BOJ Reports & Research Papers

Financial System Report

BANK OF JAPAN
OCTOBER 2018

The total of major banks, regional banks, and *shinkin* banks covered in this *Report* is as follows (as at end-September 2018).

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 40 member banks of the Second Association of Regional Banks (Regional banks II). *Shinkin* banks are the 253 *shinkin* banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as at end-September 2018.

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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 the 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 policy 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 regulatory and supervisory discussions. 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 2018 issue of the *Report*

It has become increasingly important to accurately assess financial vulnerabilities amid the prolonged low interest rate environment. Active financial intermediation -- particularly bank lending -- has contributed to an improvement in the real economy. However, if excessive risk taking spreads across financial intermediation activities, the real economy could undergo significant adjustment pressure in the future. Furthermore, when the real economy deteriorates considerably -- in other words, when a tail risk materializes -- unless financial institutions have sufficient stress resilience, they could face difficulty in maintaining their financial intermediation function, which could in turn exacerbate the real economy through a negative feedback loop.

Motivated by the above considerations, this October 2018 issue of the *Report* is concerned most with the following three areas of analysis. First, we quantitatively assess the tail risk in terms of deterioration in the real economy from a macroprudential perspective. Specifically, we use a new analytical approach called "GDP-at-risk" (GaR) to visualize the downward risks to the economy caused by financial vulnerabilities. Second, we refine the measurement of financial institutions' risk profiles, such as the amount of risk and the heterogeneity among these institutions, to take into account the recent behavior of financial institutions' risk taking and risk management. In particular, this issue of the *Report* focuses on two aspects: (1) in terms of credit risk, the actual conditions of lending to middle-risk firms and overseas lending, the two types of lending in which financial institutions have increased their risk taking in recent years; and (2) in terms of market risk, the effects of an increasing realization of gains from the sale of securities, as well as the effects of a growing exposure to stock investment trusts. Third, we conduct a more detailed analysis of financial institutions' stress resilience to tail risks, by incorporating the effects of financial institutions' recent risk taking into the Financial Macro-econometric Model (FMM). The FMM measures credit costs by taking into account the tendency that, when the real economy deteriorates, default rates of middle-risk firms increase in a nonlinear manner to a greater degree than those of financially sound firms.

Contents

I. Executive summary

Developments in financial intermediation

Domestic financial intermediation -- particularly bank lending -- has continued to be active and supported a moderate expansion of Japan's economy on the back of monetary easing by the Bank of Japan. In the domestic loan market, the interest rates for both short-term and long-term loans have been hovering around historically low levels and loans outstanding have continued to grow at a year-on-year rate of around 2 percent. Business fixed investment-related lending to small firms in particular has increased across a wide range of industries as lending competition has intensified among regional financial institutions. In the CP and corporate bond market, an increasing trend in large firms' fund-raising for working capital, refinancing, and M&A deals has continued as issuance rates have hovered at extremely low levels.

Financial institutions have maintained the upward momentum of their overseas investment and lending activities, reflecting the continued steady growth of the global economy. Institutional investors such as life insurance companies have also increased their overseas exposure.

Financial cycle and potential vulnerabilities

The funding conditions for firms and households have been highly accommodative, but the financial cycle has shown no signs of overheating as observed during the bubble period in the late 1980s. Financial institutions have maintained their active lending attitudes amid the prolonged favorable macroeconomic environment backed by economic expansion and low interest rates. The expansionary phase of the financial cycle has continued as the total credit to GDP ratio has increased with a relatively large deviation from the long-term trend, reflecting an increase in lending to middle-risk firms and the real estate sector. These financial developments have supported the economic expansion to date and also suppressed downside risk to the real economy in the near future. However, from a somewhat longer-term perspective, if the growth potential of Japan's economy does not increase, then the recent financial developments could build up pressure on balance sheet adjustments and thereby amplify downward pressure on the economy in the event of a future negative shock. This is because, if financial institutions and borrowers were to base their behaviors on overly optimistic projections, then they could suffer unexpected losses in the event of a deterioration of the macroeconomic environment.

International financial conditions have featured a prolonged period of increasing global debt outstanding and investors' search for yield. The portfolio quality of Japanese financial institutions' overseas loans has remained high on the whole, but some financial institutions have increased lending to relatively high-risk firms, driven by intensified competition with overseas financial institutions and higher foreign currency funding costs. With regard to securities investment, Japanese financial institutions have maintained a relatively high level of overseas exposure from a somewhat longer-term perspective. Therefore, continued attention should be paid to whether policy rate hikes in the United States, international trade tensions, and a rise in geopolitical uncertainties particularly over emerging market economies could affect Japan's financial markets and financial institutions through capital outflows from emerging markets and a widespread repricing of risky assets.

Stability of the financial system

Financial institutions generally have strong resilience in terms of both capital and liquidity during tail events such as the failure of Lehman Brothers (the Lehman shock). Thus, it can be judged that

Japan's financial system has been maintaining stability on the whole. However, financial institutions' core profitability has continued to decrease amid the persistent decline in the population and the number of firms as well as the prolonged low interest rate environment. Under these circumstances, regional financial institutions' capital adequacy ratios have gradually decreased because the pace of increase in financial institutions' capital has not necessarily kept up with the pace of increase in the amount of risk assets. Stress testing results in this *Report* indicate that financial institutions are able to maintain their capital above regulatory requirement levels even under a stress situation, as was the case for the tests conducted in previous issues of the *Report*. However, financial institutions tend to become more cautious in their risk taking if their capital adequacy ratios fall substantially or they continue to register net losses. Therefore, it should be noted that in the event of stress, downward pressure on the real economy from the financial system would be more likely to intensify than in the past. Financial institutions have significant heterogeneity in their loss-absorbing capacity, and those that have actively engaged in risk taking relative to their loss-absorbing capacity, in areas such as lending to middle-risk firms and the real estate sector, as well as securities investment, could experience larger declines in their capital because of credit costs and losses on securities.

Challenges from a macroprudential perspective

In order for the financial system to maintain stability into the future, financial institutions need to raise their core profitability. At the same time, the corporate sector needs to increase medium- to long-term growth expectations, which is the other side of the same coin. To this end, financial institutions' consulting and advisory services for firms are important, in addition to firms' own efforts to improve productivity and the government's initiatives to increase the economy's growth potential. Financial institutions have already been making such efforts, but it will likely take more time until they bear fruit in the form of an increase in financial institutions' profitability. It is therefore necessary for financial institutions to increase their non-interest income such as fees and commissions and drastically raise their business efficiency, as well as to improve the profitability of their loans.

Financial institutions also need to enhance their risk management in areas where they have increased their risk taking, such as lending to middle-risk firms, real estate lending, overseas lending, and securities investment. In particular, financial institutions have been increasing the amount of loans to low-return borrowers whose borrowing interest rates are low relative to their credit risk through the business cycle. It is thus increasingly important for financial institutions to examine whether their loan-loss provisions are appropriate and set their loan interest rates commensurate with the risks involved while taking into account possible future developments in the macroeconomic environment. In addition, in order to ensure sufficient loss-absorbing capacity, financial institutions need to examine whether their policies on capital and profit distribution including dividends, and their strategies for utilizing unrealized gains on securities are appropriate in terms of their stress resilience. The Bank of Japan will support such efforts by financial institutions through on-site examinations and off-site monitoring, and will also continue to closely monitor the impact on the financial system of financial institutions' various forms of risk taking from a macroprudential perspective. Based on the results of the macro stress testing for individual financial institutions outlined in this *Report*, among other information, the Bank intends to increase its dialogue with financial institutions in order to promote a deeper common understanding with regard to resilience to stress.

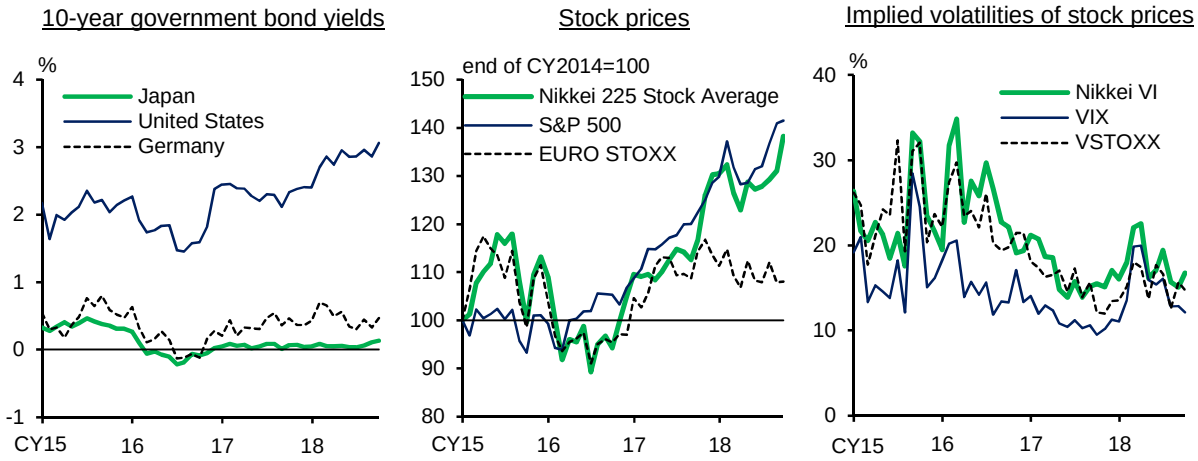
II. Risks observed in financial markets

This chapter summarizes the developments in financial markets at home and abroad mainly during the first half of fiscal 2018 and examines the risks observed.[1]

A. Global financial markets

Global financial markets have shown some volatile movements against the background of U.S. trade tensions, U.S. policy rate hikes, and uncertainties over geopolitical developments in emerging market economies and southern Europe. Although the world economy is likely to continue to grow steadily, continued attention should be paid to whether large capital outflows from emerging markets and a repricing of risky assets will spread out (Chart II-1-1).

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



Note: Latest data as at end-September 2018.
Source: Bloomberg.

U.S. and European long-term interest rates

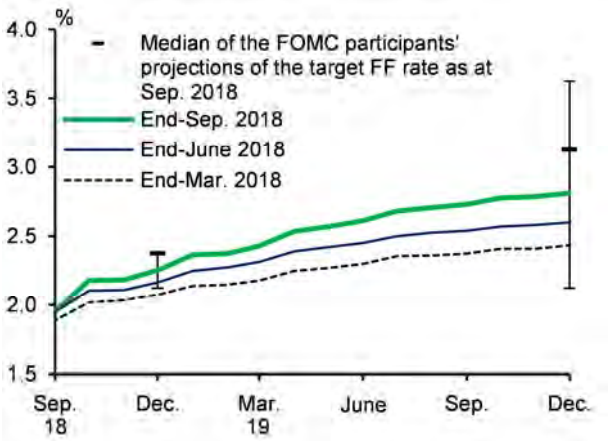
In the United States, the Federal Reserve (FRB) raised its policy rate by 25 basis points in each of the Federal Open Market Committee (FOMC) meetings held in June and September 2018. Another rate hike during 2018 has already been factored in by the markets, given the favorable economic conditions and that the inflation rate has already reached the 2 percent goal (Chart II-1-2). Although expected short-term interest rates have risen amid successive policy rate hikes, term premiums have remained at subdued levels compared to the past. Thus, the pace of rise in U.S. long-term interest rates has been moderate (Chart II-1-3). However, term premiums could snap back, leading to a sharp rise in long-term interest rates in cases where (1) the inflation rate rises at a faster pace than market expectations, thereby increasing uncertainty over the future path of monetary policy, and (2) the supply and demand conditions of U.S. Treasuries loosen further along with expansionary fiscal policy.

In Europe, Italian government bond yields rose sharply at the end of May 2018, reflecting rapidly growing concern over political developments in the country, and this partly affected some other peripheral European countries (Chart II-1-4). After the Turkish lira plummeted in mid-August, the

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

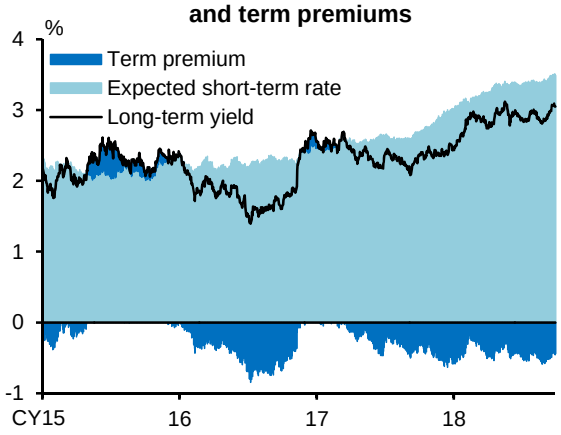
markets showed some nervous movements on concerns about the risks associated with the exposure to Turkey held by financial institutions in some peripheral European countries (Chart II-1-5). With the amount of government debt outstanding remaining high in these countries, the problems of government and banking sectors, together with their interconnectedness, appear to remain a risk to financial stability.

Chart II-1-2: Federal funds futures curves



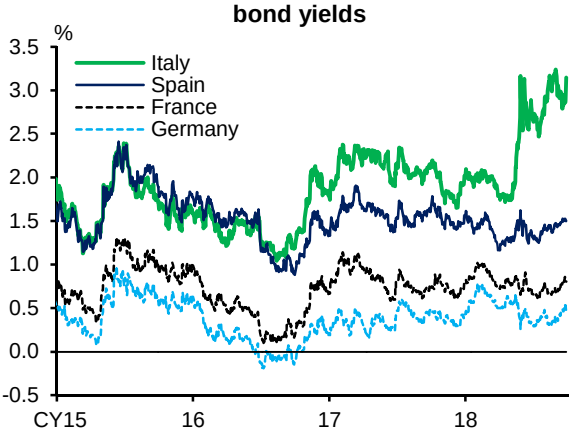
Note: The bars in the chart indicate the range between the maximum and minimum of the FOMC participants' projections of the target federal funds (FF) rate.
Source: Bloomberg; FRB.

Chart II-1-3: U.S. long-term interest rates and term premiums



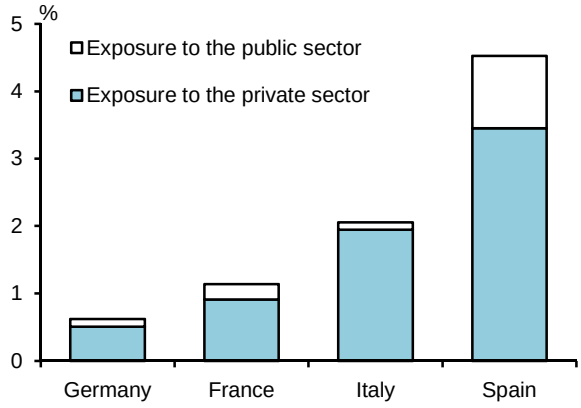
Note: The data are estimated by the Federal Reserve Bank of New York. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-4: 10-year European government bond yields



Note: Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-5: European financial institutions' exposure to Turkey

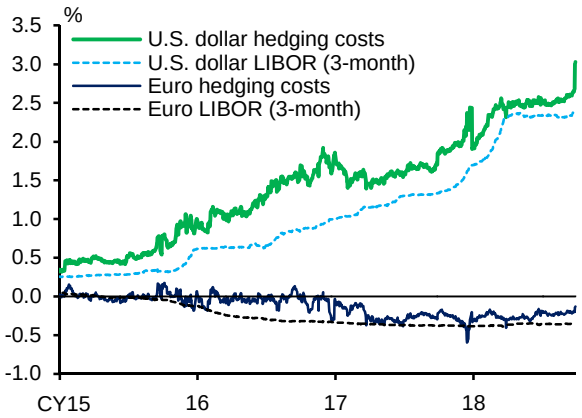


Note: Ratio of claims on Turkey over total claims of the banking sector in each country (excluding claims on residents of that country) (as at end-March 2018; on an ultimate risk basis). "Exposure to the private sector" includes claims on financial institutions.
Source: BIS, "Consolidated banking statistics."

Although yields on German and French government bonds are lower than those on U.S. Treasuries, euro-denominated investment has become more profitable for Japanese investors than U.S. dollar-denominated investment. This is because U.S. dollar hedging costs have risen moderately amid the policy rate hikes by the FRB, and thus returns on yen-hedged U.S. Treasuries have decreased (Charts II-1-6 and II-1-7). On the other hand, as the European Central Bank (ECB) has kept financial conditions accommodative, euro hedging costs have remained low, making returns on yen-hedged German and French government bonds relatively high. As a result, some Japanese institutional investors, such as life insurance companies, have rebalanced

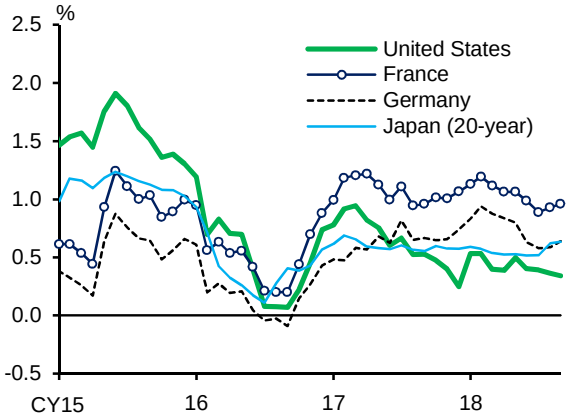
portfolios from U.S. dollar-denominated bonds to euro-denominated bonds (Chart II-1-8).

Chart II-1-6: Foreign currency hedging costs



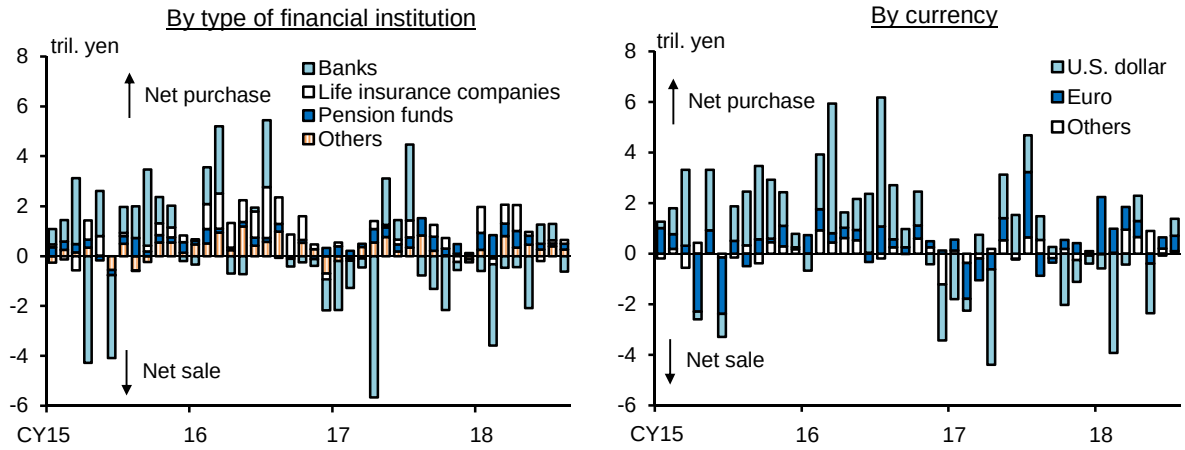
Note: 1."U.S. dollar hedging costs" and "euro hedging costs" indicate FX swap-implied U.S. dollar and euro rates (3-month), respectively.
2. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-7: Yields on yen-hedged foreign currency-denominated bonds



Note: 1. "United States" indicates 10-year U.S. Treasury yields after subtracting U.S. dollar hedging costs (3-month). "France" and "Germany" indicate corresponding 10-year government bond yields after subtracting euro hedging costs (3-month). "Japan" indicates 20-year JGB yields.
2. Monthly average. Latest data as at September 2018.
Source: Bloomberg.

Chart II-1-8: Outward portfolio investment from Japan



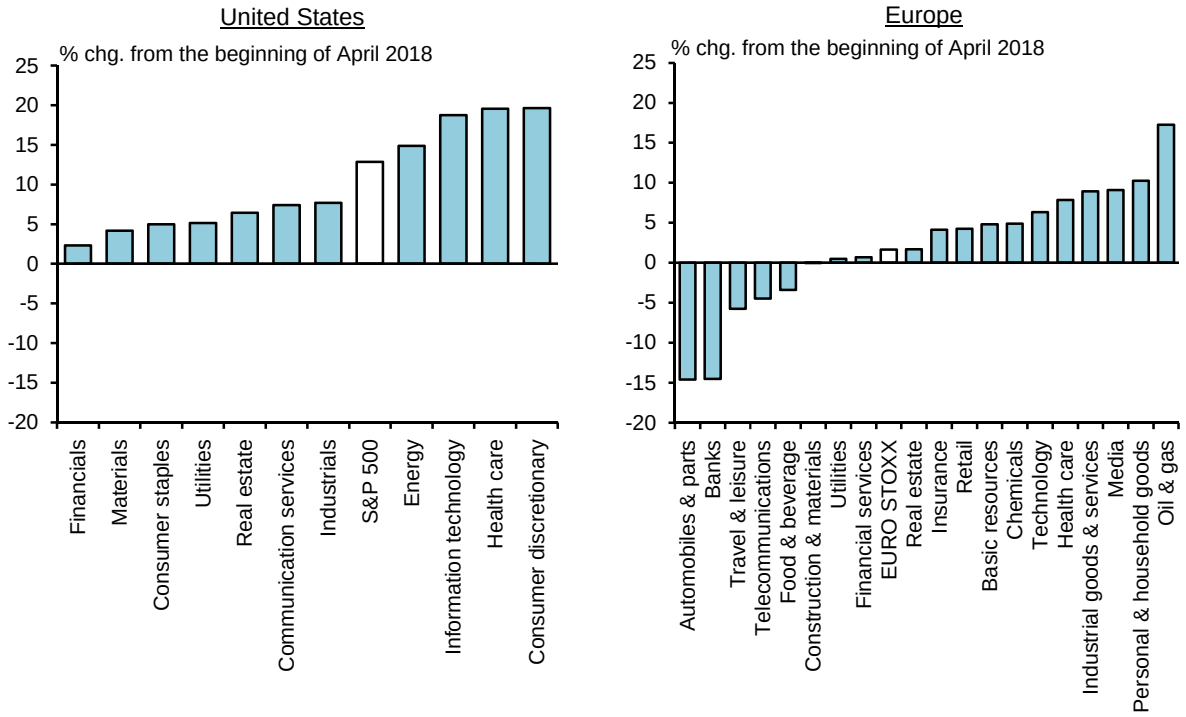
Note: 1. Net investments in medium- to long-term bonds. In the left-hand chart, "Banks" indicates deposit-taking corporations and "Pension funds" indicates trust accounts of banks and trust banks.
2. The latest data in the left-hand chart are as at August 2018 and the latest data in the right-hand chart are as at July 2018.
Source: Ministry of Finance; BOJ.

U.S. and European stock prices

U.S. and European stock prices have been supported by strong corporate earnings and stock repurchases, although uncertainty over trade tensions has put downward pressure on them. U.S. stock prices reached a record high in September 2018, owing to an improvement in corporate profits (Chart II-1-1). By sector, the automobile and capital goods sectors -- which are among those most susceptible to trade tensions -- have underperformed stock indices both in the United States and Europe. In Europe, the financial sector has also dragged down stock prices (Chart II-1-9). Meanwhile, in the United States, stock markets have been susceptible to price swings of high-tech stocks and have shown some volatile movements as interest rates have continued to rise. The active inflow of funds into high-tech stocks seems to be driven not only by positive

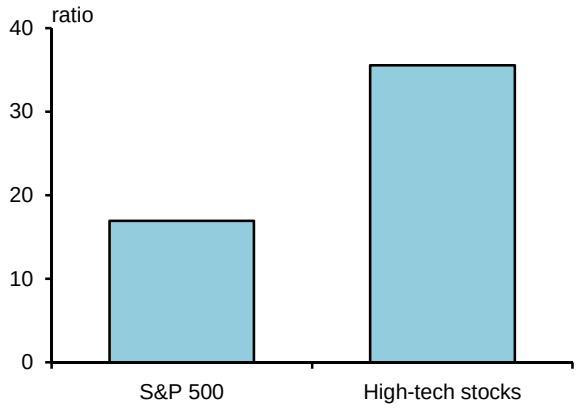
expectations for high-tech firms' earnings but also by investors' view that there are no promising alternatives; indeed, they seem to justify such a view by indicating that high-tech firms might be resilient to trade disputes compared to other firms because their businesses are not intrinsically limited by the existence of borders. Some market participants have pointed out signs of overheating in high-tech stocks and therefore attention should be paid to future developments (Chart II-1-10).

Chart II-1-9: U.S. and European stock price performance by sector



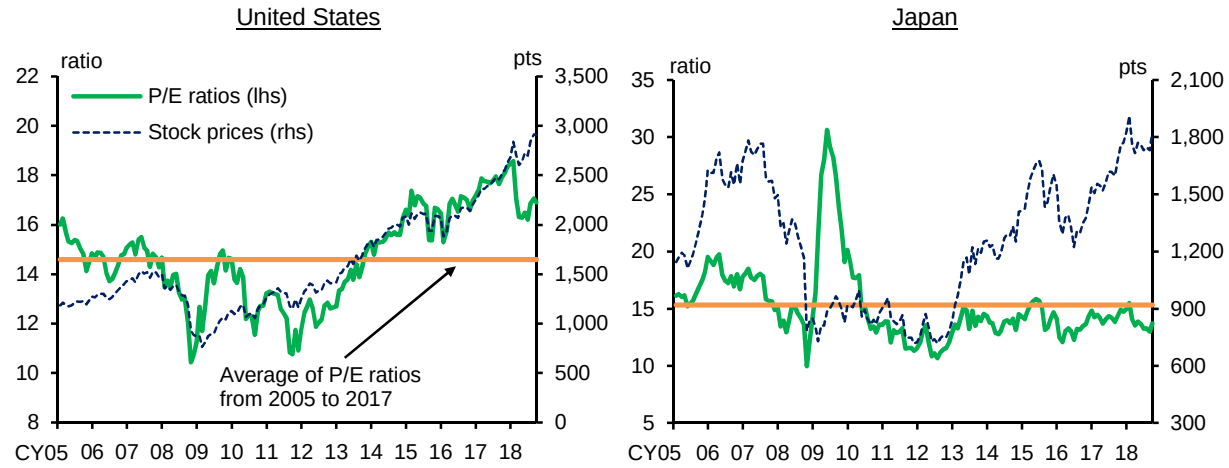
Note: In the left-hand chart, the figures indicate changes by sector in the S&P 500. In the right-hand chart, the figures indicate changes by sector in the EURO STOXX. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-10: P/E ratios in the high-tech sector



Note: 1. "High-tech stocks" indicates constituents of the NYSE FANG+ Index.
2. Latest data as at end-September 2018.
Source: Bloomberg; Thomson Reuters Japan.

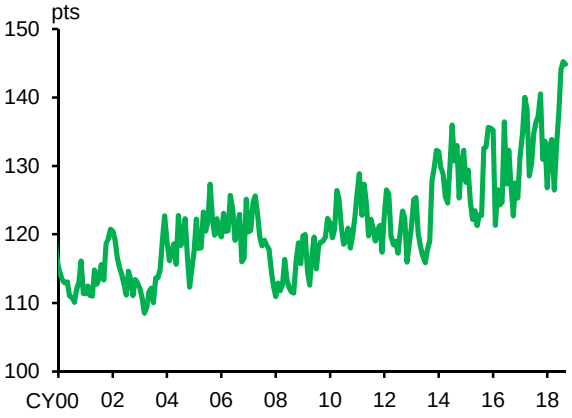
Chart II-1-11: Stock prices and valuation



Note: 1. "Stock prices" indicates the S&P 500 for the United States and the TOPIX for Japan. "P/E ratios" is calculated using expected EPS for the next 12 months.
2. Latest data as at September 2018.
Source: Thomson Reuters Japan.

U.S. stock price valuation indicators (price earnings [P/E] ratios) declined at the beginning of 2018, but they have still exceeded past averages (Chart II-1-11). This implies the risk of stock price adjustments. In fact, a tail risk indicator (SKEW) extracted from the stock options market has continued to rise (Chart II-1-12). Given this fact, a repricing of assets such as stocks could spread out, triggered by a snapback in interest rates, among other events.

Chart II-1-12: Tail risk indicator (SKEW) of U.S. stock prices

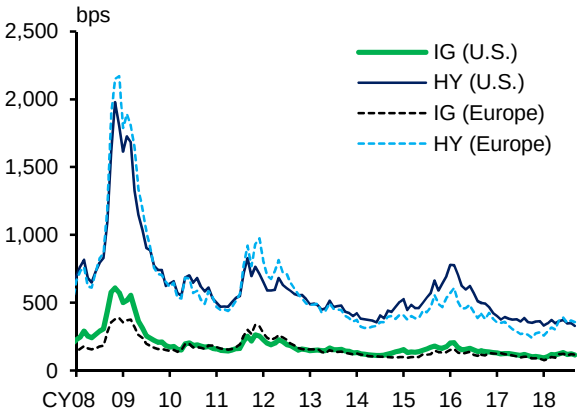


Note: 1. Calculated by the CBOE.
2. Monthly average. Latest data as at September 2018.
Source: Bloomberg.

Risks in U.S. and European credit markets

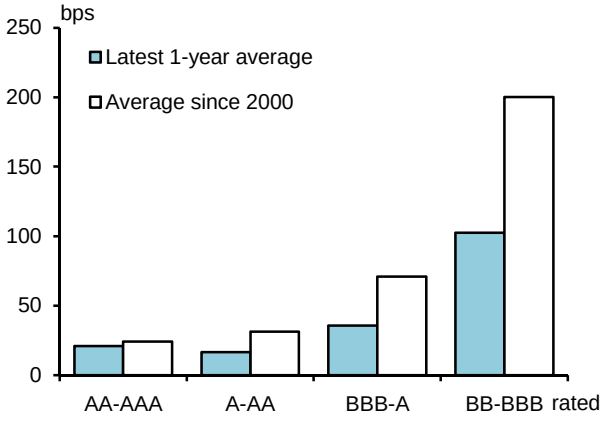
In advanced economies' credit markets, credit spreads have generally stayed low, although they temporarily widened somewhat due to heightened uncertainty over U.S. trade tensions (Chart II-1-13). The difference in credit spreads across rating classes has continued to be extremely compressed (Chart II-1-14). Both the overall strong corporate profits and investors' search for yield have contributed significantly to narrowing credit spreads. Under such circumstances, looking at the amount of corporate bonds outstanding, the share of BBB-rated bonds -- the lowest grade bonds of investment grade -- has continued to rise, reaching about 50 percent in the United States and Europe recently (Chart II-1-15).

Chart II-1-13: Credit spreads on U.S. and European corporate bonds



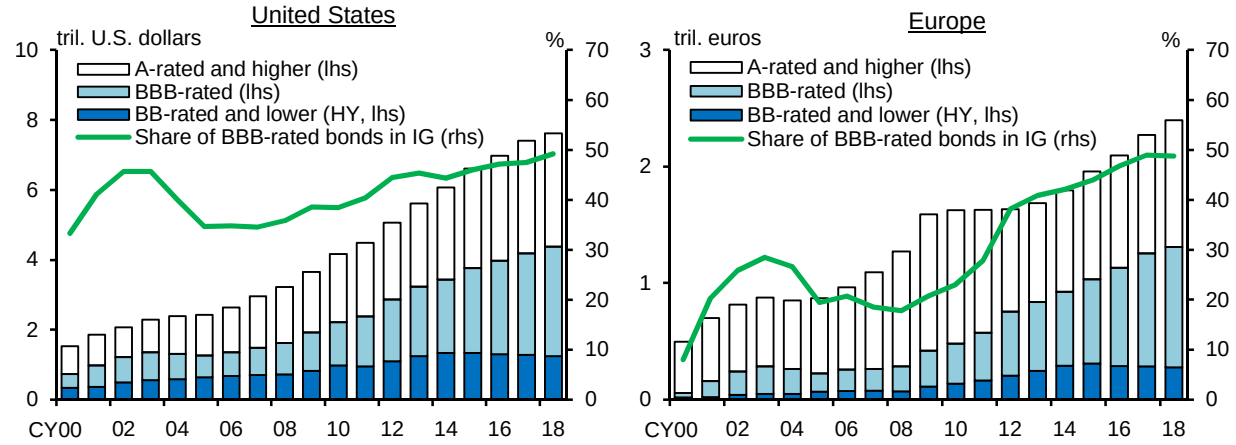
Note: 1. "IG" and "HY" indicate investment-grade bonds and high-yield bonds, respectively. Calculated by ICE Data Indices.
2. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-14: Differences in credit spreads across rating classes



Note: 1. Differences in credit spreads calculated by ICE Data Indices on U.S. corporate bonds (with remaining maturity of 3 or more years but less than 5 years) between two rating classes.
2. Latest data as at end-September 2018.
Source: Bloomberg.

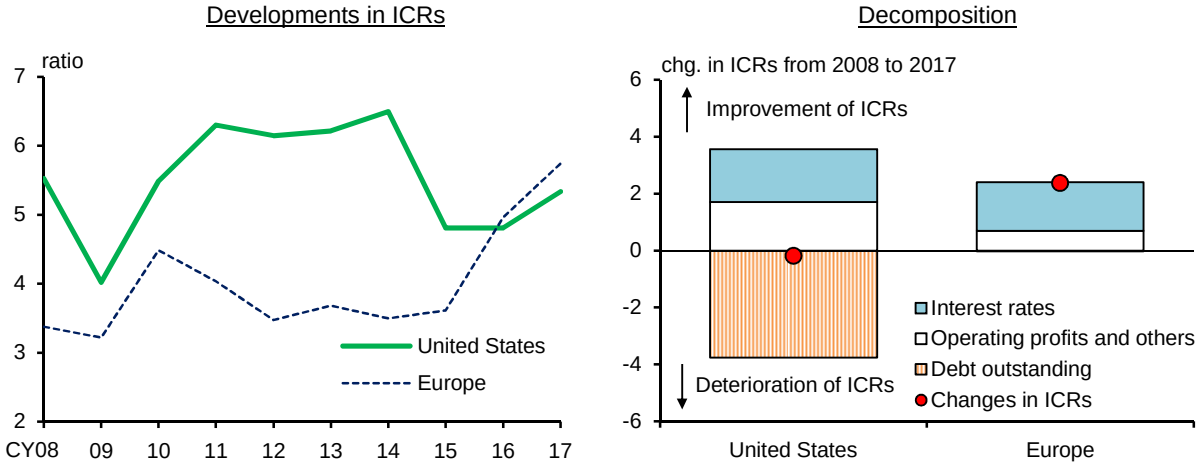
Chart II-1-15: Share of BBB-rated bonds in U.S. and European corporate bond markets



Note: 1. "IG" and "HY" indicate investment-grade bonds and high-yield bonds, respectively. Calculated by ICE Data Indices (on a face value basis).
2. The data are as at the end of each year (the data for 2018 are as at end-September 2018).
Source: Bloomberg.

There are risks that credit spreads that have tightened under the low interest rate environment could widen sharply if the interest rate environment and economic conditions were to change significantly. In fact, the decomposition of post-financial-crisis changes in the interest coverage ratios (ICRs; defined as operating profits / interest payments) of currently BBB-rated firms shows that, for U.S. firms, lower interest payments have offset increases in leverage, leaving the ICRs of these firms more or less unchanged. For European firms, most of the post-crisis changes in the ICRs can be attributed to positive impacts of low interest rates (Chart II-1-16). Therefore, if financial conditions change and the positive impact on ICRs of the low interest rates dissipates, then BBB-rated corporate bonds -- which have rapidly expanded their share in total issuance -- could be downgraded to speculative grade, which could in turn lead to an abrupt increase in credit spreads.

Chart II-1-16: ICRs of BBB-rated U.S. and European firms



Note: 1. Both the left- and right-hand charts cover firms for which financial indicators are available since 2008 and that have ratings of BBB+, BBB, or BBB- as at end-July 2018 among those listed in the investment-grade corporate bond index calculated by ICE Data Indices. "Europe" covers firms in the EU member states excluding the United Kingdom. The charts exclude firms whose debt outstanding, operating profits, or interest payments show extremely large changes.
2. ICR = operating profits / interest payments.
3. The right-hand chart shows the decomposition of cumulative year-on-year changes in ICRs from 2008 to 2017 into changes in (1) debt outstanding, (2) interest rates, and (3) operating profits and others including estimation errors. Operating profits indicate EBIT (earnings before interest and taxes). The changes in debt outstanding and operating profits are deflated by the GDP deflator.

Source: Bloomberg.

Risks in emerging markets

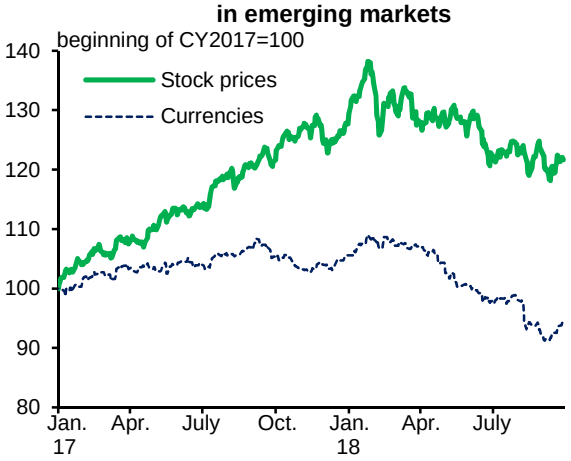
In emerging markets, the extent of declines in stock prices and depreciations of currencies, as well as the scale of capital outflows, has so far been generally limited, even though market participants have paid attention to the risks of capital outflows from emerging market economies amid successive policy rate hikes by the FRB (Charts II-1-17 and II-1-18). The rise in emerging market government bond yields has also been relatively muted (Chart II-1-19). However, some emerging markets -- such as Argentina and Turkey, which have individual vulnerabilities, including higher inflation and chronic twin deficits (current account and fiscal deficits) -- have continued to exhibit volatile market movements in the form of significant depreciations of their currencies and large drops in stock prices (Chart II-1-20). Although the repercussions of developments in such individual markets in the global financial markets have generally been limited to date, attention should be paid to whether turmoil in these markets would spill over to the overall global financial markets.

Attention should also be paid to whether U.S. trade tensions could affect emerging market currencies. In fact, in the phase of heightened concerns over U.S.-China trade disputes, the currencies of countries with close geographical and economic ties to China weakened overall (Chart II-1-21). For China itself, the Chinese renminbi has depreciated against the U.S. dollar to close to its historically low level since its devaluation in August 2015. Furthermore, Chinese stocks have continued to show sluggish movements (Chart II-1-22). Under such circumstances, the Chinese authorities have taken measures to address capital outflows and foreign exchange (FX) risks. For example, they raised the FX risk reserve requirement on banks (from 0 to 20 percent)[2]

[2] Under the FX risk reserve requirement, financial institutions are required to accumulate 20 percent of the aggregate amount of FX forward contracts with clients at the People's Bank of China (PBC) as "foreign exchange risk reserves." There is a possibility that Chinese renminbi shorting contracts at a future date (and financial institutions' cover deals) would be reduced if additional costs were passed onto clients.

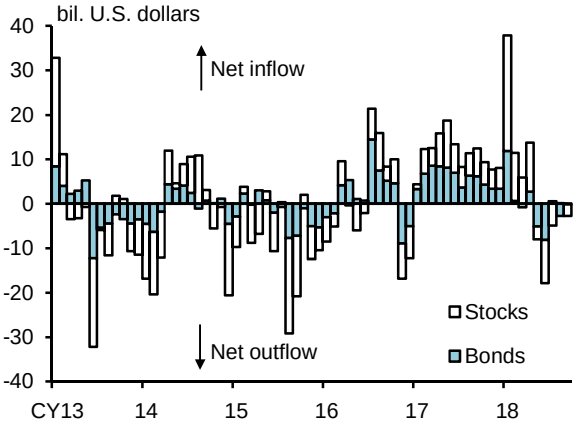
and also reintroduced a counter-cyclical factor for calculating the Chinese renminbi's reference rate against the U.S. dollar.[3] Nevertheless, the markets can be regarded as relatively calm compared to the period from mid-2015 to the beginning of 2016 (the so-called China shock), when Chinese stocks declined significantly.

Chart II-1-17: Stock prices and currencies in emerging markets



Note: "Stock prices" indicates the MSCI Emerging Markets Index (denominated in local currencies). "Currencies" indicates the J.P. Morgan EMCI Index. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-1-18: Net flows in emerging market funds

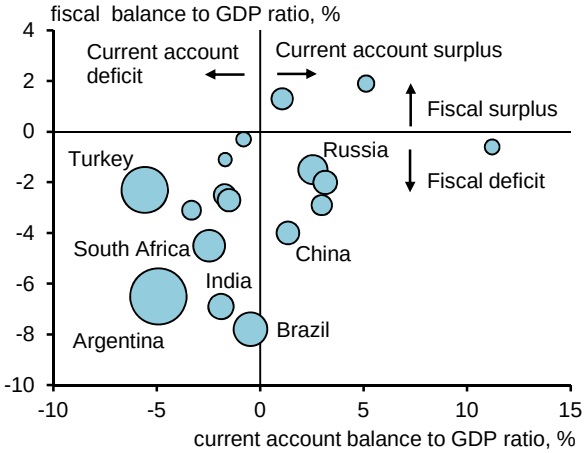


Note: Latest data as at September 2018 (up to September 26, 2018).
Source: EPFR Global.

Chart II-1-19: Yield spreads of emerging market government bonds over U.S. Treasuries

Note: Yield spreads of the EMBI Global over U.S. Treasuries. Latest data as at end-September 2018.
Source: Bloomberg.

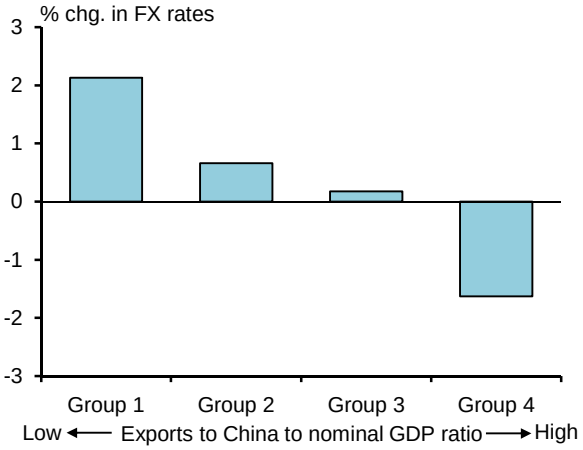
Chart II-1-20: Current account and fiscal balances and changes in FX rates



Note: 1. The size of the bubbles in the chart indicates the magnitude of the percentage decline in each currency's FX rates against the U.S. dollar from April 1 to end-September 2018. The current account balance to GDP ratio and the fiscal balance to GDP ratio are as at 2017.
2. Covers Chile, Columbia, the Czech Republic, Hungary, Indonesia, Malaysia, Mexico, the Philippines, South Korea, and Thailand as well as the countries labeled in the chart.
Source: Bloomberg; Haver Analytics.

[3] The counter-cyclical factor is an adjustment added in the formula used by Chinese market-maker banks to calculate and report the renminbi's reference rate to Chinese authorities. It was first introduced in May 2017 to mitigate unilateral changes in the Chinese renminbi exchange rate.

Chart II-1-21: Exports to China and changes in FX rates



Note: 1. Emerging markets (16 out of those covered in Chart II-1-20, excluding China) are categorized into four groups by quartile of the ratio of exports to China to nominal GDP, and the average change in FX rates is calculated for each group.
2. Changes in FX rates indicate changes in those against the U.S. dollar from June 14, 2018 (a day before the United States released a list of about 50 billion U.S. dollars' worth of products imported from China that are subject to additional tariffs) to end-July 2018.
Source: Bloomberg; Haver Analytics.

Chart II-1-22: Chinese stock prices and the Chinese renminbi

Note: 1. "U.S. dollar/Chinese renminbi" indicates FX rates in the onshore market. "Chinese stock prices" indicates the Shanghai Composite Index.
2. Latest data as at end-September 2018.
Source: Bloomberg.

B. Japanese financial markets

In Japanese financial markets, long-term interest rates have been hovering at around 0 percent in positive territory and have risen somewhat since the end of July 2018, when the Bank of Japan strengthened the framework for continuous powerful monetary easing. Although stock prices temporarily declined, mainly reflecting heightened concerns over U.S.-China trade disputes, they have been supported by strong corporate profits. Credit spreads on corporate bonds have remained at low levels.

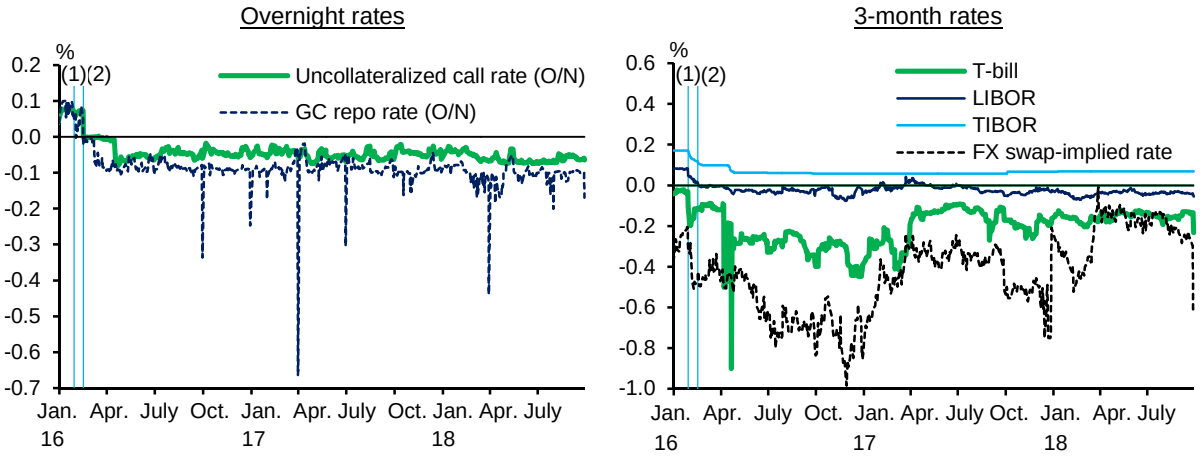
Short- and long-term interest rates

Short-term interest rates -- on both overnight and term instruments -- have been in negative territory on the whole (Chart II-2-1). The uncollateralized call rate (O/N) has hovered around the neighborhood between minus 0.08 and minus 0.03 percent. The GC repo rate has remained at approximately minus 0.20 to minus 0.05 percent. Rates on term instruments have remained at around 0 percent or in negative territory. Yields on Treasury bills (T-bills) have hovered at around minus 0.15 percent. Although FX swap-implied yen rates maturing beyond the year-end temporarily expanded their negative premium at the end of September 2018, these rates have risen while remaining in negative territory, smoothing through such variations. This is because Japanese investors' demand for dollar funds has decreased due to the lower returns on U.S. dollar-denominated bonds, with dollar hedging costs remaining high (Charts II-1-6 and II-1-7).

The 10-year JGB yields have been hovering at around 0 percent in positive territory, and have risen somewhat since the end of July 2018 when the Bank strengthened the framework for continuous powerful monetary easing (Chart II-2-2). Under Quantitative and Qualitative Monetary Easing (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 (Chart II-2-3).

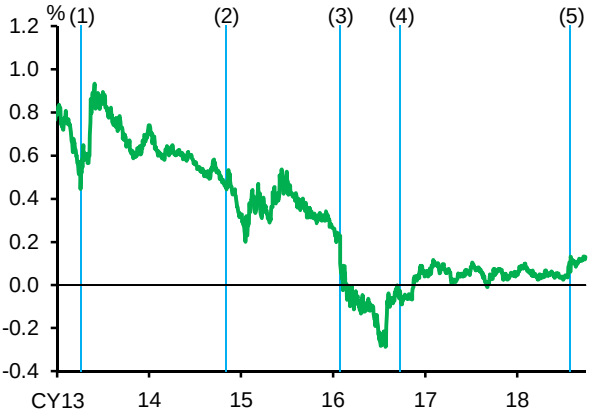
Chart II-2-1: Short-term rates



Note: 1. (1) indicates the date of the decision of introducing QQE with a Negative Interest Rate; (2) indicates the effective application date of the negative interest rate.
2. In the left-hand chart, the horizontal axis indicates the starting dates of transaction settlement. "GC repo rate (O/N)" up to April 27, 2018 indicates T/N rates. In both the left- and right-hand charts, the latest data are as at end-September 2018.

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

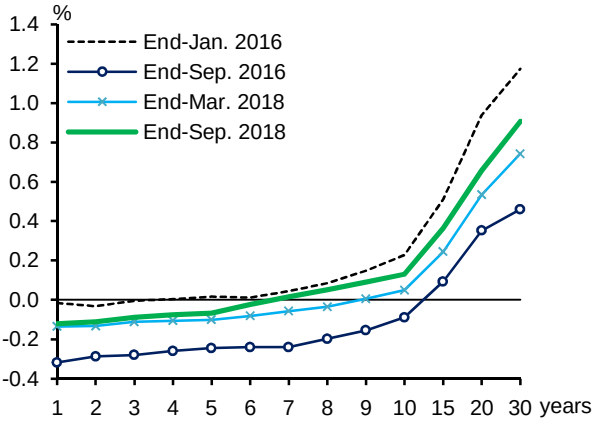
Chart II-2-2: 10-year JGB yields



Note: 1. The vertical lines in the chart indicate (1) the introduction of QQE, (2) the expansion of QQE, (3) the introduction of QQE with a Negative Interest Rate, (4) the introduction of QQE with Yield Curve Control, and (5) the announcement of strengthening the framework for continuous powerful monetary easing.
2. Latest data as at end-September 2018.

Source: Bloomberg.

Chart II-2-3: JGB yield curves



Source: Bloomberg.

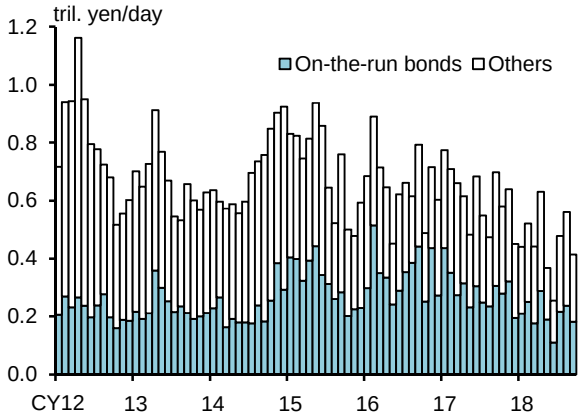
Liquidity and functioning of JGB markets

Liquidity and the degree of functioning of JGB markets have remained low overall, although some indicators have shown signs of improvement recently. After the end of July 2018, when the Bank strengthened the framework for continuous powerful monetary easing, inter-dealer transaction volume for cash JGBs, which had been sluggish until then, rose temporarily as volatility increased

somewhat (Chart II-2-4).[4] In the latest *Bond Market Survey* (August 2018), although the diffusion index for the degree of bond market functioning from the surveyed institutions' viewpoint has remained in deep negative territory, some institutions have noted that the degree of functioning has been improving (Chart II-2-5).

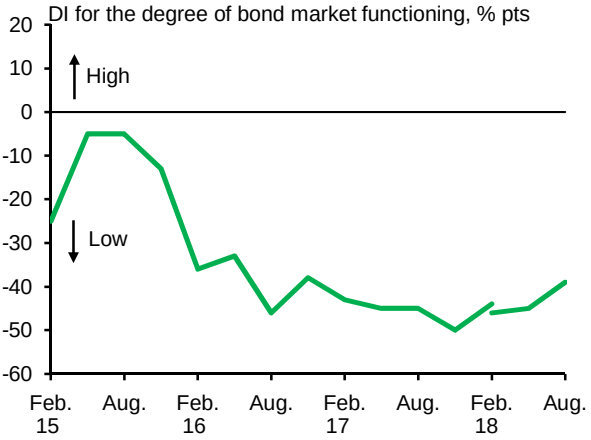
Indicators for market depth and resiliency showed some deterioration, reflecting the increase in volatility at around end-July, but have generally remained stable (Chart II-2-6). GC-SC repo rate spreads -- which indicate scarcity in specific issues -- have continued to be relatively high, implying that the supply and demand conditions of JGBs have remained tight overall (Chart II-2-7).

