middle East and Africa.  
 3. Latest data as at end-August 2019.

Source: Moody's.

Given these circumstances, we conduct simulations to examine changes in the robustness of AAA-rated CLO tranches, simply assuming that, in the event of stress in the future, ratings will be downgraded to the same extent as actually observed during the global financial crisis (i.e., a downward shift in ratings for leveraged loans and CLOs will occur). The simulations also include a

<sup>28</sup> Using a firm's stock price and related information, Moody's EDF measures the probability of the firm defaulting over a specific period of time in the future, based on the market value of the firm's assets and liabilities payable.

scenario that incorporates a more severe assumption. Specifically, the scenario assumes that the market value of defaulted loans (i.e., the amount that can be recovered from the sale of these assets in the financial market) is only half of that observed during the global financial crisis, reflecting the possibility that the quality of the underlying assets may have deteriorated in recent years. The simulation results indicate that the collateral value of the underlying assets remains higher than the outstanding amount of AAA-rated tranches, suggesting that the default risk with regard to AAA-rated tranches is relatively small. However, focusing on the market risk of CLOs, the simulation results suggest that if AAA-rated tranches are downgraded to AA or A, the market price of these CLOs may fall to a certain extent (see Box 2 for details of the analysis).<sup>29</sup>

Since the above analysis is based on some simple assumptions using information on changes in ratings and increases in spreads as seen during the global financial crisis, attention should be paid to the fact that the results are not based on wide-ranging assessments of factors that could amplify shocks, such as the aforementioned sharp increase in the size of leveraged loan market and the ensuing rise in covenant-lite loans. It is necessary for financial institutions to identify and measure risks accurately and manage them appropriately, taking into consideration the complex design of CLOs and the deteriorating trend in the credit quality of the underlying assets in recent years. While the analysis here only covers CLO investment, financial institutions should appropriately identify and manage the risk profiles of their overall overseas credit investment, such as in investment-grade corporate bonds, high-yield bonds, and investment funds, in preparing against a future global recession and adjustment in overseas credit markets.

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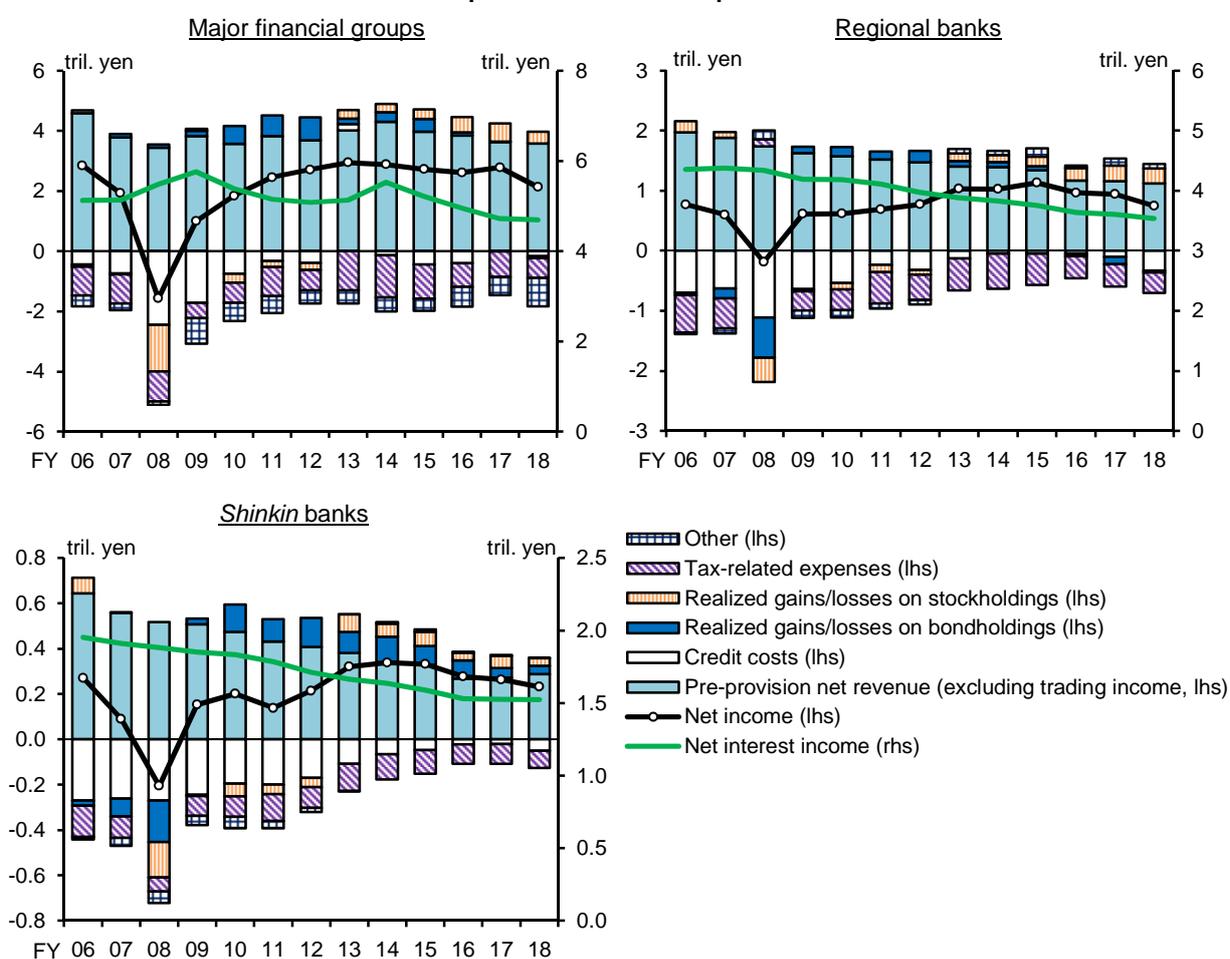
<sup>29</sup> CLOs also have the property that the duration (average investment payback period) can fluctuate significantly in the short term, due to refinancing. Hence, if the market environment deteriorates in the future, not only an increase in spreads but also an amplification of price drops due to an increase in durations may be observed.

## V. Financial institutions' financial bases and risk profiles

This chapter examines the financial bases and risk profiles of financial institutions while taking the financial vulnerabilities outlined in Chapter IV into account. It first examines the current status of financial institutions regarding profitability, which provides the basis for building up capital. Next, it examines the risk profiles of financial institutions in terms of credit risk, market risk, and liquidity risk associated with foreign currency funding and then assesses their capital adequacy relative to these risks as of the present.<sup>30</sup> Finally, it outlines cyber risk and strategic risk, which are becoming increasingly important, but it may still be premature to quantify them.

### A. Financial institutions' profitability

Chart V-1-1: Developments in and decomposition of net income



- Note: 1. "Major financial groups" covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, Shinsei Bank, and Aozora Bank.  
 2. From fiscal 2012, gains/losses from investment trusts due to cancellations are excluded from "Pre-provision net revenue (excluding trading income)" and "Net interest income."  
 3. The definition of credit costs for regional banks and *shinkin* banks is somewhat different between fiscal 2018 and fiscal 2017 due to its clarification. The same change in definition affects subsequent charts.

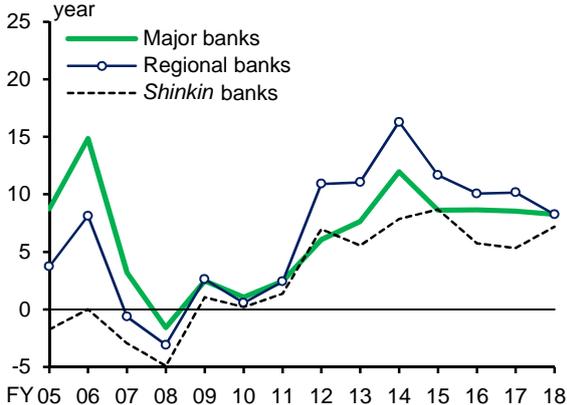
Source: Published accounts of each bank; BOJ.

<sup>30</sup> Unless otherwise noted, the figures for financial institutions' capital shown in the charts in this chapter represent common equity Tier 1 (CET1) capital for internationally active banks from fiscal 2012 onward, core capital for domestic banks from fiscal 2013 onward, and Tier 1 capital for internationally active banks and domestic banks before fiscal 2012 and fiscal 2013, respectively (excluding the transitional arrangements related to the Basel III framework).

Financial institutions' net income in fiscal 2018 remained high from a historical perspective. However, it showed a somewhat large decline. Pre-provision net revenue (PPNR) excluding trading income continued to follow a decreasing trend, especially for regional financial institutions, reflecting the persistent downward trend in domestic net interest income mainly caused by the shrinking of deposit-lending margins (Chart V-1-1). In addition, gains from securities trading were sluggish due in part to market developments such as the rise in U.S. interest rates and the decline in stock prices. Credit costs remained low but showed some increase. Financial results for fiscal 2018 highlight that the offsetting effects that have supported the financial institutions' declining core profitability have become less powerful. Meanwhile, the decline in net income at some financial institutions was in part attributable to the recognition of impairment losses for legacy computer systems and branches with low profitability.

A detailed look at developments in securities investment shows that, in the first half of fiscal 2018 when U.S. interest rates rose, a large number of financial institutions recorded losses on foreign bonds and foreign-rates-focused investment trusts. In the case of yen-denominated bondholdings, financial institutions have faced further downward pressure on investment yields because of large-scale redemptions of JGBs with higher coupon rates than those of recently issued JGBs. Moreover, especially in the case of regional banks, room for locking in gains on securities has been declining due to the repeated realization of gains and the increase in book values (Chart V-1-2).

**Chart V-1-2: Room for locking in gains**



Note: 1. "Room for locking in gains" = unrealized gains/losses on available-for-sale securities holdings / realized gains/losses on sales of securities (3-year backward moving average).  
 2. Realized gains/losses on sales of securities include gains/losses from investment trusts due to cancellations after fiscal 2012.  
 3. Median by bank type.  
 Source: BOJ.

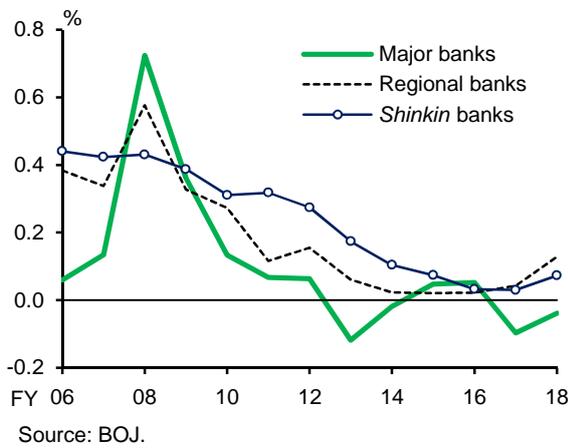
**Background behind the rise in credit costs**

Financial institutions' credit cost ratios (i.e., credit costs divided by total loans outstanding) have started to rise, particularly for regional financial institutions, although levels have remained low (Chart V-1-3). Since they have been on a declining trend for a long time due to the continued expansion of the domestic and overseas economies, their upturn, even at low levels, warrants close attention, given that regional financial institutions' profitability is currently declining. This section outlines the background behind the rise in credit cost ratios based on currently available data, a questionnaire survey of regional financial institutions conducted by the Bank of Japan, and intelligence obtained from monitoring activities.

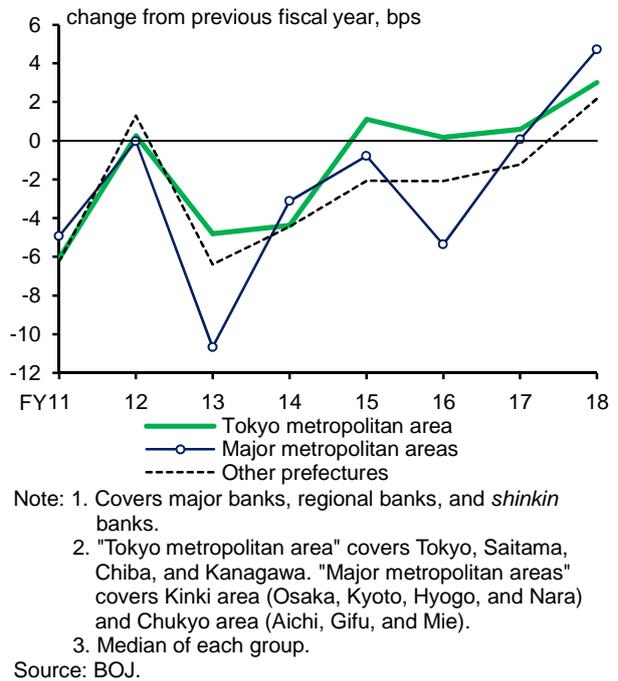
Credit cost ratios of regional financial institutions have recently been rising among a relatively wide range of institutions, regardless of the type of bank or the region where they are located (Charts V-1-3 and V-1-4). Credit cost ratios may rise due to incidental and temporary factors such as the sudden failure of a certain borrower with large exposures. However, the results of the questionnaire survey and qualitative information obtained from monitoring activities suggest that

an increasing number of financial institutions recognize that the underlying credit cost ratios would have reversed to rise even if such incidental and temporary factors were excluded (Chart V-1-5).

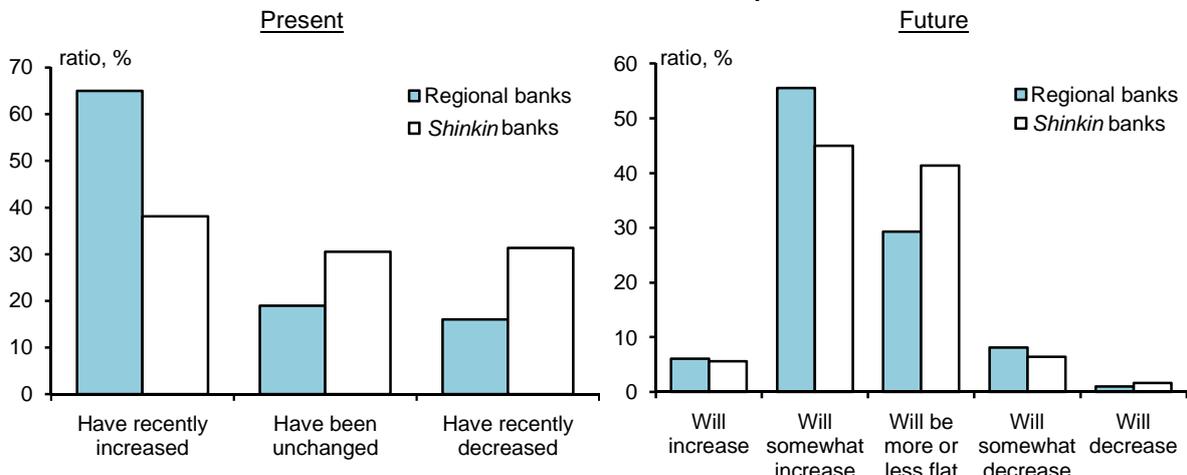
**Chart V-1-3: Credit cost ratios by type of bank**



**Chart V-1-4: Credit cost ratios by region**

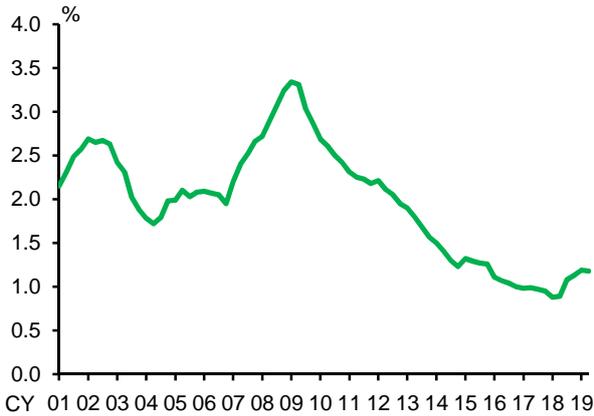


**Chart V-1-5: Financial institutions' view on developments in credit costs**



Regarding the fundamental background behind the recent rise in credit costs, the following two major points can be made. First, some low-performing firms with a long-standing business relationship with their financial institutions have been facing a delay in business restructuring. The default rate defined as loans overdue by more than 3 months or loans where the borrower was downgraded to being "in danger of bankruptcy" or below has risen slightly (Chart V-1-6). Some firms have not been able to restructure their business and improve performance even under the prolonged low interest rate environment and favorable economic conditions. In addition, firms with a high reliance on bank borrowing have relatively low profit ratios, and the improvement in profit ratios has tended to be slow even under the prolonged economic expansion (Chart V-1-7).

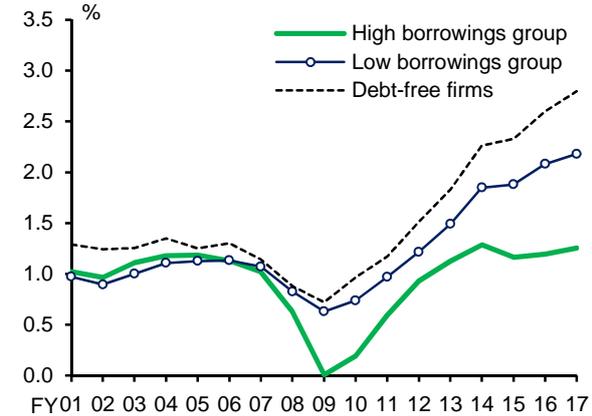
**Chart V-1-6: Firms' default rate**



Note: The figures in the chart indicate end-quarter values.  
Latest data as at June 2019.

Source: The Risk Data Bank of Japan.

**Chart V-1-7: Firms' reliance on bank borrowing and firms' ratios of operating profits to sales**



Note: 1. Firms with positive amounts of borrowings are classified into the "Low borrowings group," whose borrowings ratios are in the bottom 50th percentile, and the "High borrowings group," whose borrowings ratios are in the top 50th percentile. "Borrowings ratio" = (total borrowings) / (total assets). Covers small firms.

2. Median of each group.

Source: Teikoku Databank.

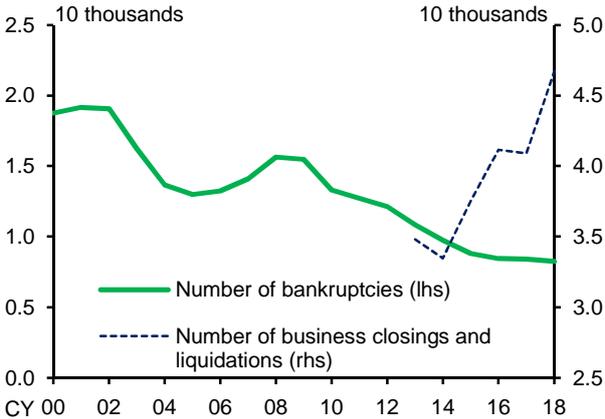
While the fact that credit costs over the past few years have been below even the levels seen during the bubble period in the late 1980s is to a large degree due to the prolonged economic expansion, to some extent it also reflects the fact that financial institutions have supported low-performing firms by offering low interest rates. Recently, some of these firms have gone bankrupt because of not being able to realize significant improvement in their business performance, while some other firms have been downgraded by financial institutions in terms of the borrower classification.<sup>31</sup> In recent years, with the aging of owners, there has been an increase in the number of firms that are unable to achieve a smooth business succession, mainly due to the lack of a successor, and these are forced to temporarily close or go out of business altogether (Chart V-1-8). In some cases, when such firms decide to close, either temporarily or permanently, it emerges that they have excessive debt and insufficient collateral, giving rise to credit costs.

The second point behind the recent rise in credit costs is some slackening of loan screening and credit risk management by financial institutions amid their efforts to increase lending. Financial institutions have, in some cases, incurred credit costs due to their insufficient knowledge particularly of the financial condition and creditworthiness of borrowers with which they have recently started to build business ties. In fact, there has been a slight increase in downgrades of loans from normal loans to loans requiring "special attention" or below, indicating heightened

<sup>31</sup> No substantial change in financial institutions' support for low-performing firms was observed even after the Act concerning Temporary Measures to Facilitate Financing for Small and Medium-Sized Enterprises, etc., which came into force in 2009, expired at the end of fiscal 2012, or after the end of fiscal 2018, when financial institutions stopped being required to report to the Financial Services Agency (FSA) of Japan the number of applications for a change in loan terms, as well as the numbers of loan approvals, loan rejections, and loan request withdrawals. However, according to anecdotal information, while firms that received financial support under the Act were required to formulate a corporate turnaround plan to be achieved over a time frame of a maximum of 10 years, some of these firms are unable to achieve their plans within the designated time frame, thus increasing the downgrading of borrowers, etc.

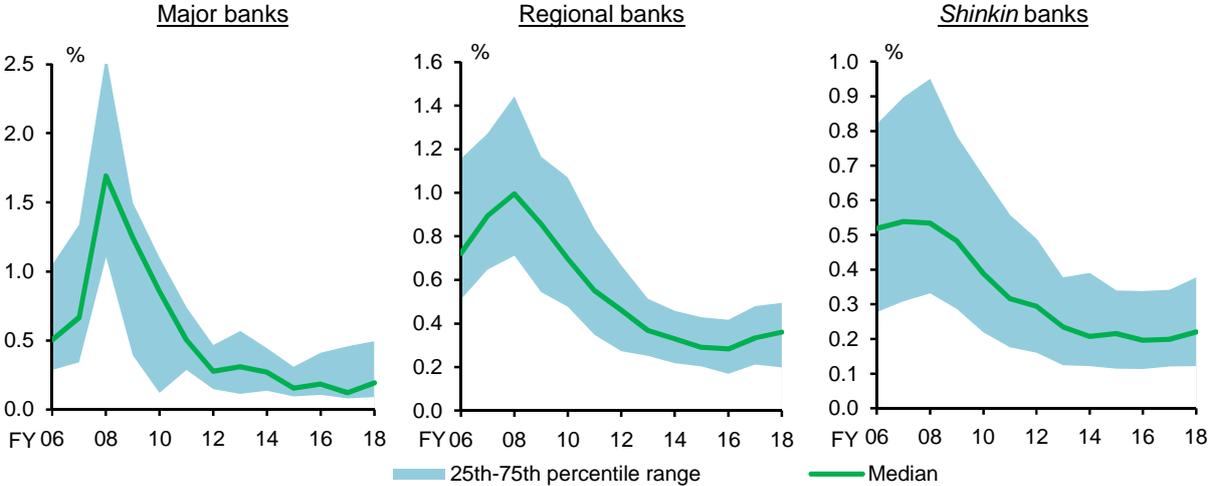
concern about sudden default (Chart V-1-9).<sup>32</sup> Moreover, the questionnaire survey and qualitative information obtained through the Bank's monitoring activities also point to an increasing number of downgrades of loans where financial institutions find it relatively difficult to obtain soft and/or detailed information on the borrower or the business environment of the area where the borrower runs its businesses, especially for (1) cases of "cross-border" lending, where a borrower is located outside the prefecture where the lender's head office is; (2) cases where a lender is neither the main nor secondary main bank for the borrower but only the third- or lower-ranking lender, and (3) cases where the business relationship is relatively recent. It is worth reiterating that financial institutions need to conduct thorough loan screening at the time of loan disbursement and during interim assessments.

**Chart V-1-8: Number of bankruptcies and business closings and liquidations**



Source: Tokyo Shoko Research.

**Chart V-1-9: Probability of being downgraded from "normal" to "special attention" or below**



Source: BOJ.

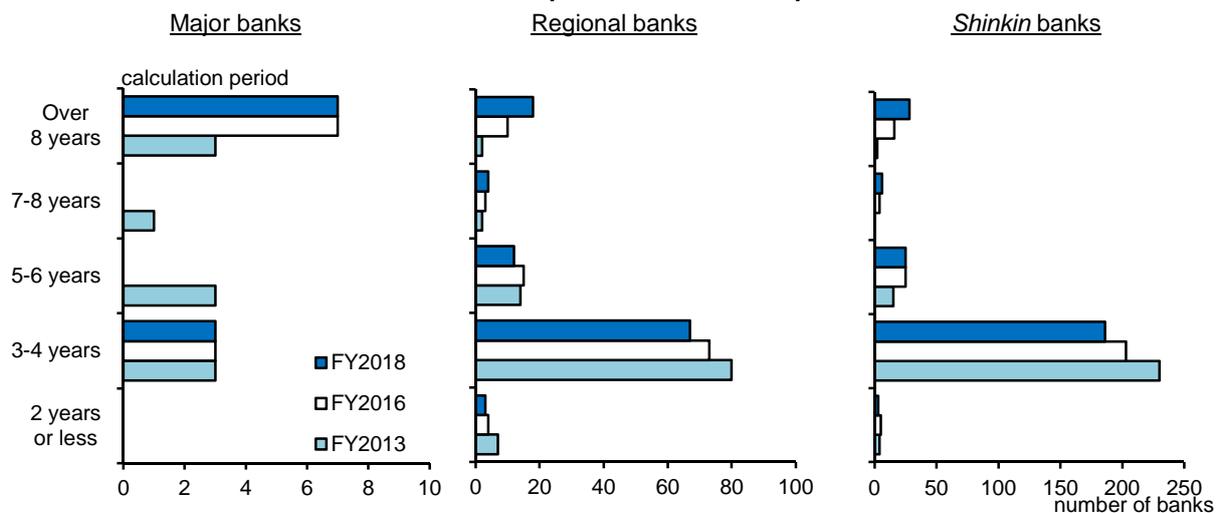
Against this backdrop, an increasing number of financial institutions have raised loan-loss provisions, which partly explains the recent increase in credit costs. Measures to raise loan-loss provisions include the revision of borrower classification of individual borrowers. Banks also extend the calculation periods for the actual loan-loss ratio or apply a more prudent provisioning

<sup>32</sup> As indicated in Chapter IV, loans to low-return borrowers, that is, firms in relatively weak financial condition whose borrowing interest rates are low relative to their credit risk through the business cycle, have been growing at a fast pace in recent years. Since a large proportion of such borrowers seem to be included in the bottom group of "normal" borrowers, the relationship with the recent rise in credit costs should be monitored with special attention.

rate to the segregated riskier group of borrowers to raise general loan-loss provisions (Chart V-1-10). It is important for financial institutions to examine their loan-loss provisions without being excessively affected by the current favorable macroeconomic environment and by taking into account a possible change in the credit cycle in the future, while staying in compliance with existing accounting principles.

Going forward, close attention needs to be paid to developments in credit cost ratios. Given that credit costs have already started to increase under the current business conditions, financial institutions need to become even more aware of the possible effects on credit costs associated with the materialization of downside risks to the economy amid the increased uncertainty about overseas economies.

