BOJ
Reports & Research Papers

# Financial System Report

BANK OF JAPAN
APRIL 2018

The total of major banks, regional banks, and *shinkin* banks covered in this *Report* is as follows (as at April 1, 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 41 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-March 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. The macroprudential framework refers to devising institutional designs and policy measures 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, 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 April 2018 issue of the *Report*

This April 2018 issue of the *Report* analyzes bank loan markets, which have been increasingly active in recent years, with particular focus on the relationship between interest rates and credit risk. Under the prolonged low interest rate environment worldwide, credit spreads on corporate bonds and other credit products have narrowed to historically low levels in many advanced economies, and concern over complacency in investors' risk perception and possible risk repricing has been pointed out. The motivation behind this issue of the *Report* is to examine whether similar developments and issues have been observed in bank loan markets.

Reflecting the prolonged economic expansion and the subsequent decline in firms' default rates, financial institutions' credit costs have been at historically low levels. However, when credit costs are calculated based on the past default rates, there is a possibility that the amount of credit risk potentially held by financial institutions could be underestimated, reflecting the persistently low economic volatility. In order to check whether financial institutions are sufficiently resilient against risks, it is important to examine how firms' financial condition will change in response to a possible deterioration of the macroeconomic environment and how it will subsequently affect financial institutions' loss-absorbing capacity. Credit risk varies significantly among individual firms, reflecting differences in their financial condition. Thus, financial institutions need to set loan interest rates at levels that match each firm's credit risk. This has become more important given the recent increase in the number of financial institutions that have boosted lending to middle-risk firms. This issue of the *Report* examines the financial condition and behavior of individual firms, particularly middle-risk firms, and provides in-depth analysis of financial institutions' lending stance toward these firms (including interest rate setting behavior) and their resilience to risks. Further, the potential vulnerabilities of the financial system are assessed, and tasks and challenges for financial institutions regarding credit risk management are outlined.

## Contents

# I. Executive summary

## *Assessment of financial intermediation and financial cycle*

Financial intermediation has remained well-functioned on the back of the Bank of Japan's monetary easing, supporting the moderate expansion of Japan's economy. In the domestic loan market, the interest rates of 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. In particular, business fixed investment-related lending to small firms has been increasing in a wide range of industries as lending competition has been intensifying among regional financial institutions. In the CP and corporate bond market, large firms' funding has been growing at a faster pace as issuance rates have hovered at extremely low levels. Meanwhile, global financial markets have been stable on the whole, although stock prices in advanced economies dropped substantially in response to the rise in U.S. long-term interest rates, which reflected increased inflation expectations. With continued growth in overseas economies, overseas investment and lending activities by Japanese financial institutions have maintained upward momentum.

The funding conditions for the non-bank private sector have been highly accommodative, but no particular signs of overheating are observed in the current phase of the financial cycle. Stock prices, which increased somewhat sharply until early 2018, have been more or less in line with the expected improvement in corporate profits. Although financial institutions and firms have been expanding the size of their balance sheets, such size has not become excessive relative to GDP. While the outstanding amount of loans to the real estate industry has registered relatively higher growth, a growing number of financial institutions have turned cautious over the risks associated with adjustments in the real estate market and credit concentration in the real estate industry, thus making their stance on real estate-related lending more restrictive. Domestic investors have also become cautious in property acquisitions due to concern over the risk of entrenched real estate valuations. Due attention should be paid to the possibility that the vulnerabilities of the financial system could potentially increase if financial institutions do not receive an appropriate level of return relative to risk from their lending and securities investment, despite not excessively expanding the size of their balance sheets.

## *Stability of the financial system*

Financial institutions have generally strong resilience in terms of both capital and liquidity in times of 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, there is some heterogeneity in financial institutions' resilience against stress. Furthermore, the current sufficiency of their level of capital does not necessarily guarantee the future stability of the financial system, because financial institutions face chronic stress, such as the persistent decline in the population and the number of firms, which determine the secular demand for financial transactions. In other words, even if financial institutions currently have the capacity to absorb losses from acute stress such as the Lehman shock, their future capital may eventually be adversely affected if their core profitability continues to fall due to chronic stress. A significant number of regional financial institutions have realized gains on sales of securities in order to maintain net income levels and a higher dividend payout ratio despite a decline in their pre-provision net revenue (excluding trading income). Continuing to unreasonably realize gains on sales of securities will reduce interest and dividend income on securities holdings in the future. Furthermore, unrealized gains on securities do actually function as a capital buffer on an economic

value basis. Therefore, it is important for financial institutions to consider desirable profit distribution, including how much to return to shareholders.

### *Vulnerabilities due to financial institutions' credit risk taking*

Financial institutions have actively extended loans at low interest rates, particularly to so-called "middle-risk firms," against the backdrop of the effects of intensified lending competition under chronic stress and monetary easing. This reflects the fact that the potential loan demand by middle-risk firms will easily materialize in response to lower loan interest rates offered by financial institutions, as these firms hold a smaller amount of internal funds and are more sensitive to loan interest rates compared to financially sound firms. The increase in loans to middle-risk firms is generally observed in financial institutions with a higher capital adequacy ratio and higher risk-taking capacity. At the same time, such an increase tends to occur in financial institutions with lower core profitability and stronger risk-taking incentives. In fact, financial institutions tend to be complacent in their perception of credit risk amid the prolonged benign macroeconomic conditions, such as economic expansion and low interest rates. If financial institutions and firms act on the premise that such a favorable macroeconomic environment will continue in the future, their balance sheets could be impaired by unexpected losses in the event of a reversal in the macroeconomic environment. The ratio of financial institutions' loan-loss provisions for overall normal loans has remained at a historically low level that is below even that before the Lehman shock. However, in the event of negative shocks, such as an economic downturn or a rise in interest rates, firms -- especially middle-risk firms with low profitability and ability to repay their debt -- could be downgraded and credit costs could rise sharply.

### *Challenges from a macroprudential perspective*

There is a possibility that financial imbalances could build up if financial institutions shift toward excessive risk taking in order to maintain profitability. There is also a possibility that the financial intermediation function could weaken if financial institutions lose their loss-absorbing capacity due to the continued decline in their core profitability. Thus, there exist both overheating and contraction risks. In order for the financial system to maintain its stability into the future, financial institutions should accelerate their efforts to ensure sustainable profitability and strengthen their capacity to address risks in the areas where they actively continue to take risks, such as domestic and overseas lending as well as investment in stocks and foreign bonds. In this regard, bearing in mind any future changes in the macroeconomic environment, financial institutions that have actively extended loans to middle-risk firms need to set appropriate interest rates reflecting the risks involved, and improve the effectiveness of credit risk management, including examining whether their loan-loss provisions are appropriate. In particular, when making loan-loss provisions, financial institutions need to appropriately smooth out cyclical fluctuations from a medium- to long-term perspective so that loan-loss provisions are not excessively affected by the current favorable macroeconomic environment. At the same time, they should deepen relationships with client firms and thereby actively support these firms' efforts to raise productivity. The Bank of Japan will support such efforts of financial institutions through, for example, its on-site examinations and off-site monitoring and will continue to closely monitor, from a macroprudential perspective, the impact on the financial system of financial institutions' various risk taking.

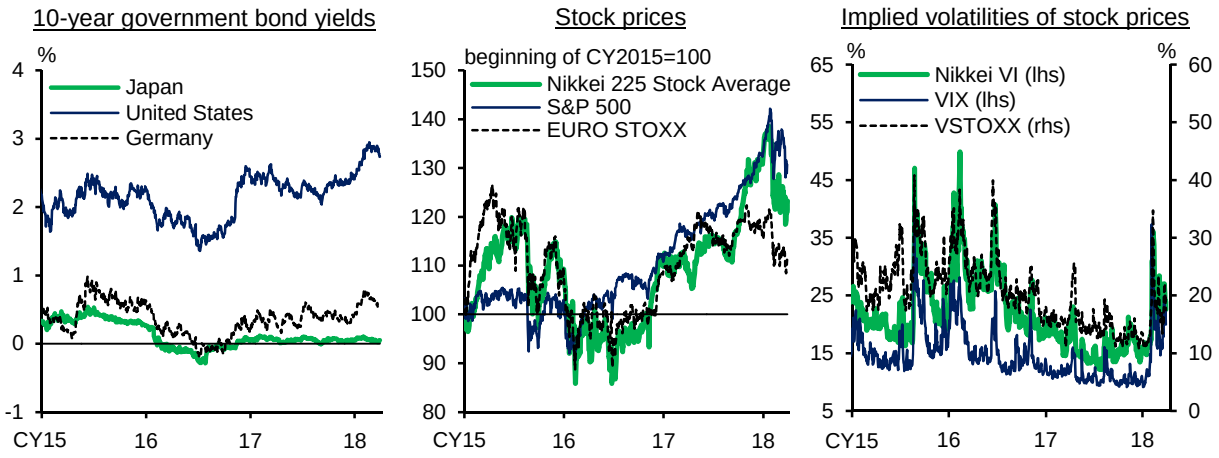
# II. Risks observed in financial markets

This chapter summarizes the developments in financial markets at home and abroad mainly during the second half of fiscal 2017 and examines risks observed.[1]

## A. Global financial markets

In global financial markets, volatilities were subdued at historically low levels and prices of risky assets, such as stocks and corporate bonds, trended upward as the global economy continued its steady growth on the whole (Chart II-1-1). Although a rise in U.S. long-term interest rates in February 2018, which reflected higher expected inflation rates, led to a significant decline in stock prices particularly in advanced economies, an increase in volatility has been observed only in stock markets thus far. In credit markets, credit spreads have remained tight. Emerging markets have also generally been calm. Nevertheless, attention should continue to be paid to the possibility that the rise in U.S. interest rates amid continuing policy rate hikes could induce an unwinding of investors' positions accumulated under a low interest rate environment and a repricing (reassessment) of risky assets, and further spill over to a wide range of global financial markets.

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




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

### *Factors behind the rise in U.S. long-term interest rates*

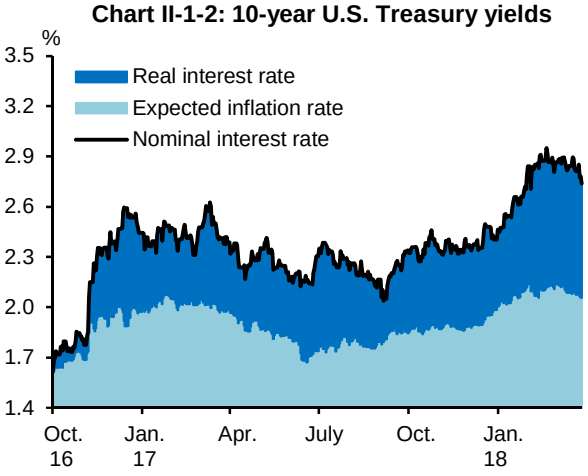
In 2017, U.S. long-term interest rates remained stable at low levels of around 2.0-2.5 percent, while the Federal Reserve (FRB) raised its policy rate by 25 basis points three times in March, June, and December (Chart II-1-1). Since the beginning of 2018, however, U.S. long-term interest rates have risen at a somewhat faster pace and have reached close to 3 percent. This is attributable to increases not only in real interest rates but also in expected inflation rates (Chart II-1-2). Long-term interest rates have risen, mainly reflecting concern over an expected increase in the issuance of U.S. Treasuries under the country's expansionary fiscal policy, and higher inflation expectations due to rises in crude oil prices and hourly wages.

Furthermore, both the expected stimulus effects of the fiscal policy and higher inflation

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

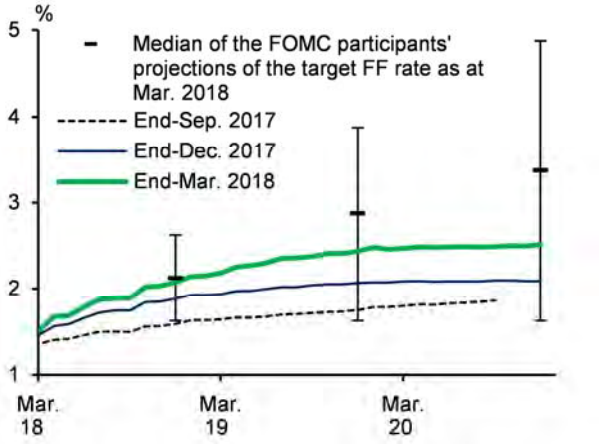
expectations have led to projections for more short-term interest rate hikes in the future, thereby contributing to the rise in nominal long-term interest rates (Chart II-1-3). Even after the FRB raised its policy rate in March 2018, market participants expect several additional rate hikes during 2018. Term premiums have remained at subdued levels, suggesting that uncertainty over future price developments and concern over a possible expansion of fiscal deficits have not heightened (Chart II-1-4). Even in February 2018, when the volatility of stock prices increased, the volatility of U.S. Treasury futures remained stable at a low level (Chart II-1-5).

**Chart II-1-2: 10-year U.S. Treasury yields**



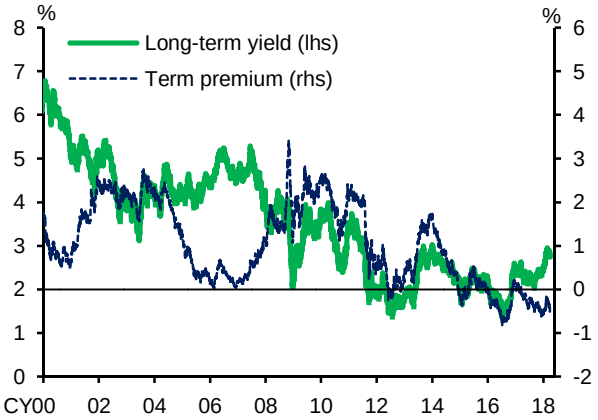

Note: 1. "Expected inflation rate" indicates the break-even inflation rate.
2. Latest data as at end-March 2018.
Source: Bloomberg.

**Chart II-1-3: Federal funds futures curves**



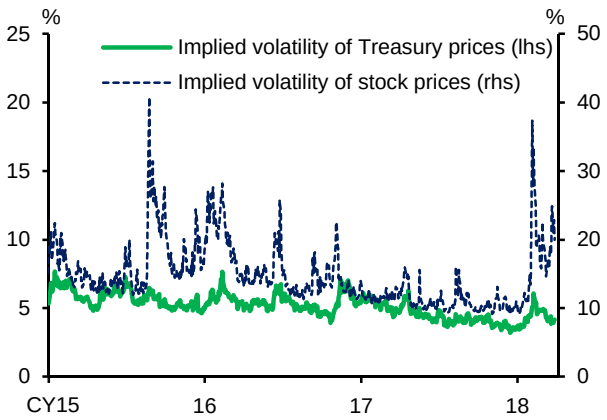

Note: The bars in the chart indicate the range between the maximum and minimum of the FOMC participants' projections of the target federal funds (FF) rate.
Source: Bloomberg; FRB.

**Chart II-1-4: 10-year U.S. Treasury yields and term premiums**




Note: Latest data as at end-March 2018.
Source: Bloomberg; FRB.

**Chart II-1-5: Implied volatilities in U.S. markets**



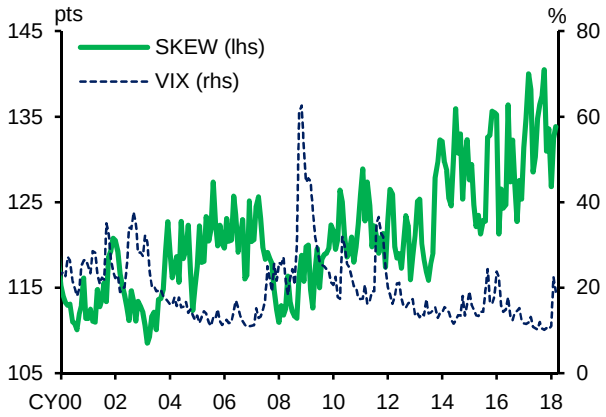

Note: 1. "Implied volatility of Treasury prices" indicates the TYVIXSM Index. "Implied volatility of stock prices" indicates the VIX.
2. Latest data as at end-March 2018.
Source: Bloomberg.

Looking ahead, as the economic expansion in the United States is expected to continue, there is a possibility that the inflation rate will rise at a faster pace than market expectations, thereby heightening uncertainty over the future path of monetary policy. There is also a possibility that the supply and demand conditions of U.S. Treasuries will deteriorate further due to the expansionary fiscal policy. Under these circumstances, term premiums could snap back, which could lead to a faster rise in long-term interest rates.

## *Decline in stock prices and increase in volatility*

The stock options market showed that in the few years until January 2018, implied volatility -- the expected future volatility of stock prices -- remained at a low level, while a tail risk indicator (SKEW) that captures the amount of risk of a substantial decline in stock prices (skew of the distribution of future stock prices) followed an upward trend (Chart II-1-6). In other words, even though the tail risk of a plunge in stock prices was a concern among investors, the prolonged rise in stock prices created a self-fulfilling feedback loop in which an increase in excess stock returns attracted more investors, thereby generating higher excess stock returns. This feedback loop brought about a further decrease in volatility. The substantial decline in stock prices in February 2018 and the subsequent adjustments imply that the feedback loop was temporarily broken and the tail risk that investors were concerned about partially materialized.

**Chart II-1-6: Implied volatility and SKEW of U.S. stock prices**




Note: 1. "SKEW" is calculated by CBOE.
2. Monthly average. Latest data as at March 2018.
Source: Bloomberg.

At the time of the recent decline in stock prices, the following mechanism of interconnectedness worked between volatility and stock prices. First, under the low interest rate and low volatility environment existing until then, capital had flowed to investment funds and products employing a "short volatility strategy," which aims to obtain profits by taking a short position in VIX futures when the volatility decreases. Second, from February 2018, upward pressure on the VIX forced these funds to adjust their positions (e.g., unwinding of VIX futures short positions), leading to a further increase in volatility. Third, funds that were aiming to control the volatility of their portfolios at certain levels (or employing a "risk parity strategy") sold their holdings of risky assets.[2] And fourth, other trend-following investors followed in selling risky assets, causing a further decline in stock prices and an increase in volatility.

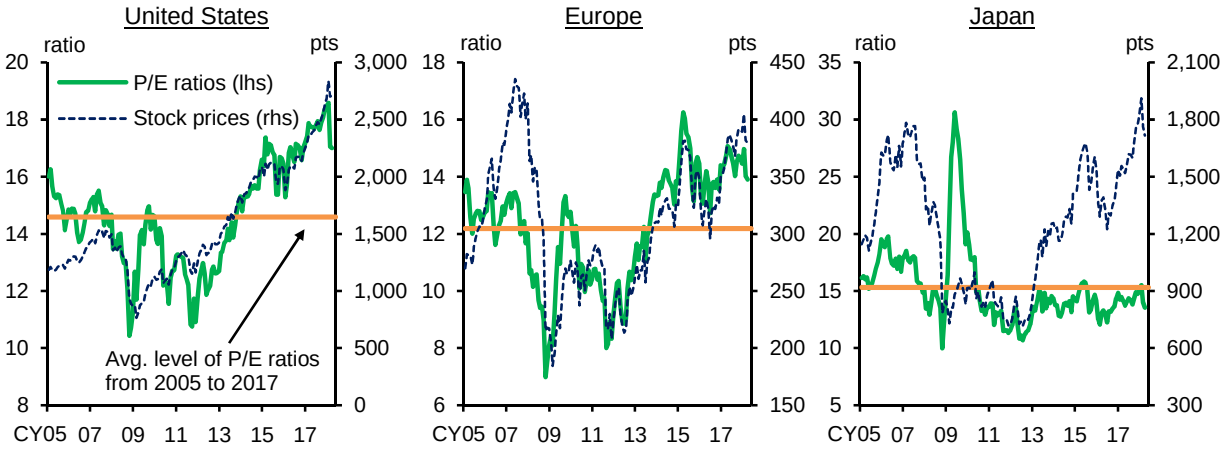
In the United States and Europe, even following the decline in stock prices in February 2018, stock price valuation indicators (price earnings [P/E] ratios) have still exceeded past averages (Chart II-1-7). This implies that the possibility of a further decline in stock prices could persist. In fact, a tail risk indicator extracted from the stock options market has remained at a high level by historical standards, although it has declined following the fall in stock prices in February 2018 (Chart II-1-6). As seen in the recent drop in stock prices triggered by the rise in long-term interest rates, any snapback in interest rates could likewise induce a repricing of risky assets such as stocks at some point in the future.

To shed light on the effects of a snapback in long-term interest rates on stock prices, we look at

[2] Furthermore, U.S. life insurance companies increased investment in "managed volatility" funds by using funds from variable annuities with guaranteed yields. The said funds, which aim to secure stable returns, tend to sell risky assets such as stocks when volatility increases. Market participants point out that this also contributed to amplifying the decline in stock prices.

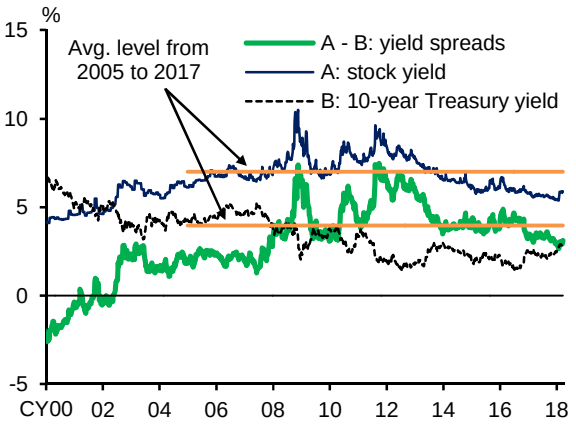
spreads between stock yields and Treasury yields and then confirm that the spreads have continued on a narrowing trend in recent years (Chart II-1-8).[3] This reflects the decline in risk premiums on stocks (as demonstrated in the decrease in the VIX) and the rise in the expected rate of growth in corporate profits in a situation where long-term interest rates have been at historically low levels and economic recovery has continued. However, investment in stocks (compared with that in bonds) has gradually become less attractive as stock yields and the yield spreads have fallen below past averages. Under such circumstances, a rise in long-term interest rates tends to trigger investors' fresh concern over the overvaluation of stock prices. The substantial decline in stock prices in February 2018 can be explained in this context.

**Chart II-1-7: Stock prices and valuation**



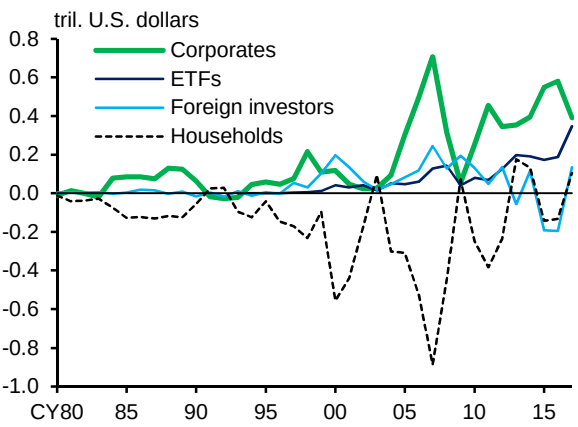

Note: 1. "Stock prices" indicates the S&P 500 for the United States, the EURO STOXX for Europe, and the TOPIX for Japan. "P/E ratios" is calculated using expected EPS for the next 12 months.
2. Latest data as at March 2018.
Source: Thomson Reuters Japan.

**Chart II-1-8: U.S. yield spreads**




Note: 1. "Stock yield" (S&P 500) = 1 / P/E ratio. P/E ratios are calculated using expected EPS for the next 12 months.
2. Latest data as at end-March 2018.
Source: Bloomberg; Thomson Reuters Japan.

**Chart II-1-9: Capital flows in the U.S. stock market by type of investor**



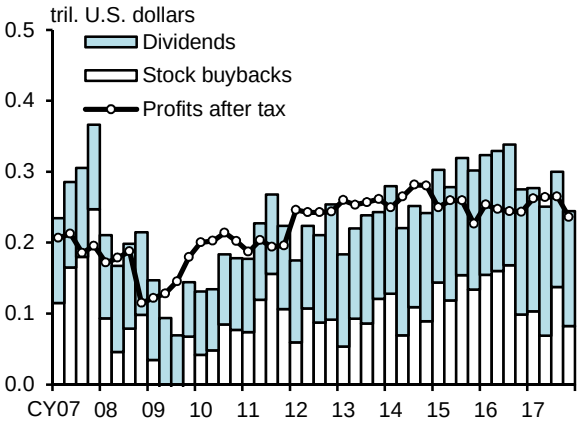

Note: 1. "Corporates" indicates ordinary industrial corporates (excluding financial institutions).
2. Latest data as at 2017.
Source: FRB.

Furthermore, we need to pay attention to the fact that the stock market structure has changed under the low and stable long-term interest rates. Looking at net capital flows in the U.S. stock

[3] As shown in the following formula, the yield spreads are determined by risk premiums on stocks and the expected rate of growth in corporate profits:
Yield spreads = stock yield (inverse of P/E ratio) – Treasury yield
= risk premium on stocks – expected rate of growth in corporate profits.

market by type of investor, the corporate sector has been the largest buyer of stocks since the failure of Lehman Brothers (the Lehman shock) (Chart II-1-9). U.S. firms -- which need to improve corporate management to raise capital efficiency -- have made significant efforts to increase shareholder returns, for example, through stock buybacks (Chart II-1-10). For such purpose, they have used funds obtained by issuing corporate bonds as well as internal funds. The possible increase in Treasury yields -- representing the base rate -- could lead to a pickup in funding costs such as corporate bond yields, and thereby affect U.S. firms' stance on shareholder returns, particularly since they have recently increased their leverage (Chart II-1-11).

**Chart II-1-10: U.S. firms' shareholder returns**




Note: 1. "Stock buybacks" indicates the difference between buybacks and sales.
2. Covers ordinary industrial corporates (excluding financial institutions). Latest data as at the October-December quarter of 2017.
Source: FRB.

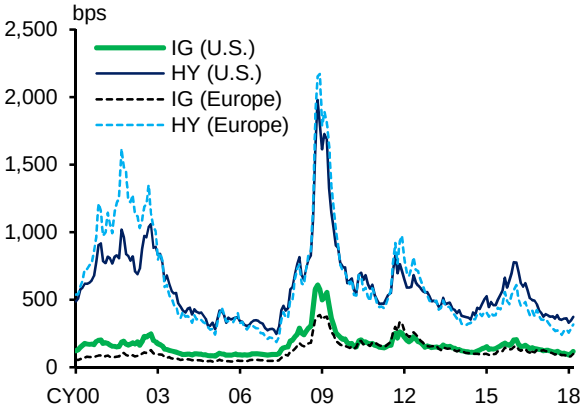
**Chart II-1-11: Financial leverage of U.S. firms**


Note: 1. Financial leverage = debt / net assets. Average for 9 sectors (excluding the financial and real estate sectors) out of the 11 that comprise the S&P 500 index.
2. Latest data as at end-December 2017.
Source: Bloomberg.

## *Tightening of supply and demand conditions in credit markets*

In advanced economies' credit markets, credit spreads remained at low levels by historical standards, even when stock prices declined significantly in February 2018 (Chart II-1-12). The tightening of supply and demand conditions in credit markets has continued to be driven by investors' search for yield. For example, the issuance of collateralized loan obligations (CLOs) has exceeded the pre-Lehman shock peak against the background of strong demand from investors (Chart II-1-13). Newly extended leveraged loans -- the underlying assets for CLOs -- have also been on an increasing trend (Chart II-1-14). At the same time, such tightening of supply and demand conditions in credit markets has led to some complacency in investors' risk perception of leveraged loans. The share of "covenant-light loans" -- which are known to offer relatively weak

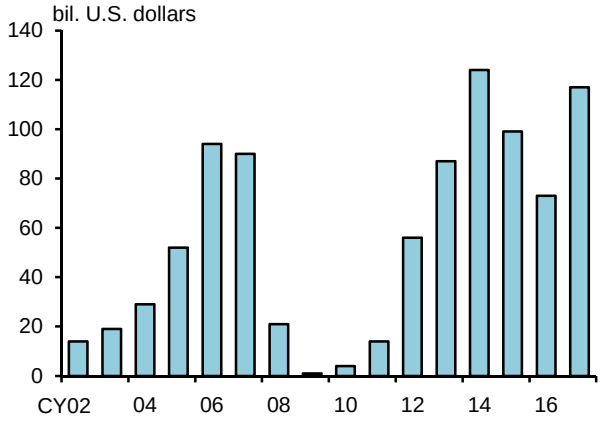
**Chart II-1-12: Credit spreads on U.S. and European corporate bonds**




Note: 1. "IG" indicates investment-grade bonds. "HY" indicates high-yield bonds. Calculated by ICE Data Indices.
2. Latest data as at end-March 2018.
Source: Bloomberg.

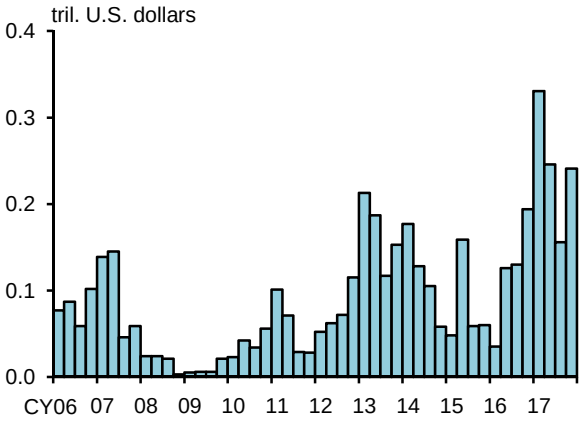
protection for creditors in case of default -- in total leveraged loans has risen, and the quality of covenants has deteriorated.[4] Should interest rates snap back, it would be necessary to carefully monitor (1) how this could affect the interest payment capacity and the default rate of firms that have increased their leverage as described above, (2) to what the extent CLOs could be repriced, and (3) whether the change in supply and demand conditions in credit markets could possibly spill over to a wider range of asset markets.

**Chart II-1-13: U.S. CLO issuance**




Note: Latest data as at 2017.
Source: J.P. Morgan.

**Chart II-1-14: Newly extended U.S. leveraged loans**

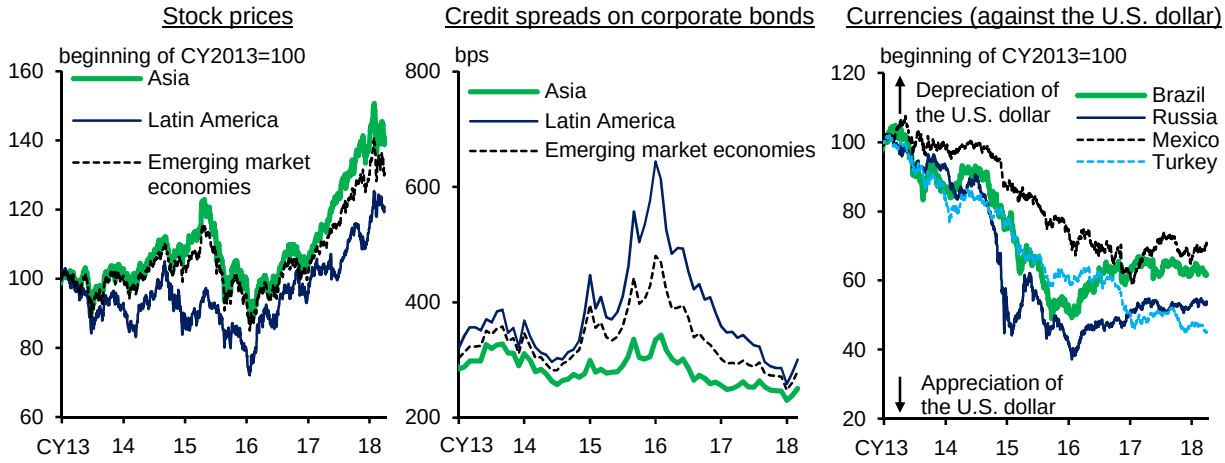



Note: Latest data as at the October-December quarter of 2017.
Source: J.P. Morgan.

## *Emerging markets*

Emerging markets showed no significant changes in capital flows, although stock prices declined in February 2018 (Charts II-1-15 and II-1-16). Amid the continued moderate recovery in emerging market economies, their markets have generally been calm. Nevertheless, the past rises in U.S. long-term interest rates -- e.g., the taper tantrum in May 2013 -- led to capital outflows from emerging markets, causing the substantial decline in their currencies. The outstanding amount of assets held by funds that invest in stocks and bonds in emerging markets has increased

**Chart II-1-15: Developments in emerging markets**

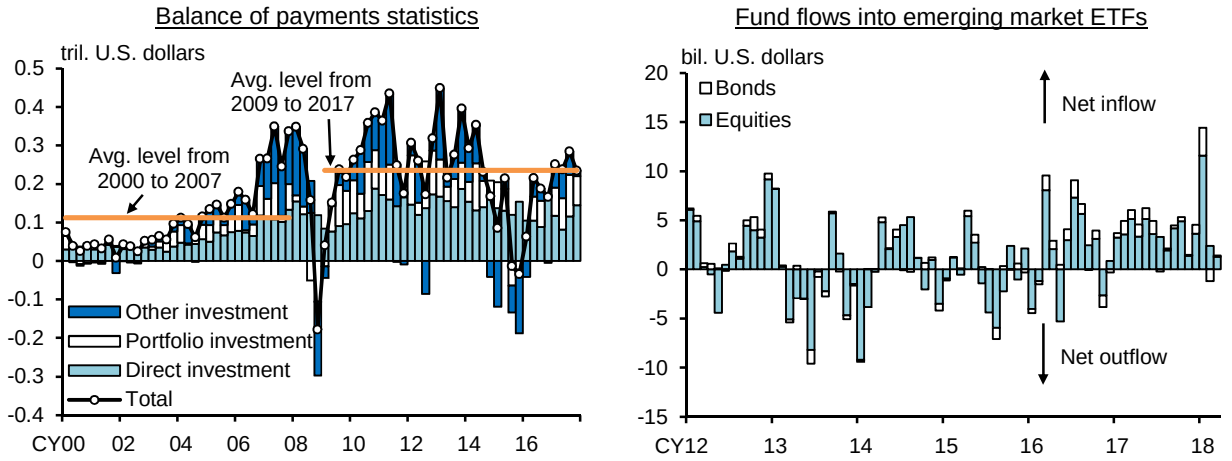



Note: Stock prices are sub-indices of the MSCI Emerging Index, denominated in local currencies. Credit spreads on corporate bonds are sub-indices of the J.P. Morgan CEMBI Broad Diversified, compiled from U.S. dollar-denominated bonds. The latest data in the left- and right-hand charts are as at end-March 2018, and the latest data in the middle chart are as at March 2018.
Source: Bloomberg; J.P. Morgan.

[4] For details, see Office of Financial Research (OFR), *2017 Financial Stability Report*, December 2017.

significantly, and emerging market firms' U.S. dollar-denominated debt has also risen. For these reasons, if an adverse shock should cause fund outflows, the effects could be larger than in the past. It has been pointed out that emerging market firms that have increased their U.S. dollar-denominated debt have also increased their share of U.S. dollar-denominated sales or assets (thereby holding a "natural hedge"), and thus these firms' resilience against fluctuations in foreign exchange rates has strengthened compared with the past.[5] However, this issue continues to warrant close attention.

**Chart II-1-16: Capital flows to emerging markets**




Note: 1. In the left-hand chart, the figures are the sum of 19 major emerging market economies. Latest data as at the October-December quarter of 2017.
2. In the right-hand chart, the figures are the fund flows of ETFs listed on the U.S. stock exchange. Latest data as at March 2018.

Source: Bloomberg; Haver Analytics.

## B. Japanese financial markets

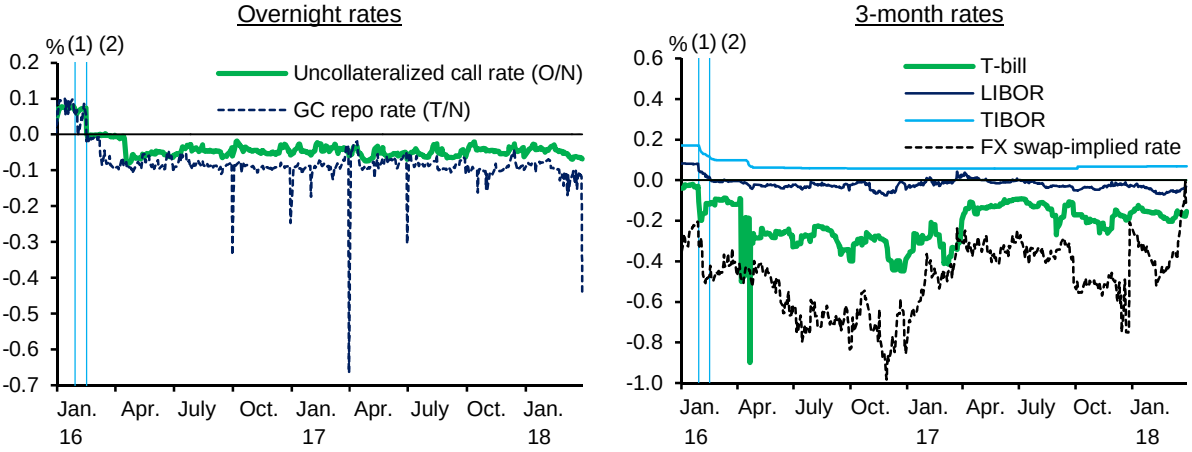
In Japanese financial markets, stock prices declined significantly in February 2018, but both short-term and long-term interest rates have been stable as the Bank of Japan has continued with Quantitative and Qualitative Monetary Easing (QQE) with Yield Curve Control. Credit spreads on corporate bonds have been at low levels.

### *Money markets*

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) and the GC repo rate (T/N) have been stable in negative territory above minus 0.5 percent. Rates on term instruments have remained at around 0 percent or in negative territory. Yields on T-bills have continued to show somewhat large fluctuations depending on domestic investors' current account positions at the Bank of Japan and changes in demand for collateral, in addition to changes in foreign exchange (FX) swap-implied yen rates. FX swap-implied yen rates have been affected by the fact that (1) foreign investors, who are lenders of U.S. dollars (borrowers of Japanese yen) in FX swap markets, tend to adjust their dollar supply in response to movements in dollar premiums, thereby changing receipts in yen, and (2) as a result, foreign investors' demand for T-bills, which are yen-denominated safe assets, changes accordingly.

[5] For details on natural hedges held by emerging market firms, see, for example, Callan Windsor, "Currency Risk at Emerging Market Firms," Reserve Bank of Australia, *RBA Bulletin*, June 2016.

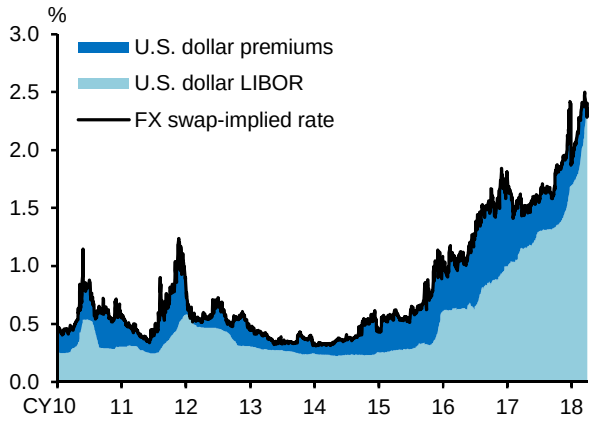
**Chart II-2-1: Short-term rates**




Note: 1. (1) indicates the date of the decision to introduce QQE with a Negative Interest Rate; (2) indicates the effective start date of the negative interest rate.
2. In the left-hand chart, the horizontal axis indicates the start dates of transaction settlement. In both the left- and right-hand charts, the latest data are as at end-March 2018.
Source: Bloomberg; Japan Bond Trading; JSDA.

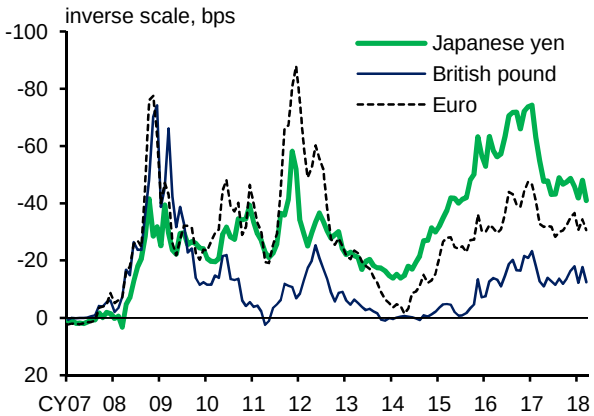
In the FX and currency swap markets, U.S. dollar premiums, particularly in the short-term zone, rose significantly through the end of 2017 (Chart II-2-2). This reflects the fact that European and U.S. financial institutions became cautious about supplying U.S. dollars through the end of 2017. However, such developments have not been observed for longer-term premiums, and short-term U.S. dollar premiums have also declined since the beginning of 2018 (Chart II-2-3). Meanwhile, the dollar LIBOR has risen due to the policy rate hikes by the FRB as well as the increase in the issuance of U.S. Treasury bills. Japanese financial institutions' dollar funding costs have also been on a rising trend, thereby reducing the net return on investment in U.S. Treasuries. Against this background, Japanese financial institutions' incentives for dollar funding seem to be waning. These developments likely have caused the recent decline in dollar funding premiums.

**Chart II-2-2: U.S. dollar funding costs through 3-month FX swaps**




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

**Chart II-2-3: U.S. dollar premiums on 1-year cross-currency basis swaps**



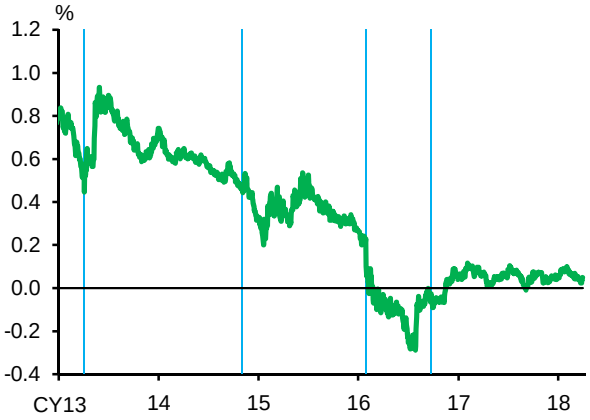

Note: Latest data as at March 2018.
Source: Bloomberg.