Chart II-2-4: Transaction volume in JGB markets



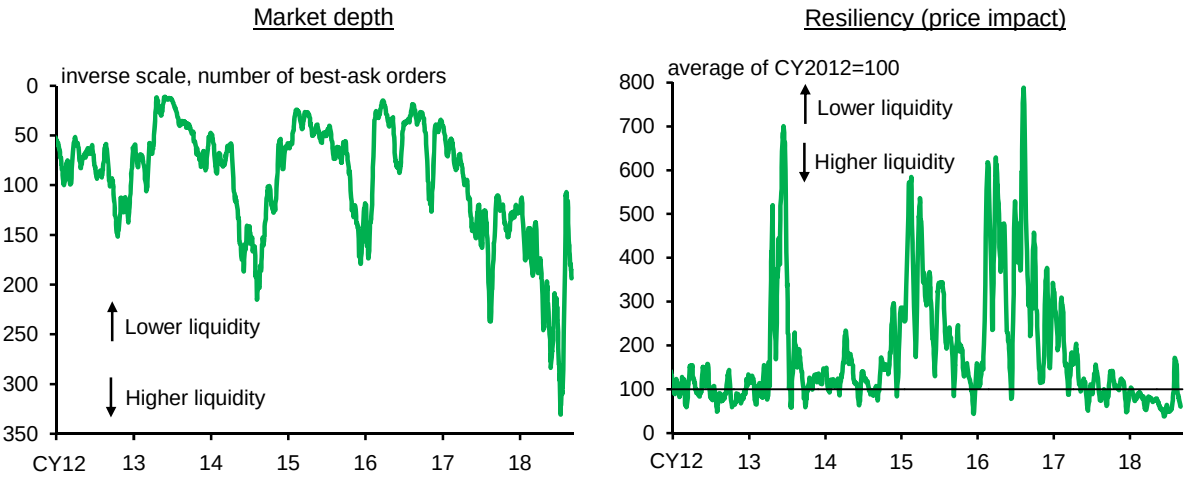
Note: Inter-dealer transaction volume for cash JGBs (2-, 5-, 10-, 20-, 30-, and 40-year JGBs) via Japan Bond Trading. Latest data as at September 2018.
Source: QUICK.

Chart II-2-5: Bond market survey



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

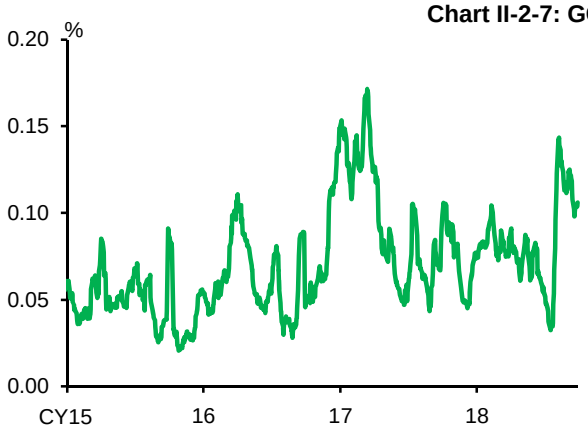
Chart II-2-6: Market depth and resiliency in JGB markets



Note: 1. In the left-hand chart, the figures are the number of orders at the best-ask price with a 1-minute frequency (median for each business day). In the right-hand chart, the figures indicate price changes per unit volume of transactions for each business day.
2. 10-day backward moving averages. Latest data as at end-August 2018.
Source: Nikkei, "NEEDS."

[4] The Financial Markets Department of the Bank of Japan updates and releases liquidity indicators of the JGB markets, generally on a quarterly basis (http://www.boj.or.jp/en/paym/bond/index.htm/#p02).

Chart II-2-7: GC-SC repo rate spreads



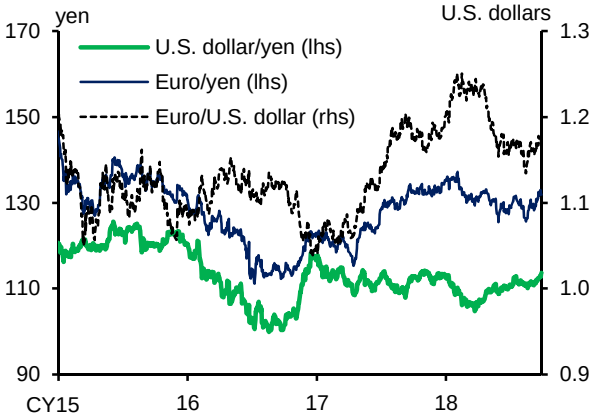
Note: 1. The data are calculated using GC repo rates and SC repo rates (average rates weighted by the trading volume of SC repos by issue) in transactions with the same settlement dates. 10-day backward moving averages.
2. Latest data as at end-September 2018.
Source: JBond Totan Securities; JSDA.

FX markets and stock and credit markets

In FX markets, the yen appreciated against the U.S. dollar during the phase of a decline in stock prices at the beginning of 2018, reflecting market participants' increased preference for the yen as a safe asset. Thereafter, the yen has depreciated, with some fluctuations, against the U.S. dollar due to a widening of interest rate differentials between Japan and the United States amid the policy rate hikes by the FRB (Chart II-2-8). However, the yen temporarily appreciated against the U.S. dollar in the phase of heightened concerns over U.S.-China trade disputes (Chart II-2-9). Risk reversals have continued to suggest market participants' vigilance against the yen's appreciation (Chart II-2-10).

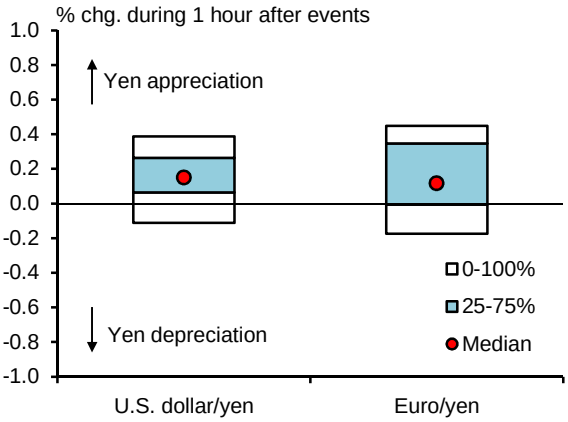
Japanese stock prices (Nikkei 225 Stock Average) marked a record high at the end of September 2018 for the post-bubble period on the back of strong corporate profits. However, throughout the first half of fiscal 2018, they have shown large fluctuations mainly due to uncertainty over U.S. trade tensions (Chart II-1-1). Intensified U.S.-China trade disputes, which have led to the underperformance of China-related stocks, have contributed to pushing down overall Japanese stock prices. In fact, an increase in co-movement between Japanese and Chinese stock prices has been observed recently (Charts II-2-11 and II-2-12). However, while valuation indicators for

Chart II-2-8: FX rates



Note: Latest data as at end-September 2018.
Source: Bloomberg.

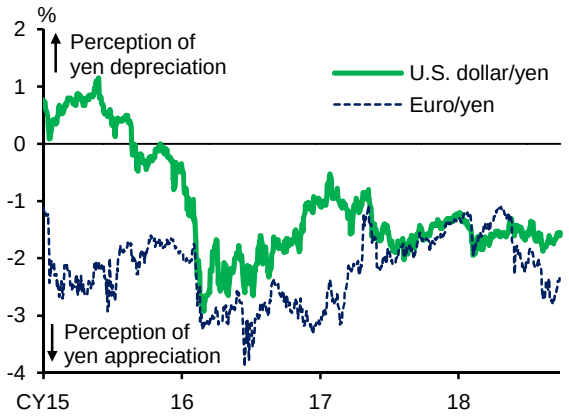
Chart II-2-9: Responses to trade policy-related events in the yen FX market



Note: Changes in yen FX rates during one hour after 16 major U.S. trade policy-related events from March 1 to September 15, 2018.
Source: Bloomberg.

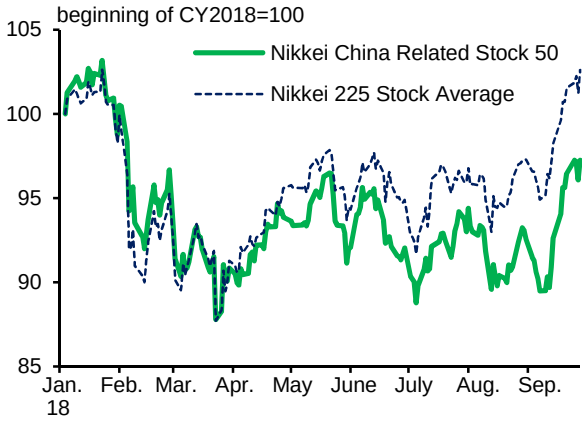
Japanese stocks (P/E ratios) -- unlike in the United States -- have not significantly exceeded past averages, strong corporate earnings have continued to support stock prices (Chart II-1-11). Credit spreads on corporate bonds have also remained stable at low levels and have not been significantly affected by some volatile movements in global financial markets (Chart II-2-13).

Chart II-2-10: Risk reversals



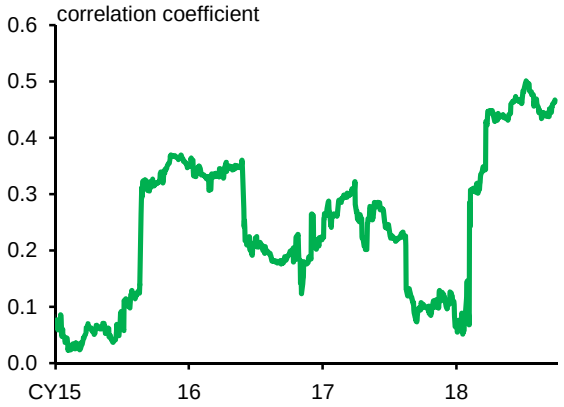
Note: Deviation between implied volatilities (1-year) of yen put and call options. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-2-11: Performance of China-related stocks



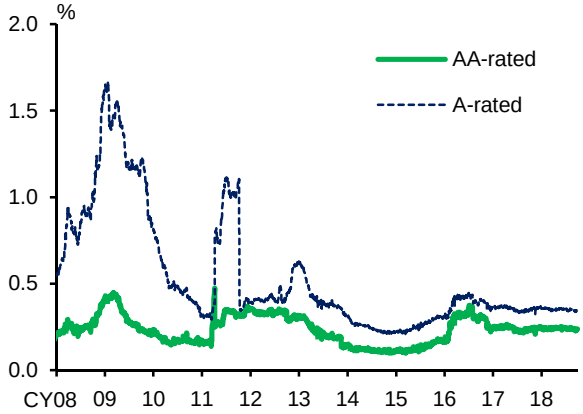
Note: Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-2-12: Co-movements between Japanese and Chinese stock prices



Note: The data are 200-day rolling correlation coefficients of daily earning rates in the TOPIX and the Shanghai Composite Index. Latest data as at end-September 2018.
Source: Bloomberg.

Chart II-2-13: 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 2018.
Source: Bloomberg; JSDA.

III. Examination of financial intermediation

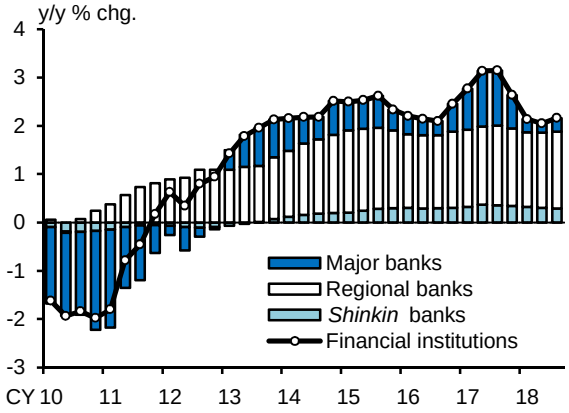
With Japan's economy expanding moderately, domestic financial intermediation -- particularly bank lending -- has continued to be active. The accommodative financial conditions have contributed to economic expansion. For example, business fixed investment-related lending to small firms has increased across a wide range of industries. Moreover, with overseas economies growing steadily, financial institutions have maintained the upward momentum of their overseas investment and lending activities. The sections below examine developments in financial intermediation, based mainly on information that was available in the first half of fiscal 2018. Specifically, we start by providing a detailed assessment of financial intermediation by financial institutions (banks and *shinkin* banks) and then outline financial intermediation by institutional investors, particularly life insurance companies and pension funds, as well as securities investment trusts. Finally, we describe developments in investment in financial assets and funding activities by the private non-financial sector (i.e., firms and households).

A. Financial intermediation by financial institutions

1. Domestic loans

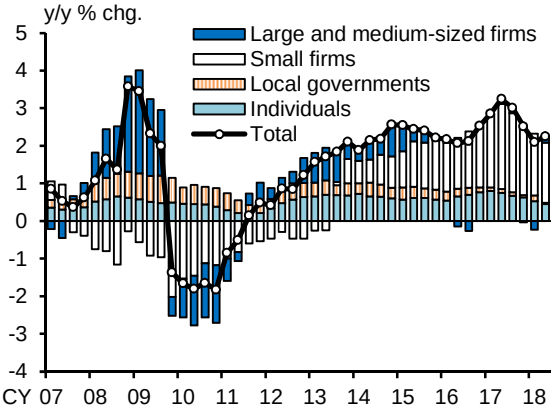
With Japan's economy expanding moderately, financial institutions' domestic loans outstanding have continued to grow at a year-on-year rate of around 2 percent (Charts III-1-1 and III-1-2). Financial institutions' lending stance has remained active, and demand for funds, especially by small firms, has kept increasing (Charts III-1-3 and III-1-4).

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



Note: Latest data as at the July-September quarter of 2018.
Source: BOJ, "Principal figures of financial institutions."

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



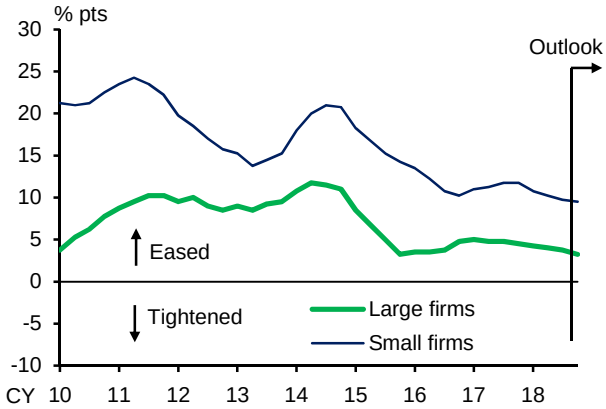
Note: Loans to banks and insurance companies are excluded. Latest data as at end-June 2018.
Source: BOJ.

Developments in loans by type of borrower

Looking at loans by type of borrower, loans to small firms have fueled the growth of total loans, and loans to individuals have also continued to grow (Chart III-1-2). Loans to local governments have been more or less unchanged, reflecting the fact that there has been no notable change in demand (Chart III-1-4).

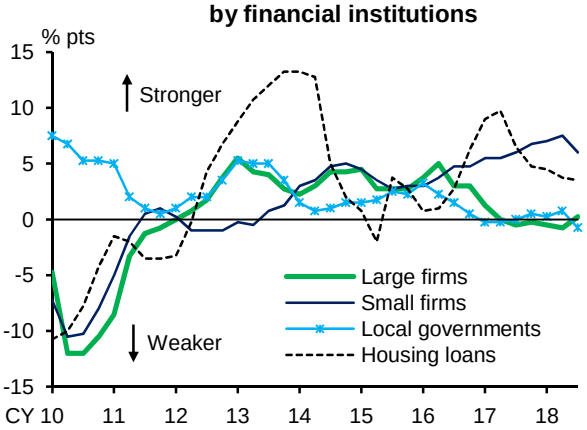
In terms of loans to firms by firm size, loans to small firms -- especially for business fixed investment --

Chart III-1-3: DI of credit standards



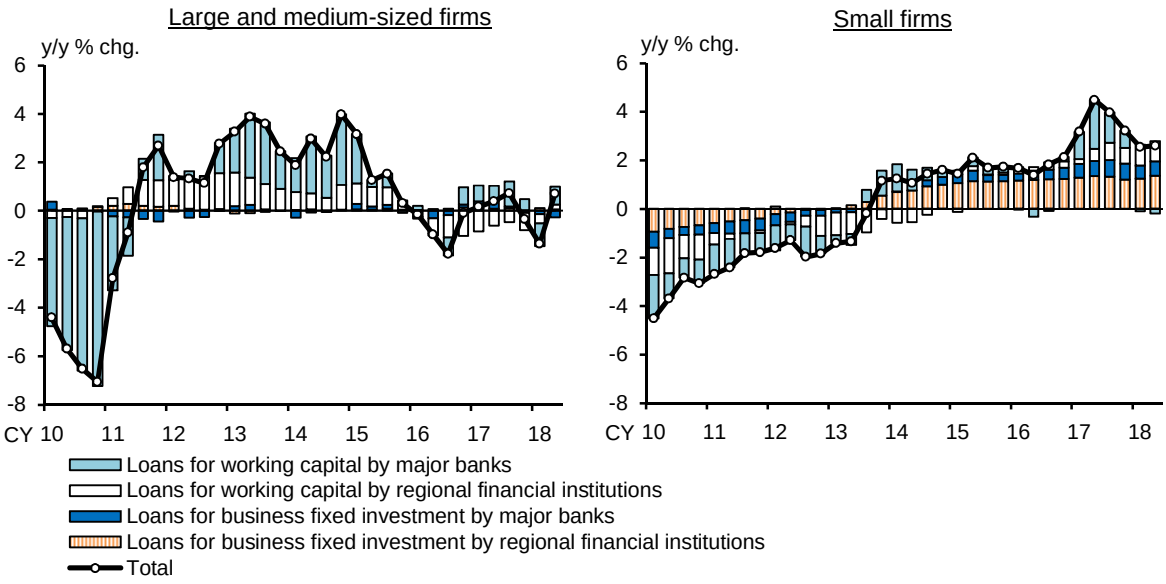
Note: 1. Based on the proportion of responding financial institutions selecting each given choice, the DI is calculated as follows:
DI = "considerably eased" + 0.5 * "somewhat eased" - 0.5 * "somewhat tightened" - "considerably tightened."
2. 4-quarter backward moving averages. Latest data as at July 2018.
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 = "substantially stronger" + 0.5 * "moderately stronger" - 0.5 * "moderately weaker" - "substantially weaker."
2. 4-quarter backward moving averages. Latest data as at July 2018.
Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

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



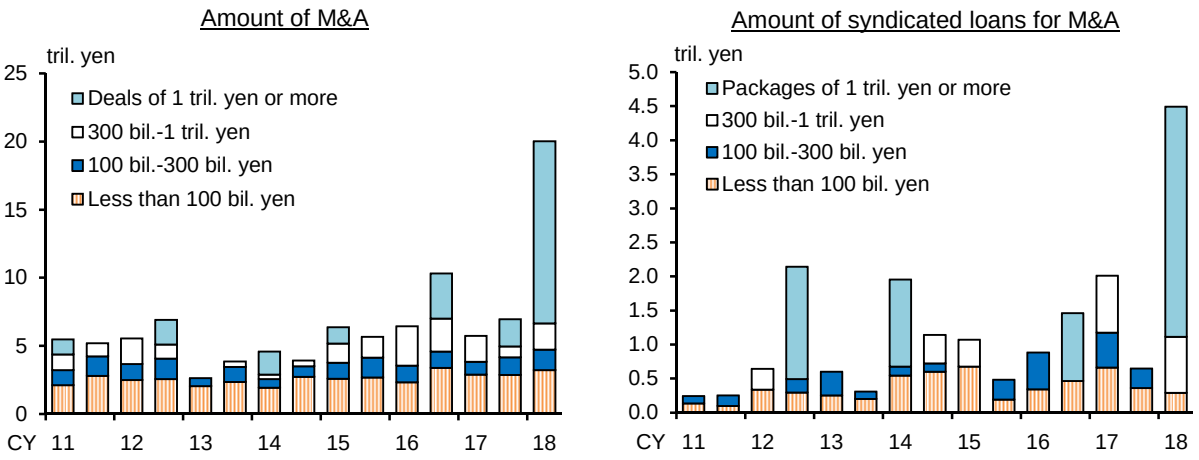
Note: Loans to the real estate industry, banks, and insurance companies are excluded. Latest data as at end-June 2018.
Source: BOJ.

have continued to increase amid the prolonged economic expansion (Chart III-1-5). On the other hand, loans to large firms have been more or less unchanged from the previous year, despite some fluctuations. While no notable rise in loans for business fixed investment has been observed against the background of firms' ample internal funds, the fluctuations in loans to large firms mainly reflect the disbursement of loans related to large-scale merger and acquisition (M&A) deals that are included in loans for working capital.[5] The volume of M&A transactions involving Japanese

[5] In the statistics, loans to holding companies of large firms, including M&A-related loans, are in many cases included in loans to small firms. The reason for this is that many holding companies are treated as small firms in the statistics because, for example, they have only a small number of regular employees.

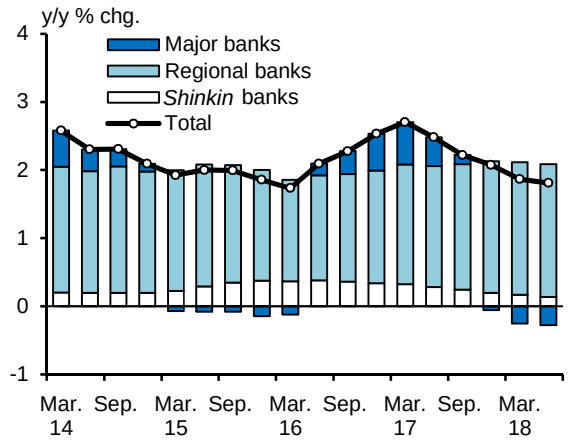
firms has recently reached a record high driven by very large-scale deals. In this environment, many banks have been engaging in lending related to large-scale M&A deals through syndicated loans (Chart III-1-6).[6]

Chart III-1-6: M&A deals related to Japanese firms



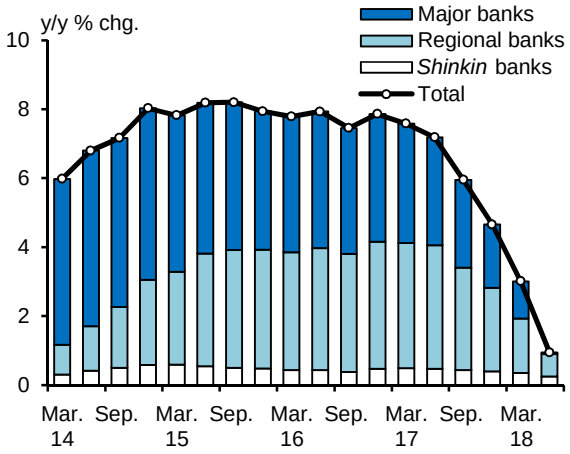
Note: In the left-hand chart, the figures are based on the date of announcement of the deals; excludes deals for banks and insurance companies. Latest data as at the first half of 2018.
Source: RECOF; Thomson Reuters Japan.

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



Note: Latest data as at end-June 2018.
Source: BOJ.

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



Note: Latest data as at end-June 2018.
Source: BOJ.

In terms of loans to individuals, housing loans have continued to grow at a year-on-year rate of around 2 percent (Chart III-1-7). While regional banks have been driving growth, major banks have decreased the outstanding amount of housing loans on a year-on-year basis as they have placed emphasis on profitability. The year-on-year growth rate of card loans has decelerated substantially, reflecting the impact of a review of advertising strategies and a tightening of screening procedures (Chart III-1-8). The share of card loans in the outstanding amount of loans to individuals is about 3

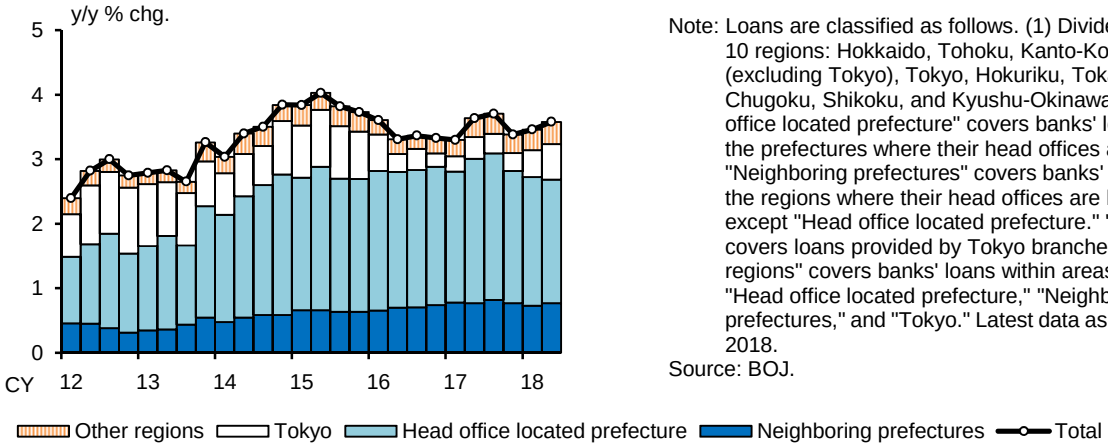
[6] In Chart III-1-6, data for syndicated loans represent the volume of loans arranged at the time of the contract, i.e., the size of the credit line. However, they do not necessarily coincide with developments in loan statistics, mainly because there is a time lag between credit line decisions and loan disbursements, as well as because credit lines are not always fully used.

percent (as at end-June 2018) and therefore small compared to housing loans (the share of which is about 90 percent).

Developments in loans extended by regional financial institutions

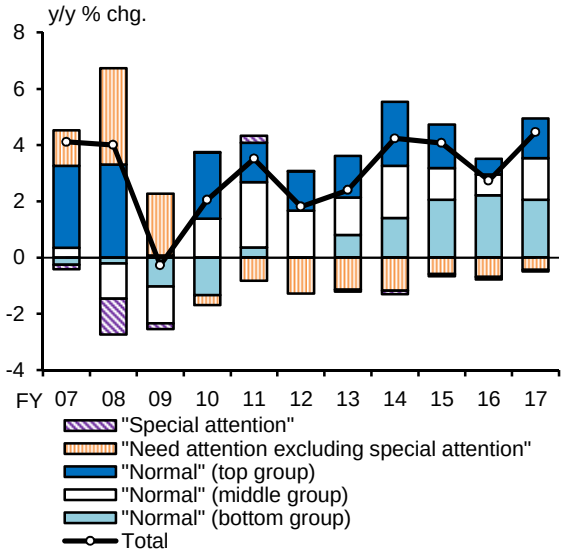
The increase in financial institutions' domestic loans outstanding has been mainly driven by regional banks (Chart III-1-1). Looking at regional banks' loans by region, the positive contribution to loan growth provided by local branches outside Tokyo has been larger than that by Tokyo branches (Chart III-1-9). For the purpose of maintaining and buttressing their own business bases and securing profitability, regional banks have returned the focus of their business operations to their home regions and increased loans in prefectures neighboring their head offices as the effects of economic expansion have spread across the country.

Chart III-1-9: Regional banks' loans outstanding by region



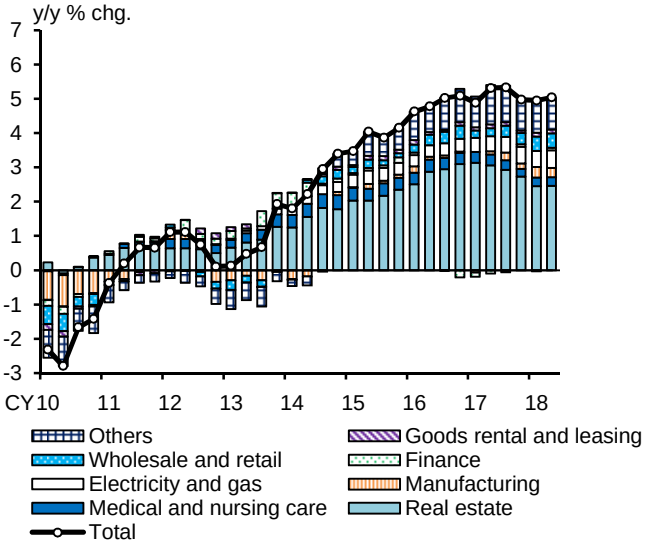
Note: Loans are classified as follows. (1) Divide Japan into 10 regions: Hokkaido, Tohoku, Kanto-Koshinetsu (excluding Tokyo), Tokyo, Hokuriku, Tokai, Kinki, Chugoku, Shikoku, and Kyushu-Okinawa. (2) "Head office located prefecture" covers banks' loans within the prefectures where their head offices are located. "Neighboring prefectures" covers banks' loans within the regions where their head offices are located except "Head office located prefecture." "Tokyo" covers loans provided by Tokyo branches. "Other regions" covers banks' loans within areas other than "Head office located prefecture," "Neighboring prefectures," and "Tokyo." Latest data as at end-June 2018.
Source: BOJ.

Chart III-1-10: Regional banks' loans outstanding by borrower classification



Note: Loans to "normal" borrowers are classified by dividing them into equal thirds from the top according to each bank's internal ratings.
Source: BOJ.

Chart III-1-11: Regional banks' loans outstanding to small firms by industry

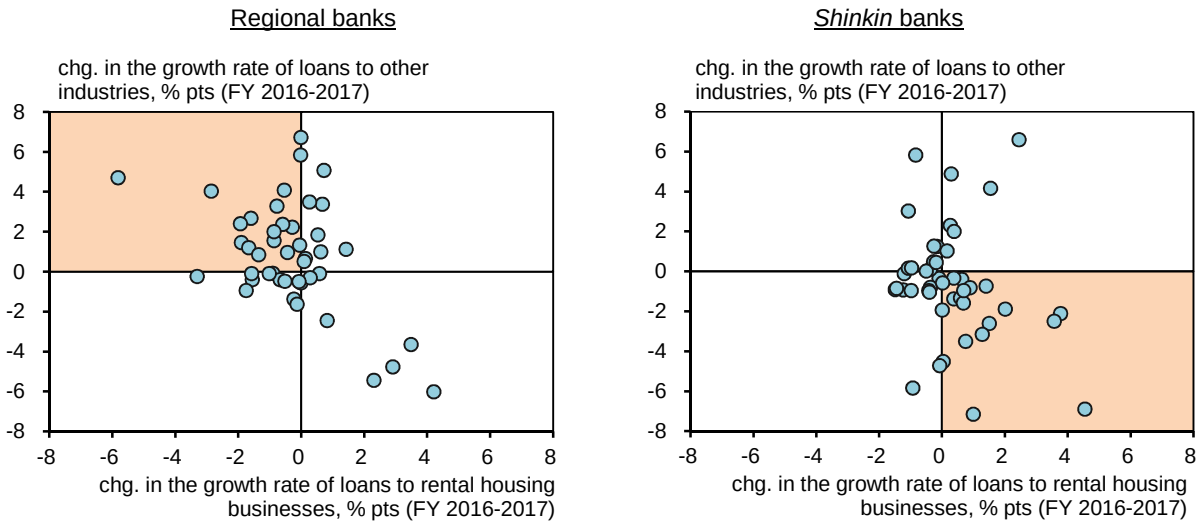


Note: Loans to banks and insurance companies are excluded. Latest data as at end-June 2018.
Source: BOJ.

Looking at regional banks' loans by borrower classification, loans to the bottom group of "normal"

borrowers have been increasing their positive contribution to total loan growth (Chart III-1-10). This mainly reflects an increase in loans to middle-risk firms with relatively low creditworthiness. Moreover, regional banks' loans to small firms have increased across a wide range of industries (Chart III-1-11). While real estate loans, including those for rental housing businesses, still have made a larger contribution to this increase, loans to many other industries, such as medical and nursing care, manufacturing, electricity and gas, wholesale and retail, and other services, have also increased. An increasing number of regional banks have become vigilant against the risks of an adjustment in the rental housing market and credit concentration in the real estate industry. Hence, they have recently turned reluctant to lend to rental housing businesses and have instead increased their focus on lending to other industries, including middle-risk firms (Chart III-1-12). Somewhat contrary to regional banks, some *shinkin* banks have become more active in lending to rental housing businesses while decelerating the growth in lending to other industries.

Chart III-1-12: Regional financial institutions' loans to rental housing businesses and other industries



Note: 1. Covers regional financial institutions.
2. Each axis represents the contribution to year-on-year changes in total loans to small firms.
3. "Loans to other industries" is calculated by excluding loans to rental housing businesses from total loans to small firms.
Source: BOJ.

Developments in real estate loans

The amount of newly extended loans, i.e., the flow of loans, to the real estate industry has recently fallen below the previous year's level; however, the outstanding amount of loans, i.e., the stock of loans, to this industry has grown at an annual pace of 5.0-6.0 percent, thus continuing to exceed the growth rate of loans to all industries of around 2 percent (Chart III-1-13). The outstanding amount of real estate loans reached a record high of around 77 trillion yen as at end-June 2018, exceeding the level seen during the bubble period in the late 1980s.[7]

[7] The following table breaks down financial institutions' loans to the real estate industry.

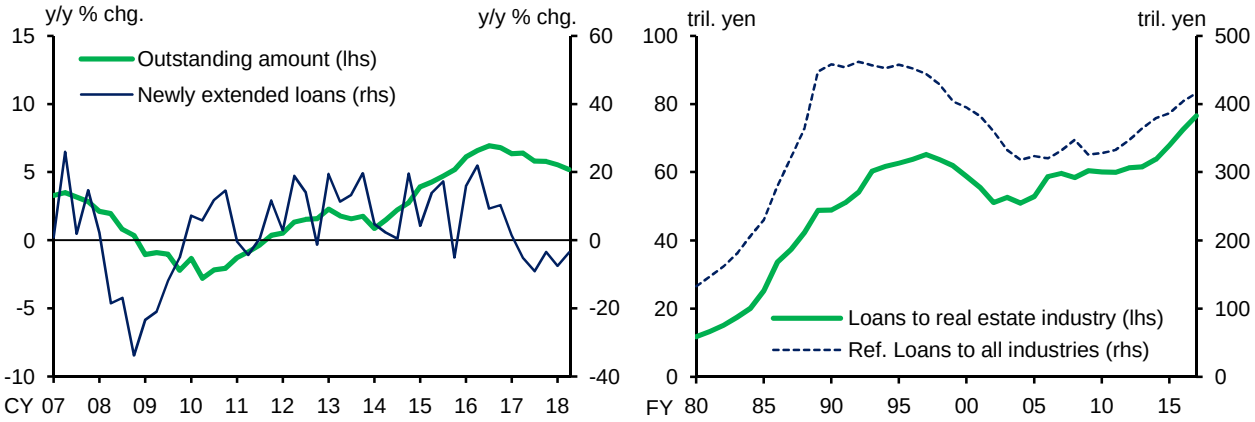
Share of loans to the real estate industry as a percentage of loans to all industries at end-March 2018

	Major banks	Regional banks	*Shinkin* banks
Real estate industry	16.2	15.4	22.9
Real estate transactions	1.8	5.9	11.2
Real estate rental and management	14.4	9.4	11.7
Real estate investment funds	4.8	0.3	0.0

Note: Estimated by the BOJ.

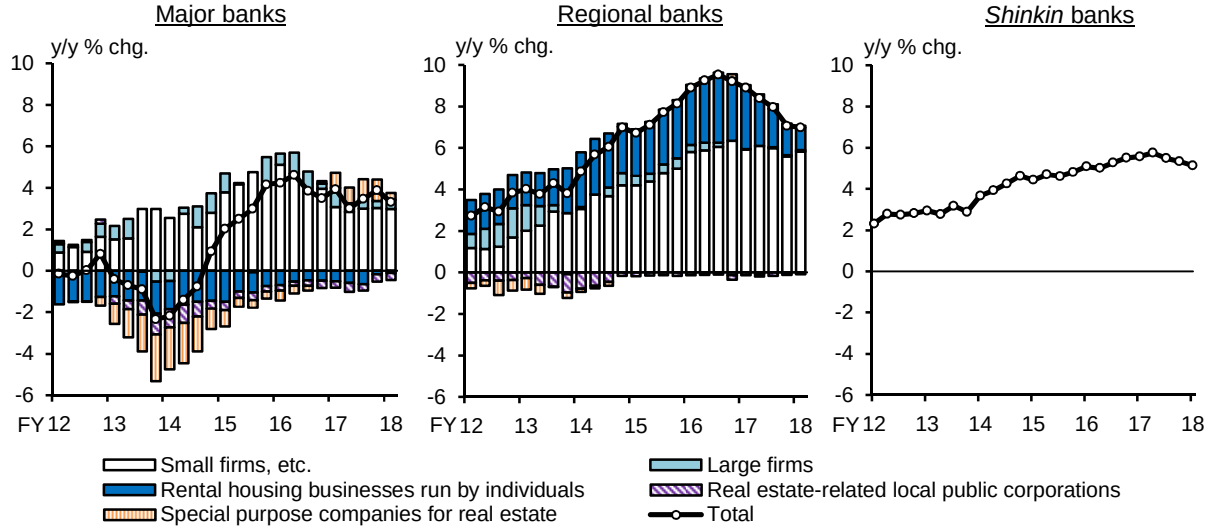
A breakdown of loans to the real estate industry by type of bank shows that major banks' loans outstanding have grown at an annual pace of 3.0-4.0 percent, led by lending to small and medium-sized firms that include real estate investment trusts (REITs) (Chart III-1-14). Although regional banks' loans outstanding have continued to grow at a higher rate than those of major banks, the growth rate -- after peaking at end-2016 -- has been on a downtrend, mainly because growth in loans to rental housing businesses run by individuals has been decelerating. Looking at the supply side, the reason for this development is that more financial institutions have turned more prudent in lending to the real estate industry, mainly due to growing concerns over credit concentration in this industry and deterioration in the quality of loan applications brought by real estate agents (see Chapter V). In addition, looking at the demand side, the reasons include the slackening of the rental housing market, as indicated by increases in vacancy rates in some areas, and the decline in the number of investment properties in favorable locations that promise profits. However, as mentioned earlier, some *shinkin* banks have been more active in extending loans to rental housing businesses (Chart III-1-12).

Chart III-1-13: Real estate loans among financial institutions



Note: 1. The right-hand chart covers domestically licensed banks only to extend the time scale.
2. In the left-hand chart, the latest data for "Outstanding amount" are as at end-June 2018 and the latest data for "Newly extended loans" are as at the April-June quarter of 2018. In the right-hand chart, the latest data are as at end-March 2018.
Source: BOJ.

Chart III-1-14: Breakdown of real estate loans

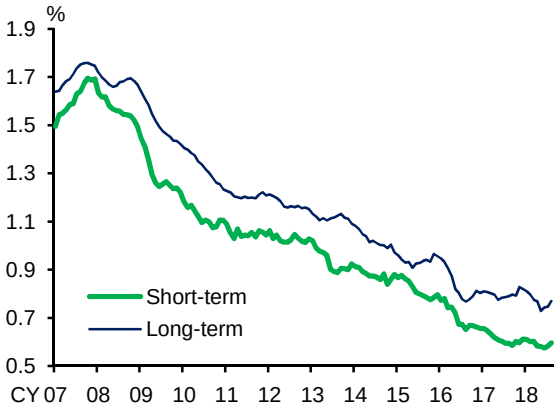


Note: Latest data as at end-June 2018.
Source: BOJ.

Developments in loan interest rates

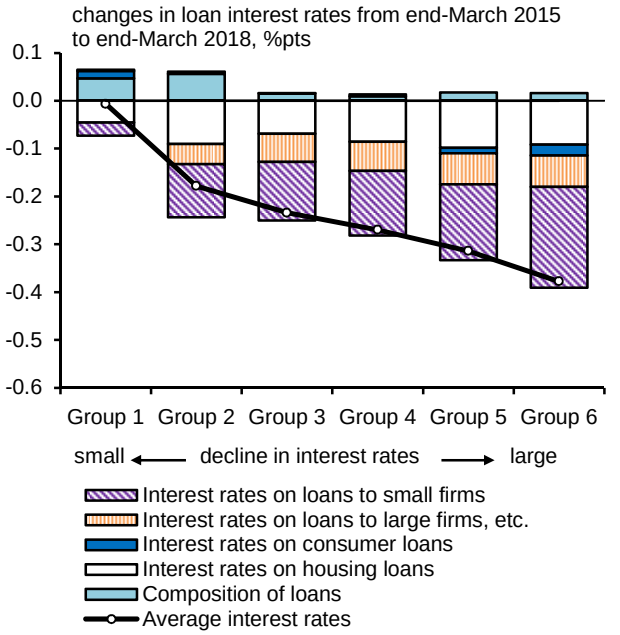
Financial institutions' average contract interest rates -- both short-term and long-term -- on new loans and discounts have been hovering around historically low levels (Chart III-1-15). Factors that have exerted downward pressure on loan interest rates include monetary easing, the improvement in firms' financial condition, and the intensified competition among financial institutions.

Chart III-1-15: Average contract interest rates on new loans and discounts among domestically licensed banks



Note: 6-month backward moving averages. Latest data as at August 2018.
Source: BOJ, "Average contract interest rates on loans and discounts."

Chart III-1-16: Dispersion in changes in loan interest rates



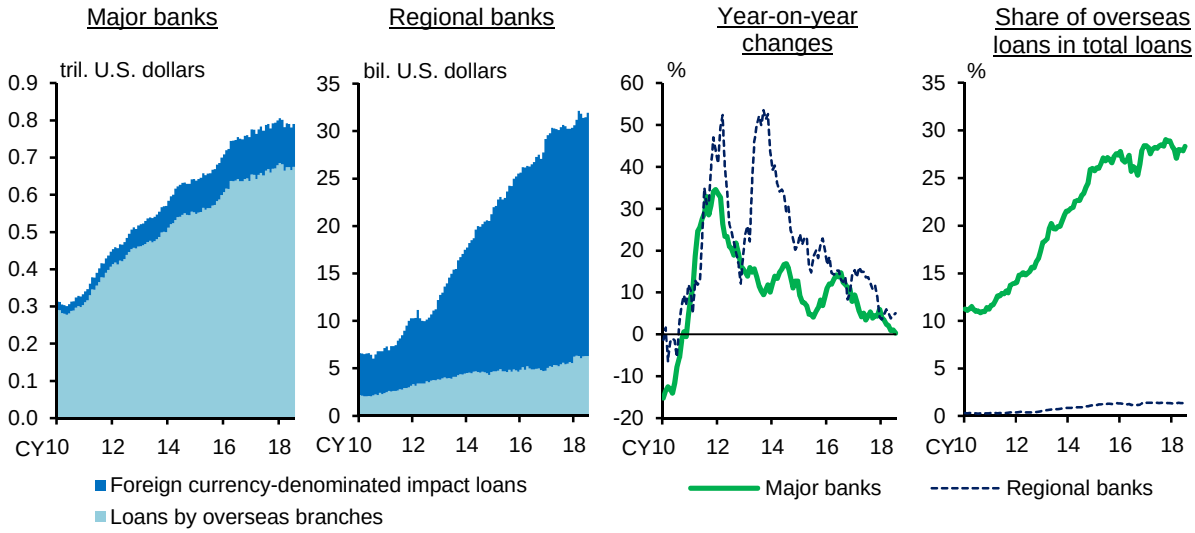
Note: Banks are sorted by the size of the decline in interest rates and grouped by every 15 banks to calculate the simple average. Covers 88 banks (major banks and regional banks) whose loan interest rates' data by type of borrower are available.
Source: BOJ.

Looking at the notable movements behind the decline in financial institutions' loan interest rates, housing loan interest rates have generally been declining across all financial institutions because of the difficulty of differentiating their products (Chart III-1-16). Financial institutions that have succeeded in restraining a decline in loan interest rates to small extent have actively changed their loan portfolios by, for example, lowering the proportion of loans with low interest rates, such as housing loans and loans to large firms, and by instead increasing the proportion of consumer loans with relatively high interest rates. Moreover, some financial institutions have differentiated their product offerings by providing loans with relatively high value added, such as M&A-related financing and subordinated loans for large firms, and structured financing -- loans to special purpose companies (SPCs) -- that is included in loans to small firms. On the other hand, financial institutions that have faced a larger decline in loan interest rates include many regional banks that are small in terms of loans outstanding. Specifically, their interest rates on loans to small firms have fallen more substantially than those of other financial institutions. This mainly reflects differences in business bases among financial institutions; specifically, the downward pressure on loan interest rates is stronger in regions experiencing large declines in the population and the number of firms, and/or in regions where competition among financial institutions is severe.

2. Overseas loans

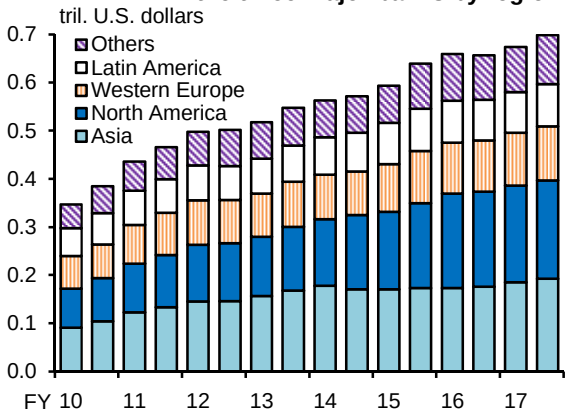
Banks have been expanding their lending to overseas firms in order to support the global activities of Japanese firms, meet financial needs in foreign countries with high long-term growth potential, and establish a more solid international business base. For major banks, overseas loans have currently accounted for roughly 30 percent of total loans (Chart III-1-17). Looking at major banks' lending by region, loans to Asia have increased in line with the economic growth within the region,

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



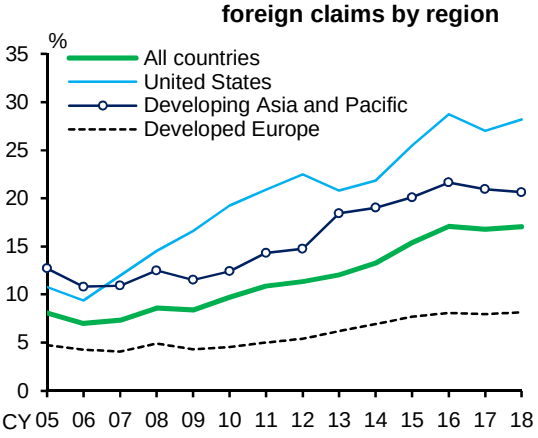
Note: 1. "Loans by overseas branches" includes parts of foreign currency-denominated impact loans in accounts held by overseas branches. "Foreign currency-denominated impact loans" indicates banks' foreign currency-denominated loans to residents.
2. The data are on a non-consolidated basis. Latest data as at end-July 2018.
Source: BOJ.

Chart III-1-18: Overseas loans outstanding of the three major banks by region



Source: Published accounts of each bank.

Chart III-1-19: Japanese banks' share of foreign claims by region



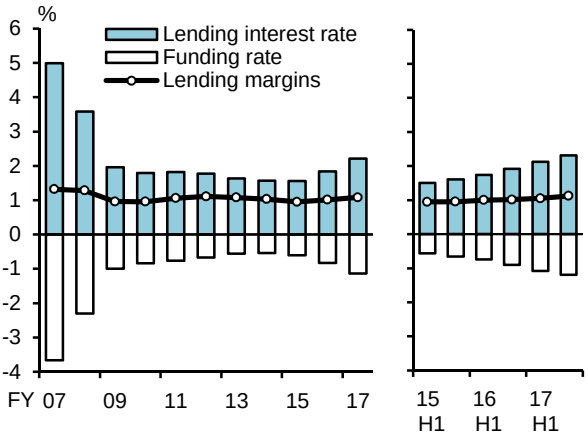
Note: 1. Covers foreign claims on non-bank private sectors (on an ultimate risk basis).
2. The data are as at the end of each year. The data for 2018 are as at end-March 2018.
Source: BIS, "Consolidated banking statistics"; BOJ, "The results of BIS international consolidated banking statistics in Japan."

and loans to North America and Europe have also continued to increase moderately (Chart III-1-18). Japanese banks' share of overall foreign claims increased as Japanese banks filled the gap left by U.S. and European banks that continued deleveraging after the global financial crisis; however, in recent years, Japan's share has generally been flat amid the re-intensified competition

with overseas financial institutions (Chart III-1-19). Japanese banks have recently been more focused on profitability than in the past; for example, they have put more emphasis on changing their loan portfolios by replacing loans with narrower profit margins for those with wider margins rather than increasing the total amount of loans. However, amid the continuing policy rate hikes in the United States, Japanese banks tend to be more susceptible to upward pressure on U.S. dollar funding costs than overseas financial institutions with a sufficient deposit base; therefore, lending margins of Japanese banks have been more or less flat (Chart III-1-20). Under these circumstances, some banks have aimed at increasing loans to firms with slightly higher risks, such as firms in the top group of non-investment-grade companies (which correspond to the middle group of the "normal" loan classification), while strengthening their risk management.

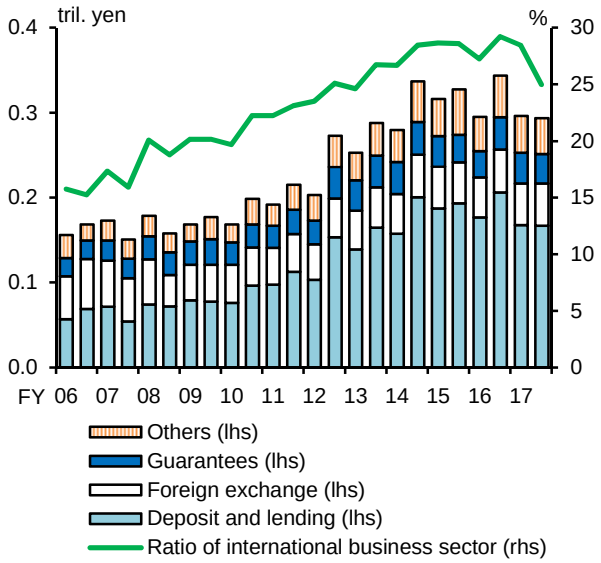
Meanwhile, major banks have also placed emphasis on increasing net non-interest income in order to improve their overall profitability. For example, with the growth in loans outstanding moderating, major banks' fee and commission income related to lending has shown sluggish growth on a non-consolidated basis, but on a consolidated basis, such income from securities business has been increasing its contribution to their profits (Chart III-1-21). Moreover, as part of their efforts to build networks of overseas bases, major banks have continued to acquire and invest in local banks, mainly in Asia. In Europe, they have been preparing to establish new local subsidiaries in European Union (EU) countries outside the United Kingdom so that they can continue to provide financial services within the EU after the United Kingdom's exit.

Chart III-1-20: Lending margins on loans in the international business sector among major banks



Note: 1. In calculating the lending margins, interest expenses on interest rate swaps are deducted.
2. Semiannual data on the right indicate annualized rates.
Source: BOJ.

Chart III-1-21: 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.