**Chart V-1-10: Calculation periods for loan-loss provision ratios**



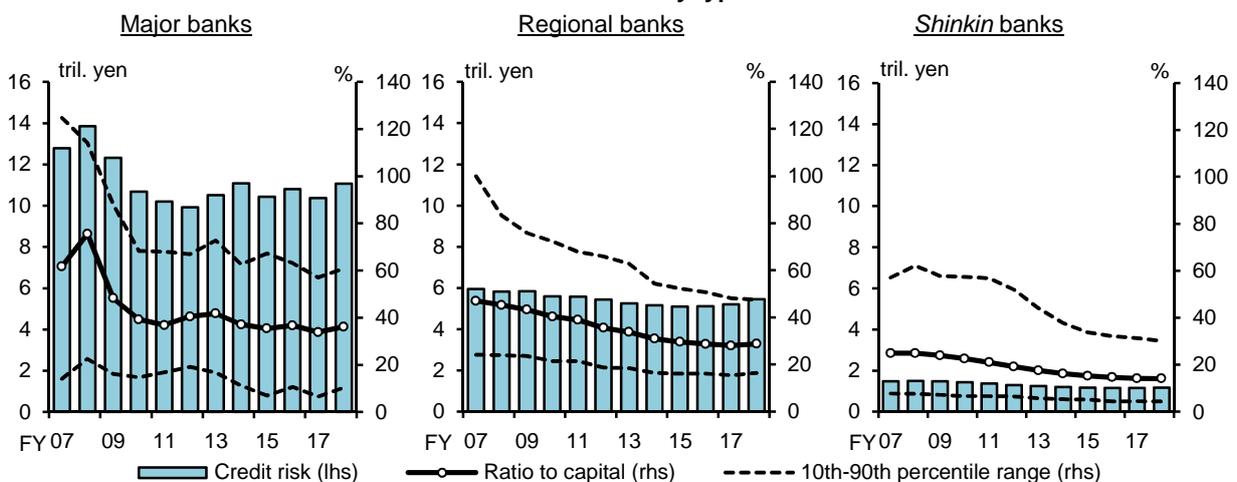
Note: "Calculation period" indicates the entire sample period for calculating loan-loss provision ratios for normal loans when each survey was conducted.

Source: BOJ.

## B. Credit risk

This and the following sections examine the risk profiles of financial institutions.

**Chart V-2-1: Credit risk by type of bank**



Note: 1. "Credit risk" is unexpected losses with a 99 percent confidence level.

2. Covers credit that is subject to self-assessment. Latest data as at end-March 2019.

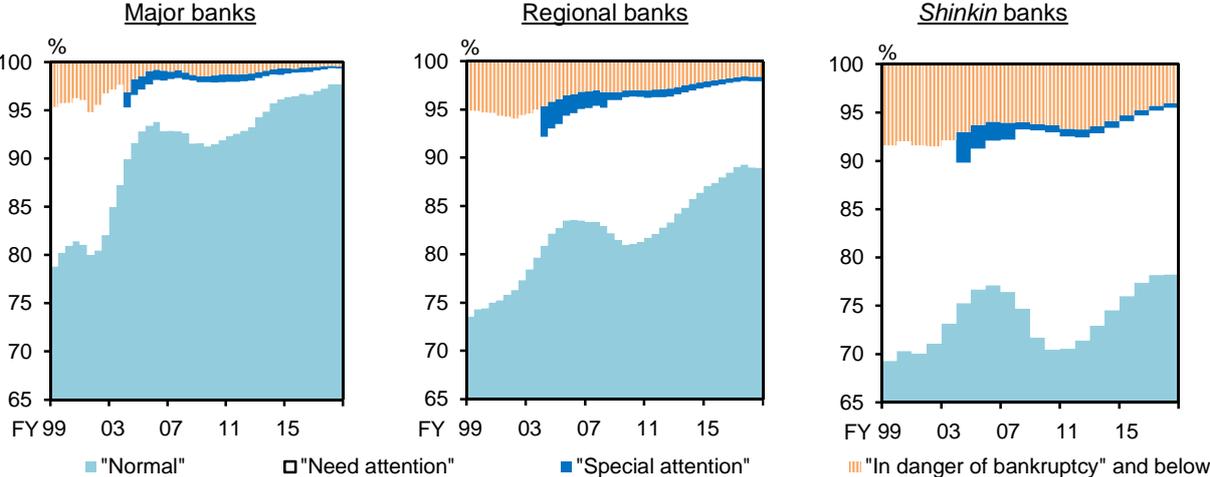
Source: BOJ.

First, the amount of credit risk held by financial institutions has remained low on the whole;

however, it has recently increased slightly for all types of banks (Chart V-2-1).<sup>33</sup>

A breakdown of loans by borrower classification shows that the share of normal loans in total loans clearly exceeded the peak before the global financial crisis for both major banks and regional banks (Chart V-2-2). However, the share of normal loans has been more or less unchanged or has started to decline as credit costs have risen, as described in the previous section. Therefore, attention needs to be paid to a possible increase in the amount of credit risk going forward.

**Chart V-2-2: Breakdown of loans by borrower classification**



Note: 1. "Need attention" indicates "Need attention excluding special attention" from fiscal 2004.  
 2. Latest data as at end-March 2019.  
 Source: BOJ.

**C. Market risk**

This section assesses four aspects of market risk, namely, the yen interest rate risk, the foreign currency interest rate risk, the market risk associated with stockholdings, and other market risk including that associated with investment trust holdings.

*Yen interest rate risk*

The amount of interest rate risk associated with the yen-denominated bond investments of financial institutions has somewhat increased recently. It had been following a downward trend since peaking in 2012, reflecting a decline in their holdings of such bonds (Chart V-3-1).<sup>34</sup> Although the reduction in yen-denominated bondholdings continues to put downward pressure on the amount of interest rate risk, an increase in the duration of bond portfolios mainly driven by the increased purchases of super-long-term bonds has raised the amount of interest rate risk as a whole.

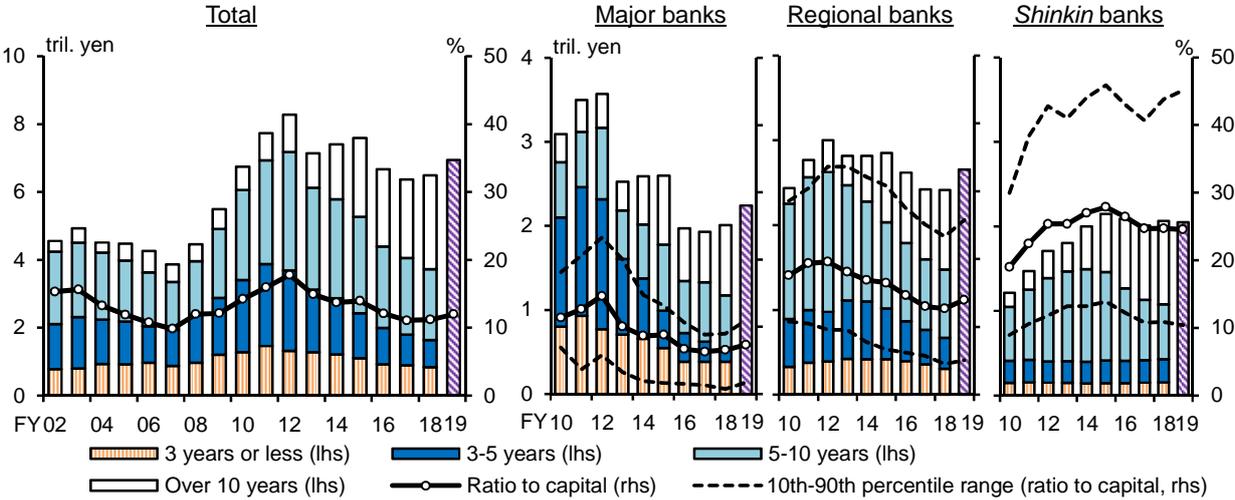
By type of bank, the ratio of the amount of interest rate risk associated with yen-denominated bond

<sup>33</sup> Credit risk here refers to unexpected losses. Unexpected losses are estimated by deducting the average amount of losses arising in 1 year (expected losses) from the upper 99th percentile of possible 1-year losses. The amount of credit risk in Chart V-2-1 and the amount of integrated risk in Charts V-5-3 and V-5-4 are calculated by referring to the default rates from fiscal 2005 to the time in question.

<sup>34</sup> In Chart V-3-1, changes in the economic value of bondholdings are calculated assuming a parallel shift in the yield curve in which the interest rates for all maturities rise by 1 percentage point. One of the interest rate risk scenarios assumed in the FSA's public notice about interest rate risk in the banking book (IRRBB) employs an upward parallel shift of 1 percentage point.

investments to the amount of capital has been low at around 5 percent for major banks, whereas it has been relatively high at around 15 and 25 percent for regional banks and *shinkin* banks, respectively. Moreover, heterogeneity in the ratio among regional financial institutions has been quite high (Chart V-3-1).

**Chart V-3-1: Interest rate risk associated with yen-denominated bondholdings among financial institutions**

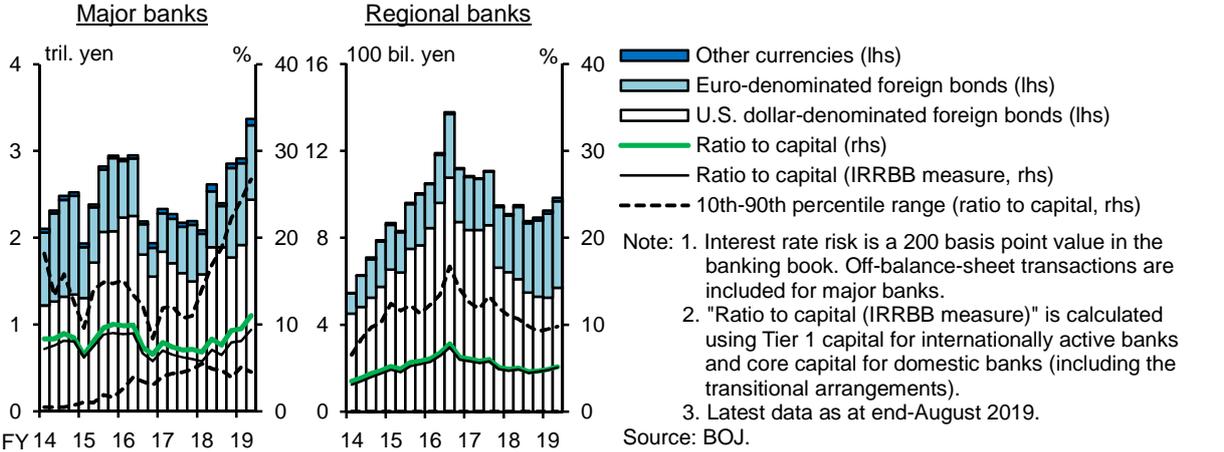


Note: Interest rate risk is a 100 basis point value in the banking book. Convexity and higher order terms are taken into account. The data for fiscal 2019 are estimated as at end-August 2019. Source: BOJ.

*Foreign currency interest rate risk*

The amount of interest rate risk associated with foreign currency-denominated bond investments by financial institutions has increased recently (Chart V-3-2).<sup>35</sup> The ratio of the amount of interest

**Chart V-3-2: Interest rate risk of foreign currency-denominated foreign bonds**



Note: 1. Interest rate risk is a 200 basis point value in the banking book. Off-balance-sheet transactions are included for major banks. 2. "Ratio to capital (IRRBB measure)" is calculated using Tier 1 capital for internationally active banks and core capital for domestic banks (including the transitional arrangements). 3. Latest data as at end-August 2019. Source: BOJ.

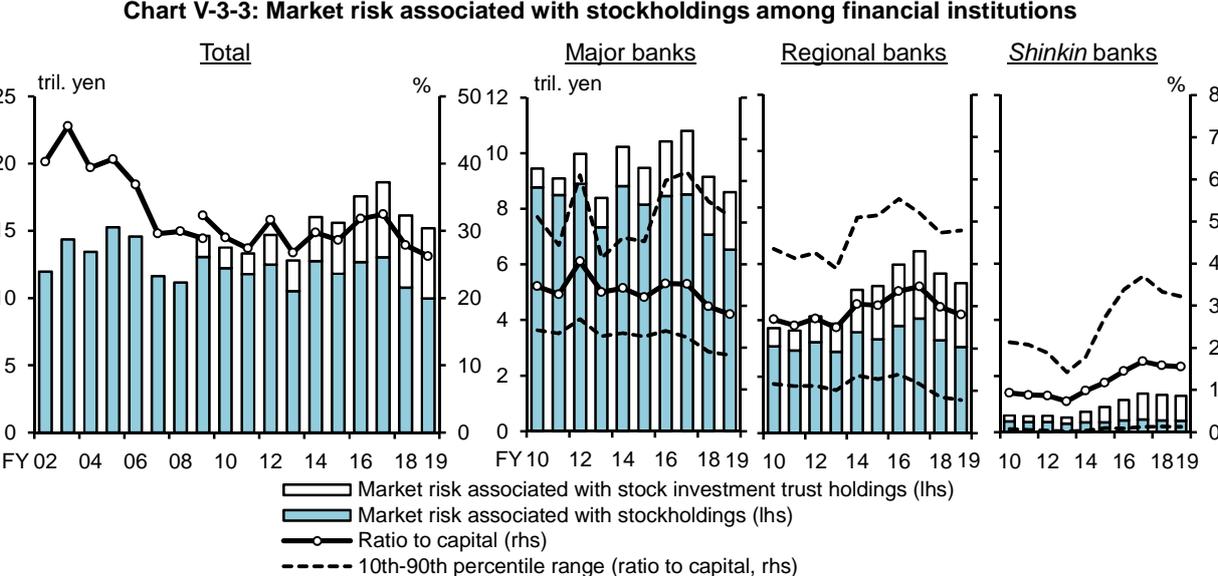
rate risk associated with foreign currency-denominated bonds to the amount of capital has been

<sup>35</sup> The FSA's public notice with regard to IRRBB sets an upward parallel shift as one of the scenarios for calculating interest rate risk, assuming the changes in the interest rates of the U.S. dollar and the euro to both be 2 percentage points. Similarly, the interest rate risk of foreign currency-denominated foreign bonds in Chart V-3-2 is calculated as the change in the economic value of bondholdings assuming a parallel shift in the yield curve in which interest rates for all maturities increase by 2 percentage points.

limited to about 10 percent for major banks and about 5 percent for regional banks. Among major banks, heterogeneity in the ratio has recently increased substantially as some of them have increased the amount and duration of their U.S. Treasury holdings and have invested more in European bonds with relatively high yields after hedging currency risk. As for regional financial institutions, there have been no major changes in the average of or heterogeneity in the ratio; however, for about 40 percent of investment trusts held by regional financial institutions, overseas interest rate risk is the main risk factor (Chart V-3-5). Thus, it is important to manage the foreign currency interest rate risk including that associated with investment trusts.

*Market risk associated with stockholdings*

The amount of market risk associated with stockholdings (including stock investment trusts) by financial institutions has reached the lowest level since fiscal 2002, due to a decrease in the exposure of financial institutions as a result of both a reduction in strategic stockholdings and a decline in stock prices (Chart V-3-3).<sup>36</sup> Meanwhile, the volatility of stock prices has been low, as stock prices have been firm during the observation period for this *Report* (Chart II-1-1). The ratio of the amount of market risk associated with stockholdings to the amount of capital has been around 30 percent both for major banks and regional banks, and around 20 percent for *shinkin* banks.



Note: 1. "Market risk associated with stockholdings" and "Market risk associated with stock investment trust holdings" are value-at-risk with a 99 percent confidence level and with 1-year holding period, and exclude risk associated with foreign currency-denominated stockholdings and stock investment trust holdings. Pre-fiscal 2009 data do not include stock investment trusts.

2. The data for fiscal 2019 are estimated using the outstanding amount of stockholdings and stock investment trust holdings as at end-August 2019 and stock prices up to end-August 2019.

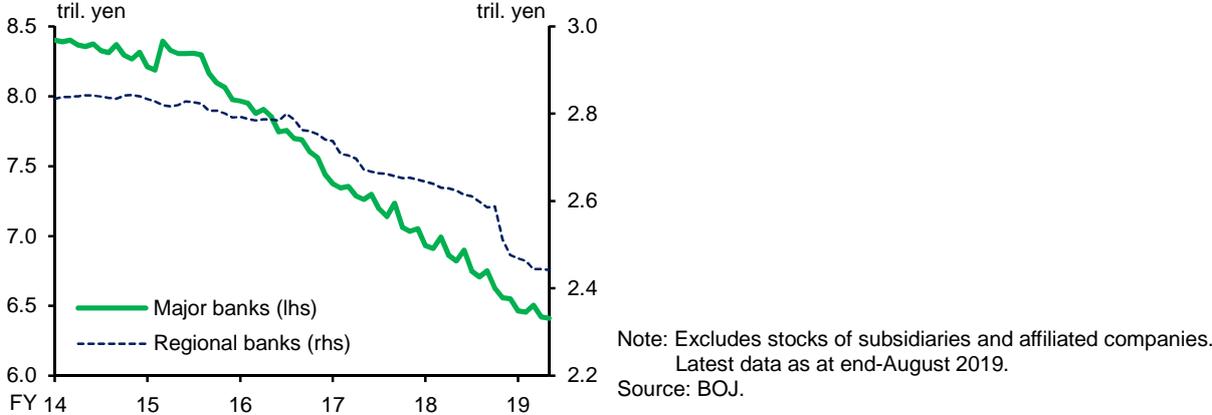
Source: BOJ.

The amount of strategic stockholdings of financial institutions has exhibited a gradual downward trend (Chart V-3-4). However, the associated market risk has remained large enough to have a substantial impact on financial institutions' financial soundness and profits, if the risk materialized. Attention should be paid to the possibility that market volatility may increase further, pushing up the market risk associated with stockholdings going forward. Financial institutions need to make

<sup>36</sup> In Chart V-3-3, the market risk associated with stockholdings (including stock investment trusts) is calculated using VaR with a 99 percent confidence level and a 1-year holding period. (The same applies to the integrated risk in Charts V-5-3 and V-5-4.) Volatility is calculated based on the past 5 years.

an objective assessment of the purpose and costs of strategic stockholdings and control their exposure to the market risk associated with stockholdings, including strategic stockholdings, within an appropriate range in terms of their financial soundness.

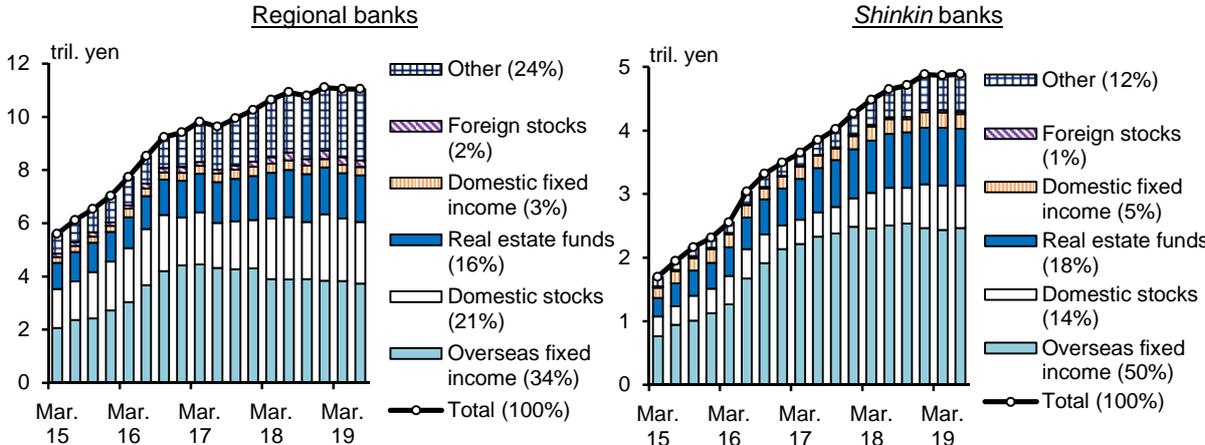
**Chart V-3-4: Strategic stockholdings among financial institutions**



*Other market risk including that associated with investment trust holdings*

As seen in Chapter III, regional financial institutions have increased their holdings of investment trusts, and as a result, they have been exposed to a wide range of market risks, such as credit, real estate, and foreign exchange related risks, as well as overseas interest rate risk and stockholdings-related risk (Chart V-3-5). For example, although the assets purchased by overseas fixed-income investment trusts consist mainly of sovereign bonds, a number of investment trusts also include products with relatively high credit risk in their portfolios (such as high-yield bonds). In addition, recently, some financial institutions have invested in multi-asset investment trusts, which invest across multiple different asset types such as domestic and foreign bonds and stocks, including those of emerging economies, and whose asset allocation is flexibly adjusted in response to the changes in markets. Risk management methods such as predictive analysis based on past investment performance are difficult to apply to these investment trusts. Unexpected losses could materialize if the covariance structure among risk factors changes significantly and risk diversification effects are limited.

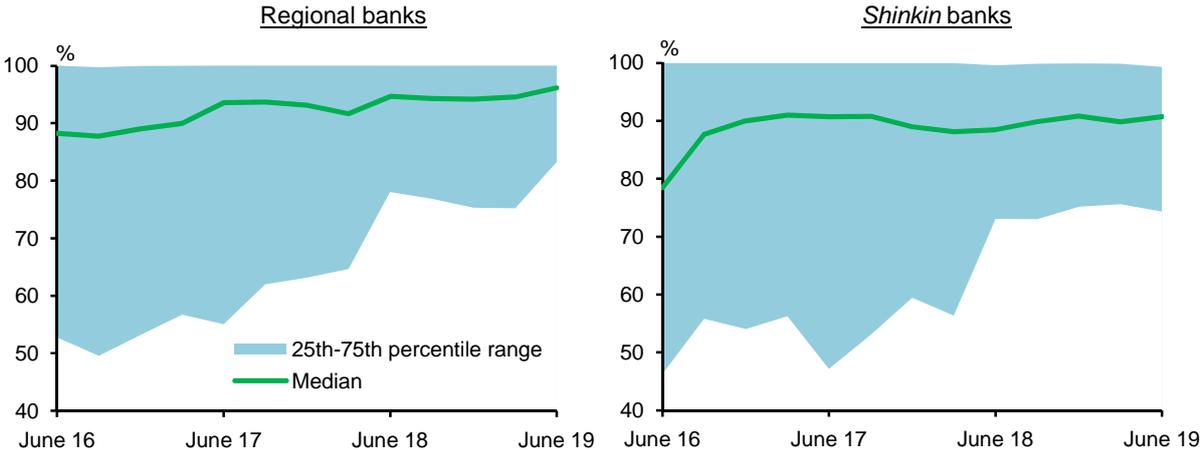
**Chart V-3-5: Breakdown of outstanding amount of investment trusts**



Note: 1. Based on book values. Figures in parentheses in the chart indicate the share of product type in last period.  
 2. Latest data as at end-June 2019.  
 Source: BOJ.

The risk measurement ratio -- which is an indicator of regional financial institutions' ability to measure and manage the amount of risk associated with investment trusts -- has been gradually increasing. Currently, the majority of institutions measure and manage the risk of more than 80 percent of the total value of their investment trust holdings, but there remain institutions that are not sufficiently measuring and managing their risks (Chart V-3-6). When financial institutions utilize investment schemes with complex risk profiles, such as investment trusts, they should (1) identify the risk factors and measure the sensitivity to those factors, (2) analyze the impact on their profits under sufficiently severe stress scenarios, and (3) study a practical organizational contingency response plan under market stress.

**Chart V-3-6: Risk measurement ratios for investment trust holdings**

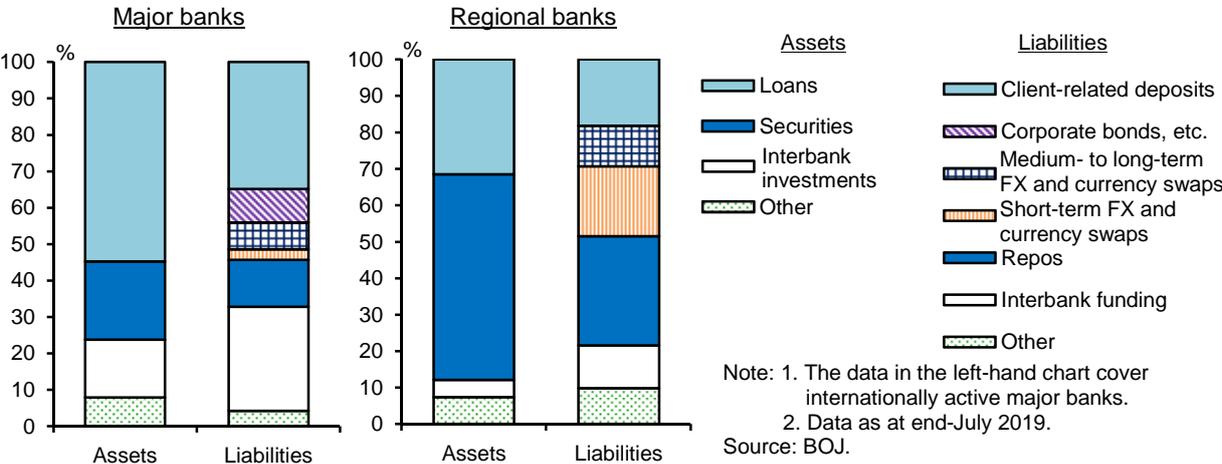


Note: 1. Risk measurement ratios are defined as the amount of investment trusts whose risk is measured divided by the total amount of investment trust holdings.  
 2. Latest data as at end-June 2019.  
 Source: BOJ.

**D. Foreign currency funding liquidity risk**

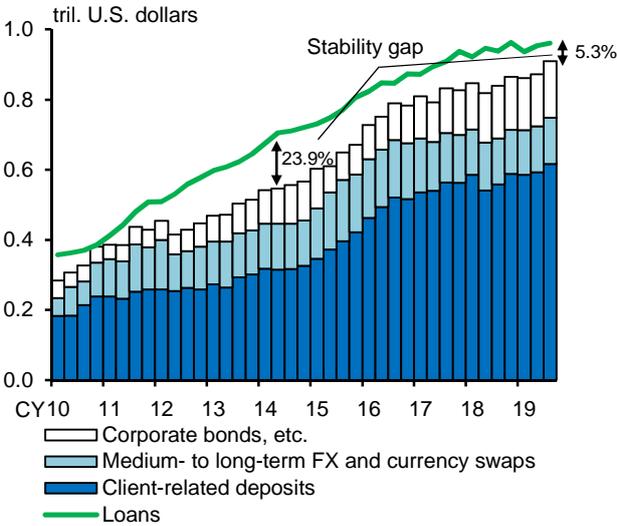
Japanese banks' foreign currency funding needs have increased substantially in recent years, reflecting the expansion of their overseas business. While the share of funding through financial markets in the foreign currency funding of Japanese financial institutions has been large compared to their yen funding, the share of stable foreign currency funding has steadily increased and financial institutions have a sufficient liquidity buffer to cover possible funding shortages even if market funding becomes difficult for a certain period.