## *Long-term JGB yields and JGB yield curve*

Under QQE with Yield Curve Control, the shape of the yield curve for JGBs has been in line with the current guideline for market operations, in which the short-term policy interest rate is set at minus 0.1 percent and the target level of 10-year JGB interest rates is around 0 percent. Yields for relatively short maturities have been stable in slightly negative territory, while 10-year JGB yields

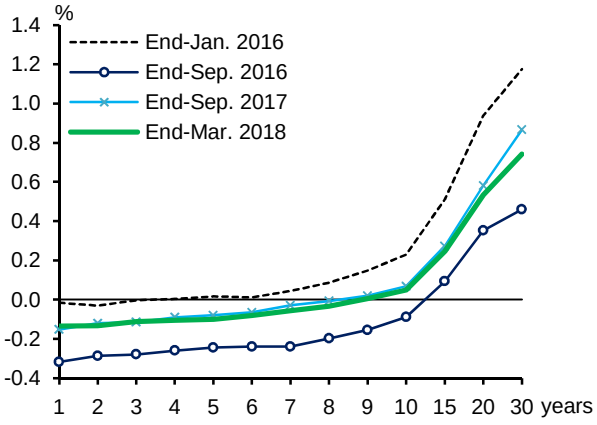
have generally been stable at around 0 percent in positive territory. 20-year JGB yields have also generally been stable in the range of 0.5-1.0 percent (Charts II-2-4 and II-2-5).[6]

**Chart II-2-4: 10-year JGB yields**




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

**Chart II-2-5: JGB yield curves**

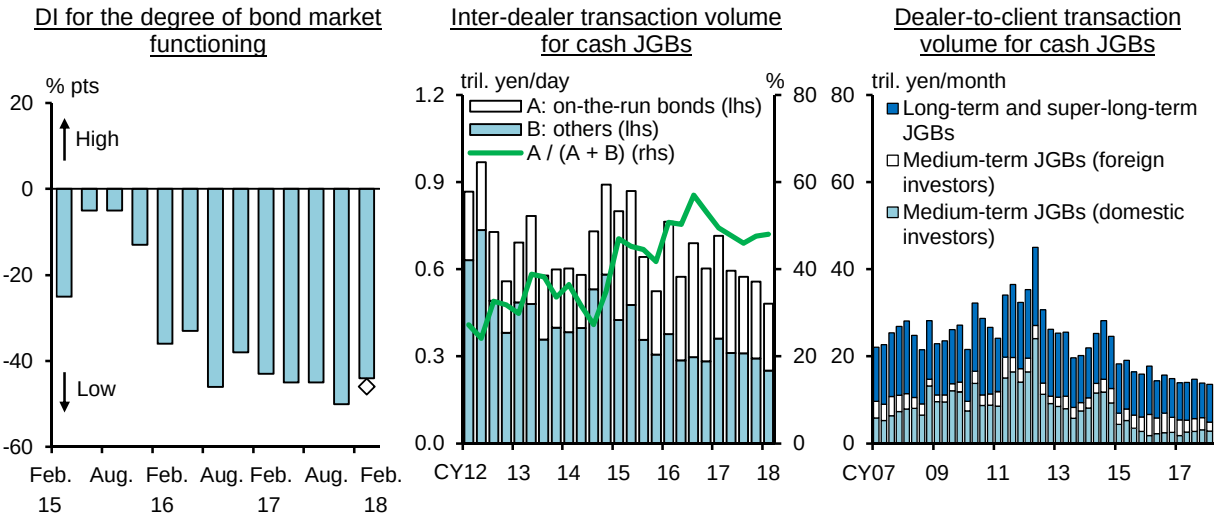



Source: Bloomberg.

## *Liquidity and functioning of the JGB markets*

With regard to liquidity in the JGB markets, many market participants have continued to mention the decline in the functioning of the JGB markets, although some indicators have shown signs of improvement (Chart II-2-6).[7] Transaction volume for long-term JGB futures has been on an

**Chart II-2-6: Bond market survey and transaction volume in the JGB markets**



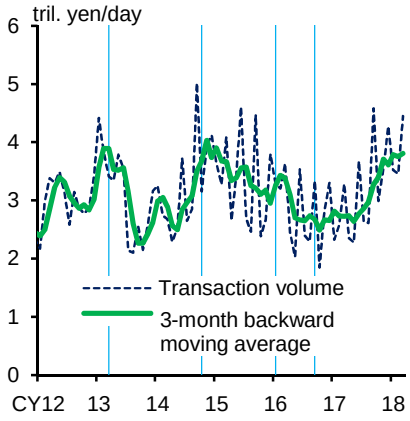

Note: 1. In the left-hand chart, based on the proportion of responding institutions selecting each given choice, the DI is calculated as follows: DI for the degree of current bond market functioning = "high" - "low." The marker in the chart is based on the responses from major institutional investors, in addition to those from regular survey respondents. The middle chart shows the trading volume via Japan Bond Trading. The right-hand chart shows the gross amount purchased by clients, excluding governments, the BOJ, etc.
2. The latest data in the left-hand chart are based on the February 2018 survey. The latest data in the middle and right-hand charts are as at January-February 2018.
Source: JSDA; QUICK; BOJ, "Bond market survey."

[6] In this section, the vertical lines in the charts indicate the introduction of QQE (April 4, 2013), the expansion of QQE (October 31, 2014), the decision to introduce QQE with a Negative Interest Rate (January 29, 2016), and the introduction of QQE with Yield Curve Control (September 21, 2016).

[7] 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).

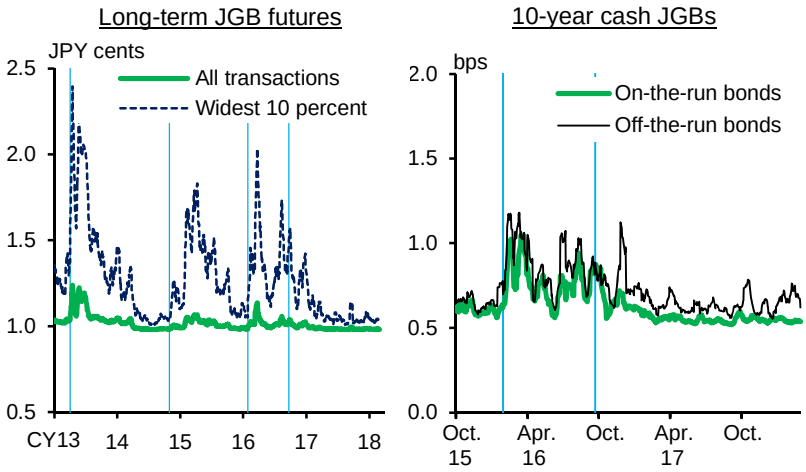
increasing trend, while inter-dealer and dealer-to-client transaction volume for cash JGBs has remained more or less unchanged at a low level (Charts II-2-6 and II-2-7). Although bid-ask spreads for long-term JGB futures and cash JGBs (on-the-run) have been trending narrower, a temporary widening of the spreads for cash JGBs (off-the-run) has still been observed (Chart II-2-8). Meanwhile, indicators for market depth and resiliency have indicated some signs of improvement (Chart II-2-9).

**Chart II-2-7: Transaction volume for long-term JGB futures**



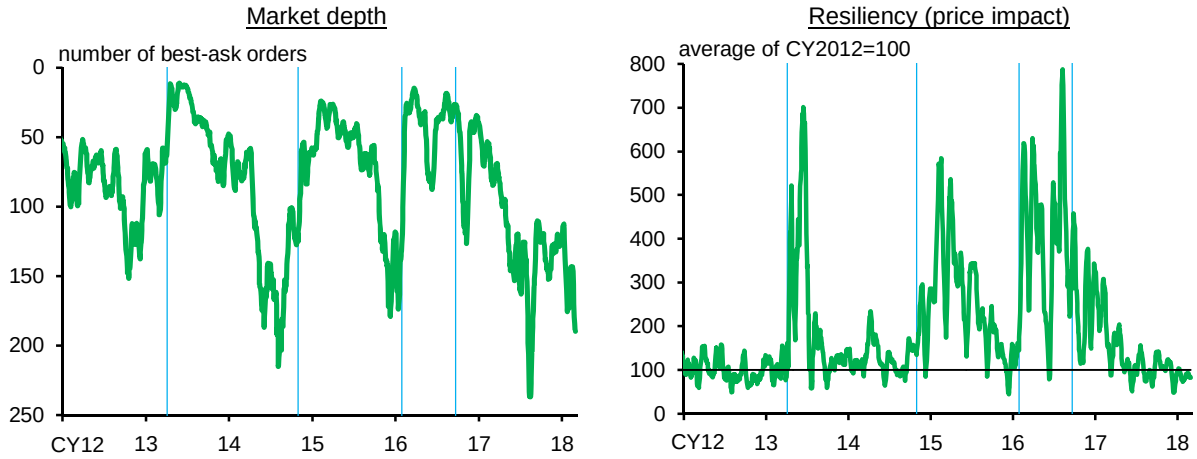

Note: Latest data as at March 2018.
Source: Osaka Exchange.

**Chart II-2-8: Bid-ask spreads in the JGB markets**




Note: 1. In the left-hand chart, "All transactions" indicates the daily average of bid-ask spreads (with a 1-minute frequency). "Widest 10 percent" indicates the daily average of the widest 10 percent of bid-ask spreads (with a 1-minute frequency) for each business day.
2. In the right-hand chart, the figures cover trading sessions during which both bid and ask quotes are posted. "Off-the-run bonds" indicates the latest off-the-run bonds.
3. 10-day backward moving averages. Latest data as at end-February 2018.
Source: Japan Bond Trading; Nikkei NEEDS.

**Chart II-2-9: Market depth and resiliency in the JGB markets**



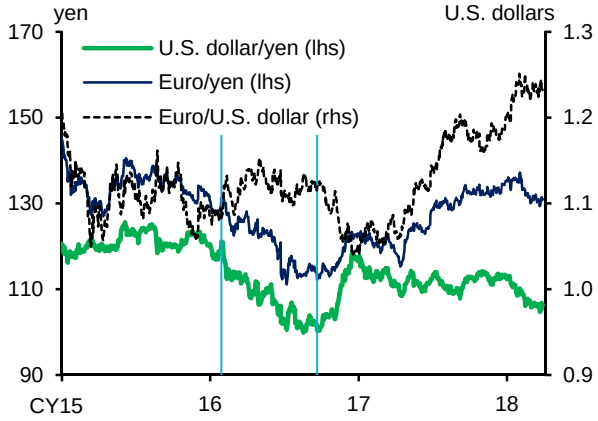

Note: 1. In the left-hand chart, the figures are the number of orders at the best-ask price with a 1-minute frequency (median for each business day). In the right-hand chart, the figures indicate price changes per unit volume of transactions for each business day.
2. 10-day backward moving averages.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

## *Foreign exchange markets and stock and credit markets*

Interest rate differentials between Japan and the United States have expanded due to the rise in

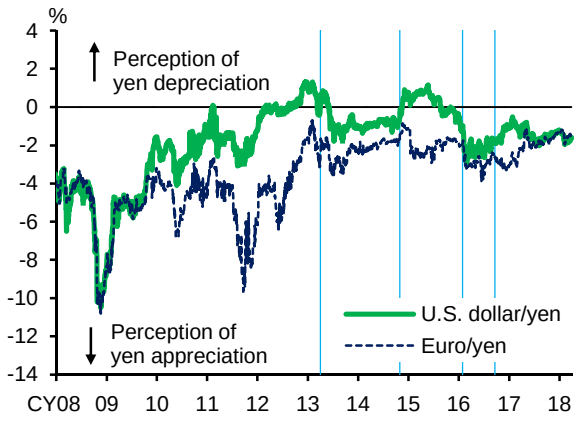
U.S. long-term interest rates. However, the yen has appreciated against the U.S. dollar, as market participants have preferred the yen as a safe asset amid the decline in stock prices (Chart II-2-10). Risk reversals suggest that market participants' vigilance over the yen's appreciation has recently heightened (Chart II-2-11).

**Chart II-2-10: FX rates**




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

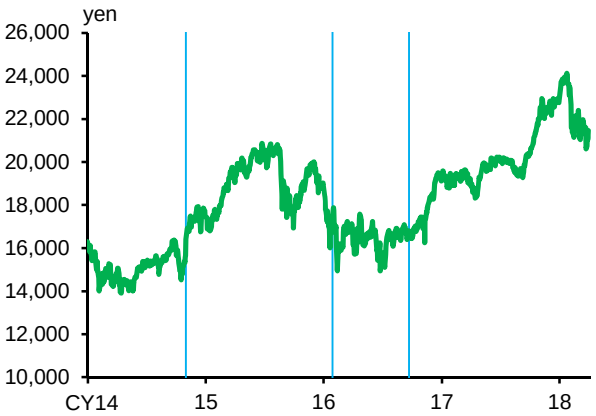
**Chart II-2-11: Risk reversals**




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

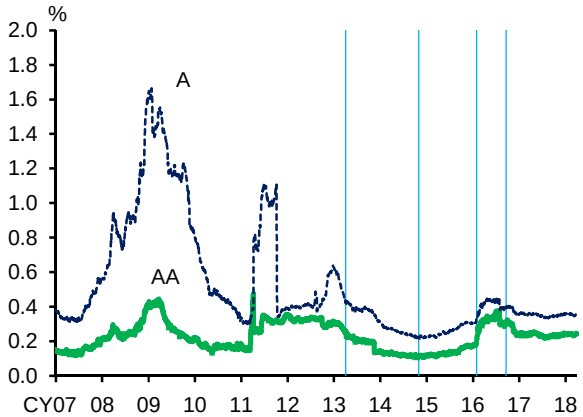
Meanwhile, in January 2018, Japanese stock prices (Nikkei 225 Stock Average) reached the 24,000 yen level for the first time in about 26 years. After February 2018, when U.S. stock prices plunged, Japanese stock prices sometimes showed more significant declines than stock prices in the United States (Chart II-2-12). This appears to reflect the fact that concern over the yen's appreciation exerted additional downward pressure on Japanese stock prices. Nevertheless, as the moderate growth outlook for the global economy has been maintained, corporate profits are still expected to be robust despite the recent appreciation of the yen. In addition, valuation indicators for Japanese stocks (P/E ratios) -- unlike in the United States and Europe -- have not significantly exceeded the past averages (Chart II-1-7). In the credit markets, credit spreads on corporate bonds have also continued to be stable at low levels. Thus far, investors' views toward corporate profits and firms' interest payment capacity have not changed significantly, even following the decline in stock prices in February 2018 (Chart II-2-13).

**Chart II-2-12: Stock prices (Nikkei 225 Stock Average)**




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

**Chart II-2-13: Credit spreads on corporate bonds**




Note: 1. Yield spreads of corporate bonds with a remaining maturity of 3 or more years but less than 7 years over corresponding government bonds. Rated by R&I.
2. Latest data as at end-March 2018.
Source: JSDA.

# III. Examination of financial intermediation

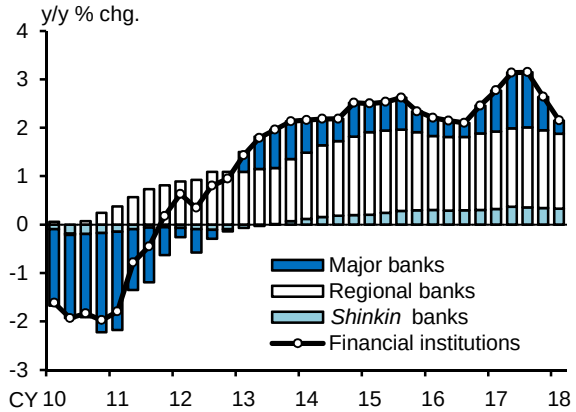
With Japan's economy expanding moderately, domestic financial intermediation -- particularly bank lending -- has remained well-functioned. The accommodative financial conditions have contributed to economic expansion and, for instance, business fixed investment-related lending to small firms has increased across a wide range of industries. Moreover, with continued growth in overseas economies, overseas investment and lending activities have maintained upward momentum. Despite the global downturn in stock prices observed since February 2018, the flow of funds from Japan to overseas has continued on an upward trend on the back of the growth differential between Japan and overseas. The sections below examine developments in financial intermediation, based mainly on information that was available in the second half of fiscal 2017. First, we outline developments in financial intermediation by financial institutions, such as banks and *shinkin* banks, investment activities by institutional investors, and households' investment in financial assets. Then, we assess the state of financial intermediation through financial markets. The final part of this chapter examines whether imbalances can be observed in these activities in terms of risk taking.

## A. Financial intermediation by financial institutions

### 1. Domestic loans

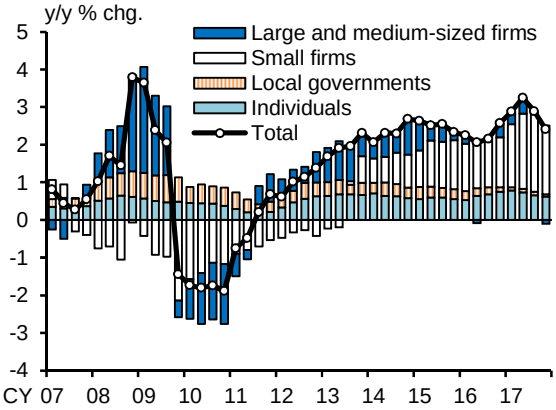
With Japan's economy expanding moderately, financial institutions' domestic loans outstanding have continued to grow at a year-on-year rate of around 2 percent (Charts III-1-1 and III-1-2). Although the growth in major banks' loans has declined due to changes in loan demand related to large-scale merger and acquisition (M&A) deals, financial institutions' lending stances have remained active, and demand for funds, especially by small firms, has been 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 January-March quarter of 2018.
Source: BOJ, "Principal figures of financial institutions."

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



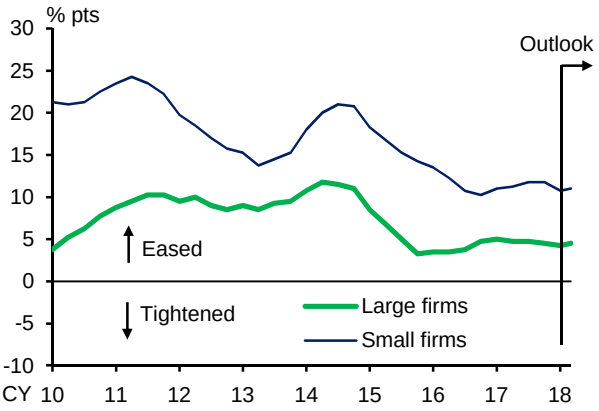

Note: Latest data as at end-December 2017.
Source: BOJ.

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

Looking at loans by type of borrower, loans to firms and individuals have continued to grow (Chart III-1-2). Loans to local governments have been more or less unchanged, reflecting no notable change in demand (Chart III-1-4).

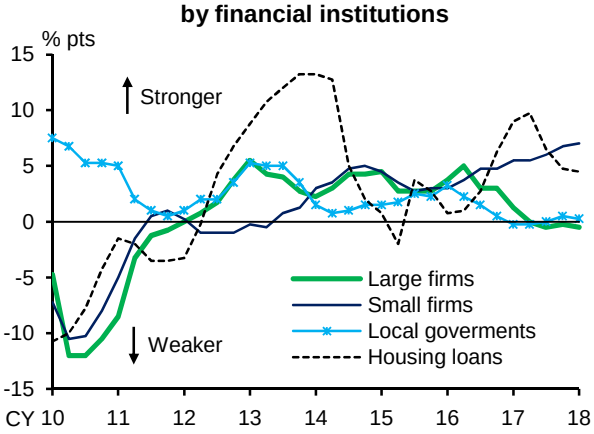
In terms of loans to firms by firm size, loans to small firms -- especially for business fixed investment --

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



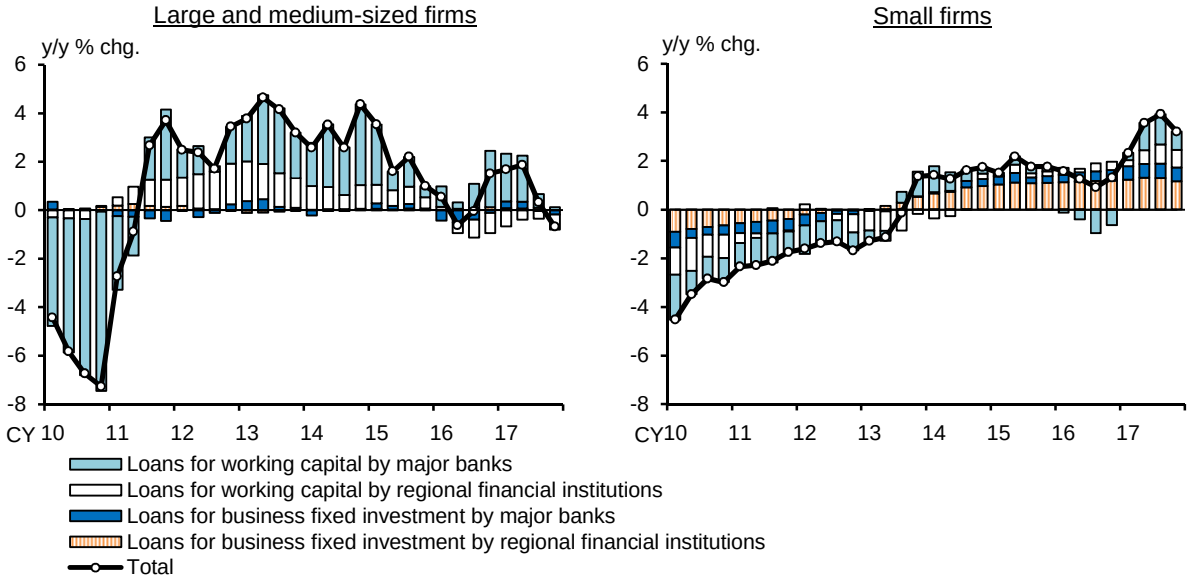

Note: 1. Based on the proportion of responding financial institutions selecting each given choice, the DI is calculated as follows:
DI = "considerably eased" + 0.5 * "somewhat eased" - 0.5 * "somewhat tightened" - "considerably tightened."
2. 4-quarter backward moving averages. Latest data as at January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

**Chart III-1-5: Corporate loans outstanding (excluding real estate loans) by type of bank and loan**



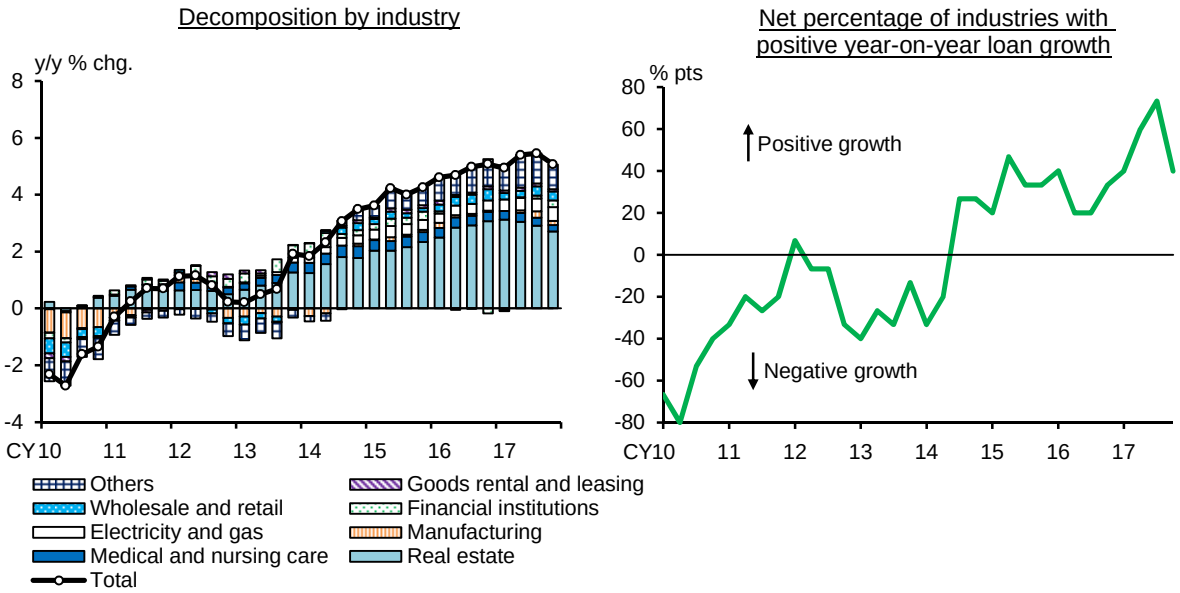

Note: Latest data as at end-December 2017.
Source: BOJ.

have continued to increase amid the prolonged economic expansion (Chart III-1-5). On the other hand, the growth in loans to large firms has decelerated recently. Although large firms have been increasing their business fixed investment, there has been no notable rise in financing through bank loans, reflecting their ample internal funds as well as increased long-term financing through the issuance of corporate bonds (see Section D below). Moreover, while there was a surge in working capital loans to large firms to provide funds related to large-scale M&A deals in the second half of fiscal 2016, there have been no major developments recently.[8]

[8] Although M&A activity related to Japanese firms has been brisk and has continued to increase in terms of the number of M&A deals, the value of transactions has fluctuated more significantly depending on the timing of large-scale In-Out transactions (purchases of foreign firms by Japanese firms). Meanwhile, in the statistics, part of

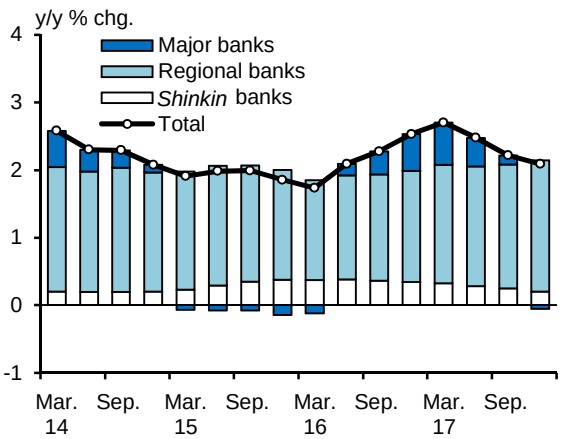
While regional financial institutions have held back from extending thin-margin loans to large firms (for working capital), they have continued to place emphasis on loans to small firms, including middle-risk firms, for the purpose of maintaining and buttressing their own business bases. Regional banks' loans to small firms have been increasing across a wide range of industries (Chart III-1-6). While real estate loans have continued to make a large contribution to such increase, loans to many other industries, such as medical and nursing care, manufacturing, electricity and gas, wholesale and retail, and other services, have also been increasing.

**Chart III-1-6: Regional banks' corporate loans outstanding to small firms by industry**



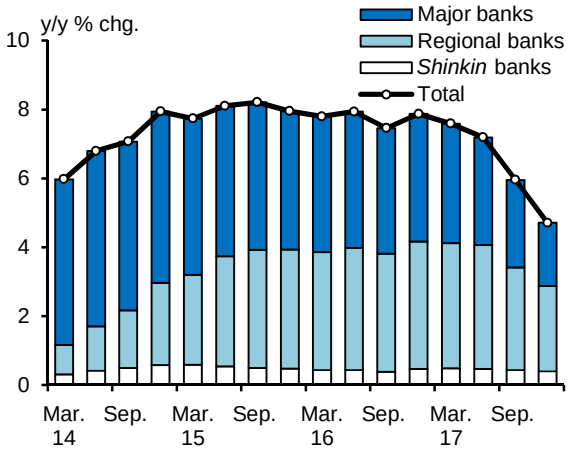

Note: In the right-hand chart, the net percentage of 30 industries continuously existing from January 2009 is calculated by subtracting industries with negative year-on-year loan growth from those with positive year-on-year loan growth. The latest data in both the left- and right-hand charts are as at end-December 2017.
Source: BOJ.

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




Note: Latest data as at end-December 2017.
Source: BOJ.

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




Note: Latest data as at end-December 2017.
Source: BOJ.

In terms of loans to individuals, housing loans have continued to grow at a year-on-year rate in the

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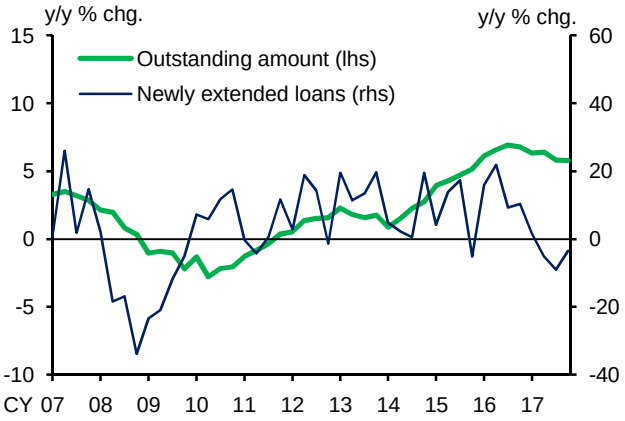
the loans to holding companies of large firms, including for M&A financing, are included in loans to small firms. In the statistics, such holding companies are treated as small firms because they, for example, only have a small number of regular employees.

range of 2.0-3.0 percent (Chart III-1-7). While regional banks have been driving growth, major banks have decreased the outstanding amount of housing loans somewhat on a year-on-year basis as they have placed emphasis on profitability. Although the year-on-year growth rate of card loans is still at a relatively high level, it has recently decelerated, reflecting the impact of a review of advertising strategies and a tightening of screening procedures (Chart III-1-8).[9]

## *Developments in real estate loans*

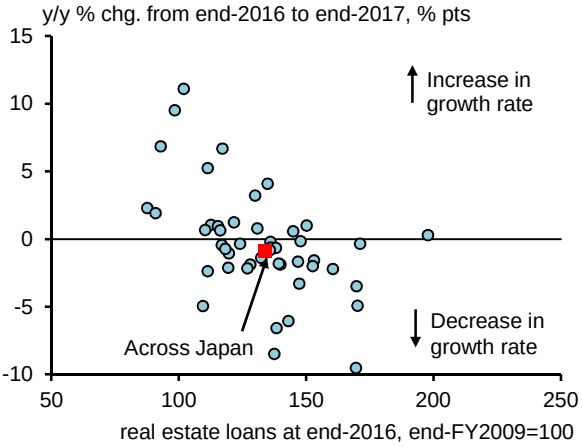
The outstanding amount of loans, i.e., the stock of loans, to the real estate industry has grown at a year-on-year rate of around 6 percent, thus still exceeding the growth rate of loans to all industries (of around 2 percent); however, the amount of newly extended loans, i.e., the flow of loans, has been declining since the start of fiscal 2017 (Chart III-1-9). The outstanding amount of real estate loans extended by domestic banks and *shinkin* banks reached a record high level of around 90 trillion yen as at end-December 2017. However, some banks have turned cautious in their lending to the real estate industry, bearing in mind the risks of an adjustment in the real estate market and excessive credit concentration in the real estate industry. Such tendency has been particularly notable in regions that experienced rapid increases in loans to the real estate industry in the past (Chart III-1-10).

**Chart III-1-9: Real estate loans among financial institutions**




Note: The latest data for "Outstanding amount" are as at end-December 2017 and the latest data for "Newly extended loans" are as at the October-December quarter of 2017.
Source: BOJ.

**Chart III-1-10: Distribution of changes in real estate loans among regional financial institutions by prefecture**




Note: The horizontal axis indicates the outstanding amount of real estate loans as at end-December 2016 compared to end-March 2010.
Source: BOJ.

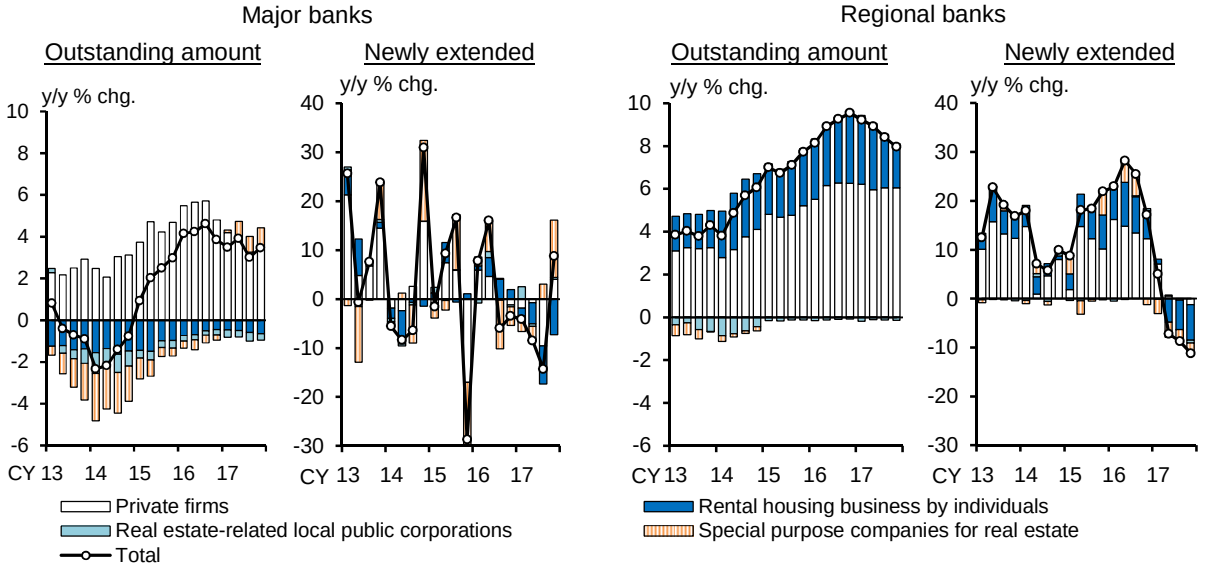
A breakdown of loans to the real estate industry shows that major banks have mainly extended loans to real estate funds, including real estate investment trusts (REITs) and private real estate funds, while they have continued to restrain lending for rental housing businesses by individuals (Chart III-1-11).[10] Prior to fiscal 2017, regional financial institutions had continued to increase loans to the real estate industry at a rapid pace in response to increasing demand to build rental properties as a means to reduce the inheritance tax burden and to invest in income-producing properties. Since the start of fiscal 2017, however, they have decelerated the growth of loans to the industry, especially to rental housing businesses by individuals and to private small and

[9] The share of card loans in the outstanding amount of loans to individuals is about 3 percent at present (as at end-December 2017) and hence small compared to housing loans (the share of which is about 90 percent).

[10] In Chart III-1-11, REITs are included in private firms.

medium-sized firms (including asset management companies founded by individuals). The supply-side reason for this development is that more financial institutions have turned prudent in lending to the real estate industry, taking into account credit concentration in the real estate industry. In addition, the demand-side 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.

**Chart III-1-11: Breakdown of real estate loans**

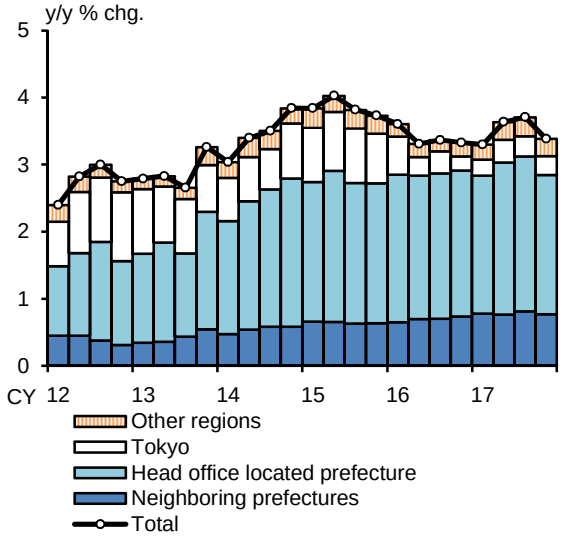



Note: The latest data for "Outstanding amount" of loans are as at end-December 2017 and the latest data for "Newly extended" loans are as at the October-December quarter of 2017.
Source: BOJ.

## *Developments in loans by region*

Looking at regional banks' loans by region, the positive contribution to loan growth provided by Tokyo branches has been shrinking (Chart III-1-12). The reason for this is that regional banks have been restraining syndicated loans with thin profit margins amid the intensifying loan competition in Tokyo. While returning the focus of their business operations to their home regions, regional banks have been increasing loans in prefectures neighboring their head offices. As a result, lending competition has been intensifying not only among financial institutions in the home prefecture, but

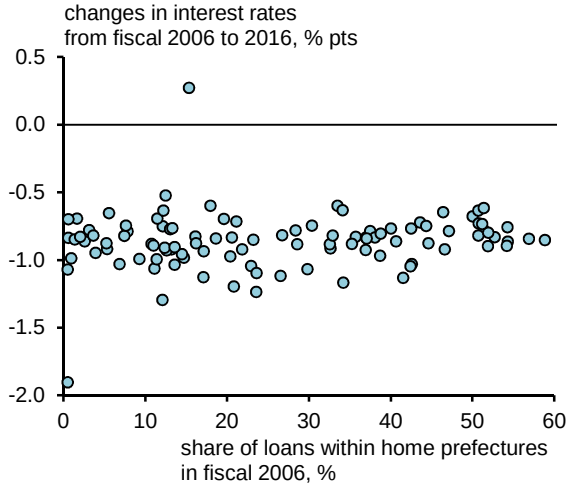
**Chart III-1-12: Composition of loans among regional banks by region**




Note: Loans are classified as follows. (1) Divide Japan into 10 regions, i.e., 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-December 2017.
Source: BOJ.

also with those in neighboring prefectures. When looking at the relationship between banks' share of loans within their home prefectures (the degree of market power in the prefecture) and changes in their loan interest rates, no significant correlation between the two can be observed (Chart III-1-13). Amid the decline in the number of firms across the regions in Japan, regional banks have been promoting corporate loans in the prefectures neighboring their head offices. Thus, the potential competitive pressure arising from loan supply by banks from outside the home prefecture has been strongly weighing on the loan market.

**Chart III-1-13: Share of regional banks' loans within their home prefectures and changes in loan interest rates**




Note: 1. The horizontal axis shows the ratio of each regional bank's loans within the prefecture where its head office is located to all loans within that prefecture. Covers major banks, etc., regional banks, and *shinkin* banks.
2. The data for loan interest rates cover the domestic business sector.
Source: Kinyu Journal, "Kinyu map"; BOJ.

## *Developments in loan interest rates*

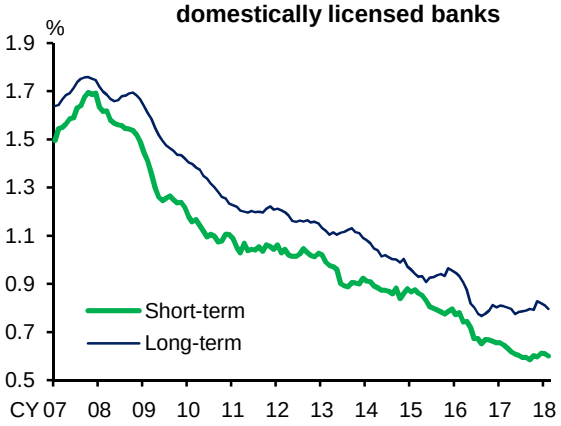
Financial institutions' average contract interest rates -- both short-term and long-term -- on new loans and discounts have been hovering around historically low levels (Chart III-1-14). To increase profit margins, financial institutions have been extending the duration of their lending (Chart III-1-15). Moreover, major banks have been increasing their efforts with respect to relatively profitable M&A-related financing and hybrid financing (such as subordinated loans). Regional financial institutions have been holding back from extending loans to large firms and have instead been concentrating on loans to small firms and credit loans (uncollateralized and unguaranteed loans), which offer relatively wider profit margins. In addition, they have continued to shift their emphasis from loans guaranteed by Credit Guarantee Corporations to "proper loans," i.e., loans without such credit guarantees (Chart III-1-16).[11] While the extension of these kinds of loans has exerted upward pressure on loan interest rates, the improvement in firms' financial condition due to the prolonged economic recovery and the intensified competition among financial institutions have exerted downward pressure on loan interest rates.

A decomposition of changes in banks' loan interest rates (calculated based on the outstanding amount of loans) shows that interest rates on loans to large firms have stopped falling, reflecting the fact that many of them are linked to market rates, and the reference rates, such as TIBOR, have been more or less flat (Chart III-1-17). On the other hand, interest rates on loans to small firms have continued to decline, although the pace of decline has turned moderate. Since loans linked to

[11] The loan interest rates for "proper loans" without credit guarantees are higher than those with credit guarantees because the former reflects the credit risk the financial institution undertakes by itself. From the firm's perspective, this means that it does not have to pay a credit guarantee fee to Credit Guarantee Corporations, but its interest rate payments to the bank are larger instead. Credit guarantee fees paid to Credit Guarantee Corporations are not included in average contract interest rates in Chart III-1-14.

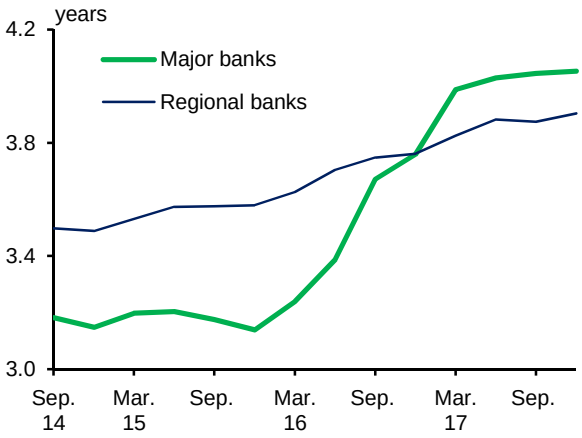
short-term prime lending rates as well as fixed-rate loans have accounted for a large share of loans to small firms, interest rates on these loans have continued to be subject to pressure from the decline in interest rates newly applied at the time of rollover. Moreover, as for loans to individuals, housing loan interest rates have continued to fall.