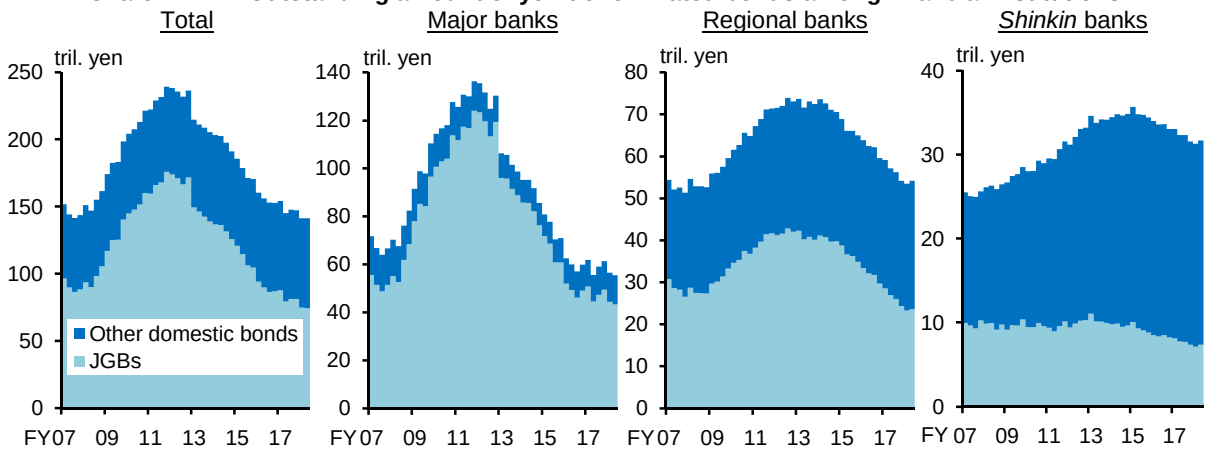
3. Securities investment

The outstanding amount of financial institutions' yen-denominated bond investment followed a declining trend, reflecting the Bank of Japan's continued large-scale JGB purchases, but the pace of decline has been moderate. The outstanding amount of foreign bond investment has been decreasing against the backdrop of a decline in returns on U.S. Treasuries. On the other hand, the outstanding amounts of investment trust products and overseas credit products held by financial

institutions have continued to be on an upward trend, implying that financial institutions have maintained their stance of active risk taking in securities investment.

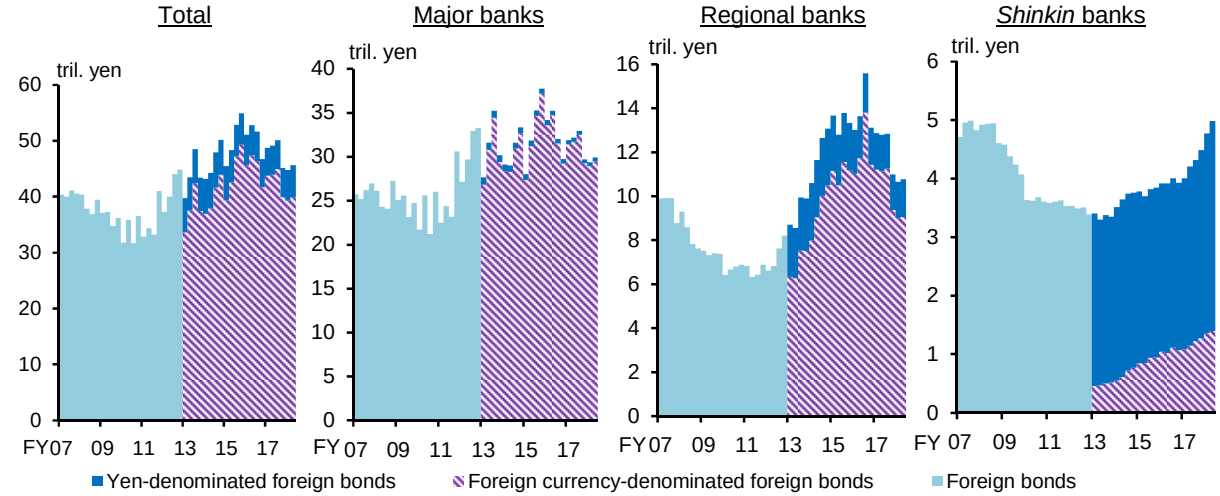
With regard to the holdings of yen-denominated bonds -- including JGBs, municipal bonds, and corporate bonds -- by type of bank, they have continued to decrease moderately for regional banks, while they have been more or less unchanged for major banks (Chart III-1-22). Even though the interest rate level of JGBs has not reached the target level for purchases, some financial institutions have maintained a certain amount of their holdings in order to secure net interest income, retain unrealized gains, keep their current account deposit balances at the Bank of Japan from increasing, and/or secure collateral for various transactions.

Chart III-1-22: 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 2018.
Source: BOJ.

Chart III-1-23: Outstanding amount of foreign bonds among financial institutions



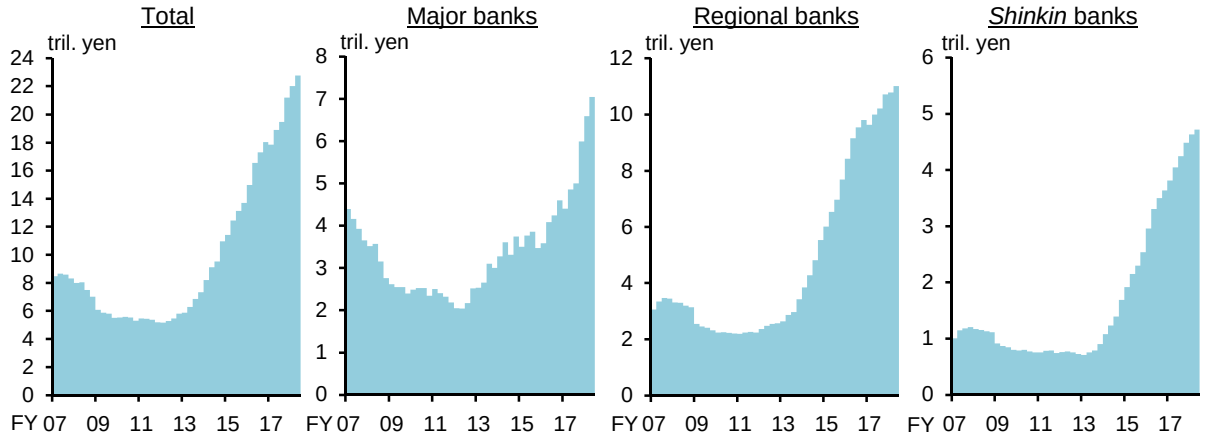
Note: 1. "Foreign bonds" is the sum of figures for "Foreign currency-denominated foreign bonds" and "Yen-denominated foreign bonds." The data up to March 2010 are figures for foreign securities.
2. The data are the sum of figures for domestic and overseas branches, based on the outstanding amount at month-end.
Latest data as at end-August 2018.
Source: BOJ.

Turning to recent developments in the holdings of foreign bonds (in yen terms), while *shinkin* banks' holdings have increased, major banks' and regional banks' holdings have decreased (Chart III-1-23). In U.S. financial markets, funding costs have been increasing with the continuing policy rate hikes and yield curves have been flattening. Against this background, financial institutions

have restrained themselves from scaling up investment in foreign bonds again, as they seek to avoid deterioration in their profitability and incurring additional unrealized losses.

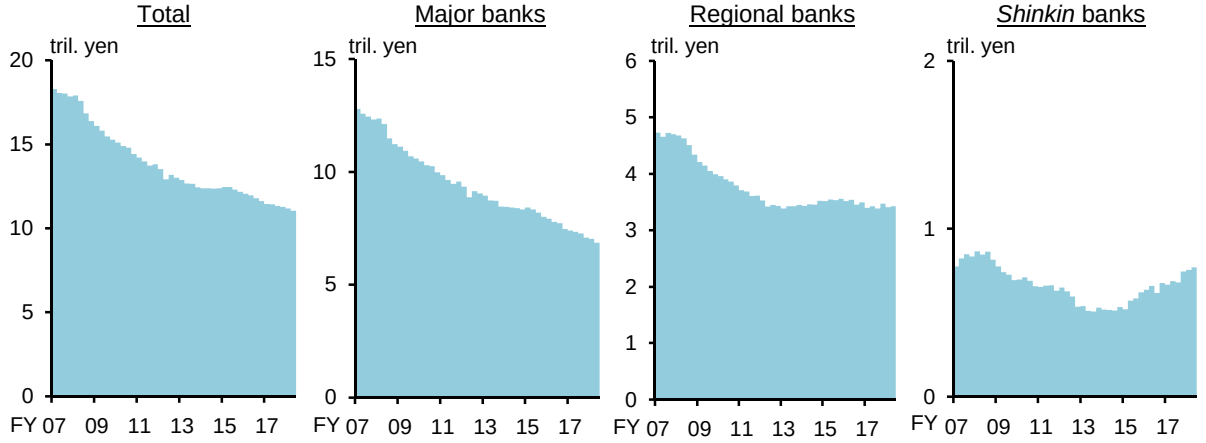
Financial institutions' holdings of investment trusts and other assets have continued to increase (Chart III-1-24). By type of bank, some major banks have increased their purchases of stock investment trusts amid steady developments in stock prices. Regional financial institutions also have continued to increase the outstanding amount of investment trusts, including, for example, balanced investment trusts that hold REITs and foreign stocks in their portfolios. With stock prices hovering at high levels, some financial institutions have purchased inverse mutual funds and ETFs to prepare for possible changes in stock prices in the future.

Chart III-1-24: 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 2018.
Source: BOJ.

Chart III-1-25: Outstanding amount of stockholdings among financial institutions

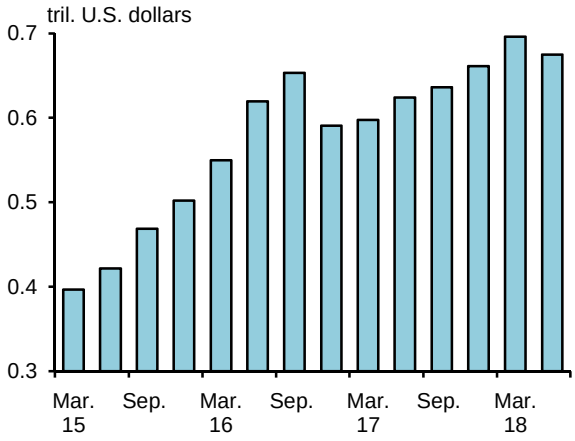


Note: 1. Based on the outstanding amount on a book value basis at month-end. The data exclude foreign stockholdings.
2. The data for major banks are the figures for domestic branches and the data for the other banks are the sum of figures for domestic and overseas branches. Latest data as at end-August 2018.
Source: BOJ.

Meanwhile, the outstanding amount of stockholdings of major banks and regional banks has been on a gradual downward trend, as they have continued to reduce their stockholdings aimed at maintaining business ties with firms (i.e., strategic stockholdings) (Chart III-1-25). On the other hand, the stockholdings of *shinkin* banks have continued on a moderate increasing trend, as these banks have increased their risk taking in stocks for the purpose of pure investment.

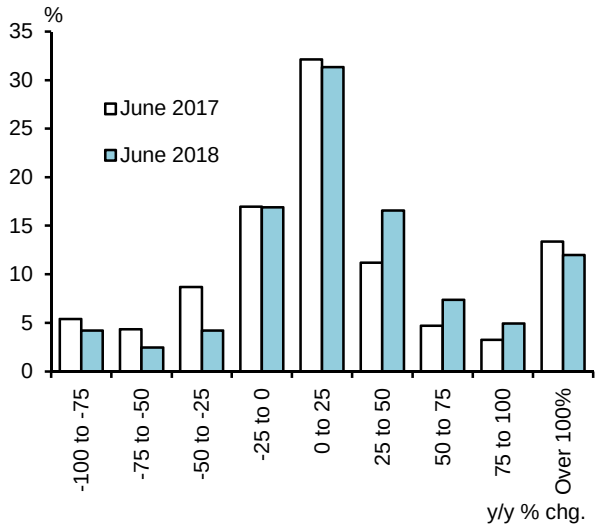
Depository institutions with a large share of investment in securities, such as Japan Post Bank and central organizations of financial cooperatives, have continued to shift their investments from yen-denominated bonds to risky assets such as overseas credit products. Investment in overseas credit products by financial institutions as a whole, including these depository institutions, has maintained an upward trend (Chart III-1-26). While there is considerable heterogeneity across financial institutions in terms of growth rates of overseas credit investment, the percentage of financial institutions with positive growth has increased on the whole (Chart III-1-27).

Chart III-1-26: Outstanding amount of overseas credit product investment among financial institutions



Note: Covers respondents among major banks, regional banks, *shinkin* banks, Japan Post Bank, and central organization of financial cooperatives.
Source: BOJ.

Chart III-1-27: Distribution of growth rates of overseas credit product investment among financial institutions



Note: Covers respondents among major banks, regional banks, *shinkin* banks, Japan Post Bank, and central organization of financial cooperatives.
Source: BOJ.

4. Financial institutions' balance sheet changes

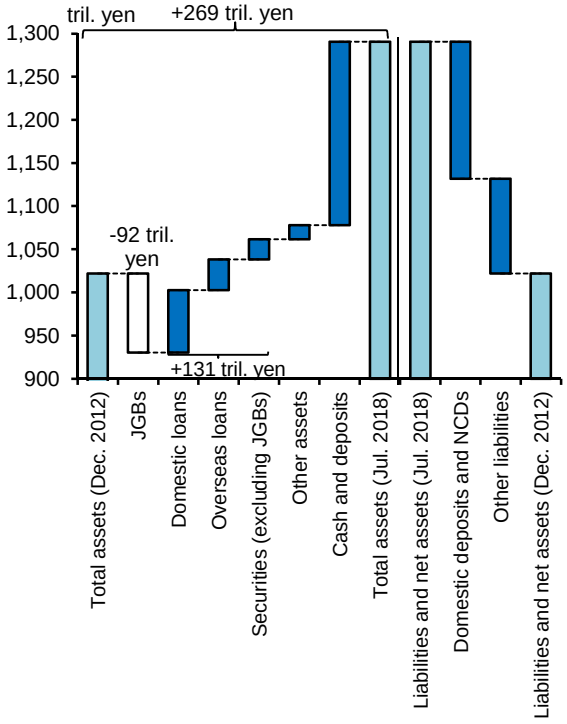
Financial institutions have continued to expand the size of their balance sheets, reflecting the increase in deposits, and to rebalance their asset portfolios through increasing risky assets.

The total assets and liabilities of financial institutions increased by 269 trillion yen in the period from December 2012, prior to the introduction of QQE, through July 2018 (Chart III-1-28). A breakdown of assets shows that portfolio rebalancing from JGBs (entailing yen interest rate risk) to other risky assets (entailing credit, equity-related, and overseas interest rate risks, etc.) has continued to take place. The total amount of domestic loans, overseas loans, and securities investment excluding JGBs increased by 131 trillion yen, while JGB holdings decreased by 92 trillion yen. Meanwhile, cash and deposits (mainly current account deposits at the Bank of Japan) increased by 213 trillion yen. On the liability side, domestic deposits and NCDs increased by 159 trillion yen, while other liabilities, such as overseas deposits and NCDs, and loans from the Bank of Japan increased by 110 trillion yen.

In terms of domestic loan-to-deposit ratios, those of major banks have continued on a downward trend, mainly due to an increase in corporate deposits of large firms with strong earnings (Chart III-1-29). On the other hand, the loan-to-deposit ratios among regional financial institutions -- which have more transactions with small firms -- have been increasing moderately due to the steady

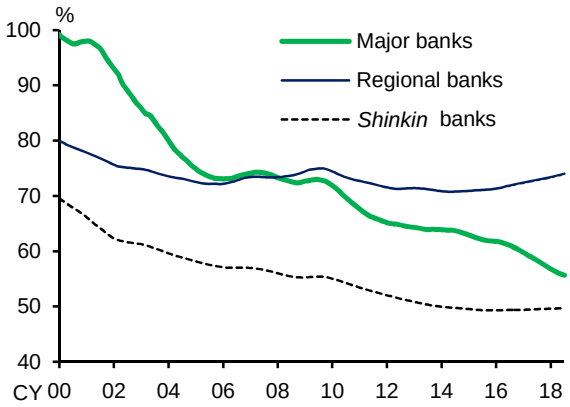
increase in lending, with corporate deposits having grown at a slower rate than those at major banks.

Chart III-1-28: Changes in assets and liabilities among financial institutions



Note: 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.
Source: BOJ.

Chart III-1-29: Domestic loan-to-deposit ratios among financial institutions



Note: 1. Loan-to-deposit ratio = loans / (deposits and NCDs).
2. The data are for domestic branches and are based on the average outstanding amount. 12-month backward moving averages. Latest data as at July 2018.
Source: BOJ.

B. Financial intermediation by institutional investors

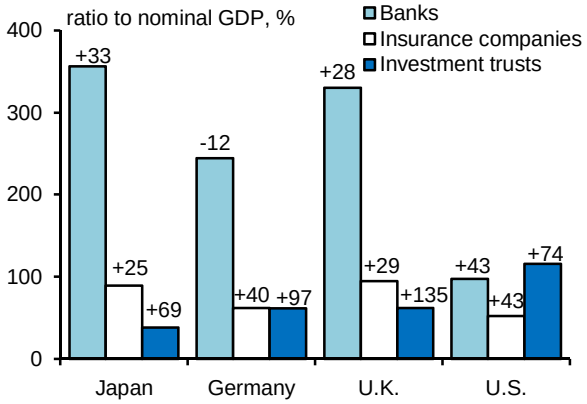
This section outlines financial intermediation by institutional investors, particularly life insurance companies and pension funds, as well as securities investment trusts. Although the size of financial asset holdings of Japanese life insurance companies is only about one-fourth that of banks, their presence in the financial system is larger than their counterparts in countries such as the United States and Germany (Chart III-2-1). On the other hand, although the size of investment trusts' asset holdings is relatively small, it has been growing significantly in recent years, due in part to increased amount of financial institutions' purchases of investment trust products (Chart III-2-2). In the United States and Europe as well, the presence of institutional investors in the financial system has rapidly increased following the global financial crisis, so that their investment activities have been increasingly drawing attention.

1. Insurance companies and pension funds

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

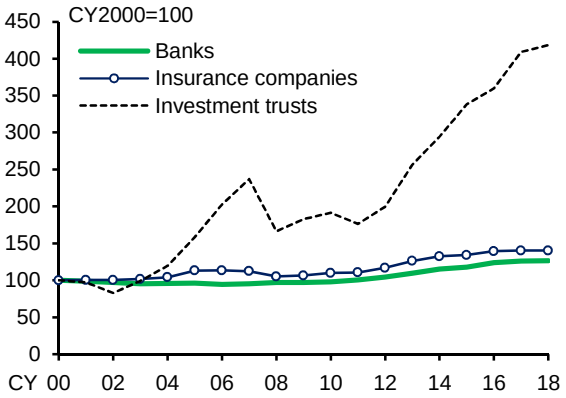
Life insurance companies' premium income -- the source of funds for their investment -- has declined, reflecting slower growth in sales of level-premium insurance products due to the effects of premium hikes in April 2017 (Chart III-2-3). Consequently, the pace of increase in assets held by insurance companies has moderated recently (Chart III-2-4). A breakdown of portfolios shows that purchases of domestic bonds, which offer low yields, have been restrained amid the prolonged low interest rate environment, while investment in foreign bonds and investment funds, which offer relatively high yields, has increased. Looking at currency-hedged foreign bonds, which account for the majority of foreign bond portfolios, insurance companies have continued to shift their investment from U.S. Treasuries to bonds that offer higher yields, due to the rise in U.S. dollar hedging costs. Most of the bonds purchased have been ones that entail relatively low risks, such as U.S. corporate bonds with a high credit rating, agency mortgage-backed securities (MBSs), and

Chart III-2-1: International comparison of the size of financial assets among financial intermediaries



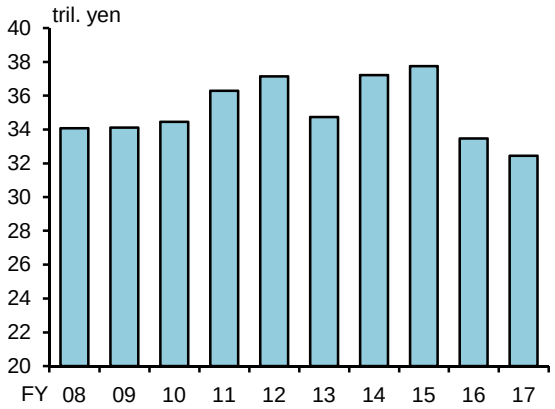
Note: 1. Latest data as at end-December 2017 for Japan, the U.S., and Germany, and end-December 2016 for the U.K.
2. Figures in the chart show percentage changes in the financial assets outstanding over the past 10 years.
Source: BOE; Bundesbank; FRB; IMF; ONS; BOJ.

Chart III-2-2: Financial assets outstanding among Japanese financial intermediaries



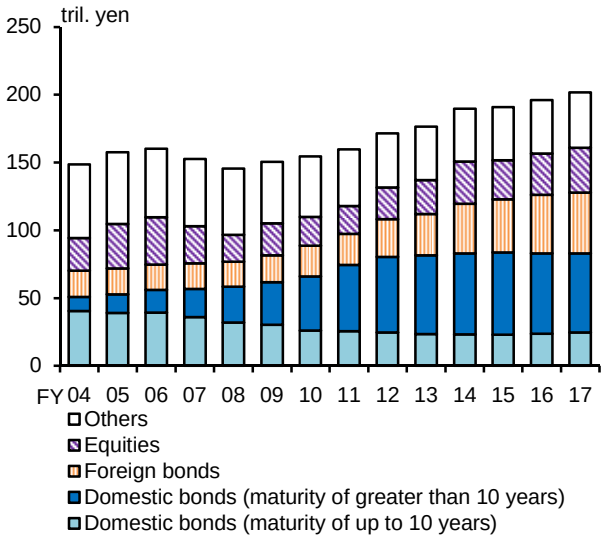
Note: 1. "Investment trusts" includes publicly offered REITs (from 2007) and privately placed REITs (from 2013).
2. Latest data as at end-June 2018.
Source: The Investment Trusts Association, Japan; BOJ, "Flow of funds accounts."

Chart III-2-3: Premium income among life insurance companies



Source: The Life Insurance Association of Japan.

Chart III-2-4: Investment assets outstanding among life insurance companies

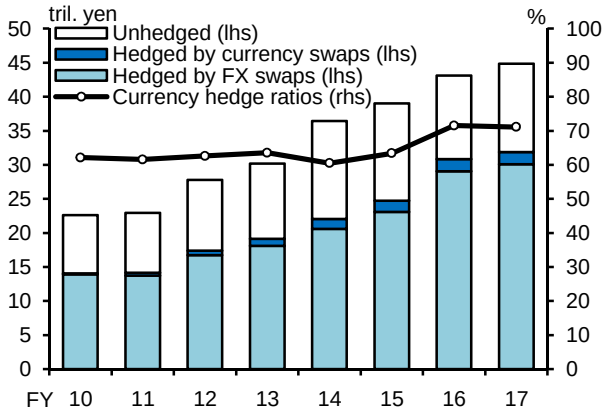


Note: 1. "Others" includes cash and deposits, loans, investment trusts, and real estate.
2. Covers nine major life insurance companies. Based on general account.
Source: Published accounts of each company.

European sovereign bonds. While some insurance companies have been purchasing collateralized loan obligations (CLOs), which entail relatively high credit risk, such moves have been limited. Moreover, some insurance companies have been increasing their holdings of unhedged foreign bonds and/or removing the hedge on foreign bonds during phases of yen appreciation. However, smoothing through variations, currency hedge ratios of life insurance companies' foreign bond investments have been almost unchanged, which suggests that life insurance companies have generally avoided increasing their exposure to foreign exchange risk (Chart III-2-5).[8]

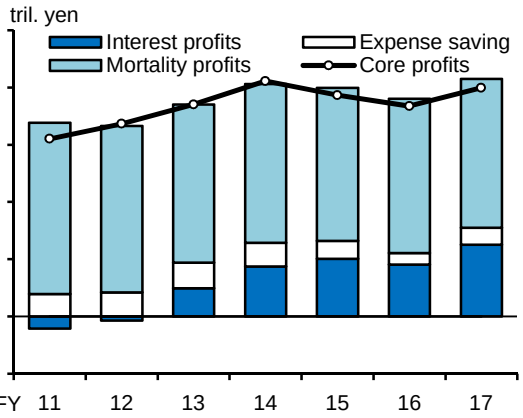
One of the reasons why insurance companies have not turned to excessive risk taking despite the prolonged low interest rate environment is the fact that their profits have been relatively stable (Chart III-2-6). Looking at life insurance companies' core profits, which represent their underlying profitability, mortality profits (the difference between expected insurance payouts based on assumed mortality rates and actual payouts) have remained at a relatively high level, reflecting the fact that actual mortality rates have remained lower than assumed mortality rates due to the increase in life expectancy. Moreover, with interest rates guaranteed to policyholders (assumed interest rates) on a long-term decline, interest margins have turned positive and interest profits (the difference between actual and expected investment returns based on assumed interest rates) have continued to improve moderately. Meanwhile, investment returns on assets have remained stable, reflecting the increases in stock dividends and interest income from foreign public and corporate bonds.

Chart III-2-5: Currency hedge ratios for foreign bond investments among life insurance companies



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

Chart III-2-6: Core profits among life insurance companies



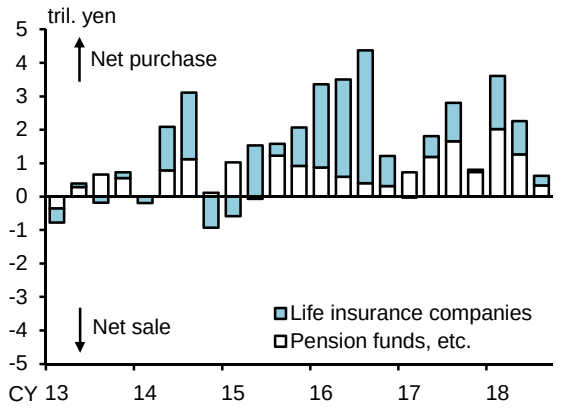
Note: Covers four major life insurance companies.
Source: Published accounts of each company.

Pension funds have continued to invest in foreign securities and domestic stocks (Charts III-2-7 and III-2-8). Looking more in detail, the Government Pension Investment Fund (GPIF) -- which is in charge of managing the assets of public pension funds (employees' pension funds and the national pension fund) -- has continued its rebalancing in response to the market conditions. In doing so, the GPIF has managed its assets in line with the basic portfolio allocation, which determines the portfolio share of each asset class from the perspective of safe and efficient asset management

[8] Life insurance companies obtain the foreign currency necessary for investment in foreign currency-denominated assets through FX swaps, outright currency transactions, and foreign currency-denominated insurance premiums. On the asset side, these companies hold sufficient amounts of foreign currency-denominated securities with high market liquidity. Therefore, in terms of foreign currency liquidity, even if stress events occur in the FX swap market, life insurance companies are fairly resilient to such stress.

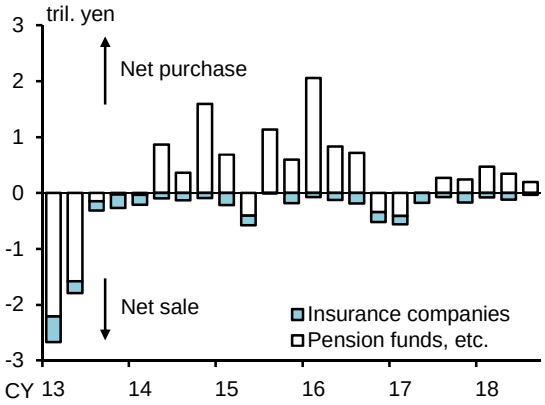
over a long-term investment horizon.[9] As part of this rebalancing, the amount of the GPIF's alternative investments, such as investments in infrastructure, private equity, and real estate, has been increasing gradually, but is subject to an upper limit of 5 percent of the GPIF's overall assets. Corporate pension funds, meanwhile, have basically maintained their cautious investment stance, as in the past.

Chart III-2-7: 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 2018.
Source: Ministry of Finance.

Chart III-2-8: 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 2018.
Source: Tokyo Stock Exchange.

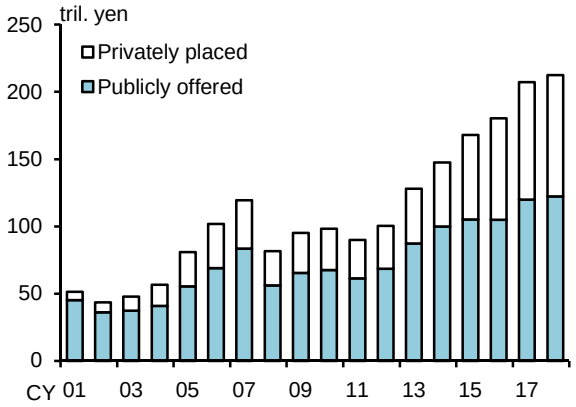
2. Securities investment trusts

Looking at investment trusts by type of placement, the outstanding amount of privately placed investment trusts, which can be tailored to investor needs, has been increasing substantially (Chart III-2-9). This mainly reflects an increase in investments by financial institutions (Chart III-1-24). Specifically, the outstanding amount of investment trusts in banks' holdings has increased markedly (Chart III-2-10). Looking at changes in the amount of funds managed by privately placed investment trusts' funds, while repurchases of shares from clients have continued to increase, sales of shares to clients have increased even more (Chart III-2-11). This indicates that financial institutions have been increasing their holdings of investment trusts while realizing gains on their holdings and then reinvesting the proceeds.

Meanwhile, the amount of funds managed by publicly offered investment trusts has been on a moderate uptrend, but the pattern of sales of shares to clients and repurchases from clients has changed in recent years (Chart III-2-12). In the past, the amount of sales and repurchases tended to co-move with stock prices. This is because when stock prices rose, households tended to sell their investment trust holdings to lock in the capital gains and reallocate the proceeds to investment trusts with greater dividend yields. However, during the phase of equity price increase from the second half of fiscal 2016, no particular increase in sales and repurchases of investment trust shares has been observed. The lack of increase likely reflects changes in the sales strategies of financial institutions, especially securities companies. Specifically, sales strategies have changed from encouraging investors to frequently switch from one trust to another to encouraging them to build up existing portfolios of investment trusts and/or use discretionary investment services.

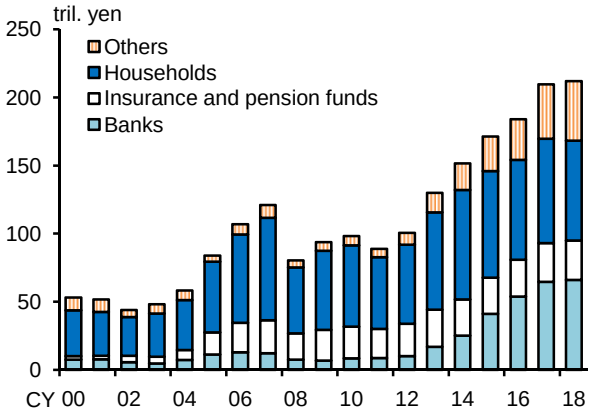
[9] The GPIF is one of the largest institutional investors in the world, with total assets of 161 trillion yen as of end-June 2018. Assets are managed both externally and internally. Investments in foreign securities are currency-unhedged according to the benchmark and are basically financed through outright currency transactions.

Chart III-2-9: Assets among investment trusts



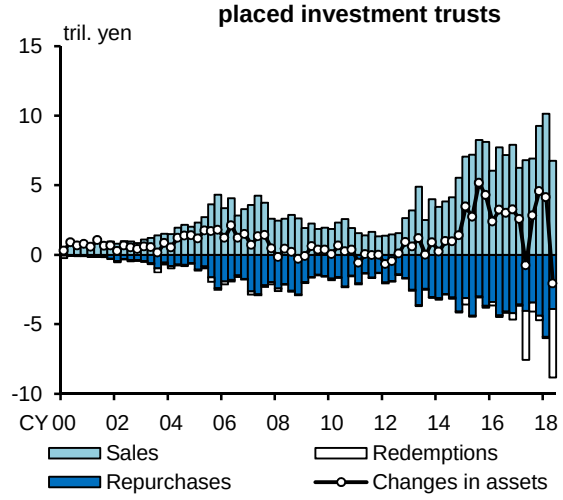
Note: 1. Includes publicly offered REITs (from 2007) and privately placed REITs (from 2013).
2. The latest data for REITs are as at end-July 2018 and the latest data for others are as at end-August 2018.
Source: The Investment Trusts Association, Japan.

Chart III-2-10: Outstanding amount of investment trusts by type of holder



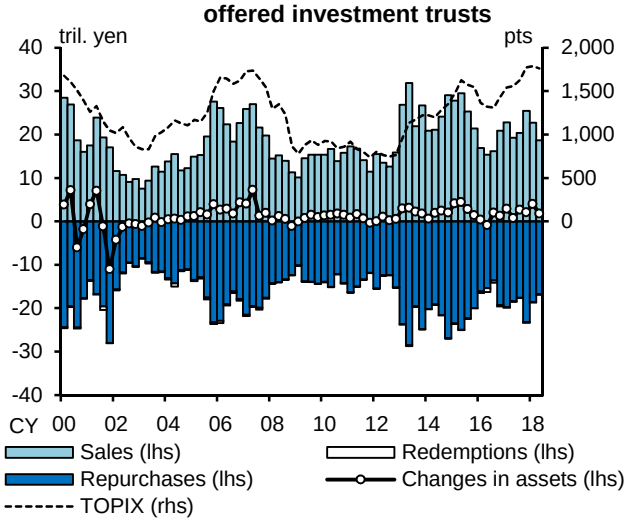
Note: Latest data as at end-June 2018.
Source: BOJ, "Flow of funds accounts."

Chart III-2-11: Changes in assets of privately placed investment trusts



Note: "Privately placed investment trusts" excludes investment corporations. Latest data as at the April-June quarter of 2018.
Source: The Investment Trusts Association, Japan.

Chart III-2-12: Changes in assets of publicly offered investment trusts



Note: "Publicly offered investment trusts" excludes investment corporations. Latest data as at the April-June quarter of 2018.
Source: Bloomberg; The Investment Trusts Association, Japan.

Through such a strategic change, instead of earning sales commissions based on transaction volumes, financial institutions have put more emphasis on trust fees, which are based on the size of clients' assets in custody. Moreover, a change in the legal framework, namely, the introduction of the Nippon Individual Savings Account (NISA) in 2014, has provided tax incentives for investments involving small contributions. It appears that these initiatives have helped to stimulate investment by households that place greater emphasis on long-term total returns and have led to a reduction in short-sighted sales and repurchases of investment trust shares.

Looking at flows of funds into and out of publicly offered stock investment trusts by type of assets, net inflows into investment trusts investing in the domestic market have continued. Also, net

inflows into both investment trusts investing exclusively in overseas markets and those investing in both domestic and overseas markets have continued as a trend.[10] However, most recently, some investment trusts investing in emerging markets have experienced outflows of funds due to increased uncertainty over political and economic conditions in these markets.[11]

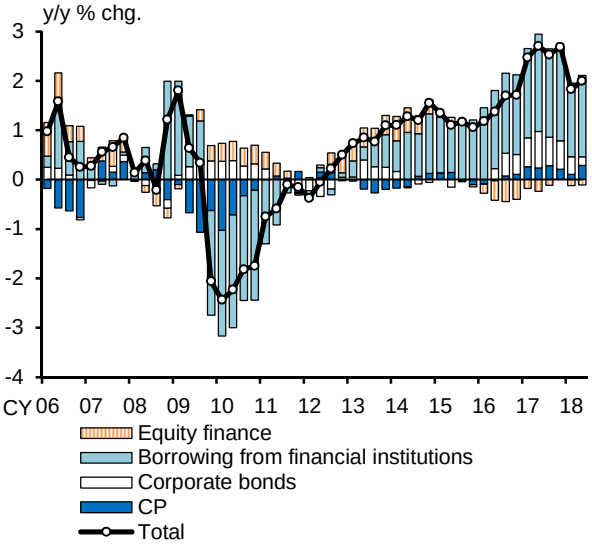
C. Investment in financial assets and funding activities by the private non-financial sector

This section outlines developments in investment in financial assets and funding activities by the private non-financial sector (i.e., firms and households), which uses financial intermediation services provided by financial institutions and institutional investors.

1. Corporate sector

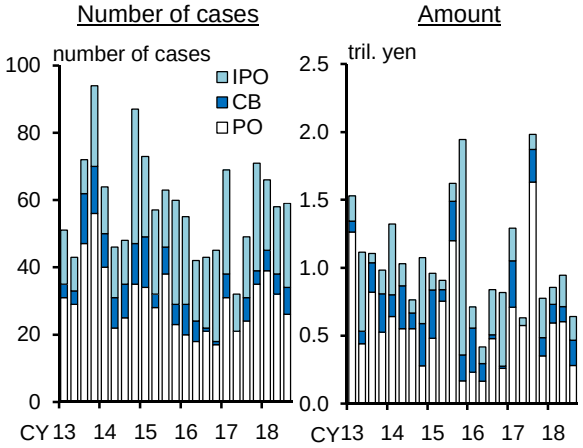
The total volume of firms' funding has continued to exceed the previous year's level, mainly led by an increase in borrowing from financial institutions, as the demand for funds for business fixed investment has been increasing (Chart III-3-1). Firms' funding through the issuance of CP and corporate bonds has also continued to increase as issuance rates have hovered at extremely low levels. The increased issuance of CP reflects the growing demand for working capital under the economic expansion. Firms have been increasing their issuance of ordinary corporate bonds, especially longer-term ones, for the purpose of raising funds such as for refinancing, business fixed

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 2018.
Source: I-N Information Systems; JASDEC; BOJ.

Chart III-3-2: Equity financing



Note: Latest data as at the July-September quarter of 2018.
Source: I-N Information Systems.

[10] Investment trusts investing in overseas assets can be differentiated into those that are currency hedged and those that are not. The outstanding amount of the former is small.

[11] To take a recent example, investment trusts investing in Turkey temporarily stopped new purchases and sales by clients because of a decline in liquidity in bond and foreign exchange markets.

investment, and M&A deals. With government bond yields at an extremely low level, investors have maintained their active purchasing stance in the corporate bond market in search of higher returns.

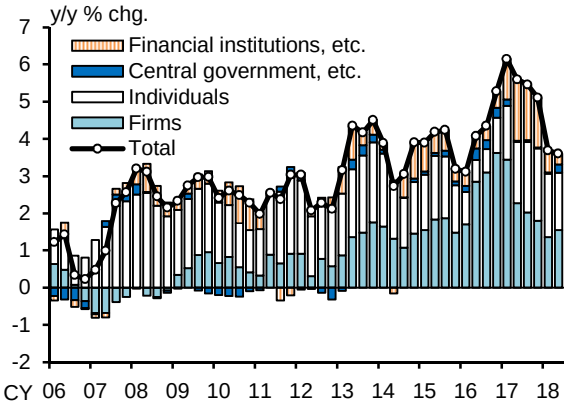
On the other hand, equity financing through the stock market has remained lackluster. This is mainly due to the increase in low-interest debt financing (bank loans, CP, and corporate bonds) as well as firms' increased emphasis on shareholder value under the corporate governance code that took effect in June 2015. Although the amount of equity financing has increased somewhat recently, reflecting some cases of large-scale initial public offerings (IPOs) and public offerings (POs), it nevertheless remains sluggish as investors and firms have become increasingly conscious of capital efficiency and shareholder returns (Chart III-3-2).

Meanwhile, deposits in the corporate sector have continued to increase, mainly due to the accumulation of retained earnings on the back of strong profits (Chart III-3-3). The possible reasons for firms' accumulation of retained earnings -- in other words, why firms have been restraining their spending relative to profits -- include (1) the trauma of financial crises in the recent past (which has led to an increase in precautionary demand for cash and deposits), (2) concern over the weakening domestic demand in the medium to long term due to population decline, (3) the aging of owners and issues related to business succession for small firms, and (4) the demand for a high level of on-hand liquidity to respond to M&A deals in a flexible manner.[12]

2. Household sector

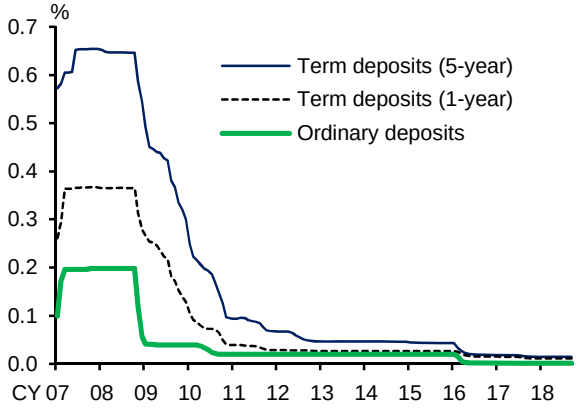
Households have maintained a cautious investment stance overall. The outstanding amount of deposits of individuals has continued to increase even though interest rates on deposits have remained at extremely low levels (Charts III-3-3 and III-3-4). The outstanding amount of stocks held by households has continued to increase, but this is mainly due to the rise in market values and not because households' overall investment stance has become active (Chart III-3-5). However, there are some signs of active risk taking, albeit to a limited extent. For example, looking at changes in outstanding client assets held by securities companies -- excluding the effects of changes in the market values of financial assets -- investment trusts have registered net inflows due to steady

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 2018.
Source: BOJ.

Chart III-3-4: Interest rates on deposits

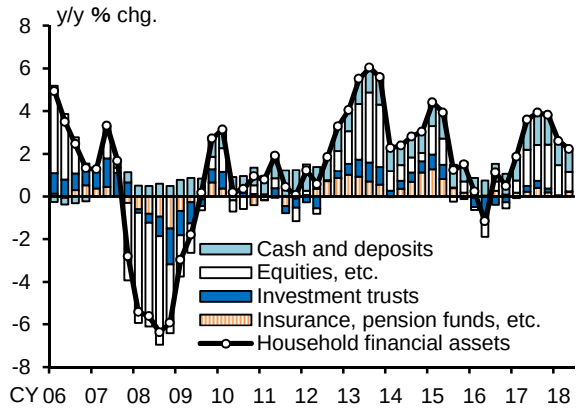


Note: 1. Interest rates on term deposits are simple averages of those posted by financial institutions.
2. Latest data as at September 25, 2018.
Source: BOJ.

[12] The annex to the *Regional Economic Report* (available only in Japanese) released by the Bank of Japan in June 2018 discusses firms' stance on spending.

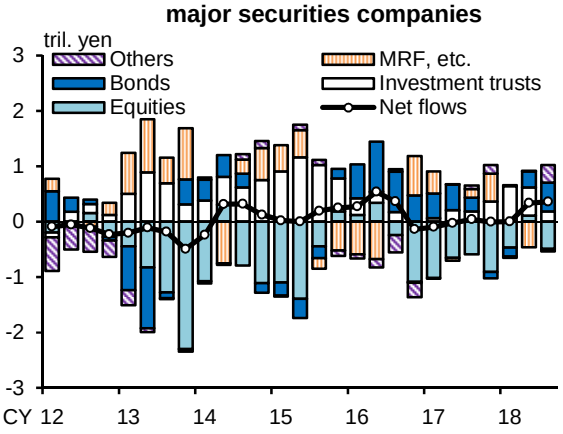
inflows of funds into mutual fund wraps (Chart III-3-6). Moreover, there have been inflows of funds into bonds -- for example, JGBs for retail investors and structured bonds with relatively high risks.

Chart III-3-5: Amount of household assets



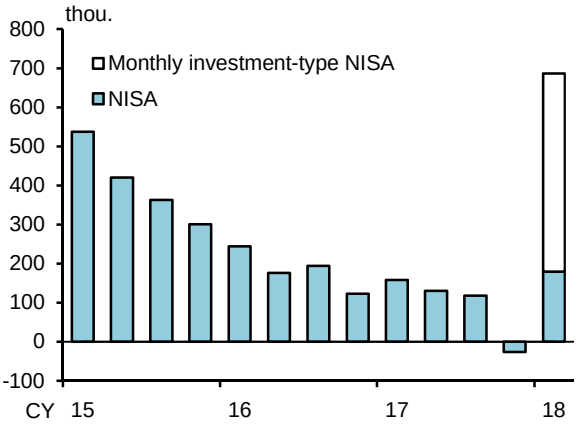
Note: Latest data as at end-June 2018.
Source: BOJ, "Flow of funds accounts."

Chart III-3-6: Capital flows by product among major securities companies



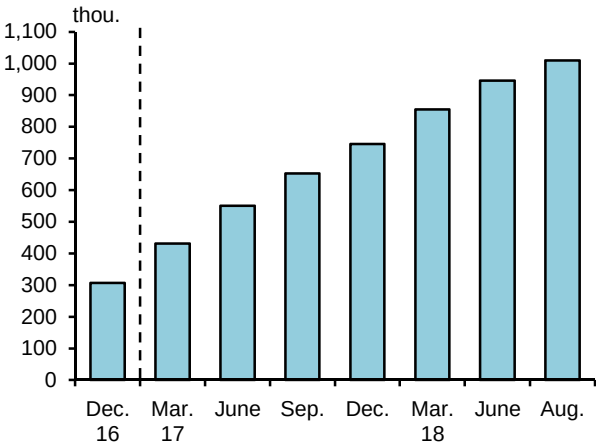
Note: 1. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes bond investment trusts.
2. Covers retail customers' assets held at 17 major securities companies that hold current accounts at the BOJ. 2-quarter backward averages. Latest data as at July-August 2018 (converted into quarterly amounts).
Source: BOJ.

Chart III-3-7: Net Increase of NISA and monthly investment-type NISA accounts



Note: Latest data as at the January-March quarter of 2018.
Source: Financial Services Agency.

Chart III-3-8: Number of subscribers of iDeCo



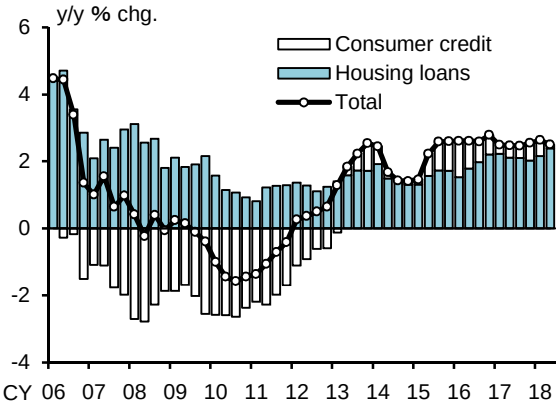
Note: Latest data as at August 2018.
Source: National Pension Fund Association.

Meanwhile, financial institutions have continued to make efforts to increase their client assets by expanding their lineup of products, such as investment trusts suitable for medium- to long-term asset formation by households, and enhancing services such as wrap accounts. As for the monthly investment-type NISA that was introduced in January 2018, the number of accounts has grown quickly, helping to expand the range of retail investors (Chart III-3-7). In addition, the individual-type defined contribution pension plan (iDeCo), the membership criteria of which were relaxed in January 2017, has continued to see a steady increase in new members (Chart III-3-8). These wide-ranging initiatives are expected to help households accumulate assets in a variety of ways.

Finally, looking at the outstanding amount of borrowings in the household sector, both housing loans and consumer credit have been increasing, and the overall amount outstanding has

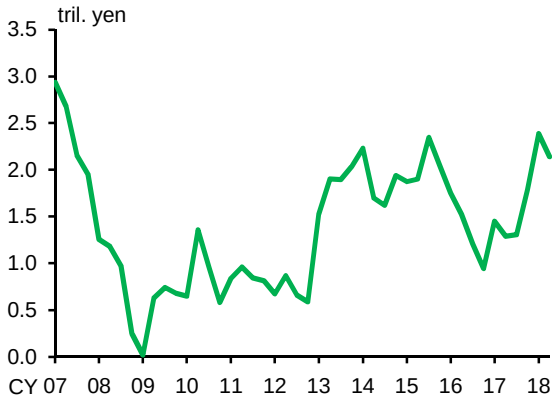
continued to grow at an annual pace of 2.0-3.0 percent (Chart III-3-9). As for consumer credit (extended by financial institutions such as banks, finance companies, and securities companies), the growth rate of card loans provided by banks has decelerated recently (Chart III-1-8). On the other hand, the rise in borrowings from securities companies has contributed to the increase in total consumer credit (Chart III-3-10). This seems to reflect an increase in stock purchases on margin amid the continued firmness in stock prices.

Chart III-3-9: Loans outstanding to households



Note: Latest data as at end-June 2018.
Source: BOJ, "Flow of funds accounts."

Chart III-3-10: Outstanding amount of stock margin transactions



Note: 1."Outstanding amount of stock margin transactions" = shares bought on margin - shares sold short.
2. Latest data as at end-June 2018.
Source: Tokyo Stock Exchange.

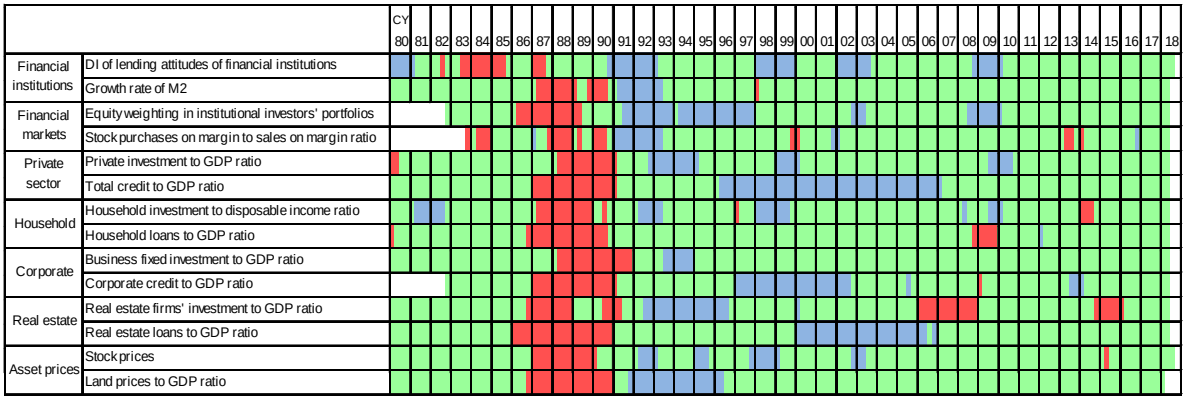
IV. Examination of the financial cycle and financial vulnerabilities

Chapter III showed that, under the accommodative financial conditions, financial intermediation -- particularly bank lending -- has continued to be active. This chapter examines whether these financial intermediation activities have led to the build-up of financial imbalances that could cause major adjustments in the real economy in the future.

A. Financial Activity Indexes (heat map)

First, using a heat map, we assess whether there are any signs of overheating or contraction in the current phase of the financial cycle. Using colors, the heat map shows the degree of the deviation of various Financial Activity Indexes (FAIXs) from their trends (Chart IV-1-1).[13] The heat map shows that while the funding conditions for firms and households have been highly accommodative, none of the indexes are "red," which would signal overheating as observed during the bubble period in the late 1980s. That is, financial and economic activities as a whole have not shown excessive movements similar to those seen during the bubble period.

Chart IV-1-1: Heat map



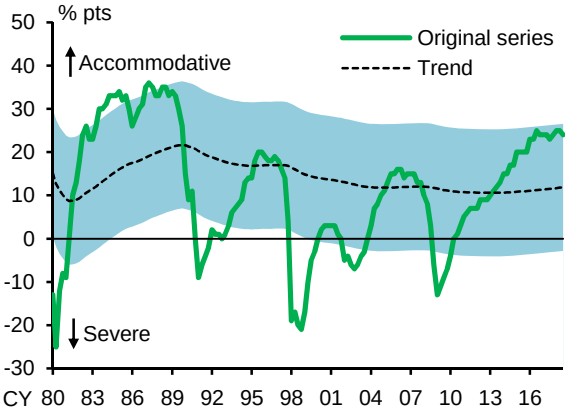
Note: The latest data for the DI of lending attitudes of financial institutions and stock prices are as at the July-September quarter of 2018. The latest data for the land prices to GDP ratio are as at the January-March quarter of 2018. The latest data for the other indicators are as at the April-June quarter of 2018.
Source: Bloomberg; Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index"; Ministry of Finance, "Financial statements statistics of corporations by industry"; Tokyo Stock Exchange, "Outstanding margin trading, etc."; BOJ, "Flow of funds accounts," "Loans and bills discounted by sector," "Money stock," "*Tankan*."