**Chart V-4-1: Foreign currency balance sheets by type of bank**



Looking into the foreign currency balance sheets of major banks, loans with relatively long maturities constitute more than half of foreign currency assets, whereas client-related deposits make up the largest share of foreign currency liabilities, accounting for about a third, followed by interbank funding (Chart V-4-1). A useful indicator for assessing the stability of this asset and liability structure is the "stability gap," which is the difference between the amount of illiquid loans and that of stable funding through client-related deposits, medium- to long-term FX and currency swaps, and corporate bonds including TLAC bonds. The stability gap of major banks has declined somewhat compared to the previous issue of the *Report* due to increases in client-related deposits and corporate bond issuance (Chart V-4-2). It should be noted, however, that client-related deposits still include deposits with relatively low stickiness, such as deposits by financial institutions that may easily be withdrawn under a stress situation as well as large-scale term deposits with short maturities.

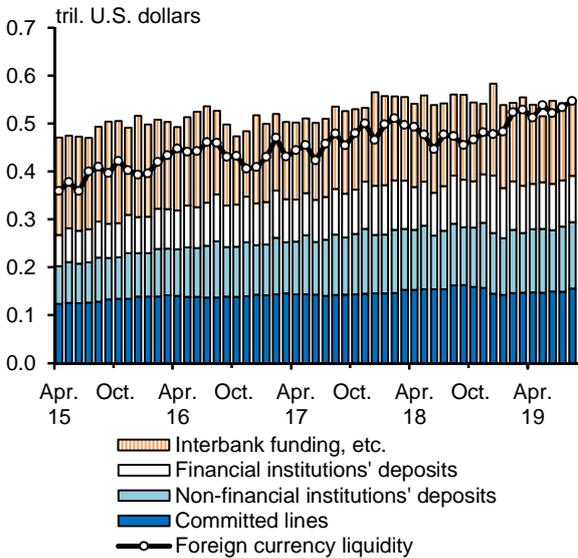
**Chart V-4-2: Stability gap among major banks**



Note: 1. Until end-March 2012, "Corporate bonds, etc." and "Medium- to long-term FX and currency swaps" indicate funding maturing in more than 3 months and thereafter, funding maturing in more than 1 year.  
 2. The figures in the chart indicate the ratios of the gaps to the loans (as at end-April 2014 and end-August 2019).  
 3. Covers internationally active banks. Latest data as at end-August 2019.

Source: BOJ.

**Chart V-4-3: Resilience to foreign currency liquidity stress among major banks**



Note: 1. "Foreign currency liquidity" = interbank investments + 50 percent of loans + FX and currency swaps + unencumbered securities. Data excluding unencumbered securities indicate assets maturing within 1 month or with no specific maturity. "Financial institutions' deposits" up to end-February 2017 are estimated based on the proportion of financial institutions' deposits to non-financial institutions' deposits from end-March 2017.  
 2. The bar graph shows the breakdown of cash outflows.  
 3. Covers internationally active banks. Latest data as at end-August 2019.

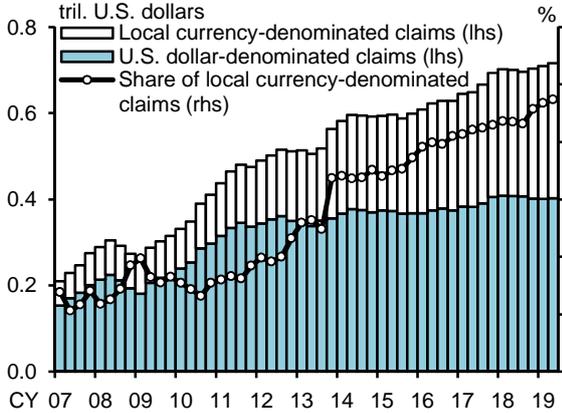
Source: BOJ.

With respect to resilience to short-term stress, major banks generally hold sufficient liquid assets to cover the expected outflow of funds under a stress situation. It should be noted, however, that such expectation is subject to uncertainty as to what degree withdrawals from unused committed lines and/or outflows from client-related deposits will occur in the event of stress (Chart V-4-3).<sup>37</sup>

<sup>37</sup> In Chart V-4-3, the following assumptions are made with regard to assets and liabilities with remaining maturities of up to 1 month (including those with no specific maturity): (1) the full amount of deposits from financial institutions and interbank funding (excluding central bank funding) is withdrawn; (2) 40 percent of deposits from non-financial institutions and central bank funding in interbank funding are withdrawn; (3) 30 percent of unused committed lines are withdrawn by the clients; and (4) 50 percent of loans are regarded as foreign currency liquidity on the premise that they will be repaid within a short time period. Repo funding is not included in either fund outflows or foreign liquid assets.

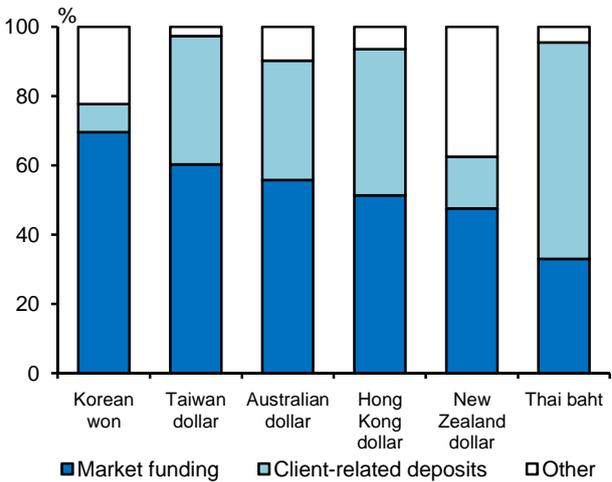
Among loans to Asia, particularly by major banks, the proportion of loans denominated in local currencies has trended up, and for some of these currencies, the dependence of banks on market funding such as FX and currency swaps and interbank funding has been high (Charts V-4-4 and V-4-5). Attention needs to be paid to the fact that liquidity in these local currency funding markets is relatively low.

**Chart V-4-4: Japanese banks' claims in Asia by currency**



Note: 1. Claims include loans, bonds, equity, etc.  
 2. "U.S. dollar-denominated claims" includes local currency-denominated cross-border claims and claims denominated in foreign currencies other than U.S. dollars.  
 3. Latest data as at end-June 2019.  
 Source: BIS, "Consolidated banking statistics."

**Chart V-4-5: Major banks' funding structure by currency**



Note: Covers five major banks' main funding sources. The top six currencies by market funding ratio are selected according to the latest data. Data as at end-June 2019.  
 Source: BOJ.

Given the above, financial institutions should (1) continue to strive to enhance their stable foreign currency funding bases, such as by diversifying their foreign currency funding counterparts and instruments; (2) manage the availability of funds and the risk of outflows, taking into account the characteristics of funding counterparts and products at more granular levels; and (3) make efforts to improve their stress testing and contingency plans for ensuring liquidity in times of emergency. In Asian countries, they need to take measures such as attracting local currency deposits, arranging committed lines with local banks, and utilizing medium- and long-term funding instruments such as swaps and capital.

Regarding the foreign currency balance sheets of regional banks in comparison with major banks, the reliance on short-term market funding such as FX and currency swaps is higher for foreign currency liabilities, while highly liquid assets such as U.S. Treasuries make up a larger share of foreign currency assets. Therefore, regional banks generally hold sufficient liquidity to cover the expected outflow of funds in the event of stress (Chart V-4-1).

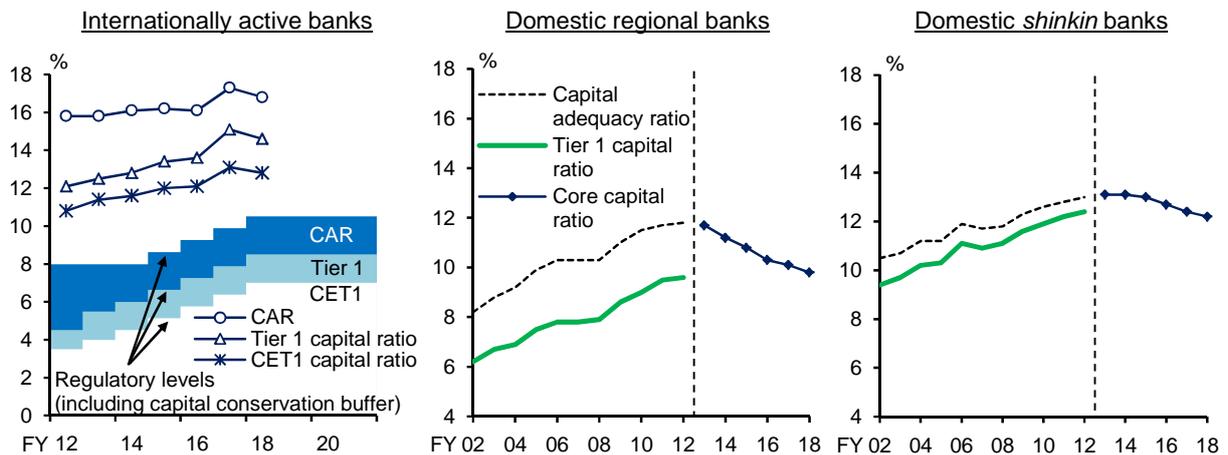
**E. Financial institutions' capital adequacy**

The capital adequacy ratios of financial institutions have been sufficiently above the regulatory requirements for all types of banks; nevertheless, those of domestic banks have continued to gradually decline in recent years (Chart V-5-1). The decline in these ratios is mainly caused by the fact that retained earnings are growing at a slower pace than risk-weighted assets, partly due to the increase in loans to low-return borrowers. In addition, the decrease in the amount of hybrid debt capital instruments (i.e., subordinated bonds and loans) due to the redemption of such instruments and the reduction in the upper limit of the inclusion of such instruments as regulatory

capital, required by a transitional arrangement of the Basel III, have also contributed to the decline (Chart V-5-2).

The capital levels of financial institutions are adequate for a whole system relative to the various types of risk that they undertake, and financial institutions have sufficient loss absorbing capacity (Chart V-5-3).<sup>38</sup> However, there is a large heterogeneity among financial institutions and some institutions have capital levels below their total amount of integrated risk exposures (Chart V-5-4).

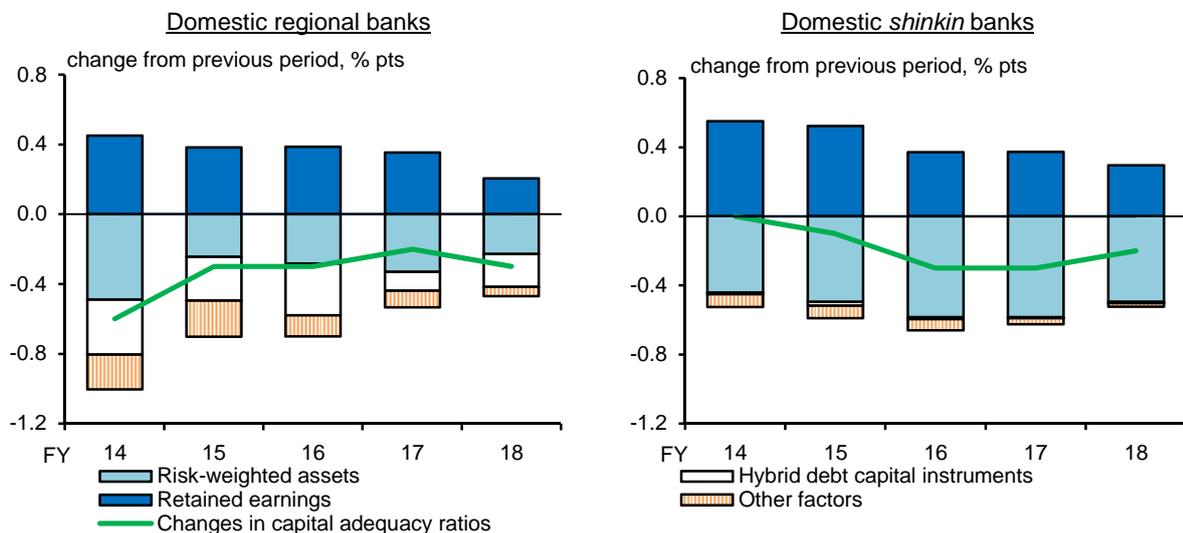
**Chart V-5-1: Financial institutions' capital adequacy ratios**



Note: "CAR" indicates total capital adequacy ratio. Classifications of internationally active banks and domestic banks are as at each time point for Basel III's regulatory ratios, and are as at end-fiscal 2013 for regulatory ratios before Basel III. The charts are calculated on a consolidated basis. Latest data as at end-March 2019. The transitional arrangements are taken into consideration.

Source: BOJ.

**Chart V-5-2: Factors of changes in capital adequacy ratios**

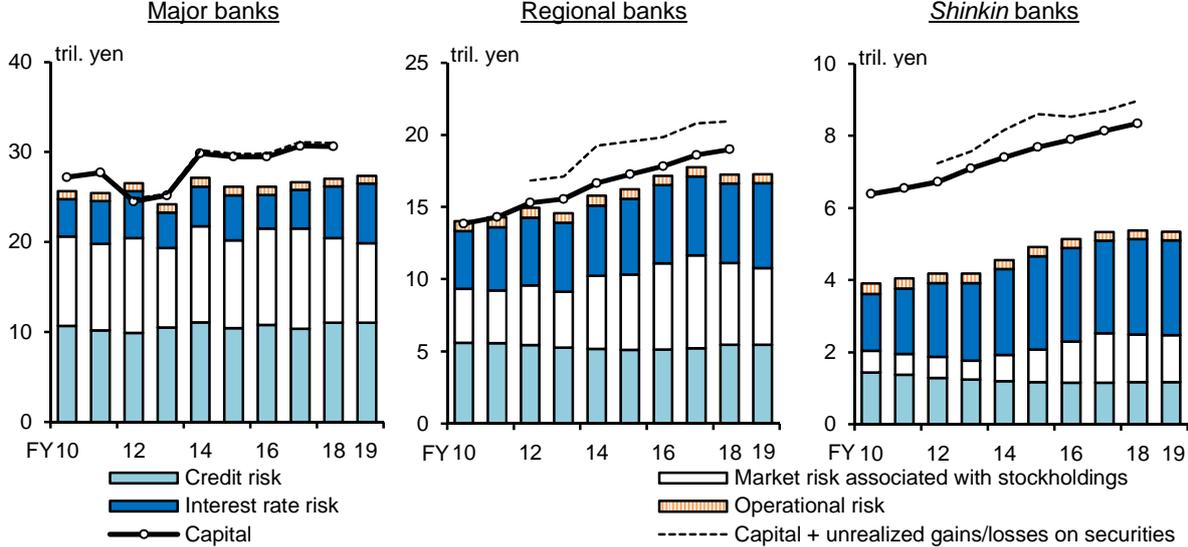


Note: The transitional arrangements are taken into consideration.  
Source: BOJ.

<sup>38</sup> The same method and parameters (such as confidence level and holding period) are used for all financial institutions in calculating the amount of risk they bear. Thus, the amount of risk presented here does not necessarily match the amount of risk calculated internally by financial institutions themselves as part of their risk management process. For the calculation method used for each type of risk, see Footnotes 33, 35, and 36. The estimation of the amount of interest rate risk takes into account Footnote 34 and the amount of risk associated with deposit-taking and lending activities and off-balance-sheet transactions. The amount of operational risk is assumed to correspond to 15 percent of gross operating profits. Moreover, the integrated risk amount is calculated simply by summing the different types of risk; that is, the correlation among the different types of risk is not taken into account.

Changes in financial institutions' capital adequacy ratios, a measure of their financial soundness, could affect their risk-taking behavior such as lending. The capital adequacy ratio that financial institutions use as a yardstick of their business stability (referred to as the "target ratio" hereafter) is estimated for domestic banks among regional banks based on certain assumptions (see Box 3).

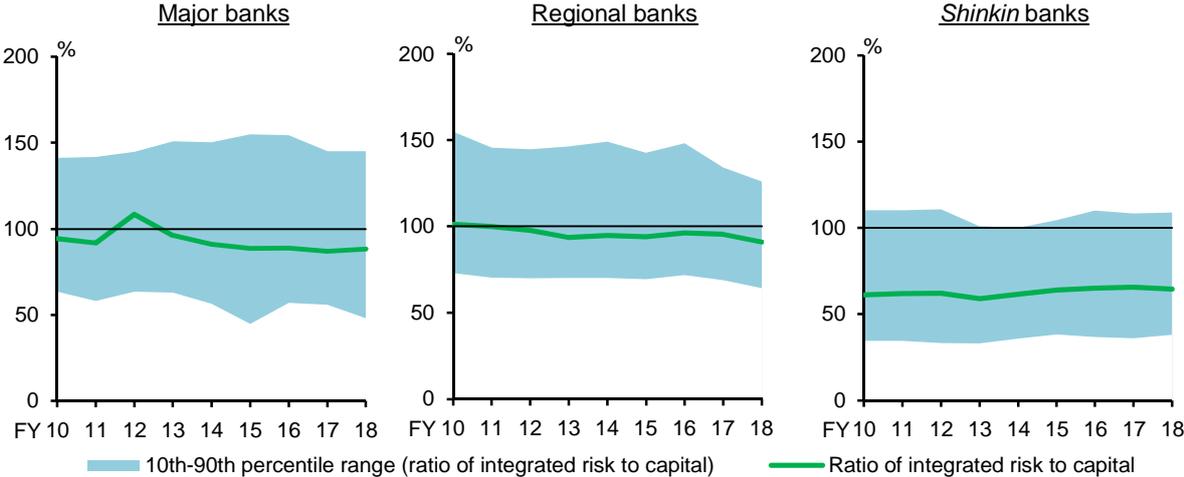
**Chart V-5-3: Risks borne and amount of capital by type of bank**



Note: 1. "Credit risk" includes risks of foreign currency-denominated assets. "Market risk associated with stockholdings" includes risks of stock investment trusts. "Market risk associated with stockholdings" and "Interest rate risk" (parts of off-balance-sheet transactions are included) in the left-hand chart include foreign currency-denominated risk. "Capital + unrealized gains/losses on securities" is the sum of capital and unrealized gains/losses on securities (tax effects taken into account) for domestic banks.  
 2. As for the fiscal 2019 data, (1) credit risk, foreign currency interest rate risk (excluding the risk associated with foreign currency-denominated bondholdings), and operational risk are as at end-March 2019, and the following data are estimated: (2) market risk associated with stockholdings and interest rate risk associated with yen- and foreign currency-denominated bondholdings as at end-August 2019, and (3) yen interest rate risk (excluding the risk associated with yen-denominated bondholdings) as at end-June 2019.

Source: BOJ.

**Chart V-5-4: Heterogeneity in risks borne by type of bank**

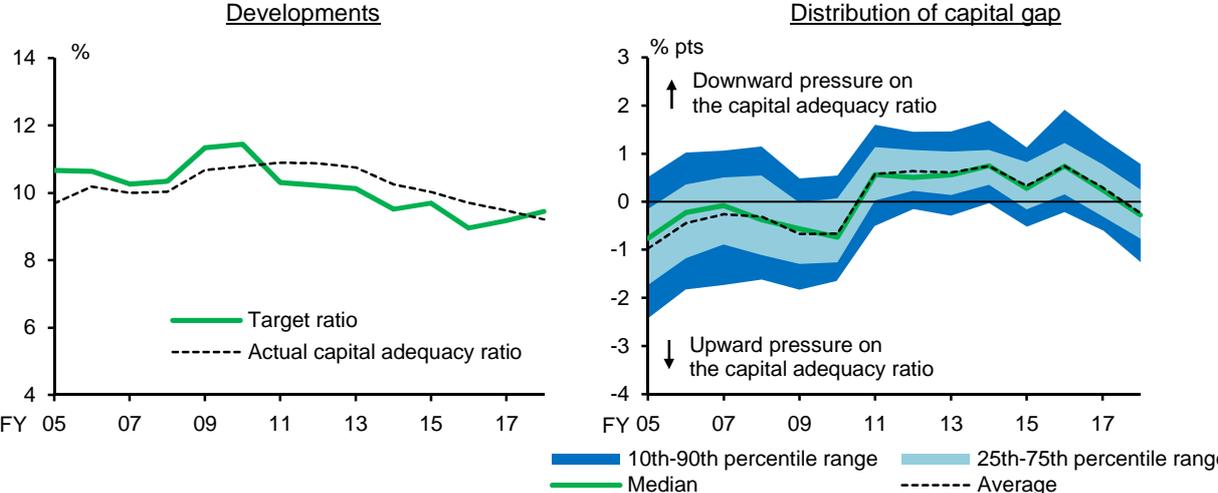


Note: "Integrated risk" is the sum of the four types of risks shown in Chart V-5-3.  
 Source: BOJ.

The estimation results show that while from 2011 onward the actual capital adequacy ratio of many banks exceeded the target ratio, the number of banks whose actual capital adequacy ratio falls below the target ratio is currently increasing (Chart V-5-5). An analysis suggests that, all else being equal, banks whose actual ratio falls below the target ratio tend to somewhat reduce the

growth of loans. While financial institutions continue to be active in lending and risk taking, attention needs to be paid to the possibility that financial institutions' lending attitudes might become more cautious given that the capital adequacy ratio at regional financial institutions started to decrease.

**Chart V-5-5: Target and actual capital adequacy ratios**

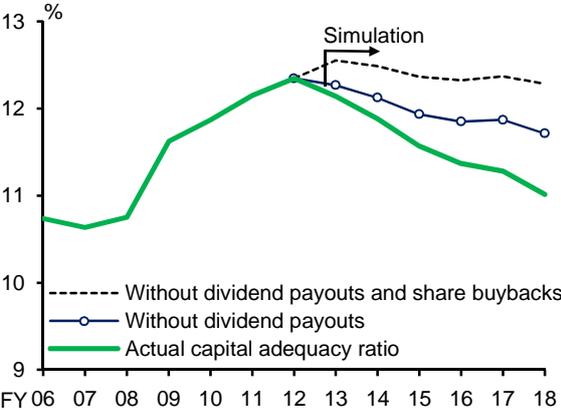


- Note: 1. Covers regional banks. The left-hand chart shows the simple average of these banks. Estimated by the BOJ.  
 2. "Actual capital adequacy ratio" indicates the core capital ratio from fiscal 2013 onward, and the capital adequacy ratio based on Basel II requirements before fiscal 2013. The transitional arrangements are taken into consideration.  
 3. Capital gap = actual capital adequacy ratio - target ratio.  
 4. Latest data as at fiscal 2018.

*Financial institutions' capital policies and shareholder governance*

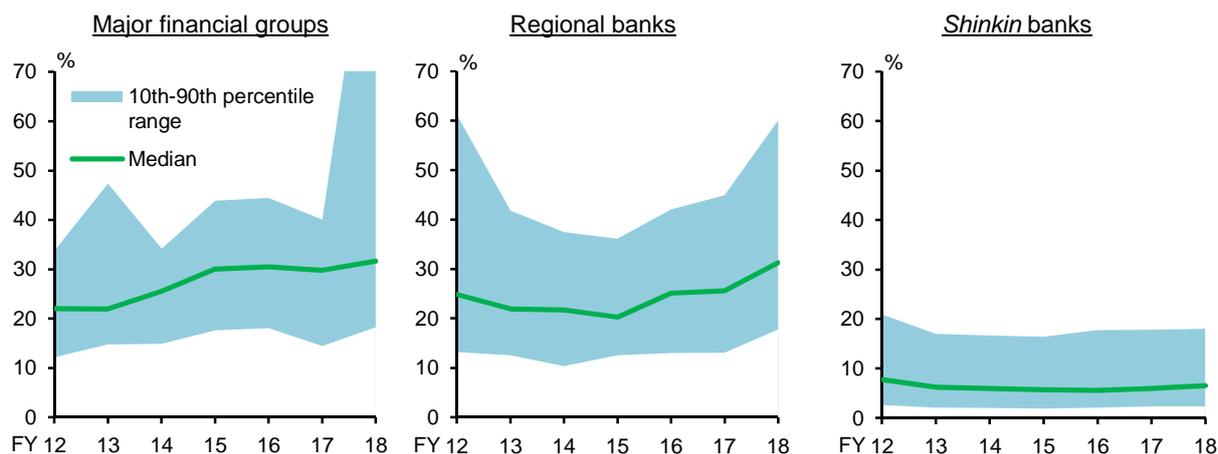
The decline in the capital adequacy ratios of regional financial institutions has also been affected by the institutions' distribution of profits through dividend payouts and share buybacks (Chart V-5-6). In recent years, the dividend payout ratios of some financial institutions -- in particular listed regional banks -- have been rising as they have prioritized stable dividend payouts despite declining profitability (Chart V-5-7). Returning capital to shareholders is one way to increase capital efficiency. However, given that financial institutions perform financial intermediation functions using deposits as the main funding source and support a wide range of economic activities, including the provision of fund settlement services, financial institutions need to be attentive to both their capital efficiency and the adequacy of their capital levels from a prudential point of view in formulating their capital policies.

**Chart V-5-6: Dividend payouts, share buybacks, and capital adequacy ratio**



- Note: 1. Covers holding companies of regional banks and regional banks that do not belong to a holding company.  
 2. The capital adequacy ratio indicates the total capital adequacy ratio for internationally active banks from fiscal 2012 onward, the core capital ratio for domestic banks from fiscal 2013 onward, and the capital adequacy ratio based on the Basel II requirements for internationally active banks and domestic banks before fiscal 2012 and 2013, respectively. The transitional arrangements are taken into consideration.  
 Source: Nikkei Inc., "NEEDS-Financial QUEST"; Published accounts of each bank; BOJ.

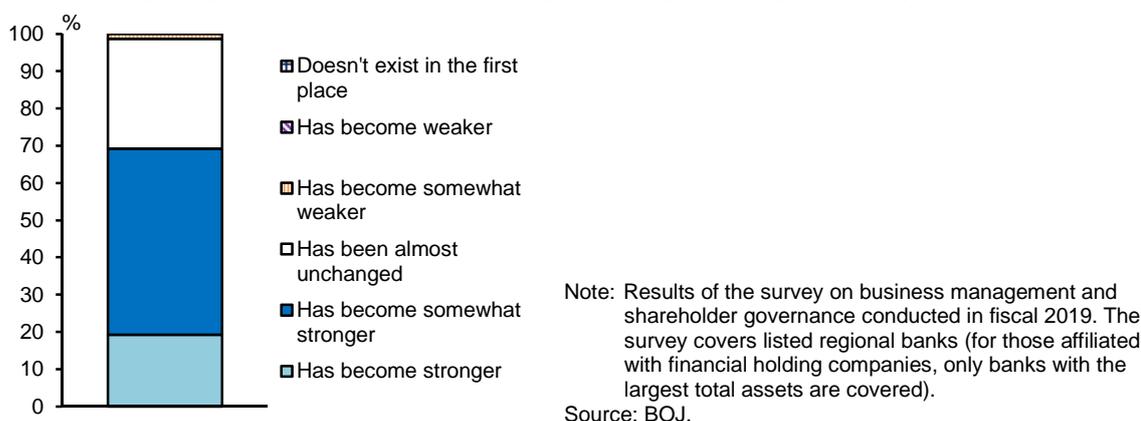
**Chart V-5-7: Dividend payout ratios by type of bank**



Note: 1. "Major financial groups" covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, Shinsei Bank, and Aozora Bank.  
 2. Dividends of *shinkin* banks cover dividends on common shares.  
 Source: BOJ.