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



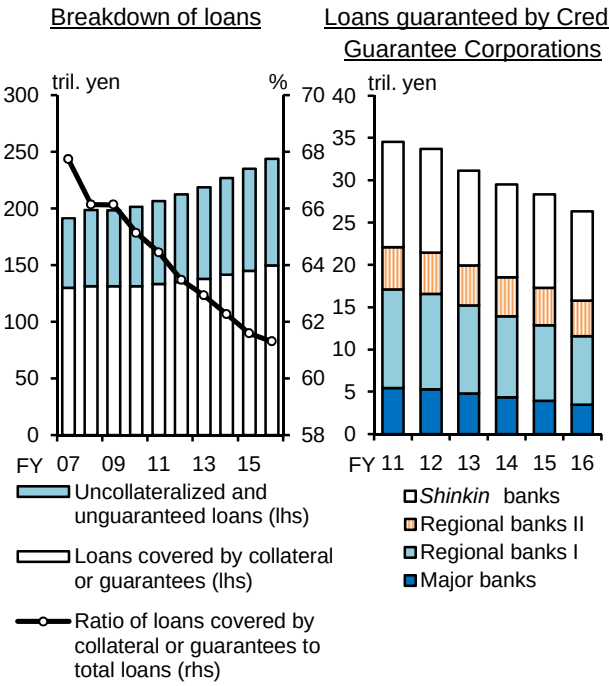

Note: 6-month backward moving averages. Latest data as at February 2018.
Source: BOJ, "Average contract interest rates on loans and discounts."

**Chart III-1-15: Average remaining maturity of fixed-rate loans among banks**



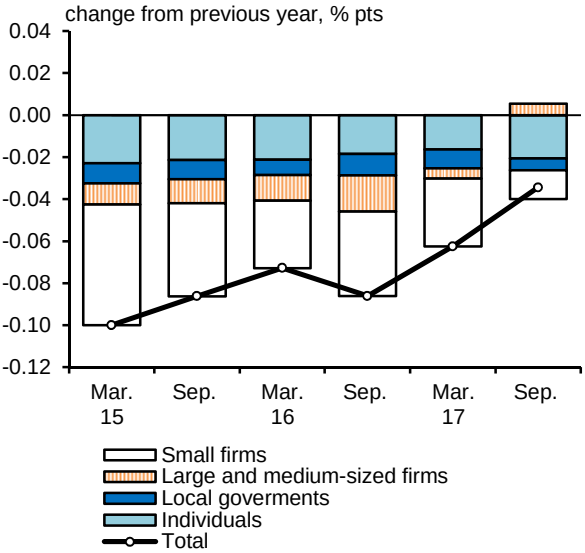

Note: The data are estimated based on the outstanding amount of loans at month-end. Latest data as at end-December 2017.
Source: BOJ.

**Chart III-1-16: Loan collateral and guarantee**




Note: 1. The left-hand chart covers regional banks.
2. The right-hand chart includes parts of guaranteed loans that are not guaranteed by Credit Guarantee Corporations.
Source: BOJ.

**Chart III-1-17: Decomposition of changes in loan interest rates by type of borrower**



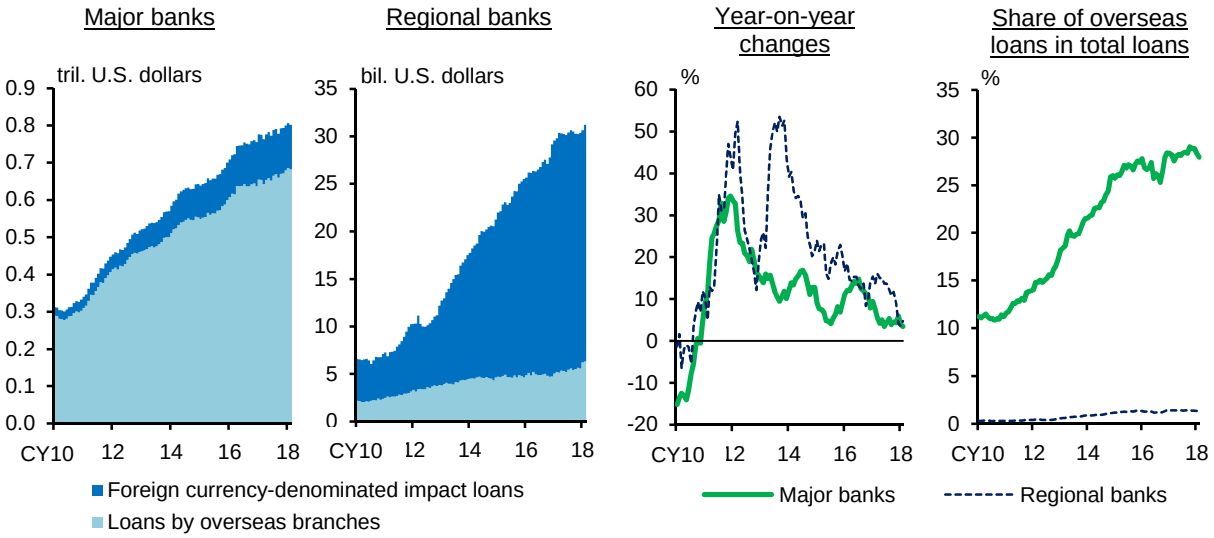

Note: The data are based on the outstanding amount of loans at month-end.
Source: BOJ.

## 2. Overseas loans

Banks' overseas loans have continued to grow moderately, and at major banks, they currently

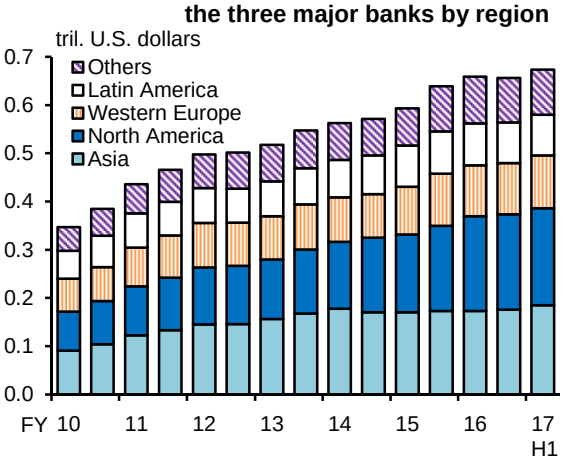
account for roughly 30 percent of total loans (Chart III-1-18). Looking at major banks' lending by region, loans to North America and Europe have been increasing moderately, while loans to Asia have been showing signs of recovery due to the gradual economic recovery within the region (Chart III-1-19). 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. In the past 1-2 years, however, competition for lending to financially sound firms has globally intensified once again, and therefore Japan's share has generally turned flat (Chart III-1-20).

**Chart III-1-18: Overseas loans outstanding among banks**



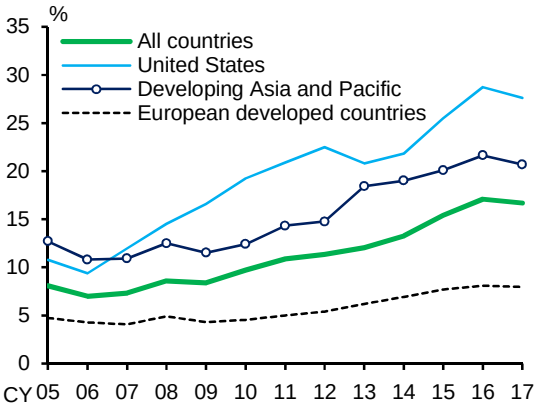

Note: 1. "Loans by overseas branches" includes parts of foreign currency-denominated impact loans in accounts held by overseas branches. "Foreign currency-denominated impact loans" indicates banks' foreign currency-denominated loans to residents.
2. The data are on a non-consolidated basis. Latest data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

**Chart III-1-19: Overseas loans outstanding of the three major banks by region**




Source: Published accounts of each bank.

**Chart III-1-20: Japanese banks' share of foreign claims by region**

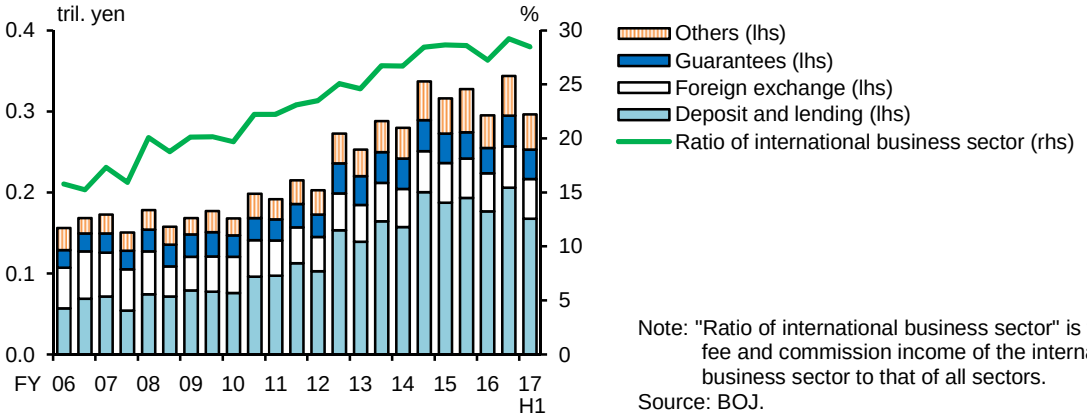



Note: 1. Covers foreign claims in the non-bank private sector (on an ultimate risk basis).
2. The data are as at the end of each year. The data for 2017 are as at end-September 2017.
Source: BIS, "Consolidated banking statistics"; BOJ, "The results of BIS international consolidated banking statistics in Japan."

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 example, 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 other than the United Kingdom so that they can continue to provide financial services within the EU after the United Kingdom's exit. Moreover, in order to improve their overall profitability, including income accruing from non-lending businesses, banks have placed even more emphasis on deepening their relationships with clients and increasing their fee and commission-based income by, for example, engaging in closer cooperation with securities companies and other firms belonging to the same financial group (Chart III-1-21).

**Chart III-1-21: Fee and commission income in the international business sector among major banks**



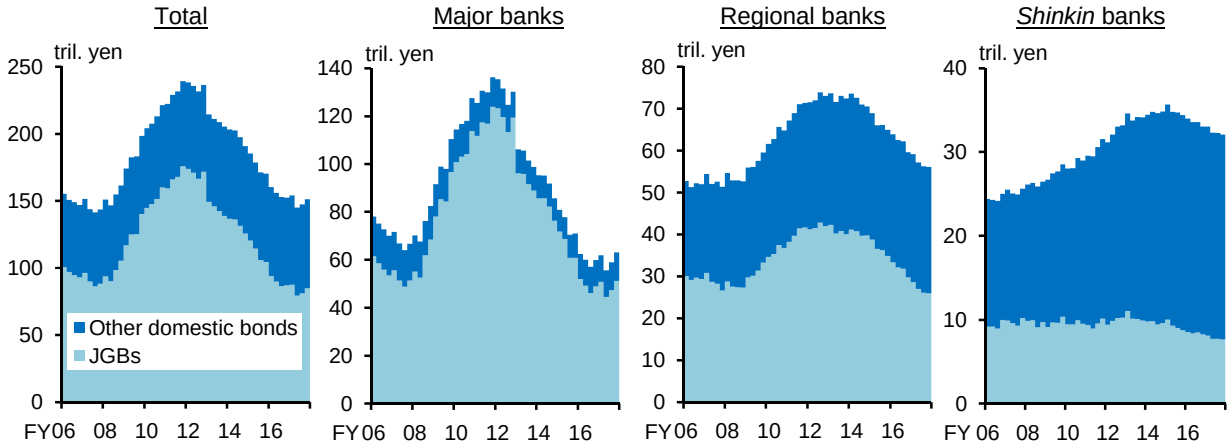

Note: "Ratio of international business sector" is the ratio of fee and commission income of the international business sector to that of all sectors.
Source: BOJ.

## 3. Securities investment

The outstanding amount of financial institutions' yen-denominated bond investment has been on a declining trend, reflecting the Bank of Japan's continued large-scale JGB purchases, but the pace of decline has recently turned moderate. On the other hand, the outstanding amount of their foreign bond investment had been on a long-term upward trend against the backdrop of the declining yields on yen-denominated bonds, but has declined recently. The outstanding amount of financial institutions' investment trusts has 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 outstanding holdings of yen-denominated bonds -- including JGBs, municipal bonds, and corporate bonds -- by type of bank, regional banks have continued to decrease their holdings moderately, while major banks, which had been greatly reducing their holdings, have

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

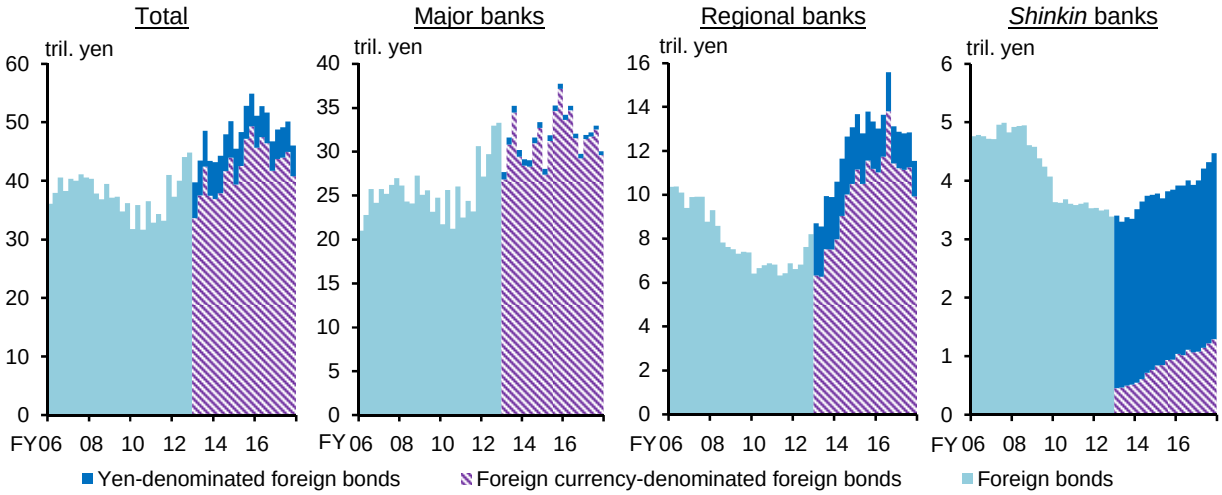



Note: The data are the sum of figures for domestic and overseas branches, based on the outstanding amount at month-end. Latest data as at end-February 2018.
Source: BOJ.

gradually restrained such efforts (Chart III-1-22). This reflects the fact that, 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. In addition, similar investment behavior has been observed with respect to bonds other than JGBs (such as government guaranteed bonds and municipal bonds).

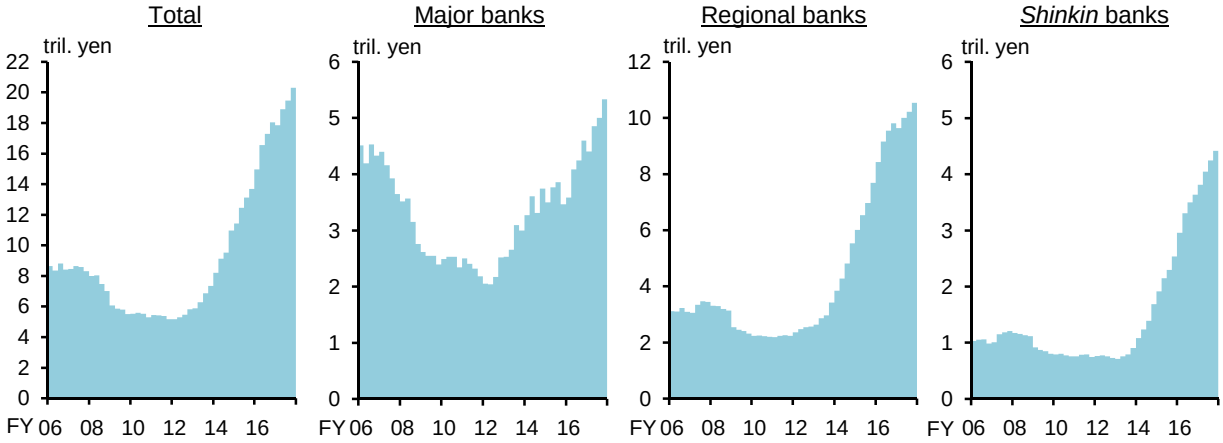
Turning to recent developments in the outstanding holdings of foreign bonds (in yen terms) by type of bank, while *shinkin* banks' holdings have continued to increase, major banks' and regional banks' holdings have decreased (Chart III-1-23). Since yield curves in U.S. markets have been flattening with the rise in the policy interest rate, the momentum toward a renewed expansion of investment in foreign bonds has generally been limited thus far. In February 2018, when U.S. Treasury prices fell -- or, when U.S. long-term interest rates rose -- some financial institutions sold foreign bonds.

**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-February 2018.
Source: BOJ.

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

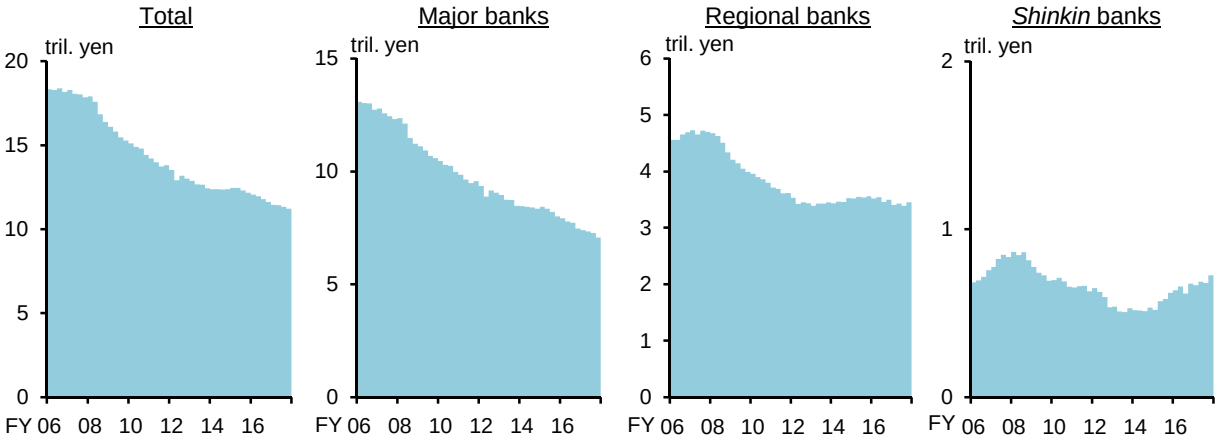



Note: 1. The data include some securities other than investment trusts.
2. The data are the sum of figures for domestic and overseas branches. The data for domestic branches are based on the average outstanding amount. The data for overseas branches are based on the outstanding amount at month-end. Latest data as at end-February 2018.
Source: BOJ.

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 holdings of stock investment trusts amid steady developments in stock prices through the beginning of 2018. As for regional financial institutions, some sold overseas fixed income investment trusts to cut their losses and others sold stock investment trusts to lock in profits. However, they have continued to increase the outstanding amount of investment trusts as a whole, for example, by increasing balanced investment trusts that hold REITs and foreign stocks in their portfolios.

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 they have enhanced risk taking in stocks for the purpose of pure investments.

**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-February 2018.
Source: BOJ.

## 4. Financial institutions' balance sheet changes

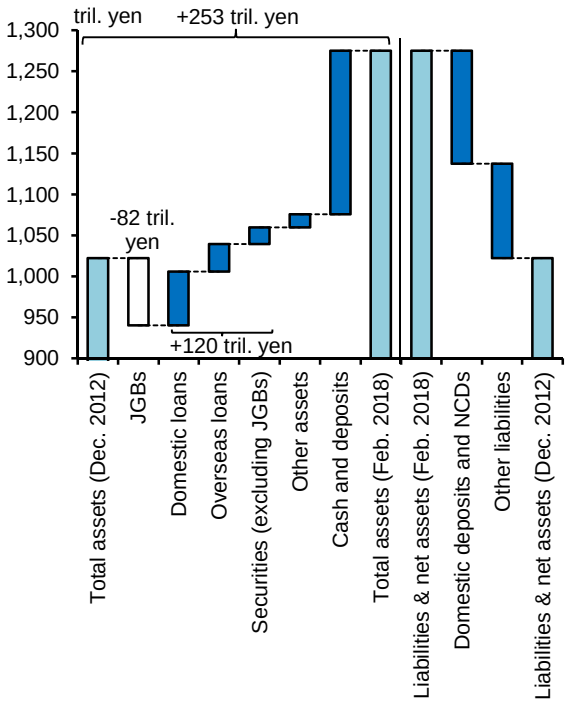
Financial institutions have continued to expand the size of their balance sheets, reflecting the increase in deposits, and to rebalance their asset portfolios through increasing risky assets.

The total assets and liabilities of financial institutions increased by 253 trillion yen in the period from December 2012, prior to the introduction of QQE, through February 2018 (Chart III-1-26). 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 120 trillion yen, while JGB holdings decreased by 82 trillion yen. Meanwhile, cash and deposits (mainly current account deposits at the Bank of Japan) increased by 199 trillion yen. On the liability side, domestic deposits and NCDs increased by 138 trillion yen, while other liabilities, such as overseas deposits and NCDs, and loans from the Bank of Japan increased by 115 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-1-27). On the other hand, the loan-to-deposit ratios among regional financial institutions -- which tend to transact with small firms -- have been increasing moderately due to the steady increase in

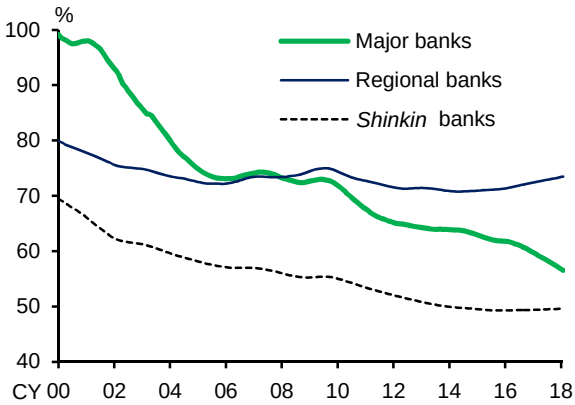
lending, with corporate deposits having grown at a slower rate than those at major banks.

**Chart III-1-26: 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-1-27: 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 February 2018.
Source: BOJ.

## B. Developments in investment by institutional investors

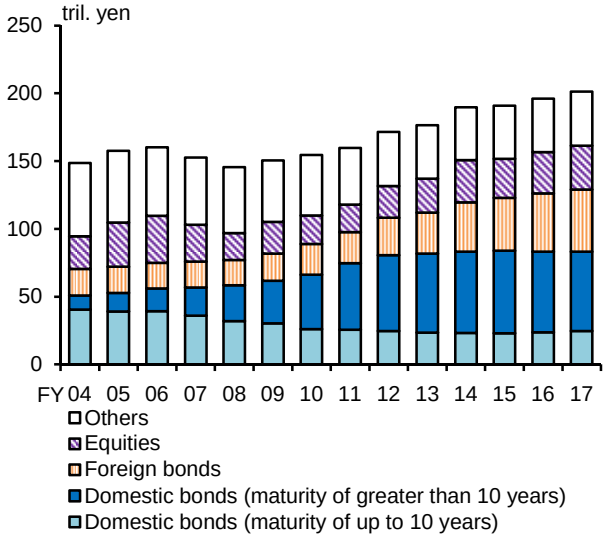
Under the prolonged low interest rate environment, institutional investors, such as life insurance companies and pension funds, have gradually increased their share of investment in foreign-currency assets.

As premium income -- the source of insurance companies' funds for investment -- has declined, reflecting slower growth in sales of level-premium insurance products due to premium hikes in April 2017, the pace of increase in assets held by insurance companies has moderated recently (Chart III-2-1). A breakdown of portfolios shows that new purchases of super-long-term JGBs have been restrained, while investment in foreign bonds and funds offering relatively high yields has increased (Chart III-2-2). Looking at currency-hedged foreign bonds, which account for the majority of foreign bond portfolios, due to a recent increase in U.S. dollar hedging costs, insurance companies have shifted their investment from U.S. Treasuries to bonds that offer higher yields. Most of the bonds purchased have been those that entail relatively low risks, such as U.S. corporate bonds with a high credit rating, agency mortgage-backed securities (MBSs), and European sovereign bonds. Moreover, some insurance companies have been reducing their currency hedge ratios and/or have been purchasing collateralized loan obligations (CLOs), but such moves have been limited thus far (Chart III-2-3).

The reasons that insurance companies have not turned to excessive risk taking despite the prolonged low interest rate environment include the fact that profits have been relatively stable.

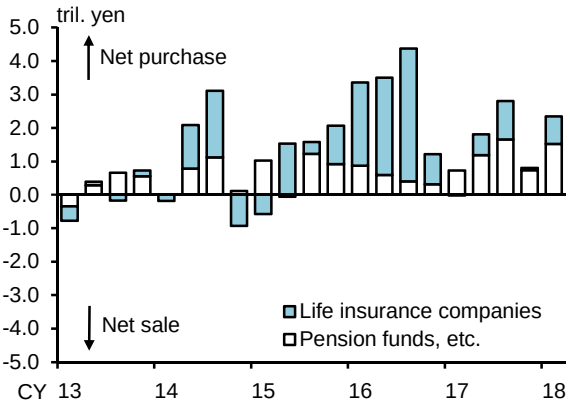
Looking at life insurance companies' core profits, which show their fundamental profitability, mortality profits (the difference between expected insurance payouts based on assumed mortality rates and actual payouts) have remained at a relatively high level, reflecting the fact that actual mortality rates have remained lower than assumed mortality rates due to the increase in life expectancy (Chart III-2-4). Moreover, with a long-term decline in interest rates guaranteed for policyholders (assumed interest rates), 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 increase in stock dividends and interest income from foreign public and corporate bonds. Such stable core profits, coupled with the high level of unrealized gains on stockholdings, appear to have discouraged insurance companies from taking excessive risks (Chart III-2-5).

**Chart III-2-1: Investment assets outstanding among life insurance companies**



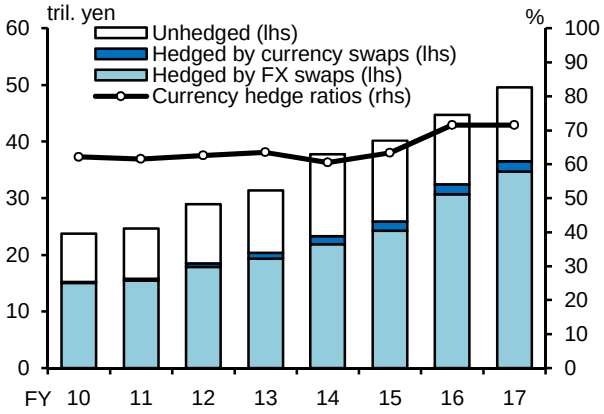

Note: 1. "Others" includes cash and deposits, loans, investment trusts, and real estate.
2. Covers nine major life insurance companies. Based on general account. The data for fiscal 2017 are as at end-September 2017.
Source: Published accounts of each company.

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



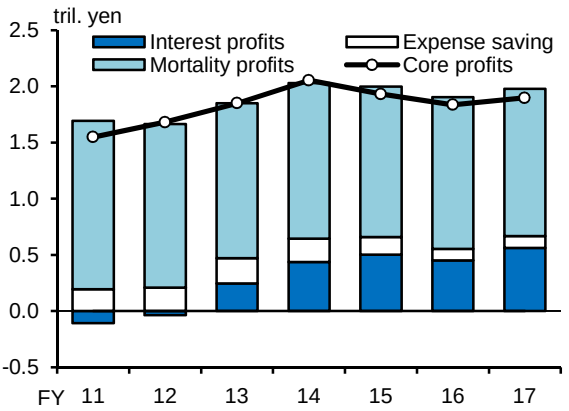

Note: 1. "Pension funds, etc." indicates trust accounts of banks and trust banks.
2. Latest data as at January-February 2018.
Source: Ministry of Finance.

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



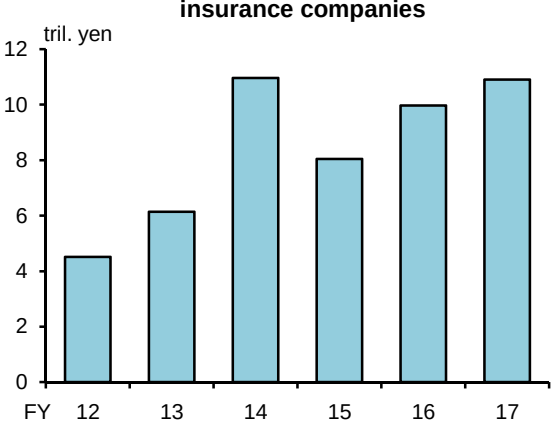

Note: Covers nine major life insurance companies. Estimated based on general account. The data for fiscal 2017 are as at end-September 2017.
Source: Published accounts of each company.

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



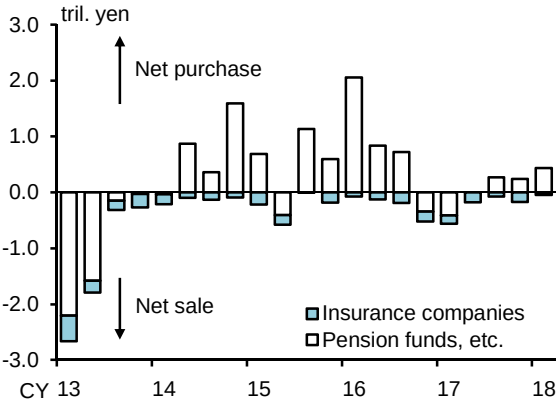

Note: Covers four major life insurance companies. The data for fiscal 2017 are annualized values for the first half of fiscal 2017.
Source: Published accounts of each company.

**Chart III-2-5: Unrealized gains on domestic stockholdings among life insurance companies**




Note: Covers nine major life insurance companies. Based on general account. The data for fiscal 2017 are as at end-September 2017.
Source: Published accounts of each company.

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




Note: 1. "Pension funds, etc." indicates banking and trust accounts of trust banks.
2. Latest data as at January-February 2018.
Source: Tokyo Stock Exchange.

Pension funds have also maintained an active investment stance toward domestic stocks and have continued to increase their investment in foreign securities (Charts III-2-2 and III-2-6). More specifically, the Government Pension Investment Fund (GPIF) has continued to manage its assets in line with the basic portfolio allocation and has continued its rebalancing according to the market environment. Since the call for applications from asset managers for investment in private equity, infrastructure, and real estate in April 2017, the GPIF has been pressing ahead with making arrangements for expanding alternative investments, such as sequentially appointing investment managers for its global infrastructure mandate ("core strategy") and domestic real estate mandate.[12] Other public pension funds have almost completed portfolio rebalancing toward the basic portfolio allocation. Corporate pension funds have basically maintained their established cautious investment stance thus far.

## C. Developments in households' investment activities

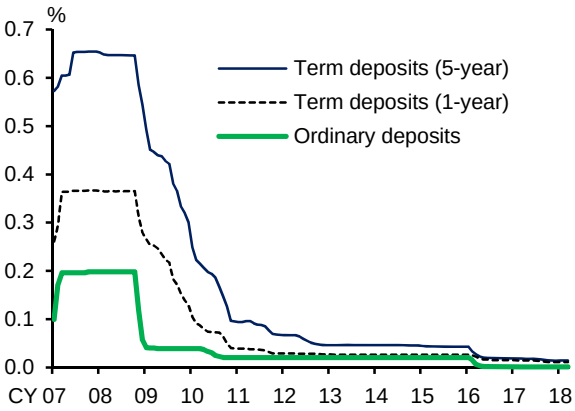
Households have been strongly inclined toward safety even under the low interest rate environment and have remained cautious in their investment in risky assets. The outstanding amount of bank deposits of individuals has steadily been increasing even though interest rates on deposits have remained at extremely low levels (Charts III-3-1 and III-3-2). On the other hand, outstanding client assets held by securities companies have been on an upward trend, but this is mainly due to the rise in market values rather than a notable increase in the inflow of funds into risky assets (Chart III-3-3).

In fact, looking by investment product, excluding the effects of movements in stock prices and foreign exchange rates on the market values of financial assets, the net outflow of funds held in equities expanded due to increased profit-taking by retail investors until the beginning of 2018. However, since February, with stock prices showing unstable movements, buying on dips has been dominant among retail investors (Chart III-3-4). Even when profit-taking with respect to Japanese stock investment trusts was concentrated, investment trusts overall registered net

[12] Amid the prolonged low interest rate environment, as part of pension funds' alternative investments, private equity (PE) fund investment, which offers relatively high returns, has recently attracted attention. For details on recent developments surrounding PE funds, see Kosuke Igarashi, Hiroki Inaba, and Koki Watanabe, "The Recent Growing Momentum of Private Equity Funds," Bank of Japan Review, No. 18-E-1, April 2018.

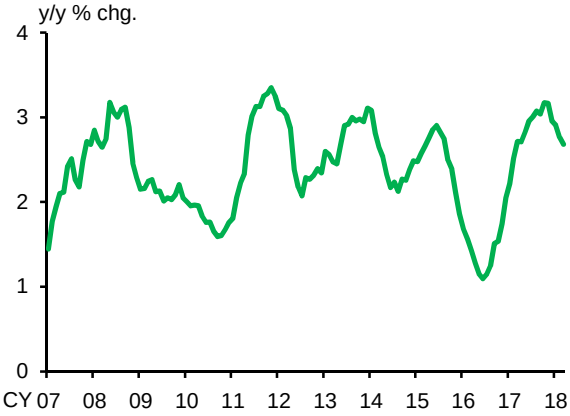
inflows, as foreign stock investment trusts and global bond investment trusts saw inflows. Bonds have continued to register inflows, especially bonds such as JGBs for retail investors, which offer relatively high yields compared to bank deposit rates; however, such inflows have been offset by early redemptions of structured bonds in response to the rise in stock prices through the beginning of 2018.

**Chart III-3-1: Interest rates on deposits**



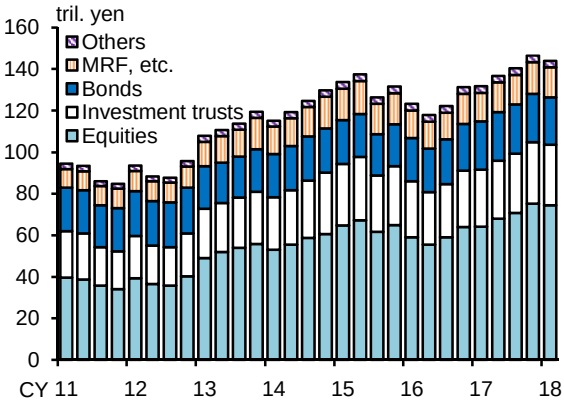

Note: 1. Interest rates on term deposits are simple averages posted by financial institutions.
2. Latest data as at March 26, 2018.
Source: BOJ.

**Chart III-3-2: Individual deposits**



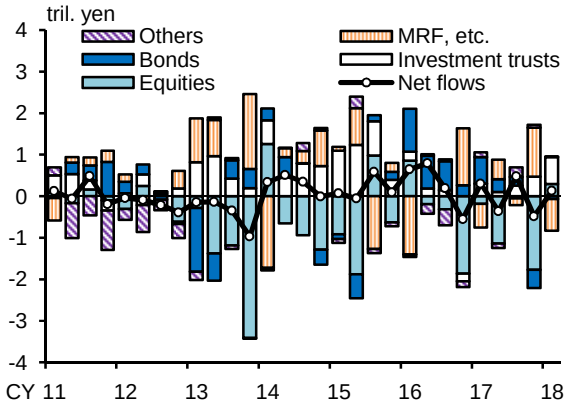

Note: Covers city banks and regional banks. Latest data as at March 2018.
Source: BOJ.

**Chart III-3-3: Client assets held by major securities companies**




Note: 1. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes bond investment trusts.
2. Covers retail customers' assets held at 17 major securities companies that hold current accounts at the BOJ. Latest data as at end-February 2018.
Source: BOJ.

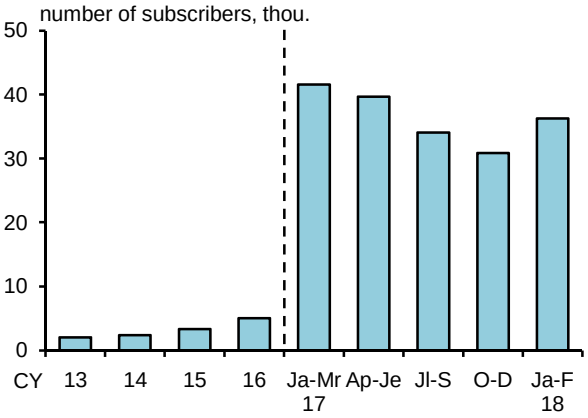
**Chart III-3-4: Capital flows by product among major securities companies**




Note: 1. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes bond investment trusts.
2. Covers retail customers' assets held at 17 major securities companies that hold current accounts at the BOJ. Latest data as at January-February 2018.
Source: BOJ.

Meanwhile, financial institutions have continued to make efforts to increase their clients' assets through expanding their lineup of products, such as investment trusts suitable for medium- to long-term asset formation for households, and through expansion of their services such as wrap accounts. The individual-type defined contribution pension plan (iDeCo), the membership criteria of which were relaxed in January 2017, has continued to see an increase in new members (Chart III-3-5). In addition, a monthly investment-type Nippon Individual Savings Account (NISA) was introduced in January 2018 and it is expected that the range of retail investors will expand due to such development. These wide-ranging initiatives are expected to help households form assets in a variety of ways.

**Chart III-3-5: Number of new subscribers of iDeCo**

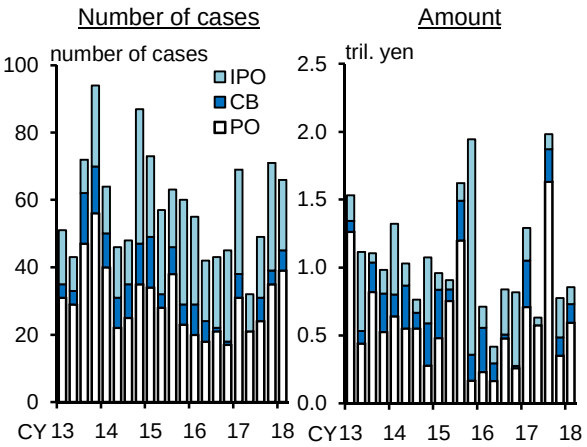



Note: Monthly average.
Source: National Pension Fund Association.

## D. Developments in firms' funding through capital markets

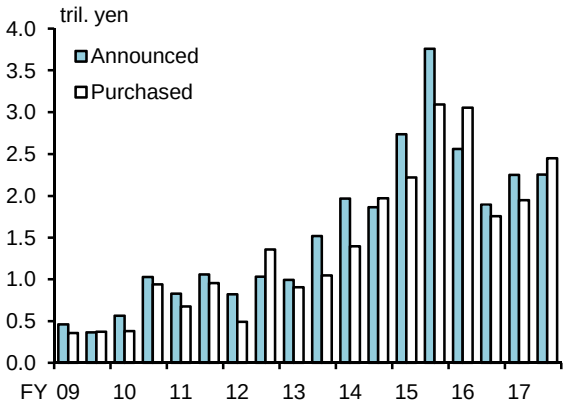
Equity financing through the stock market has remained lackluster amid firms' growing awareness with regard to capital efficiency and shareholder returns. Although the volume of public offerings (POs) temporarily increased during the July-September quarter of 2017 due to the sale of Japan Post shares (worth about 1.3 trillion yen), overall PO activity has been sluggish (Chart III-4-1). The reasons for the sluggishness of equity financing include 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. Announced and executed stock buybacks by firms have remained at a high level, reflecting firms' focus on shareholder returns, although they have been lower than before partly due to the increasing cost of share repurchases as a result of the rise in stock prices (Chart III-4-2).

**Chart III-4-1: Equity financing**




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

**Chart III-4-2: Amount of stock buybacks**

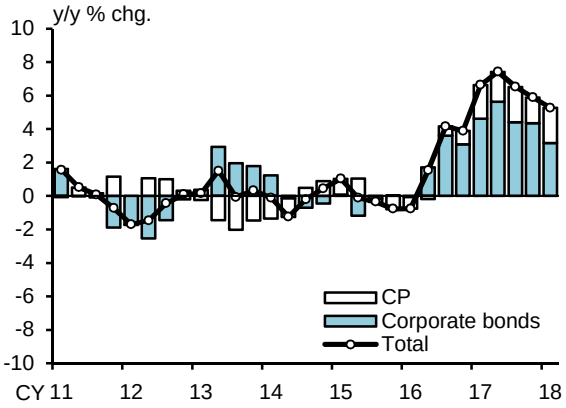



Note: Covers stocks listed on the First Section of the Tokyo Stock Exchange. Based on the announcement date. Latest data as at the second half of fiscal 2017.
Source: I-N Information Systems.

On the other hand, firms' funding through the CP and corporate bond market has been growing at a faster pace as issuance rates have hovered at extremely low levels (Chart III-4-3). The issuance of CP has been increasing against the backdrop of the growing demand for working capital as the economy continues to expand. Firms have been increasing their issuance of ordinary corporate bonds, especially longer-term ones, for the purpose of raising funds for M&A deals, refinancing issued bonds, and business fixed investment. With the extremely low government bond yields, investors searching for higher returns have maintained their active purchasing stance in the

corporate bond market.