However, looking at individual FAIXs, some -- although still in the "green" zone -- are getting closer to "red." For example, the DI of lending attitudes of financial institutions has remained at the highest level since the bubble period (Chart IV-1-2). Amid the prolonged low interest rate environment, their lending stance has continued to be active, partly driven by the intensifying competition among financial institutions. Against the background of such accommodative funding conditions, firms -- middle-risk firms in particular -- have been increasing bank borrowings and thus the total credit to GDP ratio has gradually increased, deviating upward from its trend (Chart IV-1-3). The real estate loans to GDP ratio has reached a historical high and the deviation from the

[13] The shaded areas in Chart IV-1-1 represent the following: (1) the areas shaded in red show that an indicator has risen above the upper threshold, that is, it is overheating; (2) the areas shaded in blue show that an indicator has declined below the lower threshold, that is, it is contracting excessively; (3) the areas shaded in green show a limited tendency toward either extreme; and (4) the areas shaded in white show the periods without data. For details on the FAIXs, see Yuichiro Ito, Tomiyuki Kitamura, Koji Nakamura, and Takashi Nakazawa, "New Financial Activity Indexes: Early Warning System for Financial Imbalances in Japan," Bank of Japan Working Paper, No. 14-E-7, April 2014.

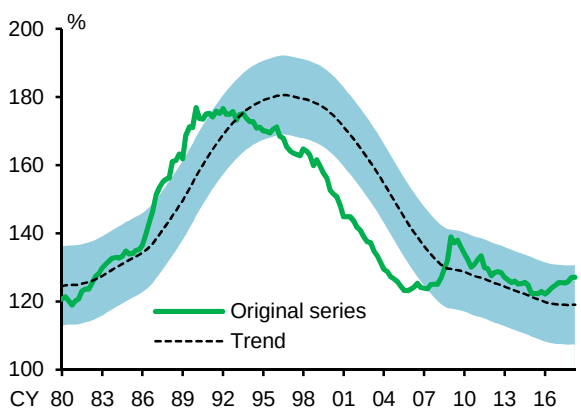
trend has increased (Chart IV-1-4). A growing number of financial institutions have become restrictive in their lending to the real estate industry out of concern over credit concentration risk. However, the amount of loans outstanding has continued to increase at a faster pace than GDP, so that the real estate loans to GDP ratio has still been rising. Meanwhile, although stock valuation does not appear to be overstretched given the strong corporate earnings (Chart II-1-11), stock prices have been hovering above their trend in the part of the "green" zone that is close to "red" (Chart IV-1-5).

Chart IV-1-2: DI of lending attitudes of financial institutions



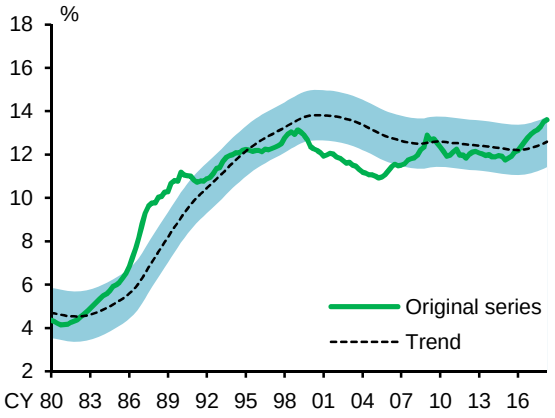
Note: 1. "Original series" is based on all firm sizes and all industries. "Trend" is calculated from the historical average. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as at the July-September quarter of 2018.
Source: BOJ, "*Tankan*."

Chart IV-1-3: Total credit to GDP ratio



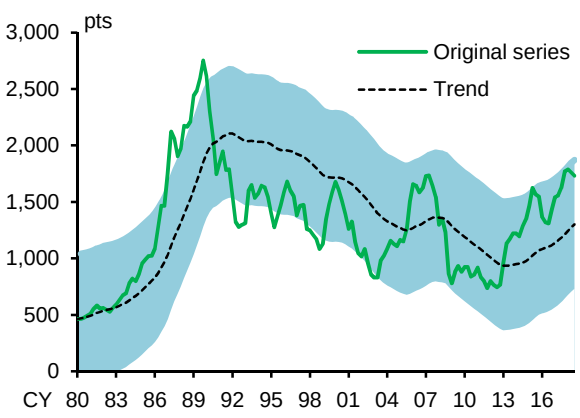
Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.
2. 4-quarter backward moving averages. Latest data as at the April-June quarter of 2018.
Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Chart IV-1-4: 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 2018.
Source: Cabinet Office, "National accounts"; BOJ, "Loans and bills discounted by sector."

Chart IV-1-5: Stock prices



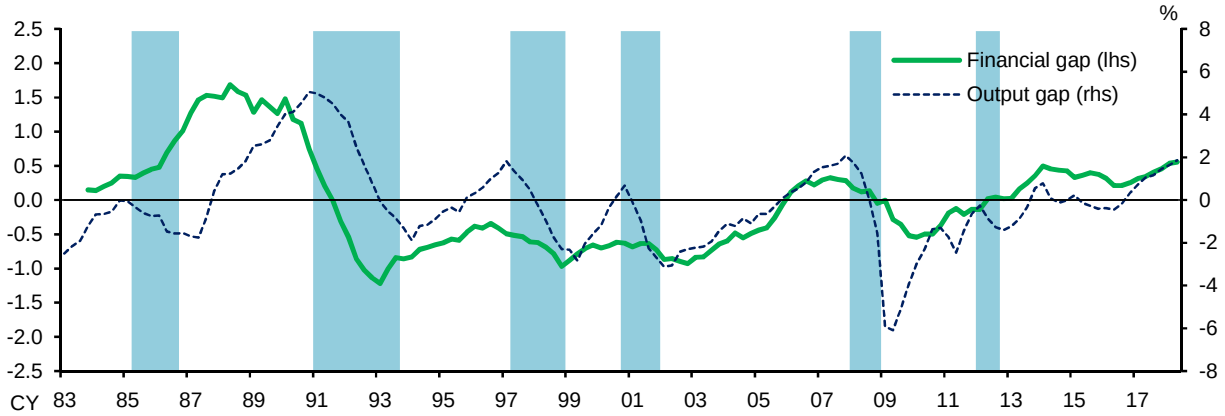
Note: 1. "Original series" is the TOPIX. "Trend" is calculated using the one-sided HP filter. The shaded area indicates 1.5 times the root mean square of the deviation from the trend.
2. Latest data as at the July-September quarter of 2018.
Source: Bloomberg.

B. Financial gap and risks to economic growth

The heat map, which shows the deviation of individual FAIXs from their trends by means of "discontinuous" color, has difficulty in quantitatively assessing the extent to which financial imbalances have built up overall. Therefore, in order to quantitatively assess the phases of the

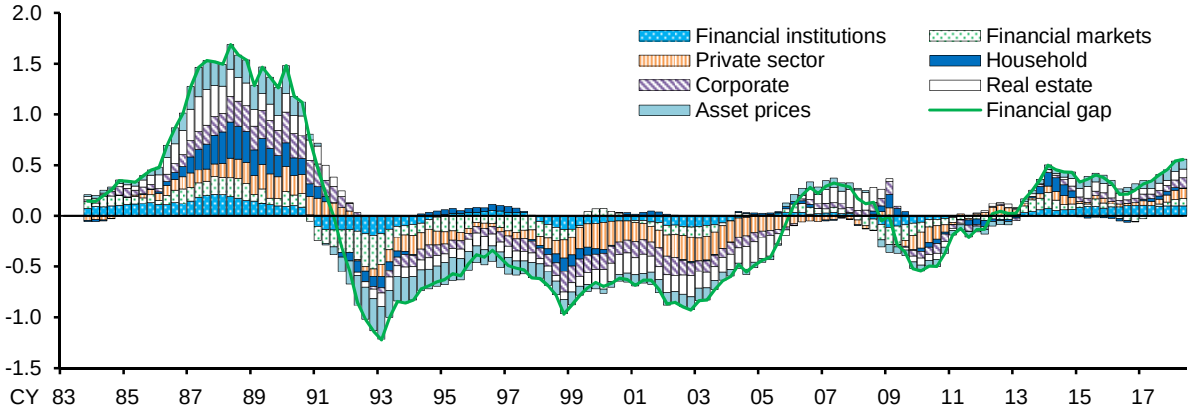
financial cycle, we construct the "financial gap," a composite indicator of the 14 FAIXs included in the heat map, by calculating the weighted average of the deviation rates of individual FAIXs from their trends. The financial gap has been increasing gradually but steadily, although below the level seen during the bubble period (Chart IV-2-1).[14]

Chart IV-2-1: Financial gap and output gap



Note: Latest data as at the April-June quarter of 2018. The shaded areas indicate recession phases.
Source: BOJ.

Chart IV-2-2: Decomposition of financial gap



Note: 1. The decomposition is based on the seven categories in the heat map (Chart IV-1-1).
2. Latest data as at the April-June quarter of 2018.
Source: BOJ.

From a historical perspective, there have been three phases of positive financial gaps: (1) the bubble period from the late 1980s to the early 1990s; (2) the period of the "Great Moderation" from the mid-2000s to the failure of Lehman Brothers (the Lehman shock); and (3) the current phase. We make the following three points by comparing the current phase with the two phases in the past. First, the current level of the financial gap has exceeded the peak before the Lehman shock and marked the largest since the burst of the bubble economy. Second, a large number of FAIXs have been in positive territory. Looking at the breakdown of the financial gap, the positive contributions have become greater for a wide range of categories, with accommodative financial conditions prevailing in the economy overall (Chart IV-2-2). Such a wide range of positive

[14] 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. Schüler, 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.

indicators differs from the phase in 2006-2007, when a real estate boom was the driving force. Third, the current phase of the positive financial gap has become prolonged. It is the longest period of a positive financial gap since the burst of the bubble economy, exceeding the phase of the "Great Moderation" before the Lehman shock. If financial institutions as well as firms and households were to base their behaviors on overly optimistic projections, then they could suffer unexpected losses in the event of a deterioration of the macroeconomic environment.

GDP-at-risk

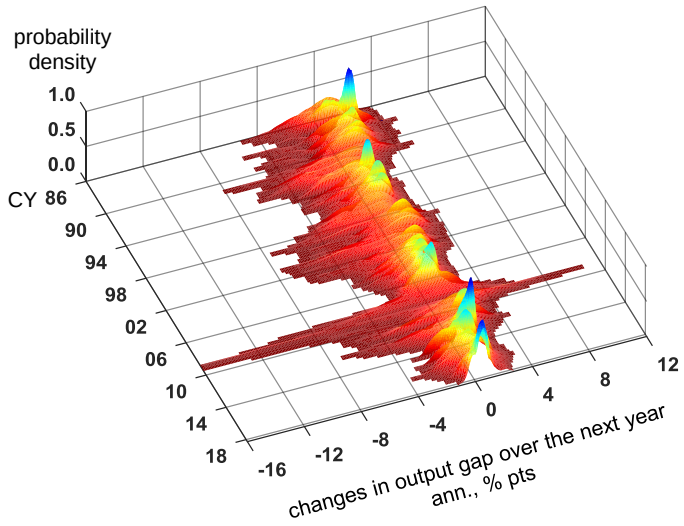
Next, to quantitatively examine the extent to which developments in the financial gap may pose a risk to the real economy, we use an approach called "GDP-at-risk" (GaR) (Box 1). The concept of GaR can be easily understood by comparing it with VaR (value-at-risk). VaR is an approach for assessing the risk involved in holding certain financial assets, which quantitatively measures the risk by indicating that a certain asset may incur a loss of more than *X* yen within the next *Y* years with the probability of *Z* percent. GaR is the corresponding approach with regard to the risk to GDP growth. Specifically, it measures the risk to economic growth by showing that the growth rate may fall below *X* percent over the next *Y* years with the probability of *Z* percent. The most important feature of GaR is that it can demonstrate how the current financial gap affects the future real economy by using a simple measure such as the GDP growth distribution. Statistically speaking, GaR estimates the conditional probability distribution of future GDP growth given a financial gap.

Specifically, we represent the risk to economic growth by a change in the future output gap. Since changes in the output gap are approximately equal to the difference between the real growth rate and the potential growth rate, this means that we estimate the probability distribution of future GDP growth relative to the potential growth rate. To measure the impact of the financial cycle, we consider not only changes in the financial gap in Japan but also changes in overseas financial conditions, which affect Japan's domestic economy, as observed during the time of the Lehman shock. It should be noted that the probability distributions of GDP growth rates shown below are estimated solely for the purpose of measuring the risk to economic growth arising from buildup in financial imbalances and do not represent the Bank of Japan's outlook for future GDP growth. Moreover, they only take the financial cycle into account as a risk factor, and therefore do not represent a comprehensive assessment of risks to economic growth. It should also be noted that the probability distributions are estimated based on limited sample data, and thus the estimates are susceptible to a considerable margin of error.

The estimated probability distributions of GDP growth rates over time show that whereas downside risk to growth over the next year has been relatively subdued compared to the past, the growth distribution over the next 3 years has shown a fatter tail on the downside (Charts IV-2-3 and IV-2-4). In other words, while the recent increase in the positive financial gap has supported private expenditure through accommodative funding conditions and suppressed downside risk to the economy in the near term of 1 year, from a somewhat longer-term perspective of 3 years, it has played a role in increasing downside tail risk by building up pressure on balance sheet adjustments (Chart IV-2-5).[15] The probability distribution of GDP growth over the next 3 years shows that the current downside tail is not as fat as around 1990 during the bubble period, but the shape of the distribution has changed in recent years as low interest rates have had a cumulative effect (Chart IV-2-6).

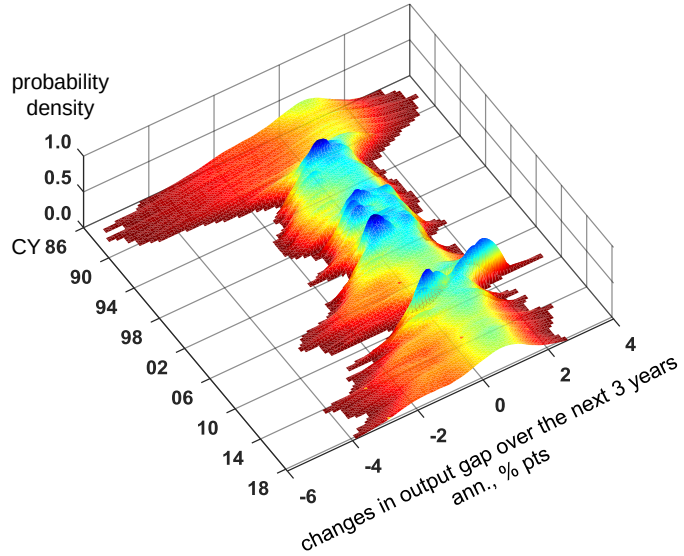
[15] The estimations show that while overseas financial conditions have a relatively large impact on both the upside and downside risks over the next year, the domestic financial gap in Japan has a larger impact over the next 3 years. During the period following the Lehman shock, the probability distribution of GDP growth over the next year greatly widened both upward and downward. This is due to rapid changes in stress in global financial markets.

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



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

Chart IV-2-4: 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.

Chart IV-2-5: Risks to future economic growth (as of the April-June quarter of 2018)

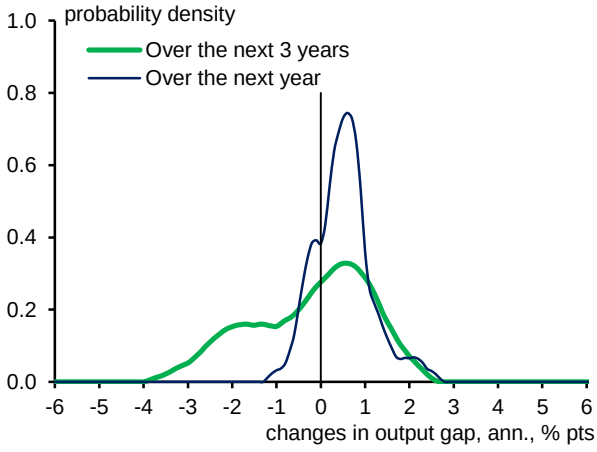
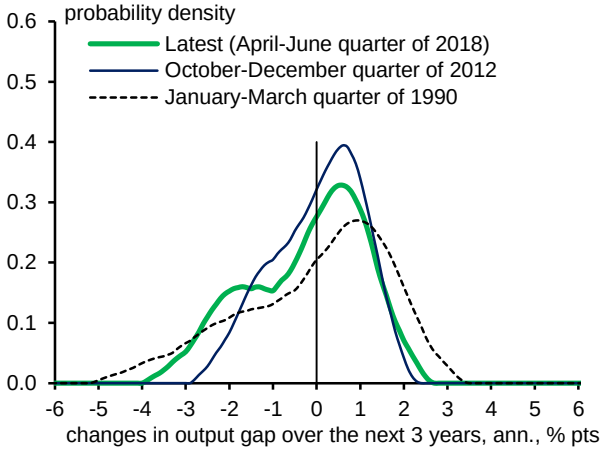


Chart IV-2-6: Comparison of risks to economic growth by period



Caveats regarding the assessment of financial vulnerabilities

The financial gap provides a convenient indicator of the financial cycle. However, gauging developments in the financial system by a single indicator has the advantage of simplicity and the disadvantage of greater measurement error. For example, it is difficult to measure vulnerabilities stemming from changes in the quality of financial institutions' loans, such as an increase in lending to middle-risk firms, by using the financial gap (and its constituent indicators such as the total credit to GDP ratio). It should also be noted that the measurement of trends in FAIXs that constitute the financial gap is subject to a certain margin of error, given changes in Japan's financial and economic structure during the post-bubble period. Such measurement error in the financial gap will of course lead to measurement error in the GaR that is estimated by using the financial gap. Thus, while GaR provides an effective framework for visualizing the downward risks to the economy caused by financial vulnerabilities, it is difficult to accurately measure financial vulnerabilities in a single indicator and the empirical results for GaR should therefore be regarded as being subject to a considerable margin of error.

In order to more comprehensively assess whether the stability of Japan's financial system is sustainable into the future -- that is, whether any financial imbalances have built up -- it is important to carefully examine financial institutions' risk profiles, including changes in the quality of their loans. An important implication of the GaR analysis is that downward risks to the economy from a somewhat longer-term perspective gradually increase during the expansionary phase of the financial cycle, although conclusive quantitative assessments of such downward risks are difficult due to a relatively large measurement error in GaR. It is therefore necessary to examine whether Japan's financial institutions have sufficient resilience to stress to maintain the smooth functioning of financial intermediation, should downside risks materialize. Chapters V and VI will focus on these issues in more detail.

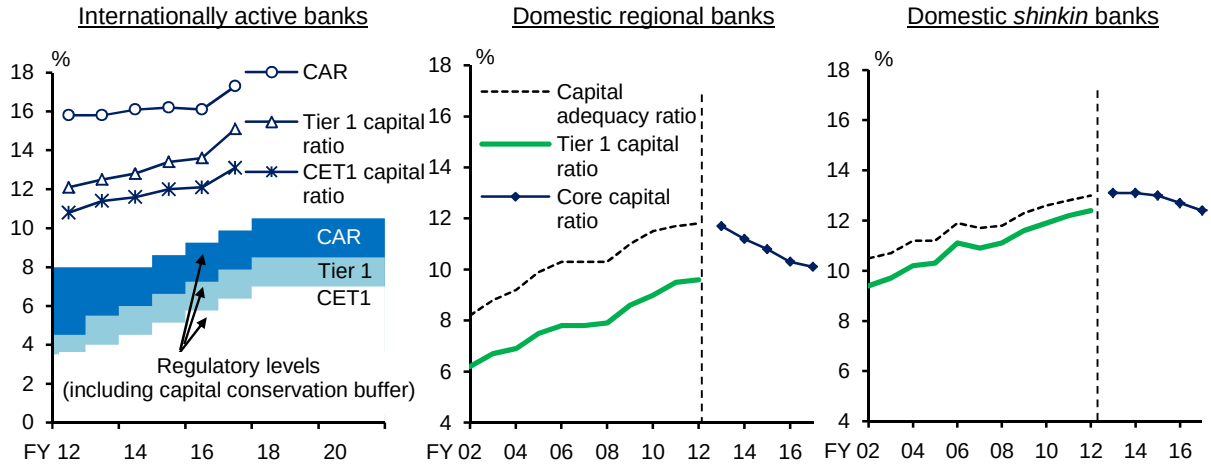
V. Financial institutions' financial bases and risk profiles

This chapter examines financial institutions' financial bases and risk profiles. First, to examine financial institutions' resilience to risk, we assess their capital adequacy and then analyze recent trends in their profits, a portion of which provides retained earnings for accumulating capital (Sections A and B). Next, we examine the risk profiles of financial institutions in detail in terms of credit risk, market risk, and funding liquidity risk (Sections C to E, respectively).

A. Financial institutions' capital adequacy

Financial institutions' capital adequacy ratios have been sufficiently above the regulatory requirements.[16] For internationally active banks, total capital adequacy ratios, Tier 1 capital ratios,

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



Note: "CAR" stands for 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 data in the left-hand and middle charts are calculated on a consolidated basis. The latest data as at end-March 2018. The data take transitional arrangements into consideration.
Source: BOJ.

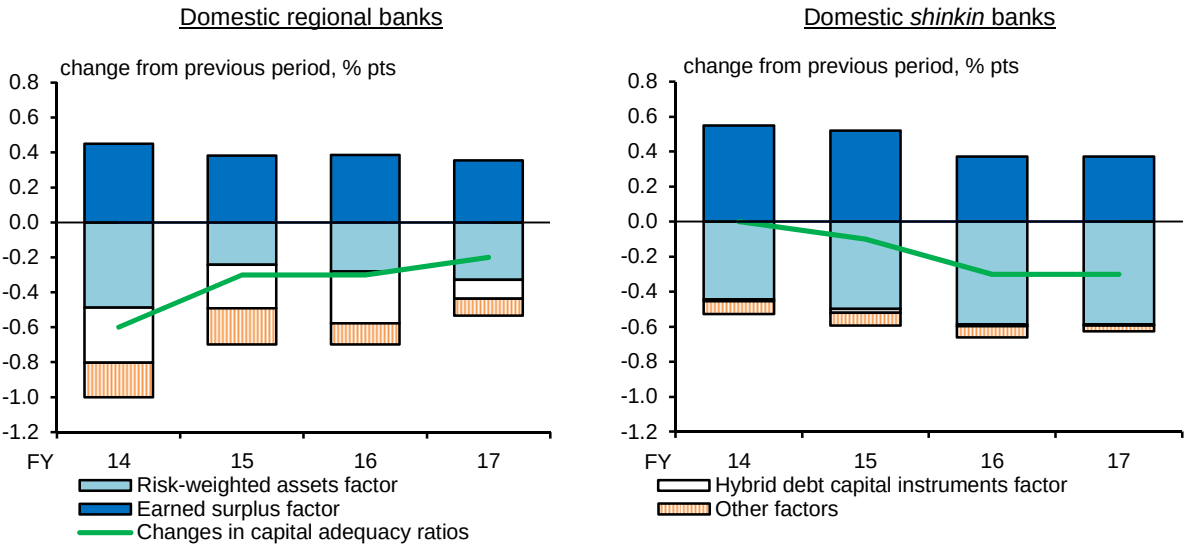
and common equity Tier 1 capital ratios (CET1 capital ratios) have all significantly exceeded the regulatory requirements (Chart V-1-1).[17] The core capital ratios for domestic banks have also substantially exceeded the regulatory requirement of 4 percent. However, these ratios have gradually declined in recent years. This decline is mainly because making profits commensurate with the increase in risk assets has become difficult; specifically, the positive contribution of earned surplus reserves has become somewhat smaller than the negative contribution of risk assets. This tendency appears to be related to the fact that financial institutions have increased loans to low-return borrowers. The gradual decline in the core capital ratios partly reflects the fact that the

[16] Unless otherwise noted, the figures for financial institutions' capital in the charts show 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).

[17] As for internationally active banks, under the Basel III requirements, (1) the capital conservation buffer (2.5 percent), (2) the countercyclical capital buffer (upper limit of 2.5 percent), and (3) the surcharge on global systemically important banks (G-SIBs) and domestic systemically important banks (D-SIBs) (1-2.5 percent for G-SIBs depending on their size and other characteristics and levels for D-SIBs determined by national authorities) started to be implemented at the end of March 2016 and will become fully effective at the end of March 2019. Under the current transitional arrangements, domestic banks can regard all or a portion of certain instruments (such as non-convertible preferred stocks and subordinated bonds) as part of new core capital, and they are allowed to include certain assets in core capital. These arrangements will be phased out gradually.

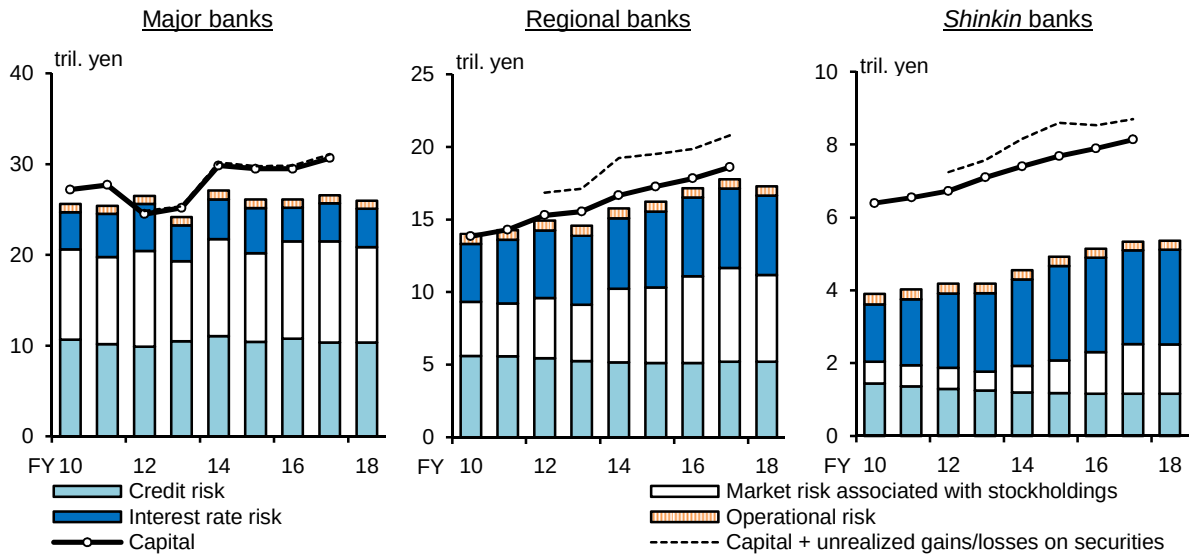
amount of hybrid debt capital instruments (subordinated bonds and loans) has decreased due to the redemption of such instruments and the reduction in the upper limit of capital inclusion in transitional arrangements related to the Basel III framework (Chart V-1-2).

Chart V-1-2: Factors of changes in capital adequacy ratios



Note: Latest data as at end-March 2018. The data take transitional arrangements into consideration.
Source: BOJ.

Chart V-1-3: Risks borne and amount of capital by type of bank

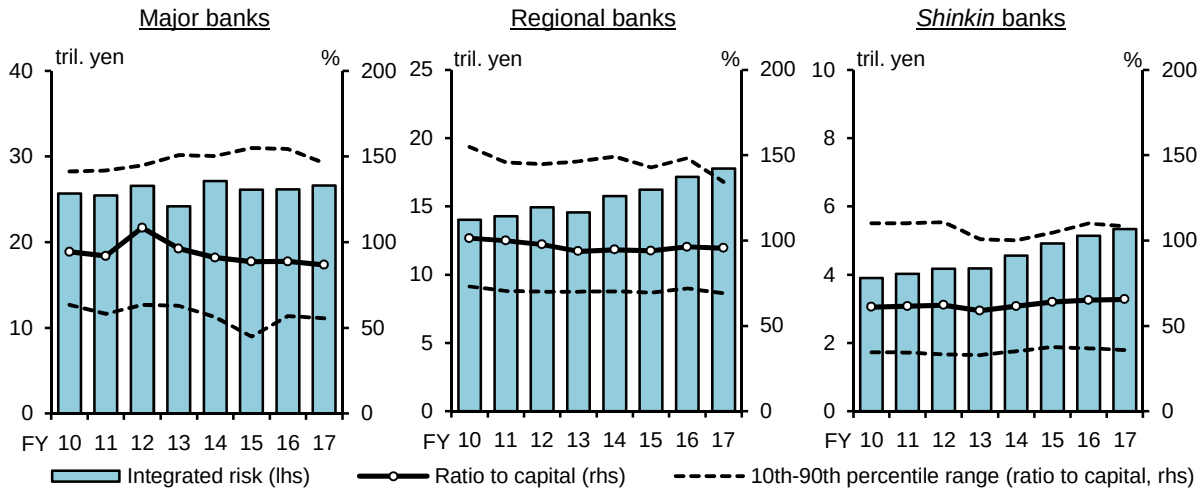


Note: 1. "Credit risk" includes risks of foreign currency-denominated assets. "Market risk associated with stockholdings" includes risks of stock investment trusts. "Market risk associated with stockholdings" and "Interest rate risk" (parts of off-balance-sheet transactions are included) in the left-hand 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 2018 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 2018, 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 2018, and (3) yen interest rate risk (excluding the risk associated with yen-denominated bondholdings) as at end-June 2018.
Source: BOJ.

Looking at the financial system overall, financial institutions' capital levels are adequate relative to the various types of risk they undertake, and financial institutions have sufficient capacity to

absorb losses (Chart V-1-3).[18] However, there is significant heterogeneity among financial institutions and there are some whose capital levels are below their held amounts of integrated risk (Chart V-1-4).

Chart V-1-4: Heterogeneity in risks borne by type of bank



Note: "Integrated risk" is the sum of the amount of risks in Chart V-1-3. Latest data as at end-March 2018.
Source: BOJ.

B. Assessment of financial institutions' profitability

Even though the capital adequacy ratios of financial institutions are currently above regulatory requirements, their capital levels being adequate in the future is not necessarily guaranteed if their core profitability remains sluggish for a prolonged period, which would lead to insufficient accumulation of retained earnings. In such a case, financial institutions would gradually become cautious in their risk taking, which would further push down their profitability, so that their capital levels would continue to decline. For this reason, the future course of financial institutions' core profitability plays a key role in assessing whether the functioning of financial intermediation will be maintained in a stable manner in the future.

Declining core profitability and increasing heterogeneity

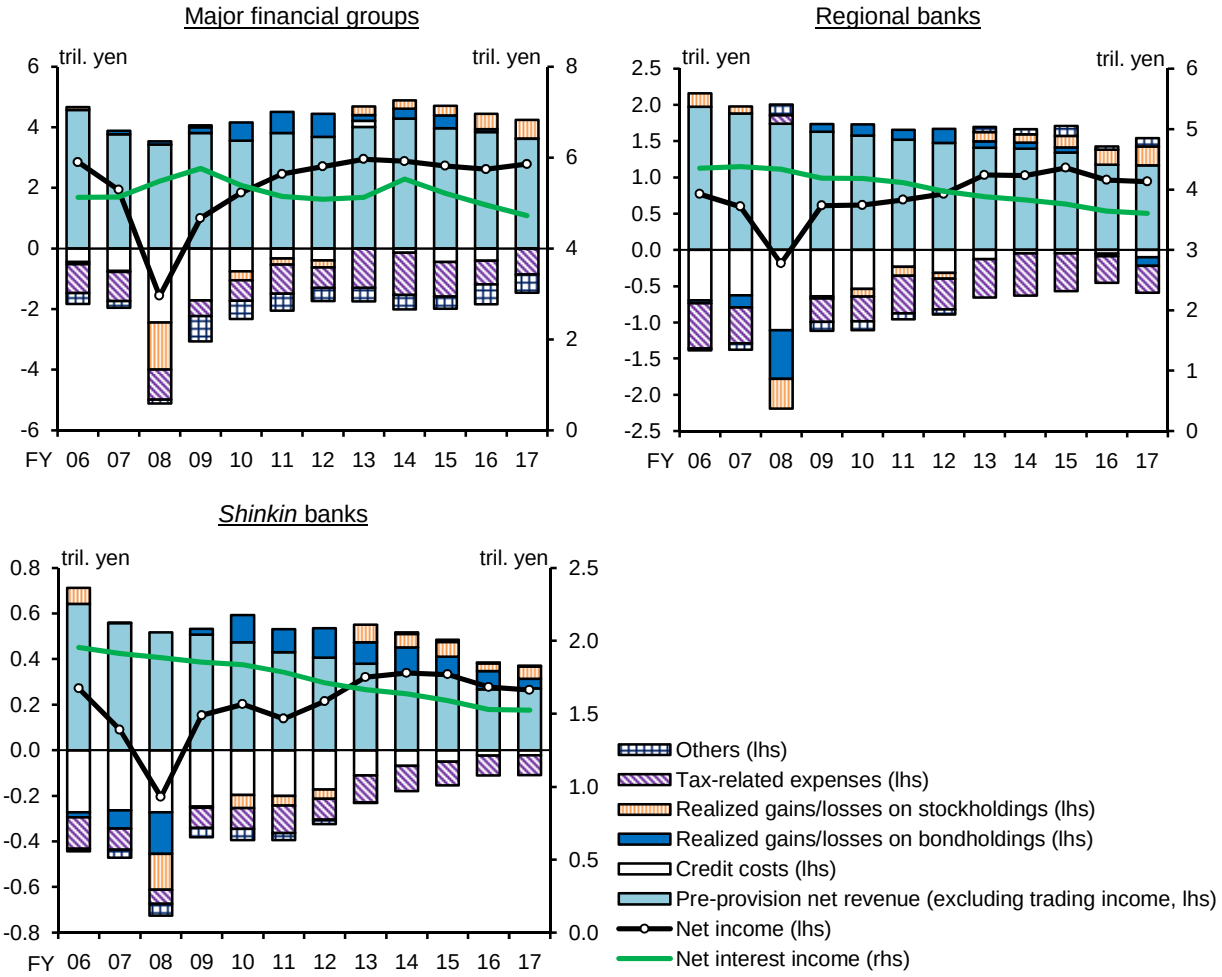
From a long-term perspective, net income has remained fairly high for all types of banks (Chart V-2-1). It has been underpinned by an increase in realized gains on stockholdings due to a strong stock market and a decrease in credit costs due to strong corporate earnings. However, net interest income has trended downward for all types of banks, reflecting narrower deposit-lending margins due to the prolonged low interest rate environment and intensified competition among financial institutions.

On the other hand, heterogeneity across different types of banks can be observed in financial institutions' core profitability measured by pre-provision net revenue (PPNR) excluding trading income. For major banks, PPNR (excluding trading income) has been supported by non-interest

[18] The same method and parameters (such as the confidence level and the holding period) are used for all financial institutions to calculate 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 21, 25, 26, 29, and 30. 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.

income through fees and commissions from M&A and syndicated loan-related businesses, as well as net interest income from overseas affiliates. For regional financial institutions, PPNR (excluding trading income) has been less supported by these income sources and thus has remained highly dependent on domestic net interest income. Consequently, the continuation of the downward trend in PPNR (excluding trading income) is especially pronounced for regional financial institutions (Chart V-2-2).[19]

Chart V-2-1: Developments in and decomposition of net income



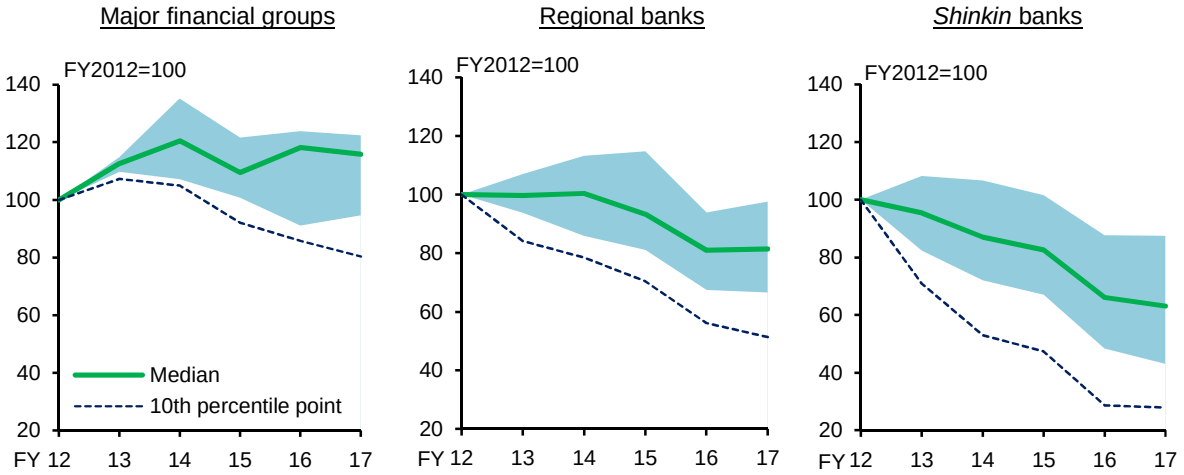
Note: 1. "Major financial groups" covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, Shinsei Bank, and Aozora Bank. The same coverage applies to the rest of this section.
2. From fiscal 2012, gains/losses from investment trusts due to cancellations are excluded from "Pre-provision net revenue (excluding trading income)" and "Net interest income."
Source: Published accounts of each bank; BOJ.

As well as the heterogeneity between major banks and regional financial institutions, it has also been noticeable in recent years that differences in core profitability have been growing within the bank categories of regional banks and *shinkin* banks. To show this, we divide regional banks and *shinkin* banks into three groups each in terms of profitability (ROA calculated using PPNR excluding trading income) in fiscal 2017. For a lower profitability group, PPNR (excluding trading income) decreases more from fiscal 2015 to 2017, which implies increasing differences in profitability among regional financial institutions (Chart V-2-3). Looking at individual factors

[19] Most recently, the decline in core profitability among regional financial institutions has prompted some to charge off deferred tax assets, which represent future tax savings, and to declare losses on land and buildings for their branches and offices.

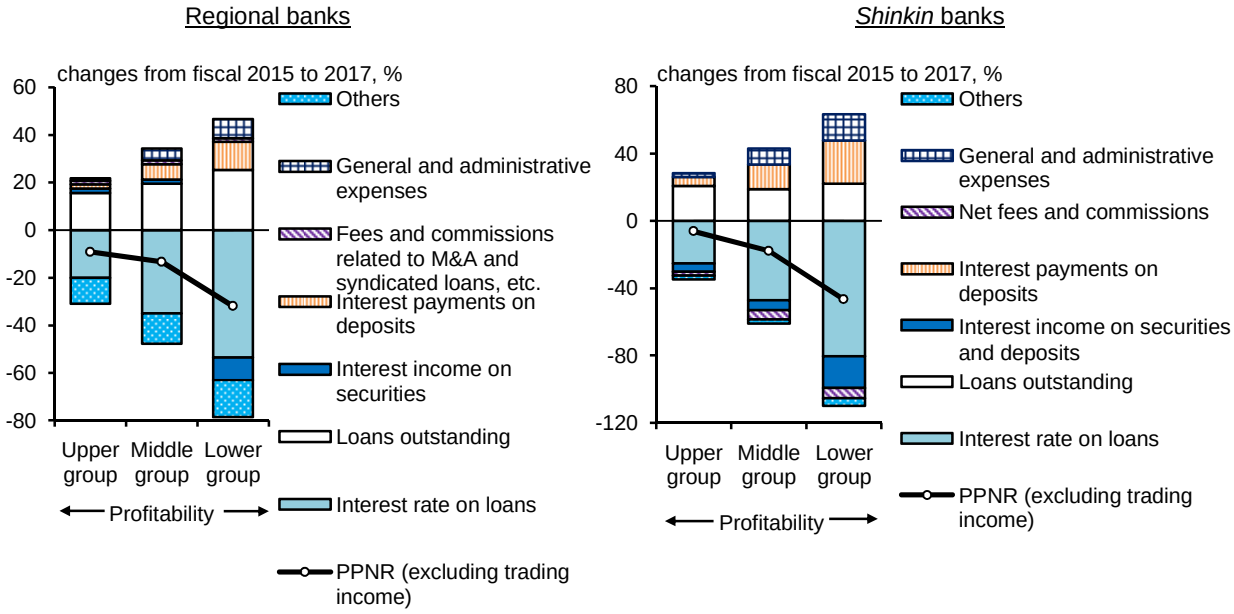
contributing to changes in profitability, total loans outstanding has increased in all groups, showing

Chart V-2-2: Heterogeneity in pre-provision net revenue (excluding trading income)



Note: The shaded area indicates the 25th-75th percentile range.
Source: Published accounts of each bank; BOJ.

Chart V-2-3: Core profitability and factors of its changes



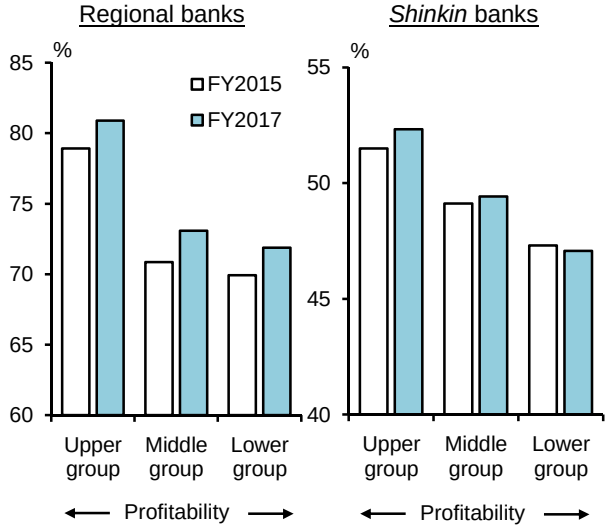
Note: Banks are divided into three groups (upper, middle, and lower) according to their ROAs calculated using PPNR (excluding trading income) for fiscal 2017. PPNR (excluding trading income) excludes gains/losses from investment trusts due to cancellations.
Source: Published accounts of each bank; BOJ.

no major heterogeneity. This reflects the fact that a wide range of financial institutions across Japan have maintained an active lending stance as the loan demand has increased, especially for small firms against the background of the prolonged economic expansion. Meanwhile, in the least profitable group for both regional banks and *shinkin* banks, reductions in general and administrative expenses as well as deposit interest payments contribute more to raising the profits than other groups. With regard to expenses, banks with low profitability have pressed ahead with reducing expenses by consolidating branches and improving administrative efficiency. Meanwhile, expense reductions for banks with high profitability have been limited due to the implementation of upfront investments to enhance sales capacity. With regard to interest payments, less profitable banks have been able to reduce their interest payments on deposits more than highly profitable

banks. This reflects the fact that less profitable banks have had more room for lowering their funding cost under the low interest rate environment because they previously were paying higher interest rates in order to collect deposits. Thus, the main cause for the divergences in core profitability across the groups is differences in the decline in loan interest rates: the less profitable banks are, the larger the negative contribution of the decline in loan interest rates to their profits is. This likely stems from the intensification of competition beyond "home areas" in recent years; specifically, regional banks have increased their focus on "cross-border" lending to prefectures neighboring the head office prefecture and this has exerted downward pressure on loan interest rates of financial institutions that used to maintain higher loan interest rates (Chart III-1-9).

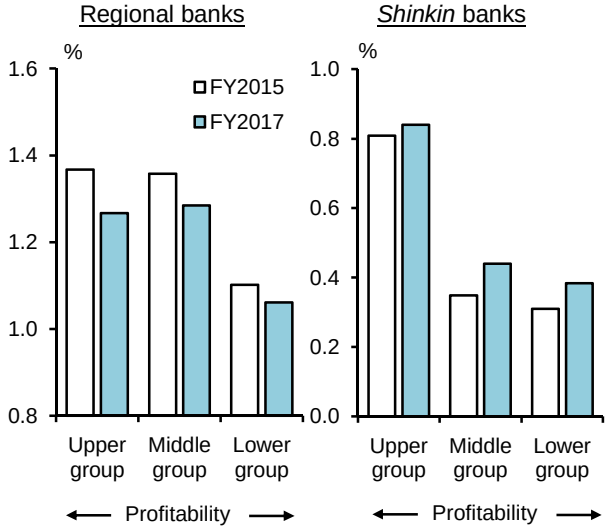
Differences in business bases for regional financial institutions have also played a role in generating the heterogeneity in the decline in loan interest rates. Loan-to-deposit ratios, which proxy for the strength of the demand for loans that each bank faces, are higher for more profitable banks (Chart V-2-4). Generally, loan-to-deposit ratios for regional financial institutions are influenced by the population growth rate and the elderly population ratio within their business area. Specifically, in areas with more elderly residents, deposits are easier to gather and demand for housing loans is smaller. In addition, the sales of small firms with limited markets (especially in the non-manufacturing sector) depend on the population of the area. This means that if the area's population declines, the loan demand from firms tends to decline, putting downward pressure on loan interest rates. On the other hand, financial institutions with a strong business base tend to secure more profits due to sufficient demand for real estate loans and consumer loans, both of which generate high loan interest rates. This allows additional risk taking, such as lending to firms with relatively high credit risk, so that their overall decline in loan interest rates seems to be relatively limited.

Chart V-2-4: Core profitability and loan-to-deposit ratios



Note: For the classification of profitability, see the note on Chart V-2-3.
Source: BOJ.

Chart V-2-5: Core profitability and stockholdings



Note: The chart indicates the ratio of outstanding amount of stockholdings relative to that of deposits. For the classification of profitability, see the note on Chart V-2-3.
Source: BOJ.

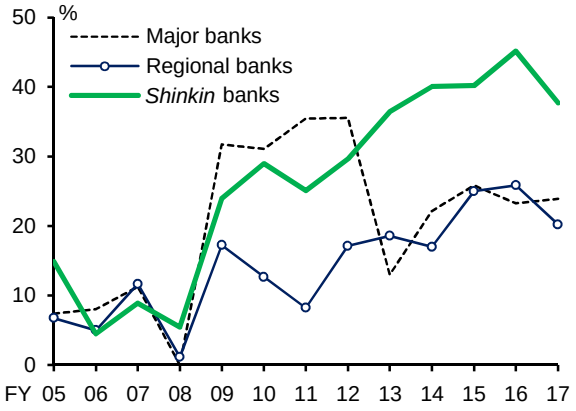
Differences in interest and dividend income from securities have also played a role in increasing profit heterogeneity, although their impact is not as large as that of differences in loan interest rates. Looking at stockholdings (relative to the amount of deposits) by group, more profitable banks have a larger share of stockholdings (Chart V-2-5). Interest yields on bonds, domestic ones in

particular, have continued to decline due to the prolonged low interest rate environment. But the improving trend in stock dividend yields due to strong corporate earnings has benefited banks with high profitability, which tend to have a larger share of stockholdings.

Trends in the realization of gains on securities sales and in dividend policies

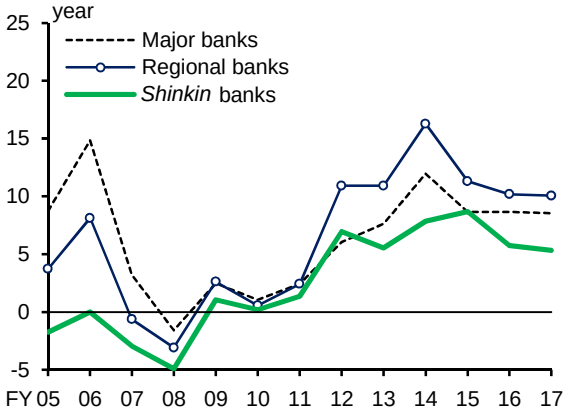
As pointed out earlier, the main reason why financial institutions have maintained a fairly high level of net income despite downward pressure on core profitability is a greater contribution of realized gains on sales of securities, in addition to the decrease in credit costs due to the economic expansion. In fact, looking at the share of realized gains/losses on securities sales in net income (i.e., the degree of dependence on realized securities gains), an increasing trend in the share has been observed among regional financial institutions; for example, the share has recently reached around 40 percent for *shinkin* banks (Chart V-2-6). Due to this active realization of gains on securities sales and subsequent reinvestment of these proceeds, the book value of securities held by financial institutions has been rising. For this reason, room for realizing gains through securities sales, calculated as the unrealized gains on securities holdings divided by the average amount of realized gains in the past, has been declining recently at some financial institutions, despite the strong stock market (Chart V-2-7).

Chart V-2-6: Ratio of realized gains/losses on sales of securities to net income



Note: 1. "Realized gains/losses on sales of securities" indicates realized gains/losses on sales of bonds/stocks, which include gains/losses from investment trusts due to cancellations after fiscal 2012. Net income indicates income before taxes.
2. Median of the ratio of realized gains/losses on sales of securities to net income calculated by type of bank is replaced by zero if the median net income is negative for that type of bank.
3. Median of each bank type. Latest data as at fiscal 2017.
Source: BOJ.

Chart V-2-7: Room for realizing gains

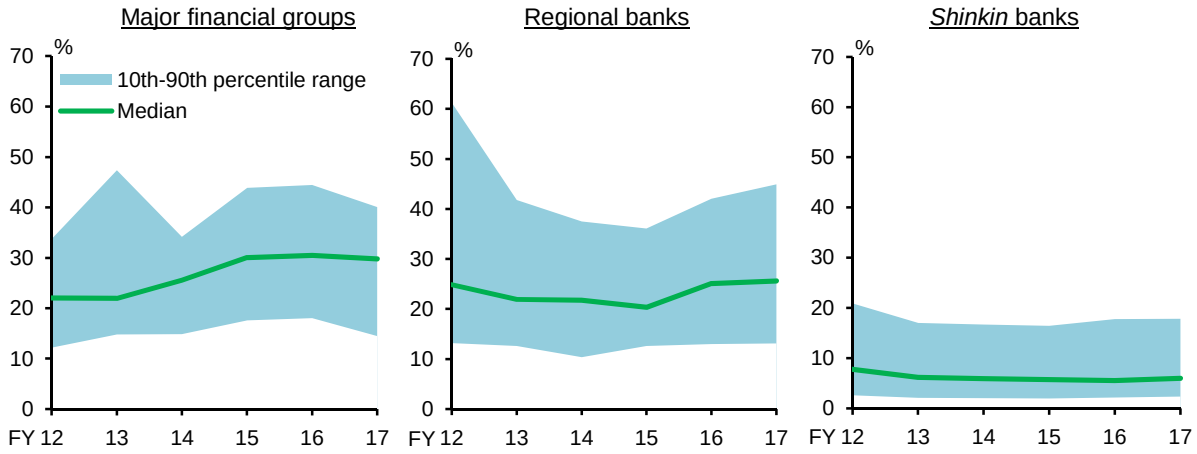


Note: 1. "Room for realizing gains" = unrealized gains/losses on available-for-sale securities holdings / realized gains/losses on sales of securities (3-year backward moving average).
2. Realized gains/losses on sales of securities include gains/losses from investment trusts due to cancellations after fiscal 2012.
3. Median of each bank type. Latest data as at fiscal 2017.
Source: BOJ.