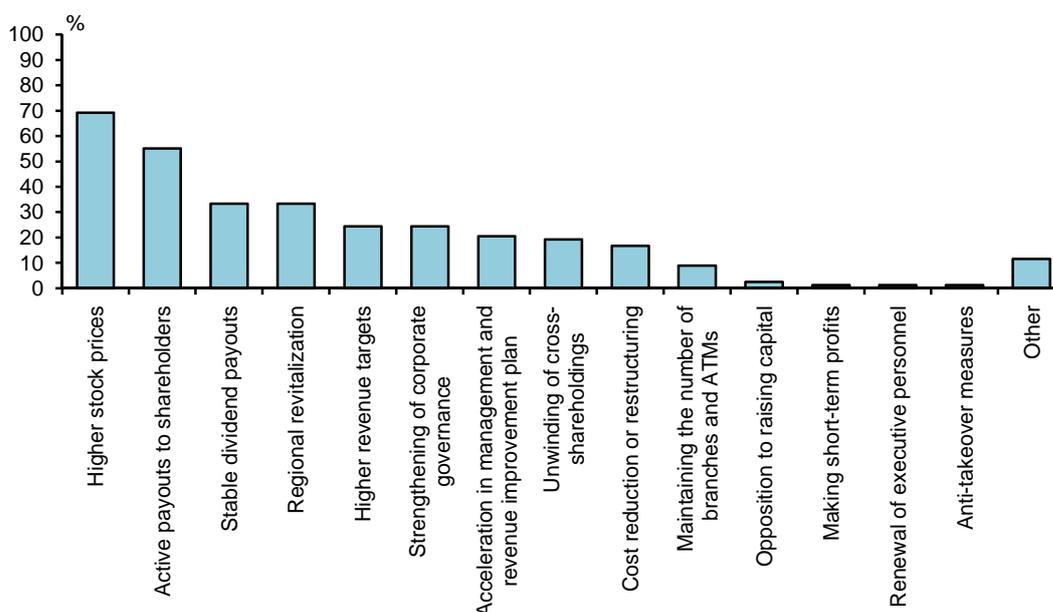
**Chart V-5-8: Awareness of pressure from shareholders**

Survey question: "How has the pressure from your bank's shareholders, such as to increase dividend payouts, improve profits, and reduce costs, changed over approximately the last 5 years?"



**Chart V-5-9: Examples of shareholder requests**

Survey question: "Which of these examples were requests from your shareholders?"  
 (up to five options could be selected)

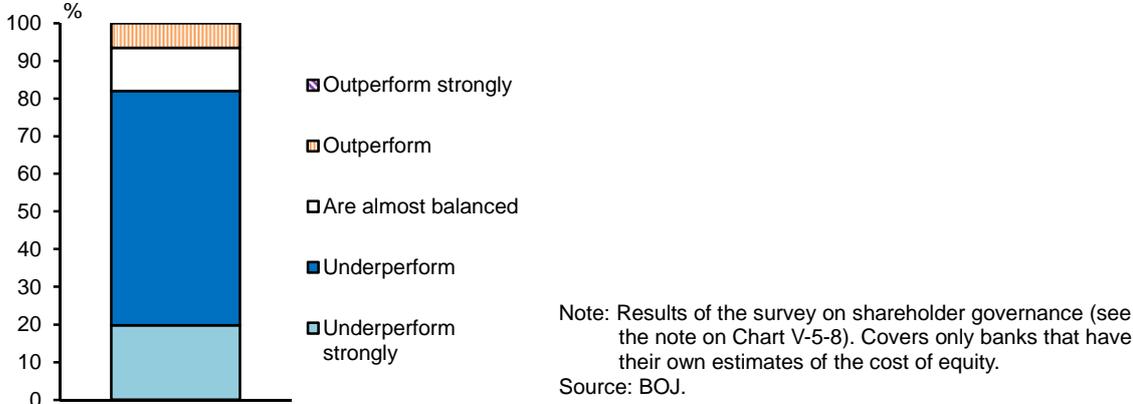


Note: Results of the survey on shareholder governance (see the note on Chart V-5-8).  
 Source: BOJ.

Meanwhile, reflecting the establishment of Japan's stewardship code and corporate governance code, efforts to encourage dialogue between firms and investors have gathered pace on both sides. Against this backdrop, pressure from shareholders on regional banks seems to have become stronger. The results of a recent questionnaire survey of regional banks conducted by the Bank of Japan show that about 70 percent of respondents indicated that the pressure "has become stronger" or "has become somewhat stronger" from their shareholders over the last 5 years, as shareholders have demanded that banks increase dividend payouts, improve profits, reduce costs, etc. (Chart V-5-8). To give specific examples, the most frequent requests cited by respondents were calls for "higher stock prices" and "active payouts to shareholders." There were also a certain number of responses citing requests for "regional revitalization" and "maintaining the number of branches and ATMs," showing that regional banks have a variety of stakeholder requests that they need to respond to (Chart V-5-9).

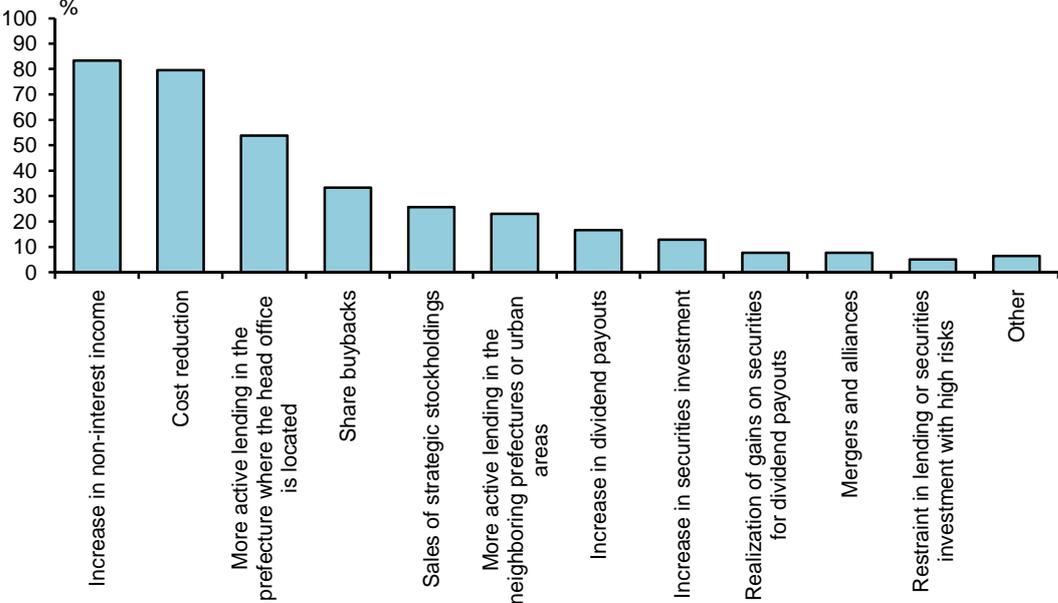
**Chart V-5-10: Comparison between earnings and the cost of equity**

Survey question: "How are your bank's sustainable earnings compared to the cost of equity?"



**Chart V-5-11: Counter-measures to meet shareholder requests**

Survey question: "What counter-measures has your bank taken to achieve the business target that your shareholders focus on?" (up to five options could be selected)



Note: Results of the survey on shareholder governance (see the note on Chart V-5-8).  
Source: BOJ.

In the same survey, among the approximately 60 regional banks responding that they used or

referred to the cost of equity in some way, nearly 80 percent indicated that their own sustainable earnings "underperform" (or "underperform strongly") their cost of equity (Chart V-5-10). Many respondents also cited "increase in non-interest income" and "cost reduction," both of which would lead to an increase in profitability, as their counter-measures to meet shareholder requests (Chart V-5-11). The survey suggests that regional banks are aware that their profitability falls below the level requested by shareholders and try to take measures to ensure various income sources and improve operating efficiency.

## F. Risks associated with digitalization

Finally, this section outlines operational and strategic risks that have become increasingly important in recent years as rapid advances in digital technology have allowed financial institutions to use such technology and non-financial corporates to increase their provision of financial services. Compared to the other types of risk discussed in the previous sections, operational risk has the following features: (1) the associated risk of losses to be incurred by a financial institution is difficult to estimate (that is, once confidence is lost at a financial institution, untold damage could occur), and in many cases, failures such as in the protection of customer information or in anti-money laundering control cannot necessarily be translated into economic losses; (2) the operational risk of a financial institution is likely to affect the risk of other financial institutions and the overall financial system due to network externalities.

### Cyber risk

Cyber risk faced by financial institutions has rapidly increased in importance, reflecting the rapid advances in digital technology in recent years. Cyber risk differs fundamentally from conventional risks in that it originates from cyberattacks launched by individuals or groups that aim to (1) steal assets or customer information from financial institutions, or (2) disrupt or destroy the functioning of the financial institutions and/or the financial system. While Japan has not so far seen a major cyber incident that brought the functioning of the financial system to a halt, cyberattacks are becoming more complex and sophisticated along with advances in digital technology. Moreover, cyber risk entails network externalities: the risk propagates through the network and the robustness of a financial institution to cybersecurity attacks affects the robustness of other financial institutions. For this reason, it has been argued that efforts made by individual financial institutions are likely to be insufficient to mitigate the risk to a socially desirable level, and thus industry-wide initiatives as well as regulation and supervision should play a significant role.<sup>39</sup>

Discussions on methods for identifying and assessing cyber risk and desirable management frameworks are currently being held primarily at the national government level.<sup>40</sup> At the same time, there exists widely shared agreement on the importance of international cooperation, given that cyberattacks easily cross national borders. Recently, there has been growing international awareness that, while making the best efforts to prevent cyberattackers from intruding into computer networks, it is crucial to strengthen operational resilience so that core functions of

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<sup>39</sup> See, for example, Anil K. Kashyap and Anne Wetherilt, "Some Principles for Regulating Cyber Risk," *American Economic Association Papers and Proceedings*, vol. 109 (May 2019): 482-87.

<sup>40</sup> In June 2019, the FSA updated the Policy Approaches to Strengthen Cyber Security in the Financial Sector formulated and announced in July 2015 in order to further enhance cybersecurity. Moreover, the Bank of Japan, in its *On-Site Examination Policy for Fiscal 2019*, states its policy to examine the status of establishing frameworks for cybersecurity management and anti-money laundering controls.

financial institutions and the financial system are maintained in the case of an intrusion by cyberattackers. Based on these considerations, the financial authorities of the G7 countries in June 2019 conducted the first joint cross-border cyber exercise assuming a global cyberattack on the financial sector in an attempt to strengthen cooperation among financial authorities as well as between financial authorities and relevant private sector parties.

The Financial Stability Board (FSB) and the Basel Committee are actively discussing ways to manage cyber risk and are expected to make various recommendations in the future. Financial institutions need to develop their risk management frameworks in line with their own strategies to exploit the potential gains offered by digital technology while taking into account international discussions and recommendations. In particular, since Japan will host the 2020 Tokyo Olympics and Paralympics, sufficient attention should be paid to the possibility of an increase in the risk of cyberattacks.

### *Anti-money laundering measures*

Since the early 2000s, measures against money laundering, including that for terrorist financing, have gained in international importance against the backdrop of the serious cross-border threat of terrorism and the proliferation of weapons of mass destruction. In this context, the Financial Action Task Force (FATF), an inter-governmental body, plays an important role in building an effective risk management system by, for example, establishing international standards and supporting members in conducting peer review of each member to assess levels of implementation.<sup>41</sup>

Against this background, the rapid advances in digital technology in recent years have triggered international debate particularly in the area of anti-money laundering measures for crypto-assets. At the G20 Finance Ministers and Central Bank Governors Meeting in March 2018, it was agreed to call on the FATF to enhance its efforts to counter money laundering involving crypto-assets. At the G7 Finance Ministers and Central Bank Governors Meeting in July 2019, it was agreed that "stablecoin"<sup>42</sup> would also need to meet the highest standards of financial regulation, especially with regard to anti-money laundering.

In Japan, the government and financial institutions share the risk assessment with regard to the type of transactions where the risk of money laundering is high, and promote initiatives in their respective areas, with (1) the government having responsibility for institutional design and sharing examples of advanced practices, and (2) financial institutions, etc., establishing transaction rules and practices, promoting industry-level information sharing and cooperation, and reaching out to their customers.

As transactions using digital technology become more sophisticated, financial institutions are expected to upgrade risk-based anti-money laundering measures on an organization-wide basis in order to sufficiently mitigate their risks by gathering and accumulating necessary information and utilizing tools such as customer risk ratings and AI technology. Such upgrades should be done under the leadership and active involvement of senior management.

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<sup>41</sup> At present, the fourth round of mutual evaluations using the recommendations formulated in 2012 are being implemented, and evaluations for Japan started in 2018.

<sup>42</sup> Stablecoins are crypto-assets that are anchored to reference assets (such as sovereign currencies) or a basket constructed from multiple assets.

## Strategic risk

Strategic risk refers to the risk to financial and business stability posed by, for example, failed business decisions, misconduct, or insufficient adaptation to changes in the business environment of the industry. Among factors that can be regarded as posing strategic risk to financial institutions, those linked to digitalization have gained importance in recent years.<sup>43</sup> The rapid advances in digital technology are expanding the frontiers of services that financial institutions can provide and offer new opportunities for fundamentally increasing their operating efficiency. On the other hand, advanced digital technologies have enabled the provision of financial services that are less expensive and more convenient than before, and major technology firms (so-called "big tech" firms), which excel in gathering, analyzing, and utilizing massive quantities of customer data, have become increasingly likely to enter the financial services industry. This raises the possibility that the profit opportunities of existing financial institutions could be eroded in the medium to long term. It is possible that conventional branch networks and costs for maintaining large-scale host computer systems might come to constitute a competitive burden in due course. In that sense, financial institutions face a significant challenge regarding how to take advantage of digital technology.

The previous issue of the *Report* presented an analysis of the use of digital technology in the field of retail payments in Japan and the impact on the banking industry.<sup>44</sup> The analysis highlighted that when fintech and big tech firms enter the financial services industry, they do so either alone or in partnership with existing financial institutions. Similar developments can currently be observed around the world, and it has been pointed out that the latter strategy is selected in many cases, especially in developed countries that already have a substantial network of existing financial institutions and credit card companies. While, at present, the field of financial services contributes only around 10 percent of big tech firms' profits, these firms have the potential to provide a full range of financial services exploiting economies of scale and scope by taking advantage of their gigantic customer bases and sophisticated capabilities in collecting and analyzing data.

Financial institutions are facing significant strategic risk as well as opportunities in terms of (1) how to make use of digital technology to increase the added value and efficiency of their customer services, (2) for such efforts, what to do by themselves and what to do in partnership with fintech and big tech firms or in making use of outside platforms, and (3) how to identify and enhance intrinsic advantages that are not replaceable by digital technology. In implementing digital strategies, it is important for financial institutions to secure the management resources, in terms of budget and human resources, necessary for research and acquisition of technology and IT investments. Financial institutions need to clarify and forcefully implement policies to address strategic risk and realize opportunities.

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<sup>43</sup> In addition to digitalization, there has been growing interest in recent years in identifying climate-related risk as part of strategic risk and managing this kind of risk accordingly. In this regard, in June 2017, the Task Force on Climate-related Financial Disclosures (TCFD) of the FSB released recommendations in order to provide a foundation for improving the ability of investors and others to appropriately assess and price climate-related risk and opportunity.

<sup>44</sup> See Box 7 of the April 2019 issue of the *Report*.

## VI. Macro stress testing

Using macro stress testing, this chapter examines how realization of a tail risk, such as a severe economic downturn, would affect the financial intermediation function and stability of the financial system. Our baseline scenario for the near future is set based on the forecasts of several research institutions and average forecasts by markets, and our medium- to long-term baseline scenario is set based on simplified macroeconomic assumptions. Next, our tail event scenarios are set so that stress similar to that during the global financial crisis arises. Then, simulation results for the baseline and the tail event scenarios are compared.<sup>45</sup> Note that all the scenarios are purely hypothetical and adopted for the purpose of effectively examining the stress resilience of financial institutions and in no way represent the Bank of Japan's outlook for the future economic and financial environment or asset prices, nor do they represent the likelihood of the outcomes.

As presented in the previous issue of the *Report*, two types of tests with different time horizons are presented: (1) a regular stress test that assumes the immediate realization of risk; and (2) a medium- to long-term stress test that assumes that a stress event occurs in 5 years' time. The second stress test was conducted for the first time in the previous *Report* in order to examine the implication of a possible prolonged decline in Japan's financial institutions' profitability for the future stability of the financial system. Under certain assumptions, this *Report* also incorporates effects that were not taken into account in the previous simulation in the medium- to long-term baseline scenario. Specifically, it examines how efforts by regional financial institutions to improve operating efficiency, such as overhead cost savings and increases in net non-interest income, will affect the future profits and financial soundness of regional financial institutions, which face significant challenges to profitability. This exercise aims to show, with a certain degree of practicality, the possibility that changes in financial institutions' activities improve their future profitability and stress resilience, which the previous *Report* mentioned.

### A. Regular macro stress testing

This section conducts stress testing assuming an immediate realization of a stress event.<sup>46</sup> The baseline scenario assumes that "with overseas economies continuing to grow moderately on the whole, Japan's economy will continue on an expanding trend." It also assumes that government bond yields evolve in line with the forward rates implied by the yield curve as of late July 2019, and that stock prices (TOPIX) and foreign exchange rates remain unchanged from the levels registered in July 2019. In contrast, the tail event scenario envisages a situation in which financial markets experience a decline in stock prices (TOPIX), an appreciation of the yen against the U.S. dollar, and a decline in domestic and foreign interest rates, all occurring to the same extent as during the global financial crisis.<sup>47</sup> At the same time, a significant economic slowdown abroad,

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<sup>45</sup> 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 Tomiyuki Kitamura, Satoko Kojima, Koji Nakamura, Kojiro Takahashi, and Ikuo Takei, "Macro Stress Testing at the Bank of Japan," *BOJ Reports & Research Papers*, October 2014. However, the detailed specifications of the model have been revised since the publication of that paper, in order to reflect, among other things, recent changes in financial institutions' behavior and profit structure.

<sup>46</sup> The stress testing targets 113 banks and 249 *shinkin* banks (accounting for approximately 80 to 90 percent of total loans outstanding). The duration of the stress event is assumed to be 3 years from April-June 2020 through January-March 2023. The major economic variables for the baseline scenario and the tail event scenario can be downloaded from the Bank's website at <http://www.boj.or.jp/en/research/brp/fsr/fsr191024.htm/>.

<sup>47</sup> However, since the lower limit for government bond yields is set to the historically lowest level, the decline in yields both at home and abroad is smaller than in the period during the global financial crisis.

again similar to that seen during the global financial crisis, is assumed to occur. As a result, Japan's output gap also deteriorates to a level comparable to that seen at that time.

### *Results of stress testing*

The simulation results under the baseline scenario show that net income follows a moderate downward trend, mainly due to the continued narrowing of lending margins caused by a loose supply and demand balance in the loan market (Chart VI-1-5). Capital adequacy ratios remain well above the regulatory requirements for all types of banks (Chart VI-1-6).

In the case of the tail event scenario, the simulation results are as follows. Net interest income declines, mainly reflecting sluggish loan demand as a result of the deterioration in domestic and overseas economies (Charts VI-1-1 and VI-1-2). In particular, internationally active banks suffer a larger fall in net interest income for the following two reasons. First, they experience a large decline in the outstanding amount of loans, partly reflecting a fall in the yen-denominated value of overseas loans due to yen appreciation. Second, they experience a large decline in lending margins caused by a substantial rise in foreign currency funding costs under destabilized global financial markets. Credit cost ratios are projected to rise to the level above their break-even points, due to a deterioration in firms' interest coverage ratio (ICR) (Chart VI-1-3). The credit cost ratio of domestic regional banks in the tail event scenario rises to approximately 1.5 percent, which is below the peak during Japan's financial crisis in the late 1990s but high by historical standards.<sup>48</sup> Moreover, securities-related realized losses are substantial due to the impairment losses of stocks, mainly reflecting the large decline in stock prices (of more than 50 percent compared to the baseline) (Chart VI-1-4). As a result, net income decreases sharply (Chart VI-1-5) and remains in deficit for 3 consecutive years for all types of banks. Capital adequacy ratios decrease correspondingly but exceed regulatory requirements on average for all types of banks (Charts VI-1-6 and VI-1-7).<sup>49</sup> The decline in capital adequacy ratios is projected to be largest for internationally active banks, for which unrealized losses on securities are reflected in their capital adequacy ratios. For domestic banks, the decline in the capital adequacy ratios is projected to be larger for regional banks than for *shinkin* banks, mainly reflecting a difference in the size of credit costs.

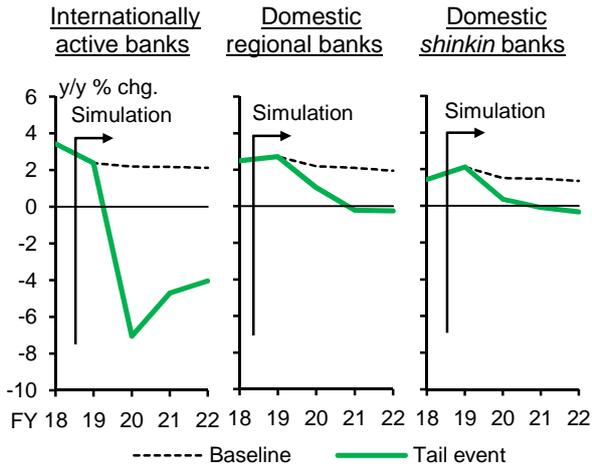
The above results show that Japan's financial institutions are resilient on the whole, even under the assumption of a realization of an immediate tail event comparable to the global financial crisis. However, there is substantial variation in financial institutions' capital adequacy ratios in the event of stress (Chart VI-1-6). In particular, the decline in capital adequacy ratios in times of stress would be larger for financial institutions that have substantially more lending to low-return borrowers and holdings of stock investment trusts, as well as those who have already locked in larger gains on securities holdings.

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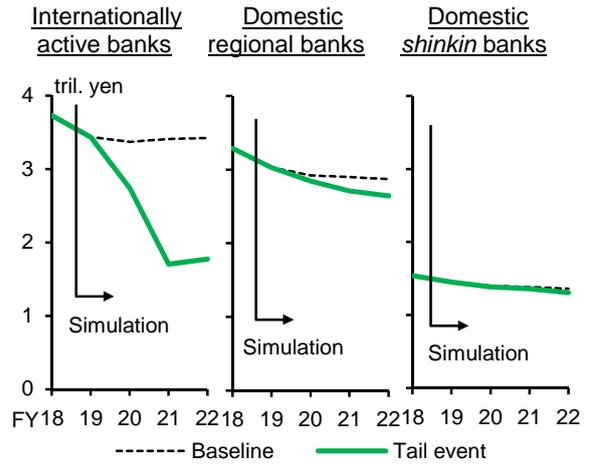
<sup>48</sup> The credit cost ratio of domestic regional banks is projected to become significantly higher than that of *shinkin* banks. This is because regional banks' share of loans to low-return borrowers is higher than that of *shinkin* banks. It is also due to the fact that credit costs for regional banks during the global financial crisis were more sensitive to business conditions than those of *shinkin* banks, which is reflected in different parameter values in the credit cost models.

<sup>49</sup> Here, regulatory requirements for internationally active banks in terms of CET1 capital ratio are the minimum required level (4.5 percent) plus the surcharge on global systemically important banks (G-SIBs, 1 to 2.5 percent) or domestic systemically important banks (D-SIBs, 0.5 percent), the capital conservation buffer (2.5 percent), and the countercyclical capital buffer (currently 0 percent in Japan). For domestic banks, the regulatory requirement in terms of the core capital ratio is 4 percent.

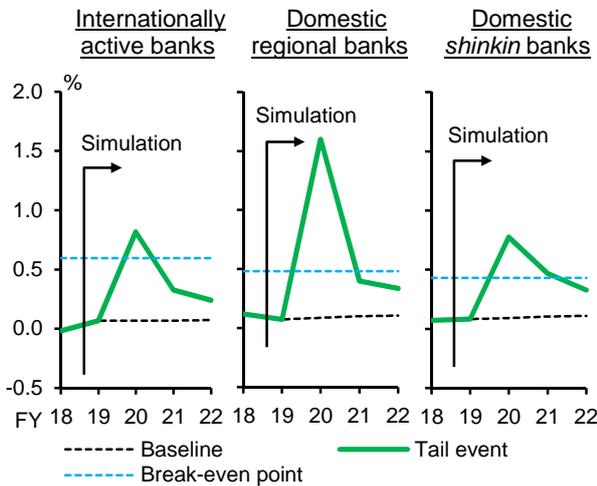
**Chart VI-1-1: Loans outstanding**



**Chart VI-1-2: Net interest income**

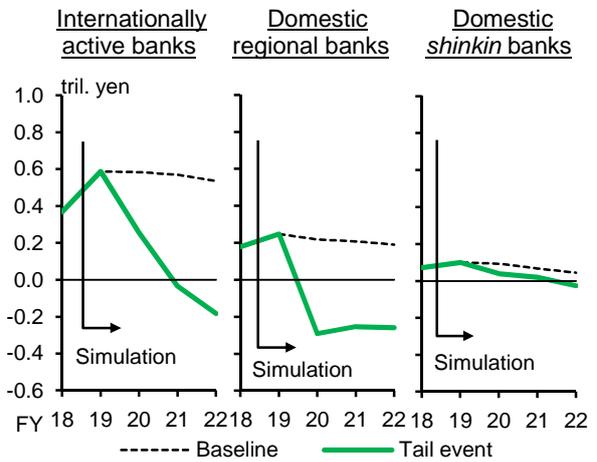


**Chart VI-1-3: Credit cost ratios**

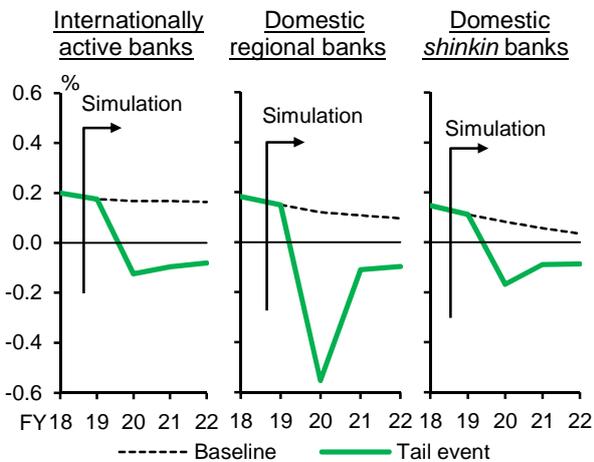


Note: "Break-even point" is as at fiscal 2018.