**Chart III-4-3: Outstanding amount of CP and corporate bonds**



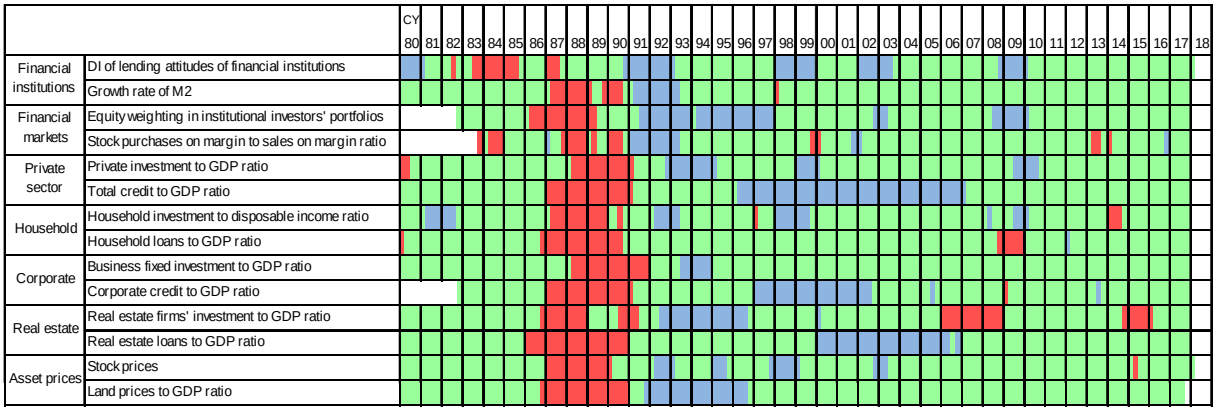

Note: Covers issues of ordinary industrial corporates.
Latest data as at end-February 2018.
Source: I-N Information Systems; JASDEC.

## E. Financial cycle

The preceding sections show that financial intermediation -- particularly lending by banks – has remained well-functioned. This section examines whether these accommodative financial conditions give rise to imbalances that could eventually lead to a significant downturn in the economy.

First, using a heat map, we objectively 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 deviation of various Financial Activity Indexes (FAIXs) from their trends (Chart III-5-1).[13] While the funding conditions for firms and households have been highly accommodative, none of the

**Chart III-5-1: Heat map**

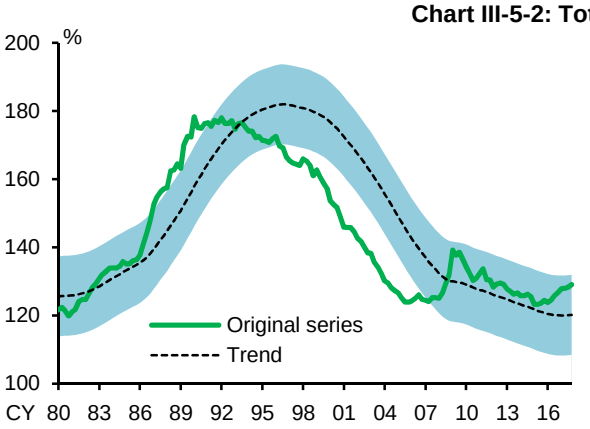



Note: The latest data for the DI of lending attitudes of financial institutions and stock prices are as at the January-March quarter of 2018. The latest data for the land prices to GDP ratio are as at the July-September quarter of 2017. The latest data for the other indicators are as at the October-December quarter of 2017.
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*."

[13] The shaded areas in Chart III-5-1 represent the following: (1) the areas shaded in red (the darkest shaded areas) show that an indicator has risen above the upper threshold, that is, it is overheating; (2) the areas shaded in blue (the second darkest shaded areas) show that an indicator has declined below the lower threshold, that is, it is contracting excessively; (3) the areas shaded in green (the most lightly shaded areas) 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.

indicators are "red," which would signal overheating, or "blue," which would signal excessive contraction. For example, although financial institutions and firms have been expanding the size of their balance sheets, the total credit to GDP ratio has not deviated significantly from the trend (Chart III-5-2).

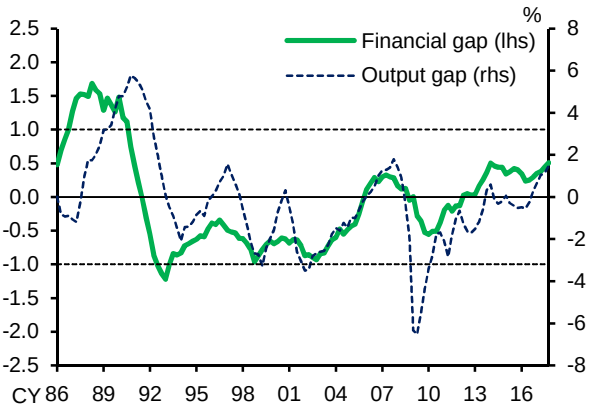
**Chart III-5-2: Total credit to GDP ratio**




Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as at the October-December quarter of 2017.
Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

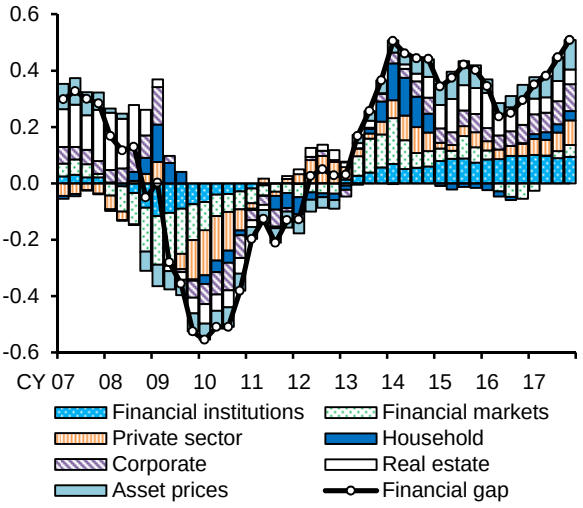
Next, we aggregate the various FAIXs included in the heat map into one indicator and construct the "financial gap" in order to quantitatively assess the phases of the financial cycle.[14] The indicator shows that the financial gap is positive but remains below the level of +1, the threshold that would represent overheating (Chart III-5-3). A breakdown of changes in the financial gap indicates that the positive values of financial activity in various areas have been increasing, but the aggregate indicator has shown no significant imbalances recently (Chart III-5-4). The positive financial gap has not been that large. However, attention needs to be paid to the fact that the

**Chart III-5-3: Financial gap and output gap**




Note: Latest data as at the October-December quarter of 2017.
Source: BOJ.

**Chart III-5-4: Decomposition of financial gap**



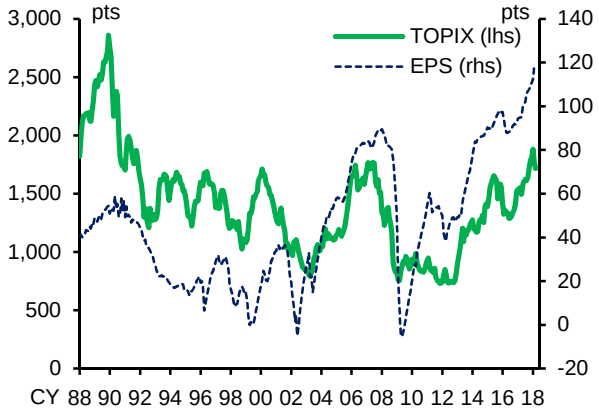

Note: 1. The decomposition is based on the seven categories in Chart III-5-1.
2. Latest data as at the October-December quarter of 2017.

[14] Since the heat map shows the deviation of individual financial and economic indicators from their trends as red, green, or blue in a discontinuous manner, it is difficult to quantitatively assess the extent to which imbalances have built up overall. In contrast, the financial gap is an indicator that makes it possible to grasp Japan's financial cycle in a continuous and aggregate manner by aggregating the deviations of the 14 FAIXs from their trends using time-varying weights that take into account the cross-correlation between these indexes. If the financial gap exceeds +1, this indicates overheating, while if it falls below -1, this indicates excessive contraction. For the aggregation method using time-varying weights that take correlations into account, 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.

duration for which the financial gap has remained in positive territory is the longest since the burst of the bubble economy. If financial institutions as well as firms and households behave on the premise that the accommodative financial conditions will continue in the future, this could lead to an inefficient resource allocation, which could be sustained only under such accommodative financial conditions. Under these circumstances, they could suffer unexpected losses in the event of a reversal in the macroeconomic environment. This is an issue that deserves further scrutiny as a potential vulnerability of Japan's financial system and will be examined in detail in Chapter VI.

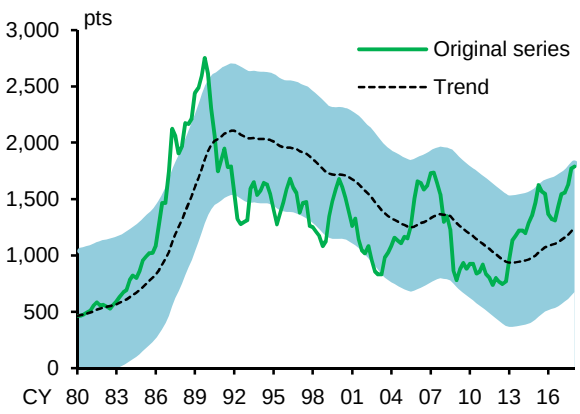
Looking at individual FAIXs, there are several signs that warrant attention. Stock prices do not show signs of significant overvaluation (Chart III-5-5). However, even after the large drop in February 2018, they are still close to "red" but in the "green" zone in the heat map, reflecting the rapid increase through the beginning of 2018 (Chart III-5-6). Moreover, the DI of lending attitudes of financial institutions has remained at the highest level since the bubble period, indicating that financial institutions' lending stance has continued to be active (Chart III-5-7). The active lending stance of banks serves as an important transmission channel of monetary easing and helps to improve business sentiment and business fixed investment, especially among small firms. However, if such accommodative financial conditions are expected to continue for excessively longer and competition among banks continues to be intensified, this could build up credit risk through the easing of loan standards, thereby undermining the stability of the financial system. Such possibility warrants attention.

**Chart III-5-5: Stock prices and corporate profits**



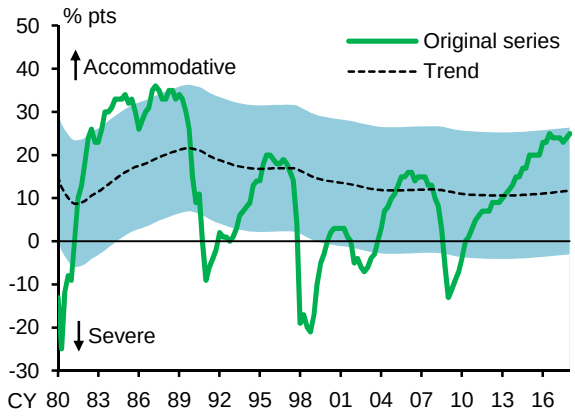

Note: 1. "EPS" is based on the actual performance over the past 1 year.
2. The latest data for "TOPIX" are as at March 2018 and the latest data for "EPS" are as at February 2018.
Source: Bloomberg; Thomson Reuters Japan.

**Chart III-5-6: 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 January-March quarter of 2018.
Source: Bloomberg.

**Chart III-5-7: DI of lending attitudes of financial institutions**

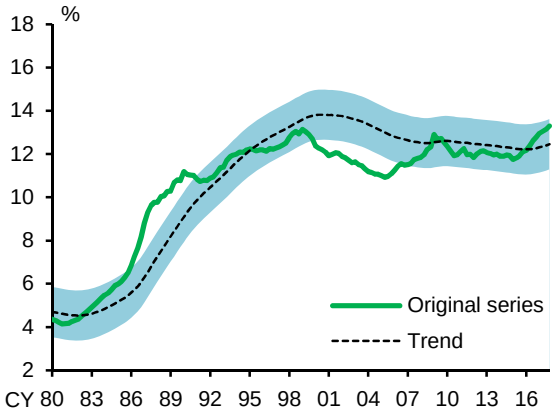



Note: 1. "Original series" is based on all firm sizes and all industries. "Trend" is calculated from the historical average. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as at the January-March quarter of 2018.
Source: BOJ, "*Tankan.*"

## *Real estate market*

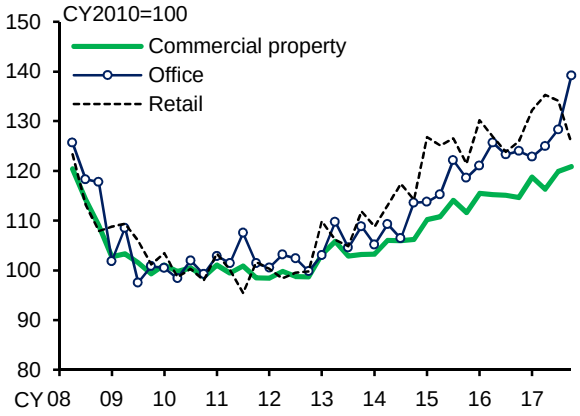
The FAIXs for the real estate market are in the "green" zone on the heat map and show no signs of overheating overall. Although the real estate loans to GDP ratio has been increasing, a growing number of financial institutions have turned cautious over the risks associated with adjustments in the real estate market and credit concentration in the real estate industry, thus making their stance on real estate-related lending more restrictive (Charts III-1-11 and III-5-8). In the real estate market, concern over the risk of entrenched real estate valuations has been spreading among domestic investors against the background of the large supply of office space coming onto the market from 2018 onward and uncertainty over the prospects of the domestic economy after the Tokyo Olympics (Charts III-5-9 and III-5-10). Moreover, property acquisitions by domestic investors such as J-REITs have been leveling off recently (Chart III-5-11). On the other hand, foreign investors have stepped up their investment stance somewhat, focusing mainly on office properties in the Tokyo metropolitan area. They have continued to execute transactions at lofty prices, increasing their share of real estate transactions. Such an increased share has been accounted for by, in addition to transactions by real estate investment funds, the recent increase in transactions by insurance companies and pension funds as well as sovereign wealth funds (SWFs).

**Chart III-5-8: Real estate loans to GDP ratio**



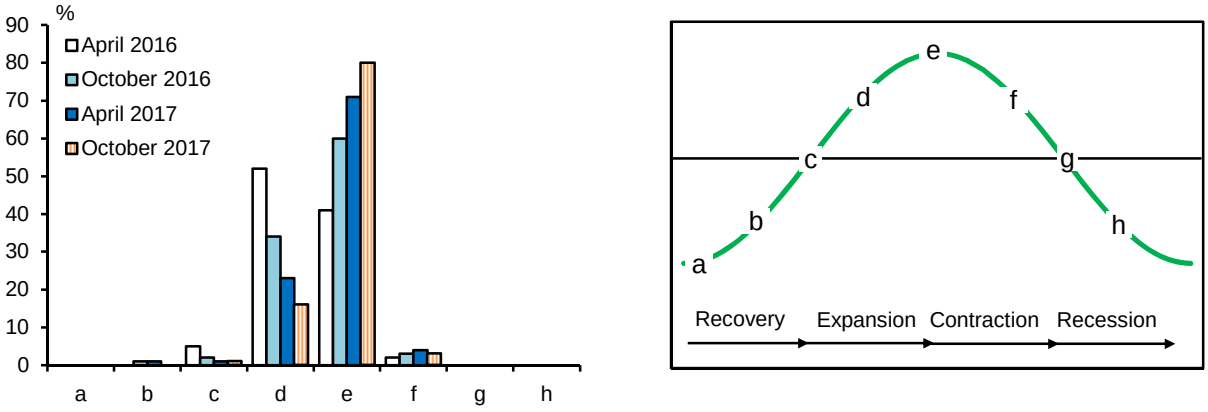

Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.
2. Latest data as at the October-December quarter of 2017.
Source: Cabinet Office, "National accounts"; BOJ, "Loans and bills discounted by sector."

**Chart III-5-9: Commercial property prices**



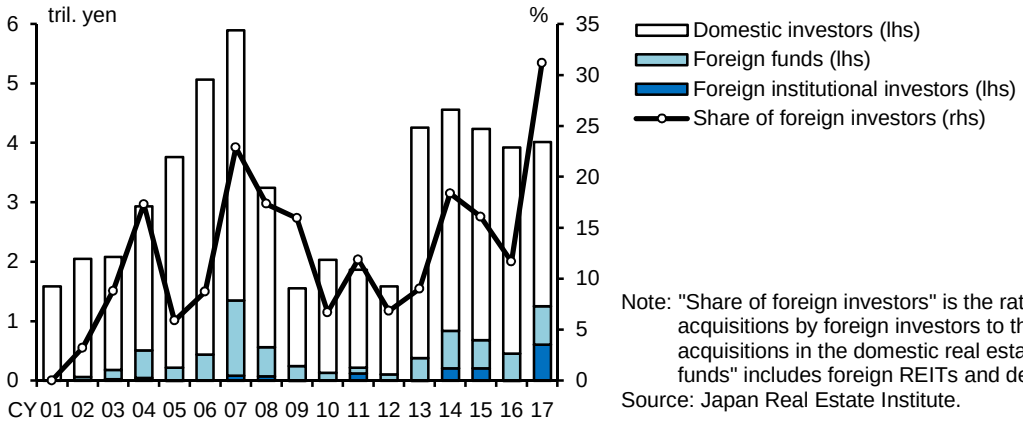

Note: Latest data as at the October-December quarter of 2017.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Japan property price index."

**Chart III-5-10: Real estate investors' assessment of the market cycle**




Note: The proportion of real estate investors (including asset managers, banks, and developers) selecting each given choice as the current state (a-h in the right-hand chart) of the Tokyo (Marunouchi and Otemachi) office market. The October 2017 survey covers 119 respondents.
Source: Japan Real Estate Institute, "The Japanese real estate investor survey."

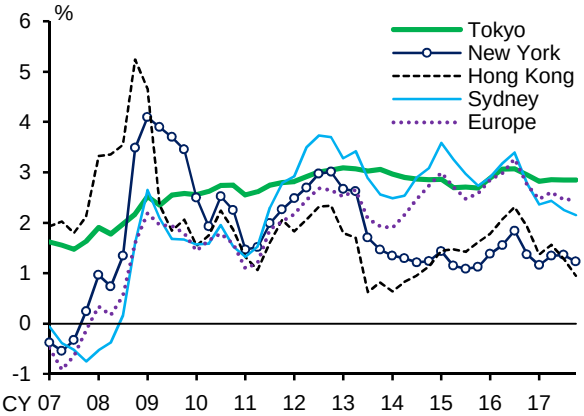
**Chart III-5-11: Value of real estate property acquisitions by domestic and foreign investors**




Note: "Share of foreign investors" is the ratio of the amount of acquisitions by foreign investors to the total amount of acquisitions in the domestic real estate market. "Foreign funds" includes foreign REITs and developers.
Source: Japan Real Estate Institute.

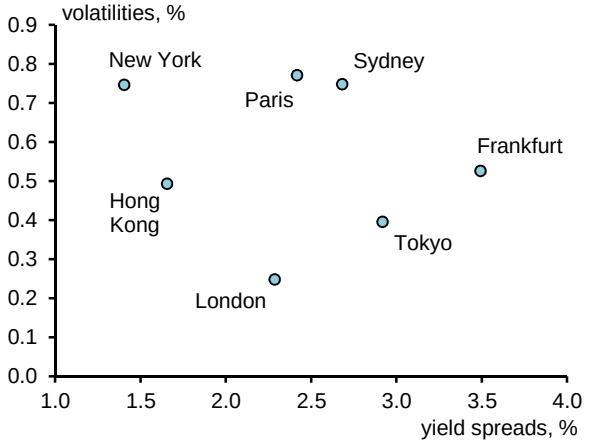
There are two reasons behind foreign investors' active investment stance. First, in the U.S. market, the largest real estate market in the world, the profitability of real estate investment has been on a downward trend, while Tokyo has maintained relatively high profitability, thereby attracting investment funds from foreign investors. The yield spread (i.e., the difference between property yields and government bond yields), a widely used indicator that represents the profitability of real estate investment, shows that in New York, the profitability of real estate investment has been deteriorating, reflecting, on the one hand, a decline in property yields due to the rise in property prices and, on the other hand, the rise in U.S. Treasury yields (Chart III-5-12). In contrast, in Tokyo, the yield spread has remained at around 3 percent, reflecting the sluggish pace of increase in real estate prices and low and stable long-term interest rates, and the volatility of returns has been low (Chart III-5-13). Therefore, from an international perspective, Tokyo is one of the most attractive cities for real estate investment. Second, the transparency of Japan's real estate market has been improving as a trend, making it easy for foreign investors to choose Tokyo as an investment destination. Looking at the Global Real Estate Transparency Index, the transparency index of the Japanese real estate market has steadily been increasing as more transaction data have been compiled and more detailed information on the financial condition of real estate-related firms has

**Chart III-5-12: Yield spreads of commercial properties**




Note: 1. Yield spreads = grade-A office yields - 10-year government bond yields. "Europe" is the simple average of yield spreads in London, Frankfurt, and Paris.
2. Latest data as at the October-December quarter of 2017.
Source: Bloomberg; JLL.

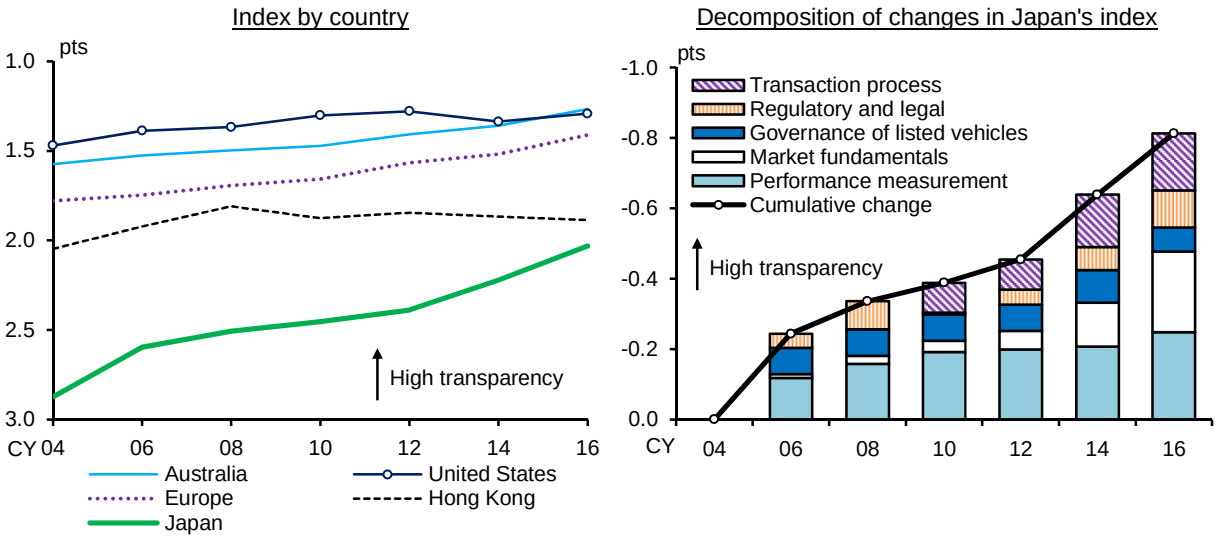
**Chart III-5-13: Returns and volatilities of commercial properties**




Note: 1. Yield spreads = grade-A office yields - 10-year government bond yields. Average from 2016 to 2017.
2. Volatilities are calculated as the standard deviations of grade-A office yields for the period from 2010 to 2017.
Source: Bloomberg; JLL.

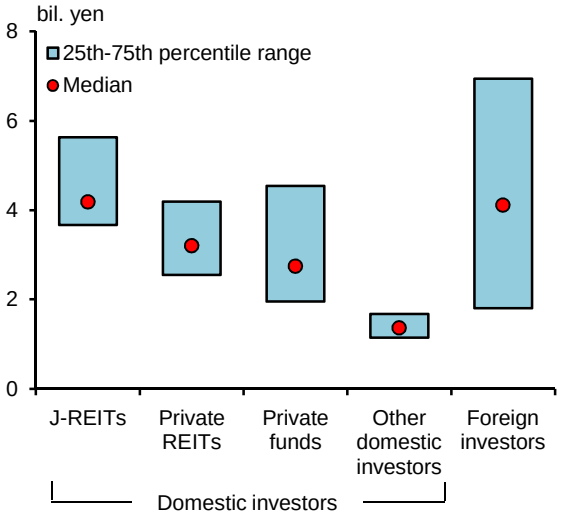
been released (Chart III-5-14).[15] While the index for Japan still lags behind those for the U.S. and European markets, it has reached about the same level as that for the Hong Kong market.

**Chart III-5-14: Global Real Estate Transparency Index**



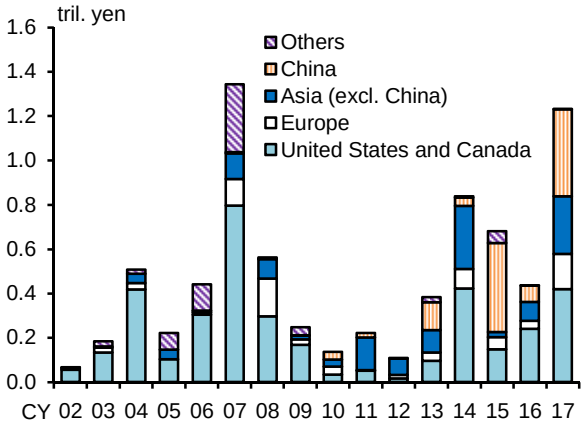

Note: 1. "Europe" in the left-hand chart is the simple average of indexes for the United Kingdom, Germany, and France.
2. The right-hand chart shows the decomposition of cumulative changes from 2004 in Japan's index.
Source: JLL.

**Chart III-5-15: Amount paid per real estate property acquisition by investor**




Note: The distribution of average amounts paid per acquisition for the period from 2002 to 2017.
Source: Japan Real Estate Institute.

**Chart III-5-16: Value of real estate property acquisitions by foreign investors by nationality**




Source: Japan Real Estate Institute.

Since institutional investors, such as insurance companies, pension funds and SWFs, tend to purchase real estate for long-term holdings, the increased presence of this category of foreign investors is expected to contribute to the stability of Japan's real estate market. That said, it is also

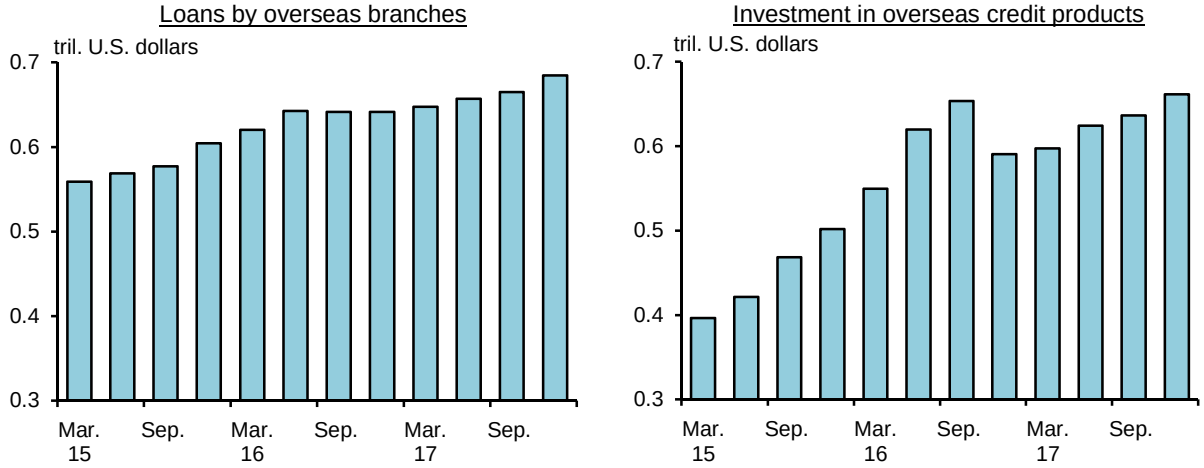
[15] Covering 109 real estate markets around the world, the Global Real Estate Transparency Index scores and indexes (based on a joint survey conducted by JLL and LaSalle Investment Management) the transparency of real estate markets from the following five perspectives: (1) performance measurement; (2) market fundamentals; (3) governance of listed vehicles; (4) regulatory and legal; and (5) transaction process. The overall score ranges from 1, which indicates the highest transparency, to 5, which indicates the lowest transparency. In the latest survey (2016 survey), the Japanese market ranked 19th with a rating of 2.03 (26th in the previous survey in 2014).

possible that it could have a destabilizing effect by increasing the link between the domestic and overseas real estate markets. In particular, foreign investors tend to deal with larger projects than domestic investors, thus having a larger impact on the market (Chart III-5-15). Moreover, while U.S. investors comprised a major share of foreign real estate investors before the Lehman shock, the share of Asian investors has increased in recent years (Chart III-5-16). How these Asian investors would react in times when overseas real estate prices decline and how this could affect Japan's real estate market warrant careful attention.

## *Growing overseas exposure*

We conclude this chapter by stating a few caveats regarding the heat map and financial gap presented in this *Report*. The 14 FAIXs that make up the heat map are selected to characterize Japan's bubble period in the second half of the 1980s and the subsequent collapse period. The financial cycle at that time was generated and developed in the domestic market. This is why the domestic bank loan market, stock market, and real estate market determine developments in the heat map (and in the financial gap estimated based on the heat map). However, even if no domestic financial imbalances have built up but Japanese financial institutions engage in excessive risk taking overseas, the associated vulnerabilities would not be detected by the heat map, which assesses only domestic financial and economic activities. In recent years, credit spreads on high yield bonds in the U.S. credit market have been extremely tight due to investors' search for yield. With regard to leveraged loans, the share of covenant-lite loans with lenient loan conditions and relatively weak protection for creditors has been rising, and the issuance of collateralized loan obligations (CLOs) incorporating such loans has also increased (Chart II-1-13). With the low interest rate environment continuing, Japanese financial institutions have increased investment in overseas credit products in addition to overseas loans (Chart III-5-17). Thus, it becomes more important to examine whether excessive risk is building up in these investments and loans. While there is no sufficiently long-term data on financial institutions' overseas exposure that is available for the heat map to assess the developments thereof, we examine financial institutions' risk taking and risk management in Chapter IV.

**Chart III-5-17: Outstanding amount of overseas loans and credit product investment among financial institutions**




Note: The left-hand chart covers major banks and regional banks. The right-hand chart covers respondents among major banks, regional banks, *shinkin* banks, Japan Post Bank, and central organizations of financial cooperatives.
Source: BOJ.

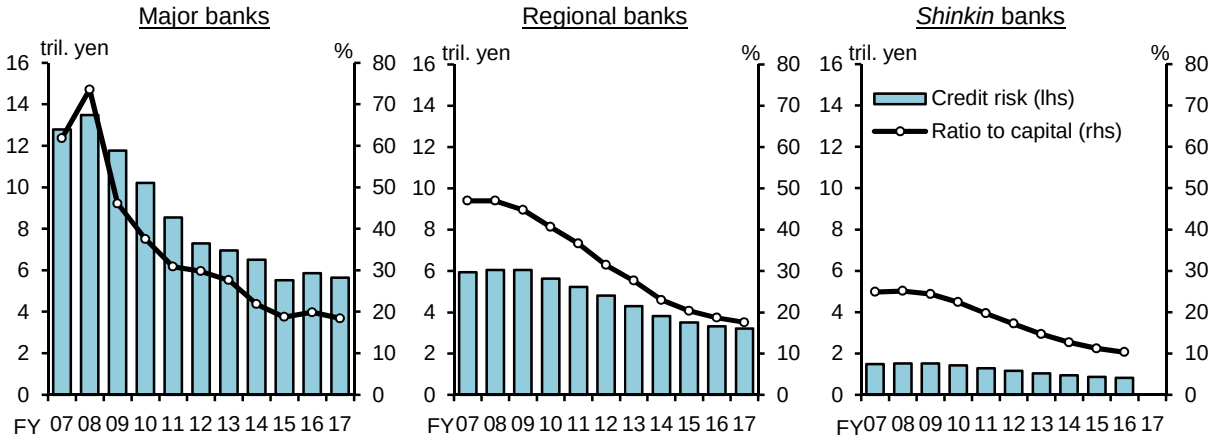
# IV. Financial institutions' risk profile and financial bases

In this chapter, we examine the entire financial system's risk profile (comprising the size of risks accumulated, the speed of accumulation, and the distribution of risks as well as its skewness within the system) by mainly analyzing financial institutions' financial data at an aggregate level. Then, we assess the adequacy of their financial bases (financial institutions' capital and funding liquidity) relative to risks at the current juncture.[16]

## A. Credit risk

The amount of financial institutions' credit risk has remained at a low level (Chart IV-1-1).[17] By type of bank, the ratio of the amount of credit risk to the amount of capital has remained at around 20 percent at major banks and regional banks and at around 10 percent at *shinkin* banks.

**Chart IV-1-1: Credit risk by type of bank**




Note: 1. Credit risk is unexpected losses with a 99 percent confidence level.
2. Covers credit that is subject to self-assessment. The data for fiscal 2017 in the left-hand and middle charts are annualized values for the first half of fiscal 2017.
Source: BOJ.

The reason that the credit risk amount has remained at a low level despite the increase in financial institutions' domestic and overseas loans outstanding is the continuing improvement in the composition of loans by borrower classification, reflecting the improved financial condition among firms amid the moderate expansion of the domestic and overseas economies. The amount of loans outstanding by borrower classification shows that the ratio of normal loans to total loans is on an upward trend, and at major banks and regional banks, the ratio clearly exceeds the peak before the Lehman shock (Chart IV-1-2). Credit cost ratios have remained at extremely low levels for every type of bank, and major banks' provisions for loan losses have recently registered large net reversals (Chart IV-1-3).

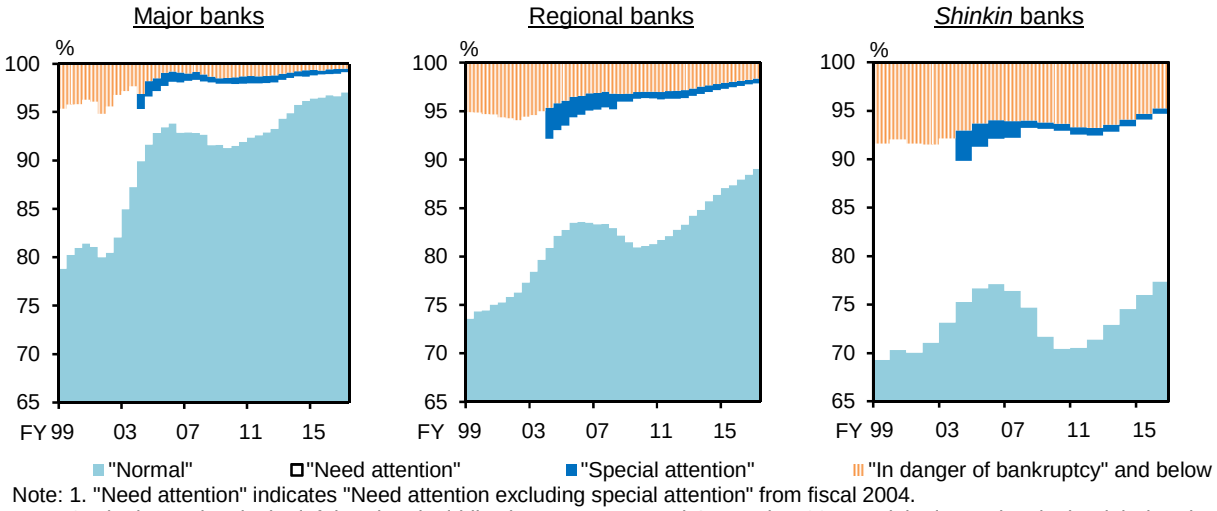
While credit risks calculated based on the past actual credit cost ratio have remained low due to the continued economic expansion and low interest rate environment, the relevant credit risk measures may underestimate the potential amount of credit risk borne by financial institutions.

[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 both before that (excluding the phase-in arrangements).

[17] Credit risk as 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 maximum amount of losses envisaged within 99 percent of the possible outcomes in 1 year.

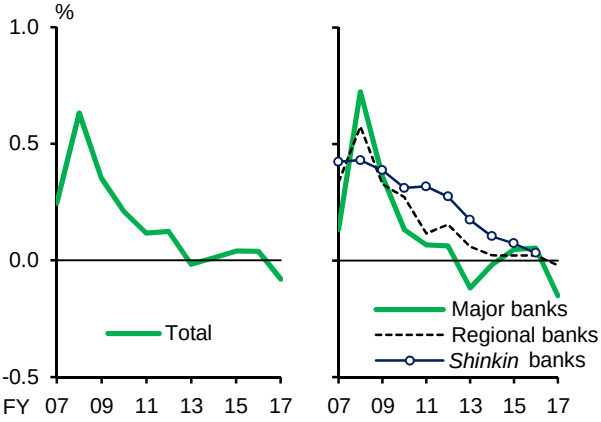
Given this possibility, financial institutions need to improve the effectiveness of their credit risk management. For example, the ratio of loan-loss provisions to normal loans has been at a historically low level, but it is desirable for financial institutions to take the possibility of a macroeconomic downturn into account and smooth out the effects of business cycles in calculating loan-loss provisions (Chart IV-1-4).[18] Moreover, financial institutions need to measure credit risk by deploying stress testing that assumes future changes in the macro-financial environment, taking into account credit portfolio changes arising from a more active lending stance (with regard to stress testing, see Chapter V).

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



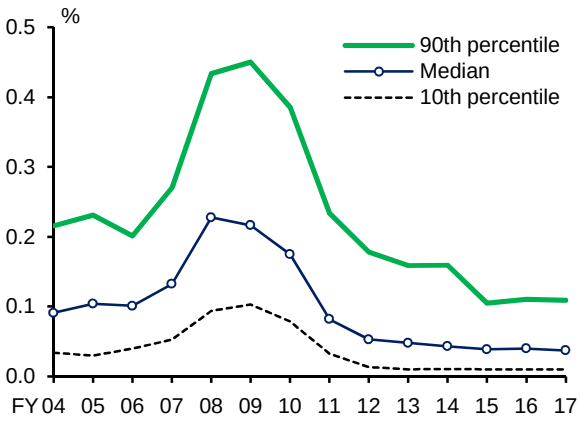

Note: 1. "Need attention" indicates "Need attention excluding special attention" from fiscal 2004.
2. The latest data in the left-hand and middle charts are as at end-September 2017 and the latest data in the right-hand chart are as at end-March 2017.
Source: BOJ.

**Chart IV-1-3: Credit cost ratios among financial institutions**




Note: The latest data for "Major banks" and "Regional banks" are annualized values for the first half of fiscal 2017 and the latest data for "*Shinkin* banks" are as at fiscal 2016.
Source: BOJ.

**Chart IV-1-4: Ratios of loan-loss provisions to normal loans**




Note: 1. The ratio of general loan-loss provisions to the total amount of normal loans.
2. Covers regional banks. Latest data as at end-September 2017.
Source: BOJ.

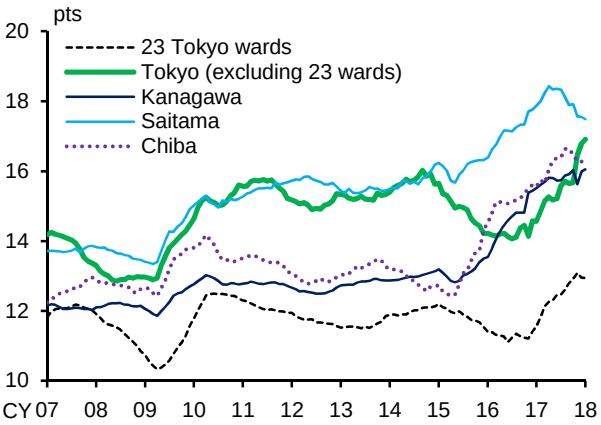
## *Credit risk related to real estate*

The outstanding amount of real estate loans has continued to grow at a high rate and has remained very large in volume, although more financial institutions have constrained new lending

[18] For details, see "Revisions to Loan-Loss Provision Calculation Methods by Regional Financial Institutions," *Financial System Report Annex Series*, April 2017 (available in Japanese only).

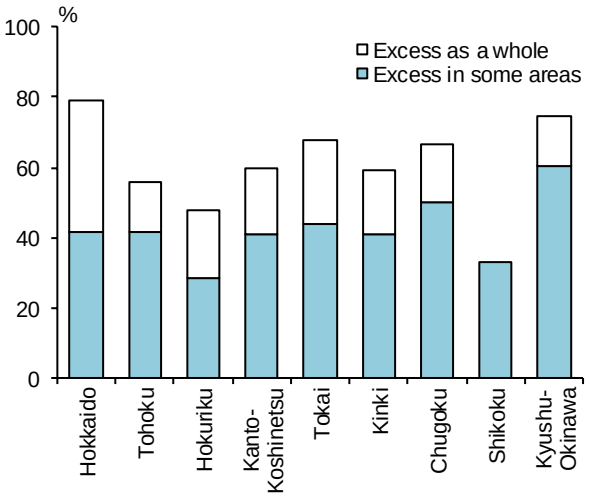
(Chart III-1-11). Real estate markets have started to show signs of some downturn, as vacancy rates have continued to rise in some regional rental housing markets and the supply of new rental properties appears to have outstripped demand across Japan (Charts IV-1-5 and IV-1-6).[19] As pointed out in the October 2017 issue of the *Report*, financial institutions that do not employ quantitative criteria -- such as the debt-service coverage ratio (DSCR) and the loan-to-value (LTV) ratio -- in their initial screening and interim assessments, as well as those that do not reflect the results of portfolio monitoring in their screening criteria, tend to have loans of lower quality. Given this situation, financial institutions need to make their credit risk management more effective by improving their initial screening and interim assessments, including more careful monitoring of the supply-demand balance in rental housing markets (Chart IV-1-7).

**Chart IV-1-5: Vacancy rates for rental housing**



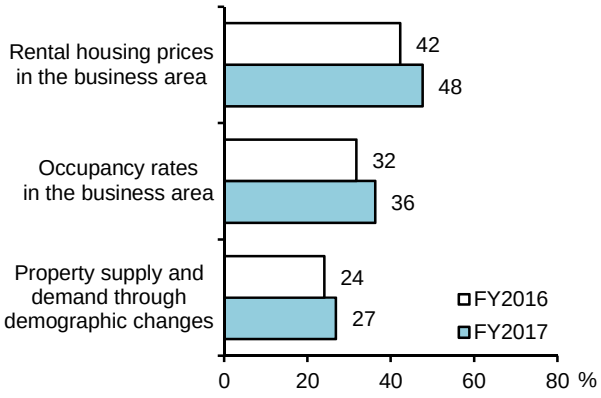

Note: Vacancy rate is the number of unoccupied rental units divided by the number of rental units seeking tenants. Latest data as at January 2018.
Source: TAS, "Residential market report."