In terms of capital adequacy regulations, unrealized gains on securities holdings are not included in regulatory capital for domestic banks (Chart V-1-3). However, such gains can function as a de facto capital buffer on an economic value basis because they could support profits in the case of loss events, for example due to an increase in credit costs. Even if financial institutions realized gains on securities sales, there would be no change in de facto (economic) capital as long as those proceeds are saved as internal reserves through net income. However, if the net income derived from realized gains on sales of securities left the financial institution in the form of dividends to shareholders, the economic capital of the financial institution would decline. In recent years, reflecting growing awareness of the importance of shareholder returns, some of the listed banks have raised their dividend payout ratio (Chart V-2-8). This mainly reflects the fact that many

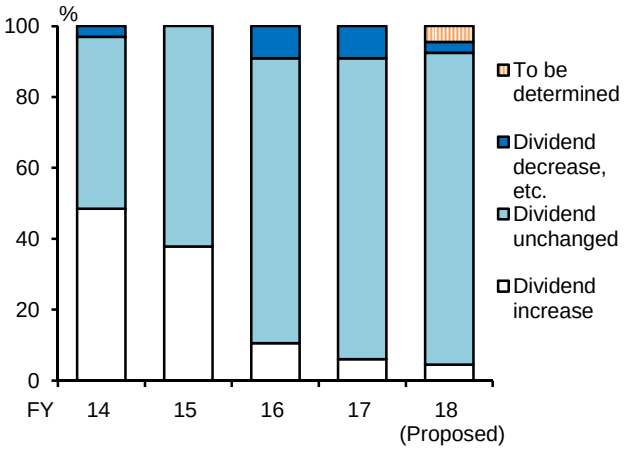
financial institutions have been managing to pay stable dividends per share despite decreasing net income (Chart V-2-9). Reluctance to cut the dividend per share seems to arise from managers' concerns that relationships with shareholders such as local firms may be jeopardized and shareholders may perceive a decrease in dividends as signaling deterioration in financial institutions' business conditions.[20]

Chart V-2-8: Dividend payout ratios by type of bank



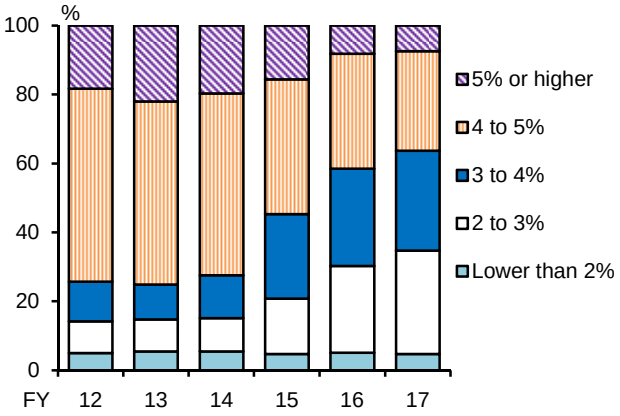
Note: Dividends of *shinkin* banks cover dividends on common shares.
Source: BOJ.

Chart V-2-9: Dividend per share of regional banks



Note: The chart indicates dividends on common shares, and covers regional banks (excluding subsidiary banks of financial groups and unlisted banks).
Source: Published accounts of each bank.

Chart V-2-10: Dividend rates of *shinkin* banks



Note: Dividend rate = amount of dividends on common shares / amount of common shares outstanding.
Source: BOJ.

In general, if a firm cannot use its equity capital efficiently to make adequate returns, returning capital to shareholders can be justified. In this sense, it is not necessarily a problem that financial institutions with declining core profitability enhance their shareholder returns by paying out dividends or repurchasing their shares by means of realized gains. However, given that financial intermediation by financial institutions supports a wide range of economic activities and thus deterioration in financial institutions' business conditions can have widespread repercussion on the economy, these institutions should maintain strong resilience to stress. Therefore, financial institutions need to be attentive to the adequacy of their capital levels if they prefer to maintain stable dividends or repurchase their shares by using realized gains. In fact, some financial

[20] On the other hand, financial institutions' managers also tend to be reluctant to raise the dividend per share when profits increase, considering that lowering dividends in the future if profits declined would be difficult.

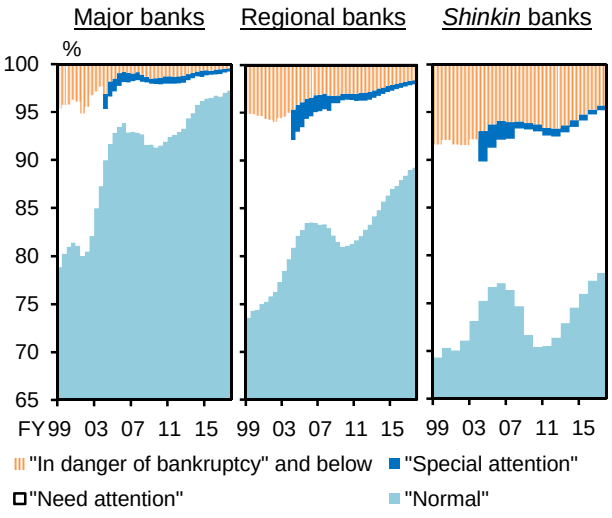
institutions have seen their capital adequacy ratios decline because they maintain stable dividends in spite of the declining net income, which in turn leads to insufficient internal reserves. Therefore, going forward, it is desirable that financial institutions communicate with shareholders regarding their distribution of profits, including their dividend policy, taking into account core profitability and stress resilience.

Meanwhile, *shinkin* banks, which are not subject to pressure from the stock market, have maintained low dividend payout ratios amid the decline in core profitability. Indeed, an increasing number of these banks have recently lowered their dividend rates (the amount of dividends on common shares / the amount of common shares) (Chart V-2-10). Many of the investors for *shinkin* banks belong to the same local community and thus are well aware of the actual business environment, including the state of the local economy. This presumably makes it relatively easy for *shinkin* banks to gain investors' understanding regarding reducing the dividend rate.

C. Credit risk

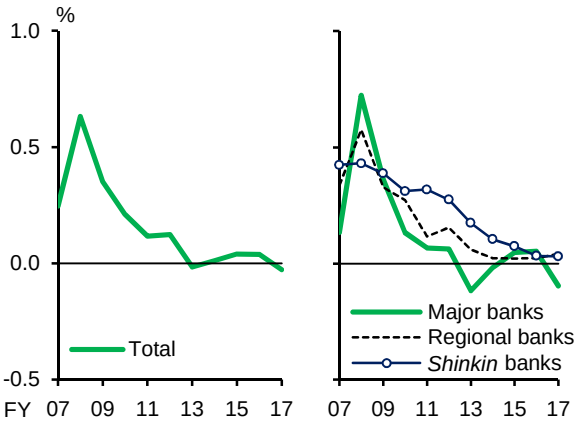
Firms' financial condition has improved amid the moderate expansion of the domestic and overseas economies and the continued low interest rate environment. As a result, the composition of financial institutions' loans by borrower classification has also improved. The ratio of normal loans to total loans has continued to increase. In the case of major banks and regional banks, the ratio clearly exceeds the peak before the Lehman shock (Chart V-3-1). Credit cost ratios have remained at extremely low levels for every type of bank, and the credit costs of major banks have recently fallen to the level of net reversals (Chart V-3-2).

Chart V-3-1: Composition 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 2018.
Source: BOJ.

Chart V-3-2: Credit cost ratios among financial institutions



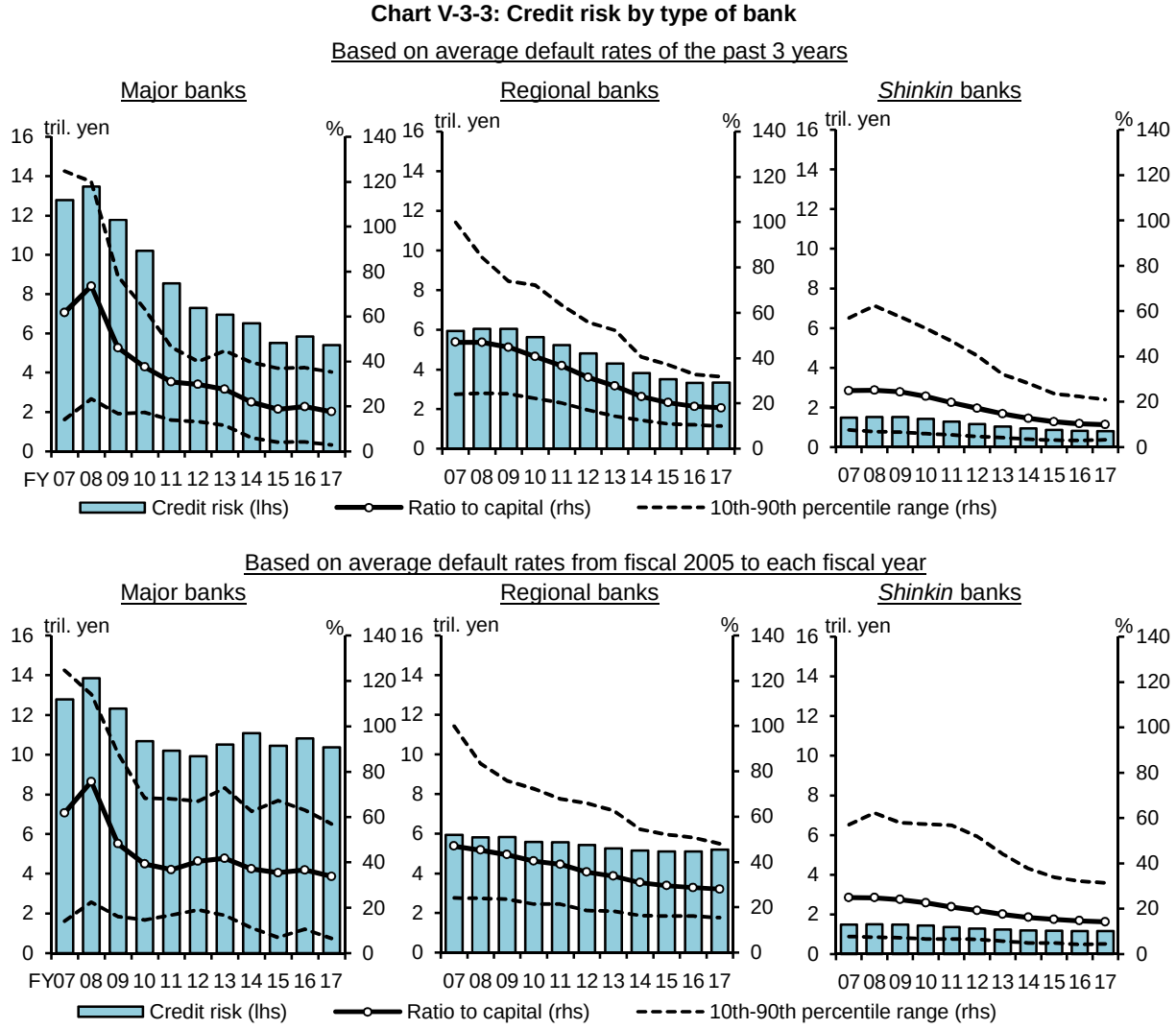
Note: Latest data as at fiscal 2017.
Source: BOJ.

Thus, while credit cost ratios have remained low, reflecting the expansion phase of the business cycle, it is important to assess financial institutions' credit risks by smoothing out the cyclical effects. That is, when credit risk is calculated based on actual default rates in the past, the reference period should be set by taking the business cycle into account. The reason for this is that if the reference period for the default rates is too short, credit risk tends to be underestimated during an economic recovery, when the default rates decline. This can lead financial institutions to

increase lending excessively, causing unexpected losses during an economic downturn.

In practice, when the reference period for the default rates is set as the past 3 years (which is short relative to a typical frequency of the business cycle), the amount of credit risk hovers around historically low levels despite the continued increase in lending (Chart V-3-3).[21] The amount of credit risk calculated in this manner is about 30-50 percent less than that calculated using the long-term average of default rates from fiscal 2005 to the time in question.[22] This suggests that the measured amount of credit risk differs substantially depending on whether the increase in default rates observed after the Lehman shock is included in the calculation.

Chart V-3-3: 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 2018.
Source: BOJ.

In assessing credit risk, it is necessary not only to smooth out the cyclical effects but also to pay due attention to the effects of changes in the characteristics and composition of borrowers. The next section focuses on loans to middle-risk firms, the real estate sector, and the overseas sector,

[21] Credit risk defined 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-1-3 and the amount of integrated risk in Chart V-1-4 are calculated by referring to the default rates from fiscal 2005 to the time in question.

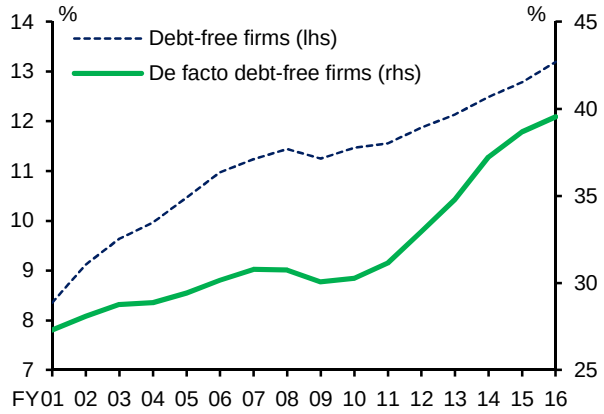
[22] Time-series data for actual default rates of borrowing firms at individual financial institutions are available from fiscal 2005.

as the share of loans to these sectors has increased in recent years.

Lending to middle-risk firms

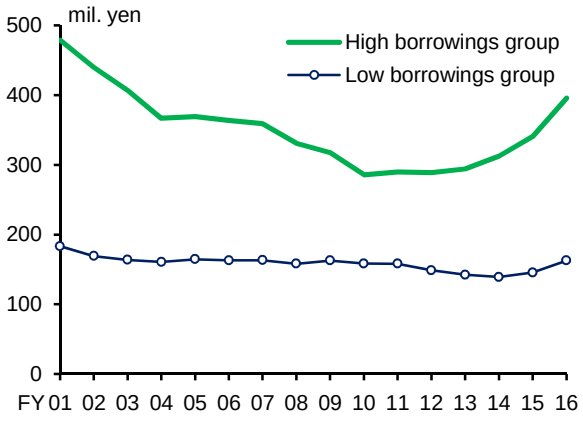
We begin with an overview of the funding structure of Japanese firms and their profitability. In Japan, the corporate sector has changed from a "net investor" to a "net saver" since the latter half of the 1990s. Under these circumstances, the share of so-called "debt-free firms," firms that have no borrowings from banks, has also increased (Chart V-3-4). However, despite this increase in the share of debt-free firms, bank lending to firms in recent years has grown at an annual pace of 2-4 percent, which exceeds the potential growth rate of the economy. This suggests that bank-dependent firms have increased their borrowings at a much larger scale relative to their average output activity if the cyclical effects are smoothed out (Chart V-3-5). Firms with a high reliance on borrowing tend to be less profitable than debt-free firms and have been struggling to improve their profitability despite a period of prolonged economic expansion. Furthermore, when economic conditions deteriorate, the profitability of these firms tends to drop sharply, thereby lowering their ability to pay interest (Chart V-3-6). As mentioned in the April 2018 issue of the *Report*, financial institutions in recent years have increased lending to firms with relatively high credit risks (so-called middle-risk firms) at low interest rates. Active lending by financial institutions to such firms at low interest rates partly reflects the fact that financial institutions have supported low performing firms by providing business consulting and advisory services. Such lending has also contributed to the current economic expansion. However, such lending could lead to an increase in credit costs when economic conditions deteriorate, as firms with a high reliance on borrowing have a relatively high propensity to spend (Chart V-3-7).

Chart V-3-4: 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.

Chart V-3-5: Borrowings outstanding per firm

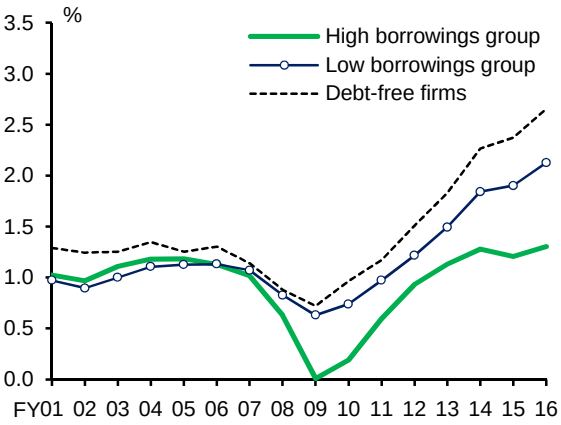


Note: Firms with positive amount of borrowings are classified into "Low borrowings group," whose borrowings ratio falls into the lower 50 percent, and "High borrowings group," whose borrowings ratio falls into the higher 50 percent. "Borrowings ratio" = (total borrowings) / (total assets).
Source: Teikoku Databank.

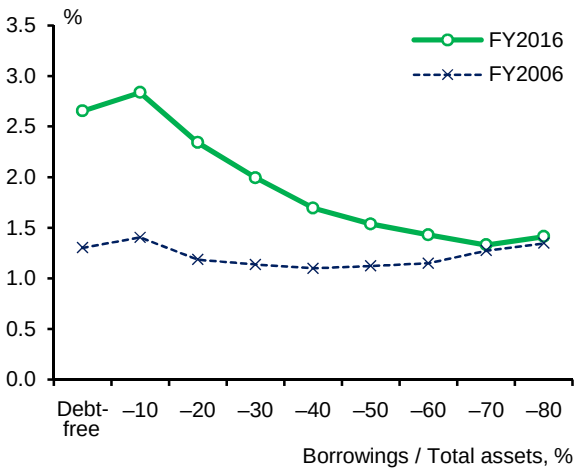
The previous issue of the *Report* identified firms with relatively weak financial condition whose borrowing interest rates are low relative to their credit risk through the business cycle and defined such firms as "low-return borrowers." The *Report* pointed out that (1) the share of financial institutions' loans to low-return borrowers in the total amount of loans to small firms (loan share of low-return borrowers) has been trending upward overall, and that (2) there is considerable variation in this share among financial institutions and the share at some institutions has recently reached 30-40 percent (Chart V-3-8).

Chart V-3-6: Firms' dependence on bank loans and firms' profitability

Ratios of operating profits to sales



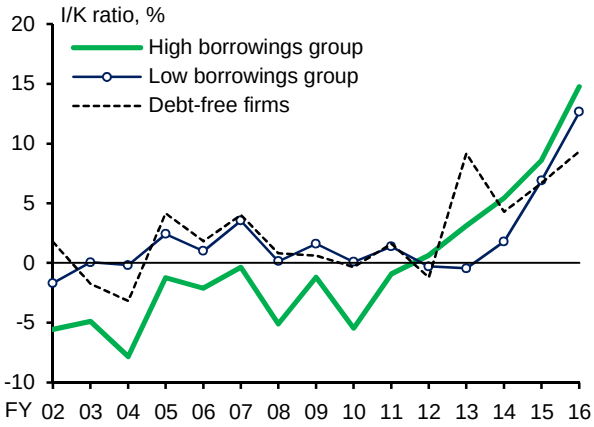
Ratios of operating profits to sales by borrowings ratio



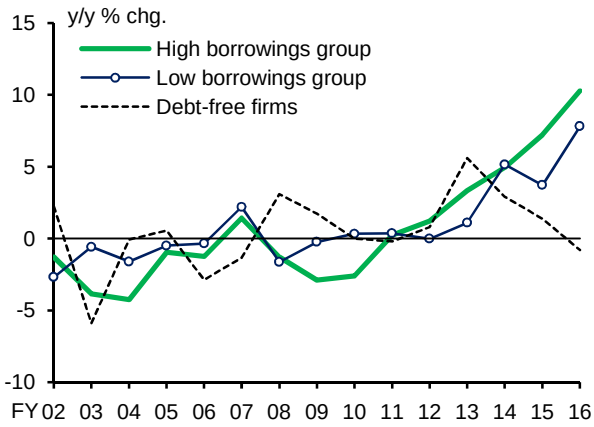
Note: Median of each group.
Source: Teikoku Databank.

Chart V-3-7: Firms' dependence on bank loans and firms' expenditure

Business fixed investment per small firm

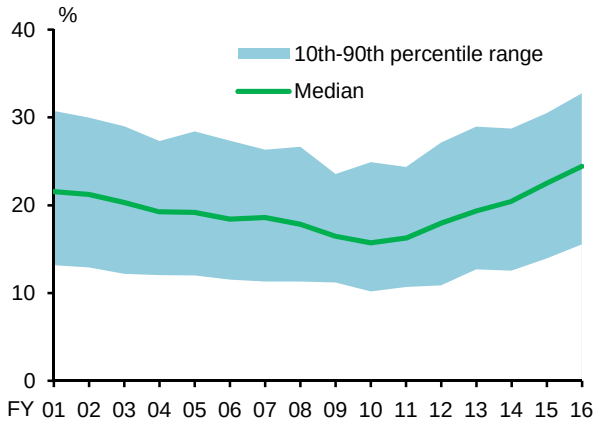


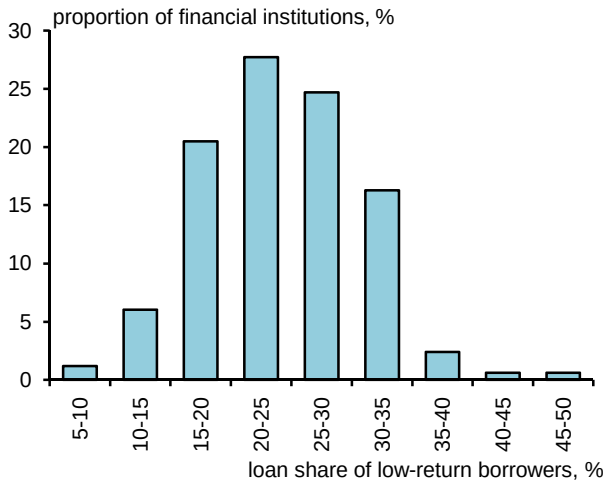
Number of employees per small firm



Note: Investment (I) in the left-hand chart is calculated as the change (ΔK) in fixed assets (K) from the previous year.
Source: Teikoku Databank.

Chart V-3-8: Loan share of low-return borrowers among financial institutions

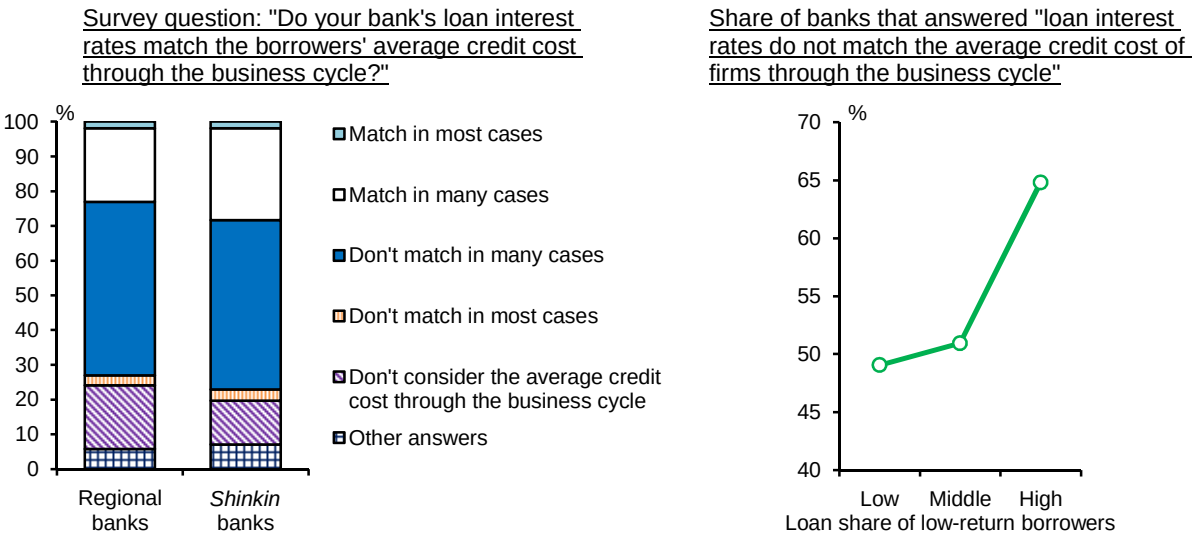




Note: The charts indicate the share of loans to low-return borrowers in the total amount of loans to small firms. Covers major banks and regional financial institutions. The data in the right-hand chart are as at fiscal 2016.
Source: Teikoku Databank.

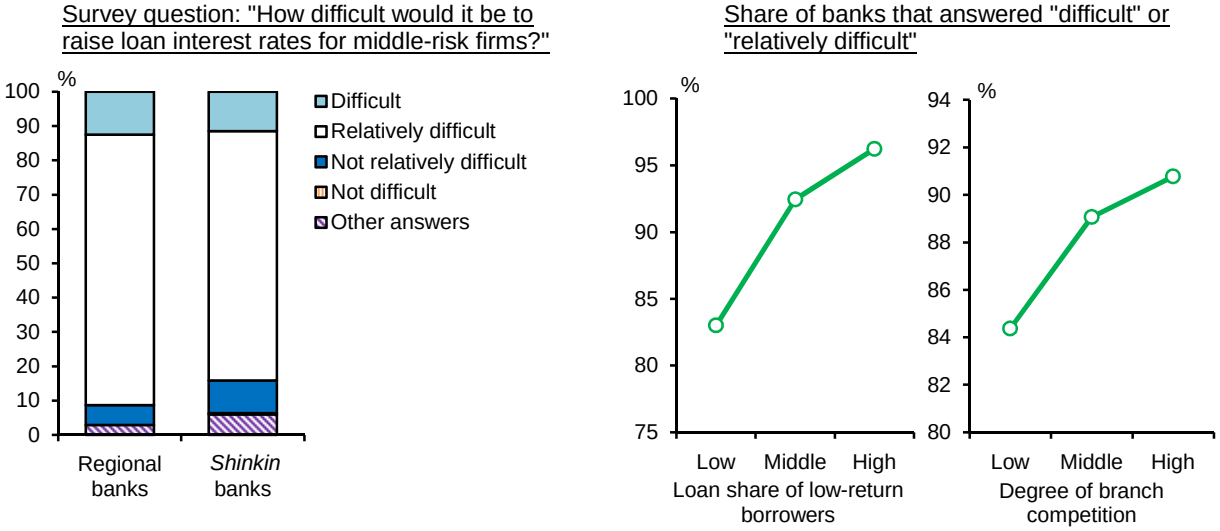
In a recent questionnaire survey of regional financial institutions conducted by the Bank of Japan, almost 50 percent of regional financial institutions responded that loan interest rates for middle-risk firms do not adequately match credit costs through the business cycle. Indeed, this response was particularly evident for financial institutions whose loan share of low-return borrowers is high. The survey thus confirmed that regional financial institutions have actually increased lending to middle-risk firms where the return does not match the risk (Chart V-3-9).

Chart V-3-9: Banks' views on loan interest rates for middle-risk firms



Note: 1. Results of the survey on risk management for lending to middle-risk firms conducted in fiscal 2018. The survey covers regional financial institutions.
2. In the right-hand chart, banks are divided into three groups according to the loan share of low-return borrowers in fiscal 2016.
Source: Teikoku Databank; BOJ.

Chart V-3-10: Difficulty in raising loan interest rates for middle-risk firms

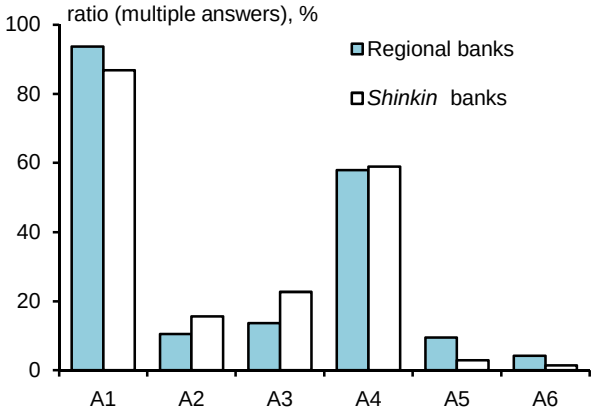


Note: 1. Results of the survey on risk management (see the note on Chart V-3-9).
2. In the right-hand chart, banks are divided into three groups according to the banks' branch competition index in fiscal 2015 (see the April 2018 issue of the *Report* for the details on the index).
Source: The Japan Financial News; Ministry of Internal Affairs and Communications; Teikoku Databank; BOJ.

Moreover, it seems that it will not be easy to raise interest rates for loans to middle-risk firms in the future. According to the survey, the large majority of regional financial institutions responded that it would be difficult to raise loan interest rates for lending to middle-risk firms even if their own

funding rates rise, and the share of respondents giving this response was particularly high among financial institutions with a high loan share of low-return borrowers (Chart V-3-10). Many regional financial institutions mentioned competition with other institutions as a reason why it was difficult to raise loan interest rates. This suggests that the intensified competition among financial institutions has become an important factor behind the narrowing of lending margins (Chart V-3-11). It will likely take time for financial institutions to improve their business management by providing firms with business consulting and advisory services.

Chart V-3-11: Reasons why it is difficult to raise loan interest rates for middle-risk firms



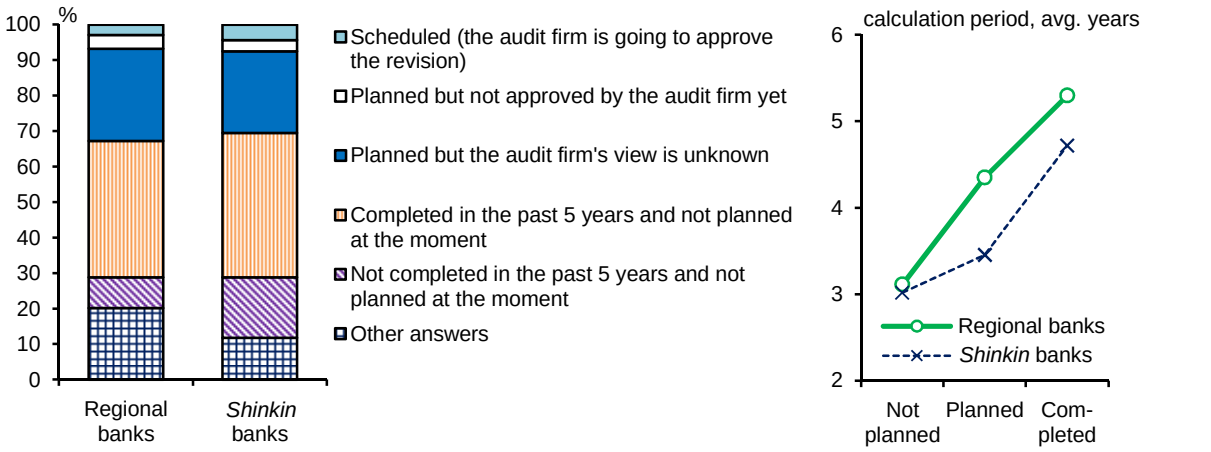
A1: Competition with other banks
A2: Concern over a possible decline in borrowers' demand for funds
A3: Concern over possible deterioration in borrowers' profitability due to an increased interest rate burden
A4: Difficulty in obtaining consent from borrowers
A5: Higher share of long-term fixed rate lending
A6: Other reasons

Note: 1. Results of the survey on risk management (see the note on Chart V-3-9).
2. "Ratio" = (number of answers) / (number of respondent banks).
Source: BOJ.

Chart V-3-12: Revision to the calculation method of loan-loss provisions

Revision status

Relationship between the revision status and the current calculation period



Note: Results of the survey on risk management (see the note on Chart V-3-9).
Source: BOJ.

A large proportion of middle-risk firms seem to have fallen into the bottom group of the "normal" borrower classification, and the ratio of loan-loss provisions for overall normal loans has remained at a historically low level.[23] Financial institutions should carefully examine their methods for calculating loan-loss provisions based on accounting rules, by appropriately smoothing out cyclical fluctuations from a medium- to long-term perspective, so that their provisions are not excessively affected by the current favorable macroeconomic environment. In the questionnaire survey, whereas about 40 percent of regional financial institutions responded that they had already revised their method for calculating loan-loss provisions, about 30 percent answered that they were still in the process of changing their procedures, and a non-negligible proportion responded

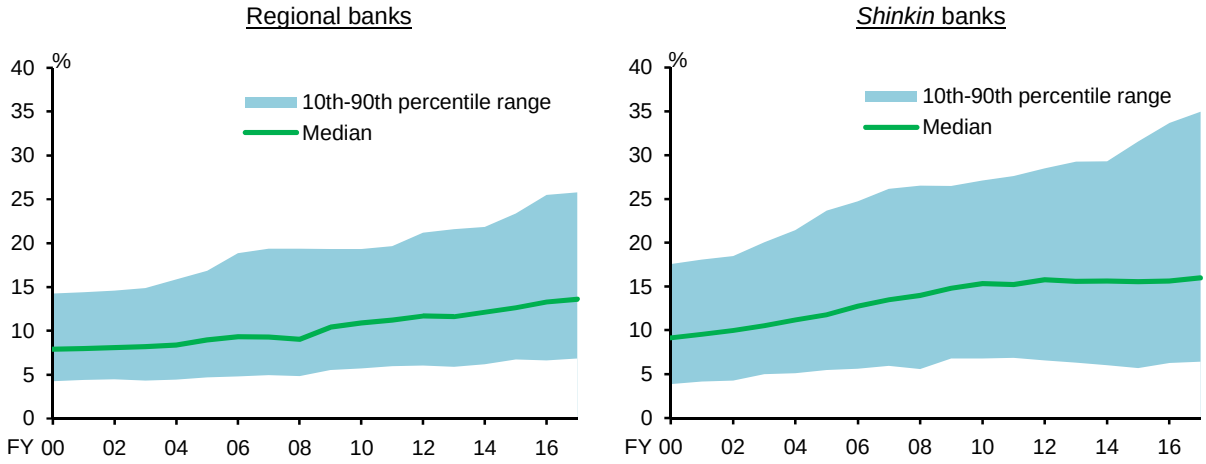
[23] Some middle-risk firms have likely been classified as "need attention" (but not as "special attention").

that they had not yet even begun a review for such a revision (Chart V-3-12). Financial institutions that have already revised their method tend to use longer calculation periods for loan-loss provisions, but these periods are still shorter than the typical length of a business cycle. Moreover, financial institutions that have not yet revised their method for calculating loan-loss provisions use even shorter calculation periods (Chart V-3-12). Thus, it is desirable for regional financial institutions to examine whether their loan-loss provisions are appropriate, taking into account possible economic downturns in the future, and then outline a plan for revising their method as necessary. If financial institutions continue to increase their provision of loans where the return does not match the credit risk, smoothing through the cycle, this will lead to a decline in their capital adequacy ratio. They need to sufficiently take this into account when formulating loan management policies.

Credit risk related to real estate

Real estate related loans, as seen in Chapter III, have continued to increase beyond the peak seen in the 1980s to 1990s. Their ratio relative to GDP has reached a record high level and their deviation from the trend has increased (Chart IV-1-4). Compared to loans to other industries, the outstanding amount of real estate loans has continued to grow at a high rate, although some financial institutions have constrained new lending (Chart III-1-13). Consequently, the share of real estate loans in the total amount of loans has continued to increase; at some regional financial institutions, this share has exceeded 30 percent and has still been rising (Chart V-3-13).

Chart V-3-13: Ratio of real estate loans to total loans



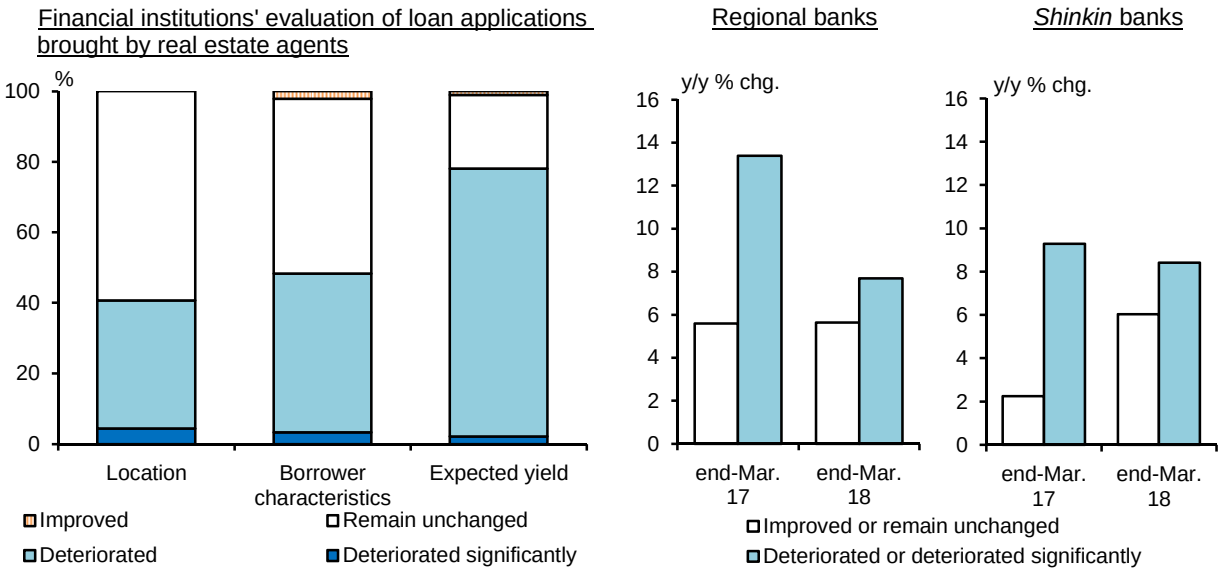
Note: 1. "Ratio of real estate loans to total loans" = (real estate loans - loans to real estate-related local public corporations) / total loans.
2. Latest data as at fiscal 2017.
Source: BOJ.

From a long-term perspective, the outstanding amount of real estate loans has exceeded the levels reached in the bubble period, even though real estate prices are much lower today than at that time. One possible explanation for this phenomenon is the recent increase in loans to rental housing businesses rather than large-scale development projects. In general, the duration of real estate development loans tends to be relatively short because real estate developers purchase land with loans and repay them once they have sold the property after developing it. On the other hand, the duration of loans to rental housing businesses tends to be longer because they repay their loans over a longer period using rental income. Under these circumstances, the risk profiles of real estate loans have changed since the bubble period; the average size of a loan has decreased, but lending durations have increased. Therefore, even if the size of each loan is small,

the accumulation of these long-term loans has resulted in an increasing trend in the total outstanding amount of real estate loans. Although the decrease in the average size of individual loans makes some contribution to risk diversification, individual loans are exposed to a common long-term risk factor arising from the supply and demand conditions in the rental housing market. For example, for regional financial institutions' loans to rental housing businesses, the rental income, which is the funding source for borrowers to repay these loans, is exposed to a common long-term risk, because the demand for rental apartments is expected to weaken due to a decreasing population, which is a common chronic stress across Japan. Furthermore, we must consider the fact that borrowers of rental housing loans include households whose loss-absorbing capacities are small.

Under these circumstances, an increasing number of financial institutions have pointed out that recently the quality of loan applications brought by real estate agents has been decreasing. Specifically, they have mentioned a worsening of borrower characteristics (e.g., an increase in investors with a low ability to pay interest), a decline in the expected return on rental properties, and an increase in the duration of loans (Chart V-3-14). Although financial institutions who have perceived a deterioration in the quality of loan applications brought by real estate agents have tended to become more reluctant to offer loans to rental housing businesses, some have continued to achieve considerable growth in this area of lending. While delinquency rates on loans to rental housing businesses have remained at low levels so far, even financial institutions with a large exposure to these types of loans do not necessarily conduct careful initial screening and interim management of their loans, including reviews of funding schedules and the use of quantitative indicators such as the debt-service coverage ratio (DSCR) and the loan-to-value (LTV) ratio (Chart V-3-15). Bearing in mind the long duration of these loans to rental housing businesses, financial institutions need to enhance the effectiveness of their risk management by, for example, setting appropriate ratios of loan-loss provisions and improving their screening and management of loans.

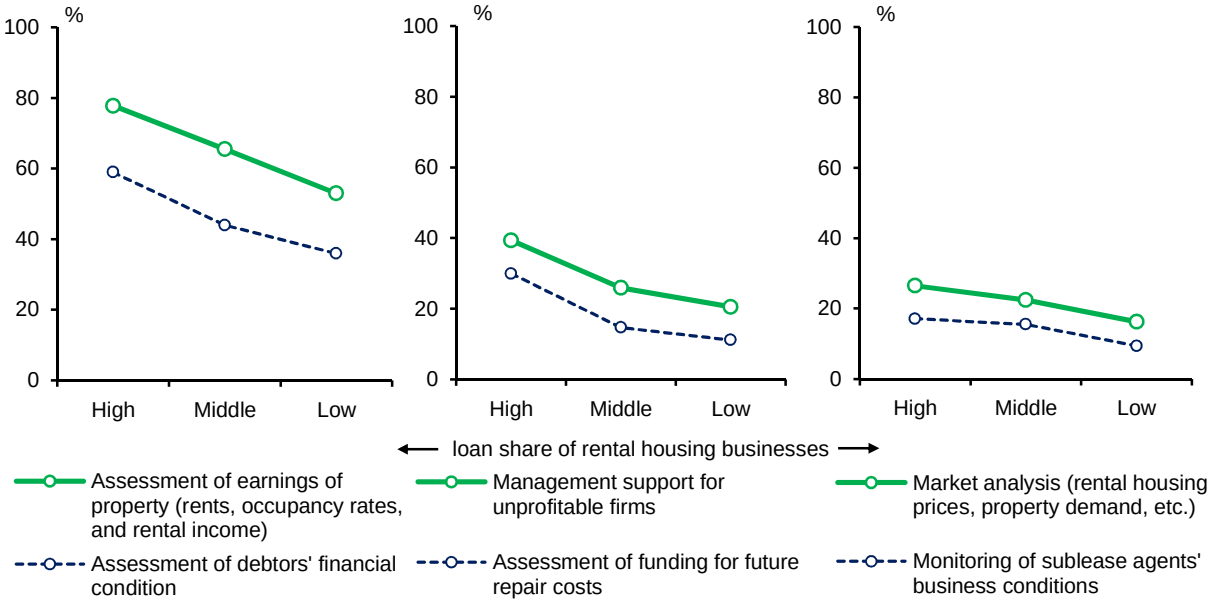
Chart V-3-14: Loans to rental housing businesses



Note: 1. Results of the survey on the risk management of loans to rental housing businesses conducted in fiscal 2018. The survey covers regional financial institutions.
2. The left-hand chart covers regional financial institutions who responded that the quality of loan applications has "deteriorated" or "deteriorated significantly" and shows how they evaluate the loan applications in terms of the location of the associated property and borrower characteristics, etc. The right-hand chart shows year-on-year percentage changes in loans outstanding to rental housing businesses for two groups that responded that the quality has "deteriorated or deteriorated significantly" or "improved or remain unchanged."

Source: BOJ.

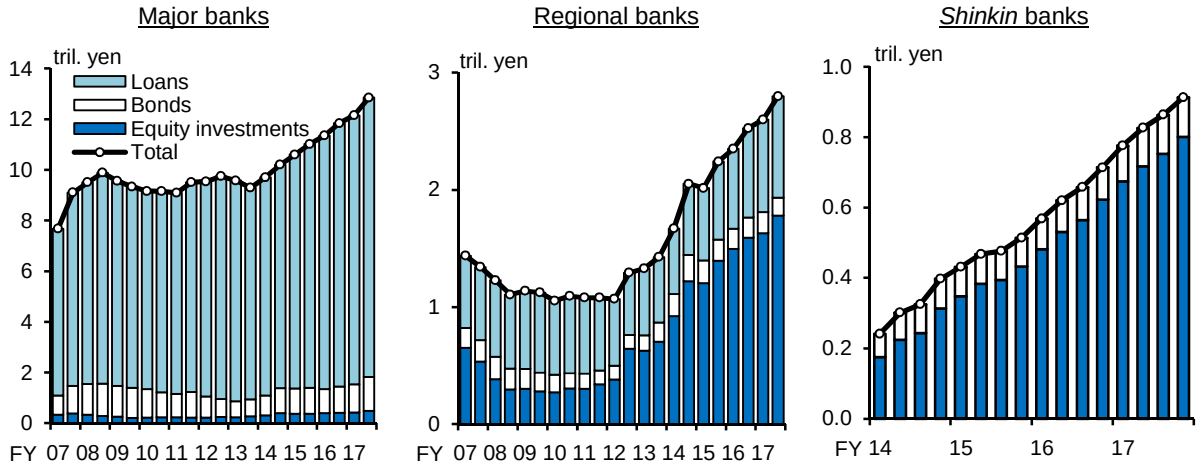
Chart V-3-15: Utilization of interim assessments of loans to rental housing businesses



Note: 1. Results of the survey on risk management (see the note on Chart V-3-14).
2. The vertical axis indicates the proportion of regional financial institutions responding that they are "currently enhancing" each interim assessment. The horizontal axis indicates three groups of regional financial institutions that are divided based on the ratio of loans to rental housing businesses to total loans at the end of fiscal 2017.
Source: BOJ.

Meanwhile, major banks have made real estate loans mainly to real estate investment funds (Charts III-1-14 and V-3-16). This reflects the increase in investment to offices, commercial properties, and logistics facilities amid the sustained economic expansion of recent years. Although the vacancy rates have so far remained low for such properties, similar to regional financial institutions, major banks are exposed to the long-term risk of a deterioration in the supply and demand conditions in the rental market due to economic downturn -- namely, the risk of delinquency in principal and interest payments arising from a fall in rental income.

Chart V-3-16: Outstanding amount of lending and investment in real estate investment funds



Note: 1. "Loans" indicates non-recourse loans.
2. Latest data as at the end of fiscal 2017.
Source: BOJ.

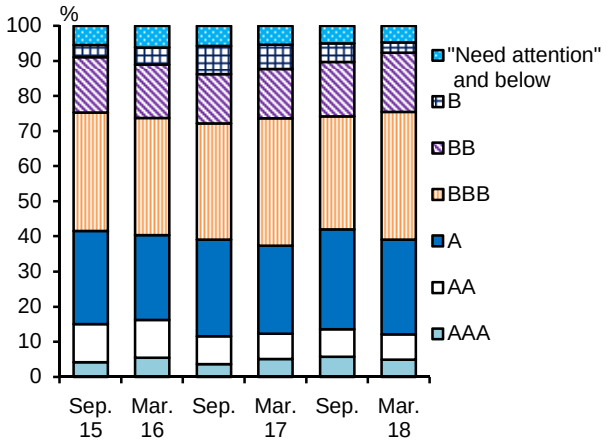
In addition, although the growth rate of real estate development loans has declined due to a slowdown in new development projects, it should still be noted that these loans are susceptible to

real estate market fluctuations and thus have a higher credit risk compared to loans to other industries. While commercial real estate prices in urban areas have continued rising (Box 2), the credit risk could increase along with real estate inventories if the real estate market contracts, which could be triggered by an outflow of foreign investors' funds. Financial institutions should therefore take appropriate risk management measures depending on the profile of borrowers in real estate loans.

Overseas credit risk

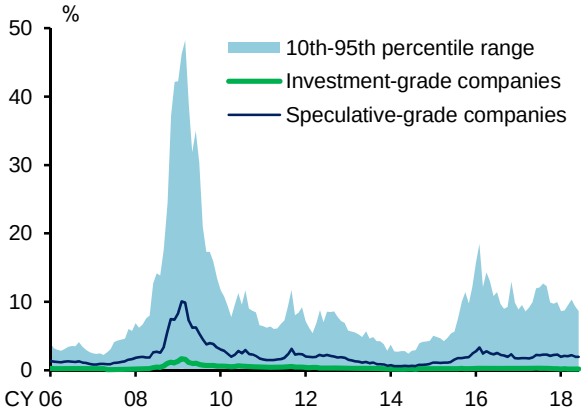
Financial institutions' overseas exposure has continued to increase, but the associated credit risk has thus far remained subdued. The portfolio quality of large-scale overseas loans has remained high on the whole, as indicated by the fact that investment-grade loans (BBB or better) account for more than 70 percent of these portfolios (Chart V-3-17). However, some financial institutions have increased lending to relatively high-risk firms, driven by intensified competition with overseas financial institutions and higher foreign currency funding costs. Therefore, it is necessary to fully examine the impact of future negative shocks such as an economic downturn and a hike in interest rates (Box 3).

Chart V-3-17: Composition of overseas large-scale loans by credit rating



Note: Covers five major banks.
Source: BOJ.

Chart V-3-18: EDF for U.S. firms



Note: 1. The number of investment-grade companies is 377 and that of speculative-grade companies is 341. The solid lines indicate average EDF (1-year EDF) for U.S. firms in each grade.
2. The shaded area indicates the 10th-95th percentile range for speculative-grade companies.
3. Ratings as at end-June 2018.
4. Latest data for EDF as at end-June 2018.
Source: Moody's.

Overseas credit investment has shown a moderate uptrend, but no excessive risk taking has been observed so far. However, some financial institutions have been increasing their holdings of high-yield bonds and/or securitized products with low liquidity to secure interest margins. Financial institutions need to be vigilant about how an economic downturn or a hike in interest rates would affect the financial condition and default rate of firms that have issued corporate bonds and leveraged loans. In overseas credit markets, spreads on corporate bonds both in the United States and Europe have remained tight (Chart II-1-13). Term premiums for U.S. long-term interest rates have also remained subdued (Chart II-1-3). These developments could lead to a reversal of risk premiums, which would increase interest rates.

The expected default frequency (EDF) for U.S. firms has remained stable at a low level for

investment-grade companies, while it has become somewhat higher for speculative-grade companies, reflecting the effects of past increases in interest rates and the risk of further increases in the future (Chart V-3-18).[24] In particular, some highly leveraged firms in the construction and real estate sectors have seen their EDF increase due to concerns over their ability to make interest payments in the event of further rate hikes. These observations suggest that financial institutions need to improve the effectiveness of their credit risk management for their overseas exposure by, for example, conducting in-depth analyses of the resilience of overseas borrowers to the rate snapback risk.

D. Market risk

This section assesses three aspects of market risk, namely, the market risk associated with stockholdings, the yen interest rate risk, and the foreign currency interest rate risk.

Market risk associated with stockholdings

The amount of market risk associated with stockholdings (including stock investment trusts) has remained more or less unchanged for the past half year (Chart V-4-1).[25] This is because the stock price volatility has remained stable at low levels, although financial institutions' exposure to stocks has increased somewhat due to the rise in stock prices and the increase in the volume of stock investment trusts. The ratio of the amount of market risk associated with stockholdings to the amount of capital has been around 20 percent both for major banks and regional banks, and around 10 percent for *shinkin* banks. The amount of market risk associated with stockholdings is calculated by setting the volatilities' reference period to 1 year; if we set this period instead to cover the past 5 years in order to include the high-volatility period, the current amount of market risk associated with stockholdings is about 40 percent larger than that calculated using only the past year as the reference period.[26]

Looking ahead, we must consider the possibility of an increase in market volatility arising from interest rate hikes in the United States, international trade tensions, and a rise in geopolitical uncertainties. The stock price volatility rose from mid-2015 to mid-2016 due to increased uncertainty over future developments in emerging economies and Brexit, but has generally been at a low level since then (Chart II-1-1). Meanwhile, some financial institutions have increased the book value of their securities holdings by realizing gains on stocks and investment trusts and reinvesting the proceeds. Bearing these points in mind, financial institutions should try to control their exposure to the market risk associated with stockholdings within an appropriate range in terms of their business capacity.[27]

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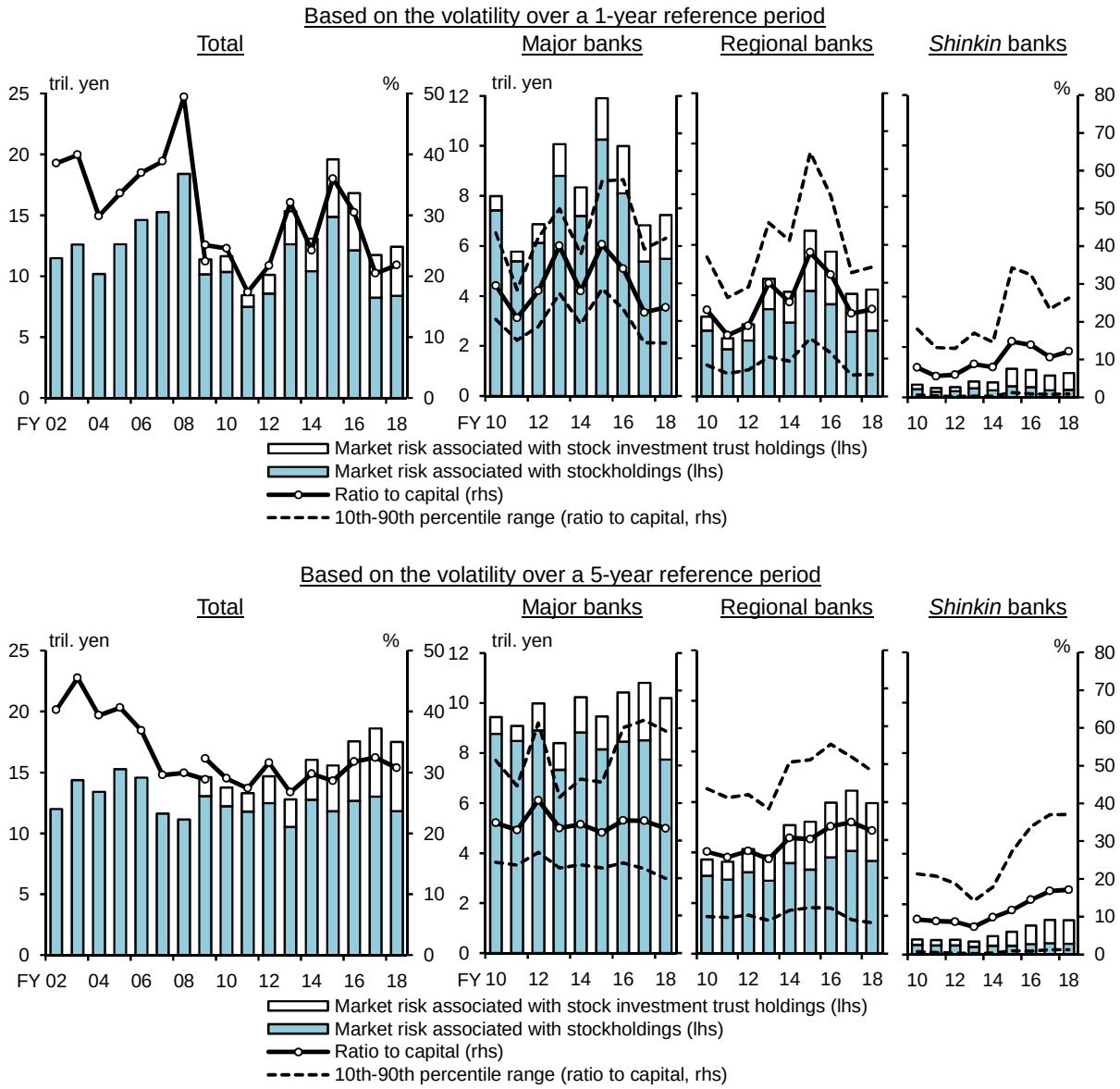
[24] Moody's EDF measures the probability of a firm defaulting over a specific period of time in the future, based on the market value of the firm's assets and liabilities payable, both estimated from information on the firm's stock price, etc.