**Chart VI-1-4: Realized gains/losses on securities holdings**

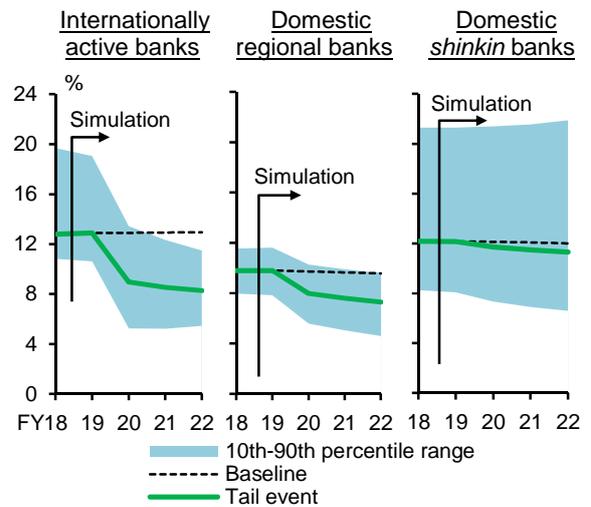


**Chart VI-1-5: Net income**



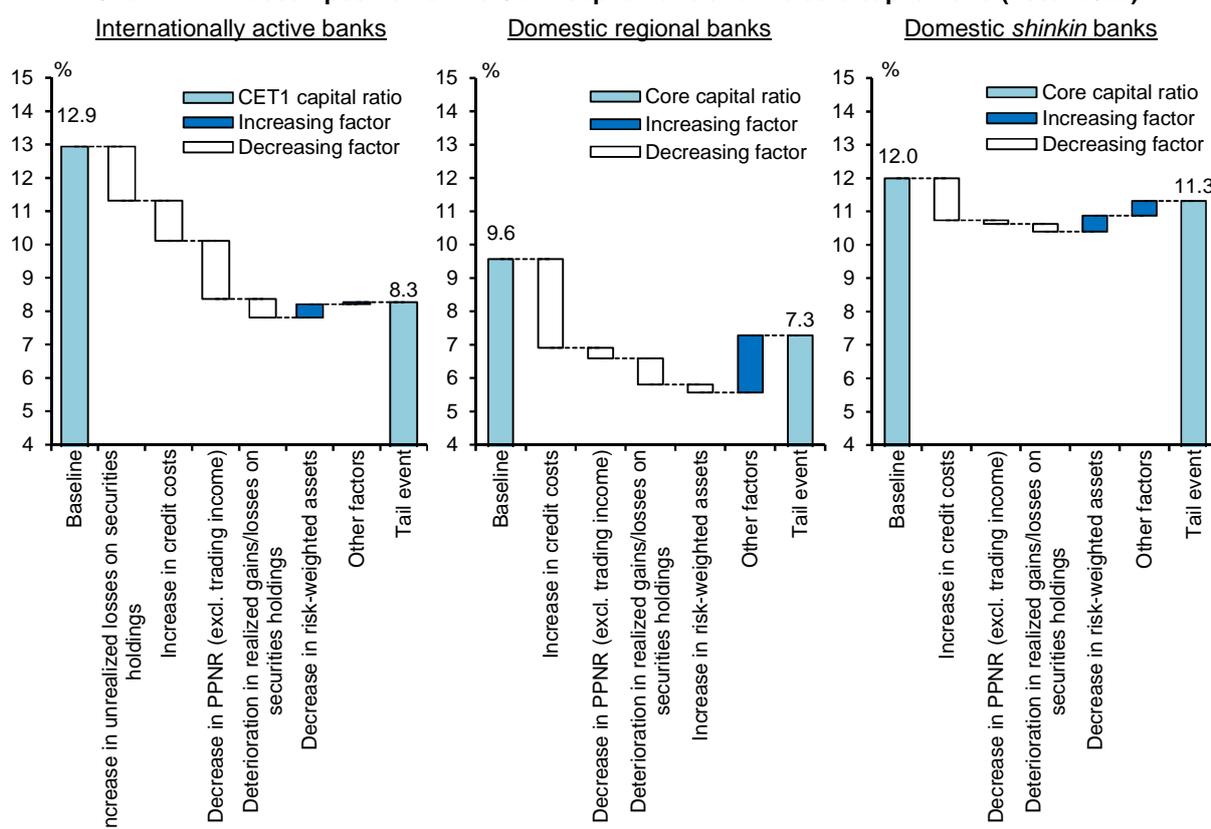
Note: The charts indicate the ratio of net income to total assets.

**Chart VI-1-6: CET1 capital ratios and core capital ratios**



Note: The left-hand chart shows the CET1 capital ratios of internationally active banks. The middle and right-hand charts show the core capital ratios of domestic banks. The transitional arrangements are taken into consideration.

**Chart VI-1-7: Decomposition of the CET1 capital ratio and the core capital ratio (fiscal 2022)**



- Note: 1. The charts indicate the contribution of each factor to the difference between the capital adequacy ratios at the end of the simulation period (as at end-March 2023) under the baseline and tail event scenarios. "Increase in unrealized losses on securities holdings" takes tax effects into account.
2. The left-hand chart shows the CET1 capital ratio of internationally active banks. The other charts show the core capital ratio. The transitional arrangements are taken into consideration.
3. "Other factors" includes taxes, dividends, and CET1 regulatory adjustments.

## B. Medium- to long-term simulation and stress testing incorporating improvements in operating efficiency

In this section, the baseline simulation period is extended to 10 years (until fiscal 2029) and stress testing is conducted assuming the scenario that a tail event is realized in 5 years' time, in order to examine financial institutions' stress resilience from a medium- to long-term perspective. In addition, the simulation in this *Report* assumes that financial institutions, to a certain extent, save on their overhead costs and improve their income other than net interest income over the next 10 years, such as by increasing their net non-interest income, and examines the difference in stress resilience relative to the case in which no such improvements take place.<sup>50</sup>

Even in the case of a tail event of the same magnitude, results for the case when the tail event is realized in 5 years' time are more severe than those for the immediate tail event shown in Section A, as in the previous issue of the *Report*. Reasons include that, in the scenario with the tail event occurring in 5 years' time, (1) the decline in core profitability over the 5-year period pushes down capital adequacy ratios somewhat further, and (2) financial institutions incur larger losses in the stress event because they have accumulated more loans to low-return borrowers. On this basis, the point of this section is to assess the extent to which regional financial institutions' stress

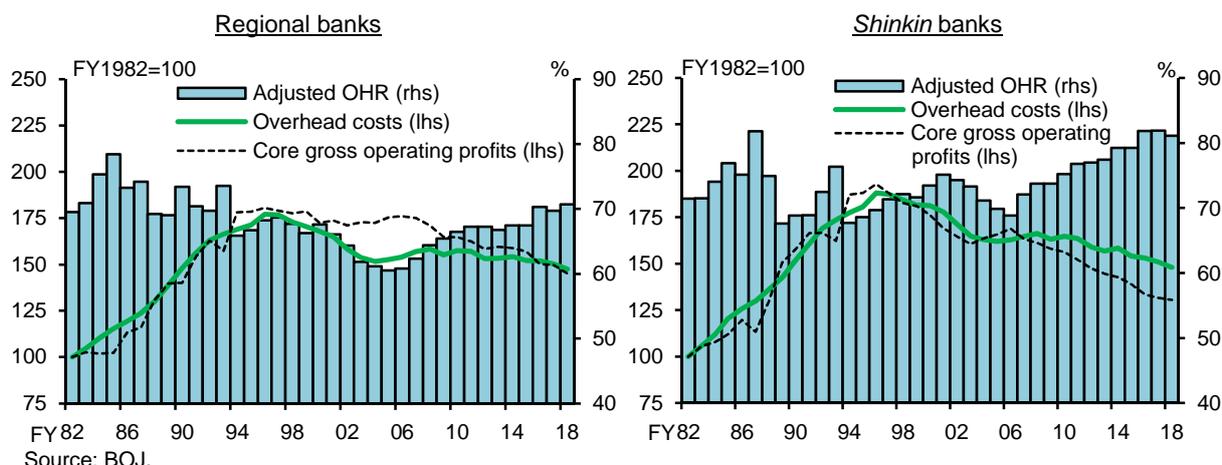
<sup>50</sup> See the last part of Chapter VI (on page 86) of the April 2019 issue of the *Report*.

resilience would increase if they managed to improve their operating efficiency.<sup>51</sup>

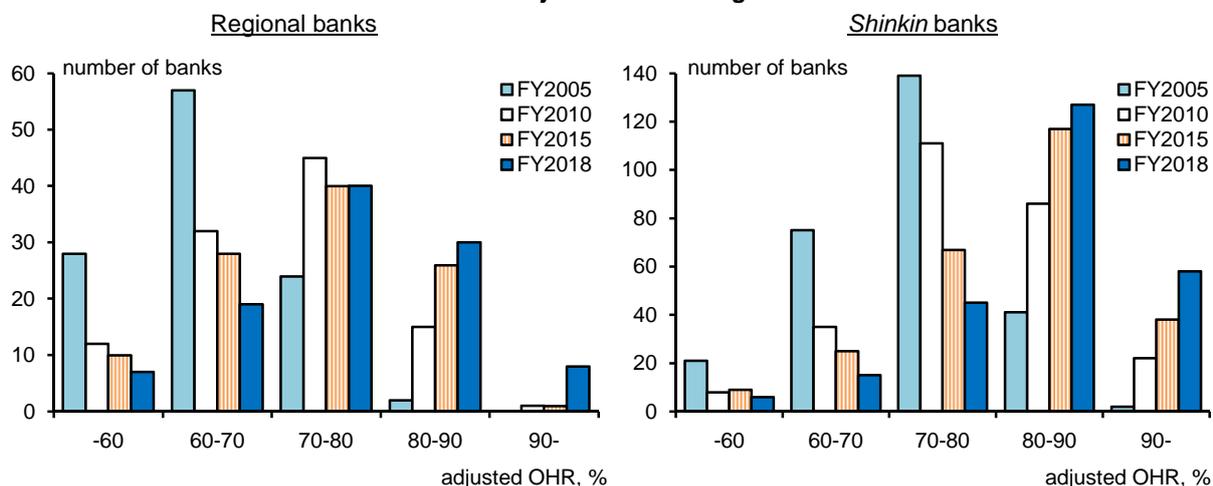
## 1. Adjusted overhead ratios (OHRs) for regional financial institutions

The simulation in this *Report* uses the adjusted overhead ratio (OHR) as an indicator for measuring financial institutions' operating efficiency. The adjusted OHR is the ratio of overhead costs to gross operating profits from core business (hereafter referred to as "core gross operating profits"). A lower value of the adjusted OHR means that a financial institution's operating efficiency is higher (i.e., more profits are generated for the same amount of overhead costs). The adjusted OHR can also be regarded as an indicator of a financial institution's break-even point (i.e., a value above 100 percent means that PPNR excluding trading income is negative). For more details on the adjusted OHR, see Box 4.

**Chart VI-2-1: Adjusted OHR of regional financial institutions**



**Chart VI-2-2: Distribution of adjusted OHR of regional financial institutions**

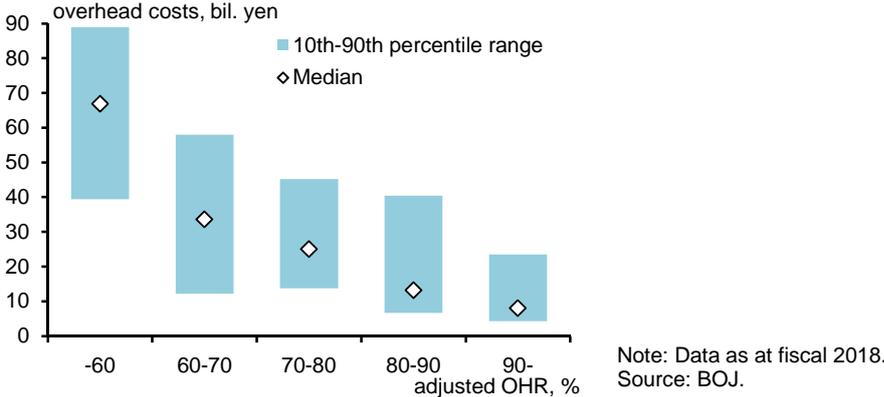


The adjusted OHRs of regional financial institutions have been on an upward trend since the mid-2000s (i.e., operating efficiency has been on a downward trend) (Chart VI-2-1). This is because the decline in core gross operating profits, i.e., the denominator of the adjusted OHR, has outpaced the decline in overhead costs, i.e., the numerator. Currently, the average adjusted OHR

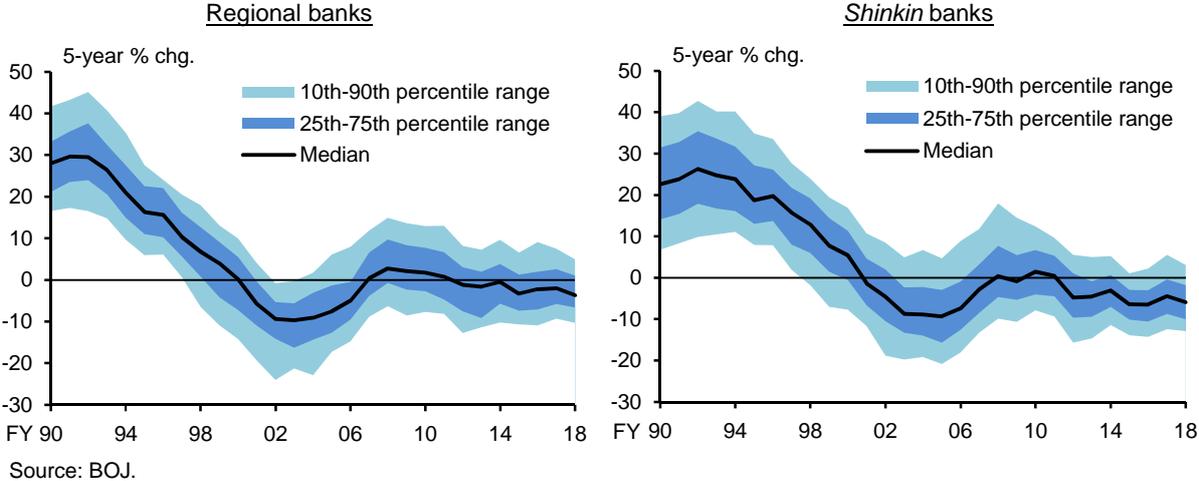
<sup>51</sup> Major banks in recent years have also been making efforts to raise operating efficiency. It should be noted, however, that the simulation here focuses on such efficiency at regional financial institutions, which are more affected by the secular decline in loan demand because domestic business is a main driver of their overall operations.

of regional banks is around 70 percent, while that for *shinkin* banks is around 80 percent. Despite financial institutions having been making various efforts to improve their operating efficiency, for example, by saving on overhead costs and by diversifying revenue sources by increasing net non-interest income, the positive impact of such improvements on their operating efficiency has not fully offset the negative impact of the decline in net interest income in recent years. Moreover, the dispersion of individual financial institutions' adjusted OHRs has somewhat increased in recent years (Chart VI-2-2). Additionally, a tendency for a larger financial institution to have a lower adjusted OHR has been observed, which suggests the presence of "economies of scale" (Chart VI-2-3).

**Chart VI-2-3: Regional banks' scale and adjusted OHR**



**Chart VI-2-4: Overhead costs of regional financial institutions**

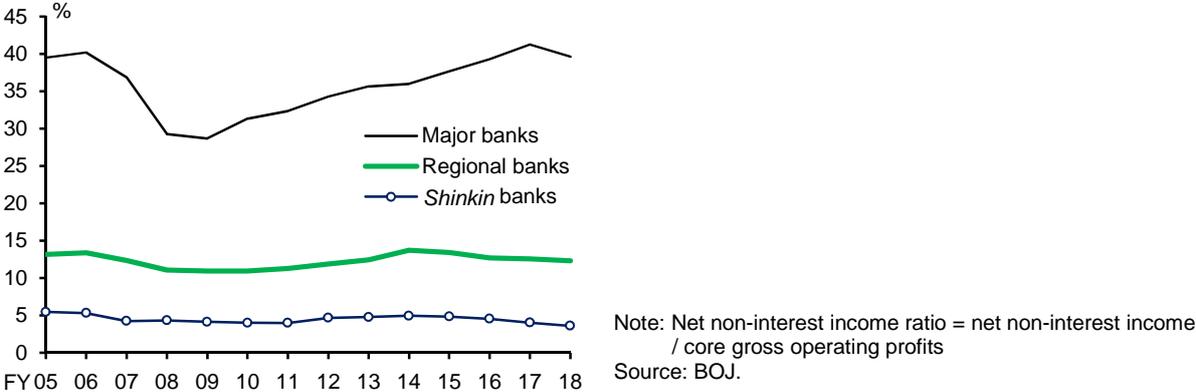


Meanwhile, about 80 percent of regional financial institutions have reduced their overhead costs over the last 5 years, with about half of them saving on overhead costs at an average annual rate of greater than 1 percent. Regional financial institutions in recent years have been accelerating their efforts to streamline operations while paying attention to making IT investments and securing the human resources necessary for strategic business evolution (Chart VI-2-4).<sup>52</sup> On the other

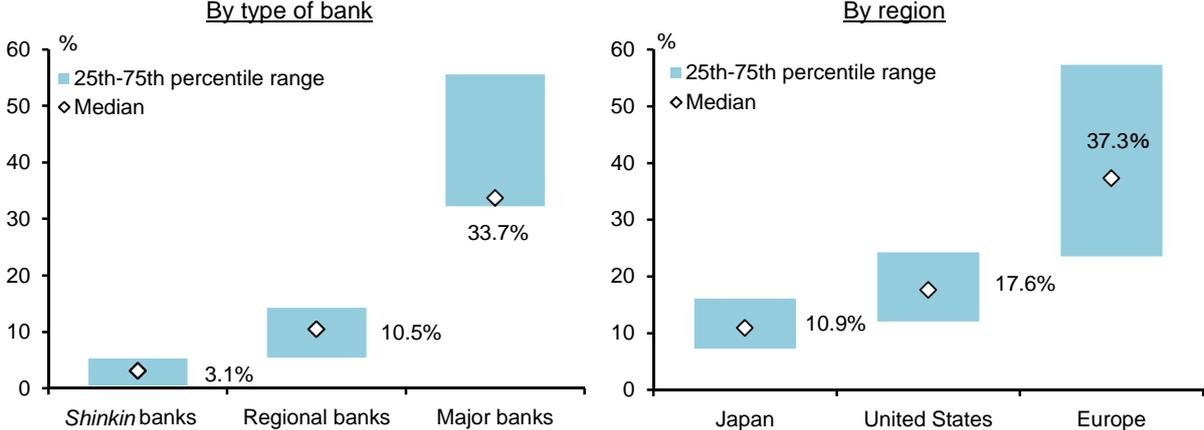
<sup>52</sup> The medium-term strategic plans of regional banks show that, whereas the number of banks targeting deposits and lending, which are representative volume indicators, is decreasing, the number of banks targeting indicators such as overhead costs, the OHR, non-interest income, and ROE is increasing, indicating that a growing number of bank executives are paying attention to operational and capital efficiency. For details, see Box 4 of the October 2018 issue of the *Report* and Kouko Hiwatashi, Yusuke Takahashi, and Saiki Tsuchiya, "Characteristics of the Medium-Term Strategic Plans of Regional Banks," *Bank of Japan Review Series*, no. 2018-J-9, December 2018 (available only in Japanese).

hand, net non-interest income ratios have remained largely unchanged for both regional banks and *shinkin* banks in recent years, whereas the ratio increased slightly for regional banks following the global financial crisis (Chart VI-2-5). Furthermore, the ratios of regional banks and *shinkin* banks have been below the levels of both major banks in Japan and their regional financial institution peers abroad (Chart VI-2-6).

**Chart VI-2-5: Developments in net non-interest income ratio**



**Chart VI-2-6: Comparison of net non-interest income ratio by type of bank and by region**



Note: 1. In the left-hand chart, net non-interest income ratio is defined in the same way as in Chart VI-2-5. Data as at fiscal 2018.  
2. In the right-hand chart, net non-interest income ratio is calculated as (gross operating profits - net interest income) / gross operating profits. Gross operating profits here include realized gains/losses on securities holdings. For Japan, data cover regional financial institutions. For the United States and Europe, financial institutions whose gross operating profits are larger than the maximum of Japan's regional financial institutions are excluded. Data are averages over fiscal 2015-2017.

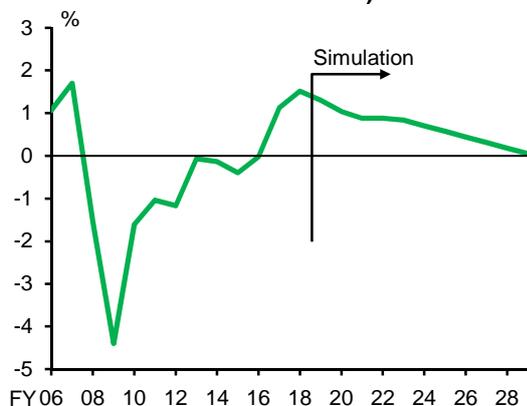
Source: OECD; S&P Global Market Intelligence; BOJ.

**2. Baseline scenario**

The baseline scenario of the medium- to long-term simulation is as follows. The first 3 years of this scenario are identical to the baseline scenario in Section A. For the subsequent 7 years, the scenario is based on the assumption that "Japanese financial institutions' domestic deposit-taking and lending activities will continue to be under structural downward pressure on profitability, with domestic and overseas economies gradually returning to their long-run equilibrium states." Specifically, as in the previous issue of the *Report*, it is assumed that the output gap gradually converges to zero, i.e., its long-run equilibrium level, and that short-term and long-term government bond yields evolve in line with the forward rates implied by the yield curve as of late July 2019 (Charts VI-2-7 and VI-2-8). In addition, the ways to set the paths for the potential growth

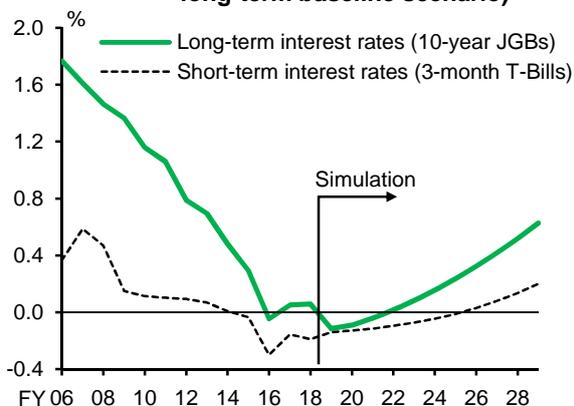
rate, the population, stock prices, and foreign exchange rates are identical to those in the previous *Report*.

**Chart VI-2-7: Output gap (medium- to long-term baseline scenario)**



Source: BOJ.

**Chart VI-2-8: Nominal interest rates (medium- to long-term baseline scenario)**



Source: Bloomberg; Ministry of Finance.

### Assumptions about operating efficiency

As noted above, the baseline scenario of the medium- to long-term simulation in this *Report* incorporates (1) overhead cost savings and (2) increases in non-interest income such as fees and commissions, both of which are the focus of regional financial institutions in recent years (hereafter referred to as the "increasing efficiency case" and then compared to the "constant efficiency case," which assumes that there are no such efforts to improve efficiency). In terms of the size of improvement, it is assumed that the adjusted OHR improves by around 5 percentage points. (This size of improvement is calculated under the level of net interest income fixed at the current level. If this amount of improvement were achieved immediately, the adjusted OHR would be around 65 percent and around 75 percent for regional banks and *shinkin* banks, respectively.)

This assumption is consistent with the following: (1) from a time series perspective, financial institutions' efficiency returns to the average level seen over the past 10 to 20 years,<sup>53</sup> and (2) from the perspective of individual financial institutions, they improve their operating efficiency to the level achieved by the top 10 percent of financial institutions having similar characteristics such as size and belonging to the same bank type.<sup>54</sup> The efficiency improvement is assumed to be achieved either by overhead cost savings at the observed average pace throughout the simulation period or by a considerable increase in net non-interest income.

For regional banks, for example, the assumed level of adjusted OHRs can be achieved by a combination of increasing their net non-interest income by about 10 percent in total over the next 10 years and saving by about 1 percent per year on their overhead costs, which is the observed average pace in recent years. If the assumption is modified to halve the pace of the overhead cost savings rate, then their net non-interest income needs to be readjusted to increase by nearly 30

<sup>53</sup> The simple average of the adjusted OHR over the past 20 years (10 years) is 65.7 percent (67.9 percent) for regional banks and 75.3 percent (78.4 percent) for *shinkin* banks.

<sup>54</sup> Specifically, the operating efficiency of each regional financial institution is estimated by bank type using a quantitative method called "stochastic frontier analysis" (see Box 4 for details) while controlling for factors such as size and business scope. Then, the hypothetical scenario assumes that the operating efficiency of each financial institution improves to the level achieved by the top 10 percent of institutions belonging to the same bank type (as a result of the improvement in operating efficiency, the average adjusted OHR improves to the level discussed above for each type of bank).

percent in total over the next 10 years to achieve the same assumed level of adjusted OHR (Chart VI-2-9). This assumed size of efficiency improvements, which is not infeasible, is considerably challenging compared to the average of what regional financial institutions have achieved so far (Chart VI-2-6). It should be noted that there is a considerable dispersion of adjusted OHRs among individual financial institutions, so that the difficulty of achieving the assumed level is not the same across these institutions (Chart VI-2-10).

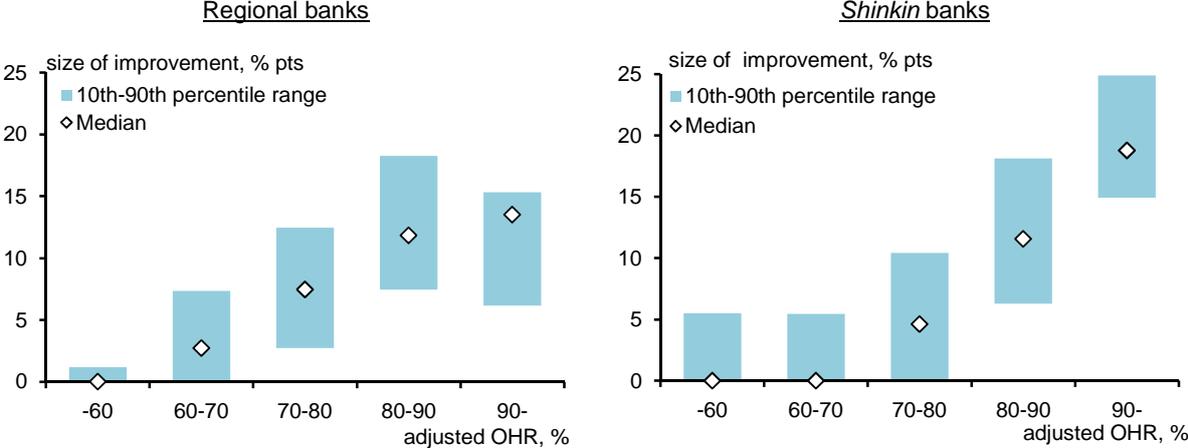
**Chart VI-2-9: Combination of overhead cost savings and increases in net non-interest income**

Top value: bil. yen; middle and bottom values: %

	Actual values of FY2018		Top value: assumed amount of increase in net non-interest income Middle value: assumed rate of increase in net non-interest income Bottom value: assumed net non-interest income ratio		
	Core gross operating profits	Net non-interest income	Three cases of overhead cost savings over the next 10 years		
			-5%	-10%	-15%
Regional banks	4,141.0	510.3 <12.3>	+151.8 [+29.7] <15.4>	+45.5 [+8.9] <13.3>	+7.0 [+1.4] <12.5>
Shinkin banks	1,594.7	57.2 <3.6>	+89.7 [+156.7] <8.7>	+34.2 [+59.7] <5.6>	+10.2 [+17.8] <4.2>

Note: 1. Figures in angle brackets indicate net non-interest income ratio (= net non-interest income / core gross operating profits).  
 2. The increasing efficiency case assumes that overhead costs will be saved by -10% over the next 10 years.  
 Source: BOJ.