**Chart IV-1-6: Regional financial institutions' assessment of rental property supply**




Note: 1. The proportion of financial institutions selecting each given choice as the current condition of the rental property supply in their business areas.
2. The results of the survey conducted in fiscal 2017 on the risk management of loans for the rental housing business. Covers regional financial institutions. The regional classification is based on the location of the banks' head offices.
Source: BOJ.

**Chart IV-1-7: Scope of rental housing market analysis**



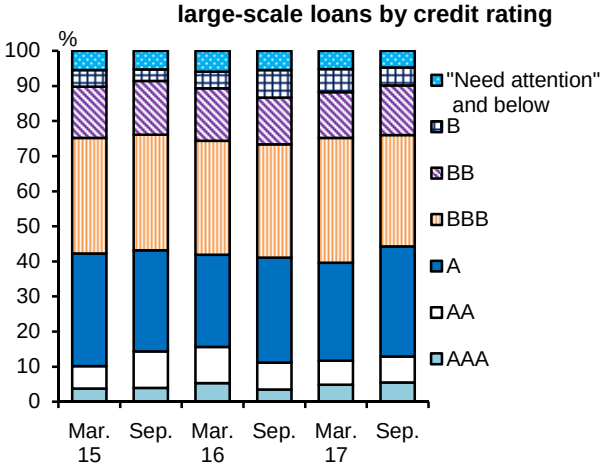

Note: 1. The proportion of financial institutions selecting each given choice as a scope of their analysis.
2. The results of the survey on the risk management of loans for the rental housing business. Covers regional financial institutions.
Source: BOJ.

[19] The denominator used to calculate the vacancy indices in Chart IV-1-5 includes only the total number of units seeking tenants and does not include the total number of units in fully occupied buildings. Thus, the occurrence of a small number of vacancies in hitherto fully occupied buildings depresses the index because those buildings are included in the calculation. Likewise, when the vacancies are filled and the buildings become fully occupied, the index is pushed up, because the fully occupied buildings are no longer included in the calculation. Caution should therefore be taken when interpreting short-term fluctuations in the indices.

### *Overseas credit risk*

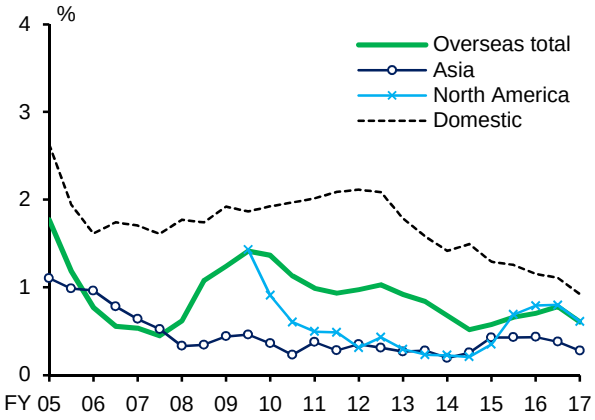
Financial institutions' overseas exposure has continued to increase (Chart III-5-17). However, the associated credit risk has thus far remained subdued. With regard to the quality of overseas loans, more than 70 percent of large-scale credit is accounted for by investment grade loans (BBB or above), and the nonperforming loan ratios have hovered at low levels (Charts IV-1-8 and IV-1-9). Even during the period of a fall in commodity prices from 2014 to 2015, the increase in credit costs associated with commodity-related firms and emerging market firms remained under control. Recently, amid the increase in dollar funding costs due to the rise in the U.S. policy rate, major banks have assessed loan profitability more strictly and have remained cautious in their initial and interim assessments of borrowers' creditworthiness. Thus, no excessive risk taking can be observed in overseas credit overall.

**Chart IV-1-8: Composition of overseas large-scale loans by credit rating**




Note: Covers five major banks.
Source: BOJ.

**Chart IV-1-9: Nonperforming loan ratios for overseas loans**




Note: Covers the three major financial groups (on a non-consolidated basis). Latest data as at end-September 2017.
Source: Published accounts of each group.

While some financial institutions have also been expanding the size of overseas credit investment, the number of financial institutions aiming to actively increase such investment is limited. In response to the increase in U.S. dollar funding premiums, some financial institutions have been increasing their holdings of high-yield bonds and/or securitized products with low liquidity to secure interest margins. However, sufficient capital has been allocated against such kind of risk taking. Moreover, with regard to securitized products such as CLOs, financial institutions have thoroughly screened their investments, examining each of them in detail, and the share of first-lien loans in underlying assets has also been quite high. However, spreads in overseas credit markets have continued to narrow (Chart II-1-12). Financial institutions need to be vigilant about how further risk repricing (reassessment) triggered by a rise in U.S. interest rates would affect the financial condition and default rate of firms that issue corporate bonds and leveraged loans.

## B. Market risk

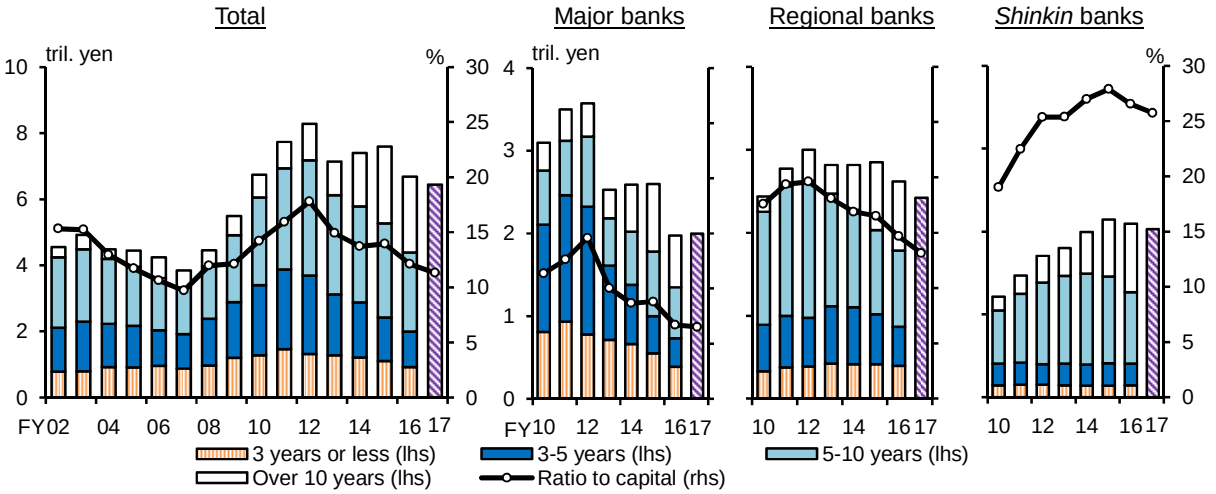
The following section assesses three aspects of market risk, namely, yen interest rate risk, foreign currency interest rate risk, and market risk associated with stockholdings.

### *Yen interest rate risk*

The amount of interest rate risk associated with financial institutions' yen-denominated bond

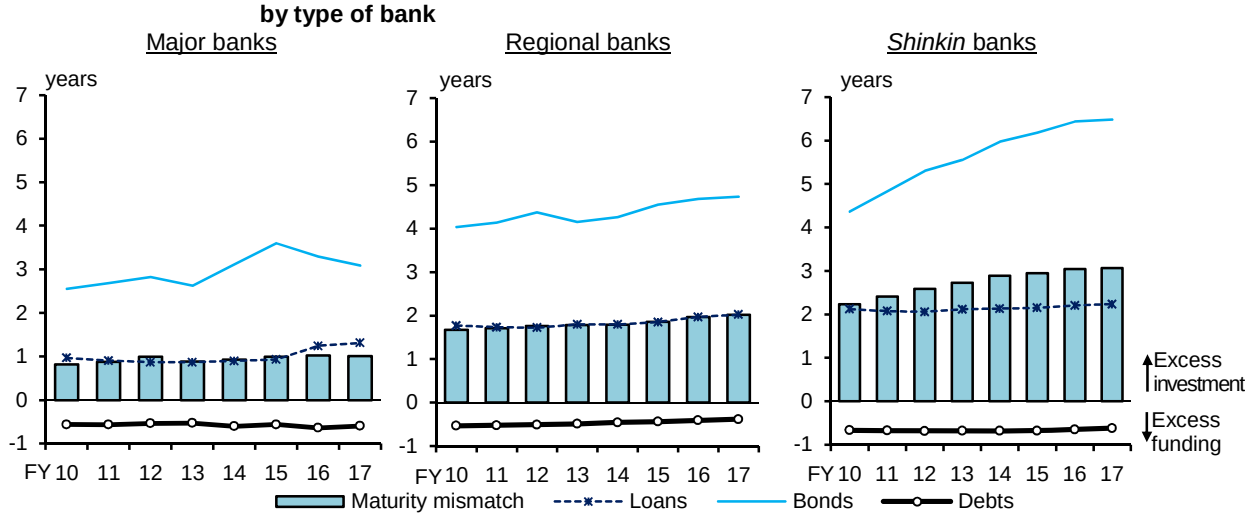
investments was on a downward trend after peaking in 2012, reflecting a decline in their holdings of such bonds, but has been more or less unchanged recently (Chart IV-2-1).[20] The duration of bond portfolios, an extension of which leads to an increase in the amount of interest rate risk, has also seen little change recently (Chart IV-2-2).

**Chart IV-2-1: Interest rate risk associated with yen-denominated bondholdings among financial institutions**




Note: Interest rate risk is a 100 basis point value in the banking book. Convexity and higher order terms are taken into account. The data for fiscal 2017 are estimated as at end-February 2018.
Source: BOJ.

**Chart IV-2-2: Average remaining maturity of yen-denominated assets and liabilities by type of bank**



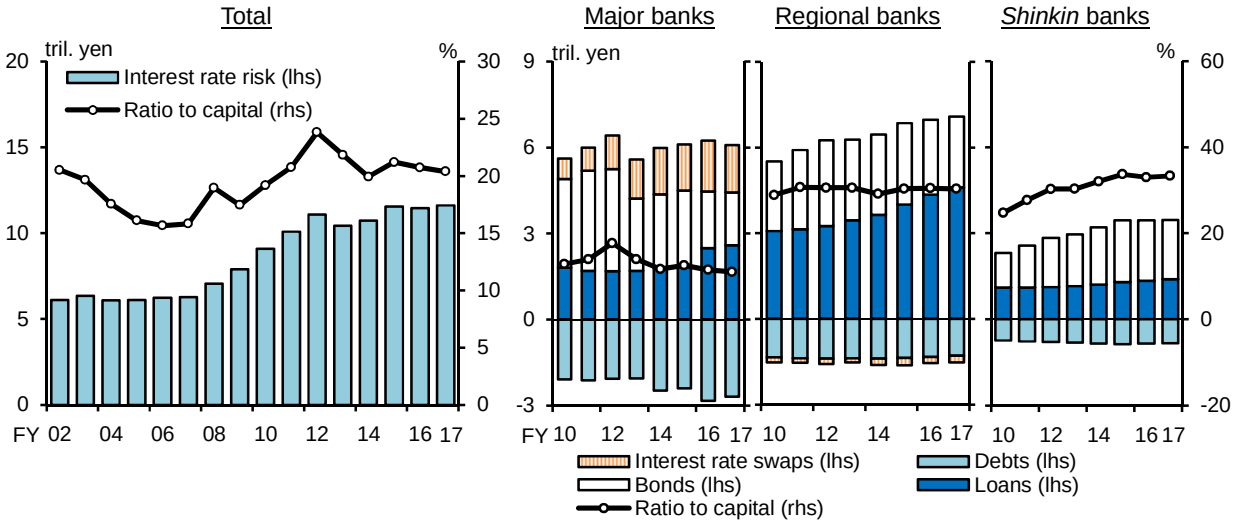

Note: 1. "Maturity mismatch" is the difference between the average remaining maturity of assets and that of liabilities. The average remaining maturity of assets is the weighted average of loans, bonds, and interest rate swaps with interest receipts. The average remaining maturity of liabilities is the weighted average of debts and interest rate swaps with interest payments.
2. The data for fiscal 2017 are as at end-December 2017.
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 by type of bank is found for the amount of yen interest rate risk overall on financial institutions' balance sheets -- in other words, yen interest rate risk including components such as

[20] The analysis in Chart IV-2-1 calculates changes in the economic value of bondholdings assuming a parallel shift in the yield curve, in which interest rates for all maturities rise by 1 percentage point.

loans and deposits in addition to bond investments (Chart IV-2-3).[21]

**Chart IV-2-3: 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 2017 are as at end-December 2017.
Source: BOJ.

## *Foreign currency interest rate 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 IV-2-4).[22] Following the reduction in foreign bondholdings in response to the rise in overseas interest rates since the fall of 2016, financial institutions have not restored foreign bondholdings, and thus the amount of risk has been restrained as a 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 7 percent at major banks and about 5 percent at regional banks.

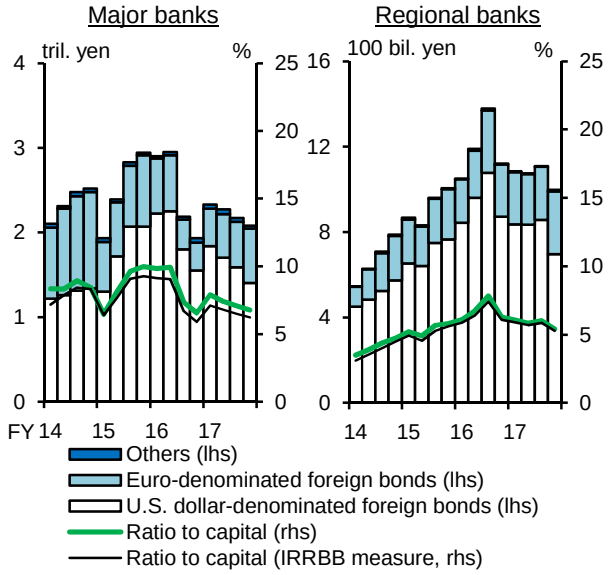
Meanwhile, regional financial institutions have continued to increase their holdings of investment trusts. Consequently, they are exposed to a wide range of market risks, such as overseas interest rate risk, stockholdings-related risk, foreign exchange risk, and real estate-related risk (Charts III-1-24 and IV-2-5). The amount of interest rate risk arising from overseas fixed income investment trust holdings, which account for about half of the outstanding amount of investment trust holdings, has reached about 20 percent of the overall amount of foreign currency interest rate risk (Chart IV-2-6). Moreover, while the assets purchased by overseas fixed income investment

[21] In Chart IV-2-3, the 100 basis point value (bpv) is estimated changes in the economic value of all assets and liabilities given a parallel shift in the yield curve, in which 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 duration of assets and liabilities) will amplify interest rate risk. In this estimation of changes in value, the 100 bpv only includes 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). It does not reflect the risk associated with foreign currency-denominated assets and liabilities or off-balance-sheet transactions, other than yen interest rate swaps. We assume that the duration of demand deposits is 3 months or less when the effect of the 100 bpv on liabilities is calculated, meaning that so-called "core deposits" are not taken into account.

[22] Based on the supervision guidelines with regard to interest rate risk in the banking book (IRRBB), released by the Financial Services Agency in December 2017, the interest rate risk of foreign currency-denominated foreign bonds in Chart IV-2-4 is calculated as a 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.

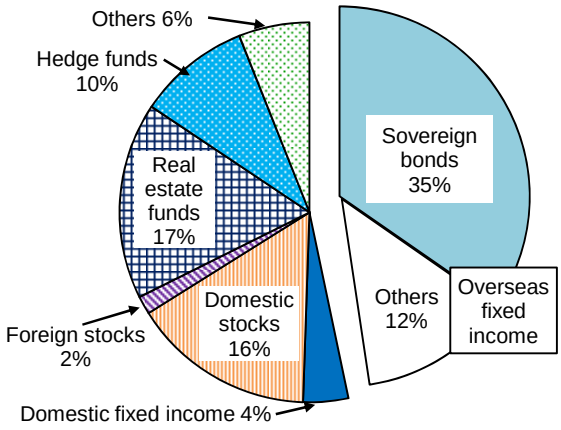
trusts consist mainly of sovereign bonds, a considerable number of investment trusts hold products with relatively high credit risk in their portfolios. Given this situation, some financial institutions need to improve their risk measurement (Chart IV-2-7). Financial institutions need to conduct a cross-sectional check of the impact that fluctuations in various risk factors have on their portfolios, and maintain a portfolio management and investment approach that takes account of the size of risks and their correlations as well as profitability. In addition, along with examining, from a wide range of perspectives, the impact of market fluctuations -- such as an increase in

**Chart IV-2-4: Interest rate risk of foreign currency-denominated foreign bonds**



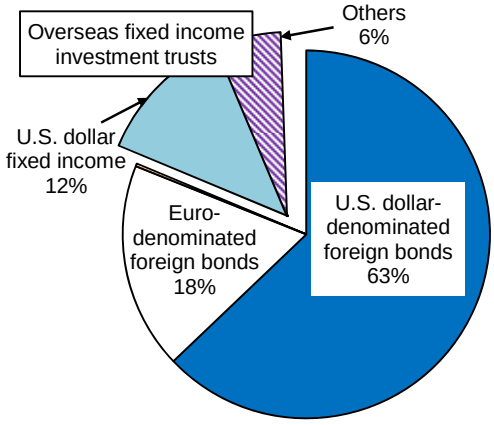

Note: 1. Interest rate risk is a 200 basis point value in the banking book. Off-balance-sheet transactions are included for major banks.
2. "Ratio to capital (IRRBB measure)" is calculated using Tier 1 capital for internationally active banks and core capital for domestic banks (including the phase-in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

**Chart IV-2-5: Breakdown of regional financial institutions' investment trust holdings**



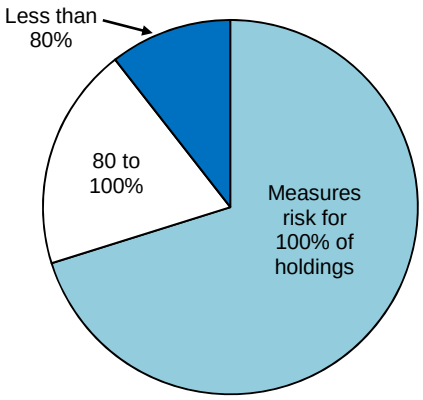

Note: Based on book values. Data as at end-December 2017.
Source: BOJ.

**Chart IV-2-6: Foreign currency interest rate risk among regional banks**




Note: Data as at end-December 2017.
Source: BOJ.

**Chart IV-2-7: Distribution of ratios of risk measurement associated with investment trust holdings among regional banks**



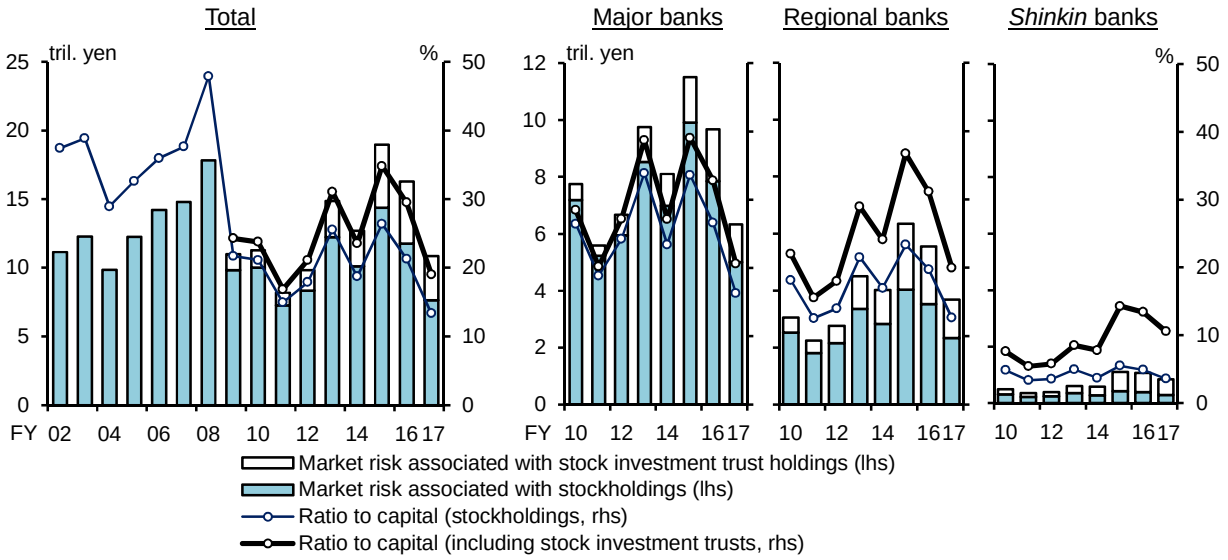

Note: 1. A bank's risk measurement ratio = amount of investment trusts whose risk is measured / total amount of investment trusts.
2. The results of the survey conducted in fiscal 2016 on the risk management of securities investment. Covers 57 respondents among regional banks.
Source: BOJ.

volatility in the global financial markets or downturn of the domestic real estate market -- on the market value of financial assets and profits, it is important for financial institutions to systematically prepare for possible measures to be taken in times of stress.

### *Market risk associated with stockholdings*

The amount of market risk associated with stockholdings (including stock investment trusts) among financial institutions has decreased thus far due mainly to the decline in market volatility (Charts IV-2-8 and IV-2-9).[23] The ratio of the amount of market risk associated with stockholdings to the amount of capital has been around 20 percent at major banks and regional banks, and around 10 percent at *shinkin* banks. While a reduction in strategic stockholdings also contributes to a decline in the amount of market risk associated with stockholdings, active investment in stock investment trusts exerts upward pressure on the amount of such market risk at regional financial institutions. Although strategic stockholdings have been on a gradual downward trend, the size of associated risk has still been sufficient to have a considerable impact on financial institutions' financial condition and profits (Chart IV-2-10).

**Chart IV-2-8: Market risk associated with stockholdings among financial institutions**

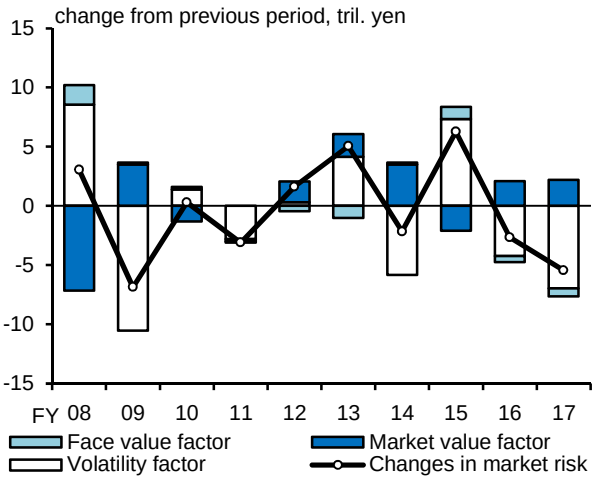



Note: 1. "Market risk associated with stockholdings" and "Market risk associated with stock investment trust holdings" are value-at-risk with a 99 percent confidence level and a 1-year holding period, and exclude risk associated with foreign currency-denominated stockholdings and stock investment trust holdings. Pre-fiscal 2009 data do not include stock investment trusts.
2. The data for fiscal 2017 are estimated using the outstanding amount of stockholdings and stock investment trust holdings as at end-February 2018 and stock prices up to end-February 2018.
Source: BOJ.

Under the corporate governance code, both financial institutions and firms have recently been required to provide a clearer explanation to stakeholders, including shareholders, of the purpose of strategic stockholdings in terms of balancing between risks and costs. In addition, the finalized Basel III framework, which was agreed upon at the end of 2017, has set stricter capital requirements for stockholdings of internationally active banks. Financial institutions need to objectively assess the purpose and costs of strategic stockholdings and control market risk associated with stockholdings, including strategic ones, within an appropriate range relative to their financial strength.

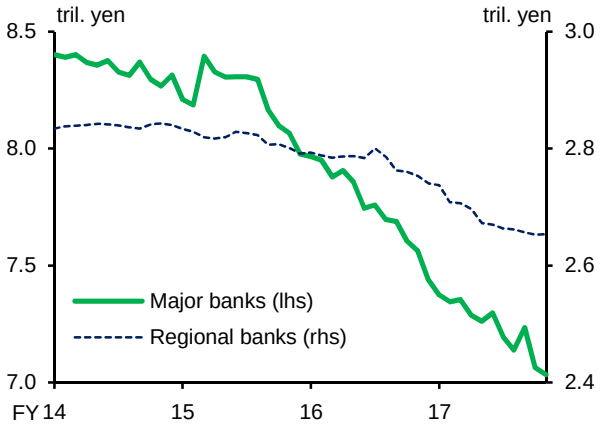
[23] In Chart IV-2-8, the market risk associated with stockholdings (including stock investment trusts) is calculated as the value-at-risk (VaR) with a 99 percent confidence level and a 1-year holding period.

**Chart IV-2-9: Factors of changes in market risk associated with stockholdings among financial institutions**




Note: Market risk associated with stockholdings is value-at-risk with a 99 percent confidence level and a 1-year holding period, and excludes risk associated with foreign currency-denominated stockholdings. There is a discontinuity in the underlying data as of fiscal 2009. The data for fiscal 2017 are estimated.
Source: BOJ.

**Chart IV-2-10: Strategic stockholdings among financial institutions**




Note: Excludes stocks of subsidiaries and affiliated companies. Latest data as at end-February 2018.
Source: BOJ.

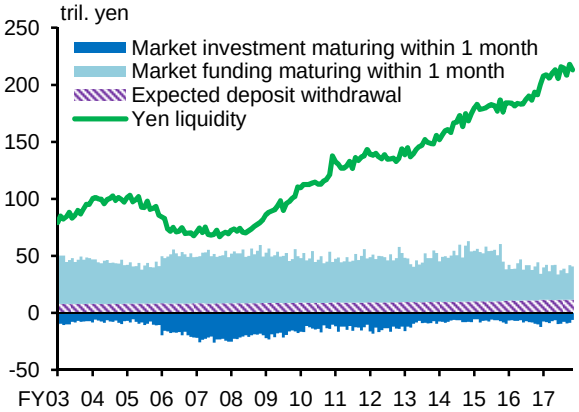
## C. Funding liquidity risk

In this section, we assess 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 of 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 total loans outstanding; 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. It is assessed that financial institutions 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 under stress situations (Chart

**Chart IV-3-1: 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-February 2018.
Source: BOJ.

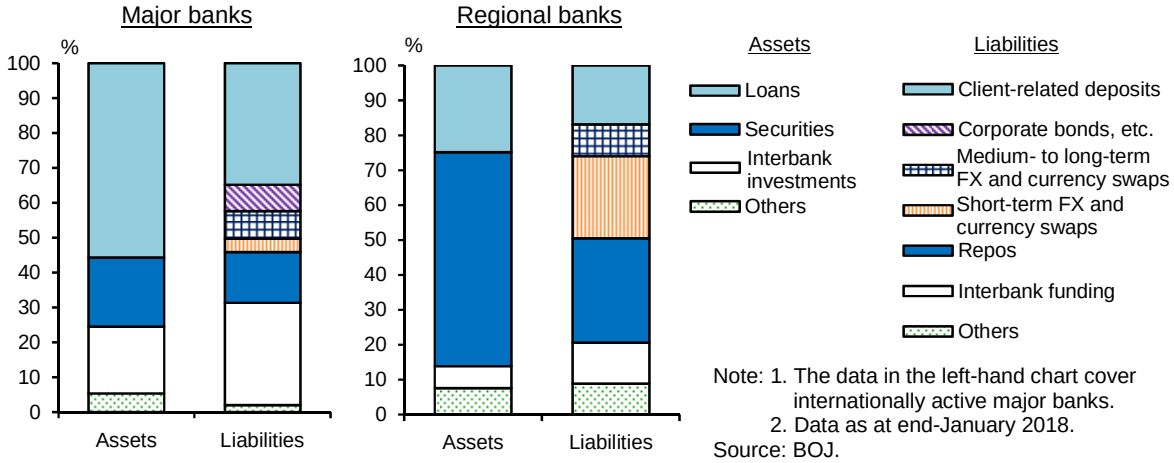
IV-3-1).[24]

## *Foreign currency funding liquidity risk*

As for financial institutions' foreign currency funding, the share of funding through financial markets has been relatively large. However, should market funding become difficult for a certain period, financial institutions have a sufficient liquidity buffer capable of covering possible funding shortages.

With respect to the foreign currency-denominated balance sheets of major banks, 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 (Chart IV-3-2). 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. The stability gap of major banks has been smaller than in the past, reflecting the increase in client-related deposits (Chart IV-3-3). Nevertheless, to some extent, a gap still remains, and client-related deposits include deposits with relatively low stickiness, such as deposits by financial institutions that may easily be withdrawn under a stress situation as well as large-scale term deposits with short maturities. Moreover, with regard to resilience to short-term stress, while major banks generally hold sufficient liquid assets to cover the expected outflow of funds under a stress situation, a certain share of fund outflows is accounted for by contingent factors for financial institutions, such as withdrawals from unused committed lines and/or outflows from client-related deposits (Charts IV-3-4 and IV-3-5).[25] While major banks have reflected 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.

**Chart IV-3-2: Foreign currency-denominated balance sheets by type of bank**

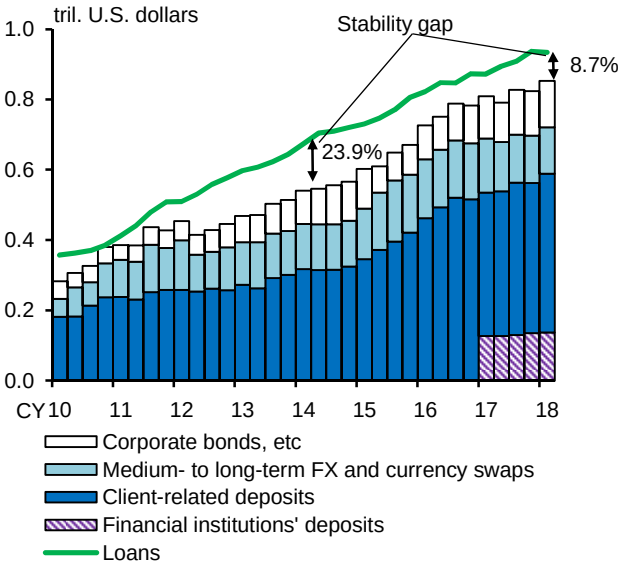



Note: 1. The data in the left-hand chart cover internationally active major banks.
2. Data as at end-January 2018.
Source: BOJ.

[24] In accordance with the concept of the Liquidity Coverage Ratio (LCR), we assume an outflow of market funding with a maturity of 1 month or less and an outflow amounting to 3 percent of total deposits.

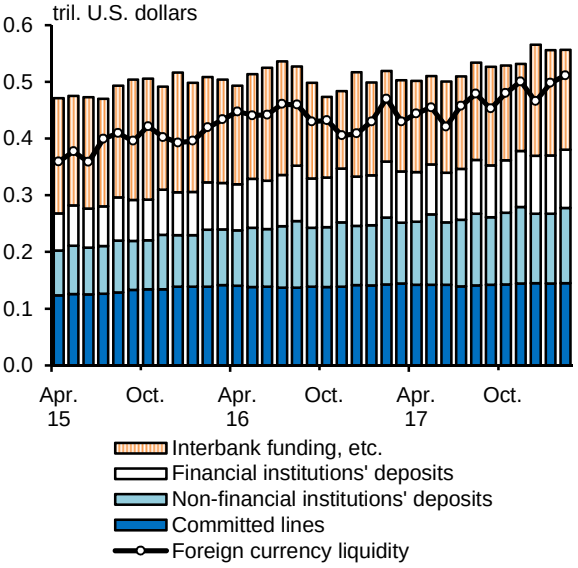
[25] In Chart IV-3-4, the following assumptions are made with regard to assets and liabilities with remaining maturities of up to 1 month (including those with no specific maturity): (1) the total amount of deposits by financial institutions and interbank funding (excluding central bank funding) is withdrawn; (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. Repo funding is included neither in fund outflows nor in foreign liquid assets.

**Chart IV-3-3: Stability gap among major banks**



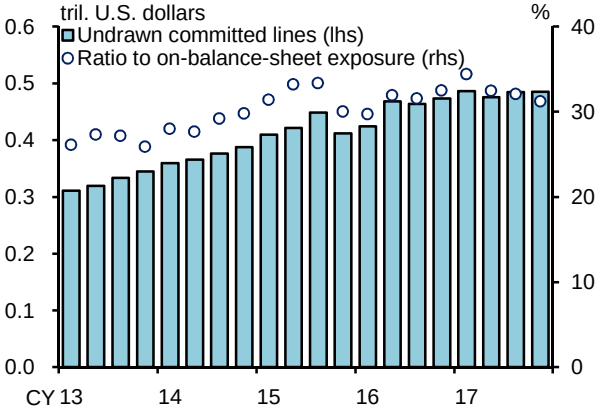

Note: 1. Until end-March 2012, "Corporate bonds, etc." and "Medium- to long-term FX and currency swaps" indicate funding maturing in over 3 months and thereafter, funding maturing in over 1 year. "Client-related deposits" includes "Financial institutions' deposits" until end-December 2016.
2. The figures in the chart indicate the ratios of the gaps to the loans (as at end-April 2014 and end-February 2018).
3. Covers internationally active banks. Latest data as at end-February 2018.
Source: BOJ.

**Chart IV-3-4: 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. Covers internationally active banks. Latest data as at end-February 2018.
Source: BOJ.

**Chart IV-3-5: Committed lines among major banks**




Note: The data are based on international claims, including cross-border claims and local claims of foreign offices for the three major financial groups. Ultimate risk basis. Latest data as at end-December 2017.
Source: BOJ.

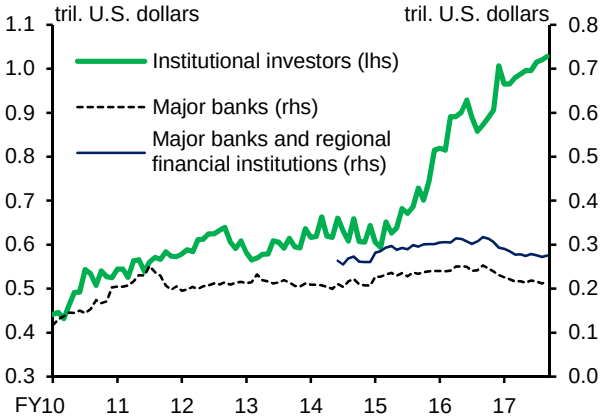
At regional banks, securities such as U.S. Treasuries make up a larger share of foreign currency investments than at the major banks. On the other hand, in terms of foreign currency funding, client-related deposits make up a smaller share, while the reliance on short-term market funding such as repos as well as FX and currency swaps is stronger than at the major banks (Chart IV-3-2). On average, regional banks hold sufficient liquid assets to nearly cover the expected outflow of funds under a stress situation. However, there are large differences among banks, and some may have to sell foreign currency-denominated securities under a stress situation. These banks need

to carefully monitor market liquidity and manage the risk limits they set, as well as make efforts to improve the effectiveness of their response to market stresses.

## *Foreign currency funding environment*

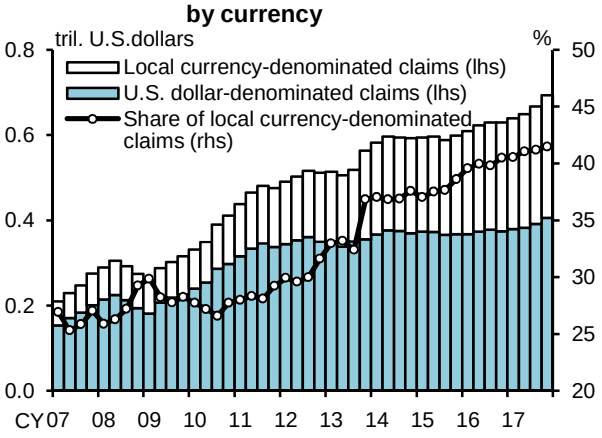
Looking at the amount of Japanese financial institutions' U.S. dollar funding through FX and currency swaps, while major banks, which have been aiming to bolster stable funding bases, have tended to restrain such funding, depository institutions that have actively engaged in market investment and institutional investors such as life insurance companies have continued to heavily use such funding (Chart IV-3-6). At the end of terms or in times of stress, liquidity in FX and currency swap markets tends to decline and U.S. dollar funding premiums tend to rise. Thus, financial institutions that heavily rely on funding in swap markets need to strictly enforce liquidity management.

**Chart IV-3-6: Amount of foreign currency funding via FX and currency swaps by Japanese financial institutions**



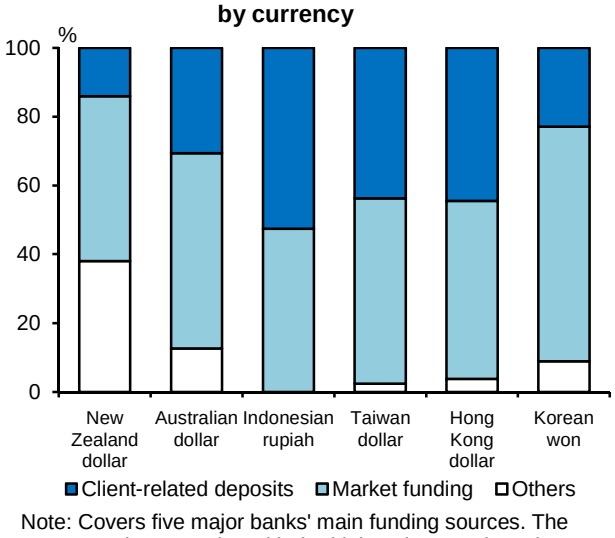

Note: 1. "Institutional investors" covers Japan Post Bank, the Norinchukin Bank, Shinkin Central Bank (from end-September 2014), and life insurance companies (members of the Life Insurance Association of Japan). The data from end-September 2017 for the life insurance companies are estimated based on the data for nine major insurance companies.
2. Latest data as at end-December 2017.
Source: Bloomberg; The Life Insurance Association of Japan; published accounts of each company; BOJ.

**Chart IV-3-7: Japanese banks' claims in Asia by currency**




Note: 1. "U.S. dollar-denominated claims" includes local currency-denominated cross-border claims and foreign currency except for U.S. dollar-denominated claims.
2. Latest data as at end-December 2017.
Source: BIS, "Consolidated banking statistics"; BOJ, "BIS international consolidated banking statistics in Japan."

**Chart IV-3-8: 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-December 2017.
Source: BOJ.

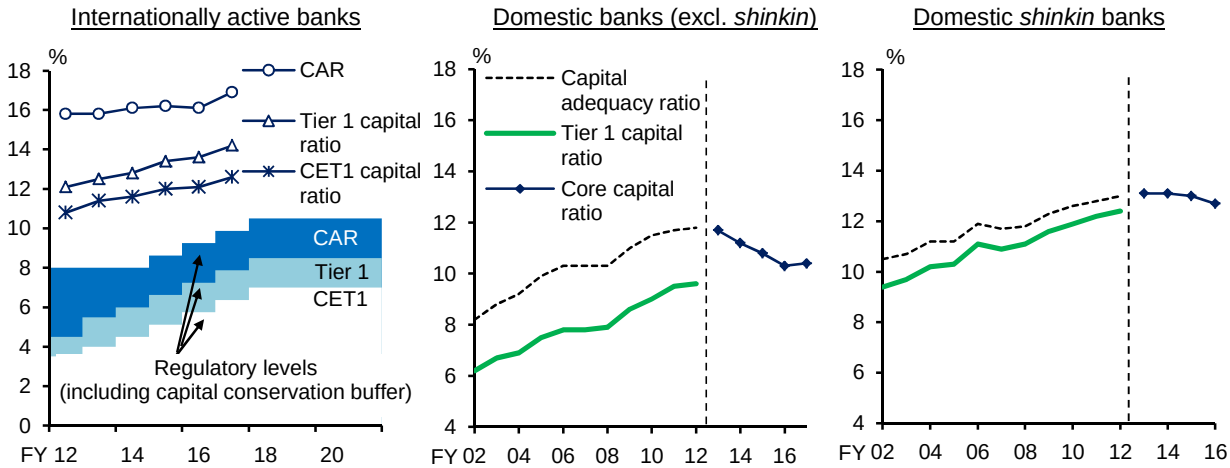
Meanwhile, the proportion of loans denominated in local currencies in total overseas loans by Japanese financial institutions has continued to trend up, especially in loans to Asia (Chart IV-3-7). Loan-to-deposit ratios have generally been on a downward trend, reflecting the fact that many

financial institutions have increased deposits at a faster pace than loans. However, for Asian currency funding, banks' dependence on market funding such as FX and currency swaps and interbank funding has remained high for several currencies (Chart IV-3-8). 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.).

## D. Financial institutions' capital adequacy

Finally, we examine financial institutions' capital adequacy. Financial institutions' capital adequacy ratios have been sufficiently above the regulatory requirements. As at the end of the first half of fiscal 2017, total capital adequacy ratios, Tier 1 capital ratios, common equity Tier 1 capital ratios (CET1 capital ratios) for internationally active banks, and core capital ratios for domestic banks significantly exceeded the regulatory requirements (Chart IV-4-1). Financial institutions will be able to adapt to the finalized Basel III framework that was agreed upon at the end of 2017. It strikes an appropriate balance between the stability of the financial system and the maintenance of the financial intermediation function, and provides an appropriate transitional period and phase-in arrangements.[26]

**Chart IV-4-1: 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 are calculated on a consolidated basis. The latest data in the left-hand and middle charts are as at end-September 2017 and the latest data in the right-hand chart are as at end-March 2017. The data take the phase-in arrangements into consideration.

Source: BOJ.