[25] In Chart V-4-1, the market risk associated with stockholdings (including stock investment trusts) is calculated with the VaR with a 99 percent confidence level and a 1-year holding period.

[26] The reference period should be set to around 5 years so that it includes at least one period in which stock price volatility spiked. The amount of market risk associated with stockholdings in Chart V-1-3 and the amount of integrated risk in Chart V-1-4 are calculated by referring to stock price volatilities over the past 5 years.

[27] According to a survey conducted in 2016, about half of regional financial institutions have set the reference period for volatility for calculating the market VaR to more than 5 years, while 40 percent use a period of 1 year or less.

Chart V-4-1: Market risk associated with stockholdings among financial institutions



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 with a 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 2018 are estimated using the outstanding amount of stockholdings and stock investment trust holdings as at end-August 2018 and stock prices up to end-August 2018.

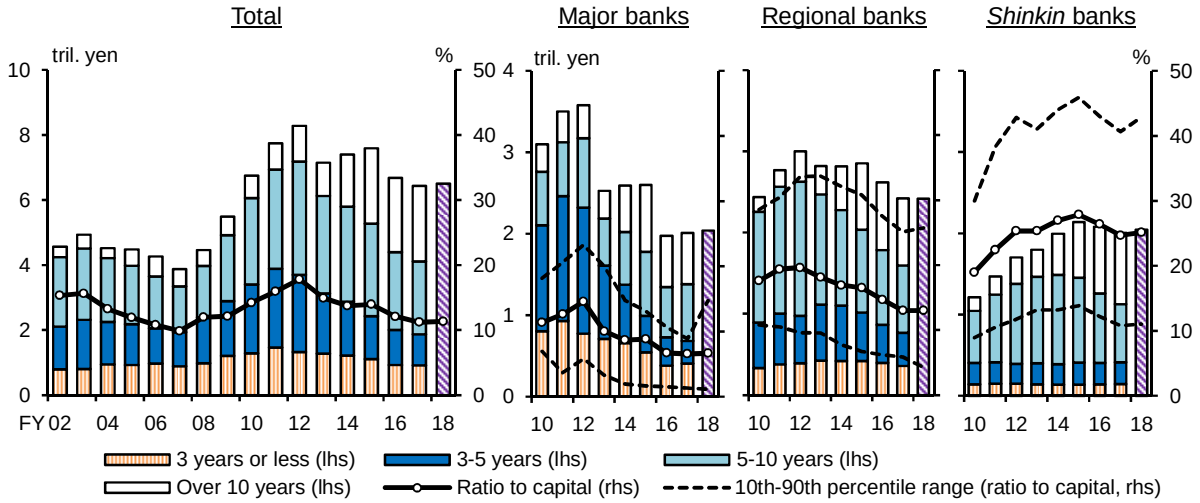
Source: BOJ.

Yen interest rate risk

The amount of interest rate risk associated with financial institutions' yen-denominated bond investments was on a downward trend after peaking in 2012, reflecting a decline in their holdings of such bonds, but has been more or less unchanged recently (Chart V-4-2).[28] While the reduction in yen-denominated bondholdings has put downward pressure on the amount of interest rate risk, the lengthening duration of bond portfolios has put upward pressure on the amount of such risk (Chart V-4-3).

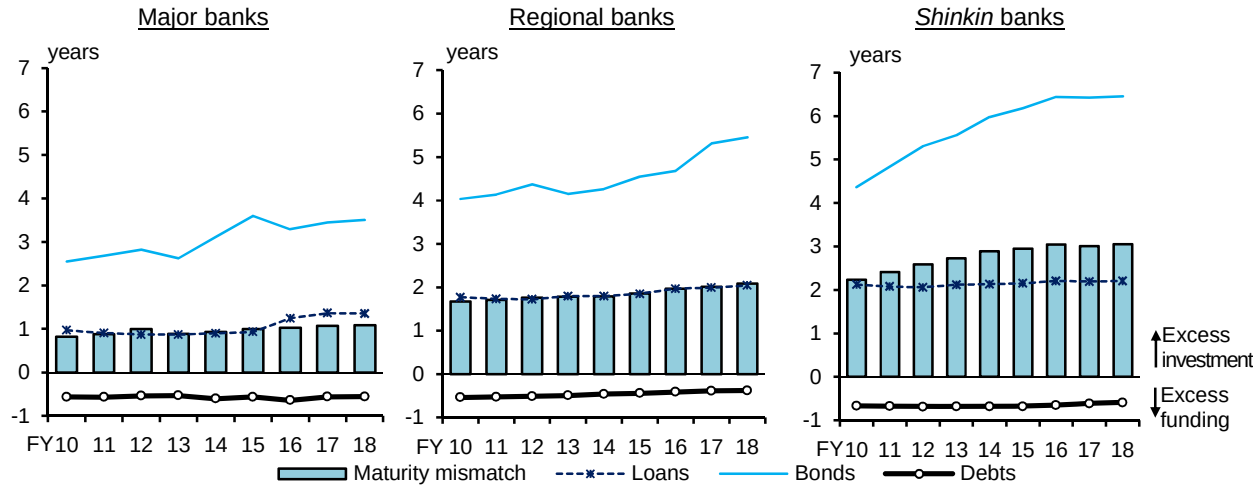
[28] In Chart V-4-2, changes in the economic value of bondholdings are calculated assuming a parallel shift in the yield curve in which the interest rates for all maturities rise by 1 percentage point.

Chart V-4-2: 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 2018 are estimated as at end-August 2018.
Source: BOJ.

Chart V-4-3: Average remaining maturity of yen-denominated assets and liabilities by type of bank



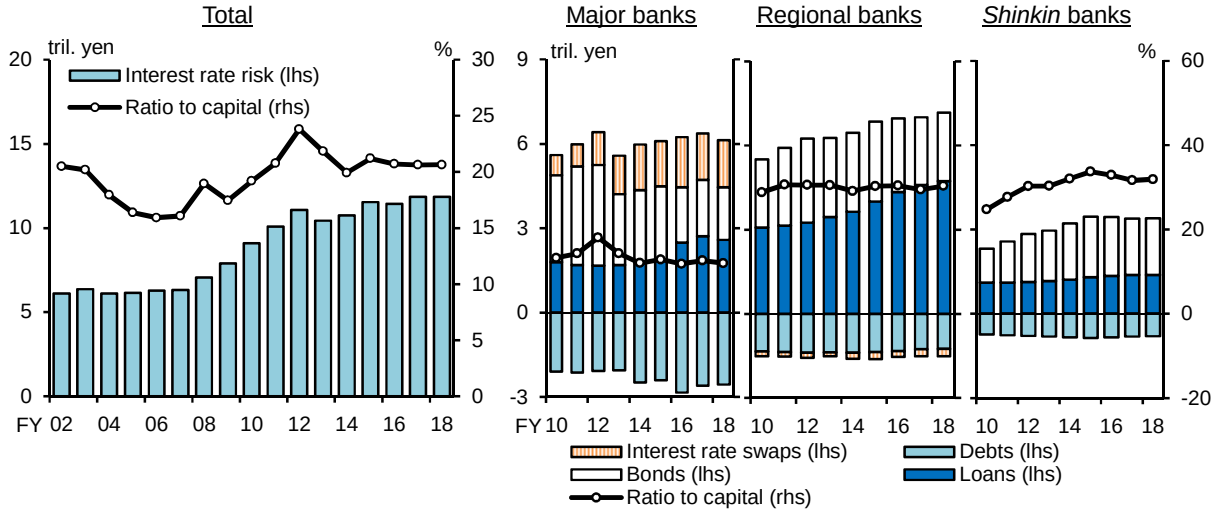
Note: 1. "Maturity mismatch" is the difference between the average remaining maturity of assets and that of liabilities. The average remaining maturity of assets is the weighted average of loans, bonds, and interest rate swaps with interest receipts. The average remaining maturity of liabilities is the weighted average of debts and interest rate swaps with interest payments.
2. The data for fiscal 2018 are as at end-June 2018.
Source: BOJ.

By type of bank, the ratio of the amount of interest rate risk associated with yen-denominated bond investments to the amount of capital has been low for major banks at around 5 percent, but relatively high at around 15 percent for regional banks and at around 25 percent for *shinkin* banks. A similar pattern -- high ratios for regional banks and *shinkin* banks -- is found for the amount of yen interest rate risk overall on financial institutions' balance sheets, i.e., yen interest rate risk including components such as loans and deposits in addition to bond investments (Chart V-4-4).[29]

[29] In Chart V-4-4, changes in the economic value of all assets and liabilities are calculated assuming a parallel shift in the yield curve in which the interest rates for all maturities increase by 1 percentage point. When the average duration of assets is longer than that of liabilities, a widening maturity mismatch (the difference between the average durations of assets and liabilities) will amplify the interest rate risk. The estimation of changes in value here includes only the interest rate risk associated with yen-denominated assets (loans and bonds) and liabilities, and yen interest rate swaps (those of *shinkin* banks are not taken into account). That is, it does not reflect the risk associated with foreign currency-denominated assets and liabilities or that with off-balance-sheet transactions

Meanwhile, regional banks and *shinkin* banks are very heterogeneous in terms of their yen interest rate risk (Chart V-4-2).

Chart V-4-4: Yen interest rate risk 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. For major banks and regional banks, off-balance-sheet transactions (interest rate swaps) are included. The data for fiscal 2018 are as at end-June 2018.
Source: BOJ.

Foreign currency interest rate risk and other market risk

The amount of interest rate risk associated with foreign currency-denominated bond investments by financial institutions has decreased from the peak in mid-2016 (Chart V-4-5).[30] Following the reduction in foreign bondholdings in response to the rise in overseas interest rates since fall 2016, financial institutions have not rebuilt their foreign bondholdings, and the amount of risk has been restrained on the whole. Specifically, the ratio of the amount of interest rate risk associated with foreign currency-denominated bonds to the amount of capital has been about 5 percent for both major banks and regional banks. However, among regional financial institutions that do not hold any foreign currency-denominated bonds, quite a few purchase investment trusts that invest in these bonds. In fact, investment trusts for which the overseas interest rate risk is the main risk factor account for slightly more than 40 percent of the total investment trusts held by regional financial institutions. Thus, it is important to manage the foreign currency interest rate risk including that associated with investment trusts (Chart V-4-6).

As seen in Chapter III, regional financial institutions have become more active in risk taking by increasing their holdings in investment trusts (Chart III-1-24). As a result, they are exposed to a wide range of market risks, such as credit risk, real estate-related risk, and foreign exchange risk as well as overseas interest rate risk and stockholdings-related risk. For example, while the assets purchased by overseas fixed income investment trusts consist mainly of sovereign bonds, some of these investment trusts hold products with relatively high credit risk in their portfolios. Moreover, regional financial institutions have significantly increased their equity investment in real estate

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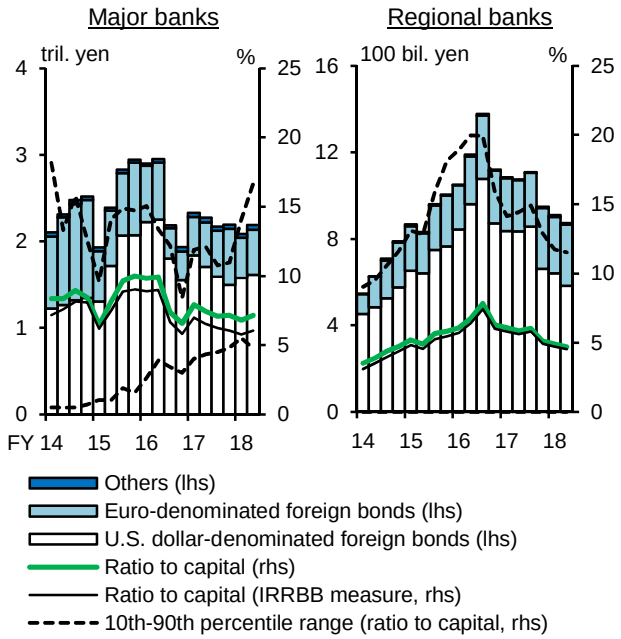
other than yen interest rate swaps. In the estimation of changes in liabilities, it is assumed that the duration of demand deposits is 3 months or less, meaning that so-called "core deposits" are not taken into account.

[30] The Financial Services Agency's public notice with regard to interest rate risk in the banking book (IRRBB) adopts the upward parallel-shifting method as a scenario for calculating interest rate risk and sets the changes in the interest rates of the U.S. dollar and the euro at 2 percentage points. Similarly, the interest rate risk of foreign currency-denominated foreign bonds in Chart V-4-5 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.

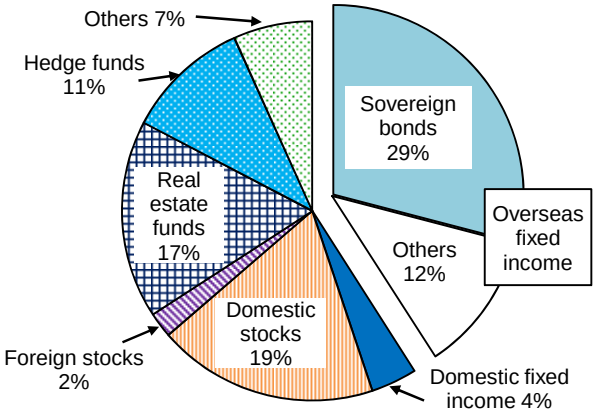
investment funds in recent years (Chart V-3-16). Such funds invest mainly in offices and commercial properties in the Tokyo metropolitan area, which are increasingly influenced by foreign investors (Chart V-4-7). Hence, a negative shock in a foreign market could affect the real estate market in Japan via foreign investors' behavior (Box 2).

Chart V-4-5: Interest rate risk of foreign currency-denominated foreign bonds



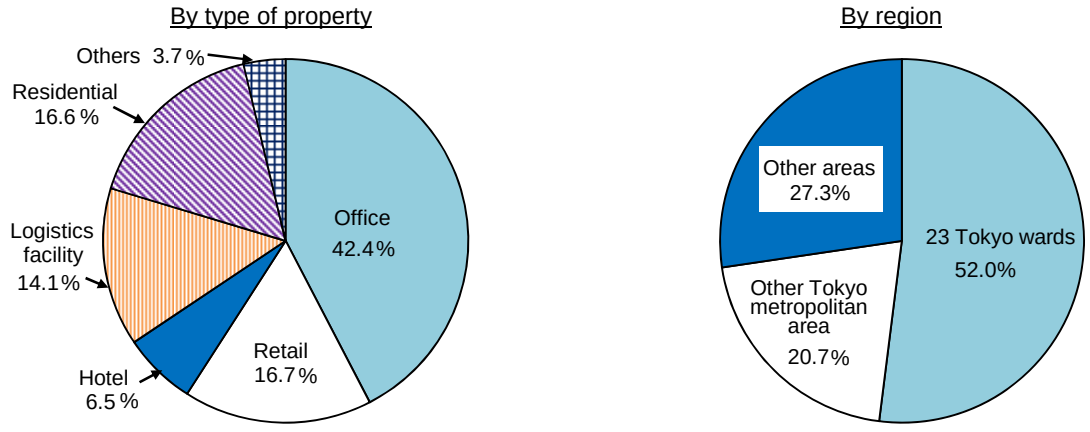
Note: 1. Interest rate risk is a 200 basis point value in the banking book. Off-balance-sheet transactions are included for major banks.
2. "Ratio to capital (IRRBB measure)" is calculated using Tier 1 capital for internationally active banks and core capital for domestic banks (including the transitional arrangements).
3. Latest data as at end-August 2018.
Source: BOJ.

Chart V-4-6: Breakdown of regional financial institutions' investment trust holdings



Note: Based on book values.
Data as at end-June 2018.
Source: BOJ.

Chart V-4-7: Composition of properties owned by real estate investment funds

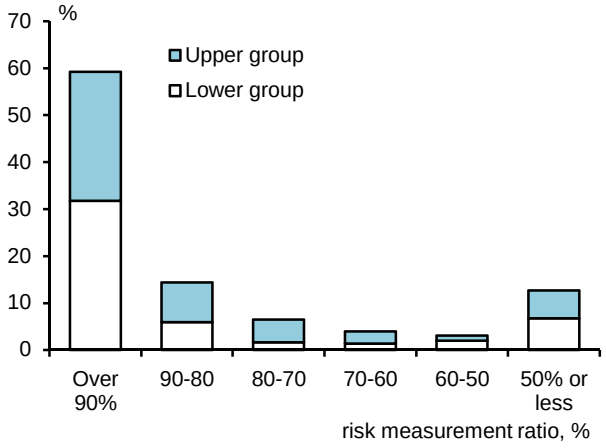


Note: 1. "Other Tokyo metropolitan area" covers Tokyo (excluding 23 wards), Saitama, Chiba, and Kanagawa.
2. Data as at end-December 2017.
Source: The Association for Real Estate Securitization.

However, looking at financial institutions' ability to measure the amount of risk associated with investment trusts (risk measurement ratio), some institutions do not sufficiently monitor their risk factors although slightly more than half estimate the risks for over 90 percent of the total value of their investment trust holdings (Chart V-4-8). Financial institutions need to conduct cross-sectional

checks of the impact that fluctuations in various risk factors have on their portfolios and establish a portfolio management and investment framework that takes account of the size of risks and their correlations as well as profitability. There is also a need to reflect the impact of market fluctuations -- such as an increase in volatility in global financial markets or a downturn of the domestic real estate market -- on the market value of their financial assets and profits and then analyze these developments from a wide range of perspectives. Moreover, it is important for financial institutions to prepare countermeasures at the organizational level to be employed in times of stress.

Chart V-4-8: Distribution of ratios of risk measurement associated with investment trust holdings



Note: 1. Regional financial institutions are classified into two groups based on their ratios of the amount of investment trust holdings to the amount of securities holdings.
2. "Risk measurement ratio" = amount of investment trusts whose risk is measured / total amount of investment trusts.
3. Covers regional financial institutions. Data as at end-June 2018.
Source: BOJ.

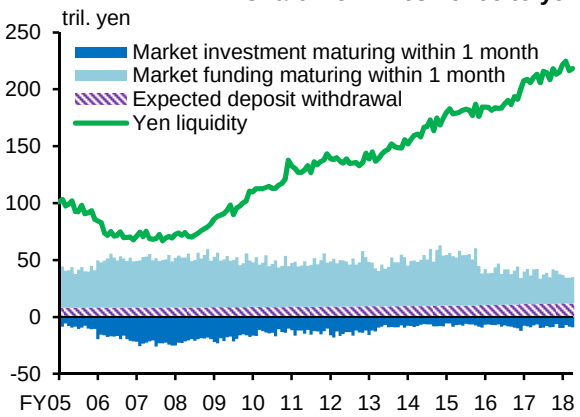
E. Funding liquidity risk

This section assesses the funding liquidity risk, first in yen and then in foreign currencies.

Yen funding liquidity risk

Financial institutions have sufficient yen funding liquidity. The stability of the investment and funding structure in yen is high, mainly because (1) the majority of the funding is sourced from stable retail deposits, (2) the outstanding amount of deposits is far larger than the total outstanding

Chart V-5-1: Resilience to yen liquidity stress among major banks



Note: 1. It is assumed that 3 percent of deposits are withdrawn.
2. "Yen liquidity" = cash + deposits + JGBs.
3. Latest data as at end-July 2018.
Source: BOJ.

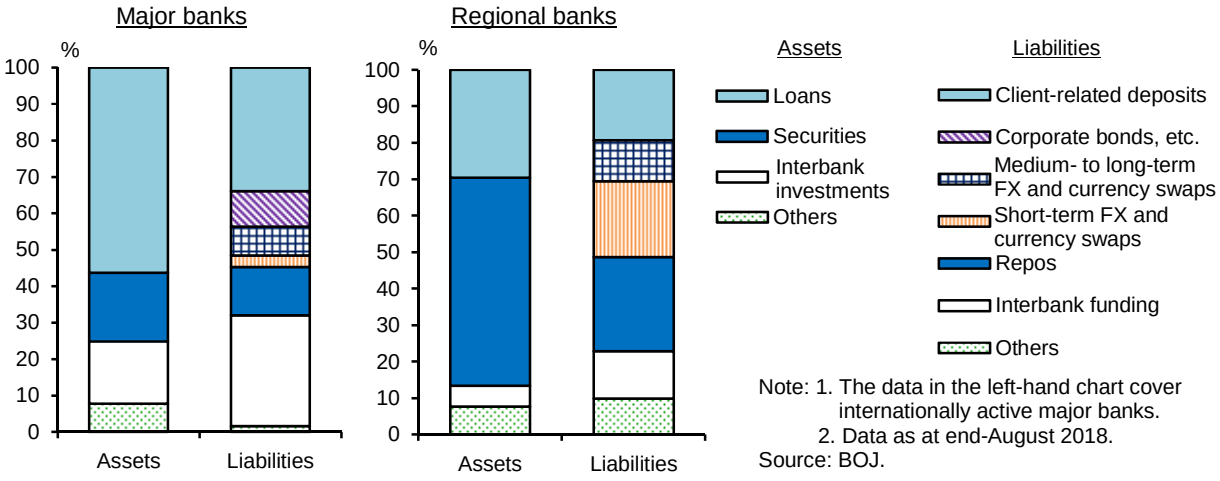
loans, and (3) a large part of the excess of deposits over loans is invested in highly liquid securities such as JGBs or current account deposits at the Bank of Japan. Financial institutions can therefore be judged to have a sufficiently high degree of resilience to short-term stress, as they hold liquid assets worth far more than the expected fund outflows even in a stress situation (Chart

V-5-1).[31]

Foreign currency funding liquidity risk

Regarding financial institutions' foreign currency funding, the share of funding through financial markets has been large compared to yen funding. However, financial institutions have steadily increased their proportion of stable funding, and they also have a sufficient liquidity buffer capable of covering possible funding shortages even if market funding becomes difficult for a certain period.

Chart V-5-2: Foreign currency-denominated balance sheets by type of bank



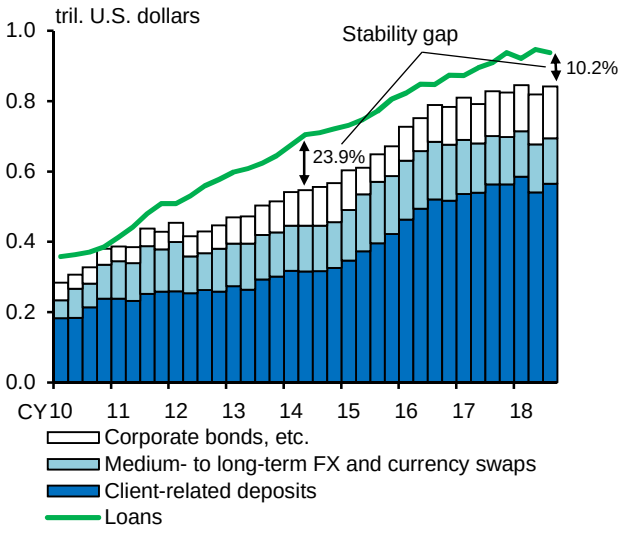
Note: 1. The data in the left-hand chart cover internationally active major banks.
2. Data as at end-August 2018.
Source: BOJ.

With respect to the foreign currency-denominated balance sheets of major banks (Chart V-5-2), loans with relatively long maturities account for a large proportion of foreign currency investments, whereas client-related deposits make up the largest share of foreign currency funding, namely, about a third, followed by interbank funding. A useful indicator for assessing the stability of this investment and funding structure is the "stability gap" -- the gap between the amount of illiquid loans and 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 shown a decreasing trend over a somewhat long period of time (Chart V-5-3). In this regard, the total growth in bank deposits in the United States has been trending downward, likely as a result of the policy rate hikes by the FRB and the increased issuance of T-bills by the Treasury Department (Chart V-5-4).[32] Specifically, a rise in returns on financial assets that are substitutable for bank deposits raises the opportunity cost of holding deposits and therefore encourages a shift of funds away from deposits. In particular, since T-bills (and the MMFs that invest in them) are safe assets that are a substitute for bank deposits, the increased issuance of T-bills and the consequent rise in their interest rates are likely to crowd out bank deposits. As the issuance of T-bills is expected to continue to increase, continuing rises in interest rates could further increase the opportunity costs of deposit holdings and thereby reduce deposit growth further. It should be noted that client-related deposits include deposits by financial institutions and term deposits with short maturities, which are likely to be sensitive to interest rate changes and can easily be withdrawn under a stress situation.

[31] Based on the concept of the liquidity coverage ratio (LCR), an outflow of market funds with a maturity of 1 month or less and an outflow amounting to 3 percent of total deposits are assumed.

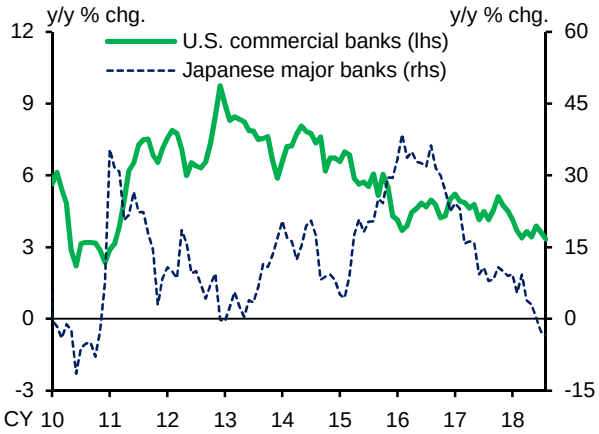
[32] The amount outstanding of issued T-bills has increased by about 700 billion U.S. dollars as of July 2018 since 2016, reflecting the increase in fiscal deficits due to tax reforms accompanying tax cuts and a rise in expenditures, such as on defense.

Chart V-5-3: 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 over 3 months and thereafter, funding maturing in over 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 2018).
3. Covers internationally active banks. Latest data as at end-August 2018.
Source: BOJ.

Chart V-5-4: Deposits at U.S. commercial banks and foreign currency deposits at Japanese banks



Note: 1. "U.S. commercial banks" includes U.S. branches of non-U.S. banks. "Japanese major banks" covers internationally active major banks.
2. Latest data as at end-August 2018.
Source: FRB; BOJ.

With regard 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 fund outflow factors include factors that are incidental for financial institutions, such as withdrawals from unused committed lines and/or outflows from client-related deposits (Chart V-5-5).[33] While major banks have taken measures to reflect the analytical results of the characteristics of committed lines and deposits in their risk management, they also need to make further efforts to carefully manage the risk of outflows and bolster stable funding bases, taking into account the characteristics of transaction partners and products.

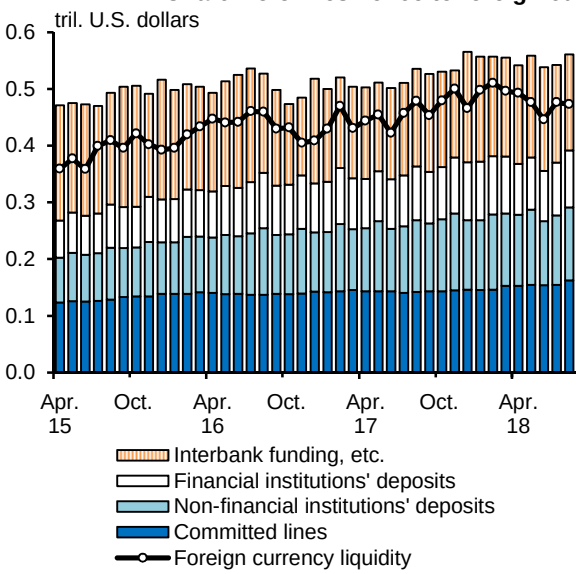
Next, looking at the foreign currency-denominated balance sheets of regional banks, the reliance on short-term market funding such as repos as well as FX and currency swaps is higher when compared to major banks. For investment, loans, which are less liquid than securities, make up a smaller share, while securities, such as U.S. Treasuries, make up a larger share, compared to major banks (Chart V-5-2). Therefore, regional banks as a whole hold sufficient liquid assets to mostly cover the expected outflow of funds under a stress situation.

In addition, the proportion of loans denominated in local currencies other than the U.S. dollar in total overseas loans by Japanese banks, particularly major banks, has continued to trend up, especially in loans to Asia (Chart V-5-6). In Asian countries, local currency-denominated loan-to-deposit ratios have declined, but banks' dependence on market funding such as FX and currency swaps and interbank funding has remained high for several currencies (Chart V-5-7).

[33] In Chart V-5-5, 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 total amount of deposits by financial institutions and interbank funding (excluding central bank funding) is withdrawn; (2) 40 percent of deposits by non-financial institutions and central bank funding in interbank funding are withdrawn; (3) 30 percent of unused committed lines are withdrawn; 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 included neither in fund outflows nor in foreign liquid assets.

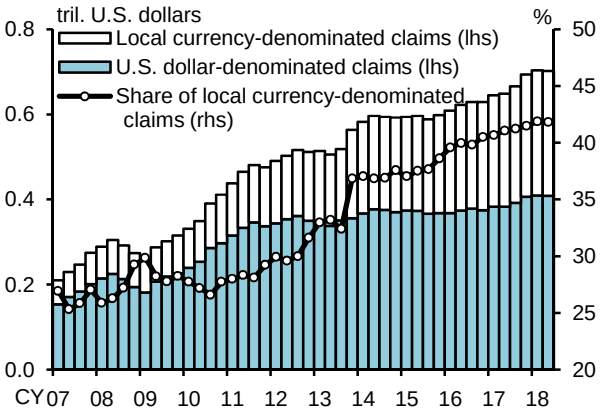
Because liquidity in local currency funding markets is relatively low, financial institutions need to continue to make efforts to bolster stable funding bases through, for example, arranging committed lines with local banks and utilizing medium- and long-term funding means (swaps, capital, etc.).

Chart V-5-5: Resilience to foreign currency liquidity stress among major banks



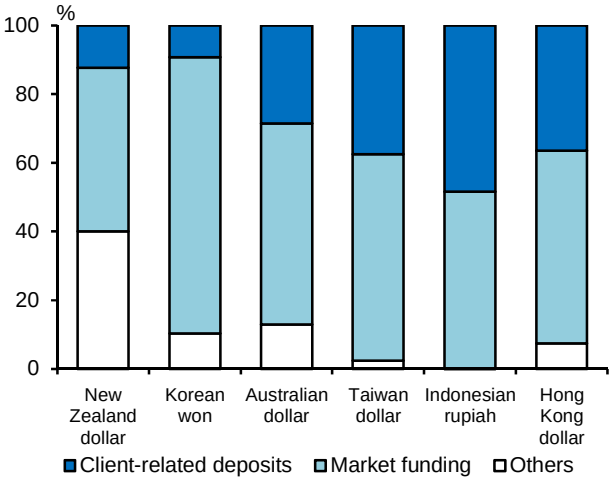
Note: 1. "Foreign currency liquidity" = interbank investments + 50 percent of loans + FX and currency swaps + unencumbered securities. Data excluding unencumbered securities indicate assets maturing within 1 month or with no specific maturity. "Financial institutions' deposits" up to end-February 2017 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 2018.
Source: BOJ.

Chart V-5-6: Japanese banks' claims in Asia by currency



Note: 1. Claims include loans, bonds, equities, etc.
2. "U.S. dollar-denominated claims" includes local currency-denominated cross-border claims and claims denominated in foreign currencies except for U.S. dollars.
3. Latest data as at end-June 2018.
Source: BIS, "Consolidated banking statistics."

Chart V-5-7: Major banks' funding structure by currency

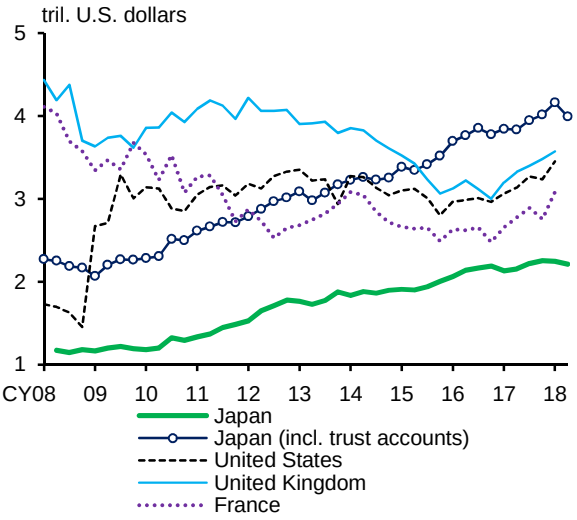


Note: Covers five major banks' main funding sources. The top six currencies with the highest loan-to-deposit ratios are selected according to the latest data. Data as at end-June 2018.
Source: BOJ.

International comparison of non-U.S. banks' foreign currency funding

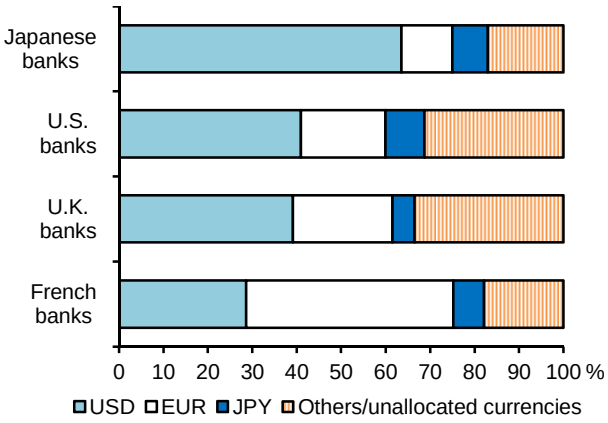
Japanese banks have consistently increased foreign claims, particularly U.S. dollar-denominated foreign claims, since the global financial crisis. This contrasts with U.S. and European banks, which had been deleveraging until recently (Charts V-5-8 and V-5-9). On the other hand, reliance on cross-currency funding (i.e., funding through FX and currency swaps) in U.S. dollar funding is higher for Japanese banks than for European banks according to an international comparison using statistics published by the Bank for International Settlements (BIS) (Chart V-5-10). At first

Chart V-5-8: Foreign claims by nationality of banks



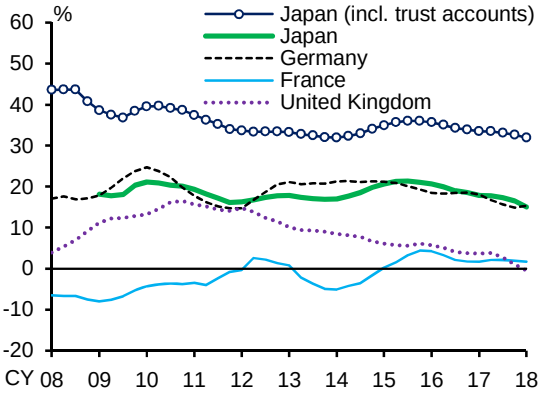
Note: Foreign claims on an ultimate risk basis. The latest data for "Japan" and "Japan (incl. trust accounts)" are as at end-June 2018. The latest data for the others are as at end-March 2018.
Source: BIS, "Consolidated banking statistics"; BOJ.

Chart V-5-9: Foreign claims by nationality of bank and by currency



Note: Data as at end-March 2018.
Source: BIS, "Consolidated banking statistics," "Locational banking statistics"; BOJ.

Chart V-5-10: Ratio of funding in FX and currency swaps to total U.S. dollar funding at non-U.S. banks



Note: 4-quarter backward moving averages. Latest data as at end-March 2018.
Source: BIS, "Locational banking statistics"; BOJ.

Chart V-5-11: Ratio of funding in FX and currency swaps to total foreign currency funding at Japanese major banks

Note: Covers internationally active banks. Latest data as at end-August 2018.
Source: BOJ.

sight, this comparison may give the impression that Japanese banks have expanded their foreign currency-denominated balance sheets through FX swaps, the market liquidity of which tends to decline in times of market stress. However, such an apparent result reflects differences in the definitions of the statistics and some caution is required in interpreting this result. The deviation between U.S. dollar-denominated assets and liabilities in the statistics is usually used as a proxy for the cross-currency funding. However, when doing this, one should note that data for Japanese banks include not only bank accounts but also trust accounts, whereas data for U.S. and European banks include (with some exceptions) only bank accounts.[34] Trust accounts include U.S. dollar-denominated assets such as those of institutional investors and households. Thus, if

[34] Although BIS guidelines encourage including trust accounts, as well as bank accounts, in the statistics, the actual implementation differs across countries.

trust accounts are included in the calculation of the cross-currency funding, then it will look as if even institutional investors' investments in U.S. dollar-denominated assets were financed by banks' funding through FX swaps;[35] this is certainly misleading. In fact, if we estimate deviations between U.S. dollar-denominated assets and liabilities excluding trust accounts by making certain assumptions, then the reliance on cross-currency funding for Japanese banks decreases substantially and is not particularly high compared to international levels. Moreover, based on the cross-currency funding ratio of Japanese major banks, reliance on FX and currency swaps has declined markedly, reflecting Japanese major banks' efforts to bolster stable funding bases in recent years (Chart V-5-11).[36] Summarizing, Japanese financial institutions' reliance on FX and currency swap markets in foreign currency funding is not particularly high relative to other countries.

[35] For their foreign investments, institutional investors (life insurance companies, pension funds, and securities investment trusts) use foreign currency funding via FX outright, FX swaps, and insurance fees denominated in foreign currencies.

[36] Japanese banks' reliance on cross-currency funding as calculated from the statistics shifts downward when trust accounts are excluded, but the degree of reliance has generally been flat over time (Chart V-5-10). This seems to arise from the fact that some financial institutions have not lowered their reliance on FX swaps until recently. However, these financial institutions have resilience to stress because they have ample liquidity buffers in the form of securities with high market liquidity.

VI. Macro stress testing

The previous chapter showed that financial institutions' capital levels were generally adequate relative to the amounts of risk they undertake (Chart V-1-3). However, looking at financial institutions individually, there was considerable variation, and there were some financial institutions whose amounts of risk exceed their capital levels (Chart V-1-4). Moreover, financial institutions' core profits, which are an intrinsic source for accumulating capital, may continue to be under downward pressure. Given these facts, we need to examine financial institutions' resilience to stress in more detail. In this chapter, we therefore conduct macro stress testing to examine how the balance between the amounts of risk financial institutions have taken on and their capital levels might change in the event of an economic downturn, taking recent changes in financial institutions' behavior into account.

Specifically, we examine financial institutions' capacity to absorb losses, assuming a tail event scenario in which financial and economic conditions at home and abroad deteriorate to levels comparable to those following the Lehman shock. While this scenario has been applied in every semiannual report, the impact of stress on the financial system may differ, even for financial and economic stress of the same magnitude, depending on financial institutions' risk profiles and financial bases at the time. For example, even the same macroeconomic shocks would result in larger credit costs and losses on securities if financial institutions' risk taking increased due to the prolonged low interest rate environment. Moreover, the same degree of stress may result in negative net income for a larger number of financial institutions as the decline in core profitability continues. It should be noted that the tail event scenario presented is purely hypothetical for analytical purposes of stress testing and does not represent the Bank of Japan's outlook for the economy, asset prices, and the like, nor does it show the likelihood of such outcomes.

A. Baseline scenario and tail event scenario

The subjects of the stress tests are 114 banks and 253 *shinkin* banks (accounting for approximately 80 to 90 percent of total loans outstanding), and the duration of stress is assumed to be the two and a half years from October-December 2018 through January-March 2021. The simulation utilizes the Financial Macro-econometric Model (FMM) developed by the Financial System and Bank Examination Department of the Bank.[37] The FMM has the following features: (1) it is an econometric model consisting of two sectors -- a financial sector and a real sector -- that incorporates the feedback loop effects between the two sectors; and (2) it enables us to analyze not only aggregate variables for the overall financial sector but also individual variables such as changes in the balance sheets and profits and losses for each financial institution.

For the stress testing in this *Report*, we refined the model with regard to securities-related gains and losses to capture the actual behavior of financial institutions more appropriately. In simulations in the previous issues of the *Report*, it was assumed for simplicity that each financial institution's gains from the sale of securities would remain unchanged from the most recent values during the simulation period. However, in recent years, unrealized gains have followed a downward trend as financial institutions have actively realized profits on securities (Chart V-2-7). Thus, the number of financial institutions that will be unable to realize gains at the same pace as in the past has been increasing. Therefore, in the simulations for this *Report*, we set an explicit upper limit for the

[37] For more details, 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.

realization of gains from the sale of stocks; that is, the realized gains could be no more than each financial institution's unrealized gains (Chart VI-1-1). If the upper limit is not binding, financial

Chart VI-1-1: Concept chart of setting the upper limit of realizing gains on securities

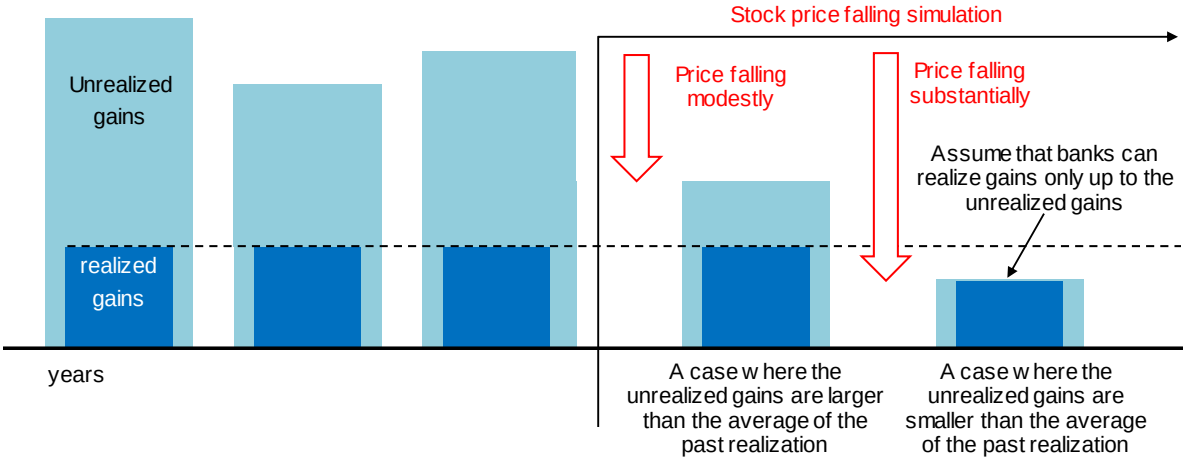
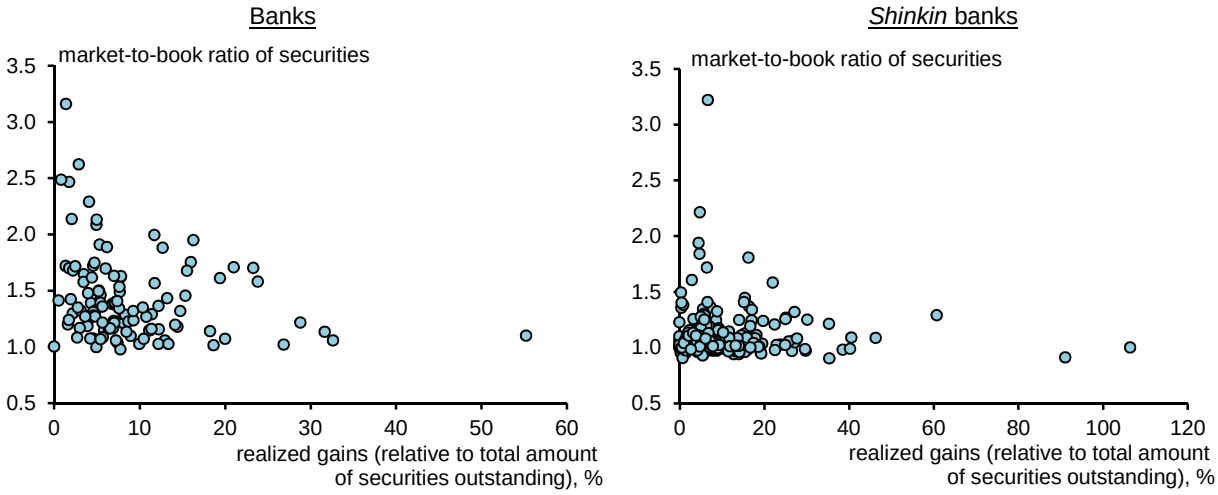


Chart VI-1-2: Relationship between realized gains on securities and market-to-book ratio of securities: scatter plot among financial institutions



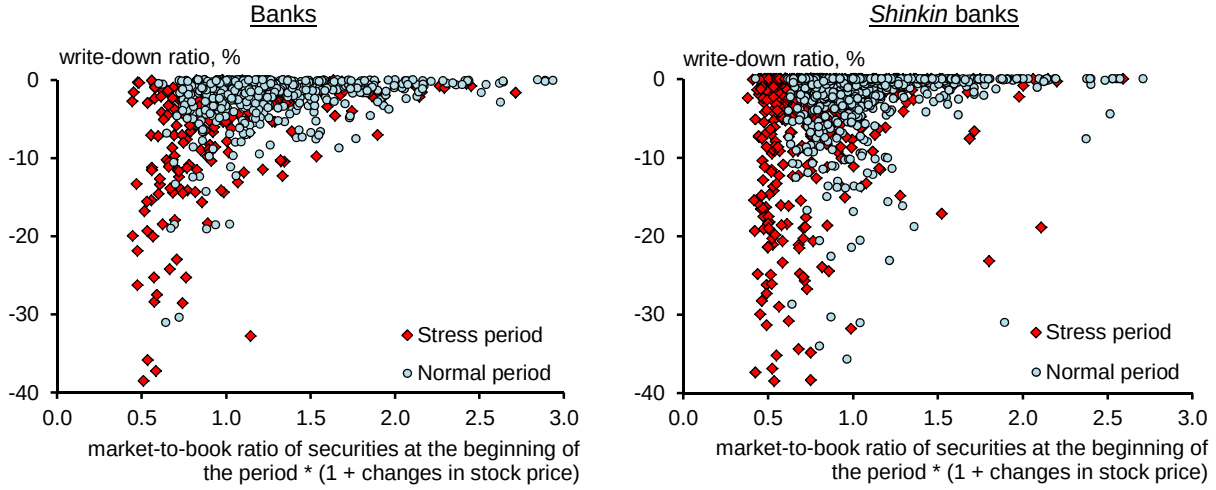
Note: 1. Securities include stocks and stock investment trusts. Data except "realized gains" are as at end-March 2018.
2. "Realized gains" is the sum of realized gains/losses on sales of stocks and profits from investment trusts due to cancellation from fiscal 2015 to 2017.
Source: BOJ.

institutions are assumed to continue to realize gains at the same pace as seen in the past 3 years during the simulation period.[38] We also assume that if a financial institution has exhausted its unrealized gains on stocks, it will use unrealized gains on bonds. Moreover, as some financial institutions have reinvested realized gains in financial assets such as investment trusts, they have been gradually increasing the book value of their securities holdings (i.e., they have been decreasing the market-to-book ratio of securities holdings), while increasing their exposure to stocks (Chart VI-1-2). These financial institutions will likely incur large securities-related losses at times of stress. In fact, the lower the market-to-book ratio of a financial institution's securities

[38] With regard to strategic stockholdings, which have played some role in maintaining business relationships, it is unclear whether financial institutions can continue to sell these stocks at the same pace as in the past even if they are sitting on unrealized gains; however, in the simulation, it is assumed that they can continue selling such stocks. Moreover, in practice, even when unrealized gains on foreign and domestic bonds taken together (i.e., netting out gains and losses on the two) are drying up, financial institutions can still take profits if there are unrealized gains on either of them. However, in the simulation here, for simplicity, the upper limit for the realization of gains from the sale of bonds is set on a net basis of foreign and domestic bonds.

holdings at the beginning of the period becomes, the greater the losses on write-down tend to increase in a nonlinear manner in the event of a large fall in stock prices (Chart VI-1-3). Therefore, in the stress testing for this *Report*, we introduce into the model a mechanism through which impairment losses could be recognized in response to larger unrealized losses on securities, by explicitly modeling the relationship between the market-to-book ratio of financial institutions' securities holdings and the write-down ratio.[39]

Chart VI-1-3: Relationship between market-to-book ratio of securities and write-down ratio: scatter plot among financial institutions



Note: 1. The sample period is from fiscal 2006 to 2012. Fiscal 2007 and 2008 are stress periods, and others are normal periods.
2. Securities include stocks and stock investment trusts.
3. "Write-down ratio" = - (losses on write-down of stocks) / (book value of securities before write-down)
Source: BOJ.

Baseline scenario

The baseline simulation, based on the forecasts of several research organizations and average forecasts by markets, assumes that "with overseas economies continuing to grow at a steady pace, Japan's economy will also continue its moderate expansion."[40] In addition, it is assumed that JGB yields evolve in line with the implied forward rates priced into the yield curve as of late August 2018. Stock prices (TOPIX) and foreign exchange rates are assumed to remain unchanged from the levels registered in August 2018.

The baseline simulation results are as follows. With both domestic and overseas economies expanding at a moderate pace, total loans outstanding are expected to continue growing at an annual rate of 2-3 percent (Chart VI-1-4). However, due to lending competition among financial institutions, lending margins especially in the domestic market are expected to continue their moderate downward trend (Chart VI-1-5). As a result, net interest income especially for domestic

[39] Moreover, we change the assumptions regarding dividends. In the past simulations, for simplicity we set the payout ratio for all financial institutions to 20 percent; however, in the simulations for this *Report*, we assume the ratio as its average over the past 3 years for each financial institution. (However, if a financial institution registers a net loss, it is assumed to pay no dividends.) This change reflects the following observations. First, there is significant heterogeneity in the levels of payout ratio (Chart V-2-8). And second, the payout ratios have been increasing at financial institutions that have maintained stable dividends per share despite the decline in their net income (Chart V-2-9).