**Chart VI-2-10: Assumed improvement in operating efficiency**



Note: Figures in the chart indicate the assumed size of reductions in adjusted OHR in the increasing efficiency case.  
 Source: BOJ.

Before discussing the simulation results in full, the projections for the ex-post adjusted OHRs show that they return to the current level at the end of the simulation period. This is because the effects of the decline in net interest income (an increasing factor for the adjusted OHR) due to the narrowing of lending margins over the next 10 years will be mostly offset by the effects of improvement in operating efficiency (a decreasing factor for the adjusted OHR) assumed here.<sup>55</sup> As a result, the current uptrend in the adjusted OHR is projected to halt (Chart VI-2-18).

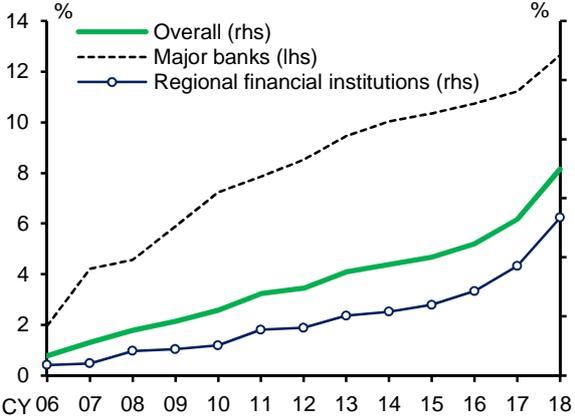
*Assumptions about loan demand*

The simulation in the previous issue of the Report incorporated a mechanism in which the secular

<sup>55</sup> In the simulation results, factors to push down the adjusted OHR include the indirect effects of the downward trend in loan demand becoming moderate, which will be discussed later.

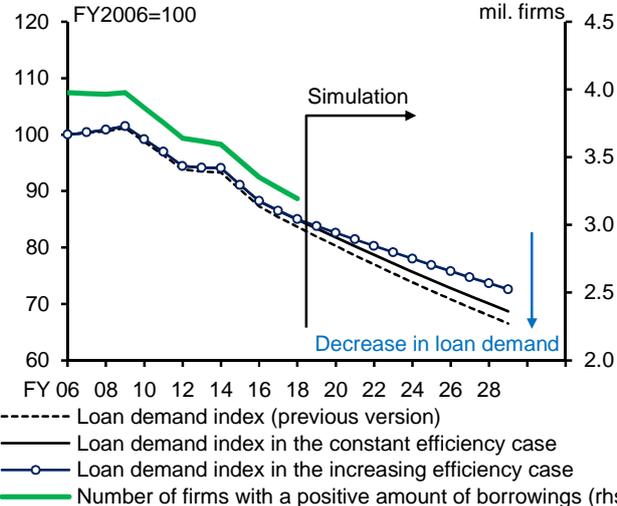
decline in loan demand leads to a fall in lending margins through a loosening of the supply-demand balance in the loan market. In the simulation, the "loan demand index," calculated as the number of borrowing firms per bank branch, was used as a proxy variable to capture the trend in loan demand at the macro level. However, financial institutions have recently been working to review their branch strategies in order to improve their business efficiency by, for example, using so-called "branch-in-branch" consolidation and joint branches, as well as establishing "lightweight" branches that specialize in retail operations. The simulation in this *Report* attempts to refine the loan demand index from two perspectives, taking into account the direct and indirect effects of changes in branch operations on the supply-demand conditions in the loan market. First, the loan demand index was revised to reflect the *de facto* decline in the number of branches due to the increased use of "branch-in-branch" consolidation (Chart VI-2-11).<sup>56</sup>

**Chart VI-2-11: Share of "branch-in-branch" among all branches**



Note: The number of "branch-in-branch" is estimated by identifying branches located at the same address based on *Nihon Kinyu Meikan* (Japan's financial directory) released by the Japan Financial News Co., Ltd.  
Source: The Japan Financial News Co., Ltd.

**Chart VI-2-12: Loan demand index (medium- to long-term baseline scenario)**



Note: 1. "Loan demand index" is calculated by dividing the number of borrowing firms by the number of bank branches (constructed for each prefecture).  
2. "Loan demand index in the constant efficiency case" takes into consideration the effect of the *de facto* decreases in the number of branches by using "branch-in-branch" consolidation. "Loan demand index in the increasing efficiency case" additionally supposes that overhead cost saving efforts induce streamlining of branches, etc.  
Source: Ministry of Internal Affairs and Communications; Teikoku Databank; The Japan Financial News Co., Ltd.

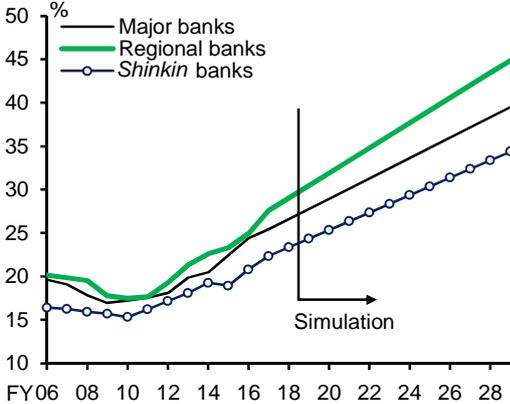
Second, the effects of streamlining of branch operations as part of overhead cost savings are reflected in the loan demand index.<sup>57</sup> Both of the two refinements will increase the number of

<sup>56</sup> Specifically, when calculating the loan demand index, the number of branches was counted by simply regarding a "branch in a branch" as half of a normal branch (i.e., by simply assigning a value of 0.5), taking into account the impact of such consolidation on the competitive environment surrounding financial institutions. As a result, the downtrend in the loan demand index in recent years (and hence the future downtrend assumed in the simulation) becomes somewhat less pronounced.

<sup>57</sup> Specifically, given that the estimated elasticity of the number of branches to changes in overhead costs for each bank type is about 0.5, it is assumed that, in the increasing efficiency case, a 1 percent decline in overhead costs

borrowing firms per branch, thus moderating the downward trend in the loan demand index somewhat (i.e., downward pressure on lending margins will be alleviated) (Chart VI-2-12). Meanwhile, as in the previous *Report*, it is assumed that, in tandem with the continued decline in the loan demand index, the share of loans to low-return borrowers, for which the loan interest rate is not commensurate with the credit risk involved, continues to rise (Chart VI-2-13).

**Chart VI-2-13: Share of loans to low-return borrowers (medium- to long-term baseline scenario)**



Note: The chart indicates the share of loans to low-return borrowers among the total amount of loans to small firms.  
Source: Teikoku Databank.

**3. Medium- to long-term profit simulation and tail event scenario in 5 years' time**

*Medium- to long-term profit simulation assuming improvements in financial institutions' operating efficiency*

The results for the medium- to long-term simulation of financial institutions' profits under the above assumptions are as follows. In the baseline scenario, the growth in loans outstanding of domestic banks gradually slows, reflecting the decline in Japan's population and the shrinking of the positive output gap (Chart VI-2-14). Loans outstanding of internationally active banks maintain a largely constant growth rate, with the decline in domestic lending -- as observed in domestic banks -- being offset by the growth in overseas lending. Yields on securities will decline even from a somewhat longer-term perspective, since long-term interest rates remain low, reflecting the fact that yield curves both at home and abroad are currently flattening. Even with market interest rates turning upward, lending rates remain more or less unchanged except for at the very end of the simulation period, due to the continuing structural downward pressure reflecting the decline in loan demand (Chart VI-2-15). As a result, net income of domestic banks follows a downward trend throughout the simulation period. It should be noted, however, that average net income ROA of domestic banks significantly shifts upward compared to the constant efficiency case, which does not assume any improvements in operating efficiency, as does the entire cross-sectional distribution of net income ROA (Chart VI-2-16). On the other hand, net income ROA of internationally active banks remains largely unchanged due to the positive contribution from the growth in overseas lending.

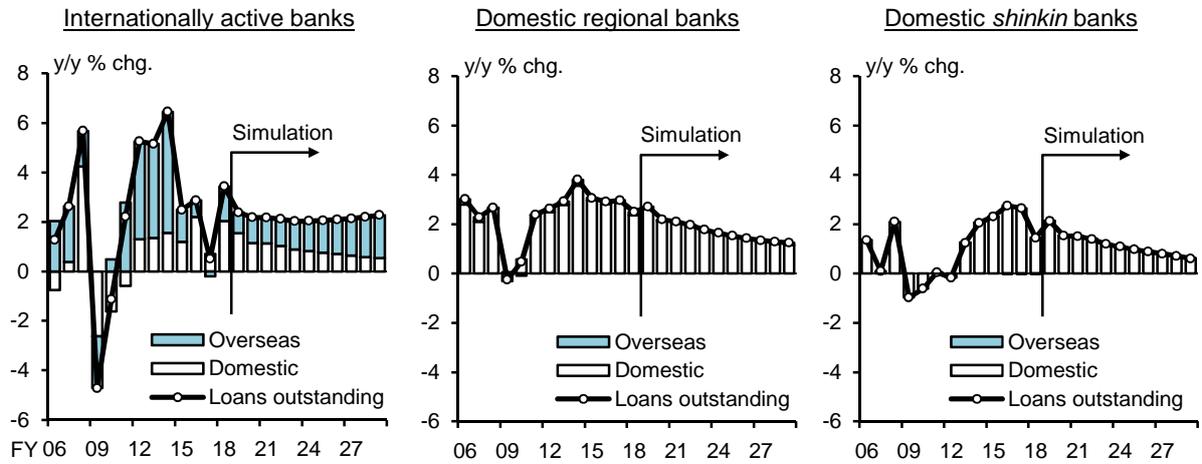
While the improvement in domestic banks' operating efficiency cannot fully compensate for the downward pressure on profits in domestic deposit-taking and lending activities and in securities investment and the upward pressure on credit costs, it does make a substantial positive contribution to profits (Chart VI-2-17). Moreover, both the average and the distribution of the adjusted OHR during the simulation period shift significantly downward compared to the constant

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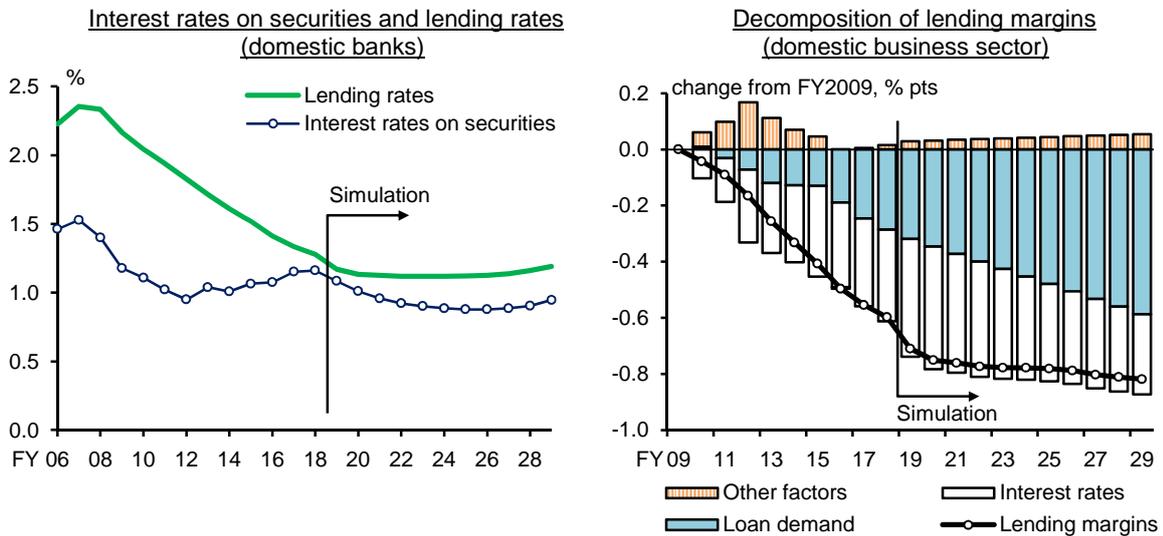
pushes up the loan demand index by 0.5 percent. These observations on regional financial institutions' branch operations in recent years and their reflection in the simulation assumptions are partly based on information gathered in the Bank's on-site examinations and off-site monitoring activities.

efficiency case (Chart VI-2-18).

**Chart VI-2-14: Loans outstanding in the increasing efficiency case (medium- to long-term baseline scenario)**

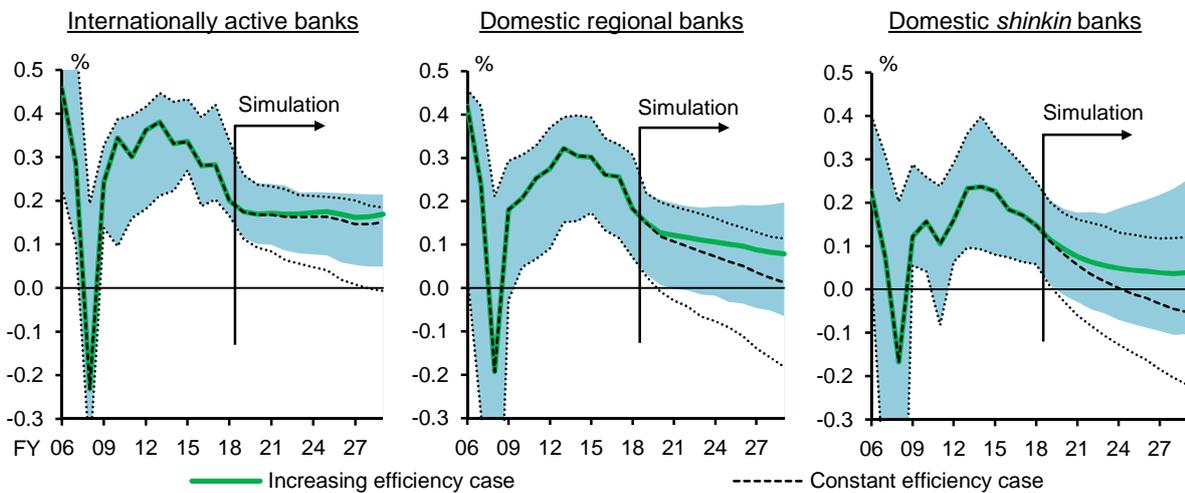


**Chart VI-2-15: Interest rates on securities and lending rates in the increasing efficiency case (medium- to long-term baseline scenario)**



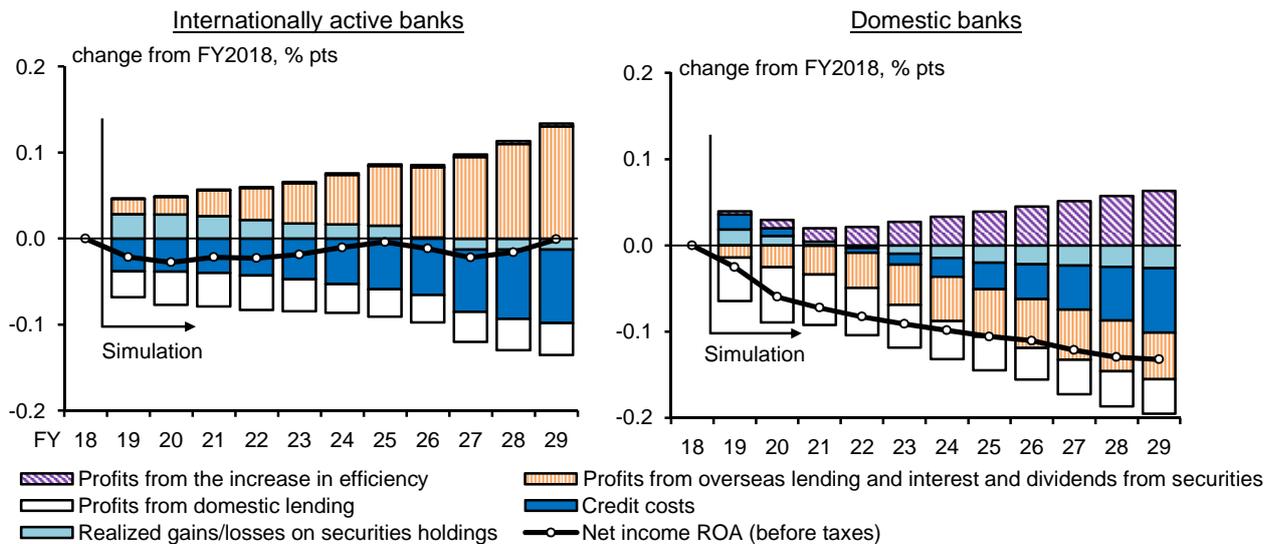
Note: "Other factors" in the right-hand chart includes a nonperforming loan factor and estimation errors.

**Chart VI-2-16: Net income ROA (medium- to long-term baseline scenario)**



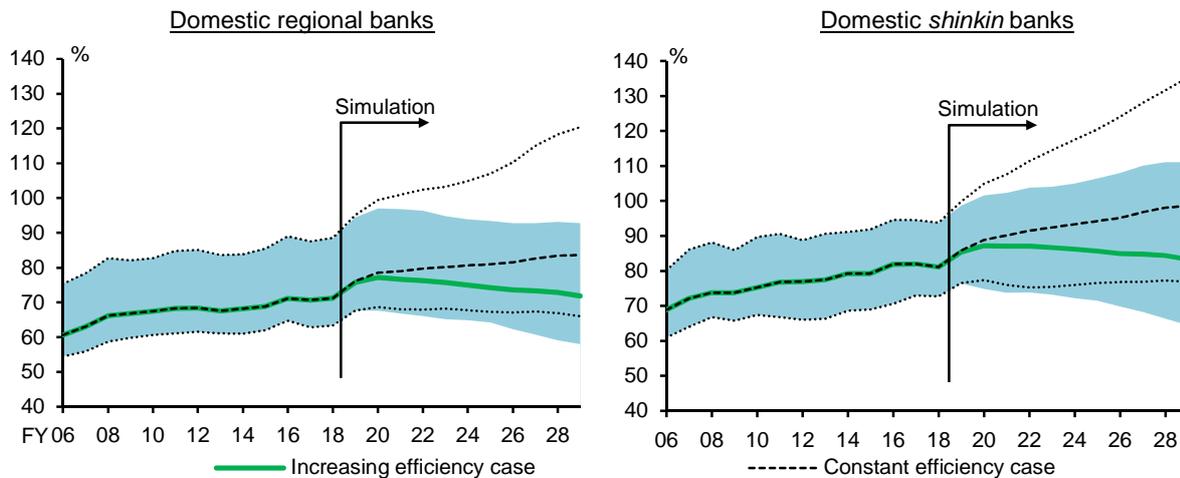
Note: The shaded areas indicate the 10th-90th percentile range in the increasing efficiency case, and the thin dotted lines indicate the 10th-90th percentile range in the constant efficiency case.

**Chart VI-2-17: Decomposition of net income ROA in the increasing efficiency case (medium- to long-term baseline scenario)**



Note: "Profits from the increase in efficiency" is the sum of the overhead cost savings and the increase in the net non-interest income assumed in the increasing efficiency case.  
 "Profits from domestic lending" indicates the net interest income from domestic lending (domestic loans outstanding  $\times$  lending margins in the domestic business sector).  
 "Profits from overseas lending and interest and dividends from securities" is defined as the PPNR (excluding trading income) minus the net interest income from domestic lending and the profits from the increase in efficiency.

**Chart VI-2-18: Adjusted OHR (medium- to long-term baseline scenario)**



Note: The shaded areas indicate the 10th-90th percentile range in the increasing efficiency case, and the thin dotted lines indicate the 10th-90th percentile range in the constant efficiency case.

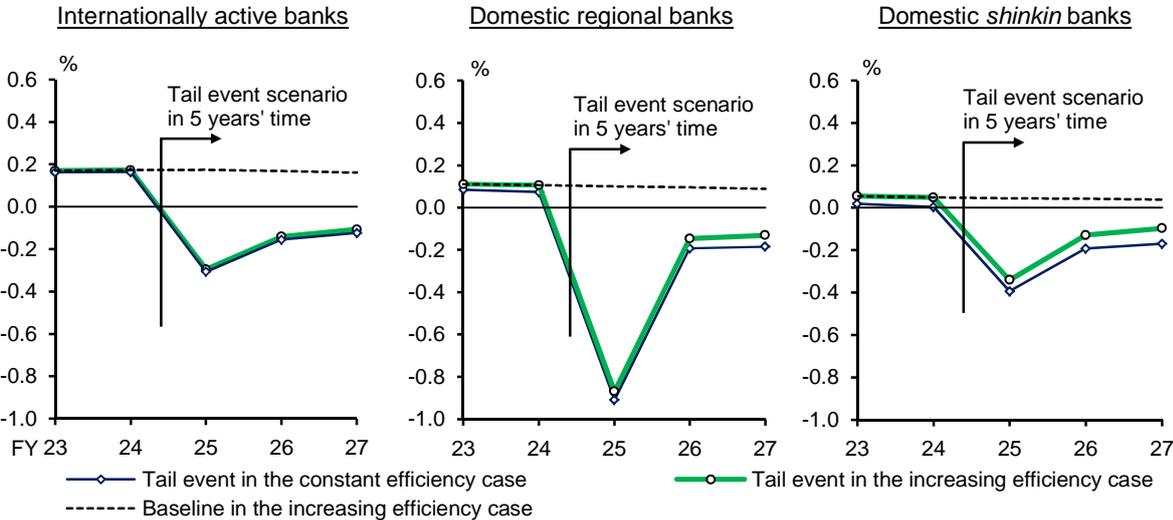
**Tail event scenario in 5 years' time**

Setting the above simulation results as a benchmark, stress testing is conducted assuming that a severe stress event similar to the global financial crisis will occur in 5 years' time ("tail event scenario in 5 years' time"). That is, the model is simulated for the 3 years from fiscal 2025 to fiscal 2027 assuming the realization of the stress event. The size of the assumed shock is essentially the same as that in the immediate tail event scenario described earlier.

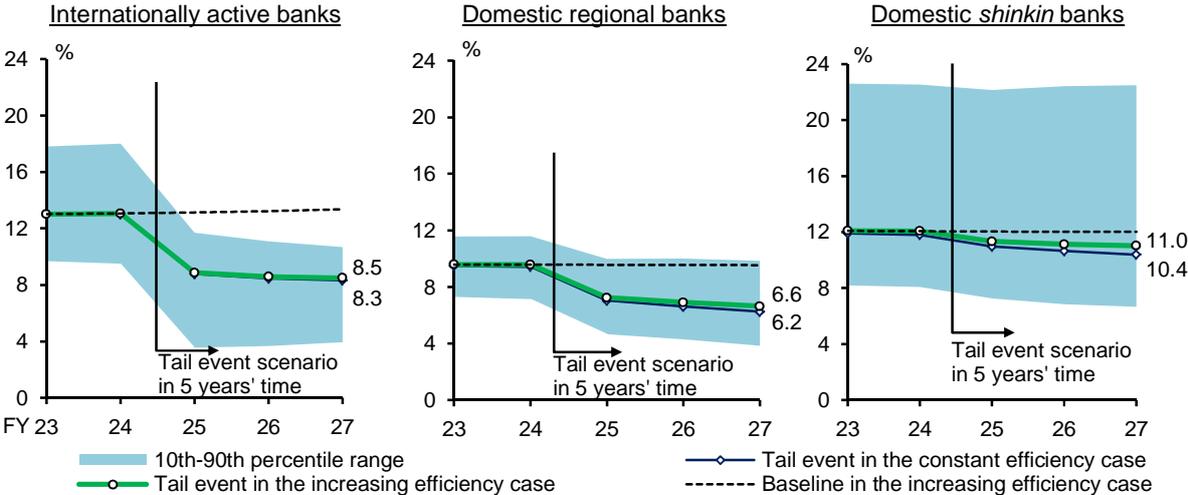
The results are as follows. Financial institutions incur substantial net losses due to the deterioration in credit costs and realized losses on stock holdings, as well as the decline in PPNR (excluding trading income) (Chart VI-2-19). Capital adequacy ratios of domestic regional banks

decline more markedly than in the scenario in which the tail event is assumed to be realized immediately (Chart VI-2-20). This result reflects the following developments assumed over the next 5 years: (1) the share of loans to low-return borrowers continues to increase due to the secular decline in loan demand, leading to more significant deterioration in credit costs in the event of stress; and (2) the realization of gains from the sales of securities and the decline in unrealized gains continue, leading to larger impairment losses in securities holdings at the time of the future stress. Although capital adequacy ratios overall remain above regulatory requirements, the distribution of the capital adequacy ratios of individual financial institutions shows a substantially fatter downside tail. The overall characteristics of these results are not very different from those in the previous *Report*. In the event of stress, the more financial institutions' capital adequacy ratios and profits decline, the more cautious their lending stance is likely to become. Thus, from a macroprudential perspective, it is necessary to continue to pay close attention to the possibility that downward pressure on the real economy may be amplified by the financial sector, depending on the degree of the decline in capital adequacy ratios and profits of individual financial

**Chart VI-2-19: Net income ROA (tail event scenario in 5 years' time)**



**Chart VI-2-20: CET1 capital ratios and core capital ratios (tail event scenario in 5 years' time)**



Note: 1. The left-hand chart shows the CET1 capital ratios of internationally active banks. The middle and right-hand charts show the core capital ratios of domestic banks. The transitional arrangements are taken into consideration.  
 2. "10th-90th percentile range" is for the tail event in the increasing efficiency case.

institutions.<sup>58</sup> However, the capital adequacy ratios of domestic banks after the stress event are higher in the increasing efficiency case than those in the constant efficiency case by around 0.5 percentage points.

### *Importance of improving operating efficiency*

This chapter estimates the effects of improvements in operating efficiency on financial institutions' future profitability and capital adequacy ratios. As emphasized in the previous *Report*, these results substantially depend on the assumptions regarding economic and financial conditions, as well as each financial institution's behavior, so that the results are subject to a larger margin of error than those of the regular stress tests, in which the stress event is assumed to occur immediately. The aim of the medium- to long-term simulation is not to present the unique scenario most likely to be realized in the future or the level of operating efficiency that financial institutions should aim for, but to understand the severity of financial institutions' future profit environment and the importance of various efforts to respond to such an environment by showing several hypothetical scenarios and the simulation results under those scenarios.