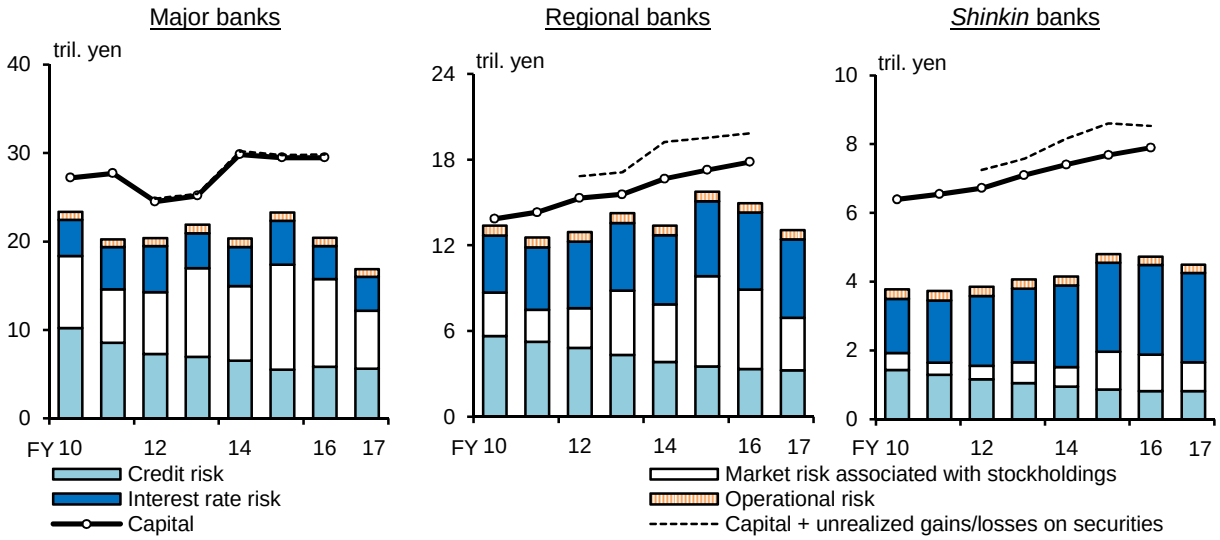
Moreover, financial institutions' capital levels have generally been adequate relative to the amount of the various types of risk they undertake (Chart IV-4-2).[27] Financial institutions are currently

[26] 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) of 1-2.5 percent (depending on their size and other characteristics) started to be implemented at the end of March 2016 and will become fully effective at the end of March 2019. Under the current phase-in 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 not to exclude certain assets from core capital. These arrangements will be phased out gradually. The moderate decline in the core capital ratios of domestic banks observed in Chart IV-4-1 is due to the gradual phasing out of the effects of these arrangements.

[27] Common methods and parameters (such as the confidence level and the holding period) are used to calculate the amount of risk borne by all financial institutions. Thus, the amount of risk presented here does not necessarily

judged to have sufficient loss-absorbing and risk-taking ability.

**Chart IV-4-2: 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 2017 data, (1) credit risk, foreign currency interest rate risk (excluding the risk associated with foreign currency-denominated bondholdings) and operational risk in the left-hand and middle charts are as at end-September 2017 and those in the right-hand chart are as at end-March 2017, 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-February 2018, and (3) yen interest rate risk (excluding the risk associated with yen-denominated bondholdings) as at end-December 2017.

Source: BOJ.

match the sum of those calculated internally by financial institutions as part of their risk management process. For the calculation methods used for each type of risk, see the notes to Charts IV-1-1, IV-2-3, IV-2-4, and IV-2-8. The amount of operational risk is assumed to correspond to 15 percent of gross operating profits.

## V. Assessment of the financial system's resilience against stress

The previous chapter indicates that financial institutions' capital levels are generally adequate relative to the amount of risk they undertake, and financial institutions currently have sufficient capacity to absorb losses and take on risks. However, there are two caveats with regard to this assessment. First, since the risk measures are calculated based on actual credit costs and market fluctuations observed in the past, if the economic recovery period becomes prolonged and volatility remains low, it is possible that those risk measures could underestimate the amount of potential risks financial institutions bear. Therefore, in order to see whether financial institutions are sufficiently resilient to risk, it is desirable to examine their capacity to absorb losses under potential severe stress scenarios, regardless of the recent favorable macroeconomic environment. Secondly, if financial institutions face chronic stress, such as the persistent decline in the population and the number of firms, which determine the secular demand for financial transactions, the current sufficiency of their level of capital does not necessarily guarantee the future stability of the financial system.[28] In other words, even if financial institutions currently have the capacity to absorb losses from acute stress such as the Lehman shock, their future capital may eventually be adversely affected if their core profitability continues to fall due to chronic stress. The following sections present a macro stress test that addresses the first caveat as well as an assessment of financial institutions' core profitability that addresses the second caveat.

### A. Macro stress testing

This section presents a stress test that assumes a tail event scenario in which financial and economic conditions at home and abroad deteriorate to a level comparable to those during the Lehman shock. This scenario is applied in every semiannual report. Since the simulation assumes a level of economic activity comparable to that observed during the Lehman shock, the more overheated the recent economic activities are, the greater the degree of stress to be applied. In other words, the degree of stress is calibrated countercyclically in examining the resilience of the financial system against stress and financial institutions' capital adequacy. In addition, as financial institutions' risk profiles and financial bases change from time to time, the impact of stress on the financial system could vary even for financial and economic stress of the same magnitude. The scenario presented in this stress testing exercise is a hypothetical one that is developed for the purpose of effectively conducting the above-mentioned examination and analysis. It should be noted that the scenario presented is not an indication of the likelihood of outcomes for the economy, asset prices, or other factors, nor should it be interpreted as the Bank of Japan's outlook.

The subjects of the stress test are 115 banks and 253 *shinkin* banks (accounting for approximately 80 to 90 percent of total credit outstanding), and the duration of stress is assumed to be 3 years, from April-June 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.[29] The model employed in the stress test in this *Report* contains various revisions from the model in previous issues of the *Report*. While the previous model did not explicitly distinguish between domestic and international businesses in modeling financial

[28] For details, see Hiroshi Nakaso, former Deputy Governor of the Bank of Japan, "New Frontier of Macroprudential Policy: Addressing Financial Institutions' Low Profitability and Intensified Competition," speech at the Kin'yu Konwa Kai (Financial Discussion Meeting) hosted by the Jiji Press in November 2017.

[29] 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.

institutions' loan interest rates and funding rates, the model employed in this *Report* specifies the interest rates in each business. Specifically, the model incorporates mechanisms by which (1) the intensified competition among financial institutions in Japan resulting from the persistent decline in the population and the number of firms exerts downward pressure on domestic loan interest rates, and (2) various risk premiums tend to be added on to foreign currency-denominated loan interest rates and funding rates in times of stress. As a result, the test estimates the profitability of domestic business somewhat more strictly than before, while the impact of stress, such as the contraction of overseas economies and financial market turmoil, is manifested more strongly for internationally active banks. The following sections discuss the specific contents and results of the stress testing exercise.[30]

## *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 moderate pace, Japan's economy will also continue its moderate expansion." In addition, it is assumed that JGB yields evolve, more or less in line with the implied forward rates priced into the yield curve as at late January 2018.

The baseline simulation results are as follows. As the Japanese and overseas economies expand moderately, financial institutions continue to increase lending (Chart V-1-1). However, domestic lending margins continue to narrow, reflecting the intensified competition resulting from chronic stress (Charts V-1-2 and V-1-3). Consequently, net interest income trends downward moderately mainly in domestic business (Chart V-1-4). Meanwhile, net non-interest income (such as fees and commissions for sales of investment trusts) increases, reflecting economic expansion as well as rising stock prices, and credit costs remain low, reflecting the favorable financial condition of firms (Chart V-1-5). As a result, despite the moderate decrease in net interest income, the capital adequacy ratios of both internationally active banks and domestic banks remain well above the regulatory requirements throughout the simulation period (Chart V-1-6).[31]

**Chart V-1-1: Loans outstanding**

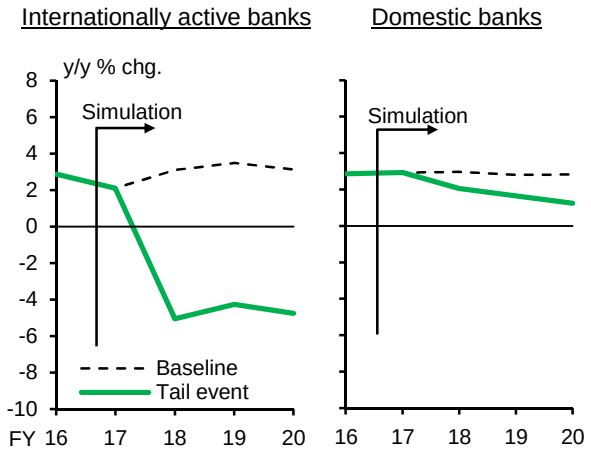
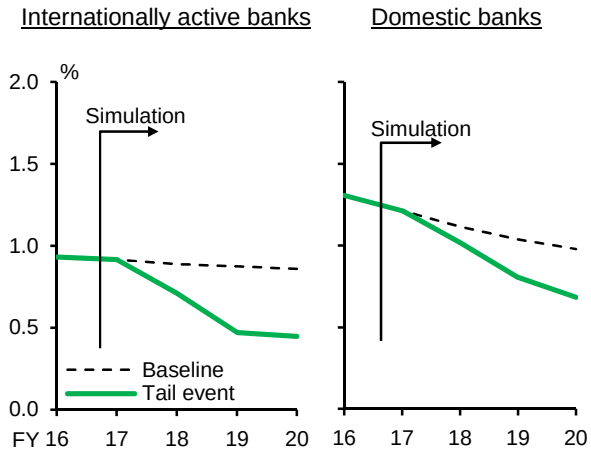



**Chart V-1-2: Lending margin**




[30] 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/fsr180419.htm/.

[31] The moderate decline in the core capital ratios of domestic banks is due to the gradual phasing out of the effects of transitory arrangements adopted during the transition to new regulatory requirements for the calculation of their capital adequacy ratios as well as the decline in net interest income.

**Chart V-1-3: Lending and funding rates by business sector**

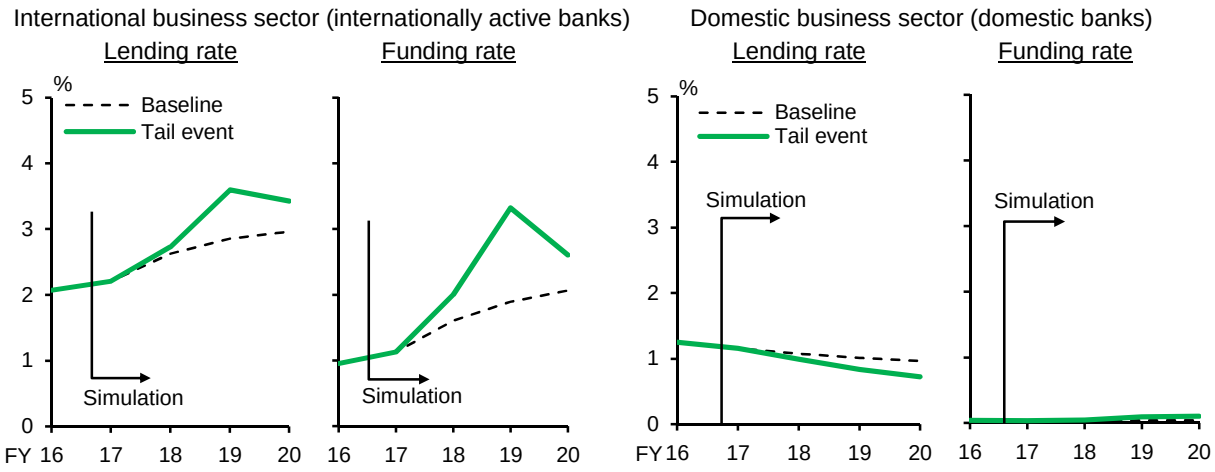



**Chart V-1-4: Net interest income**

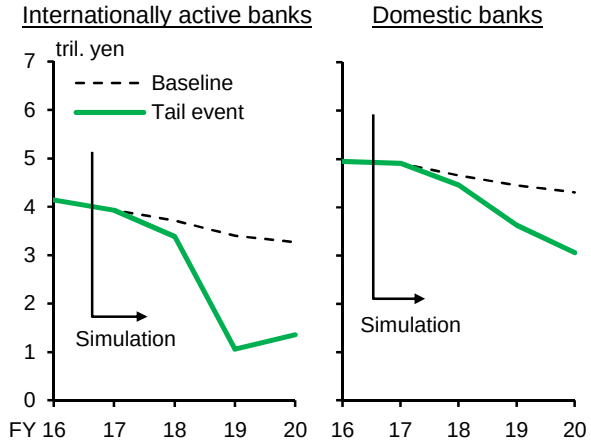
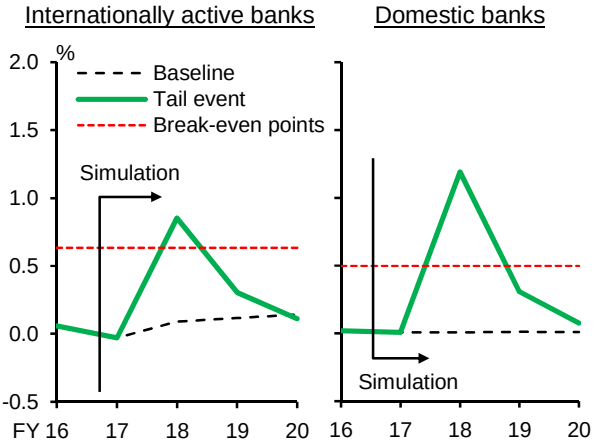
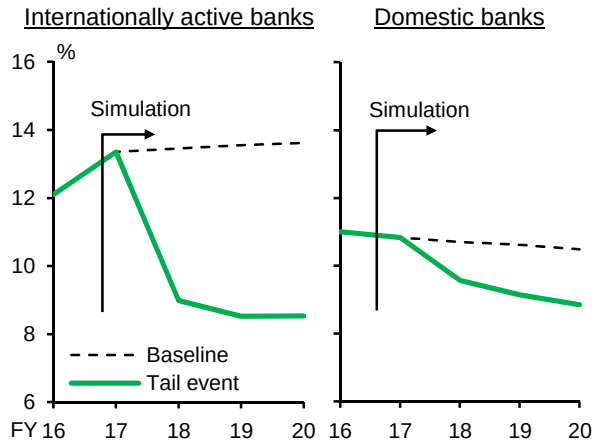



**Chart V-1-5: Credit cost ratios**




Note: "Break-even points" is as at the first half of fiscal 2017 (those for *shinkin* banks are as at fiscal 2016).

**Chart V-1-6: 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 phase-in arrangements into consideration.

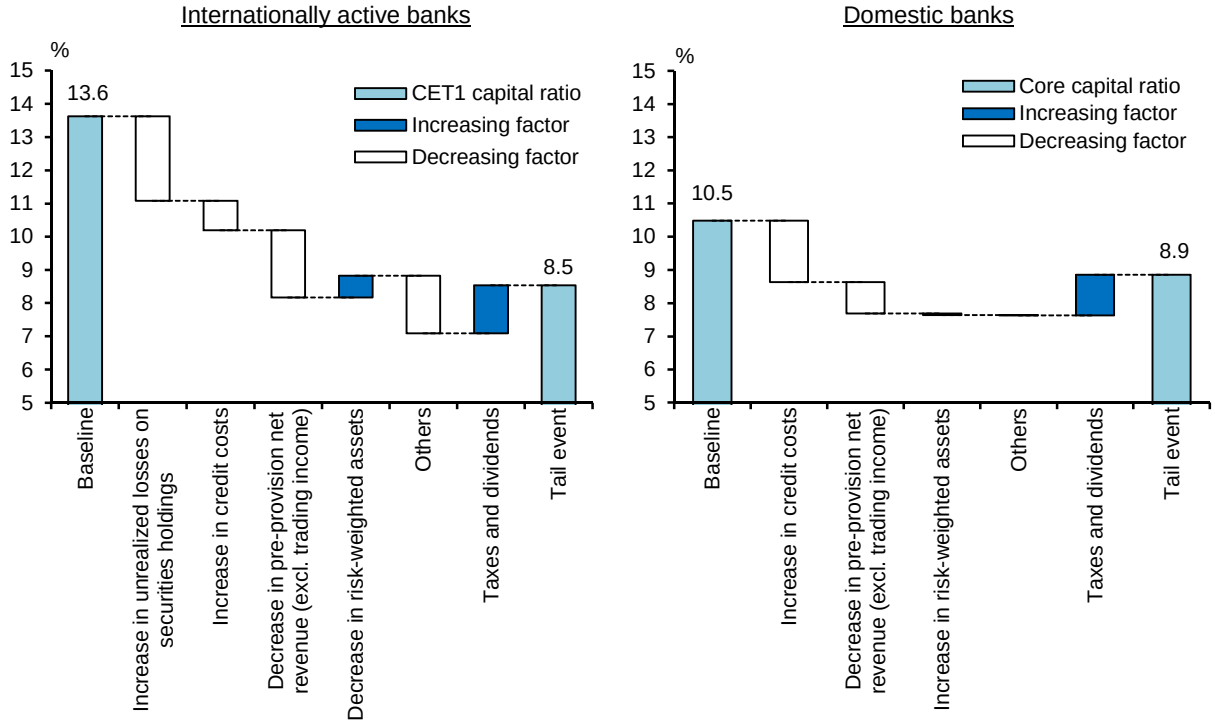
## *Tail event scenario*

The tail event scenario envisages a situation in which financial markets experience a decline in stock prices (TOPIX), appreciation of the yen against the U.S. dollar, and a decline in JGB yields of a degree similar to that during 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 during the Lehman shock. The simulation results based on this scenario are as follows. The loan growth rate falls due to financial institutions' tighter lending stances stemming from a decline in their profitability and capital adequacy ratios, as well as subdued demand for funds due to the economic downturn (Chart V-1-1). In particular, the total amount of loans decreases sharply at internationally active banks, reflecting a substantial decline in overseas loans due to the contraction of overseas economies as well as a fall in the yen-denominated value of loans caused by the appreciation of the yen. In addition, lending margins narrow more at internationally active banks (Charts V-1-2 and V-1-3). This is because, while foreign currency funding costs rise substantially, reflecting the instability in international financial markets and the decline in Japanese financial institutions' creditworthiness, internationally active banks find it difficult to pass on these increased costs to overseas loan interest rates in light of the sluggish demand for funds.[32] As a result, overall net interest income declines, and such decline is larger for internationally active banks, for which overseas loans account for a larger proportion of total loans (Chart V-1-4). In addition, internationally active banks incur unrealized losses on securities holdings in response to declines in stock prices at home and abroad, and see a decrease in net non-interest income, including fees and commissions for sales of investment trusts. Meanwhile, credit cost ratios at both internationally active banks and domestic banks rise to levels above their break-even points due to the deterioration of firms' financial condition, reflecting the significant economic downturn at home and abroad (Chart V-1-5).

For internationally active banks, the capital adequacy ratio falls by 5.1 percentage points

**Chart V-1-7: Decomposition of the CET1 capital ratio and the core capital ratio (fiscal 2020)**



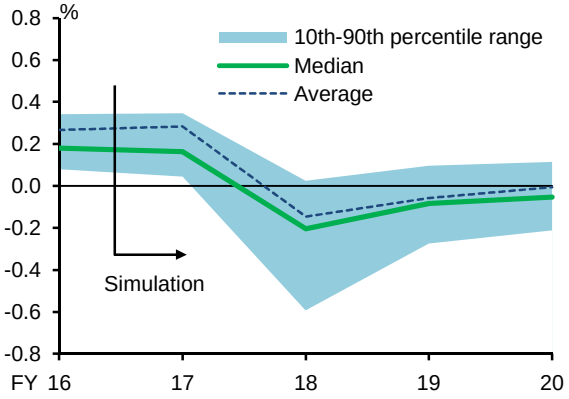

Note: 1. The charts indicate the contribution of each factor to the difference between the capital adequacy ratios at the end of the simulation period (as at end-March 2021) under the baseline and tail event scenarios. "Increase in unrealized losses on securities holdings" takes tax effects into account.
2. The left-hand chart shows the CET1 capital ratio of internationally active banks. The right-hand chart shows the core capital ratio of domestic banks. These take the phase-in arrangements into consideration.

[32] 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.

compared to the baseline scenario due to a decrease in pre-provision net revenue (PPNR) excluding trading income and an increase in unrealized losses on securities holdings. However, it remains above the regulatory requirement (Charts V-1-6 and V-1-7). For domestic banks, the capital adequacy ratio also declines by 1.6 percentage points, mainly due to an increase in credit costs and a decrease in PPNR (excluding trading income), but remains well above the regulatory requirement.

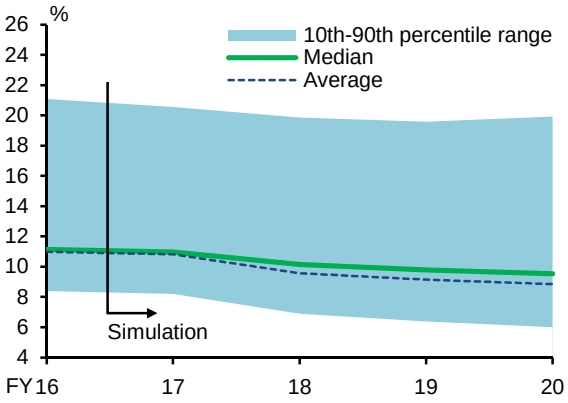
In sum, the simulation confirms that, on average, Japan's financial institutions are generally resilient against acute stress. However, it should be noted that there is some heterogeneity among financial institutions with regard to net income and capital adequacy ratios in the stress situation. About 80 percent of financial institutions incur net losses. Furthermore, the capital adequacy ratio of about a quarter of domestic banks exceeds the regulatory requirement (4 percent) yet falls short of the stability benchmark of 8 percent (Charts V-1-8 and V-1-9). It also should be noted that the simulation does estimate the impact of the downgrading of the hypothetical representative firm but does not take into account heterogeneity in firms' stress resilience arising from their size and financial condition. Under the continuing low interest rate environment, loans to firms that are susceptible to negative shocks have been increasing (see Chapter VI). Against this background, it is possible that the impact of a rise in credit costs at the time of a tail event could be larger than in the simulation here.

**Chart V-1-8: Distribution of financial institutions' net income (tail event scenario)**




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

**Chart V-1-9: Distribution of domestic banks' core capital ratios (tail event scenario)**

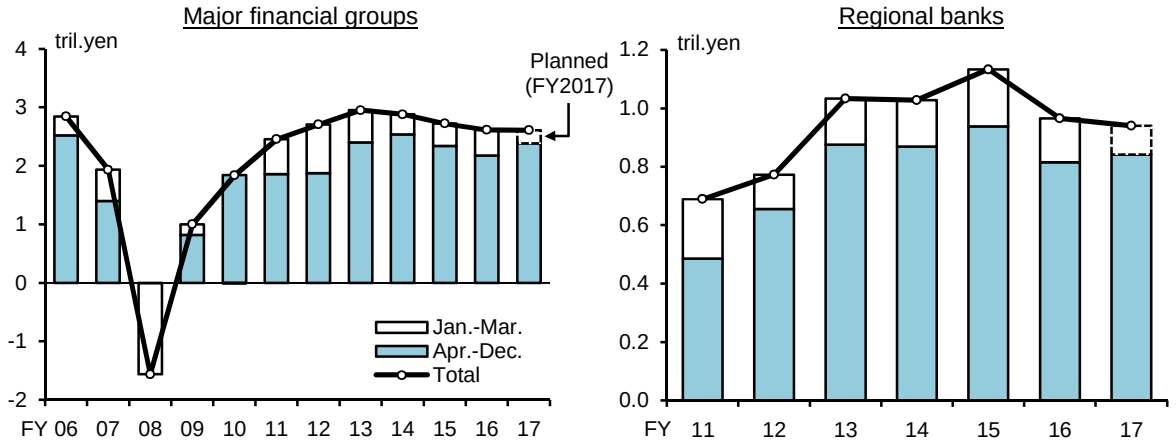



## B. Assessment of financial institutions' profitability

Although financial institutions' profits remain at a fairly high level from a long-term perspective, downward pressure on core profitability, especially in domestic deposit-taking and lending activities, has strengthened. While net income in the first 3 quarters of fiscal 2017 increased, supported by gains on sales of stocks and reversals of provisions for loan losses, net interest income fell (Charts V-2-1 and V-2-2). According to financial institutions' business plans, net income for the full fiscal year 2017 is expected to decline slightly. A major factor pushing down net interest income is the narrowing of deposit and lending margins under the continued low interest rate environment and the intensified competition among financial institutions, with the increase in loans being insufficient to offset the decline in interest margins.

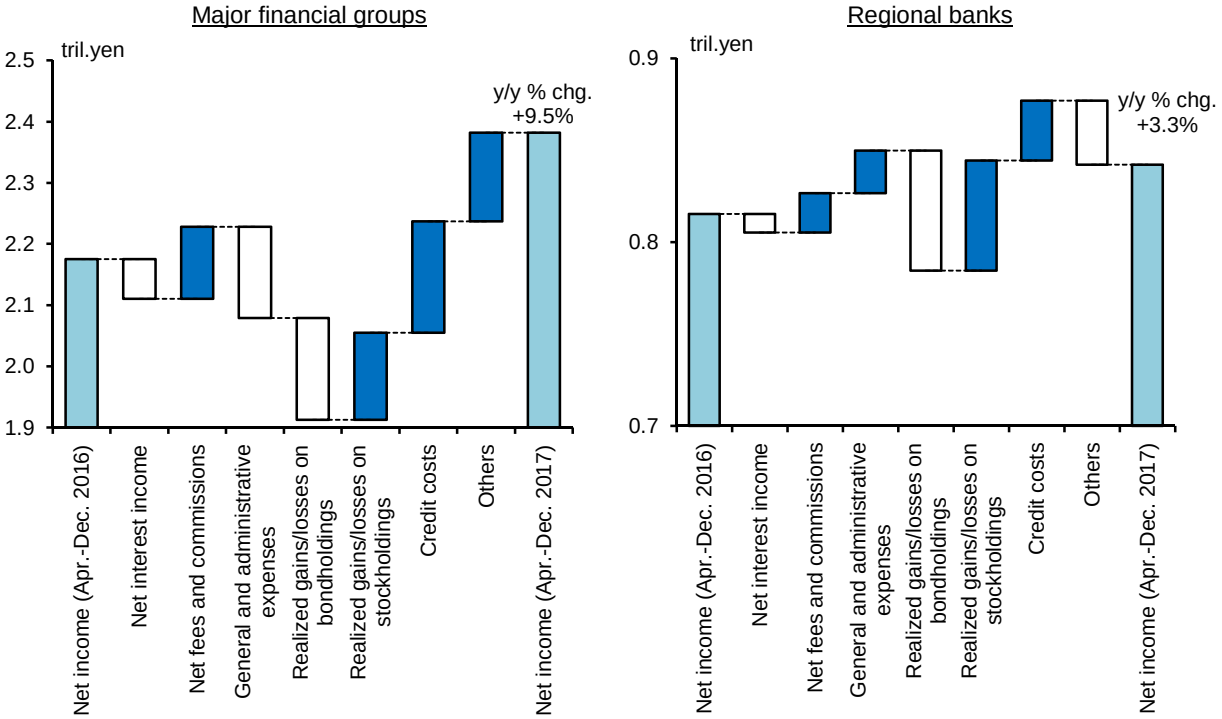
Given such severe profit environment, major financial groups are making full-scale efforts to improve business efficiency, focusing on (1) accelerating the integration of the business

**Chart V-2-1: Net income**




Note: The left-hand chart covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, Shinsei Bank, and Aozora Bank.
Source: Published accounts of each bank; BOJ.

**Chart V-2-2: Decomposition of change in net income from the previous year**



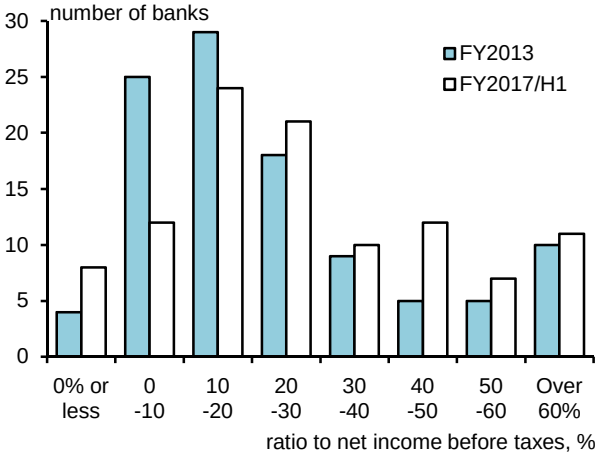

Note: The left-hand chart covers Mizuho Financial Group, Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, Resona Holdings, Sumitomo Mitsui Trust Holdings, Shinsei Bank, and Aozora Bank.
Source: Published accounts of each bank.

operations of their groups, (2) reviewing personnel and branch strategies, and (3) pushing ahead with digital strategies. Moreover, regional banks have reduced general and administrative expenses through improvement in business efficiency, and are making efforts to diversify revenue sources by expanding net non-interest income, for instance, by establishing securities subsidiaries and reviewing various fee structures, such as transfer and remittance fees (Box 1).[33] Meanwhile, a considerable number of regional financial institutions have maintained net income levels by making up for the decline in their PPNR (excluding trading income) through the realization of large

[33] For details, see "Trends in the Management of Regional Banks' Securities Subsidiaries," *Bank of Japan Review Series*, May 2018 (provisional, available in Japanese only).

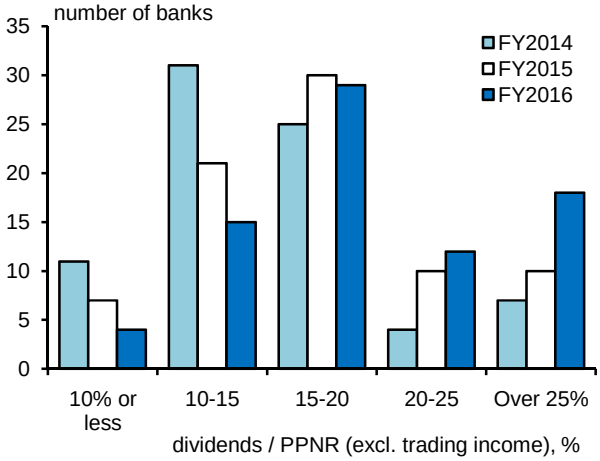
gains on sales of securities. As a result, the dependence of net income on realized gains on sales of securities has increased in recent years (Chart V-2-3). In addition, despite a decline in their PPNR (excluding trading income), some financial institutions have realized gains on sales of securities in order to maintain a higher dividend payout ratio (Chart V-2-4 and Box 2). This tendency can be marked for banks with a large share of foreign institutional shareholders.

**Chart V-2-3: Distribution of ratio of realized gains/losses on securities holdings to net income**




Note: 1. Realized gains/losses on securities holdings include profits from sales of investment trusts.
2. Covers regional banks.
Source: BOJ.

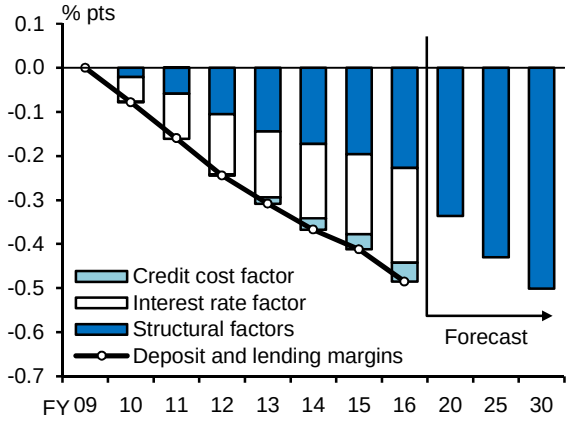
**Chart V-2-4: Profits and dividends among financial institutions**




Note: Covers regional banks and regional financial groups whose financial data from fiscal 2014 to 2016 are available.
Source: Nikkei, "NIKKEI ValueSearch"; BOJ.

Under capital adequacy regulations, unrealized gains on securities are not included in domestic banks' capital, but they do actually function as a capital buffer on an economic value basis. In fact, as shown in a past issue of the *Report*, financial institutions with large unrealized gains tend to actively increase their holdings of risky assets, while those with small unrealized gains tend to be cautious in doing so.[34] The persistent decline in the population and the number of firms will continue to exert structural downward pressure on financial institutions' deposit and lending margins (Chart V-2-5). Under such circumstances, it is no longer sustainable for financial institutions to continue to rely on realized gains on sales of securities in order to maintain their net

**Chart V-2-5: Factors for reduction in deposit and lending margins among regional financial institutions**




Note: 1. The chart indicates the decomposition of cumulative changes in deposit and lending margins from fiscal 2009, based on the panel estimation (covering the period from fiscal 2001 to 2016) for regional financial institutions.
2. In the estimation, financial institutions' deposit and lending margins are used as the dependent variable. The explanatory variables used are the population growth, the population aging, the number of branches in the business areas of each financial institution (representing "Structural factors"), the nonperforming loan ratio of each financial institution (representing "Credit cost factor"), and 5-year JGB yields (representing "Interest rate factor").
3. With regard to forecasting "Structural factors," the population growth and population aging forecasted by the National Institute of Population and Social Security Research are used. The number of branches in business areas is assumed to remain constant from fiscal 2016.

[34] For details, see Box 5 in the April 2017 issue of the *Report.*

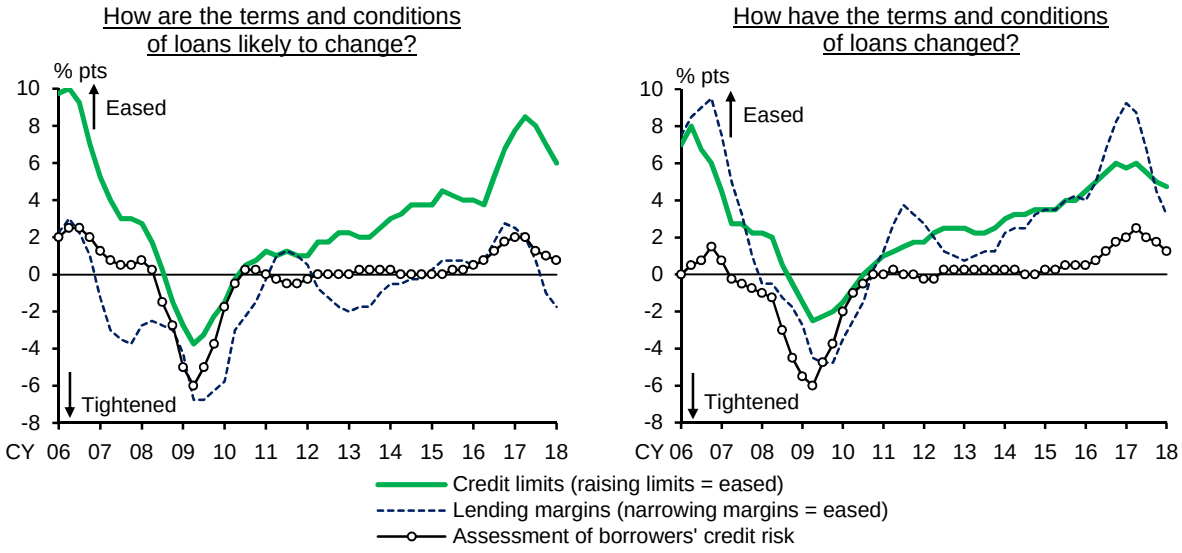
income and dividends at current levels. It should also be noted that continuing to unreasonably realize gains on sales of securities and pay dividends, both of which deviate from business plans, will reduce interest and dividend income on securities holdings and impair the capacity to absorb losses in the future. Therefore, it is important for financial institutions to consider desirable profit distribution, including how much to return to shareholders, while making efforts to secure sustainable profits based on medium- to long-term earnings forecasts that also incorporate the inevitable future decline in the population and the number of firms.

# VI. Financial institutions' credit risk taking and potential vulnerabilities of the financial system

As seen in Chapter III, financial institutions have been maintaining an active lending stance and increasing loans, especially for business fixed investment by small firms. The active extension of loans is a part of their portfolio rebalancing and has been contributing to an improvement in economic developments.[35] If such positive developments become even more widespread and lead to further improvements in economic activity and prices, financial institutions' profitability could also improve.

However, if financial institutions shift toward excessive risk taking in rebalancing their portfolios, financial imbalances could build up, thereby impairing the stability of the financial system from a longer-term perspective. In fact, financial institutions tend to be complacent in their perception of credit risk amid the prolonged benign macroeconomic conditions, such as economic expansion and low interest rates (Chart VI-1). In the case of market transactions, for example of corporate bonds, excessiveness of risk taking can be checked relatively easily based on price information such as credit spreads. However, in the case of loans extended by financial institutions, macro indicators such as the credit-to-GDP gap (the deviation of the credit to GDP ratio from its long-run trend) do not provide sufficient information on the quality of loans because they do not take into account the creditworthiness heterogeneity across borrowing firms. Thus, to examine potential vulnerabilities associated with credit risk taking in loan extension, we need to conduct an in-depth analysis and assessment of the links between borrowing firms' creditworthiness, loan interest rates, and loan amounts by utilizing granular bank-firm level microdata.

**Chart VI-1: DI for terms and conditions of loans to small firms**




Note: 1. Based on the proportion of responding financial institutions selecting each given choice, the DI for terms and conditions of loans (for changes in the next 3 months in the left-hand chart and for changes in the past 3 months in the right-hand chart) is calculated as follows:
DI = "eased considerably" + 0.5 * "eased somewhat" - 0.5 * "tightened somewhat" - "tightened considerably."
2. 4-quarter backward moving averages. Latest data as at January 2018.
Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

Based on these considerations, this chapter examines whether financial institutions' credit risk taking in the loan market could have a negative impact on the stability of the financial system in the

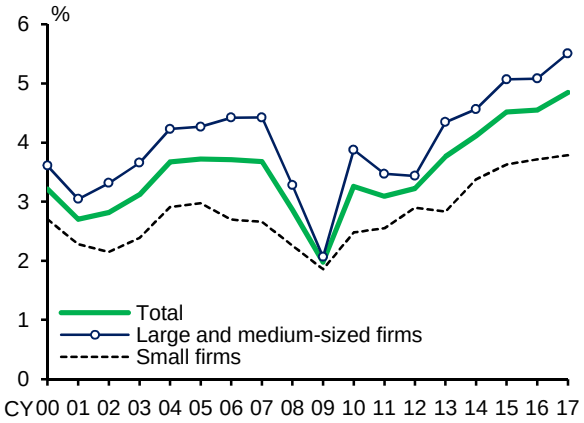
[35] In Box 2 in the April 2017 issue of the *Report*, using microdata from the *Tankan* (Short-Term Economic Survey of Enterprises in Japan), it was shown that the increasingly active lending stance of financial institutions was leading to an improvement in firms' business sentiment.

medium to long term through a deterioration in the quality of loans.

## A. Variations in financial condition across firms and distortion in loan interest rates

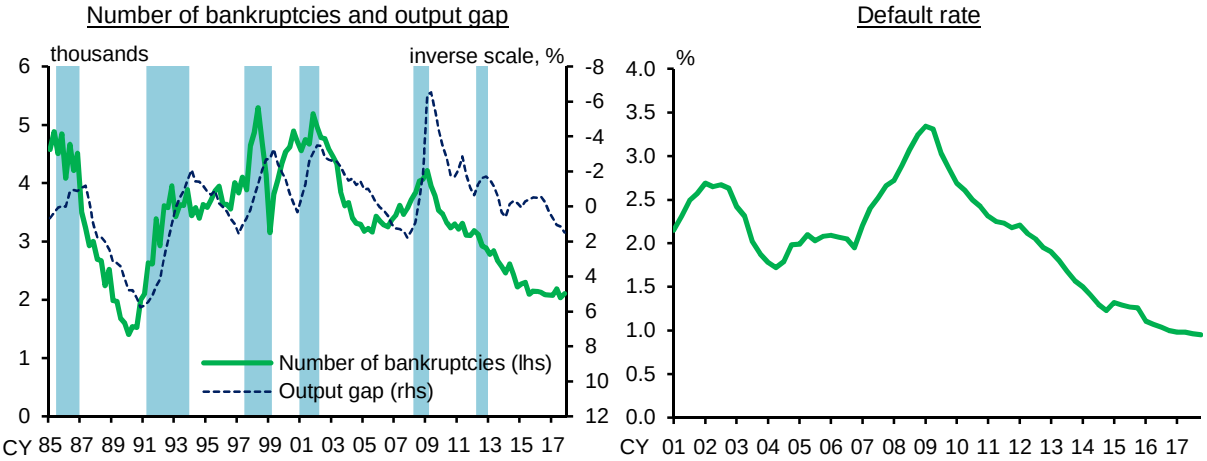
As shown in Chapter IV, financial institutions' credit costs have been at historically low levels (Chart IV-1-3). This reflects the fact that default rates have declined due to the improvement in firms' ability to pay interest, which has been driven by the drop in interest rates on the back of monetary easing and the record-high level of corporate profits boosted by the prolonged economic expansion (Chart VI-1-1). In fact, the number of corporate bankruptcies has declined to a level last seen during the bubble period in the latter half of the 1980s, and the default rate (in which default is defined as being overdue by more than 3 months or having one's borrower classification downgraded to "in danger of bankruptcy" or below) has fallen to the lowest level since the 2000s (Chart VI-1-2).

**Chart VI-1-1: Ratios of operating profits to sales by firm size**




Note: "Large and medium-sized firms" covers firms with capital of 100 million yen or more, and "Small firms" covers firms with capital of less than 100 million yen. Excludes financial and insurance industries.
Source: Ministry of Finance, "Financial statements statistics of corporations by industry."

**Chart VI-1-2: Number of bankruptcies and default rate**

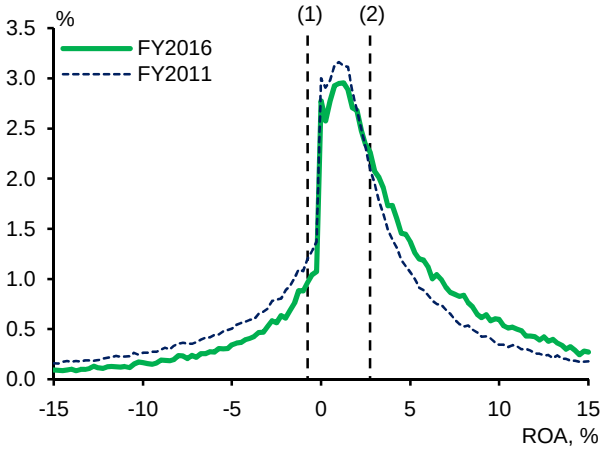



Note: 1. In the left-hand chart, latest data as at the October-December quarter of 2017. The shaded areas indicate recession phases.
2. In the right-hand chart, the figures indicate the values of the last month of each quarter. Latest data as at December 2017.
Source: The Risk Data Bank of Japan; Tokyo Shoko Research; BOJ.