[40] 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/fsr181022.htm/.

banks also continues to decline moderately (Chart VI-1-6). Meanwhile, credit costs remain low, reflecting the favorable financial condition of firms (Chart VI-1-7). Net income is expected to decline

Chart VI-1-4: Loans outstanding

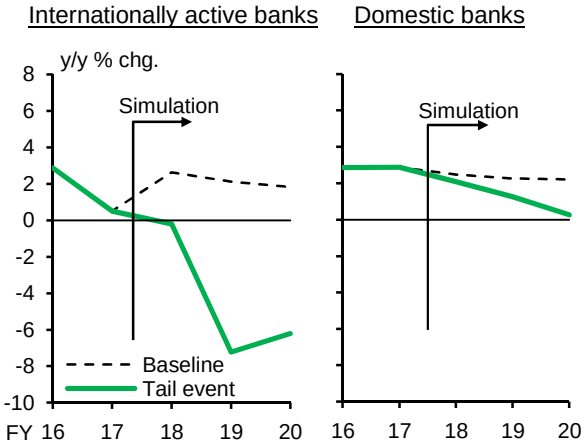


Chart VI-1-5: Lending margin

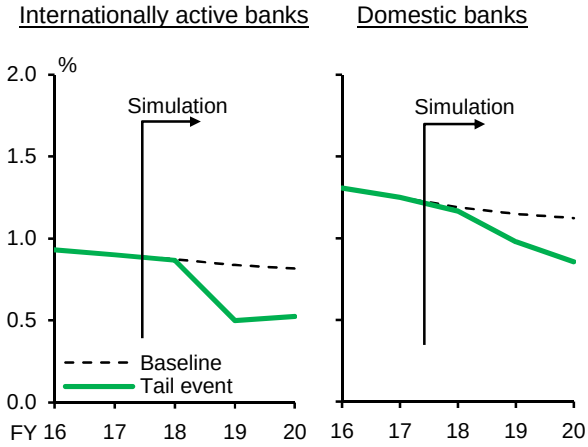


Chart VI-1-6: Net interest income

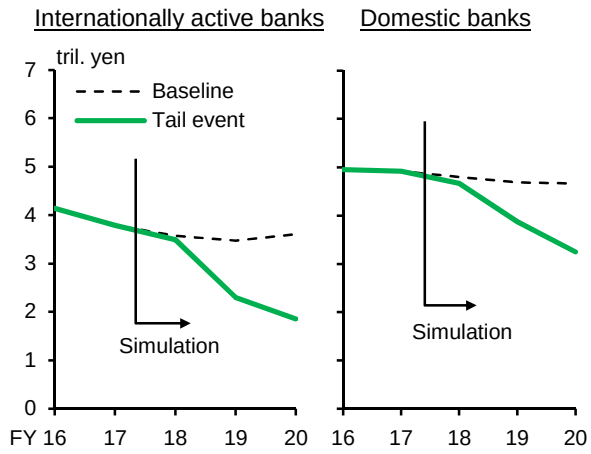
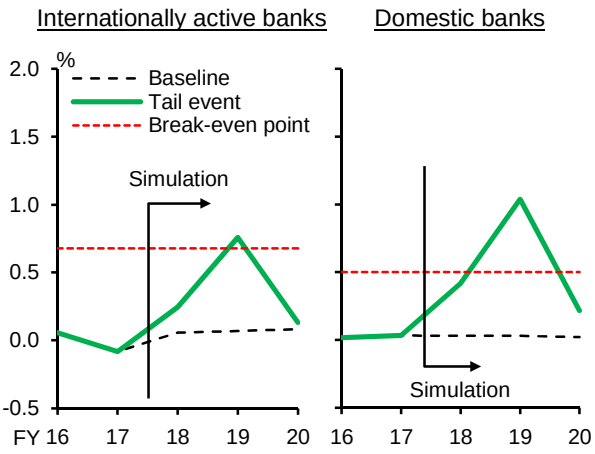
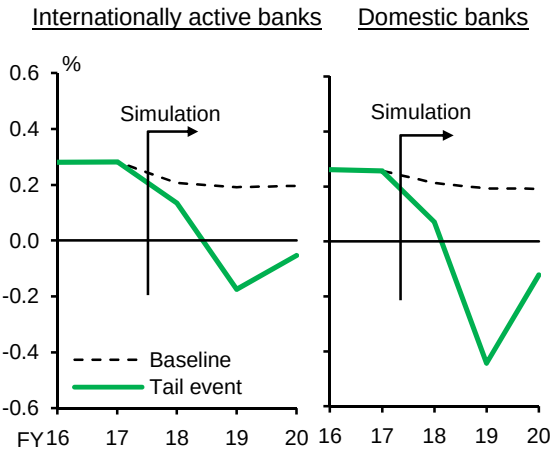


Chart VI-1-7: Credit cost ratios



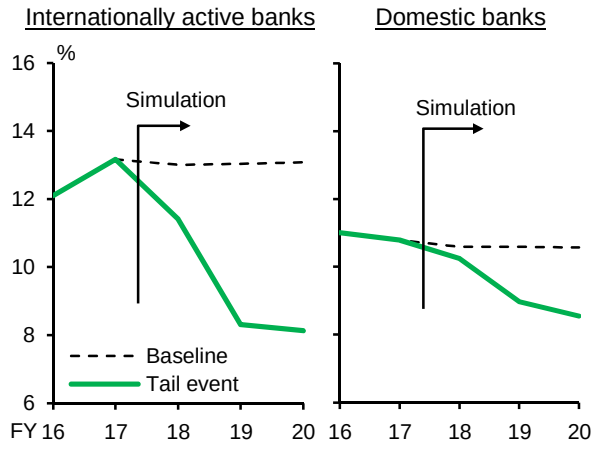
Note: "Break-even point" is as at fiscal 2017.

Chart VI-1-8: Net income



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

Chart VI-1-9: CET1 capital ratios and core capital ratios



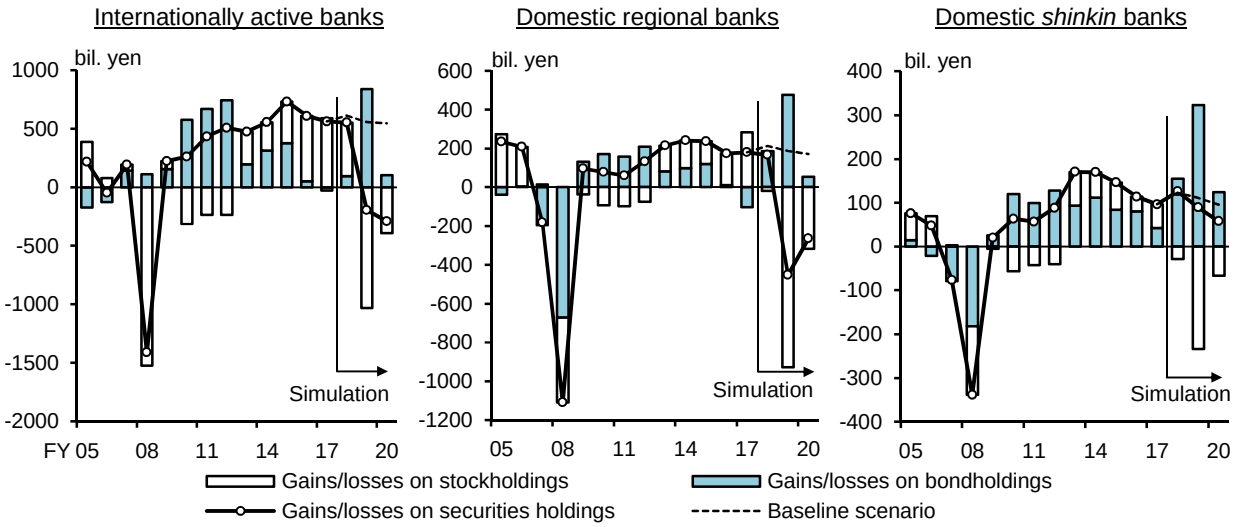
Note: The left-hand chart shows the CET1 capital ratio of internationally active banks. The right-hand chart shows the core capital ratio of domestic banks. These take the transitional arrangements into consideration.

moderately as a result of the decreases in net interest income and realized gains on securities holdings while remaining at a relatively high level from a long-term perspective (Chart VI-1-8). The capital adequacy ratios remain well above the regulatory requirements throughout the simulation period (Chart VI-1-9). However, some regional banks, which have increased their payout ratios despite their declining net-income trend, accumulate retained earnings at a slower pace than accumulating risk assets. Thus, together with the effects of the transitional arrangements related to the Basel III framework (such as the reduction in the proportion of instruments that can be included in capital), their capital adequacy ratios continue to decline moderately.

Tail event scenario

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 JGB yields of a degree similar to that following the Lehman shock. Simultaneously, a significant economic slowdown occurs abroad similar to the one seen at that time. As a result, Japan's output gap deteriorates to a level comparable to that seen following the Lehman shock. The simulation results based on this scenario are as follows.

Chart VI-1-10: Realized gains/losses on securities holdings (tail event scenario)

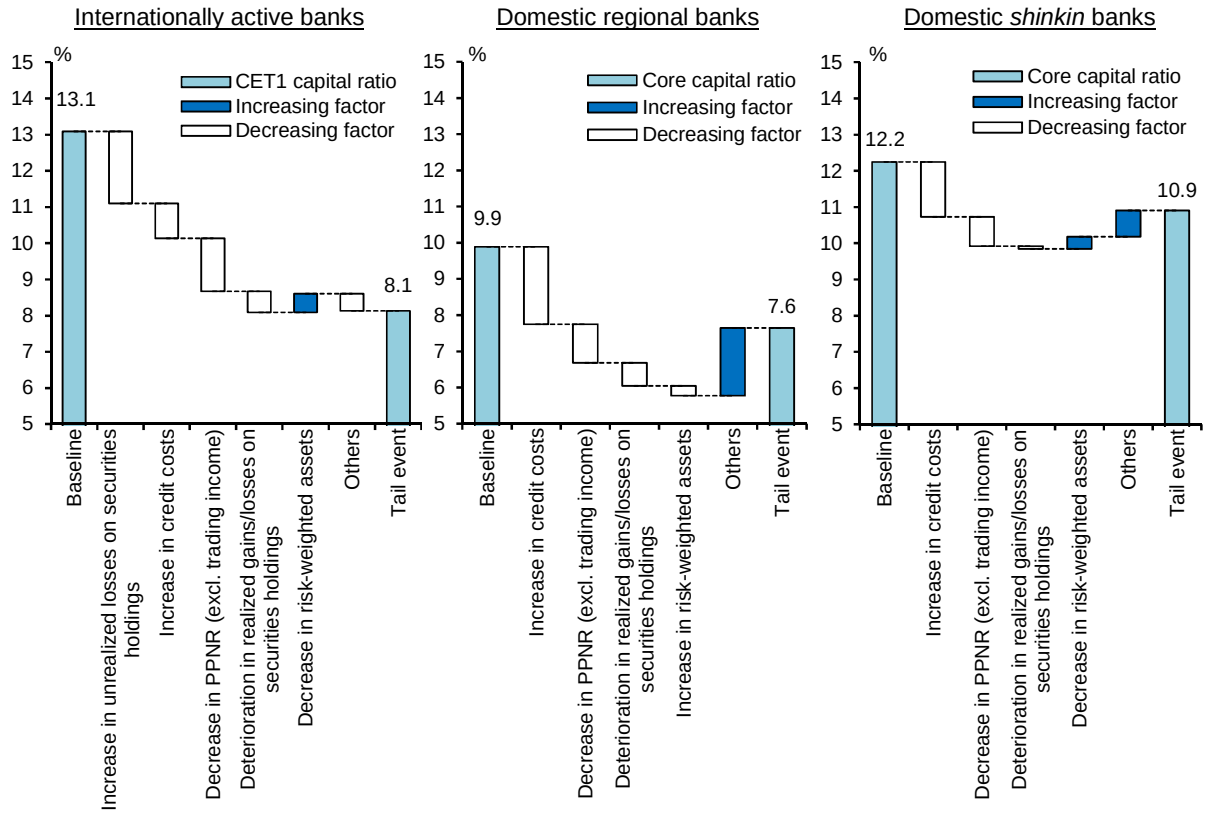


First of all, net interest income would decline significantly, as deterioration in domestic and overseas economies would lead to sluggish loan demand and the narrowing of lending margins (Charts VI-1-4, VI-1-5, and VI-1-6). Net interest income would fall much more at internationally active banks than at domestic banks because the former would suffer a larger decline in the outstanding amount of loans, partly reflecting the fall in the yen-denominated value of overseas loans due to yen appreciation. This is also because internationally active banks would see a larger fall in lending margins, since their foreign currency funding costs would rise substantially due to instability in global financial markets.[41] Credit cost ratios at both internationally active banks and domestic banks would rise to levels above their break-even points, reflecting the deterioration of firms' financial condition due to the significant economic downturn at home and abroad (Chart VI-1-7). Moreover, the large decline in stock prices (of more than 50 percent compared to the baseline) would give rise to losses due to the devaluation of stocks and stock-related investment

[41] Specifically, in the simulation, it is assumed that the foreign currency funding premiums in the U.S. dollar LIBOR market and FX and currency swap markets rise to the same extent as in the wake of the Lehman shock.

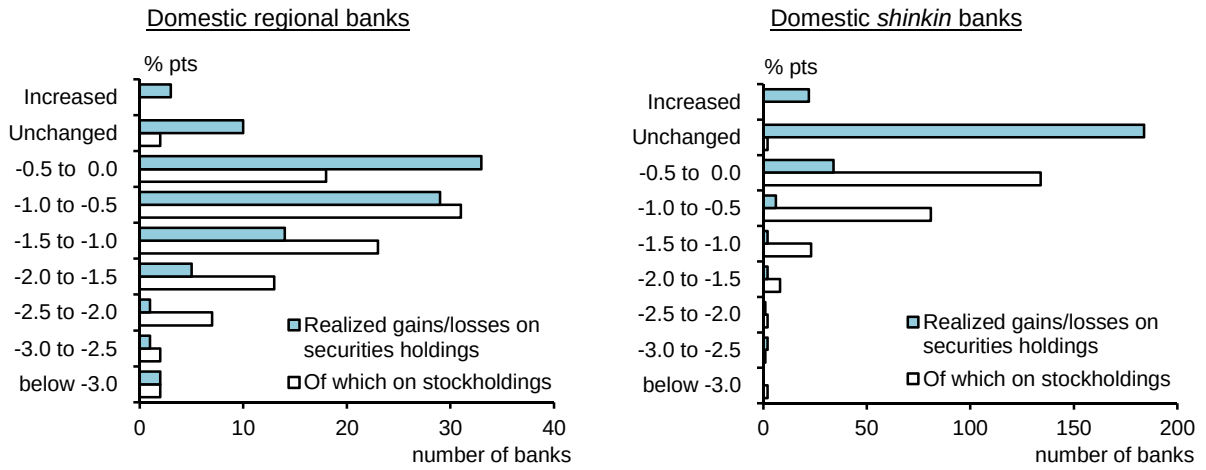
trusts held by financial institutions, leading to substantial securities-related realized losses (Chart VI-1-10). Although financial institutions would have some room for realizing gains on bonds

Chart VI-1-11: Decomposition of the CET1 capital ratio and the core capital ratio (fiscal 2020)



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 2021) 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. These take the transitional arrangements into consideration.
3. "Others" includes taxes, dividends, and CET1 regulatory adjustments.

Chart VI-1-12: Impact of realized gains/losses on securities holdings on core capital ratios (contribution under the tail event scenario)



Note: The vertical axis shows the deviations of the core capital ratio from the baseline scenario, which are attributable to realized gains/losses on securities holdings, at the end of simulation period (end-March 2021).

reflecting the rise in bond prices (decline in government bond yields) during times of stress as in the period after the Lehman shock, this would not be sufficiently large to compensate for the losses on

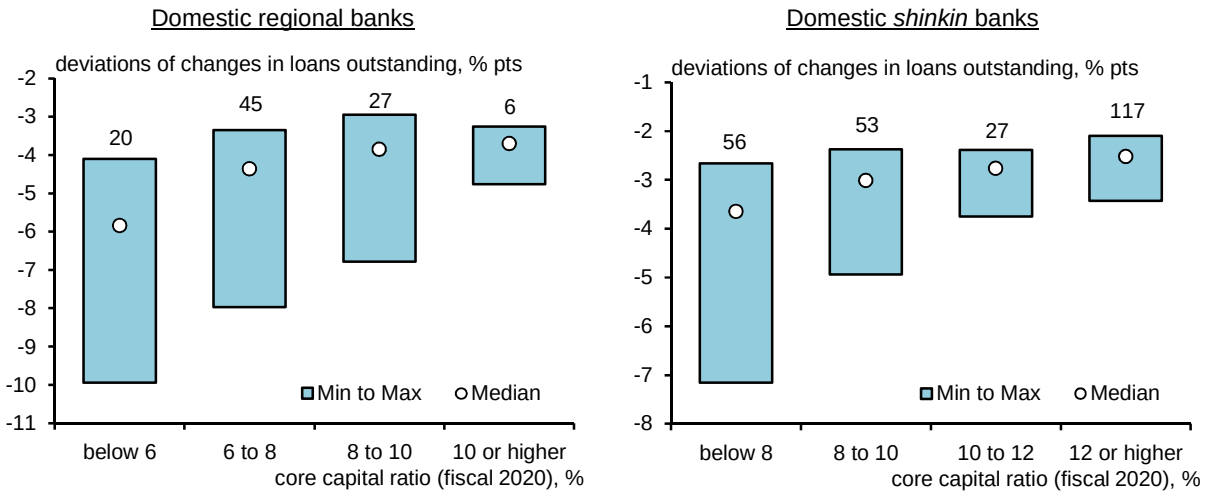
write-down of stocks and other financial assets.[42] Especially at regional financial institutions, stock-related losses would be larger than those registered after the Lehman shock, since they have increased their exposure to investment trusts in recent years (Chart III-1-24).

As a result, for all types of banks, their net income would decrease sharply (Chart VI-1-8). Their capital adequacy ratios would also decrease correspondingly, but would exceed regulatory requirement levels (Chart VI-1-9).[43] The decline in capital adequacy ratio would be largest at internationally active banks as unrealized securities-related gains/losses are reflected in their capital adequacy ratios; among domestic banks, the decline would be larger at regional banks than at *shinkin* banks (Chart VI-1-11).[44] This is because regional banks have larger exposure to stocks and have smaller unrealized gains on bonds than *shinkin* banks (Chart VI-1-12).

Potential vulnerabilities of the financial system

As the above results show, Japan's financial institutions are resilient against considerable stress on the whole. However, the following three points warrant attention from a macro-prudential perspective.

Chart VI-1-13: Core capital ratio and loans outstanding (tail event scenario)



Note: 1. The vertical axis shows the deviations of the cumulative changes in loans outstanding (from end-March 2018 to end-March 2021) to domestic firms from the baseline scenario.
2. The figures in the charts indicate the number of financial institutions within each group.

First, the more financial institutions' capital adequacy ratios and profits fall, the more cautious their lending stance tends to be at times of stress. In fact, the simulation results based on the tail event scenario show that, even if capital adequacy ratios exceed regulatory requirement levels, the lower

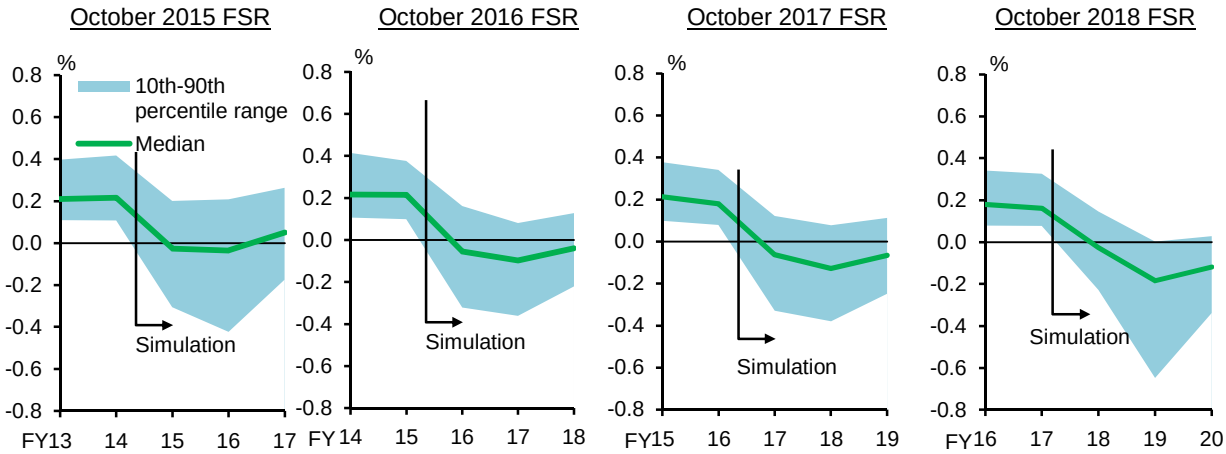
[42] Following the Lehman shock, regional financial institutions registered large realized bond-related losses, which was due to impairment losses on structured bonds at some of these institutions. In recent years, holdings of structured bonds have been limited.

[43] In both the baseline scenario and the tail event scenario, it is assumed that general and administrative expenses remain unchanged from the actual levels in fiscal 2017. If banks are able to reduce such expenses, the decline in net income would be smaller than in the simulation results.

[44] For internationally active banks, whether they sell securities and record the associated gains or losses in their net income statements or whether they hold on to securities and record unrealized gains or losses on their balance sheets essentially makes no difference in terms of their capital adequacy ratios, since unrealized gains or losses on securities holdings are included in CET1 capital. Since the impact of market-value fluctuations of securities holdings on internationally active banks' CET1 capital was already taken into account in previous stress tests, the revision of the model for this *Report* does not affect the downward deviation of CET1 capital from the baseline. (All that the revision does is to change the balance between unrealized gains/losses on securities and realized gains/losses on securities.)

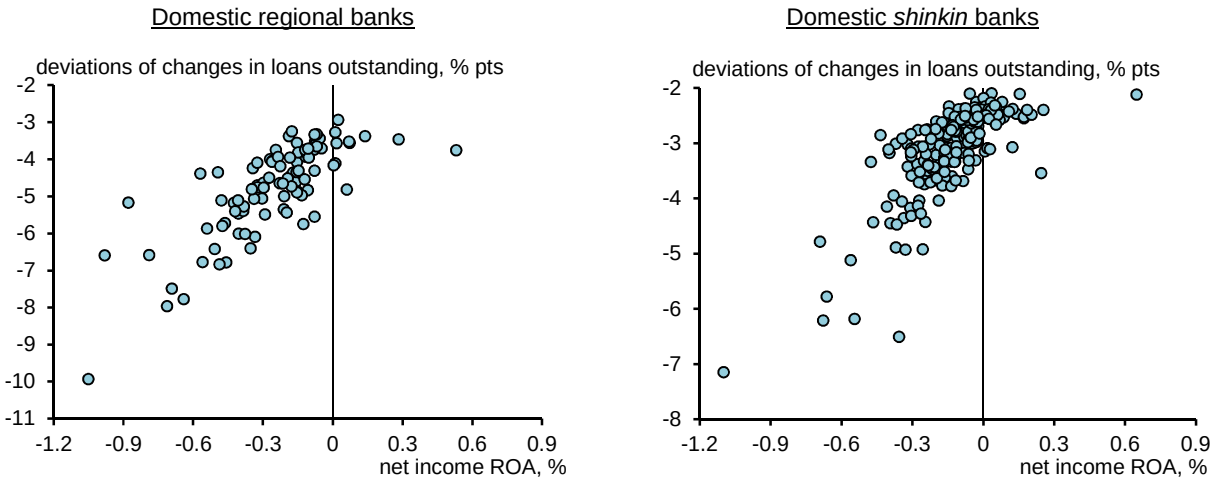
capital levels become, the more lending tends to be suppressed (Chart VI-1-13). In addition, if banks continue to register net losses, they will expect a future downward trend in their capital levels. Therefore, even if their current capital levels exceeded the regulatory requirement, they could become more cautious in their risk taking and restrain their lending.[45] In fact, a considerable number of financial institutions would incur losses for two consecutive years in the tail event scenario (Chart VI-1-14). We observe the tendency that the lower a financial institution's ROA becomes, the more it restrains lending (Chart VI-1-15).

Chart VI-1-14: Distribution of financial institutions' net income (tail event scenario): comparison with the past stress tests



Note: The charts indicate the ratio of net income to total assets. Covers internationally active banks and domestic banks.

Chart VI-1-15: Financial institutions' ROA and deviations in loans outstanding (tail event scenario)



Note: 1. The vertical axis shows the deviation of the cumulative changes in loans outstanding (from end-March 2018 to end-March 2021) to domestic firms from the baseline scenario.
2. "Net income ROA" = (average net income) / (average total assets) over the period of fiscal 2018 to 2020.

Second, comparing the stress testing results in this issue with those in previous issues of the *Report* reveals that financial institutions' net income and capital adequacy ratios in the tail event scenario have been gradually decreasing (Chart VI-1-14). This partly reflects the effect of the refinement of the model concerning securities-related gains and losses in this *Report* to better capture banks' actual behavior. However, it is also due to the fact that their capital adequacy ratios

[45] For more on the mechanism through which a decline in financial institutions' profitability lowers their incentive to supply loans, see Chapter V and Box 5 in the October 2016 issue of the *Report*.

have declined reflecting the cumulative effects of the gradual decline in the baseline net interest income (Chart V-1-2).

And third, the impact on profits and capital adequacy ratios at times of stress exceeds that observed following the Lehman shock. In the tail event scenario for this issue, financial institutions continue to incur net losses until the end of the simulation period even after the increase in credit costs has peaked (Chart VI-1-8). This contrasts with the V-shaped recovery and return to net profits after the Lehman shock (Chart V-2-1). Such a difference is related to the pace of decline in net interest income. Specifically, although lending margins narrowed moderately at the time of the Lehman shock, there still remained room for deposit rates to fall, which provided support for net interest income (Chart III-3-4). Moreover, a large decline in net interest income could be avoided because financial institutions could easily increase interest receipts from their bondholdings. However, in the current environment there is little room for these factors to take effect as they did in the past.

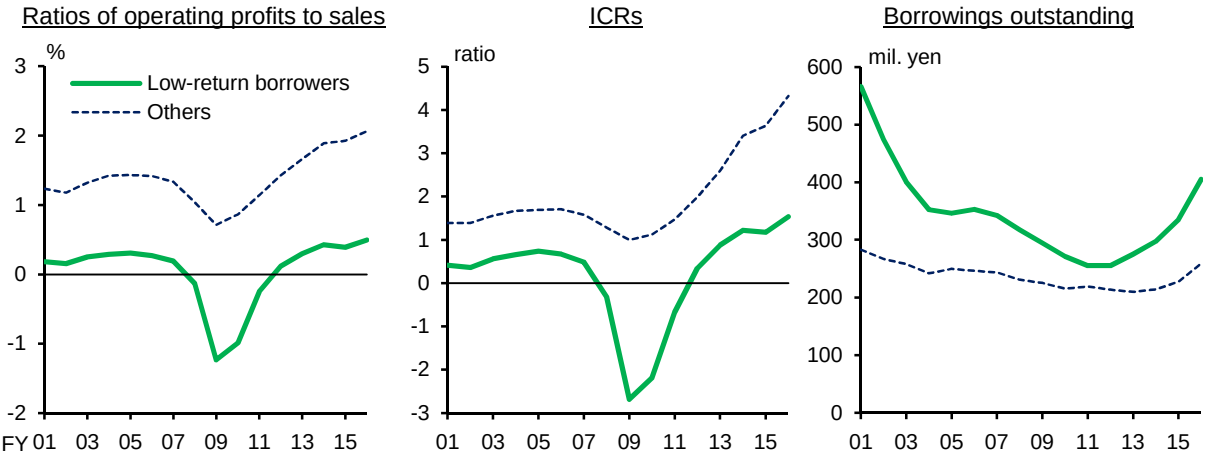
B. Stress testing incorporating the increase in lending to middle-risk firms

The previous section examined financial institutions' stress resilience while taking into account the impact of their risk taking in investing in securities such as stock investment trusts. Under the prolonged low interest rate environment, financial institutions have also actively engaged in risk taking in their lending to firms, in addition to investing in securities (Chart V-3-8). This section examines through stress testing how financial institutions' more active lending to middle-risk firms could affect the financial system.

Heterogeneity in firms' interest payment capacity

Dividing banks' borrowers into two groups -- firms in a vulnerable financial position (low-return borrowers) and relatively healthy firms (other borrowers) -- there are large differences in their ICRs, which show their capacities to pay interest.[46] That is, the ICR of low-return borrowers, which mostly

Chart VI-2-1: Financial indicators of borrowers

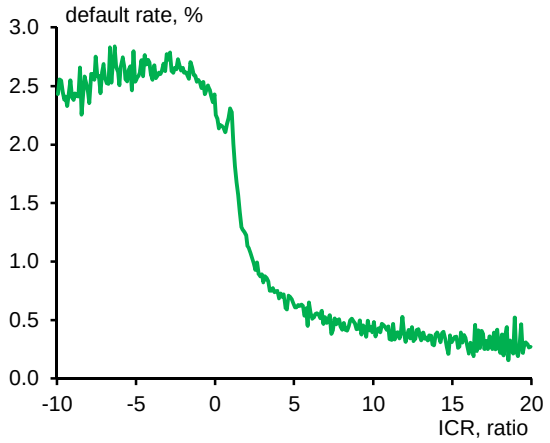


Note: The charts cover small firms. "Ratio of operating profits to sales" and "ICR" are the median of the distributions of each firm group, and "borrowings outstanding" is the average of the distributions. Latest data as at fiscal 2016.
Source: Teikoku Databank.

[46] "Low-return borrowers" are defined as firms in a relatively weak financial position whose borrowing interest rates are low relative to their credit risk. "Other firms" are all other firms that do not meet these criteria. For details on this classification of firms, see Chapter VI of the April 2018 issue of the *Report*.

include middle-risk firms, is lower than that of other borrowers and falls more substantially when the economy deteriorates (Chart VI-2-1). This reflects the fact that the outstanding amount of borrowing of low-return borrowers tends to be large and that their operating profits, which are low in normal times, fall further in the event of an economic downturn. Therefore, the default rates of these borrowers could easily increase (Chart VI-2-2).

Chart VI-2-2: ICRs and the default rates



Note: Covers financial statements data of small firms from January 1999 to March 2018. Defaults are defined as (1) being overdue by more than 3 months, (2) having one's borrower classification downgraded to "in danger of bankruptcy" or below, or (3) being subrogated by Credit Guarantee Corporations. Firms are sorted by their ICRs, and the default rate is calculated for each group.
Source: CRD.

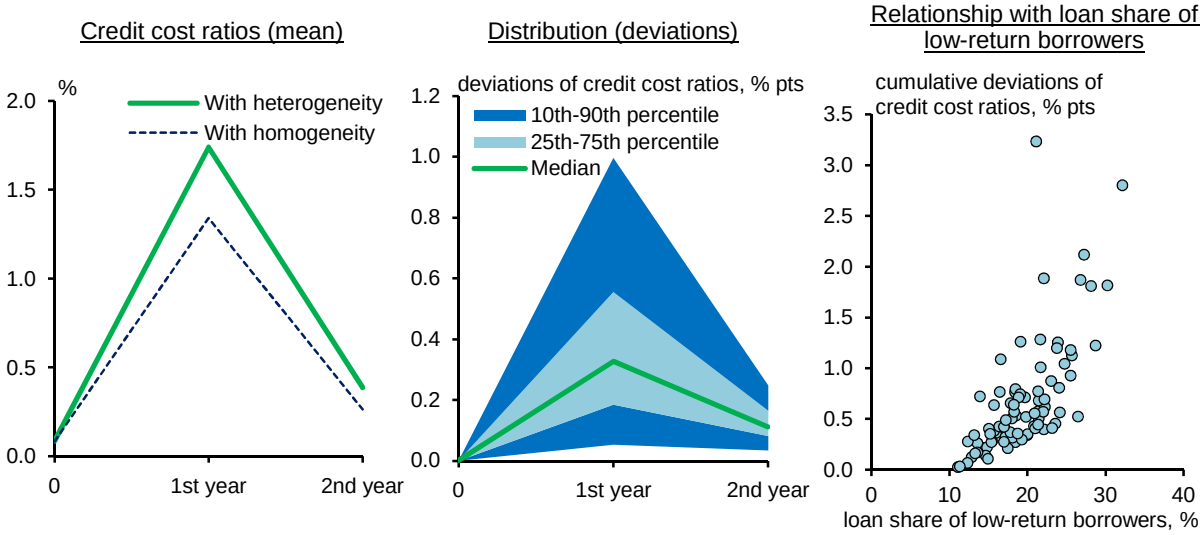
In the simulation, we modify the model on credit costs, taking such heterogeneity in firms' interest payment capacity into account. Specifically, in the simulation in the preceding section (and previous issues of the *Report*) we modeled the relationship between the ICR of a representative firm and credit costs, assuming homogeneity in firms' interest payment capacity. In this section, we split firms into low-return borrowers and other borrowers and conduct a simulation incorporating into the model the following feature: the ICR sensitivity to changes in the macroeconomy differs between the two groups of firms. Moreover, we model individual financial institutions' credit costs to differ reflecting heterogeneity across banks in the share of loans to low-return borrowers in total loans (Chart V-3-8).

Stress testing results

For the stress testing, we assume the same tail event scenario as in the previous section. In the stress testing, we only focus on regional banks (domestic banks). *Shinkin* banks are excluded from the stress testing here because of a lack of sufficient data on the share of loans to low-return borrowers.

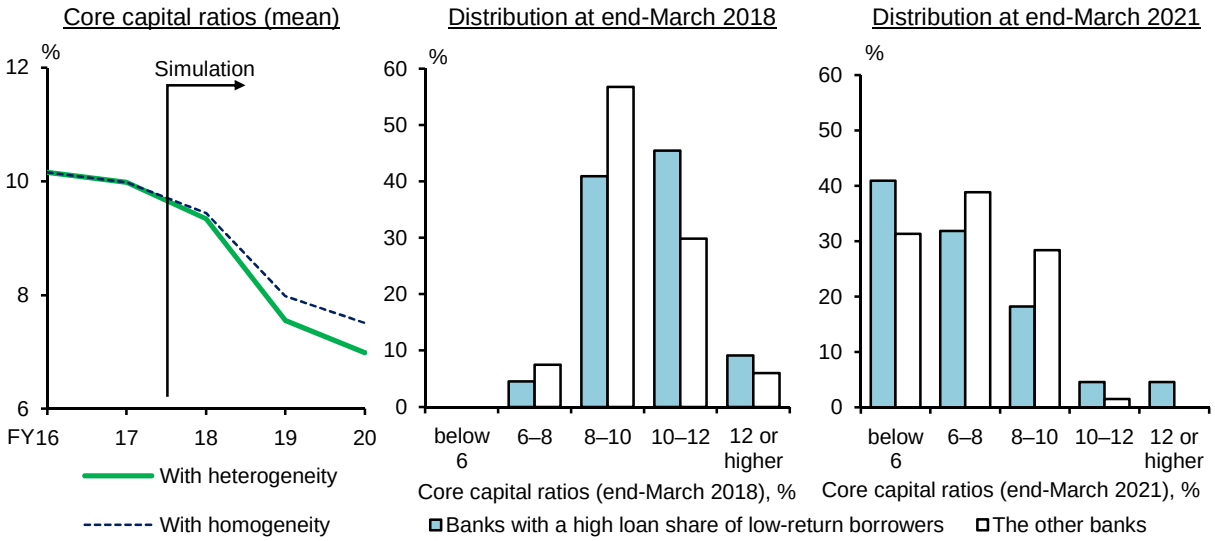
When heterogeneity in firms' interest payment capacity as well as individual financial institutions' loan exposures to low-return borrowers are taken into account, credit cost ratios increase to 1.5-2.0 percent, a greater increase compared to the stress testing results in the previous section that assumed homogeneity in firms' interest payment capacity (Chart VI-2-3). This level of credit cost ratios is relatively high from a long-term perspective, although lower than that during the Japan's banking crisis in the late 1990s. In particular, the higher the share of loans to low-return borrowers in a financial institution's total loans becomes, the larger the increase in its credit costs tends to be in the simulation. As a result, the capital adequacy ratio of financial institutions declines by slightly more than 0.5 percentage point relative to the stress testing results in the previous section that assumed homogeneity in firms' interest payment capacity (Chart VI-2-4). Specifically, the higher the share of loans to low-return borrowers becomes, the larger the drop in the capital adequacy ratio and the subsequent decrease in lending could be (Chart VI-2-5). This suggests that the recent increase in financial institutions' lending to low-return borrowers could increase financial system vulnerabilities in the future.

Chart VI-2-3: Credit cost ratios (tail event scenario): taking into account heterogeneity in firms' ability to pay interest



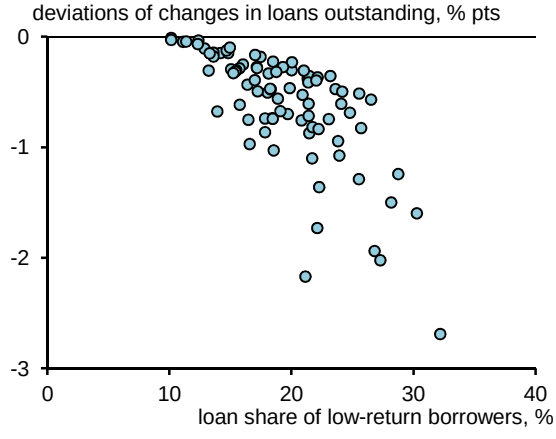
Note: The vertical axis of the middle chart shows the deviations of credit costs that are calculated as the differences between those simulated by assuming heterogeneity in firms' ability to pay interest and by assuming homogeneity in their ability to pay. Covers regional banks (domestic banks) whose loan shares of low-return borrowers can be estimated. The vertical axis of the right-hand chart shows the cumulative deviations of credit costs from end-March 2018 to end-March 2021.

Chart VI-2-4: Core capital ratios (tail event scenario): taking into account heterogeneity in firms' ability to pay interest



Note: "Banks with a high loan share of low-return borrowers" indicates banks that have a loan share of low-return borrowers higher than the top 25th percentile. Covers regional banks (domestic banks) whose loan shares of low-return borrowers can be estimated.

Chart VI-2-5: Loan shares of low-return borrowers and deviations in loans outstanding (tail event scenario)



Note: The vertical axis shows the cumulative changes in loans outstanding (from end-March 2018 to end-March 2021) to domestic firms that are calculated as the differences between those simulated by assuming heterogeneity in firms' ability to pay interest and by assuming homogeneity in their ability to pay. Covers regional banks (domestic banks) whose loan shares of low-return borrowers can be estimated.

VII. Toward ensuring financial stability in the future

Japan's financial system has been maintaining stability on the whole. Financial institutions have gradually increased their risk taking and financial intermediation activities have been active with credit growth outstripping economic growth. However, despite the increase in financial institutions' risk taking, there has been no change in their steady decline in core profitability. If financial institutions were to continue to accumulate assets that do not necessarily generate returns commensurate with the risks, then their capital base would weaken, potentially impeding their financial intermediation function should a negative shock occur.

The decline in financial institutions' core profitability has been driven not only by the prolonged low interest rate environment but also by structural factors such as the sluggish growth expectations regarding domestic demand-related industries amid the population decline and the associated chronic excess savings in the corporate sector. Faced with a decline in loan-to-deposit ratios, many financial institutions have focused on increasing their lending volume, so that interest rate competition among financial institutions has intensified.[47] Moreover, with the number of de facto debt-free firms on the rise, financial institutions have been gradually increasing the share of their lending to low-return borrowers, from which they have difficulty securing profit margins that match the credit risks. Given these facts, an increase in medium- to long-term growth expectations in the corporate sector is essential for financial institutions to secure appropriate profits, that is, profits that are commensurate with the risks, in a sustainable manner.

Recently, domestic businesses with the potential to grow despite the decreasing population have been emerging, such as those related to inbound tourism, medical and welfare services, the environment, disaster prevention, and city planning. Digital innovations in such areas as the Internet of Things (IoT), artificial intelligence (AI), and big data can provide a wide range of industries with opportunities for revolution and growth, depending on how the digital innovations are adopted. In order to convert these positive developments into sustainable economic growth, efforts by a wide range of entities are important, such as efforts by firms to raise their productivity, regulatory and institutional reforms by the government, and promotion of innovation by various actors. Financial institutions have a large role to play in these efforts. For example, through active engagement with borrowing firms (debt governance), they can (1) support pro-active initiatives by firms such as the launch of new ventures in growing sectors, expansion of market areas and business fields, and development of both business overseas and new technologies; and (2) strengthen support for firms to make them better able to address business challenges such as business succession, chronic labor shortages, and the withdrawal from unprofitable business fields. Such initiatives would increase firms' demand for funds and improve their capacity to make interest payments, thereby improving financial institutions' profitability through an improvement in lending margins and reduction in credit costs. Financial institutions have already made efforts to address these medium- to long-term challenges (Box 4). However, it will likely take more time until such efforts bear fruit in the form of an increase in financial institutions' profitability.

Against this background, for Japan's financial system to maintain stability into the future and for financial intermediation to function smoothly even in the event of stress, financial institutions need to make efforts focused in particular on the following three challenges.

The first challenge is to strengthen efforts by financial institutions to raise their core profitability.

[47] See Chapter VI, Section C, on the "Competitive environment for financial institutions" in the October 2017 issue of the *Report*.

In order to run their banking businesses in a sustainable way from a medium- to long-term perspective, financial institutions need to form clear strategies based on the prospects for regional economies and their own business base. To this end, they need to do the following: (1) improve the profitability of their loans; (2) increase their non-interest income, including fees and commissions, by enhancing, for example, their consulting and advisory services for firms and supporting households' wealth management (Box 5); and (3) drastically increase their business efficiency, for example, by overhauling their business processes and expense structures. In taking the above steps, it is also important for financial institutions to make use of FinTech and digital technology. On the one hand, FinTech and digital technology potentially undermine existing financial institutions' profit opportunities by encouraging non-financial firms' entry to financial businesses. On the other hand, they also provide financial institutions with an opportunity to expand the frontiers of the financial services that they offer, as well as provide them with tools that can potentially radically increase their business efficiency. Moreover, by using these new technologies, financial institutions can shift management resources to information production activities such as face-to-face relationships with and consulting and advisory services for firms, which banks are best positioned to provide. Furthermore, in order to more actively and effectively pursue such efforts, one possible option would be for financial institutions to merge or collaborate with other institutions and form alliances with firms in other business areas.

The second challenge is to enhance their risk management in areas where they have increased their risk taking.

In terms of credit risk, it is important for financial institutions to enhance the management of their lending to middle-risk firms and the real estate sector, as well as their overseas lending (see Chapter V, Section C). In the case of market risk, they need to strengthen their risk management frameworks, given that they have expanded their risk taking in a wide range of areas, including stocks, credits, real estate, and FX, as well as overseas interest rates through active investment in investment trusts and funds (see Chapter V, Section D). For liquidity risk, financial institutions need to continue to bolster the stability of their funding bases and strengthen their resilience to stress, taking into account the increase in their overseas lending and securities investment (see Chapter V, Section E). In addition, from the perspective of preventing unexpected losses and maintaining their credibility, it is important for financial institutions to strengthen their efforts in the areas of cyber security, data protection, and anti-money laundering. Moreover, given that increasing their core profitability will likely take time, financial institutions should ensure sufficient loss-absorbing capacity. To this end, they need to make clear their policies on capital and profit distribution including dividends, as well as their strategies for utilizing unrealized gains on securities (see Chapter V, Section B).

The third challenge is for large financial institutions to address their increasing systemic importance.

Reflecting the gap in the growth rate between home and abroad, major banks have been searching for revenue sources overseas and striving to provide a wide range of financial services globally across their financial group. As a result, the scale of major banks has continued to increase, as well as their overall influence on the financial system. Against this background, large financial institutions have a greater need to establish a solid financial base, bolster their business management frameworks, prepare to respond to a stress event in an orderly manner, and develop management information systems to deal with increasingly complex operations. In particular, given that overseas credit has greatly expanded in recent years, it is increasingly important for financial institutions to enhance and effectively use stress testing that takes into account the more

diverse and complex overseas-related risks, as well as to strengthen their risk management frameworks with respect to foreign-currency liquidity risks.

In order to ensure the stability of the financial system, the Bank of Japan, through on-site examinations, off-site monitoring, and various seminars, will continue to provide support to financial institutions in their efforts to address the challenges mentioned above.[48] As part of this, based on the results of the macro stress testing for individual financial institutions outlined in this *Report*, among other information, the Bank intends to increase its dialogue with financial institutions in order to promote a deeper common understanding with regard to resilience to stress. Moreover, as financial institutions grapple with overcoming structural problems, it is also important to develop an institutional framework for the financial system that adapts to the structural changes facing financial institutions, such as technological innovation, and to consider how government financial institutions should function. The Bank of Japan will hold discussions with parties concerned, taking these issues into account.

[48] For more details on the basic approach in conducting on-site examinations in fiscal 2018, see "On-Site Examination Policy for Fiscal 2018," March 2018. For more details on the Bank's initiatives in fiscal 2018, see Chapter VII of the April 2018 issue of the *Report*.

Box 1: Quantitative assessment of financial vulnerabilities using GDP-at-risk

GDP-at-risk (GaR) is an analytical approach to quantitatively assess the extent of the risk posed by current financial vulnerabilities to the future real economy.[49] Specifically, by estimating the conditional probability distribution of future GDP growth given the financial gap, GaR makes it possible to show the tail risk to economic growth by indicating that the economic growth rate may fall below *X* percent in the next *Y* years with the probability of *Z* percent (Chart B1-1). Put differently, GaR is equivalent to the concept of VaR but expressed in terms of GDP growth. Since GaR allows us to show the potential impact of financial vulnerabilities on the real economy by using a simple measure such as the GDP growth distribution, a number of international organizations -- such as the International Monetary Fund (IMF) -- and central banks have recently started to use it as one of their tools for monitoring financial vulnerabilities.[50]

Chart B1-1: Concept chart of GDP-at-risk

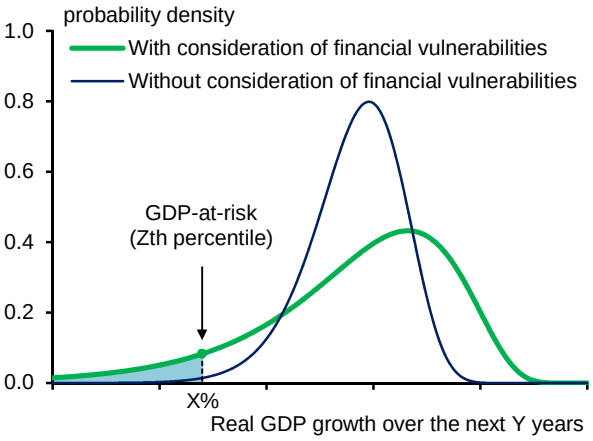
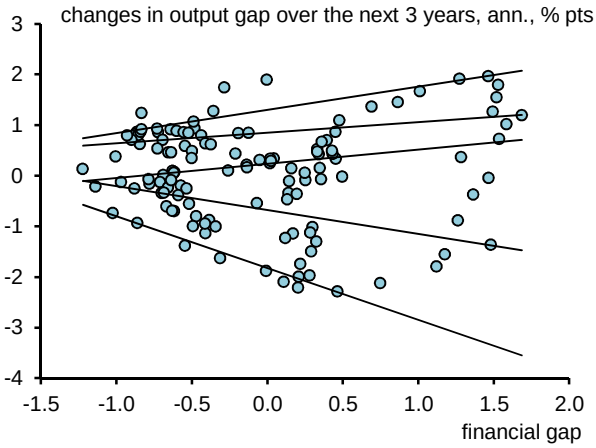


Chart B1-2: Relationship between output gap changes over the next 3 years and the financial gap



Note: 1. The sample period is from the October-December quarter of 1983 to the April-June quarter of 2015.
2. The solid lines in the chart show 5th, 25th, 50th (median), 75th, and 95th percentile lines from the bottom.

In order to estimate the probability distribution of future GDP growth, a statistical approach called quantile regression is employed. Whereas ordinary least-squares regression estimates the impact of explanatory variables on the *mean* of the dependent variable, quantile regression estimates that on the dependent variable at a specific quantile such as the 50th percentile (the median) or the 5th percentile. Using this approach, it is possible to assess, for example, that an increase in financial vulnerabilities does not have a major impact on the economic growth in normal times (around the median of the GDP growth distribution) but could lead to a severe economic downturn, albeit with small probability (for instance, at the lower 5th percentile of the growth distribution).

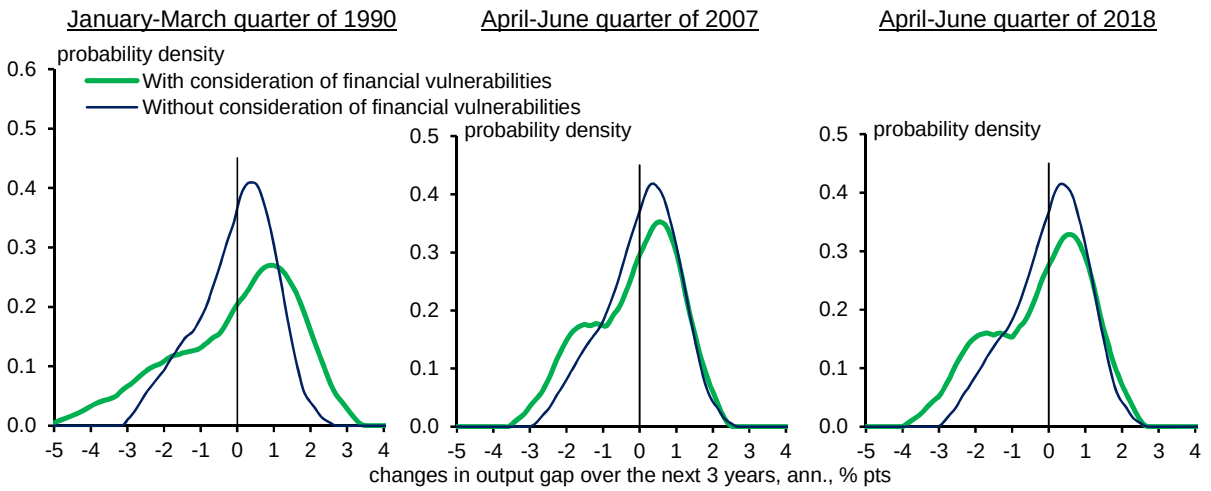
In fact, plotting changes in the output gap over the next 3 years (approximation of the difference between the GDP growth rate and the potential growth rate over the next 3 years) against the financial gap, no clear correlation between them can be observed in the neighborhood of the median of changes in the output gap (Chart B1-2); however, at the lower 5th percentile, an increase in the financial gap has a significant negative effect on the output gap. While ordinary least-squares

[49] For details on the GaR approach, see Tobias Adrian, Nina Boyarchenko, and Domenico Giannone, "Vulnerable Growth," Federal Reserve Bank of New York Staff Report No. 794, September 2016 (forthcoming in *American Economic Review*).

[50] The GaR approach was introduced in the financial stability report published by the IMF in 2017, in such reports by the ECB and the Bank of Canada (BOC) in the first half of 2018, and in working papers published by the FRB and the Bank of England (BOE) in 2018.

regression would lead to the conclusion that an increase in the financial gap does not have an impact on future growth, using quantile regression makes it possible to quantitatively assess the tail risk that the financial gap affects future growth.