Paying attention to these points, the implications of the simulations in this *Report* can be interpreted as follows: (1) financial institutions' efforts to save on overhead costs and increase net non-interest income are important, as the decline in net interest income is likely to continue, and (2) continuing such efforts will have meaningful effects on their profitability and capital adequacy ratios, but (3) in order to achieve higher profitability (lower adjusted OHRs) than the current level, it is necessary to accelerate efforts relative to those assumed in this *Report*. This suggests that wide-ranging efforts by financial institutions to improve operating efficiency such as through overhead cost savings and increases in net non-interest income will significantly enhance their future financial soundness and stress resilience.

Demand for conventional deposit-taking and lending services will continue to decrease if the fundamental factor for the decline in net interest income and the narrowing of lending margins is the decline in growth expectations for domestic and local economies under the shrinking population. It is necessary to take decisive measures to streamline those businesses and the associated overhead costs. On the other hand, even under the shrinking and aging population, there exists growing demand for particular types of financial services such as solution-related services for firms and wealth management services focusing on medium- to long-term asset accumulation for households. If financial institutions are able to capture such demand, increases in fees and commissions, as well as in loan interest rates, can be attained. To do so, they may need to increase strategic expenditures to the levels necessary to capture the demand, including those for adapting to digitalization. It is thus important to strike an appropriate balance between cost savings and accommodating increased necessary expenses while aiming to streamline the overall expense structure.

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<sup>58</sup> With regard to lending by domestic banks, the simulation, referring to past data, incorporates a mechanism whereby the rate of decline in lending becomes larger when the core capital ratio falls below 8 percent. However, it should be noted that, as discussed in Section E of Chapter V and in Box 3, the capital adequacy ratio that financial institutions set as their target for business stability is not necessarily constant, but can change depending on the business environment.

## VII. Toward ensuring financial stability in the future

Japan's financial system has been maintaining stability on the whole. Financial intermediation has been active in both the loan and securities markets, thereby supporting a trend of economic expansion.

However, financial institutions' profitability, particularly that of domestic deposit-taking and lending activities, has continued to decline. Against this backdrop, the accumulation of vulnerabilities warrants close monitoring. Major financial institutions have expanded their global activities and pursued group-wide strategies to provide comprehensive financial services. As a result, they have been successful in maintaining a certain profit level while also increasing their systemic importance and becoming more susceptible to the effects of overseas financial cycles. On the other hand, regional financial institutions have become more active in domestic lending to the real estate industry and middle-risk firms, as well as in securities investment. However, as they have not been able to secure adequate profits relative to the increased risks, their capital adequacy ratios have continued to decline moderately. Should this situation persist, their capital base would become vulnerable, which could result in a weakening of the financial intermediation function.

These changes in the activities of major banks and regional financial institutions both stem from the decline in domestic deposit-taking and lending activities. This decline seems to be not only due to the prolonged low interest rate environment but also, from a longer perspective, due to structural factors such as the shrinking population, the decline in growth expectations, and the secular decline in loan demand associated with the chronic excess savings in the corporate sector that started at the end of the 1990s. This structural change in the savings and investment balance also contributes to a slackening of the loan market and intensified competition between financial institutions.

Based on the above observations, a recovery in the profitability of financial institutions is important for ensuring stability of the financial system into the future. To achieve this, it is essential to raise the potential growth rate of Japan's economy and revitalize regional economies. For this to be achieved, various entities need to make their efforts: firms to increase their productivity; and the government to reform regulations and institutions, and stimulate innovation. Financial institutions can also play an important role by providing solution-related services for firms regarding business succession and restructuring, as well as financial services supporting wealth accumulation by households in response to the rise in longevity. Financial institutions have already been intensifying such efforts, but they need to further accelerate efforts to improve operating efficiency, including those indicated in this *Report* (see Chapter VI and Box 4).

### *Challenges for financial institutions*

Against this backdrop, in order for the financial system to maintain stability into the future and carry out its financial intermediation functions effectively even in the event of stress, financial institutions need to address the following four business challenges.

First, financial institutions should strengthen efforts to raise their core profitability. Specifically, they need to accelerate efforts to (1) enhance their capacity to provide more attractive financial services such as solution-related services for firms and services supporting households' wealth accumulation, (2) keep their loan interest rates commensurate with the risks involved and increase their non-interest income based on the provision of enhanced services, and (3) review business processes and expense structures. To strongly promote the improvement in operating efficiency, effective options include mergers or collaboration with other financial institutions, as well as

alliances with firms in other business areas.

Second, financial institutions should enhance their risk management in areas where they have actively increased their risk taking. In terms of credit risk, financial institutions need to strengthen their risk management for lending to middle-risk firms and the real estate industry (see Section B of Chapter IV) and for overseas lending (see Section C of Chapter IV). It is also important for financial institutions to take into account characteristics of their loan portfolios and future prospects when managing loans and setting loan-loss provisions. In terms of market risk, financial institutions need to improve their risk management in response to the wide-ranging and complex risks associated with credit investment and investment trusts (see Section C of Chapter IV). In terms of liquidity risk, financial institutions need to secure stable foreign currency funding bases (see Section D of Chapter V). Moreover, major financial institutions with systemic importance need to ensure a solid financial base, strengthen their governance on a global and group-wide basis, and prepare to deal with a stress event in an orderly manner.

Third, financial institutions should adapt to digitalization. While advances in digitalization can possibly erode the profit opportunities of existing financial institutions, they can also provide financial institutions with tools for expanding the frontiers of services that financial institutions can provide and fundamentally increasing their operating efficiency. In terms of strategic risk as to whether financial institutions are able to develop appropriate business strategies in response to changes in the business environment, adaptation to digitalization is one of the most important topics recently (see Section F of Chapter V). Therefore, financial institutions need to develop strategies to exploit the potential gains offered by digital technology and establish frameworks for cybersecurity management and anti-money laundering controls.

Finally, financial institutions should implement appropriate capital policies. Given that both investors and firms have been more closely scrutinizing capital efficiency and payouts to shareholders in recent years, striking the right balance between appropriate payouts and enhancement of capital is particularly important for regional banks whose profitability has continued to decline. Financial institutions need to develop business plans that appropriately take capital costs into account according to their governance structure, which differs between corporations and cooperative institutions. At the same time, they need to clarify capital policies, including those pertaining to sufficient capital levels, dividend payout plans, and the effective use of unrealized gains on securities, and they also need to improve communication with shareholders and a wide range of other stakeholders.

### *Actions by the Bank of Japan*

In order to ensure the stability of the financial system, the Bank of Japan, through on-site examinations, off-site monitoring, and other activities such as holding seminars, will continue to provide support to financial institutions in their efforts to address the challenges listed above.<sup>59</sup>

In conducting on-site examinations and off-site monitoring, the Bank will continue to focus on grasping financial institutions' future profitability and financial soundness and sharing its views with these institutions. In doing so, the Bank will concentrate on examining financial institutions' resilience to downside risks by conducting profit simulations and utilizing as necessary the results of its macro stress testing for individual financial institutions. The Bank will actively engage in dialogue with financial institutions about which the Bank has concerns regarding their future

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<sup>59</sup> For more details on the basic approach applied in conducting on-site examinations in fiscal 2019, see "[On-Site Examination Policy for Fiscal 2019](#)," March 2019. For the Bank of Japan's agenda for fiscal 2019, see the April 2019 issue of the *Report*.

profitability and financial soundness. Such dialogue will cover the capital levels necessary for these institutions to perform their financial intermediation functions in a stable manner into the future as well as management policies, including capital policies, that can secure such capital levels.

The Bank will hold seminars for financial institutions and support their efforts to put in place more sophisticated risk management and improve profitability, such as the use of digital technology and the reengineering of business processes. The Bank will also conduct financial system research by strengthening its analysis from a macroprudential perspective. At the same time, it will make further refinements to the model for credit risk assessment and improvements in stress testing by utilizing granular data, in collaboration with financial institutions. Moreover, the Bank will enhance its framework for monitoring developments in global financial markets and overseas financial systems by coordinating with overseas central banks and other organizations and participating in international meetings. It will also contribute to discussions on international financial regulations, including regarding the smooth implementation of the Basel III framework and its impact assessment. With respect to measures related to transaction activities, the Bank will take the measures necessary to ensure the stability of the financial system, including carrying out its lender-of-last-resort function when deemed appropriate.

As financial institutions grapple with structural problems, it is important to develop an institutional framework for the financial system that adapts to structural changes such as digital technology innovations and to consider how government financial institutions should function. The Bank of Japan will hold discussions with the parties concerned, taking these issues into account.<sup>60</sup>

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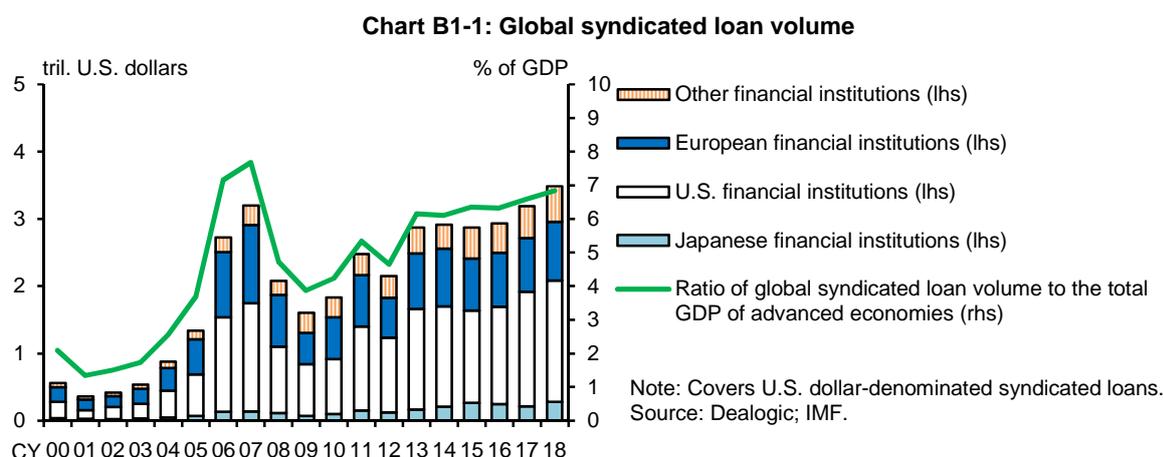
<sup>60</sup> To ensure the stability of the financial system, the FSA and the Bank of Japan have taken advantage of opportunities to exchange views and share awareness at various levels, including holding meetings of the Council for Cooperation on Financial Stability. The FSA and the Bank of Japan also work on joint surveys, as well as research on various specific topics.

## Box 1: Increased connectedness between Japanese and overseas financial institutions in syndicated loans

As a result of the active expansion of the overseas operations of Japanese financial institutions since the global financial crisis, the connectedness of Japanese financial institutions with overseas financial systems has increased. The previous issue of the *Report* measured this global financial connectedness by using stock price data of Japanese major banks and overseas global systemically important banks (G-SIBs) and showed that, in the event of stress in overseas credit markets, the degree to which the impact of such stress would be transmitted to Japan has increased in recent years.<sup>61</sup>

In practice, the increase in connectedness between Japanese banks and overseas financial institutions has proceeded on both the asset and liability sides through (1) an increase in common exposure in overseas lending and securities investment, and (2) the reliance of Japanese banks on overseas financial institutions as foreign currency liquidity suppliers. This box focuses on channel (1) and investigates how connectedness with overseas G-SIBs has increased through an increase in common exposures, using granular data on the underwriting of syndicated loans, which Japanese major banks have expanded since the global financial crisis.<sup>62</sup>

First, looking at developments in syndicated loan transactions in recent years, while the amount of (U.S. dollar-denominated) syndicated loans underwritten worldwide fell substantially during the global financial crisis, it subsequently increased again and most recently has recovered to the pre-crisis level (Chart B1-1).



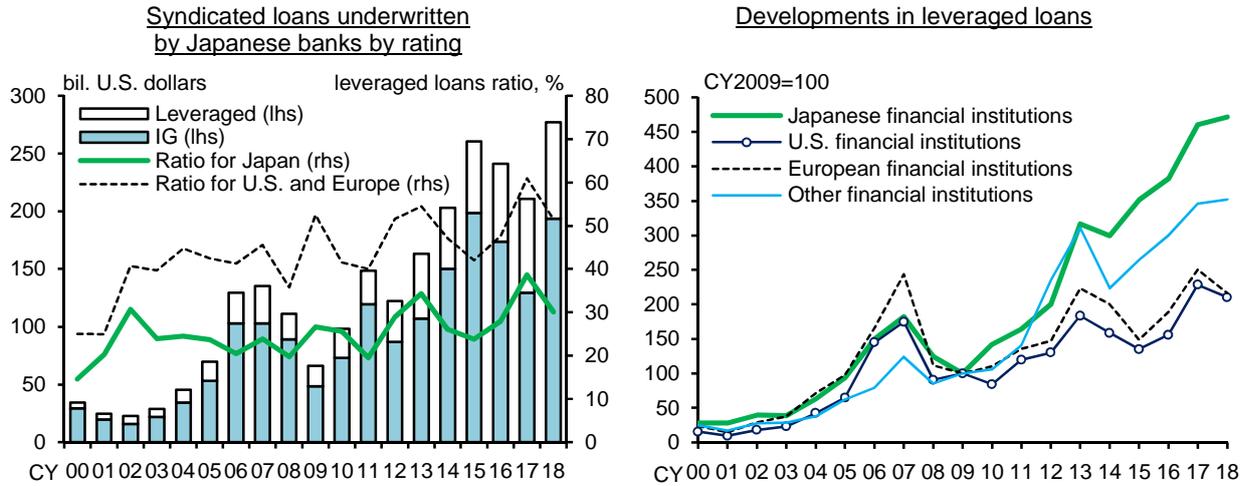
Although Japanese banks' share of syndicated loan underwriting in the market overall is small, the amount of such loans underwritten by Japanese banks has increased significantly since the global financial crisis. This increase reflects deleveraging by U.S. and European financial institutions and the secular decline in profitability of domestic deposit-taking and lending activities. Looking at the syndicated loans of Japanese banks in terms of borrower rating, the underwriting of loans to investment-grade firms makes up the largest share. In recent years, however, the rate of increase in underwriting of lower-rated leveraged loans by Japanese banks has been substantially higher than that by U.S. and European financial institutions. Against this backdrop, the share of leveraged loans

<sup>61</sup> For details, see Box 3 in the April 2019 issue of the *Report*.

<sup>62</sup> The analysis uses individual transaction data on the underwriting of U.S. dollar-denominated syndicated loans provided by Dealogic (number of observations: approximately 100,000). The analysis focuses on the total exposure of syndicated loans, including committed lines. Financial institutions included in the analysis are not only major banks but also securities companies, etc.

among the total amount underwritten by Japanese banks has also gradually risen (Chart B1-2).

**Chart B1-2: Developments in syndicated loans underwritten by Japanese banks**



Note: "Leveraged" and "IG" indicate syndicated loans rated BB or below and rated above BB, respectively.  
Source: Dealogic.

**Chart B1-3: Calculation methodology for the Interconnectedness Index**

Step 1. The distance between financial institutions  $i$  and  $j$  is defined as follows:

$$\text{Distance}_{i,j} = \frac{1}{\sqrt{2}} \times \sqrt{\sum_{k=1}^K (w_{i,k} - w_{j,k})^2}$$

$k$ : Category of borrowers by country and industry

$w_{i,k}$ : Share of category  $k$  in the total outstanding of financial institution  $i$ 's lending

$w_{j,k}$ : Share of category  $k$  in the total outstanding of financial institution  $j$ 's lending

Step 2. The Interconnectedness Index for financial institution  $i$  is calculated as follows:

$$\text{Interconnectedness}_i = \left( 1 - \sum_{j \neq i} x_{i,j} \times \text{Distance}_{i,j} \right) \times 100$$

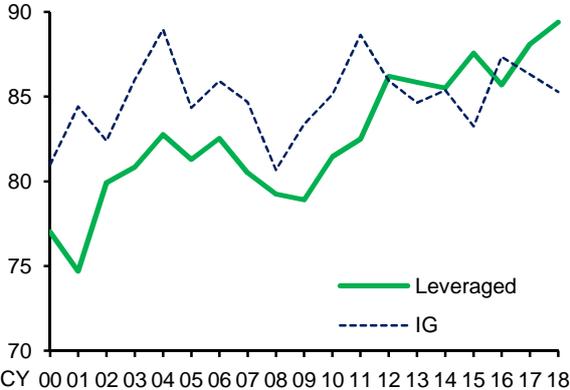
$x_{i,j}$ : Transaction weight between financial institutions  $i$  and  $j$

Next, similarities between syndicated loans underwritten by Japanese major banks and overseas G-SIBs are examined for investment-grade loans and leveraged loans. Specifically, we compile the "Interconnectedness Index," which represents how similar the country and industry shares of syndicated loans underwritten by Japanese major banks are to those underwritten by overseas G-SIBs (Chart B1-3).<sup>63</sup> The closer the value of this index is to 100, the more similar is the country and industry composition of syndicated loans underwritten by Japanese major banks and overseas G-SIBs. The results show that the index for investment-grade syndicated loans, with some fluctuations, has remained more or less unchanged and does not necessarily indicate that there has been an increase in common exposure. On the other hand, for leveraged loans, the index rose sharply in the wake of the global financial crisis and has recently increased further, providing clear

<sup>63</sup> For details on the Interconnectedness Index calculated here, see Jian Cai, Frederik Eidam, Anthony Saunders, and Sascha Steffen, "Syndication, Interconnectedness, and Systemic Risk," *Journal of Financial Stability*, 34 (February 2018): 105-120.

evidence that the common exposure of Japanese major banks and overseas financial institutions for leveraged loans has increased (Chart B1-4).<sup>64</sup>

**Chart B1-4: Japanese G-SIBs' Interconnectedness Index**



Note: 1. "Leveraged" and "IG" indicate syndicated loans rated BB or below and rated above BB, respectively.  
 2. The figures in the chart are simple averages of Japanese G-SIBs' Interconnectedness Indexes calculated with respect to other G-SIBs.  
 Source: Dealogic.

In summary, compared to U.S. and European financial institutions, Japanese banks have a small presence in the syndicated loan market. Japanese banks also have credit portfolios with high quality on the whole, as their shares of investment-grade loans are generally high. However, in the case of leveraged loans, Japanese banks in recent years have sharply increased underwriting, which has resulted in an increased connectedness with overseas financial institutions through the growth in common exposure. With regard to leveraged loans, there have been concerns that the financial condition of U.S. and European speculative-grade borrowers might deteriorate and that credit costs may materialize in the event of a future recession. Taking these points into account, substantial attention needs to be paid to the fact that Japan's major banks and financial system are becoming more susceptible to a potential major adjustment in overseas credit markets. Such effects would spread not only through the direct channel from borrowers but also through second-round spillover effects from decreases in foreign currency provisions by overseas financial institutions whose financial soundness has deteriorated, as well as from fire sales of assets.

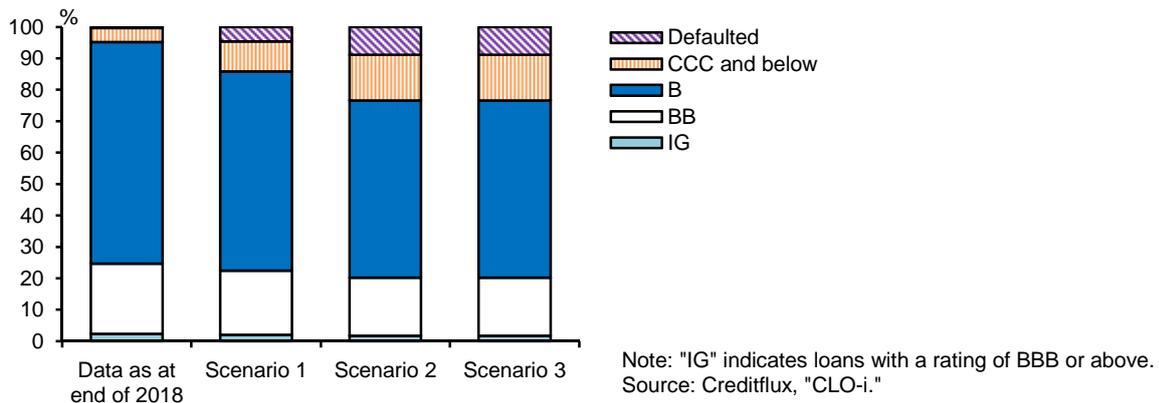
<sup>64</sup> Since common exposure is measured using data at the time of syndicated loan underwriting, subsequent sales to investors are not taken into account. However, since it can be assumed that many of the syndicated loans underwritten by overseas G-SIBs are sold to other overseas banks and non-banks, the conclusion that the global connectedness of Japanese banks has increased is unlikely to change. This increase in the commonality of exposures in terms of the country and industry composition of loans can also be confirmed from data at a higher level of granularity, such as at the level of individual large-scale syndicated loans.

## Box 2: Simulation analysis for the robustness of highly rated tranches of CLOs

Using granular data on CLOs in the United States and Europe, this box examines the robustness of highly rated tranches of CLOs (AAA-rated tranches) by employing various simulations that assume the same degree of credit and market stress observed during the global financial crisis.<sup>65</sup>

First, we perform simulations assuming that the credit rating of the leveraged loans, which are the underlying assets of CLOs, declines in the event of stress. For this simulation, we construct three stress scenarios based on information on changes to the ratings of underlying assets during the global financial crisis from 2008 to 2009 (Chart B2-1). Scenario 1 assumes a milder recession than that during the global financial crisis, in which ratings are downgraded by only half as much as during that period. Scenario 2 assumes a recession similar to that during the global financial crisis and hence a downgrading of ratings of the same extent as during that period. Finally, Scenario 3 assumes the same extent of rating downgrades as Scenario 2, but based on the recent increase in the share of covenant-lite loans in the leveraged loan market, it imposes the additional severe assumption that the recovery rate of defaulted underlying assets is only half that observed during the global financial crisis. The simulations calculate the interest payment capacity and the adequacy of collateral for AAA-rated tranches of CLOs for each of the three scenarios. In these simulations, the market value of underlying assets is estimated using the rate of price decline calculated from actual leveraged loan transactions data at the time of the global financial crisis.

**Chart B2-1: Changes in the composition of the rating of underlying assets by scenario**



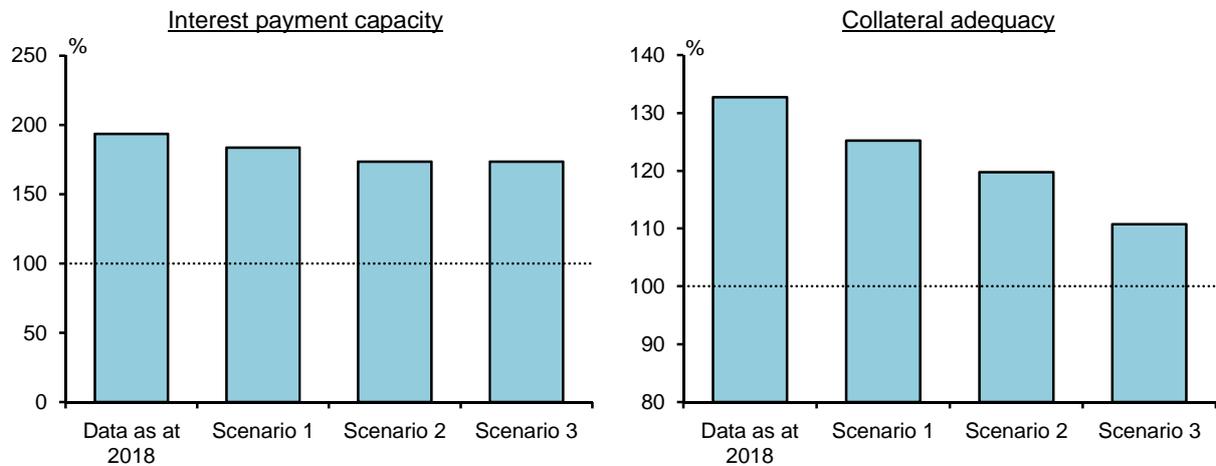
Under those scenarios, (1) the simulations examine the interest payment capacity with regard to AAA-rated tranches assuming that there are no interest payments from the underlying assets that have defaulted. In addition, (2) the simulations also examine the adequacy of collateral assuming that, in evaluating the collateral value of the underlying assets, the book value is used for loans with a rating of B or above, but for loans with a rating below B, the smaller of the market value and the recovery amount is used.

The results indicate that interest payments to AAA-rated tranches are sufficient in all three scenarios, being well above the level at which interest payments would cease. For the adequacy of collateral for AAA-rated tranches, measured by the collateral value of the underlying asset amount outstanding divided by the AAA-rated tranche amount outstanding, the results indicate that, although in Scenario 3 (the most severe scenario) the ratio falls close to the level of a partial loss

<sup>65</sup> The analysis uses the CLO-i database provided by Creditflux. CLO-i covers CLOs issued in the United States and Europe and comprises observations for 1,500 individual CLOs. Further, it provides granular data on the underlying loans as well as individual senior and junior obligations and equity issued.

of principal, the collateral value remains sufficient to fully cover AAA-rated tranches in all scenarios (Chart B2-2).

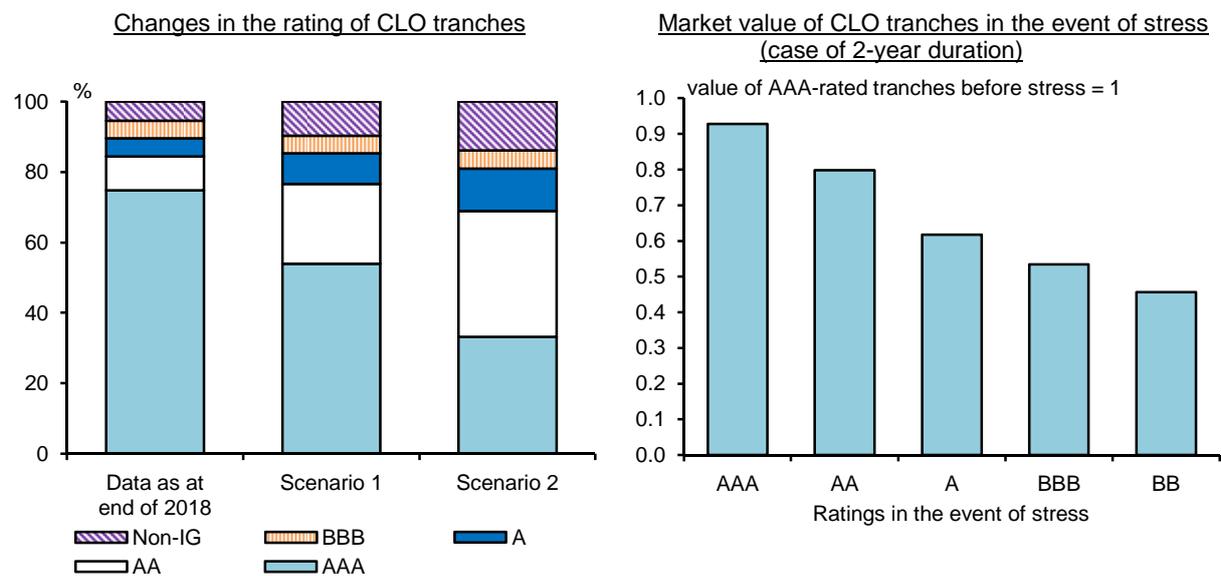
**Chart B2-2: Stress simulation of credit risk for AAA-rated tranches of CLOs**



Note: 1. In the left-hand chart, interest income from loans with a rating of CC or below is assumed to be zero. The value for "Data as at 2018" is the median.  
 2. In the right-hand chart, the value of loans with a rating of B or above is calculated by book value, while the value of loans with a rating below B is calculated by market value. The market value used here is estimated using the median of transaction prices for each rating in 2009. In Scenario 3, the value of loans with a rating of below B is calculated at half the price of the market value. The value for "Data as at 2018" is the median.