However, the improvement in corporate profits is not uniform but varies across firms. Looking at the distribution of operating return on assets (ROA) for individual small firms, we find that over the most recent 5 years, the average has increased from -0.7 percent in fiscal 2011 to +2.8 percent in fiscal 2016 and this has mainly been driven by a thickening of the right tail of the distribution (Chart

VI-1-3). Nevertheless, a considerable number of firms have remained in the left tail of the distribution, struggling to improve their profitability despite the prolonged economic recovery. One possible reason for the long-term stagnation of such low-profitability firms is that they may have been unable to adapt to structural changes in global supply chains, which have been driven by globalization and exchange rate fluctuations. Another possible reason is that they may have been suffering, more so than other firms, from structural downward pressures, such as the aging and decline of the population in their regions.

**Chart VI-1-3: Distribution of small firms' ROA**




Note: (1) indicates the average for fiscal 2011 (-0.7%), and (2) indicates the average for fiscal 2016 (+2.8%).
Source: Teikoku Databank.

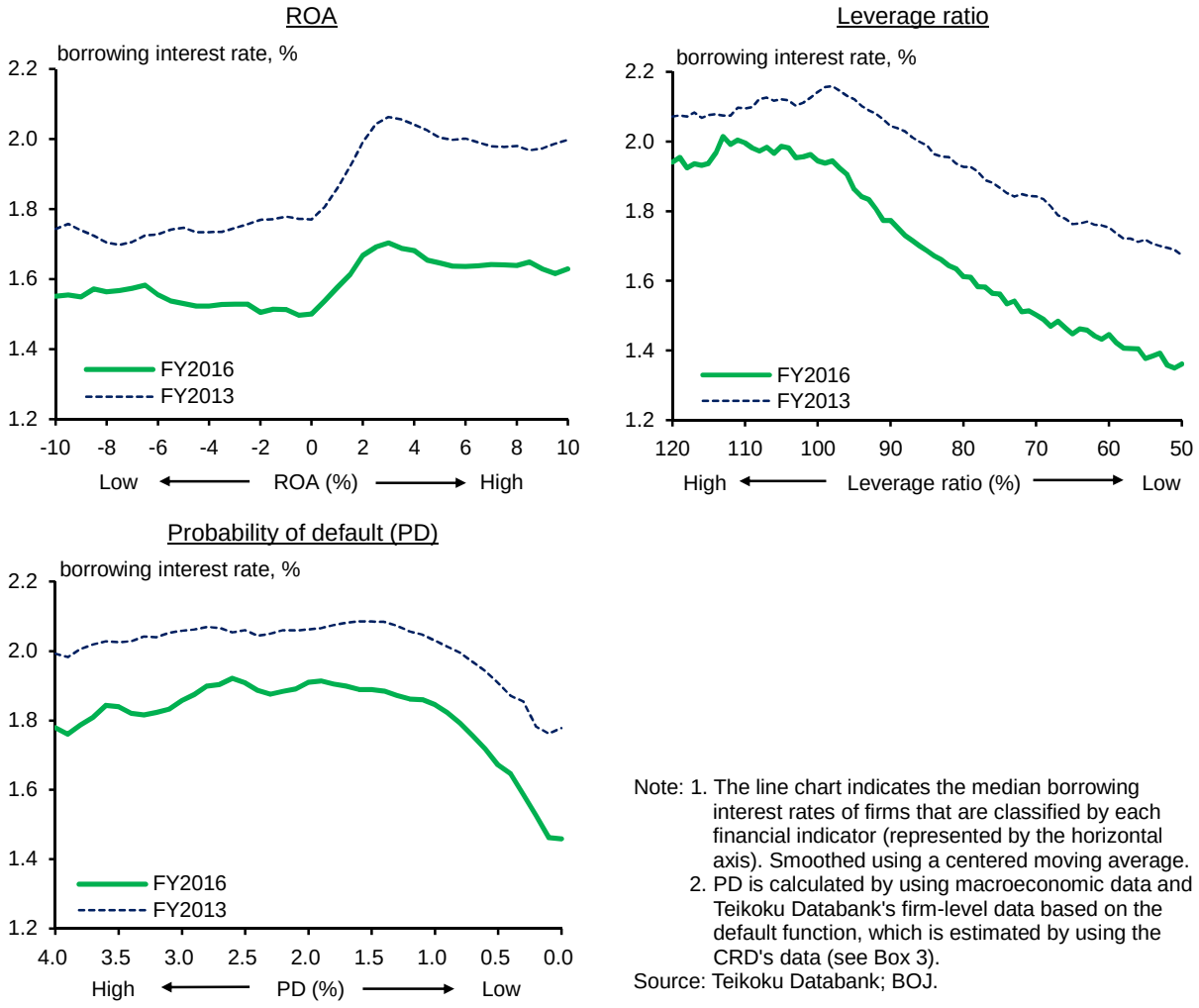
As seen above, financial condition, including profitability, varies significantly across firms. Meanwhile, looking at the relationship between firms' financial condition and loan interest rates, there are cases where loan interest rates do not match their credit risks. Generally, banks' loan interest rates are set so as to reflect the size of the borrowing firm's credit risk. Therefore, the higher the firm's credit risk, the higher this risk premium is supposed to be. However, some loan interest rates are set relatively low compared to high credit risks judged based on each of the following indicators: (1) profitability (operating ROA), (2) financial leverage (liabilities / total assets), and (3) probability of default (PD), which is estimated using various macroeconomic and financial variables including (1) and (2) (Chart VI-1-4).[36] For example, it is usually supposed that the higher the PD, the higher the loan interest rate should be. However, in the actual data, such relationship breaks down when the PD increases to a certain level. Furthermore, as the PD exceeds that level, the loan interest rate gradually falls, contrary to the expectation. This seems to partly reflect the fact that financial institutions have extended mainly short-term loans, rather than long-term loans, to firms with high PDs, since the repayment probability of long-term loans is more uncertain (Chart VI-1-5). However, the long-term borrowing ratio does not have a large impact on the interest rate level; in fact, even after adjusting the impact of the long-term borrowing ratio, the relationship between the borrowing interest rate and the credit risk (PD) is almost unchanged.[37] It has long

[36] In the analysis in this chapter, unless otherwise mentioned, a loan interest rate is defined as the effective borrowing rate calculated by dividing the total interest rate payments of a firm by the firm's total amount of borrowings. A loan interest rate calculated in this manner will decrease when the lender's agreement to allow for a repayment delay leads to a reduction in total interest rate payments, as well as when the financial institution sets a low contract interest rate on a new loan or agrees to lower the interest rate on an existing loan.

[37] Another possibility is that financial institutions set relatively low interest rates for firms with high credit risk in return for receiving high-quality collateral or obtaining credit guarantees. Data limitations make it difficult to verify the effects of collateral protection, but the data on small firms in the Credit Risk Database (CRD) enable us to quantitatively analyze how credit guarantees affect the relationship between firms' financial condition and their borrowing interest rates. An analysis using such data confirms that (1) effective loan interest rates increase by the amount of guarantee fees when the lender obtains a credit guarantee, while (2) the existence or absence of a credit guarantee does not significantly alter the shapes of the curves that relate ROA and leverage to borrowing

been the case that, at the request of a firm facing financial difficulties, financial institutions have set low contract interest rates on a new loan or agreed to lower the interest rate on an existing loan. In recent years, however, financial institutions may have been lowering loan interest rates relative to the borrower's credit risk on their own initiative to increase loans amid intensifying lending competition. In other words, by lowering loan interest rates, financial institutions may be trying to tap the funding needs of firms that are sensitive to interest rates.

**Chart VI-1-4: Firms' financial condition and borrowing interest rates**




Note: 1. The line chart indicates the median borrowing interest rates of firms that are classified by each financial indicator (represented by the horizontal axis). Smoothed using a centered moving average.
2. PD is calculated by using macroeconomic data and Teikoku Databank's firm-level data based on the default function, which is estimated by using the CRD's data (see Box 3).
Source: Teikoku Databank; BOJ.

In the following, we define a "low-return borrower" as a firm in relatively weak financial condition, whose borrowing interest rate is low relative to its credit risk. The name is derived from the fact that loans to such firms have a low risk-adjusted return for the lender. The more specific definition focuses on the relationship between the borrowing interest rate and the two variables, the operating ROA and the financial leverage. We have selected these two variables from various financial variables that can have an impact on firms' PDs and eventually affect a lender's future credit costs. Using these variables, a low-return borrower is defined as a borrowing firm that meets one of the following two criteria in 2 consecutive years, and we refer to other firms as "other borrowers" (or "others" for short).[38]

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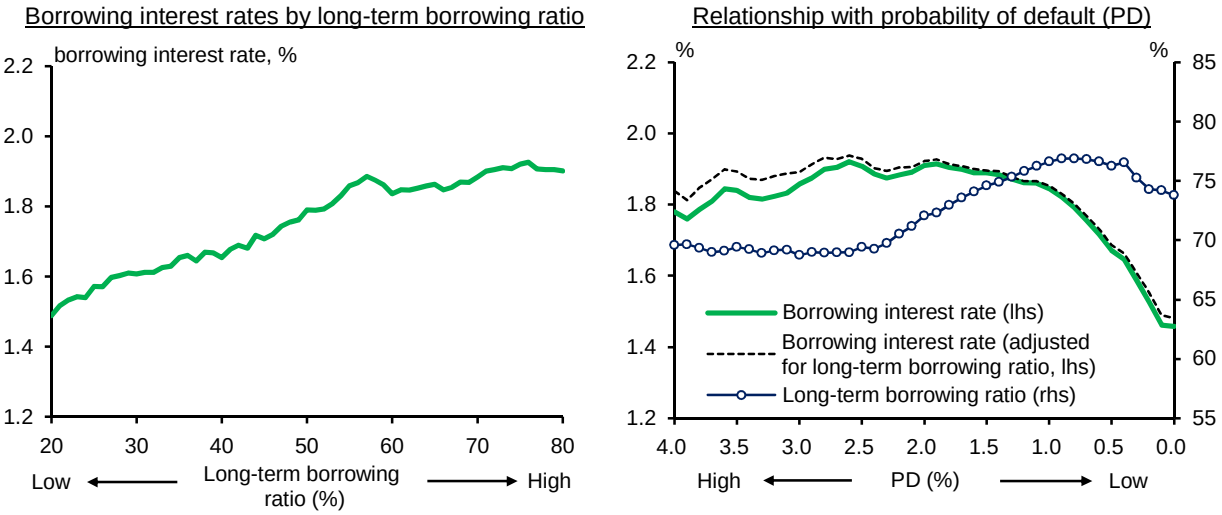
interest rates (Chart VI-1-4). It is therefore unlikely that the protection afforded by a credit guarantee is the main reason for the distortion in interest rates observed in Chart VI-1-4.

[38] The reason the definition requires that one of the two criteria be met in 2 consecutive years is to ensure that only firms that suffered from continuing financial difficulties are selected, while avoiding the inclusion of those that happened to have a temporarily weak reading in 1 fiscal year. In order to control industry differences, low-return

(1) ROA criterion: The firm's operating ROA is below the median of the distribution of all firms, but its borrowing interest rate is lower than that for the most creditworthy firms in the ROA distribution (i.e., the firms in the top 10 percent in the distribution).

(2) Leverage criterion: The firm's financial leverage is above the median of the distribution of all firms, but its borrowing interest rate is lower than that for the creditworthy firms in the financial leverage distribution (i.e., the firms in the bottom 50 percent in the distribution).

**Chart VI-1-5: Long-term borrowing ratios and borrowing interest rates**




Note: 1. Long-term borrowing ratio = long-term borrowings / total borrowings.
2. The left-hand chart indicates the median borrowing interest rates of firms that are classified by their long-term borrowing ratios. The right-hand chart indicates the median values of borrowing interest rates and long-term borrowing ratios of firms that are classified by their PD. The data in both charts are as at 2016. Smoothed using a centered moving average.
3. In the right-hand chart, "Borrowing interest rate (adjusted for long-term borrowing ratio)" is calculated as follows. (1) Estimate the relationship between borrowing interest rates and long-term borrowing ratios based on the left-hand chart. (2) By using the estimated relationship, calculate changes in borrowing interest rates by assuming that all firms have the same long-term borrowing ratio -- it is set at 75 percent in the chart.
Source: Teikoku Databank; BOJ.

A couple of remarks should be made regarding the above definition of low-return borrowers. First, the definition is centered on the distributions of firms' financial indicators. The reason for this is that the "through-the-cycle" PDs (i.e., PDs calculated by smoothing out the effects from business-cycle fluctuations) of firms in the less creditworthy part of the distribution are higher than those in the other part of the distribution, implying that such firms' credit risks to financial institutions are relatively high (Box 3). Second, the definition refers to firms' borrowing interest rate as well as financial indicators. This is to take into account whether the borrowing interest rate (which is the return to the lender) adequately reflects the credit risk of the borrower firm. "Low-return borrowers" are firms for which the return does not match the risk; therefore, a firm with high credit risk is not identified as a low-return borrower if its borrowing interest rate is high enough to match the risk.[39]

The share of low-return borrowers in the total number of small firms (low-return borrower share)

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borrowers are identified by industry. Further, since firms with extremely low leverage hardly have any borrowings, their borrowing interest rates may not be strongly associated with their financial health. For this reason, in the leverage criterion, we define the creditworthy firms relatively widely to include those in the bottom 50 percent in the financial leverage distribution.

[39] Once general and administrative expenses are taken into account, the absolute level of return on loans to many borrowers, including financially sound firms, has actually declined amid the long-term narrowing of lending margins. The definition of "low returns" in this chapter does not focus on such absolute level of return on loans. Based on the definition, a firm is identified as a low-return borrower if its credit risk is higher than that of financially sound firms and if, nonetheless, its loan interest rate is not higher than that of financially sound firms.

has been on a slight upward trend since the Lehman shock, albeit with some fluctuations (Chart VI-1-6).[40] Moreover, after declining until 2010, the share of loans to low-return borrowers in the total amount of loans to small firms (loan share of low-return borrowers) has been rising at a faster pace than the low-return borrower share.[41] The most recent loan share of low-return borrowers is at more or less the same level as in the early 2000s, when financial institutions had to deal with nonperforming loan problems after the financial crisis in Japan (Chart VI-1-7). The rise in the loan share of low-return borrowers reflects an increase in the average size of loans per firm as well as a

**Chart VI-1-6: Low-return borrower share**

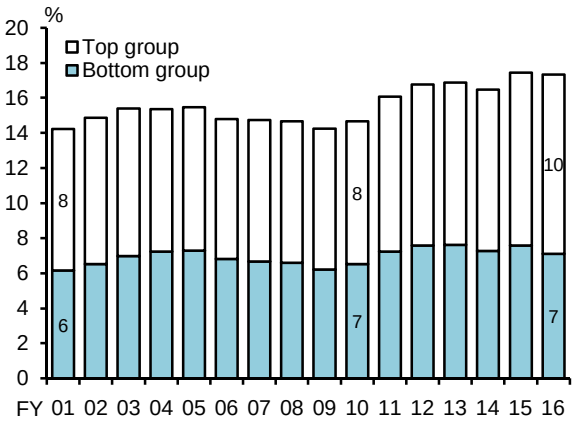
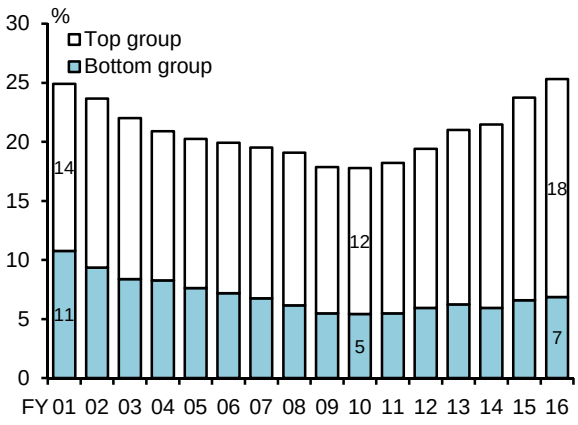
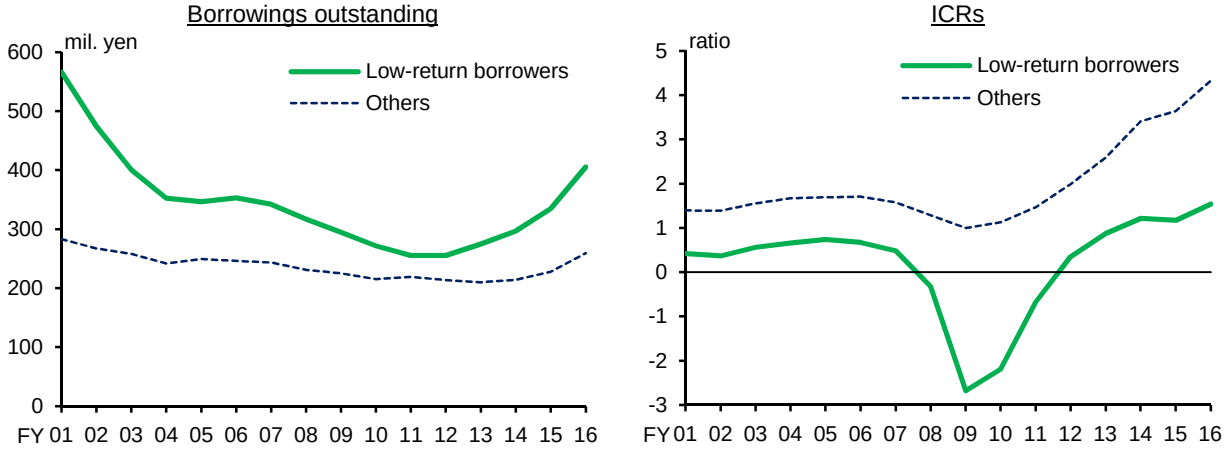



**Chart VI-1-7: Loan share of low-return borrowers**




Note: Low-return borrowers are classified into (1) "Bottom group," consisting of those whose ROA fell into the bottom 25 percent of firms for 2 consecutive years or whose leverage ratio fell into the top 25 percent for 2 consecutive years, and (2) "Top group," consisting of all other low-return borrowers. Other charts in this chapter follow the same classification.
Source: Teikoku Databank.

**Chart VI-1-8: Financial indicators of low-return borrowers (1)**




Note: Borrowings outstanding is the average of the distributions of each firm group, and ICR is the median of the distributions.
Source: Teikoku Databank.

[40] The reasons that the low-return borrower share decreased slightly in the wake of the Lehman shock include (1) the fact that low-return borrowers exited the market as a result of bankruptcy, etc., and (2) the fact that, due to the large negative macro shock, firms across the board saw a large deterioration in their financial condition, resulting in a substantial "reshuffling" of the ROA and leverage distributions (that is, the positions of some former low-return borrowers in the distributions improved relatively).

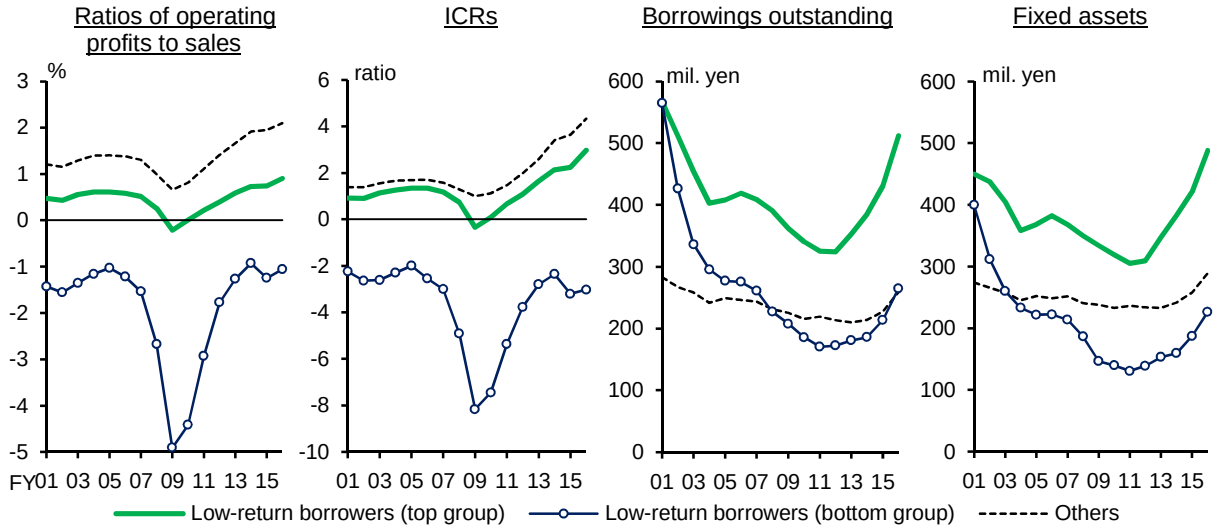
[41] The broad picture of the historical developments in the loan share of low-return borrowers does not change if we alter the thresholds for the borrowing interest rate in the two criteria. For example, even if we raise the thresholds, the loan share of low-return borrowers still follows a moderate upward trend. Meanwhile, the average ROA of low-return borrowers changes depending on the thresholds. More specifically, it is clearly lower if the thresholds for the borrowing interest rate are set lower. This likely reflects (1) cases where financial institutions agree to lower the interest rate on an existing loan at the request of firms in a weaker financial position and/or (2) cases where financial institutions set lower interest rates on new loans on their own initiatives to tap the funding needs of firms with lower profitability.

moderate increase in the low-return borrower share (Chart VI-1-8).

## B. Causes of the rise in the loan share of low-return borrowers

As seen in the previous section, the loan share of low-return borrowers has steadily been increasing since around 2010 (Chart VI-1-7). Looking at the breakdown, the share of loans to the "top group" of such borrowers (i.e., those in relatively favorable financial condition) has been increasing in recent years. This is in contrast to the developments observed during the early 2000s, when the share was high for loans to the "bottom group" (i.e., those with particularly low profitability and high leverage). In terms of financial condition, there has been a considerable difference between the top group and the bottom group. Furthermore, in the early 2000s, the amount of borrowings by the bottom group (and nonperforming assets financed by these loans) was massive (Chart VI-2-1). In contrast, the increase in borrowings by the top group (and equipment assets financed by these loans) has been pronounced in recent years.[42] These observations suggest that the underlying mechanism for the recent increase in loans to low-return borrowers may be fundamentally different from the mechanism observed during Japan's past financial crisis. Specifically, until the early 2000s, financial institutions seem to have increased so-called "forbearance lending" to high-risk firms (i.e., firms that were highly likely to default without financial support) to avoid incurring credit costs, amid concern over their possible capital shortages due to nonperforming loan problems.[43] In contrast, the recent increase in loans to low-return borrowers seems to reflect the fact that financial institutions, equipped with strong balance sheets, have been actively taking on credit risk mainly by extending loans to so-called "middle-risk firms." Such behavior has likely been driven by the stronger downward pressure on

**Chart VI-2-1: Financial indicators of low-return borrowers (2)**




Note: Ratio of operating profits to sales and ICR are the median of the distributions of each firm group, and borrowings outstanding and fixed assets (per firm) are the average of the distributions. Latest data as at fiscal 2016.
Source: Teikoku Databank.

[42] In Chart VI-2-1, the amounts of borrowings and tangible fixed assets of the bottom group of low-return borrowers have also been increasing recently, albeit less than the top group. This is because the chart shows the average per firm and more strongly reflects the developments of large-scale firms in the bottom group. Excluding these firms, the amounts of borrowings and tangible fixed assets have been more or less unchanged recently -- the medians of the bottom group have been more or less flat, although they are not shown in the chart.

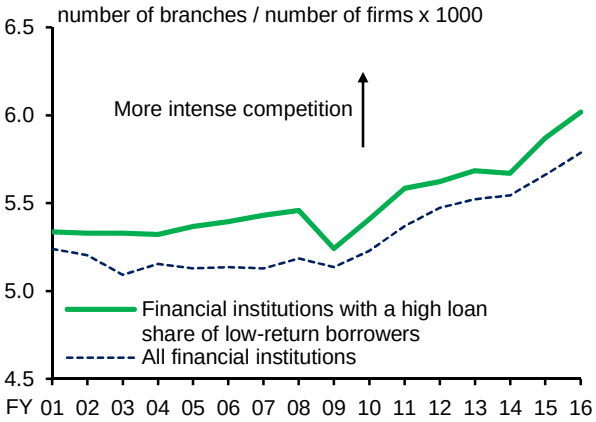
[43] In Europe, some financial institutions saw an increase in nonperforming loans in the wake of the sovereign debt crisis. As with Japanese financial institutions until the early 2000s, they appear to have extended "forbearance lending" to firms with low interest payment capacity in order to avoid an increase in their credit costs. For details, see Box 1 of the November 2017 issue of the European Central Bank's *Financial Stability Review*.

lending margins amid the intensified lending competition among financial institutions as well as the prolonged monetary easing (Box 4).

### *Impact of competition among financial institutions*

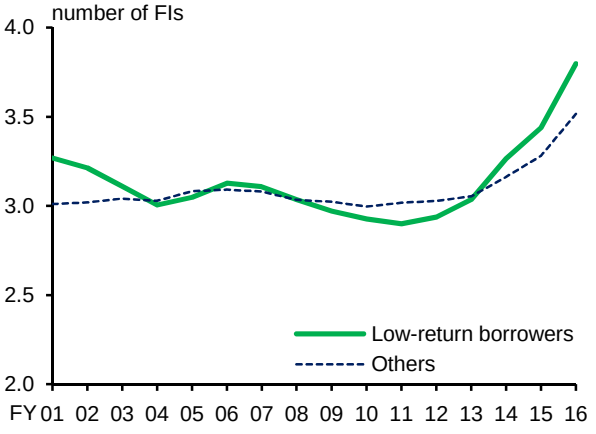
As examined in detail in the previous issue of the *Report*, competition among financial institutions has been intensifying, particularly in loan markets, amid the downward trend in the demand for financial intermediation services due to the decline in the number of firms and the population.[44] The indicator for the degree of financial institutions' competition, calculated based on the ratio of the number of financial institutions' branches to the number of firms, started to rise around 2010 (Chart VI-2-2). This suggests that competition among financial institutions' branches has further intensified in recent years. Under these circumstances, the branches have been trying to strengthen their business with corporate clients in search of new profit opportunities and seem to be widening the range of firms to which they extend loans, particularly with respect to middle-risk

**Chart VI-2-2: Degree of branch competition among financial institutions**



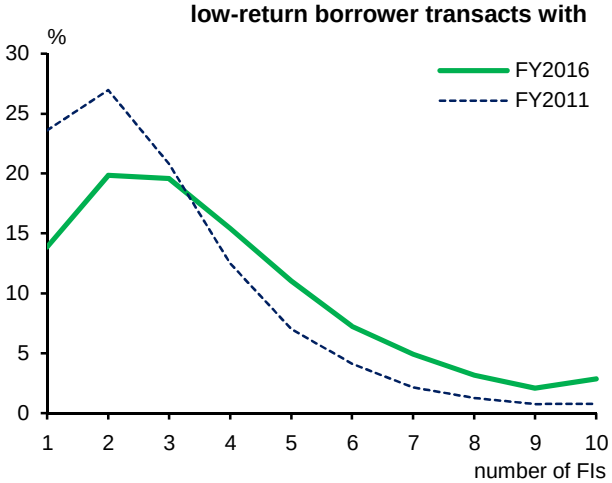

Note: 1. The degree of branch competition is calculated as follows. (1) As an index of branch overcapacity, the ratio of the number of financial institutions' branches to the number of firms is calculated for each prefecture. (2) To see how each financial institution's loans to firms are concentrated in areas with intense branch competition, its client firms are grouped based on the prefecture where their headquarters are located, and thereby associated with the prefecture-level overcapacity index. (3) The degree of branch competition that each financial institution is facing is calculated as the weighted average of the overcapacity index by using the share of each loan to the financial institution's total loans as weights.
2. The dashed and solid lines indicate the median of the degree of branch competition for all financial institutions and for financial institutions whose loan share of low-return borrowers is higher than the top 25th percentile, respectively.
Source: The Japan Financial News; Ministry of Internal Affairs and Communications; Teikoku Databank.

**Chart VI-2-3: Number of financial institutions that each small firm transacts with**




Note: The chart indicates the median value for each firm group.
Source: Teikoku Databank.

**Chart VI-2-4: Distribution of the number of financial institutions that each low-return borrower transacts with**



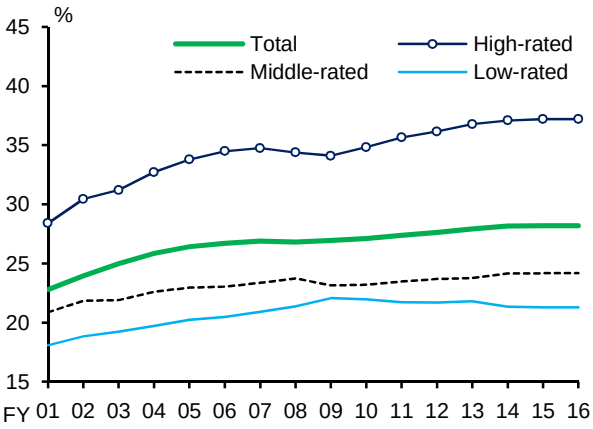

Source: Teikoku Databank.

[44] For details, see Chapter VI, Section C. "Competitive environment for financial institutions" in the October 2017 issue of the *Report.*

local firms within their business area. In fact, small firms have transacted with more financial institutions in the past 5 years than before, and this is particularly evident for low-return borrowers (Charts VI-2-3 and VI-2-4).

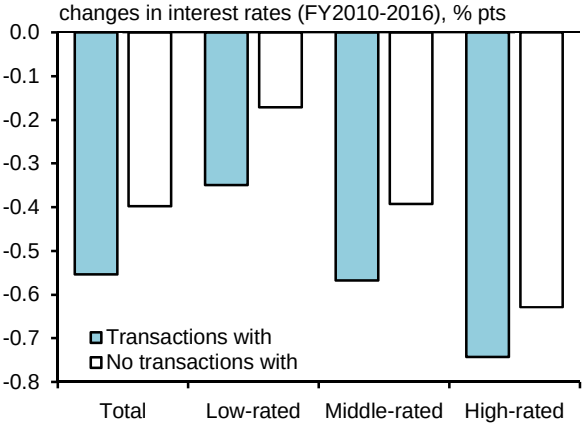
Furthermore, the presence of government financial institutions seems to have contributed to the intensification of lending competition among financial institutions. The share of firms that transact with both private and government financial institutions has been on a gradual upward trend over the long term, and there have been no signs of a decline despite the recent economic expansion (Chart VI-2-5). It is true that government financial institutions partly supplement the function of private financial institutions. Looking at firm-level borrowing interest rates, however, firms that transact with government financial institutions have experienced a larger decline in interest rates than firms that transact only with private financial institutions, partly due to the effects of various finance-related policy measures. Thus, there is a possibility that competition to lower loan interest rates, including that with government financial institutions, has been further intensifying (Chart VI-2-6).

**Chart VI-2-5: Share of firms that have transactions with both private and government financial institutions**



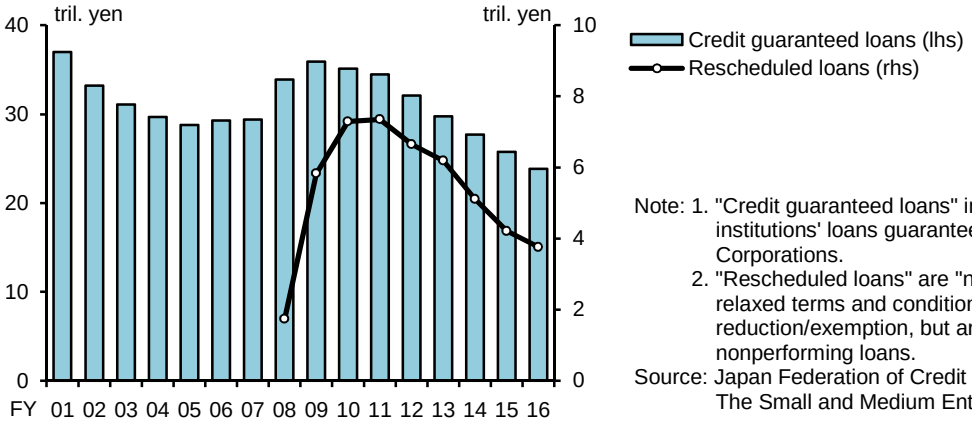

Note: 1. The ratio of the number of small firms that have transactions with both private and government financial institutions to the number of small firms that have transactions with private financial institutions.
2. In each fiscal year, firms are classified as "High-rated" if their rating is in the top 25 percent, "Middle-rated" if their rating is within the 25-75th percentile range, and "Low-rated" if their rating is in the bottom 25 percent.
Source: Teikoku Databank.

**Chart VI-2-6: Transactions with government financial institutions and declines in borrowing interest rates**




Note: 1. "Transactions with" indicates small firms that transact with government financial institutions, and "No transactions with" indicates small firms that do not. For each firm group, the average change in borrowing interest rates is calculated.
2. For the classification of ratings, see the note in Chart VI-2-5.
Source: Teikoku Databank.

**Chart VI-2-7: Credit guaranteed loans and rescheduled loans**



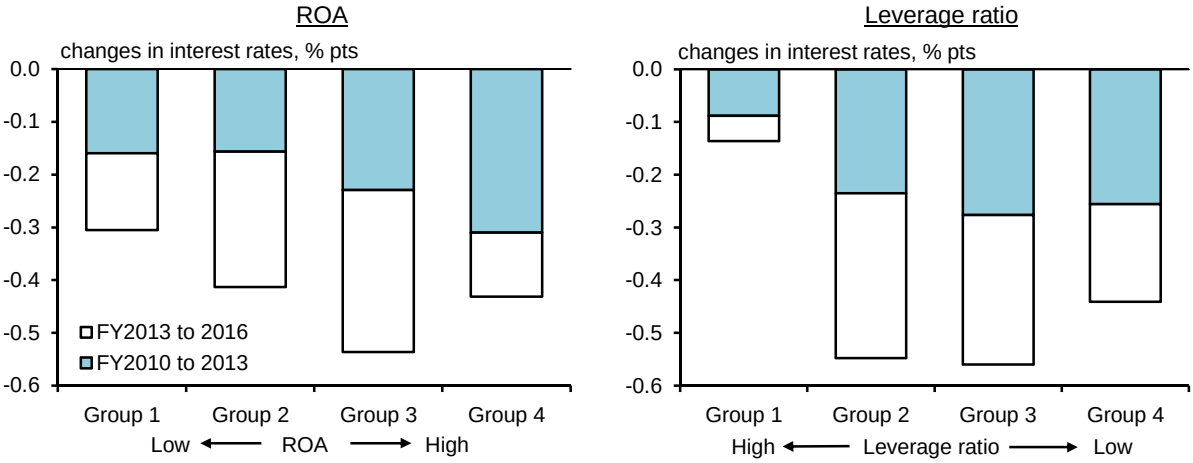

Note: 1. "Credit guaranteed loans" indicates private financial institutions' loans guaranteed by Credit Guarantee Corporations.
2. "Rescheduled loans" are "need attention" loans with relaxed terms and conditions, including interest rate reduction/exemption, but are not classified as nonperforming loans.
Source: Japan Federation of Credit Guarantee Corporations; The Small and Medium Enterprise Agency; BOJ.

In relation to this point, various policy measures introduced after the Lehman shock, such as the implementation of the SME Finance Facilitation Act and the expansion of the Credit Guarantee System, may also have contributed to some extent to the increase in loans to low-return borrowers. However, the outstanding amounts of both credit guaranteed loans and rescheduled loans have recently been on declining trends from their peaks after the wake of the Lehman shock (Chart VI-2-7). Therefore, it is unlikely that these policy measures are a major factor behind the upward trend in the loan share of low-return borrowers since 2010.

### *Effects of monetary easing*

In addition to intensified lending competition among financial institutions, the prolonged monetary easing has also likely helped boost lending to low-return borrowers, particularly middle-risk firms, through the portfolio rebalancing channel. Looking at the decline in loan interest rates from 2010 by firm characteristics, until around 2013, the decline for firms in more favorable financial condition (a high ROA and low leverage) was relatively large (Chart VI-2-8). This means that the effects of monetary easing initially materialized in the relatively low risk zone. Subsequently, as monetary easing continued, the decline in loan interest rates in the low risk zone gradually became smaller, while the decline in the middle risk zone became larger. Meanwhile, the decline in the high risk zone (the lowest ROA and the highest leverage) has remained limited.

**Chart VI-2-8: Declines in loan interest rates by firm group**




Note: Small firms are categorized into four groups by quartile of their ROA and leverage ratios, and the average change in interest rates is calculated for each group.
Source: Teikoku Databank.

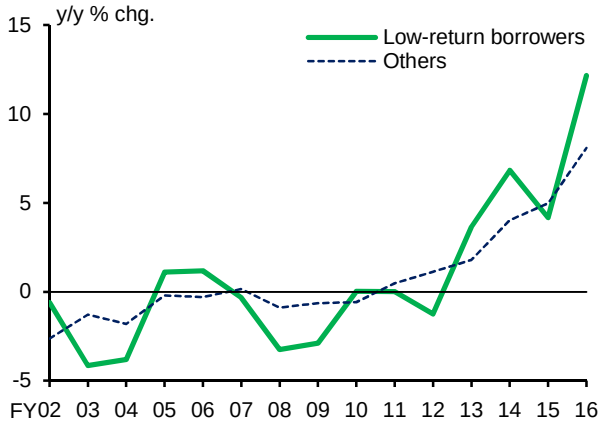
Middle-risk firms tend to be highly dependent on bank loans because they hold a smaller amount of internal funds compared to financially sound firms. Due to their relatively low profitability, however, middle-risk firms' ability to repay their debt is relatively low. Thus, even when they are keen to increase their business fixed investment to boost profits, high borrowing interest rates tend to make them reluctant to increase their borrowings. In other words, unlike financially sound firms with abundant internal funds, middle-risk firms are highly sensitive to borrowing interest rates, and their potential demand for loans will easily materialize if financial institutions offer lower loan interest rates. Through this mechanism, monetary easing and competition among financial institutions have encouraged loans to low-return borrowers, particularly to middle-risk firms.

### *Impact of the prolonged economic expansion*

Another important fact is that the prolonged economic expansion has led to a rise in potential

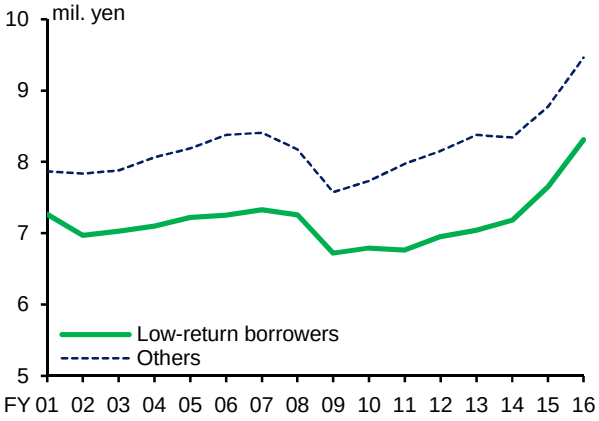
demand for loans among low-return borrowers, particularly among middle-risk firms. Looking at the developments in input factors of production, which determine firms' loan demand, the number of employees of low-return borrowers has continued to grow at a somewhat faster pace than others (Chart VI-2-9). Low-return borrowers lag behind others in terms of labor productivity, implying that more labor input is required to produce one unit of value added at these firms (Chart VI-2-10). Therefore, they seem to have absorbed more of the labor force than others under the prolonged economic recovery. In addition, business fixed investment by low-return borrowers has recently continued to grow at a somewhat faster pace than others (Chart VI-2-11). During Japan's financial crisis in the early 2000s and following the Lehman shock, business fixed investment by low-return borrowers decreased substantially. In the current economic expansion, however, business fixed investment demand, such as pent-up investment demand to rebuild production capacity and investment demand to save labor inputs to alleviate employee shortages, likely has been materializing more recently.

**Chart VI-2-9: Number of employees per small firm**



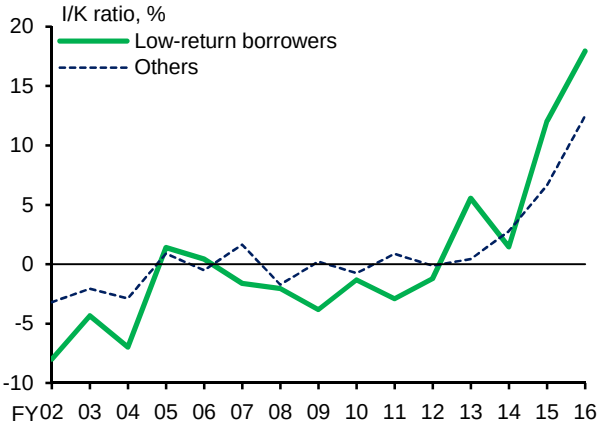

Source: Teikoku Databank.

**Chart VI-2-10: Labor productivity in a small firm**



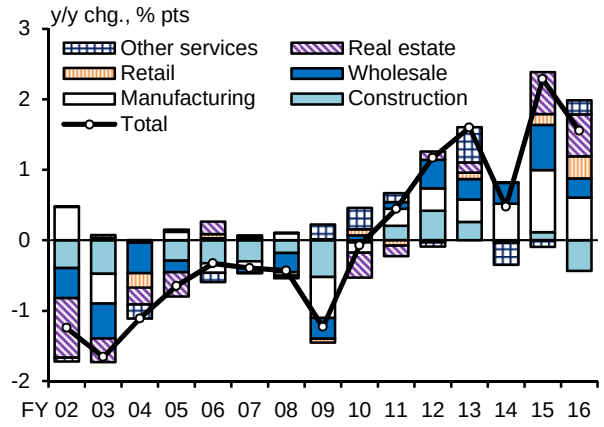

Note: The chart indicates gross profit (total sales - cost of sales) per employee.
Source: Teikoku Databank.