Chart B1-3: Financial vulnerabilities and risks to economic growth over the next 3 years



Specifically, in order to assess the impact of the financial vulnerabilities on risks to economic growth, we compare the results of the following two regressions: (1) the changes in the output gap over the next 3 years are regressed only on changes in the output gap, which show the current growth momentum of the economy; and (2) indicators of financial vulnerabilities (Japan's financial gap and an indicator of financial conditions in the United States) are added as explanatory variables to the first regression.[51] Looking at the most recent probability distributions (April to June 2018) derived from the two quantile regressions (Chart B1-3), the outcome with the highest probability when forecasting is only based on the current output gap is that the output gap will continue to expand in a positive direction in the future; specifically, the economy will continue to expand over the next 3 years. In contrast, when indicators of financial vulnerabilities are included in the explanatory variables, although the most likely outcome remains that the output gap will expand in a positive direction, its probability decreases and the risk that the output gap will be much lower increases.[52] The tendency that downward tail risk increases if we estimate risks to economic growth taking account of financial vulnerability indicators as well as real economic indicators can similarly be observed during the phases in the past when the financial gap was positive (i.e., the bubble period from the late 1980s to the early 1990s and the period of the Great Moderation) (Chart B1-3). Moreover, the tendency that the downside risks to economic growth gradually increase if the expansionary phase of the financial cycle continues can be observed not only in Japan but in many

[51] The indicator we use for financial conditions in the United States is the National Financial Conditions Index published by the Federal Reserve Bank of Chicago.

[52] Specifically, the regression equation is as follows:

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

The quantile regression result reveals the following features about the coefficient β in the case of *Y*=3 years:

$$\beta_{5\%ile} < 0 < \beta_{95\%ile}, \quad |\beta_{95\%ile}| < |\beta_{5\%ile}|.$$

That is, the effect of an increase in the financial gap on the downside risk to economic growth is larger than that on the upside risk. However, the effect of the financial gap depends on the forecast horizon. For example, the estimation result in the case of *Y*=3 years shows $\beta_{5\%ile} < 0$, implying that an expansion of the financial gap increases the downside risk to economic growth. On the other hand, the result in the case of *Y*=1 year indicates $0 \leq \beta_{5\%ile}$, implying that an expansion of the financial gap suppresses the downside risk. Such differences in the estimated coefficients give rise to the particular shape of the probability distributions (Chart IV-2-5).

advanced and emerging countries.[53]

The GaR approach is a useful tool to quantify the tail risk associated with the accumulation of financial imbalances in a relatively simple manner. However, a few caveats need to be borne in mind. First, the GaR approach does not provide a structural explanation for the mechanisms through which an increase in financial vulnerabilities poses downside risks to the economy; instead, it only describes the past observed relationship in a reduced form. The pressure to adjust balance sheets that have expanded under the accommodative funding environment is thought to play an important role in a mechanism through which downside risks to the economy increase as overheating in financial activity intensifies; however, GaR does not explicitly model such a mechanism. Therefore, in order to assess the risks to financial stability, we should not rely on GaR analyses only; instead, we should take a more comprehensive approach by employing structural models that describe the behavior of economic entities, including financial institutions, as well as using information obtained through the Bank's on-site examinations and off-site monitoring. The second caveat concerns the limited availability of time-series data. The GaR analysis presented in this *Report* uses data from 1983 onward; however, tail events during this sample period are limited to the collapse of the bubble economy and the Lehman shock. While it is unavoidable that the number of tail events is small by definition, this means that the probability distributions of future GDP growth need to be interpreted with caution in terms of the robustness and stability of the quantile regression results.

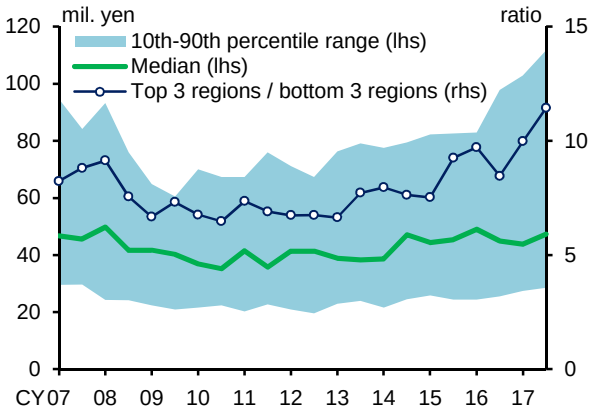
[53] For details, see Chapter 3, "Financial Conditions and Growth at Risk" in the IMF's *Global Financial Stability Report*, October 2017.

Box 2: Recent developments in the real estate market

In the real estate market, although no nationwide overheating like during the bubble period (from the late 1980s to the early 1990s) can be observed, the tightness of supply and demand has increasingly differed between urban areas -- in particular the Tokyo metropolitan area -- and rural areas (Chart B2-1). Increasing regional discrepancies in real estate markets have been a global phenomenon, and the channels through which the real estate market affects the financial system have also changed over time. Specifically, demand for real estate property has been concentrated on urban areas. Through exposure to investment funds investing in these real estate assets, economic entities across the country -- regardless of where they reside -- could be affected by a supply-demand adjustment in urban real estate markets. Therefore, even if the real estate market in Japan as a whole is not overheating, developments in urban real estate markets may have an impact on the financial system overall.

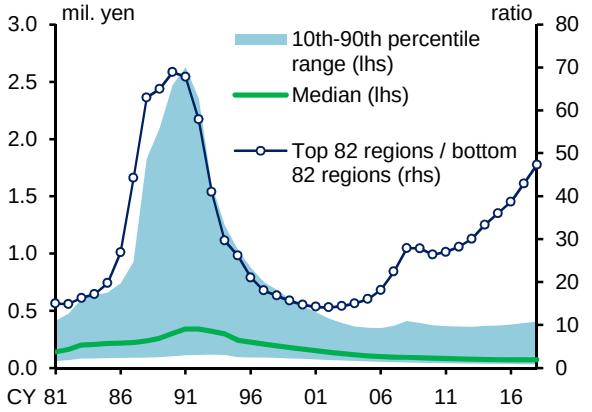
Chart B2-1: Distribution of property prices

Commercial property prices



Note: 1. The chart indicates the average commercial property transaction prices for each of the 30 regions. The quality of each property is adjusted by applying the Hedonic approach.
2. "Top 3 regions / bottom 3 regions" is the ratio of the simple average price of the top 3 regions (mainly in Tokyo) to that of the bottom 3 regions. The top 3 regions and the bottom 3 regions are extracted semiannually and correspond to the regions above the 90th percentile and below the 10th percentile, respectively.
3. Latest data as at the second half of 2017.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Japan property price index," "Real estate transaction-price information."

Commercial land prices

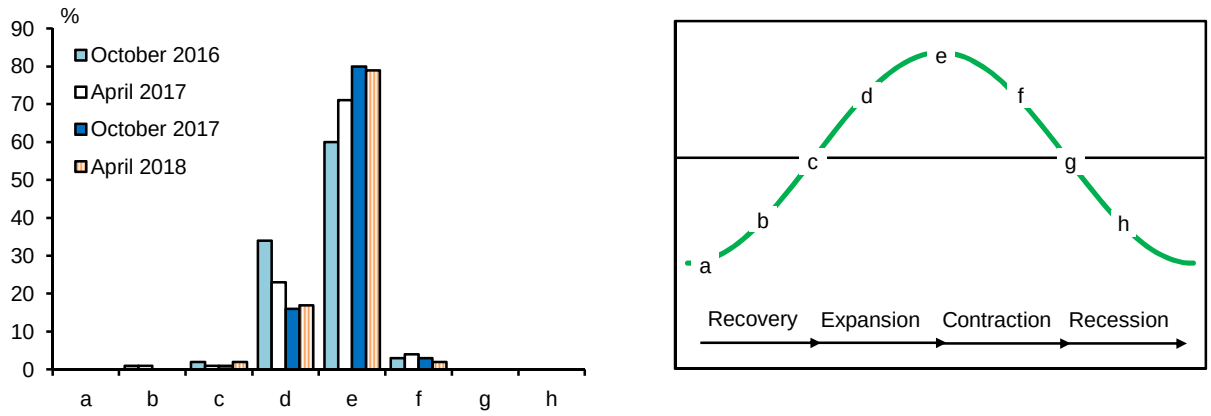


Note: 1. The chart indicates the land market values for municipalities covered by "Land market value publication" as at beginning-January 2018, taking into account the mergers of municipalities.
2. "Top 82 regions / bottom 82 regions" is the ratio of the simple average price of the top 82 regions to that of the bottom 82 regions. The top 82 regions and the bottom 82 regions are extracted annually and correspond to the regions above the 90th percentile and below the 10th percentile, respectively.
3. Data are as at the beginning of each year. Latest data as at the beginning of 2018.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land market value publication."

Among domestic real estate market participants, concerns over the potential overvaluation of properties have been spreading against the background of uncertainty over the prospects for the domestic economy after the Tokyo Olympics (Chart B2-2). Nevertheless, despite these circumstances, the upward trend in office prices in urban areas, particularly in the Tokyo metropolitan area, has continued (Chart B2-3). The continued rise in property prices in major urban areas, unlike in rural areas, is attributable to (1) a real factor such as regional gaps in demographics and economic activity, and (2) a financial factor such as an increasing co-movement between property prices in Tokyo and major foreign cities, which has been accompanied with the increase in transactions by foreign investors (Chart B2-4). Looking at trends in office prices in major international cities since the Lehman shock, office prices in New York started to rise first, followed by London, then by cities such as Tokyo and Paris, indicating that

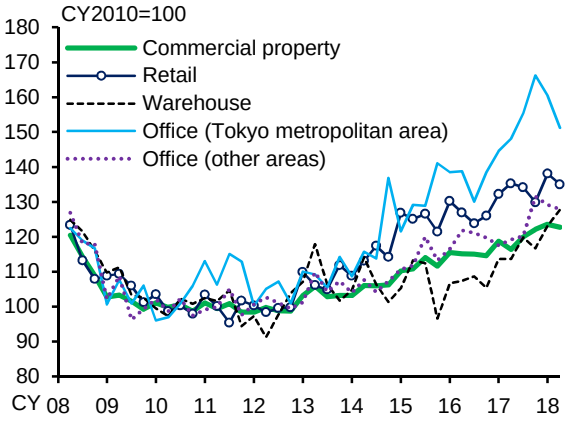
these office prices have been rising together, albeit with some lags (Chart B2-5).

Chart B2-2: Real estate investors' assessment of the market cycle



Note: The chart indicates the proportion of real estate investors (including asset managers, banks, and developers) who select each given choice as the current state (a-h in the right-hand chart) of the Tokyo (Marunouchi and Otemachi) office market. The April 2018 survey covers 117 respondents.
Source: Japan Real Estate Institute, "The Japanese real estate investor survey."

Chart B2-3: Commercial property prices nationwide



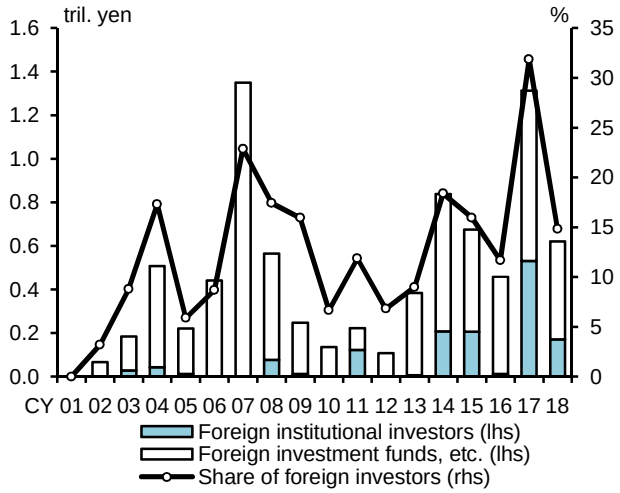
Note: 1. "Tokyo metropolitan area" covers Tokyo, Saitama, Chiba, and Kanagawa.
2. "Office (other areas)" is estimated using the office price index and the number of transactions nationwide and in the Tokyo metropolitan area.
3. Latest data as at the April-June quarter of 2018.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Japan property price index."

Amid the prolonged global low interest rate environment, foreign investors have actively searched for yield. Specifically, they have in recent years increasingly invested in real estate markets, which offer relatively high returns. In doing so, foreign investors have selected their investment properties, with particular focus on commercial real estate in major international cities, considering the relative transparency, liquidity, and profitability. In recent years, the transparency of Japan's real estate market has improved steadily as more transaction data have been compiled and more detailed information on the financial condition of real estate-related firms has been released (Chart B2-6). Moreover, in terms of profitability, looking at the yield spread (i.e., the difference between property yields and government bond yields), a widely used indicator, Tokyo has maintained a level of around 3 percent in a stable manner, while other major foreign cities have shown a moderate downward trend (Chart B2-7). This relatively high profitability appears to have encouraged an inflow of funds to Tokyo, led by foreign investors who prefer stable income returns from long-term investment.

In recent years, the number of domestic and foreign institutional investors, which tend to hold real estate properties for the long term, has gradually increased. Such a change in the market structure can be viewed as helping stabilize the real estate market. At the same time, however, the increasing co-movement between domestic and overseas real estate markets could possibly destabilize the markets in times of a stress event. In particular, if a sharp decline in risk appetite of

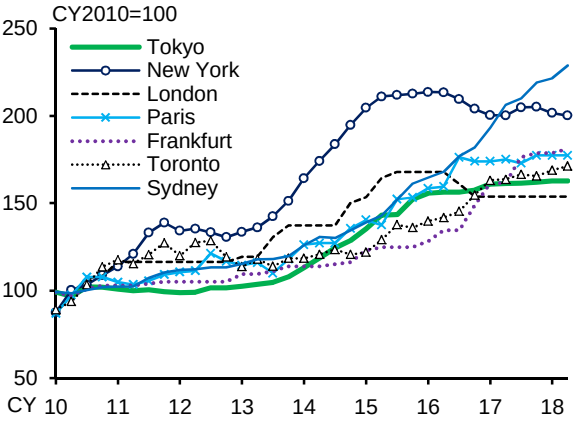
domestic and overseas investors were to cause a significant deterioration in urban real estate market conditions, this would result in growing losses among financial institutions that have increased their exposure to the real estate market. This could in turn have an impact on the financial system.

Chart B2-4: Value of real estate property acquisitions by type of foreign investors



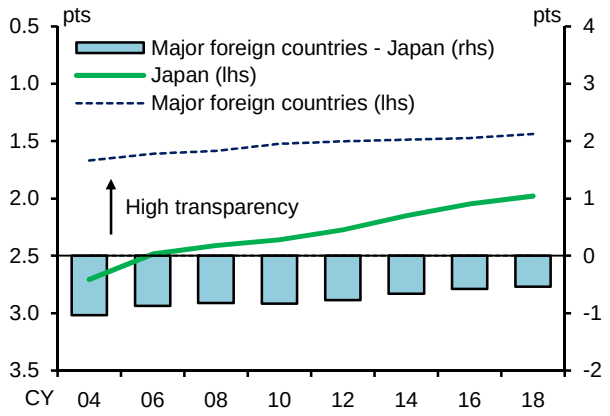
Note: 1. "Share of foreign investors" is the ratio of the value of acquisitions by foreign investors to the total value of acquisitions in the domestic real estate market.
2. "Foreign investment funds, etc." includes foreign REITs and developers.
3. Latest data as at the first half of 2018 (converted into annual value).
Source: Japan Real Estate Institute.

Chart B2-5: Office capital value by global major city



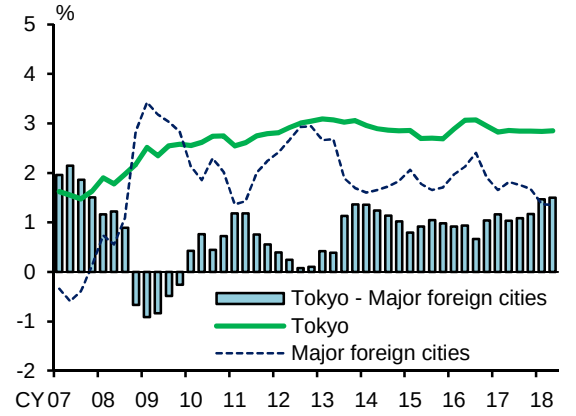
Note: 1. Grade-A office capital value.
2. Latest data as at the April-June quarter of 2018.
Source: Jones Lang LaSalle Incorporated.

Chart B2-6: Global Real Estate Transparency Index



Note: "Major foreign countries" is the weighted average of the indexes for the United States, the United Kingdom, France, Germany, Australia, and Hong Kong with nominal GDP based on PPP.
Source: IMF; Jones Lang LaSalle Incorporated.

Chart B2-7: Yield spreads



Note: 1. Yield spreads = grade-A office yields - 10-year government bond yields.
2. "Major foreign cities" is the weighted average of yield spreads for New York, London, Paris, Frankfurt, Sydney, and Hong Kong with nominal GDP based on PPP.
3. Latest data as at the April-June quarter of 2018.
Source: Bloomberg; IMF; Jones Lang LaSalle Incorporated.

Box 3: Impact of an interest rate snapback on overseas firms' default probabilities

Corporate bond spreads and term premiums have hovered near historically low levels in global financial markets, particularly in advanced countries such as the United States. This suggests the possibility of a "snapback" in interest rates due to a repricing of risk, which could potentially be triggered by a policy rate hike by the FRB or a decline in global investors' risk appetite. This box presents a quantitative analysis of the impact of such an interest rate snapback on overseas firms' default probabilities.

The analysis focuses on listed U.S. firms for which both the expected default frequency (EDF) and financial data are available. The sample comprises 377 investment-grade companies (rated Baa or better) and 341 speculative-grade companies (rated below Baa). In order to calculate the interest rate elasticity of the default frequency, we estimate a fixed effects model in which each firm's EDF is regressed on the U.S. aggregate corporate bond spreads and long-term (10-year) U.S. Treasury yields.[54] In addition to these two interest rate indicators, explanatory variables in the panel analysis include each firm's ROA and liabilities-to-assets ratio in order to take firm-specific factors into account. The estimation period is from January 2006 to June 2018.

Chart B3-1: Panel estimates: fixed effects model

		Explanatory variables				
		Corporate bond spread (IG)	Corporate bond spread (HY)	10-year U.S. Treasury yield	ROA for each firm	Liabilities-to-assets ratio for each firm
Dependent variables: EDF	Investment-grade companies	0.21 ***	—	0.04 ***	-0.32 ***	0.61 ***
	Speculative-grade companies	1.28 ***	—	0.31 ***	-0.97 ***	3.89 ***
		—	0.44 ***	0.38 ***	-0.95 ***	3.88 ***

Note: 1. *** indicates statistical significance at the 1 percent level.
2. "IG" and "HY" indicate investment grade and high yield, respectively.
3. Logarithmic transformation is applied to ROA and liabilities-to-assets ratio. If ROA is positive, it is replaced by log(1+ROA); if negative, it is replaced by -log(1-ROA).
4. Corresponding quarterly data are used as monthly data for ROA and total liabilities-to-assets ratio because of data availability.

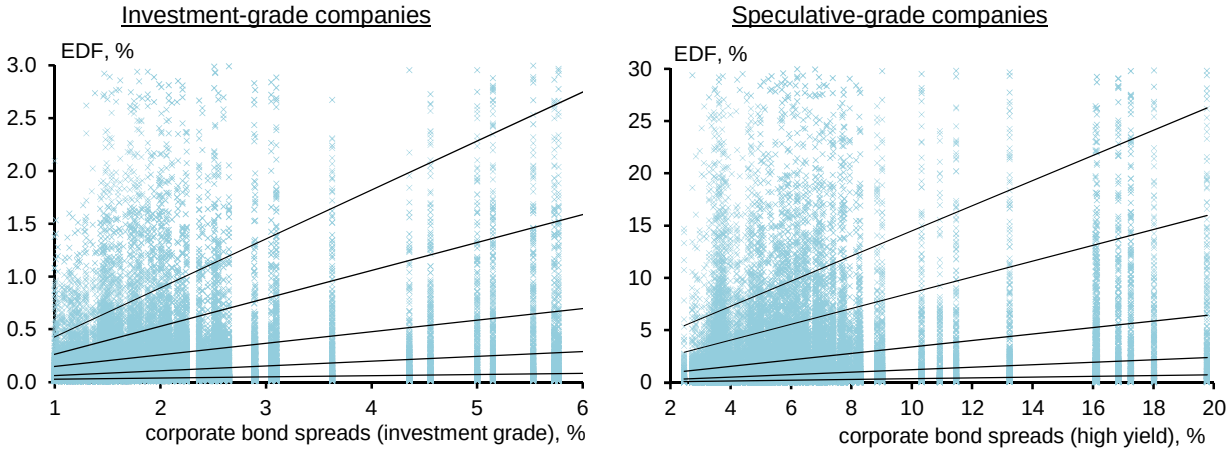
Looking at the results of the panel estimation (fixed effects model), the coefficients on the interest rate variables have the expected signs and are statistically significant for both the investment-grade and speculative-grade companies (Chart B3-1). Specifically, the results indicate that an increase in either corporate bond spreads or long-term interest rates puts upward pressure on a firm's EDF. In addition, the coefficient on corporate bond spreads is larger for speculative-grade companies than that for investment-grade companies, indicating that the impact is heterogeneous. Specifically, for the same increase in corporate bond spreads, the lower a firm's rating is, the more its EDF is likely to rise. Furthermore, looking at the impact of firm-specific factors, the coefficients on ROA and the

[54] The corporate bond (CB) spreads are included on an aggregated basis in the explanatory variables as a proxy for the stress on the financial market as a whole and therefore they are not the spreads of each firm's CB. Under this specification, spurious correlation may occur between the EDF and the CB spreads since these spreads fluctuate according to each firm's credit risks. To deal with this problem, the model was also estimated using the excess bond premium (EBP), which represents the risk appetite of investors in the corporate bond market, instead of CB spreads, but there were no major differences in the results. For details on EBP, see Giovanni Favara, Simon Gilchrist, Kurt F. Lewis, and Egon Zakrajšek, "Updating the Recession Risk and the Excess Bond Premium," FEDS Notes, October 6, 2016.

liabilities-to-assets ratio have the expected signs and are statistically significant for both the investment-grade and speculative-grade groups. This implies that a firm with lower profitability or higher leverage has a lower debt servicing capacity and its EDF thus tends to be higher.

These estimation results show the *average* impact of a change in interest rates on the EDF of a firm in one of the two groups, i.e., investment-grade and speculative-grade companies. However, the interest rate sensitivity of a firm's EDF could vary depending on the level of EDF. That is, just as the interest-rate sensitivities of speculative-grade companies, which have high EDFs on average, are higher than those of investment-grade companies, firms with higher EDFs within each group may be more sensitive to interest rates. Therefore, in order to capture such a heterogeneous effect within each group, we also estimated a quantile regression model. The results indicate that, in both groups, a firm with a higher EDF tends to have a larger coefficient on corporate bond spreads (Chart B3-2). For example, for the speculative-grade companies, a firm with an EDF at the 90th or 95th percentile was estimated to be much more vulnerable to a rise in interest rates than an average company (Chart B3-3).

Chart B3-2: Percentile lines estimated by quantile regression



Note: The solid lines in the charts are 25th, 50th, 75th, 90th, and 95th percentile lines from the bottom.
Source: Bloomberg; Moody's.

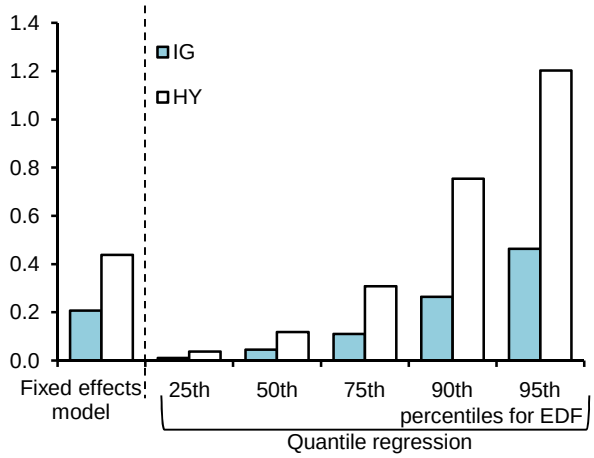
Next, we estimate how much a firm's EDF could rise if a snapback in interest rates actually occurred. For the snapback scenario, we assume that corporate bond spreads and term premiums on long-term U.S. Treasuries return to their average values for the estimation period. Specifically, we assume that corporate bond spreads for investment-grade companies rise by 50 bps, those for speculative-grade companies rise by 200 bps, and 10-year U.S. Treasury yields rise by 120 bps.[55] Calculating the increase in firms' EDFs under this scenario based on the above estimation results, we find that increases in EDFs are generally limited in the case of investment-grade companies, whereas the increases of speculative-grade companies are quite large, especially for the firms represented by the 90th and 95th percentiles (Chart B3-4). These estimates are based on the assumption that firms' ROAs (and liabilities-to-assets ratios) remain unchanged; if, however, firms' ROAs actually also decreased, due to a deterioration in the economy stemming from rising interest rates, then firms' EDFs could deteriorate even more.

The above analysis for U.S. firms examined the impact of an interest rate snapback on firms' EDFs

[55] Looking at the spread of high-yield bonds, the difference between the long-term average since fiscal 2006 (5.77 percent) and the level as of June 2018 (3.71 percent) is about 200 bps. Moreover, looking at the term premium on long-term (10-year) U.S. Treasuries, the difference between the long-term average (0.74 percent) and the June 2018 value (-0.48 percent) is about 120 bps.

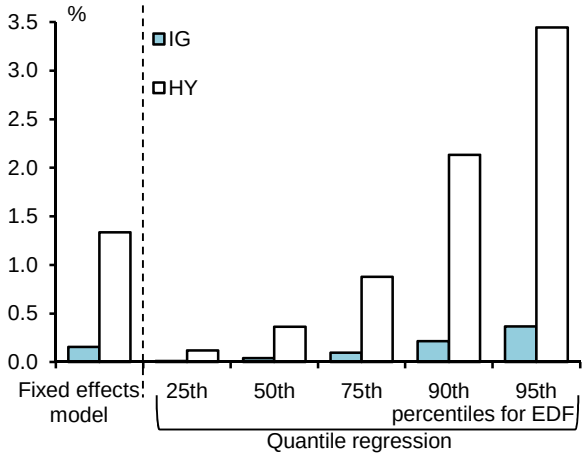
across all industries; however, the impact is likely to differ by industry. An estimation by industry gave results (not shown here due to space limitations) indicating that EDFs in the construction and real estate industries tend to be more sensitive to interest rates than those in other industries. Even within the same industry, the interest-rate sensitivity of default probabilities is likely to differ between U.S. firms such as analyzed here and emerging market firms, reflecting differences in balance sheet structures due to currency mismatches. This means that Japanese financial institutions that have actively increased their overseas lending need to carefully examine the borrowing firms' resilience to interest rate snapback risk, taking the characteristics of individual borrowers into account.[56]

Chart B3-3: Coefficients on corporate bond spreads



Note: The coefficients for investment-grade companies (IG) and speculative-grade companies (HY) are those on corporate bond spreads for investment grade and high yield, respectively.

Chart B3-4: Increase of EDF under the snapback scenario



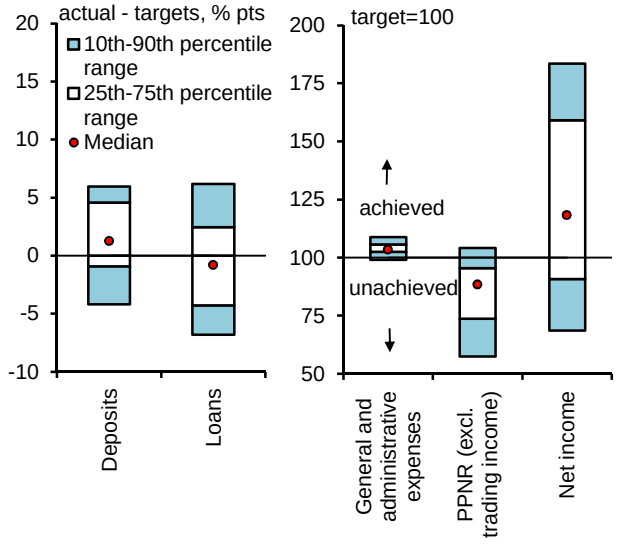
Note: Long-term interest rate, investment-grade bond spreads, and high-yield bond spreads are assumed to increase by 120bps, 50bps, and 200bps, respectively.

[56] Although Japanese banks have increased their overseas loans, it remains a challenge to quantitatively assess their credit risks because of the limited historical data so far. To deal with this problem, banks can make use of external information such as the EDF by linking it with their own internal rating.

Box 4: Features of regional banks' medium-term management plans

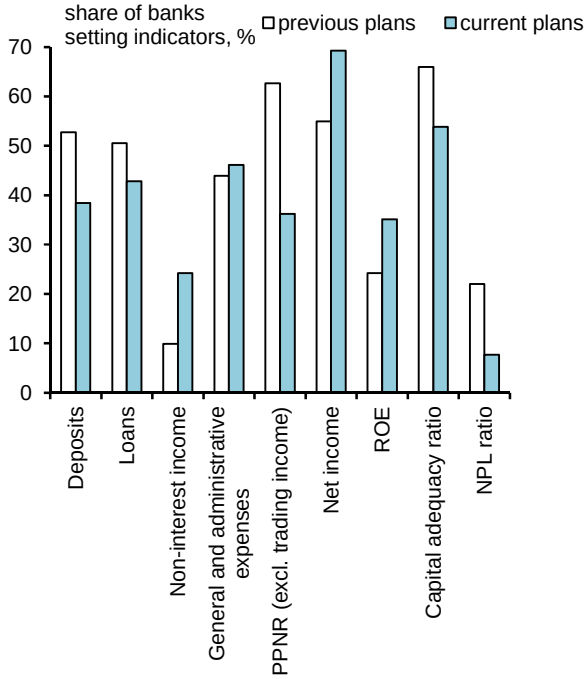
This box examines features of regional banks' management strategies and numerical targets using their medium-term management plans.[57] Specifically, it provides an overview of regional banks' current medium-term plans made in fiscal 2016-2018 and compares them with their previous plans made in fiscal 2013-2015.[58]

Chart B4-1: Achievement status of numerical targets in previous medium-term management plans



Note: 1. Covers regional banks. Excludes banks without targets. "General and administrative expenses" includes data for banks setting indicators of both the overhead ratio and gross operating income.
2. "General and administrative expenses" is obtained by dividing targets by achievements.
Source: Published accounts of each bank.

Chart B4-2: Performance indicators in medium-term management plans



Note: 1. Covers regional banks.
2. "General and administrative expenses" includes the overhead ratio. "PPNR (excl. trading income)" includes gross operating income from core business and net operating income.
Source: Published accounts of each bank.

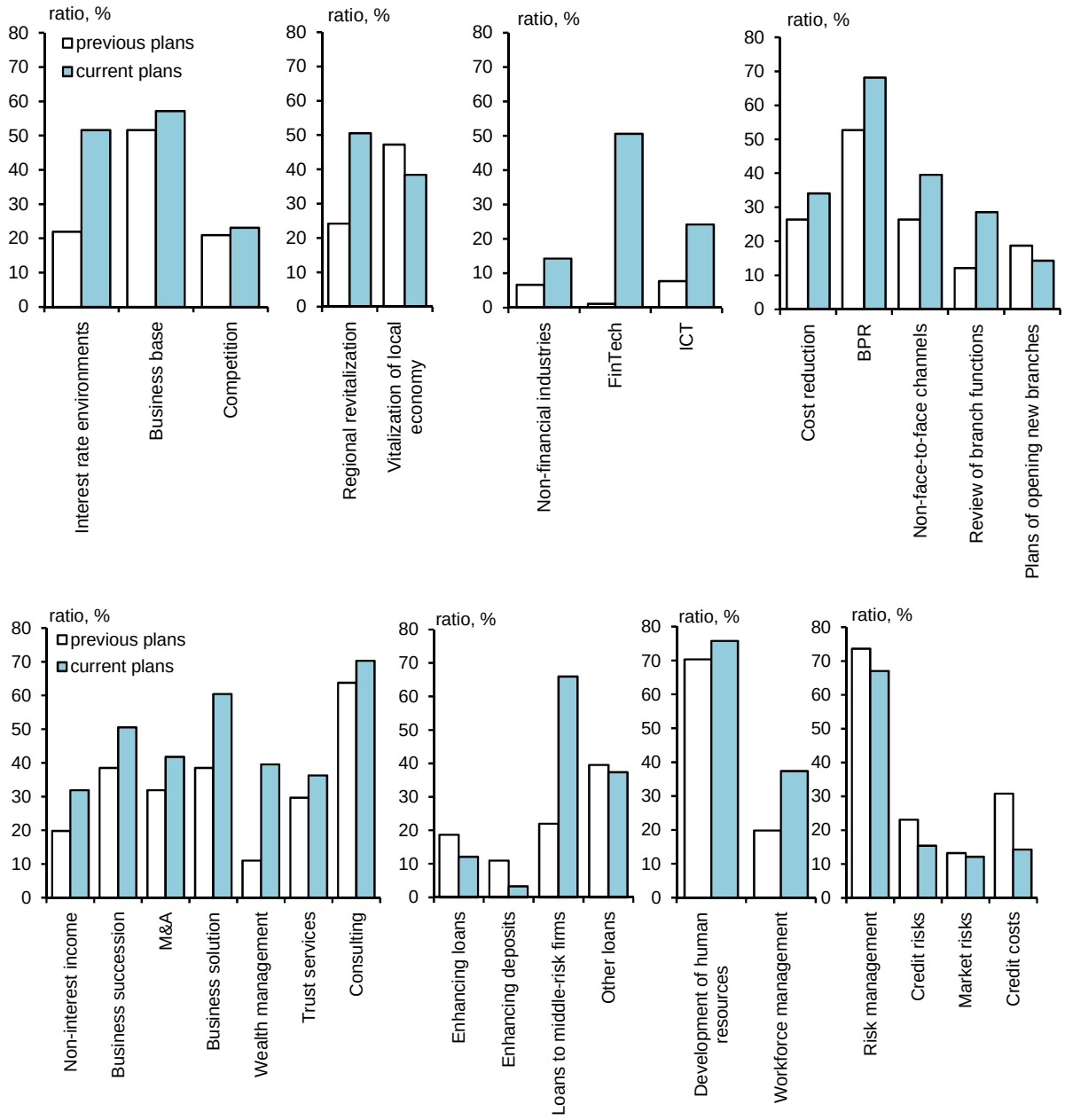
First, we discuss the extent to which numerical targets set in the previous medium-term plans were achieved (Chart B4-1). Around half of banks achieved their targets for deposits, while slightly over half of banks failed to achieve their lending targets. Regarding expenses, many banks made progress in reducing expenses more than they had planned, reflecting a decrease in labor costs and reduction in deposit insurance premiums. Considering profit indicators, more than half of the banks did not achieve their targets for PPNR (excluding trading income), due to the effects of monetary easing and increased lending competition. On the other hand, many banks exceeded their net income targets, reflecting a decline in credit costs due to improvements in the macroeconomic conditions as well as the realization of gains on securities, particularly on stocks

[57] For banks receiving public capital injections under the Act on Special Measures for Strengthening Financial Functions, the Business Strengthening Plans formulated by such banks were used.

[58] The analysis focuses on 91 regional banks. Subsidiaries of financial holding companies are counted as part of the holding company unless they set their own medium-term management plan. Counting all subsidiaries separately, the total number of banks covered is 101. The large majority of regional banks formulate their medium-term management plans for a period of 3 years. Partitioning regional banks included in the analysis by the starting year of their medium-term plans, 30 banks have plans starting in fiscal 2016, 26 in fiscal 2017, and 34 in fiscal 2018. In addition, one bank has a plan starting in fiscal 2014.

and domestic bonds. However, there are also a significant number of banks that did not achieve their targets, so there is considerable heterogeneity in performance among individual banks.

Chart B4-3: Ratio of banks using keywords in their medium-term management plans



Note: Each keyword in the charts represents a category of specific terms as in the following examples. "Interest rate environments" includes low interest rates, negative interest rates, and monetary easing. "Business base" includes population decline, aging population, decline in the number of firms, and closing business. “Competition” includes competitive environment, and interest rate competition. "BPR" includes improvements of operational efficiency, and robotic process. "Review of branch functions" includes branch functions, cross-branch cooperation, branch network, mobile branches, and in-store branches. "Plans of opening new branches" includes new branches and branch opening. "Trust services" includes bequests, testaments, and inheritance. "Loans to middle-risk firms" includes project finance, project assessments, and middle-risk. "Other loans" includes personal loans, non-purpose loans, consumer loans, and card loans. "Workforce management" includes employee satisfaction, diversity, and workplace environment. "Credit costs" includes non-performing loans.
Source: Published accounts of each bank.

Considering the numerical targets for the current medium-term plans (Chart B4-2), the number of banks that have published volume targets for deposits and lending has decreased. On the other hand, amid the growing awareness of the need to lower operating costs, many banks have continued to set targets related to expenses and efficiency. In terms of profit indicators, an

increasing number of banks have ceased to set targets for PPNR (excluding trading income), as many of them failed to achieve their targets set in their previous plans; however, a growing number of banks have set targets for their net income. Moreover, an increasing number of banks have made a commitment to management benchmarks such as the return on equity, and there appears to be greater consideration of shareholder demands, particularly institutional investors.[59] Meanwhile, the number of banks that have set numerical targets for soundness indicators such as the capital adequacy ratio and the nonperforming loan ratio has significantly decreased.

To understand how regional banks have perceived business conditions and formulated their management strategies for meeting their numerical targets, we search for keywords mentioned in their medium-term plans and calculate their frequency (Chart B4-3).[60] Our findings can be summarized with four main points.

First, an increasing number of banks have perceived the business environment as severe. In addition to a substantial increase in references to interest rate environments, there continue to be many banks concerned about the weakening of their business base due to a decreasing and aging population and shrinking number of firms. Under these conditions, regional banks have tried to maintain and expand their customer base through efforts directed at revitalizing local communities and stimulating regional economies. Specifically, these banks have focused their efforts on growing industries and business areas in which a region already has a strong foundation such as tourism and agribusiness, medical and nursing care, and renewable energy. In addition, an increasing number of banks have faced challenges, namely competition from other industries and adaption to new technologies such as investment in ICT and FinTech.

Second, regional banks have taken a stronger stance with regard to efforts to raise business efficiency and productivity. Apart from cost reductions, notable concrete plans include using robotic process automation (RPA) and pursuing operational reforms and business process re-engineering (BPR).[61] Moreover, many banks have increased their use of non-face-to-face channels for customer communication and reviewing branch functions, and simultaneously they have planned to constrain total staff numbers and transfer existing staff to sales and other departments in order to raise productivity.

Third, regional banks have changed their policy to raise their gross operating profits. Due to the narrowing of lending margins as well as capital constraints, an increasing number of banks have sought to raise non-interest income. In particular, to increase income from service fees charged to businesses, they have sought to strengthen their provision of business solutions, examples of which are services related to business succession and M&As, as well as developing new opportunities including overseas markets. At the same time, banks have continued to try to increase fee and commission income from services for individuals such as those related to wealth management and inheritance. Next, considering interest income, banks have been increasingly aware of the need to focus more on the profitability than the volume of loans that they provide, and more banks have promoted business lending to middle-risk firms; in addition, many banks have continued to promote various types of loans to individuals such as so-called card loans. Moreover, from the perspective of promoting such business, more banks have planned to strengthen human

[59] In the current medium-term plans, some banks have started to refer to environmental, social, and governance (ESG) issues -- something to which institutional investors pay attention.

[60] Focusing on the medium-term plans publicly released by regional banks, we converted the plans into a machine-readable text format and then applied text-mining techniques to extract certain keywords.

[61] Generally speaking, RPA refers to efforts to automate routine office processes through the use of computers in order to increase efficiency, while BPR refers to a complete and radical review of business processes.

resource development and improve workforce management. As the recruitment of new graduates becomes more competitive, quite a few banks have planned to raise employee satisfaction and enhance diversity management and workforce management that stresses the value of work.

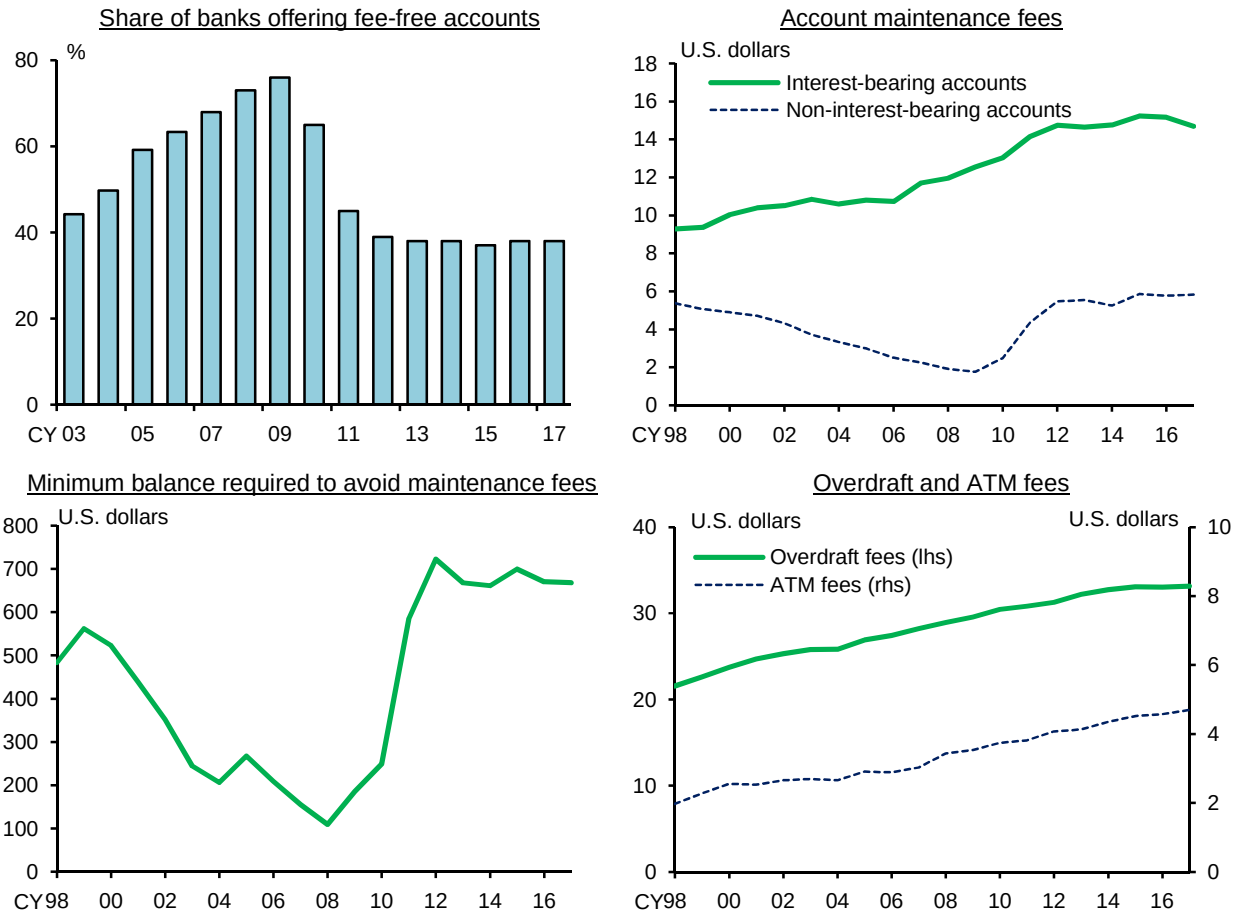
Fourth, although many banks have continued to highlight the importance of risk management, the number of such banks has decreased. This is partly due to the decline in credit costs, reflecting improved economic conditions, which has resulted in a decline in the number of banks referring to credit risks. Moreover, in spite of the fact that quite a few banks have strengthened their financial markets divisions, only a small number of banks provide a detailed description of the establishment of risk management structures.

As part of on-site examinations and off-site monitoring, the Bank of Japan will deepen its dialogue with regional banks regarding the idea behind their medium-term management plans, necessary measures to implement these plans and the resulting outcome, as well as interim assessments of and adjustments of their plans' targets.

Box 5: U.S. and European financial institutions' approach for securing retail-related fees and commissions

Financial institutions in the United States and Europe have earned stable income from fees and commissions through various retail-related services. Amid the continuing low interest rate environment, non-interest income, particularly from fees and commissions, is regarded as an important source of earnings for financial institutions.[62] This box discusses three aspects of U.S. and European financial institutions' approach for securing income from fees and commissions.

Chart B5-1: Basic figures on bank account services among the U.S. financial institutions



Note: Covers 250 financial institutions in the U.S. Latest data as at 2017.
Source: Bankrate.

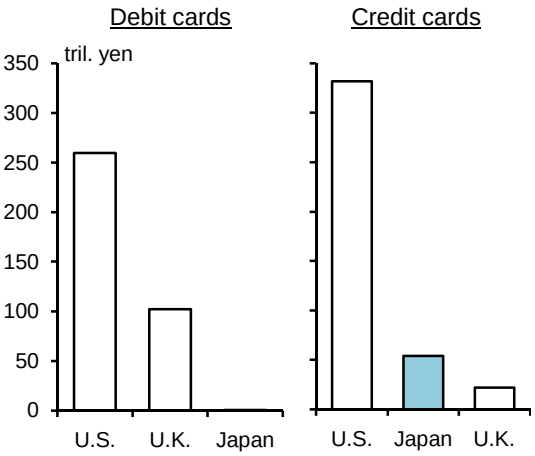
First, maintenance fees for transaction accounts are flexibly modified (Chart B5-1). In the United States before the Lehman shock, amid intensifying competition among banks, the proportion of banks providing fee-free accounts increased, and a growing number of banks lowered the required minimum account balance for account maintenance fees to be waived. At the same time, among fee-charging accounts, some banks lowered the maintenance fees for non-interest-bearing accounts. However, following the Lehman shock, financial institutions in the United States have actively changed their fee structures as deposit spreads have been decreasing during the prolonged low interest rate environment. Specifically, the share of banks offering free accounts has

[62] For an international comparison of the structure of financial institutions' profits with a particular focus on non-interest income, see Chapter VI of the October 2017 issue of the *Report*, as well as the following speech by Hiroshi Nakaso (former Deputy Governor of the Bank of Japan): "New Frontier of Macroprudential Policy: Addressing Financial Institutions' Low Profitability and Intensified Competition," delivered on November 29, 2017, at the Kin'yu Konwa Kai (Financial Discussion Meeting) hosted by Jiji Press. For details on recent efforts by Japanese regional banks to raise fees and commissions, see Box 1 in the April 2018 issue of the *Report*.

decreased, halving from slightly below 80 percent immediately after the Lehman shock to just under 40 percent at present. Further, the required minimum account balance for account maintenance fees to be waived has gradually risen about four-fold since a decade ago. In addition, account maintenance fees for fee-charging accounts -- both interest-bearing and non-interest-bearing -- are currently close to the previous peak, due to repeated fee increases. Moreover, overdraft fees and ATM usage fees have also continued to rise consistently.

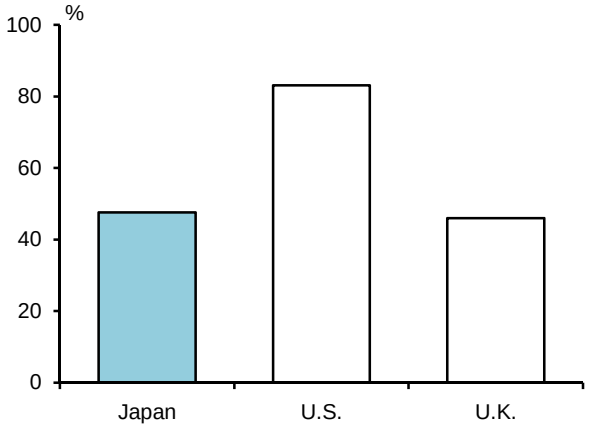
Second, fee and commission income is secured from debit and credit cards (Charts B5-2 and B5-3). In the United States and Europe, these cards are widely used as a payment means for transactions and bank-issued cards account for a large proportion. In contrast, in Japan, where credit card companies and retailers dominate, bank-issued cards make up a relatively small share, due in part to the effects of the past regulations.[63] The issuance of debit and credit cards not only provides U.S. and European financial institutions with a means to win and retain customers but also generates annual membership fees and merchant fees, making such cards a stable source of non-interest income. In addition, relatively more credit card users choose revolving payments in the United States and Europe, so that the related income also contributes to financial institutions' profits.

Chart B5-2: Total value of card payments



Note: Data as at 2016.
Source: BIS; OECD.

Chart B5-3: Share of credit cards issued by banks and their affiliates



Note: 1. Data as at 2015 for Japan, at 2016 for the U.S., and at 2012 for the U.K.
2. The data cover the top nine credit card issuing banks for the U.S. and the top five banks for the U.K.
Source: Companiesandmarkets.com; Forbes; Ministry of Economy, Trade and Industry, "Survey of Selected Service Industries."

And third, U.S. and European financial institutions make good use of "price bundling strategies" in providing a combination of multiple services. In Japan, deposit-related services are often provided as a stand-alone product, while in other countries, package accounts are common. Package accounts provide a set of various services tailored to customers' needs. For example, U.S. financial institutions provide package accounts that allow customers at a discount to purchase insurance products and investment trust products and consult investment advisors, as well as to make payments by using ATM and checking-related services (Chart B5-4). In the United Kingdom, "reward accounts," which provide a narrower range of services relative to the package accounts at a greater reduction in fees, have become common. However, in Germany, for example (where competition among banks is fierce, like in Japan), package accounts offered by banks remain

[63] The international comparison of the share of credit cards issued by banks shown in Chart B5-3 is subject to a considerable margin of error because of cross-country differences in data calculation method.

unpopular among customers, compared to free accounts that charge fees for individual services.

Chart B5-4: Example of service fees and features of packaged accounts in the U.S.

		Premium	Standard	Basic
Account maintenance fee (per month)		$25	$13	$5
Statement fee (per month)		No charge	$2	$2
ATM	Bank-owned	No charge	No charge	No charge
	Others	No charge	No charge for the first 5 times per month	$3
Debit card	Premium	No charge	$5 per month	$5 per month
	Standard	No charge	No charge	No charge
Interest-bearing		Eligible	Eligible	None
Preferential interest rate		Eligible	Eligible	None
Availability of additional checking accounts		Eligible	None	None
Availability of saving accounts		Eligible	Eligible	None
Personal check		No charge	No charge for the first 3 checks per month	$15 per box
Cashier's check		No charge	Fees apply	Fees apply
Wire transfer (incoming)		No charge	Fees apply	Fees apply
Online/mobile banking		No charge	No charge	Fees apply

(continued)

		Premium	Standard	Basic
Teller service	Cashier's check	No charge	$5	$5
	Money order	No charge	$3	$3
	Traveler's check	No charge	2.5%	2.5%
Overdraft fee		$35	$35	$40
Overdraft protection		$7.5	$12	$12
Family member account		No charge	No charge for the first 2 accounts	Fees apply
Home-equity loan fee		No charge	Fees apply	Fees apply
Cash transfer to brokerage accounts		No charge for the first 10 times	Fees apply	Fees apply
Safe deposit box rental fee		30% discount	30% discount	No discounts
Investment guidance		No charge	Fees apply	Fees apply
Preferred interest rate on loans		Eligible	Eligible	None
Credit monitoring		Discounts apply	Discounts apply	No discounts

Note: Shaded areas indicate preferred services.
Source: Publications from financial institutions in the U.S.

Even in the United States and Europe, some customers seem reluctant to accept any introduction of or increase in fees for various services. In response, financial institutions in these countries carefully differentiate their services according to their customers' characteristics and transaction records, and also raise the value added of the services provided. As a result, they are able to gain customers' acceptance, thereby securing fee and commission income. At the same time, advances such as FinTech are occurring in information technologies, resulting in major changes in the environment surrounding the retail banking business. For example, the entry of new businesses to the market has hastened the trend for certain individual financial services to be unbundled on the one hand, and for multiple financial and non-financial services to be rebundled on the other. Japanese financial institutions should learn from case studies in the United States and Europe and gain customer understanding that their services are worth the price, by upgrading these services to improve customer convenience and safety. In doing so, they could make use of information and communication technologies and promote collaborations and partnerships with external entities.

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)

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 / risky assets

CET1 capital includes common equities and retained earnings.

Risky assets are financial institutions' risk-weighted assets.

Tier 1 capital ratio = Tier 1 capital / risky assets

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

Total capital adequacy ratio = Total capital / risky 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 / risky assets

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

Risky assets are financial institutions' risk-weighted assets.