Source: Creditflux, "CLO-i."

**Chart B2-3: Stress simulation of market risk for AAA-rated tranches of CLOs**



Note: 1. In the left-hand chart, "Non-IG" indicates CLO tranches with a rating of BB or below. Equity is excluded.  
 2. In the right-hand chart, changes in the market values are calculated based on the maximum increase in spreads for each rating during the global financial crisis. The price changes are simulated as changes in the present values caused by the increase in discount rates, which are assumed to increase by the same amounts as the spreads. The market values shown here are scaled by AAA-rated tranches before stress, which are normalized to 1.

Source: Bloomberg; Creditflux, "CLO-i."

Next, we conduct market stress simulations assuming that the spreads of AAA-rated tranches of CLOs increase rapidly due to a deterioration in the quality of underlying assets and/or a worsening of the market environment. Specifically, the impact on the price of AAA-rated tranches is examined by assuming that the market spread for the tranches of each rating increases to the maximum level actually observed during the global financial crisis (Chart B2-3). This assumption is based on developments at that time, namely: (1) a substantial number of AAA-rated tranches were

downgraded to AA or below, and (2) the spreads of tranches rated AA or below, in particular, increased substantially.

The results indicate that even AAA-rated tranches would experience a price drop of about 10 percent due to the increase in spreads. Furthermore, if AAA-rated tranches were downgraded to AA or A, their prices would drop by 20 to 30 percent (Chart B2-3). The simulation estimates a price drop by assuming a duration of 2 years, which approximates the durations observed recently. However, CLOs can be redeemed after a certain period from their arrangement, and the share of refinanced CLOs in the total issuance amount of CLOs has increased rapidly, reflecting the favorable market environment (Chart IV-3-7). Taking such increases in refinancing into account, as well as the fact that CLOs have the characteristic that their durations can fluctuate in a short period of time, there exists the possibility that, in the event of market stress, not only an increase in spreads but also an amplification of price drops due to an increase in durations caused by the difficulty of refinancing could be observed.

Since the above simulations are based on simple assumptions using information on changes in ratings and increases in spreads during the global financial crisis, the results should be regarded as subject to a margin of error. Bearing this in mind, the results suggest that AAA-rated tranches of CLOs are reasonably robust in terms of credit risk, i.e., protected against a loss of principal or a suspension of interest payments in the event of stress. However, attention should be paid to, among other things, the risk of a decline in market prices, due to a downgrading of ratings in the event of a sudden change in economic and market conditions or fluctuations in durations.

### Box 3: Financial institutions' capital adequacy ratios and lending behavior

Changes in financial institutions' capital adequacy ratios, which measure their financial soundness, could affect their risk-taking behavior such as lending. Financial institutions use their capital adequacy ratios as yardsticks of their business stability, and these ratios can vary due to changes in (1) risk profiles, (2) profitability, and (3) business environment, such as regional economic conditions. For example, financial institutions have an incentive to maintain a higher capital adequacy ratio when they are increasing their lending with high credit risk. At the same time, such financial institutions might accept a slight decline in capital adequacy ratio if their unrealized gains on securities increase due to a rise in stock prices.

Given these considerations, we model the capital adequacy ratio that regional banks (domestic banks) use as a yardstick as follows. A key behavioral assumption is that, in setting the capital adequacy ratio as a reference yardstick (the "target ratio," hereafter), banks determine how much of a buffer above the minimum regulatory level that they wish to retain, taking into account the business environment being faced:

$$(\text{Target ratio})_{i,t} = \alpha_i + \beta \sum_{k=0}^{\lambda} (\text{Variables representing the bank's business environment})_{i,t-k} \quad \dots (1)$$

where  $i$  indexes banks and  $t$  represents time. For the estimation of the target ratio, we use the following proxy variables to represent each bank's business environment: (1) to represent its risk profile, unrealized gains/losses on securities and the amount of risk held; (2) to represent factors affecting its profitability, the ROA based on pre-provision net revenue (PPNR) excluding trading income, i.e., "core ROA," net non-interest income, the adjusted overhead ratio (OHR), and the year-on-year change in the population of the prefecture where its headquarter is located; and (3) to represent business cycle factors, the unemployment rate in the prefecture where its headquarter is located.<sup>66</sup> In practice, however, banks may need some time and costs to make decisions and adjust their business resources to achieve the target ratio. Therefore, we assume the following partial adjustment model, where the difference between the actual and the target ratios is gradually adjusted (the estimation period is from fiscal 2005 to fiscal 2018):<sup>67</sup>

$$\begin{aligned} (\text{Capital adequacy ratio})_{i,t} - (\text{Capital adequacy ratio})_{i,t-1} \\ = \rho \{ (\text{Target ratio})_{i,t} - (\text{Capital adequacy ratio})_{i,t-1} \} + \epsilon_{i,t} \quad \dots (2) \end{aligned}$$

The estimation results show that the variables that are assumed to represent the business environment have a statistically significant impact on the target ratio (Chart B3-1). An increase in unrealized gains on securities and a decline in the amount of risk held by banks push down the target ratio (i.e., reduce the target level of capital buffer). While a decline in core ROA is also associated with a decline in the target ratio, this can be interpreted as reflecting banks' attempt in recent years to compensate for the decline in their core profitability through active risk taking (and, consequently, allowing a decline in their capital).

As mentioned in Chapter V, while the estimated target ratio had been on a downward trend since fiscal 2010, it has recently started to increase slightly (Chart V-5-5). A decomposition of changes in the target ratio shows that (1) the secular decline in core ROA and (2) the downward trend in the

<sup>66</sup> Other determinants of the target ratios may include the costs incurred when a bank goes bankrupt and funding liquidity conditions. In the analysis here, it is assumed that the former are constant throughout the observation period, while the latter are not taken into account because of their insignificant impact.

<sup>67</sup> For details, see Christoffer Kok and Glenn Schepens, "Bank Reactions after Capital Shortfalls," European Central Bank Working Paper Series, no. 1611 (November 2013).

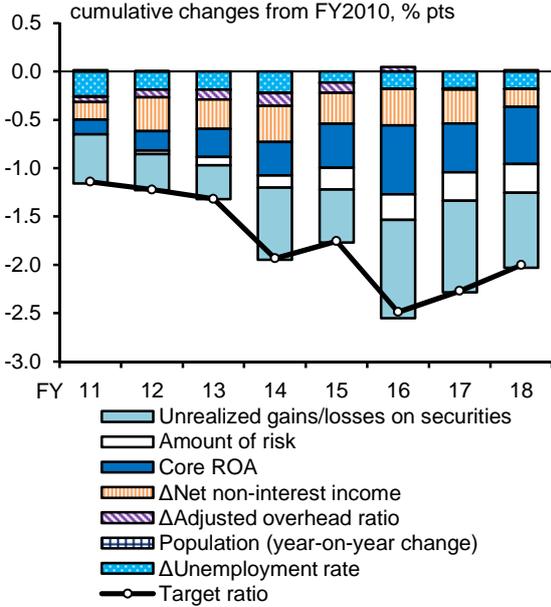
amount of risk held by banks reflecting improved creditworthiness of borrowers under favorable economic conditions have consistently pushed down the target ratio. On the other hand, (3) the amount of unrealized gains on securities, which had been increasing the past several years, has started to fall recently (pushing up the target ratio) (Chart B3-2). As a result, the actual ratio is now slightly below the target ratio. These findings suggest that regional banks, facing a secular decline in profitability, had been actively taking risks while lowering the target ratio by recognizing unrealized gains on securities as a *de facto* buffer. However, as of recently, they may be somewhat raising their target ratios due to, among other reasons, declines in unrealized gains.

**Chart B3-1: Estimation results for target ratio**

Explanatory variables	Dependent variable: Δ capital adequacy ratio (% pts)	
Unrealized gains/losses on securities	-0.10 ***	(0.02)
Amount of risk	0.11 **	(0.05)
Core ROA	0.88 ***	(0.24)
ΔNet non-interest income	-0.13 *	(0.08)
ΔAdjusted overhead ratio	0.04 **	(0.02)
Population (year-on-year change)	0.00	(0.20)
ΔUnemployment rate	0.21 ***	(0.05)
Capital adequacy ratio (previous period)	-0.33 ***	(0.03)
Sample size	1,279	
Adj.R <sup>2</sup>	0.280	

- Note: 1. The estimation period is from fiscal 2005 to 2018. The estimation includes fixed effects. \*\*\*, \*\*, and \* indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Figures in parentheses indicate standard errors.
2. "Unrealized gains/losses on securities" is the ratio to risk-weighted assets. "Amount of risk" is the sum of the credit risk, yen interest rate risk, and market risk associated with stockholdings, divided by total assets. The credit risk denotes the unexpected losses calculated by using average default rates of the past 3 years. "Net non-interest income" is the ratio to net assets. "Population" and "Unemployment rate" are the prefecture-level data based on where banks' headquarters are located.

**Chart B3-2: Decomposition of target ratio**



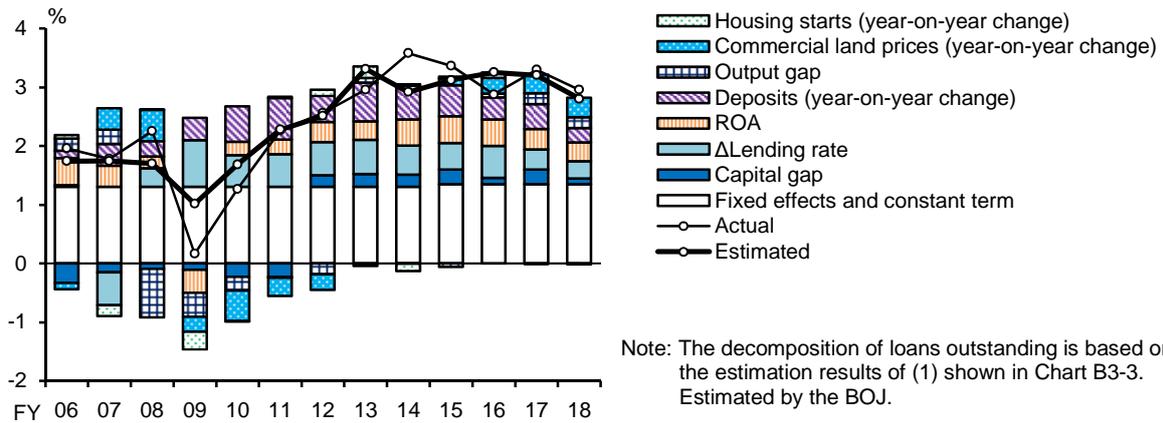
Note: The decomposition of target ratio is based on the estimation results shown in Chart B3-1. Estimated by the BOJ.

**Chart B3-3: Estimation results for outstanding amount of lending**

Explanatory variables	Dependent variable: outstanding amount of lending (year-on-year change,%)	
	(1)	(2)
Capital gap	0.34 *** (0.10)	
Capital adequacy ratio		0.12 (0.11)
ΔLending rate	-4.85 *** (1.65)	-5.87 *** (1.68)
ROA	1.14 *** (0.43)	1.26 *** (0.45)
Deposits (year-on-year change)	0.20 *** (0.07)	0.20 *** (0.07)
Output gap	0.14 *** (0.05)	0.17 *** (0.05)
Commercial land prices (year-on-year change)	0.06 *** (0.01)	0.07 *** (0.01)
Housing starts (year-on-year change)	0.01 * (0.01)	0.01 * (0.01)
Sample size	1,187	
Adj.R <sup>2</sup>	0.173	

- Note: 1. The estimation period is from fiscal 2006 to 2018. The estimation includes fixed effects. \*\*\* and \* indicate statistical significance at the 1 percent and 10 percent levels, respectively. Figures in parentheses indicate standard errors.
2. "Capital gap," "Capital adequacy ratio," and "ROA" represent data for the previous period. "Commercial land prices" and "Housing starts" are the prefecture-level data based on where banks' headquarters are located.

**Chart B3-4: Decomposition of loans outstanding**



Note: The decomposition of loans outstanding is based on the estimation results of (1) shown in Chart B3-3. Estimated by the BOJ.

As for the impact of the difference between the actual ratio and the target ratio (referred to as the "capital gap" below) on lending, panel estimation shows that a negative capital gap (i.e., the actual adequacy ratio is below the target ratio) reduces lending growth (Charts B3-3 and B3-4). Therefore, when considering whether financial institutions' lending attitudes, which so far have been accommodative, will change in the future, attention should be also paid to developments in the capital gap. However, (1) the estimation results show that the estimated parameter is not very large, (2) the estimates of the target ratio are subject to a margin of error because they are based on a limited number of explanatory variables, and (3) as suggested by the estimation, there are a variety of other factors that affect lending growth. Given those caveats, it should be noted that the results here do not necessarily predict a decline in lending growth in the immediate future.

#### **Box 4: Background behind the differences in operating efficiency between financial institutions**

In recent years, financial institutions have been actively working to improve operating efficiency. Regarding this point, there are considerable differences in operating efficiency, especially among regional financial institutions. This box examines the background of these differences by using quantitative methods and tries to provide insights that can be used for making improvements.

Financial institutions can be regarded as entities that use labor and physical inputs (or the overhead costs for these) to produce financial services such as lending, investment in securities, and service transactions -- or "produce" gross operating profits from core business (hereafter referred to as "core gross operating profits") by providing these services to customers. The efficiency of these production activities can be measured by financial institutions' adjusted overhead ratio (OHR), which is the ratio of overhead costs to core gross operating profits. The adjusted OHR is an indicator linked to a financial institution's break-even point (the indicator is greater than 100 percent when the institution's pre-provision net revenue [PPNR] excluding trading income is negative). A lower value indicates a higher operating efficiency for the financial institution, that is, that the financial institution is generating more value added through the financial services provided for a given amount of overhead costs. Thus, an analysis of factors causing differences in the adjusted OHR between financial institutions will provide a better understanding of the background behind the differences in financial institutions' operating efficiency.

The analytical framework is as follows. The core gross operating profits of financial institutions can be regarded as being determined primarily by the following factors: (A) their expenses for inputs (labor and physical inputs); (B) the profitability of their lending and securities investment business; (C) unit labor and physical input costs; and (D) other operating efficiencies not captured by these factors (referred to as "narrowly-defined efficiency" below). For this decomposition, we employ a quantitative approach called "stochastic frontier analysis."<sup>68</sup> Using panel data, we estimate the efficiency frontier, i.e., the maximum core gross operating profits that a financial institution could achieve for a given amount of overhead costs on the basis of the profitability of its lending and securities investment business and its unit labor and physical input costs. We then calculate each financial institution's "narrowly-defined efficiency," defined as the difference between the efficiency frontier and the actual core gross operating profits of the financial institution. "Narrowly-defined efficiency" indicates how efficient each financial institution is in its production activities among a group of financial institutions with similar amounts of overhead costs and business scope. Thus, "narrowly-defined efficiency" is intended to reflect a wide range of factors through which a financial institution could increase operating efficiency by saving on overhead costs and increasing core gross operating profits, such as various means to raise productivity (e.g., effective utilization of IT, reengineering of business processes, accumulation of management know-how, human resource development including through training, and increasing resource allocation efficiency such as through redeployment of personnel), personnel reductions, branch consolidation, increases in income from sources other than deposit-taking and lending activities (net non-interest income), and partnerships and alliances with other financial institutions and nonfinancial firms (to achieve economies of scope).

Since the adjusted OHR, as a measure of a financial institution's operating efficiency, is the ratio of overhead costs to core gross operating profits, differences in adjusted OHR between financial institutions can be decomposed into differences in the four factors (A) to (D) above (Chart B4-1).

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<sup>68</sup> This approach is widely used for the analysis of the operating efficiency of financial institutions. See, for example, the May 2018 issue of the *Financial Stability Review* of the European Central Bank.

**Chart B4-1: Specification of production function and methodology for decomposing adjusted OHR**

Specification of production function	Methodology for decomposing adjusted OHR
$\log(\text{Core gross operating profits})_{i,t}$ $= \alpha \cdot \log(\text{Overhead costs})_{i,t} + \beta \cdot X_{i,t} - u_i + \text{Error}_{i,t}$ <ul style="list-style-type: none"> <li>• <math>X_{i,t}</math>: Financial indicators representing profitability of lending and securities investment business, and unit labor and physical input costs</li> <li>• <math>u_i</math>: Narrowly-defined efficiency</li> </ul> <p>Note: Subscripts <math>i</math> and <math>t</math> denote financial institution and time, respectively.</p>	<p>(Difference in adjusted OHR between financial institutions)</p> $= \Delta \log(\text{Overhead costs/Core gross operating profits})$ $= (1 - \alpha) \cdot \Delta \log(\text{Overhead costs}) - \beta \cdot \Delta X + \Delta u - \text{Error}$ <div style="text-align: center; margin-top: 10px;"> <math>\underbrace{\hspace{10em}}_A \quad \underbrace{\hspace{2em}}_{B, C} \quad \underbrace{\hspace{1em}}_D</math> </div> <p>Difference in...</p> <ul style="list-style-type: none"> <li>Economies of scale (A)</li> <li>Profitability of lending and securities investment business (B)</li> <li>Unit cost of labor and capital (C)</li> <li>Narrowly-defined efficiency other than the above (D)</li> </ul>

With respect to this, (A) the contribution of the level of expenses for inputs (labor and physical inputs) can be regarded as representing "economies of scale," that is, financial institutions with larger overhead costs tend to have disproportionately larger core gross operating profits, as discussed later.<sup>69</sup> The following takes a closer look at the estimation results, focusing on (A) "economies of scale" and (D) "narrowly-defined efficiency," while (B) the profitability of financial institutions' lending and securities investment business and (C) unit labor and physical input costs, together with the estimation error, are aggregated as "other factors."

**Chart B4-2: Estimation results for regional banks**

Dependent variable	Core gross operating profits (log)		
Estimation period	FY2004-07	FY2008-12	FY2013-18
Overhead costs (log)	1.157 ***	1.106 ***	1.210 ***
Loan-to-deposit ratio	0.874 ***	0.417 ***	0.453 ***
Deposit-lending margins minus credit cost ratio	0.213 ***	0.094 ***	0.223 ***
Credit cost ratio	0.162 ***	0.089 ***	0.217 ***
Security-to-deposit ratio	0.327 ***	0.223 ***	0.344 ***
Deposit-security margins	0.086 ***	0.107 ***	0.086 ***
Personnel expenses per employee (log)	-0.077	-0.018	-0.059
Non-personnel expenses per branch (log)	-0.055	-0.056 *	-0.235 ***
Observations	412	517	624

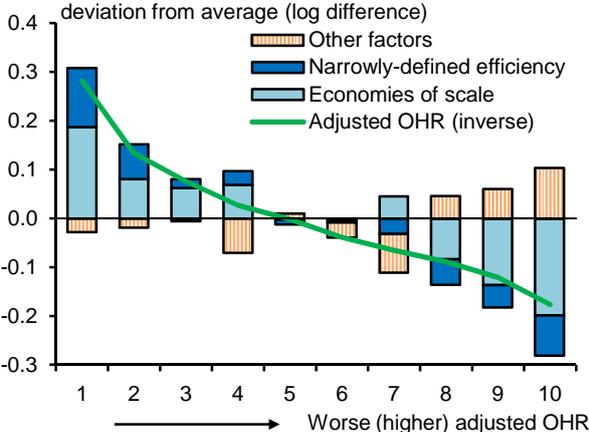
Note: \*\*\* and \* indicate statistical significance at the 1 percent and 10 percent levels, respectively.  
Source: BOJ.

First, looking at the estimation results for regional banks, "economies of scale" operate in all sub-periods, and most of the other variables are statistically significant (Chart B4-2). Moreover, the parameter estimates are generally stable in all sub-periods. Using these results to decompose the deviation of each bank's adjusted OHR from the average among regional banks shows that, on the whole, "economies of scale" play the largest role, followed by "narrowly-defined efficiency" (Chart B4-3). Looking at the results for the group of banks with higher adjusted OHR, "other

<sup>69</sup> It is known from earlier empirical studies that financial institutions' need to bear large fixed costs such as for branches and computer systems means that as they increase their scale, their unit output costs will fall. Having "economies of scale" here is defined in terms of whether the estimated parameter  $\alpha$  is significantly larger than 1. That is, "economies of scale" are assumed to be present if an increase in overhead costs is associated with a disproportionate increase in core gross operating profits (i.e., a decline in the adjusted OHR). This tendency can be confirmed in the actual data (see Chart VI-2-3).

factors," which include unit labor and physical input costs, push the adjusted OHR down, indicating that, although these banks seem to be actively making efforts to reduce per capita labor costs and physical input costs per branch, these efforts are not fully offsetting their low "economies of scale" and "narrowly-defined efficiency."

**Chart B4-3: Decomposition of adjusted OHR of regional banks**



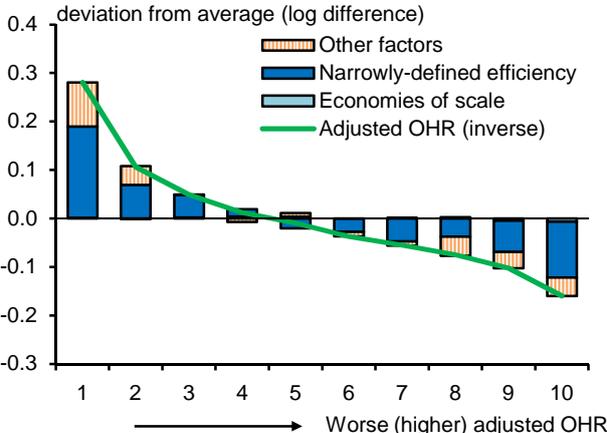
Note: Regional banks are sorted in ascending order by adjusted OHR, and divided into ten groups on the horizontal axis. Other factors include error terms.  
Source: BOJ.

**Chart B4-4: Estimation results for *shinkin* banks**

Dependent variable	Core gross operating profits (log)		
	FY2004-07	FY2008-12	FY2013-18
Overhead costs (log)	1.016 ***	1.009 ***	1.017 ***
Loan-to-deposit ratio	0.321 ***	0.488 ***	0.599 ***
Deposit-lending margins minus credit cost ratio	0.045 ***	0.105 ***	0.111 ***
Credit cost ratio	0.041 ***	0.114 ***	0.142 ***
Security-to-deposit ratio	0.403 ***	0.380 ***	0.384 ***
Deposit-security margins	0.103 ***	0.141 ***	0.131 ***
Personnel expenses per employee (log)	-0.285 ***	-0.248 ***	-0.096 ***
Non-personnel expenses per branch (log)	0.076 ***	0.016	-0.079 ***
Observations	996	1264	1516

Note: \*\*\* indicates statistical significance at the 1 percent level.  
Source: BOJ.

**Chart B4-5: Decomposition of adjusted OHR of *shinkin* banks**



Note: *Shinkin* banks are sorted in ascending order by adjusted OHR, and divided into ten groups on the horizontal axis. Other factors include error terms.  
Source: BOJ.

Next, looking at the estimation results for *shinkin* banks, the estimated parameter of "economies of scale" is smaller than that for regional banks, although the results suggest positive "economies of

scale," as in the case of regional banks (Chart B4-4). While the background behind this is not clear from these estimation results, possible explanations are that sharing of computer systems is more prevalent at *shinkin* banks than at regional banks and/or that the size of their geographical areas of operation is more limited. The parameter estimates for most of the other variables are statistically significant, as in the case of regional banks. Decomposing the deviation of each *shinkin* bank's adjusted OHR from the average among *shinkin* banks shows that, unlike in the case of regional banks, the impact of "economies of scale" is limited, whereas the impact of "narrowly-defined efficiency" is larger than in the case of regional banks (Chart B4-5).

The above analysis suggests the following three insights for improving operating efficiency.

First, there are considerable differences in operating efficiency between regional financial institutions even among banks of the same business type. Also, a number of regional financial institutions seem to have room for improving efficiency. Although many regional financial institutions are already making efforts to raise operating efficiency, these efforts need to be accelerated in a number of respects. Specifically, the following options could be considered: reviewing the management structure in order to improve profitability and risk management; increasing net non-interest income through the provision of financial services such as solution-related services for firms and wealth management services for households; concentrating resources in strategically prioritized business areas and withdrawing them from areas with deteriorating profitability; investing in IT and reengineering business processes with a view to adapting to digitalization; and building partnerships and alliances with other financial institutions and business enterprises.

Second, "economies of scale" potentially have a significant effect on operating efficiency. This suggests that mergers and partnerships among financial institutions and alliances with firms in other business areas could be effective options for improving operating efficiency. The estimation results suggest that "economies of scale" have a somewhat larger effect in the case of regional banks than in the case of *shinkin* banks. However, it is possible that synergy effects (i.e., economies of scope) and a productivity improvement resulting from mergers, partnerships, and alliances can contribute to improving operating efficiency of *shinkin* banks because these are included in the estimate for "narrowly-defined efficiency." Furthermore, it should be noted that the above findings represent only a set of estimation results based on a particular quantitative approach, in which all the various factors related to scale, management integration, etc., cannot be comprehensively taken into account.

Third, as mentioned above, reductions in per capita labor costs and physical input costs per branch, which are included in "other factors," have to some degree led to an improvement in operating efficiency, reflecting recent moves such as reviewing wage curves, using "branch-in-branch" consolidation and establishing lightweight branches, and pushing ahead with the use of common ATMs. On the other hand, financial institutions need to ensure that they can meet the overhead costs necessary for maintaining the quality of their services, such as those for strategic investment in IT systems and securing human resources. It is thus important to strike an appropriate balance between saving on overhead costs and securing funds for necessary expenses.

## 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 unrealized 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 unrealized gains/losses on bondholdings

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

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

Credit cost ratio = credit costs / total loans outstanding

### *Capital adequacy ratios of internationally active banks*

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

CET1 capital includes common equities and retained earnings.

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

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

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

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

### *Capital adequacy ratios of domestic banks*

Core capital ratio = core capital / risk-weighted assets

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