**Chart VI-2-11: Business fixed investment per small firm**




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

**Chart VI-2-12: Loan share of low-return borrowers by industry**




Note: The chart indicates each industry's contribution to the changes from the previous year in the loan share of low-return borrowers.
Source: Teikoku Databank.

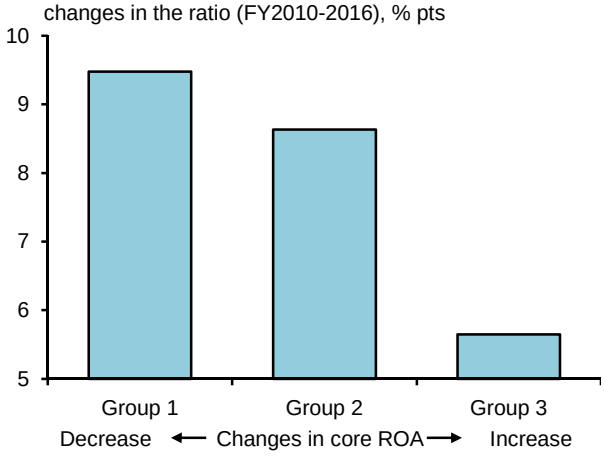
As described above, it seems that, because low-return borrowers are short of internal funds, in the process of increasing their input of production factors under the prolonged economic expansion, they have increased their demand for loans for working capital and business fixed investment. Loans to low-return borrowers have increased in a wide range of industries, such as

manufacturing, wholesale and retail, and real estate (Chart VI-2-12). This is consistent with the fact that the positive effects of the prolonged economic expansion have spread over a wide range of industries.

### *Risk taking by financial institutions*

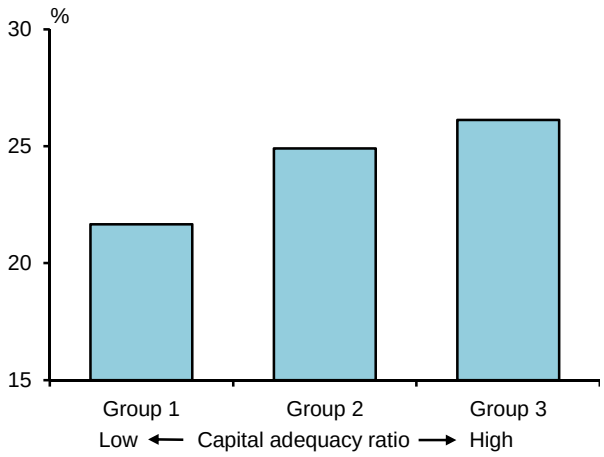
The final part of this section examines the characteristics of financial institutions that have increased loans to low-return borrowers, particularly middle-risk firms. Although Box 4 provides a more detailed quantitative analysis, the results can be summarized as the following two observations. First, with respect to the characteristics of banks with risk-taking incentive, banks with a larger decline in PPNR excluding trading income (which is an indicator of the core profitability of banks) have increased loans to low-return borrowers (Chart VI-2-13). Second, with respect to the characteristics of banks with risk-taking ability, banks with a higher capital adequacy ratio have increased loans to low-return borrowers (Chart VI-2-14). These observations indicate that the increase in loans to low-return borrowers in recent years is fundamentally different in nature from the "forbearance lending" observed in Japan until the early 2000s and in some European countries during the European sovereign debt crisis. That is, "forbearance lending" was lending by financial institutions with a weak capital base to firms with a high PD that would likely default without financial support such as interest rate reductions or exemptions (mainly, loans to the bottom group in Chart VI-1-7). The purpose of such lending appears to have been to avoid further adversely affecting these institutions' capital base through the incurrence of credit costs and provide them some time to wait for the economy to recover. In contrast, what is currently happening is that financial institutions that have abundant capital bases and plenty of risk-taking ability are becoming increasingly active in risk taking in the middle risk zone (mainly, lending to the top group in Chart VI-1-7). The purpose for this seems to be to counter the downward pressure on profits that arises from the intensified lending competition and prolonged monetary easing. It can be said that this increase in financial institutions' loans to firms has been providing financial support to firms' production activities, thereby contributing to economic expansion.

**Chart VI-2-13: Decrease in core ROA and changes in the loan share of low-return borrowers**




Note: 1. In each fiscal year, financial institutions are categorized into three groups based on the changes in their core ROA, and the average change from the previous year in the loan share of low-return borrowers is calculated for each group. The chart indicates the cumulative change from fiscal 2010 for each group.
2. Covers financial institutions whose capital adequacy ratio is 9 percent or more. For more details, see BOX 4.
Source: Teikoku Databank; BOJ.

**Chart VI-2-14: Capital adequacy ratio and the loan share of low-return borrowers**

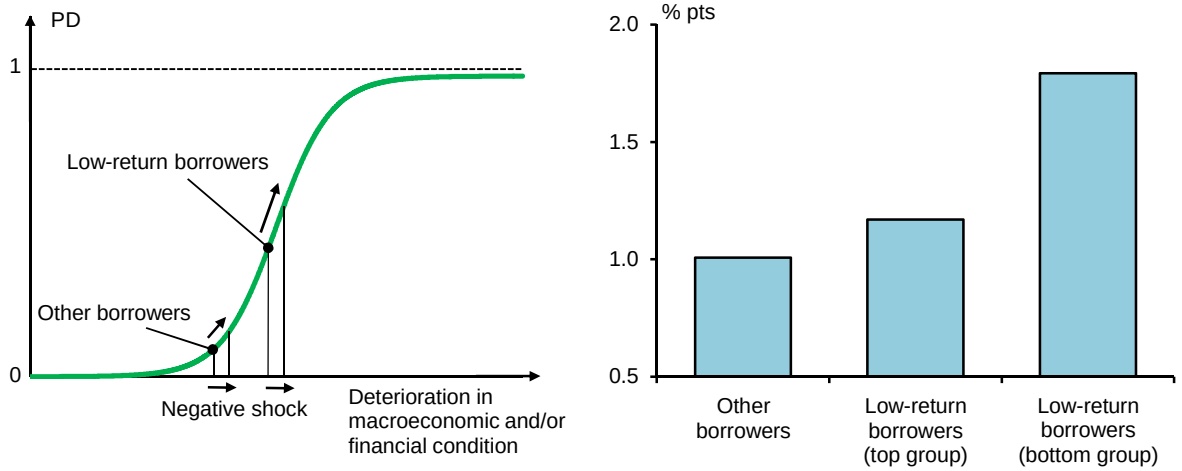



Note: Financial institutions are categorized into three groups based on their average capital adequacy ratios from fiscal 2010 to 2016, and the average loan share of low-return borrowers in fiscal 2016 is calculated for each group.
Source: Teikoku Databank; BOJ.

## C. Credit risk of loans to low-return borrowers and debt governance

While financial institutions have been actively taking on credit risk focusing mainly on middle-risk firms, credit costs at this point are at historically low levels, as mentioned above, reflecting the decline in defaults due to the economic expansion and low interest rates (Chart IV-1-3). However, in the event of negative shocks, such as an economic downturn or a rise in interest rates, many low-return borrowers could be downgraded and credit costs could rise sharply. Individual low-return borrowers have significantly increased the outstanding amount of borrowings per firm over the last several years. As a result, although the borrowing rates of low-return borrowers have been kept as low as those of financially sound firms, their interest coverage ratio (ICR), which represents their ability to pay interest, has been much lower than others, recently at a little over 1.0 (Chart VI-1-8). This suggests that the profits of low-return borrowers have only been slightly above their interest payments. Among low-return borrowers, the ICR for the top group (middle-risk firms) has been higher than that for the bottom group (high-risk firms). However, if interest rates turn upward, the ICR for even the top group could decline sharply due to the large outstanding amount of borrowings (Chart VI-2-1). Due to their lower ability to cover interest payments, the PD of low-return borrowers could easily rise compared to others in the event of negative macro shocks, such as an economic downturn, an increase in input costs, or a rise in interest rates (Box 3). For example, our estimation shows that, if a negative macro shock -- such that the PD of other borrowers in relatively healthy financial condition increased by 1 percentage point under the macroeconomic environment in 2016 -- occurred, the already high PD of low-return borrowers would rise more substantially than others (Chart VI-3-1). In fact, the size of the increase significantly exceeds 1 percentage point.

**Chart VI-3-1: Relationship between firms' financial condition and the probability of default (PD)**



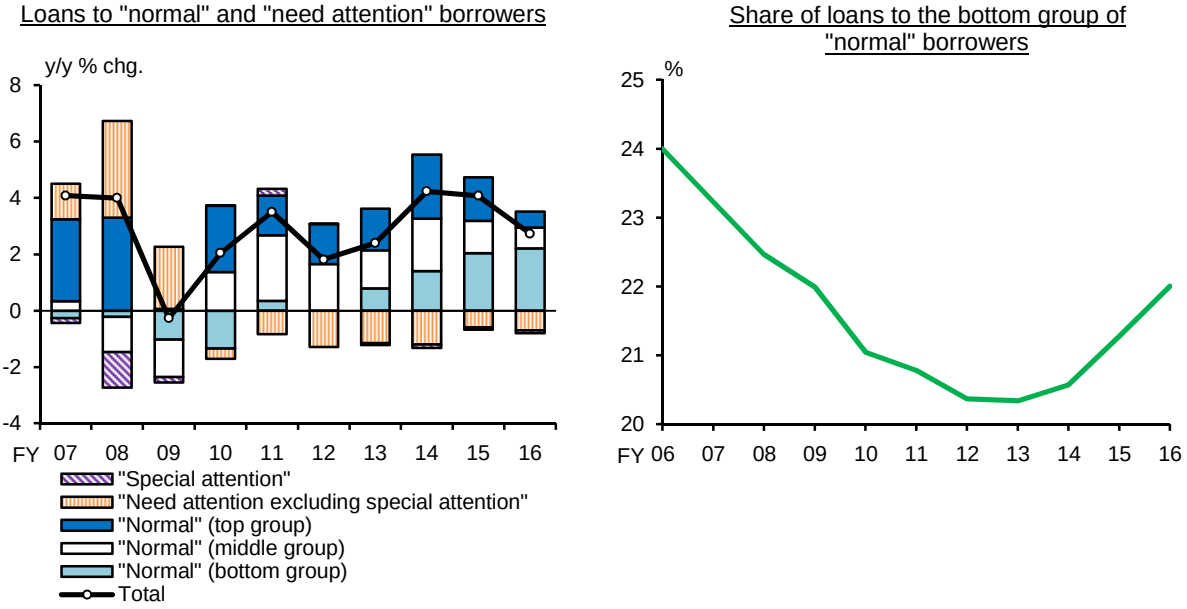

Note: In the right-hand chart, a rise in the PD (median) for each firm group is calculated by assuming a shock that raises the PD of "Other borrowers" by 1 percentage point, based on the macroeconomic environment as at 2016.
Source: CRD; Teikoku Databank.

### *Improving financial institutions' credit risk management*

Bearing in mind the large size of credit risks associated with low-return borrowers and any future changes in the macroeconomic environment, financial institutions need to set appropriate interest rates reflecting the risks involved, and improve the effectiveness of credit risk management, including examining whether their loan-loss provisions are appropriate. In this regard, the composition of loans by borrower classification shows that, in recent years, loans to borrowers that have been upgraded to the bottom group of the "normal" classification have been increasing amid the prolonged economic expansion (Chart VI-3-2). Such borrowers, however, are more likely to be downgraded in the event of a future negative shock. Among low-return borrowers, a large

proportion of the top group, including middle-risk firms, seems to be classified into the bottom group of the "normal" classification.[45] The ratio of loan-loss provisions for overall normal loans has declined and remained at a historically low level that is below even that before the Lehman shock (Chart IV-1-4). In particular, this decline seems to be observed for financial institutions whose loan-loss provision ratios are based on shorter calculation periods, which cause provisions to more strongly reflect the long-standing economic recovery and prolonged low interest rate environment in recent years (Chart VI-3-3). According to our estimation, if some negative macro shocks occurred and thus loan-loss provision ratios for normal loans rose to levels similar to those observed at the time of the Lehman shock, some regional financial institutions would incur credit costs amounting to more than 50 percent of the current PPNR (excluding trading income) from the additional loan-loss provisions for normal loans alone (Chart VI-3-4).

**Chart VI-3-2: Composition of loans by borrower classification among regional banks**



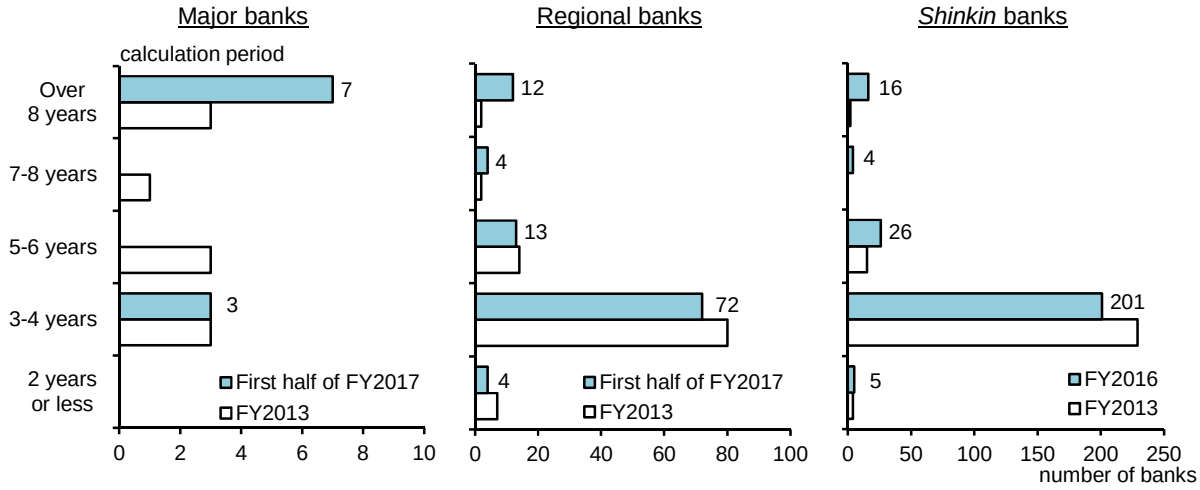

Note: Loans to "normal" borrowers are classified by dividing them into equal thirds from the top according to each bank's internal ratings. The right-hand chart shows the proportion of loans to the bottom group of "normal" borrowers to the total loans subject to self-assessment.
Source: BOJ.

The estimation results indicate that 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 the provisions are not excessively affected by the current favorable macroeconomic environment. Financial institutions have been lengthening lending durations to ensure profit margins (Chart III-1-15). This trend is evident for loans to low-return borrowers, especially to middle-risk firms (Chart VI-3-5). These observations suggest that it has become more important to assess credit risks through the cycle. Looking at calculation periods for loan-loss provisions for normal loans, some regional financial institutions as well as major banks have lengthened them, but quite a large number of financial institutions still set short calculation periods (Chart VI-3-3). It is desirable for financial institutions to further improve their method for calculating loan-loss provisions, taking into account their lending business models and effective lending periods and keeping in mind the possible changes in the future macroeconomic environment.[46]

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

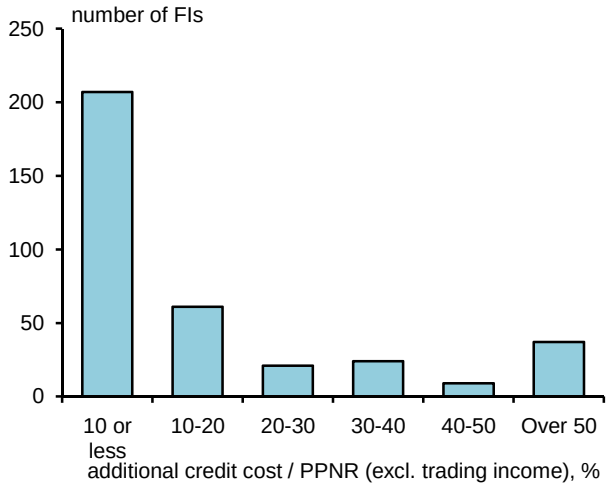
[46] Many regional financial institutions have been working on reviewing and improving the calculation method of loan-loss provisions, but many of them have not yet reached the implementation phase. Regional financial

**Chart VI-3-3: Calculation periods for loan-loss provision ratios**



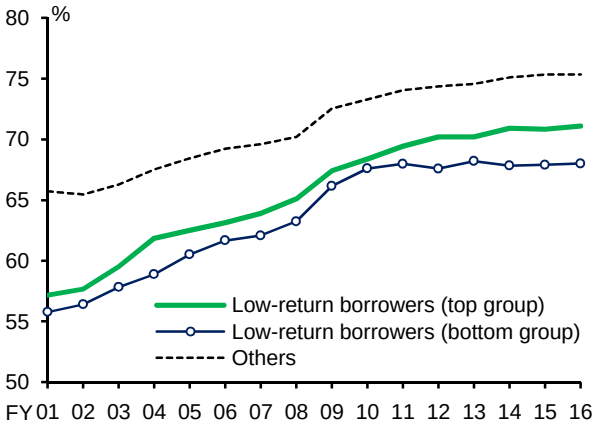

Note: Calculation period indicates the entire sample period for calculating loan-loss provision ratios for normal loans when each survey was conducted.
Source: BOJ.

**Chart VI-3-4: Impact on profits of a rise in loan-loss provision ratios for normal loans**




Note: For each financial institution, credit costs (as a ratio to PPNR excluding trading income) of additional loan-loss provisions for normal loans as at fiscal 2016 are calculated by assuming that provision ratios for normal loans rise by as much as at the time of the Lehman shock (in fiscal 2008-2009). Covers regional financial institutions.
Source: BOJ.

**Chart VI-3-5: Small firms' long-term borrowing ratio**




Note: Long-term borrowing ratio = long-term borrowings / total borrowings.
Source: Teikoku Databank.

## *Enhancing debt governance by financial institutions*

Financial institutions should not only improve their credit risk management but also deepen relationships with client firms and thereby actively support these firms' efforts to raise productivity. Looking at the performance of low-return borrowers over a somewhat longer term, the probability that firms that have once been identified as low-return borrowers will remain in such classification has gradually increased in recent years (Chart VI-3-6). This suggests that banks have thus far

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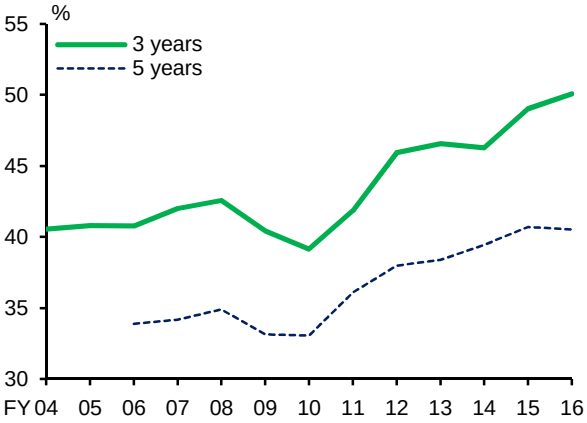
institutions should continue with their efforts to improve the calculation method of loan-loss provisions by referring to the experiences of financial institutions that have succeeded in ensuring rationality and objectivity in the overhaul of the calculation method. For details, see "Revisions to Loan-Loss Provision Calculation Methods by Regional Financial Institutions," *Financial System Report Annex Series*, April 2017 (available in Japanese only).

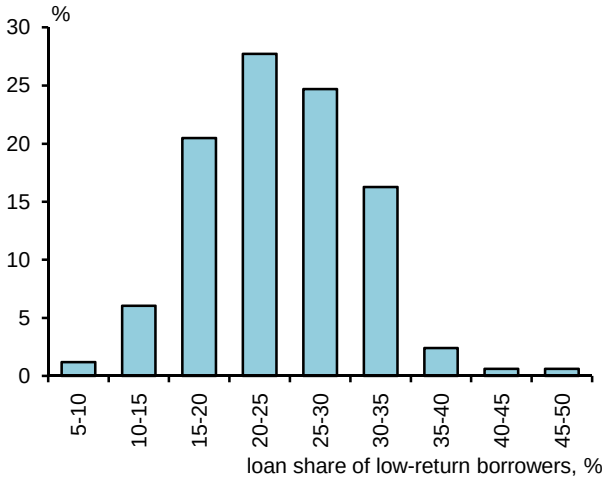
been unable to reset loan interest rates for low-return borrowers toward an appropriate level that reflects the associated credit risk, because low-return borrowers' financial condition has not necessarily been improving in a steady manner despite economic expansion and banks' extension of loans at low interest rates. Under these circumstances, if interest rates rise in the future, financial institutions could possibly face either of the following problems: (1) an increase in credit costs due to the default of low-return borrowers or (2) a profit margin squeeze caused by refraining from a rise in loan interest rates or making interest rate reductions or exemptions in order to avoid default. In order to avoid facing such problems, financial institutions are expected to closely monitor client firms even after lending. Specifically, they need to encourage client firms to increase their cash flows by improving their management efficiency through the expansion of sales channels as well as the increase of business fixed and IT investments. Moreover, they need to actively provide advisory support to resolve challenges for the management of client firms, including support to implement new promising businesses, address business succession problems, and exit from unprofitable business areas. The current favorable financial and macroeconomic environment provides an excellent opportunity for banks to promote firms' drastic improvement of their productivity.

**Chart VI-3-6: Transition probability of low-return borrowers**




Note: The ratio of the number of low-return borrowers who were also classified under the same status 3 or 5 years before to the total number of low-return borrowers as at each year. Covers small firms whose financial data are available as at the reference point of time.
Source: Teikoku Databank.

**Chart VI-3-7: Distribution of financial institutions' loan shares of low-return borrowers**




Note: Covers major banks and regional financial institutions. Data as at fiscal 2016.
Source: Teikoku Databank.

The loan share of low-return borrowers has been trending up in recent years (Chart VI-1-7). In addition, it should be noted that there is considerable variation in this share among financial institutions and the share at some institutions has recently reached 30-40 percent (Chart VI-3-7). In particular, financial institutions with a large loan share of low-return borrowers have to deal with the significant challenge of improving credit risk management and enhancing their support for borrowing firms through debt governance. If there are many low-return borrowers in financial institutions' business areas and these borrowers' productivity does not improve, not only financial institutions' profits but also the regions' potential to create value added will eventually decrease. If low-return borrowers make efforts to raise productivity and efficiency in business processes based on support from financial institutions, the efficiency of resource allocation in the regions will improve over the longer term. This in turn could contribute to bottoming up the growth potential of the economy as a whole in spite of the fact that it faces a labor shortage problem. Furthermore, if such situation materializes, financial institutions' own business bases are also likely to be strengthened.

## VII. Toward ensuring financial stability in the future

Japan's financial system has been maintaining stability on the whole. However, there is a possibility that financial imbalances could build up if financial institutions shift toward excessive risk taking in order to maintain profitability. There is also a possibility that the financial intermediation function could weaken if financial institutions lose their loss-absorbing capacity due to the continued decline in their core profitability. Thus, there exist both overheating and contraction risks. In order for the financial system to maintain its stability into the future, it is essential for financial institutions to make efforts to maintain and improve profitability while steadily addressing the accumulation of risks as well as their greater variation and complexity.

### *Challenges for financial institutions*

In order to ensure the stability of the financial system as a whole, it is desirable for individual financial institutions that constitute the financial system to tackle the following three challenges.

First, individual financial institutions need to clarify their business plans toward raising their profitability and implement them by utilizing their core competence, while taking into account the medium- to long-term outlook for the regional economies and their own business bases.

The profitability of domestic deposit-taking and lending activities has been on a declining trend, against the backdrop of factors such as the declining growth potential of the domestic economy and the continuation of the low interest rate environment. Going forward, the problem of financial institutions' low profitability is expected to worsen, given the structural changes in their business environment, such as the shrinking regional population and business base. Based on the medium- to long-term profit forecasts, which take a future decline in the population and the number of firms into account, regional financial institutions need to strengthen their efforts to utilize their core competence in order to ensure sustainable profitability. It is also important for them to improve their management efficiency by making efficient use of human resources and equipment through operational reforms. In addition, financial institutions need to prop up the regional economies that constitute their own profit bases, by deepening relationships with borrowing firms and actively supporting these firms' efforts to improve productivity.

Second, financial institutions need to strengthen their capacity to address risks in the areas where they actively continue to take risks.

As core profitability has declined, financial institutions have increased their loans to domestic middle-risk firms and overseas entities while increasing investment trust and foreign bond holdings with regard to securities investment. Overall, the risks borne by financial institutions have generally remained appropriately controlled relative to their financial bases. When looking at individual financial institutions, however, there remains some room for improvement in their risk and profit management frameworks. Considering the possible changes in the macroeconomic environment at home and abroad, financial institutions need to appropriately assess risks and returns and improve the effectiveness of credit and market risk management. Meanwhile, given the impact of wider interest rate differentials between home and abroad, it is important to continue to improve the management of funding liquidity risks of major currencies, such as the U.S. dollar, and local currencies mainly of Asian countries. In addition, ensuring cyber security is another important challenge amid the proliferation of IT utilization in financial businesses.

Third, large financial institutions need to address their increasing systemic importance.

Large financial institutions, as members of integrated group companies, have been providing a wide range of financial services globally. Consequently, these institutions have grown in size and their sources of risk and return have become more diversified and complex, thereby increasing their influence on macro-financial stability and economic activity. Under these circumstances, further action by large financial institutions is more strongly called for. This includes efforts to establish a solid financial base sufficiently resilient to the accumulation of risks, to enhance business management frameworks, including the utilization of stress testing, to make preparations to act in an orderly manner in times of stress, and to develop management information systems to deal with increasingly complex operations and risks.

### *Actions by the Bank of Japan*

Toward ensuring the stability of the financial system, the Bank of Japan will, through its on-site examinations and off-site monitoring, continue to provide support to financial institutions in their efforts to meet their challenges mentioned above.[47]

Through such examinations and monitoring, the Bank will gain an understanding of individual financial institutions' business conditions as well as how macro-financial risks are accumulated and encourage financial institutions to deal with the above-mentioned challenges in order to ensure their soundness. In particular, with regard to the low profitability of regional financial institutions due to structural factors, such as a decline in the population and the number of firms, it is highly important and urgent for them to strengthen their efforts to secure sustainable profits. Keeping this in mind, in fiscal 2018, the Bank will continue to conduct targeted on-site examinations to assess profitability, in addition to regular on-site examinations. Additionally, through its off-site monitoring, the Bank will also follow up on business strategies and operational reforms conducted by financial institutions. Thus, the Bank will maintain dialogue with financial institutions by effectively combining its on-site examinations and its off-site monitoring. The Bank will provide a wide range of seminars for financial institutions. These seminars will cover topics such as how to enhance the ability to assess firms, which will in turn help strengthen the financial intermediation function. There will be also seminars on how to raise productivity through operational reforms, which is expected to contribute to improving financial institutions' profitability.[48] With regard to its financial system research, the Bank will make progress in collaborative research with financial institutions as necessary, in order to improve stress testing and promote the effective use thereof. In addition, the Bank will strengthen its analysis of the potential vulnerabilities of the financial system from a macroprudential perspective.

As part of its efforts to respond to financial globalization, the Bank will further strengthen its coordination with overseas central banks and other organizations while enhancing its framework for monitoring developments in global financial capital markets and the overseas financial system. With regard to international financial regulations, the Bank will contribute actively to international discussions on the adoption of Basel III and its impact assessment, with a view to striking an appropriate balance between the resilience of the financial system and its smooth functioning. As for measures related to transaction activities, the Bank will conduct policy measures to ensure financial system stability, including by carrying out its lender-of-last-resort function when deemed

[47] 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.

[48] The Bank holds various seminars and workshops, with a view to reinforcing financial institutions' support for regions' and industries' efforts to enhance their vigor and backing financial institutions' business management practices. The seminars and workshops held during fiscal 2017 pertained to (1) how to enhance the ability to assess firms, (2) operational reforms, (3) governance reforms, and (4) the advancement of financial technology through the utilization of IT.

appropriate.[49] In the context of the above measures, the Bank will continue to appropriately coordinate with relevant authorities, particularly the Financial Services Agency.[50]

[49] The Bank has a lender-of-last-resort function with regard to both collateralized and uncollateralized yen funds. Moreover, it stands ready to extend loans in U.S. dollars in case of an emergency, by utilizing its foreign currency-denominated assets. The Bank also has a framework to allow for the extension of loans in Australian and Singaporean dollars in an emergency situation, by utilizing the bilateral local currency swap arrangement signed with authorities.

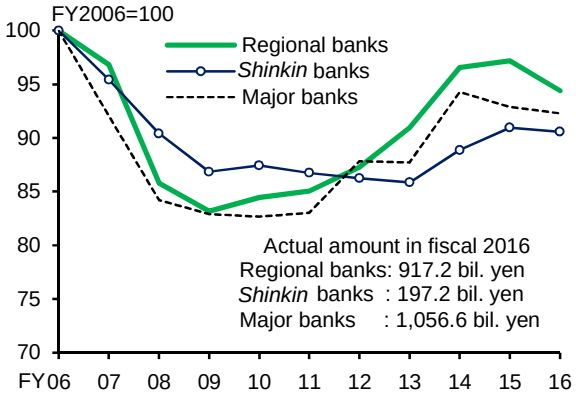
[50] During fiscal 2017, the Financial Services Agency and the Bank of Japan held a meeting of the Council for Cooperation on Financial Stability in August 2017 and February 2018 to exchange views on the current situation of the financial system and the market.

## Box 1: Regional financial institutions' efforts to raise fees and commissions

With their net interest income on a declining trend, many regional financial institutions are strengthening various efforts to increase net non-interest income. This box focuses on increases in fees and commissions as part of these efforts and provides an overview of the characteristics and future issues regarding such efforts.

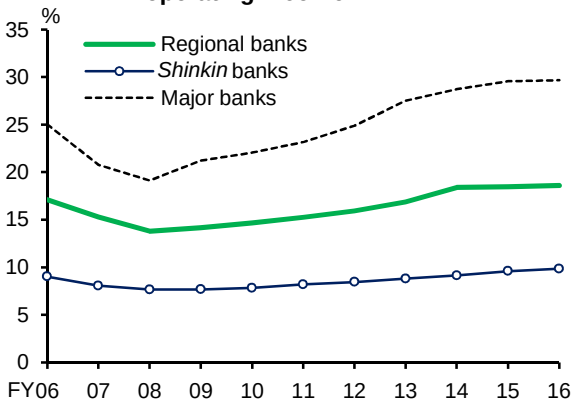
Fee and commission income, which makes up a substantial proportion of non-interest income, is recovering after declining in the wake of the global financial crisis, mainly reflecting the fall in sales of investment trusts due to the drop in stock prices (Chart B1-1). Nevertheless, fee and commission income in fiscal 2016 was still below the level registered in fiscal 2006. This is partly due to the fact that commissions related to funds transfer services are on a downward trend partly because of the diffusion of Internet banking. Meanwhile, a comparison of the share of fees and commissions in operating income by type of bank shows that the share at major banks, which handle a wide range of services, such as the arrangement of syndicated loans and securities brokerage business, is high at around 30 percent; on the other hand, at regional banks, it is slightly less than 20 percent, while at *shinkin* banks, it is only around 10 percent (Chart B1-2). Furthermore, looking at the breakdown of regional banks' fee and commission income, only two areas, funds transfer services and sales of investment trusts, etc., account for the majority of such income. As a result, their income sources are much less diversified than those of major banks (Chart B1-3).

**Chart B1-1: Fee and commission income**



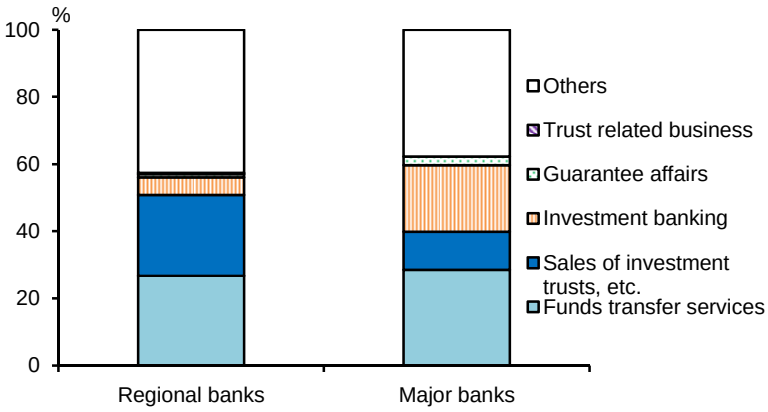

Note: Covers the domestic business sector. The data for "Major banks" cover the three major banks.
Source: BOJ.

**Chart B1-2: Share of fees and commissions in operating income**




Note: Covers the domestic business sector. The data for "Major banks" cover the three major banks.
Source: BOJ.

**Chart B1-3: Breakdown of fee and commission income**




Note: 1. Covers the domestic business sector. The data for "Major banks" cover the three major banks.
2. Data as at fiscal 2016.
Source: BOJ.

Under these circumstances, regional financial institutions are working on various measures to increase fee and commission income. First, they are trying to strengthen sales of assets under custody, such as investment trusts, through the establishment of securities subsidiaries and the development of human resources. Second, they are strengthening their efforts in the solutions business for corporate customers, aiming at increasing fee income related to business matching and business succession. At the same time, they intend to enhance customer retention and lending, thereby expecting synergies in the solutions business. Third, as will be seen below, they are raising various fees and commissions.

Published materials by regional financial institutions (regional banks and *shinkin* banks) indicate that in fiscal 2017, the number of regional financial institutions which raised and/or newly introduced fees and commissions increased by close to 40 percent in comparison to fiscal 2016. By type of bank, the number of such regional banks and *shinkin* banks increased by 57 percent and 29 percent, respectively (Chart B1-4). Moreover, looking at the cumulative number of financial institutions that have increased fees and commissions since the start of fiscal 2016, around 55 percent of regional banks and 40 percent of *shinkin* banks have raised at least some of their fees and commissions.

**Chart B1-4: Raised/introduced service fees**

%

| | Number of banks in action | | | Ratio of banks in action | | |
|---|---|---|---|---|---|---|
| | Regional banks | *Shinkin* banks | Total | Regional banks | *Shinkin* banks | Total |
| Fiscal 2017 | 44 (57.1) | 67 (28.8) | 111 (38.8) | 41.9 | 26.3 | 30.8 |
| Fiscal 2016 | 28 | 52 | 80 | 26.7 | 20.4 | 22.2 |
| From fiscal 2016 onward | 58 | 103 | 161 | 55.2 | 40.4 | 44.7 |

Note: The figures in parentheses are year-on-year percentage changes.
Source: Published accounts of each bank.

While there is considerable diversity in the types of fees and commissions that have been raised, the most common ones are transfer and remittance fees, followed by various types of certificate issuance fees, money exchange-related fees, fees related to loan prepayment and change of loan conditions, and fees related to real estate collateral administration (Chart B1-5). The following is an overview of financial institutions' strategies based on the types of fees and commissions.

**Chart B1-5: Major financial services for which fees were raised/introduced in fiscal 2017**

| | Number of banks in action |
|---|---|
| Transfer and remittance | 50 |
| Certificate issuance | 48 |
| Money exchange | 47 |
| Loan prepayment | 24 |
| Real estate collateral administration | 22 |
| Change of loan conditions | 19 |
| Payment collection | 18 |
| Loan execution | 18 |
| Bill and check issuance | 17 |
| Night safe usage | 16 |

Source: Published accounts of each bank.

First, financial institutions have been raising fees and commissions that are likely to be accepted by customers as user-pay charges for services. Apart from charges for depositing large amounts of coins and for large withdrawals of banknotes of a specific denomination, these include charges for the issuance of balance statements or transaction history statements (including those in English) requested by auditors as well as the issuance of certificates using non-standard forms. Since local government offices are charging similar fees, such as for the certification of an official seal registration or for certificates of residence, it might be the case that customers' understanding is likely to be obtained regarding such changes. Fee increases for the early repayment of loans or changing the terms of loans (such as a change from a floating interest rate to a fixed interest rate) fall into this category. Customers will take into account the cost of related fees before deciding whether to refinance or change the terms of their loans and therefore such fees are more likely to be accepted by customers.

Second, financial institutions are also raising fees with the aim of improving operational efficiency and enhancing customer retention. Financial institutions have been setting bank transfer charges to discourage the use of teller services and instead encourage the use of ATMs and automatic transfers that are more cost-efficient, and this trend is continuing. Moreover, with the aim of retaining customers, financial institutions are promoting customer differentiation by raising transfer fees for customers that use cash cards issued by other banks while making them free for loyal customers (those receiving their salary and/or holding more than a certain amount of savings in an account at the bank).

Third, financial institutions are also starting to charge fees for services that used to be free. Specifically, in addition to introducing a charge for opening a checking account, a growing number of financial institutions are requesting local governments to pay charges for the handling of public funds.[51] Financial institutions, taking into account investment income from core deposits, used to offer services to local governments free of charge. However, as it has become difficult to secure sufficient profits from such investment, they are now trying to impose charges that match the cost of providing those services. Thus far, it has been pointed out that negotiations with local governments are not proceeding smoothly, partly due to long-standing relationships and stretched government finances.

Meanwhile, another issue under consideration that relates to the third point is the introduction of a so-called "account maintenance fee" for the provision of customer deposit services.[52] The profitability of settlement services through ordinary bank accounts -- as in the case of the profitability of checking account services and local government transactions as described above -- is deteriorating. Financial institutions have an enormous number of accounts, including accounts that have been inactive, and maintaining and managing the account information involves substantial costs in terms of investment in computer systems. Moreover, management costs are increasing, for instance, due to the need to enhance security against the risk of money laundering. Meanwhile, the Japanese Bankers Association is working on measures to improve customer

[51] Broadly speaking, there are (1) fees and commissions for the receipt and payment of public funds (including the administration of transfers of salaries to employees), and (2) fees for the dispatch of staff from financial institutions to local government offices. Regarding the latter, some degree of understanding is starting to grow among local governments.

[52] Even after deposit spreads fell to nearly zero in the mid-1990s due to the liberalization of deposit interest rates and the low interest rate environment, financial institutions did not impose any account maintenance fees because of the competition among financial institutions and social norms for services in Japan. At present, a small fraction of financial institutions are collecting maintenance fees for accounts that have been inactive for a certain period of time. For details, see Hiroshi Nakaso, former Deputy Governor of the Bank of Japan, "New Frontier of Macroprudential Policy: Addressing Financial Institutions' Low Profitability and Intensified Competition," speech at the Kin'yu Konwa Kai (Financial Discussion Meeting) hosted by the Jiji Press in November 2017.

convenience, such as its plan to offer 24 hour, 365 day real-time settlement services for transfers between banks from October 2018. Going forward, it is necessary for financial institutions to continue to make efforts toward improving the efficiency of customer services, to enhance the provision of services that will improve the convenience and safety of customers, and to obtain customers' understanding regarding appropriate compensation for financial services.

## Box 2: Effects of changes in regional banks' corporate governance on their management

In recent years, the organizational structure of corporate governance at many regional banks has undergone changes. Such changes reflect their efforts toward incorporating outside views in management decisions and strengthening transparency, which have been made partly in response to the revision of the Companies Act and the enactment of the Corporate Governance Code in 2015. For example, at regional banks, the ratio of outside directors to total directors has increased on average from 8 percent in fiscal 2010 to 12 percent in fiscal 2013, and further to 25 percent in fiscal 2016 (Chart B2-1). Moreover, as of fiscal 2016, about a quarter of regional banks had made the transition from a Company with Board of Company Auditors to a Company with Audit and Supervisory Committee, which facilitates their appointment of outside directors and strengthens the supervision of management by the board of directors.

**Chart B2-1: Outside director ratios at regional banks**

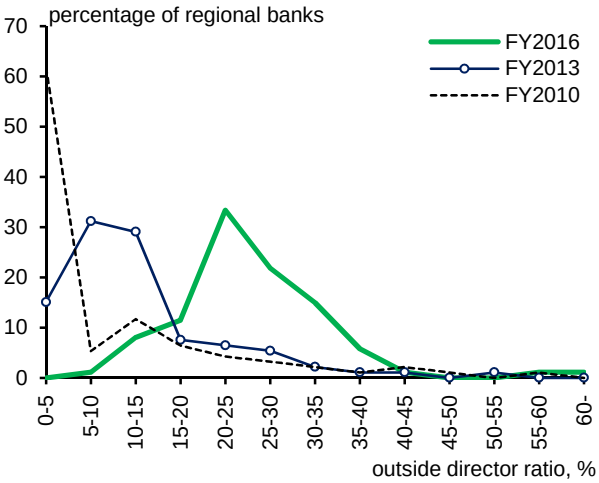
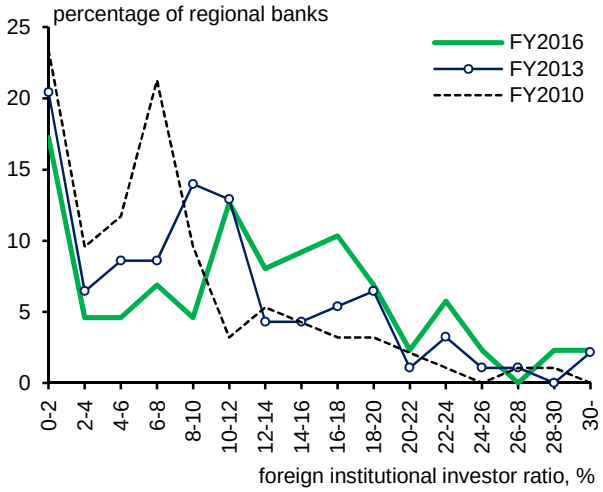



**Chart B2-2: Proportion of foreign institutional investors in regional banks' shareholders**




Note: The data in both the left- and right-hand charts cover regional banks and regional financial groups that are operating in each fiscal year, and exclude subsidiary banks.
Source: Nikkei, "NIKKEI ValueSearch"; published accounts of each bank.

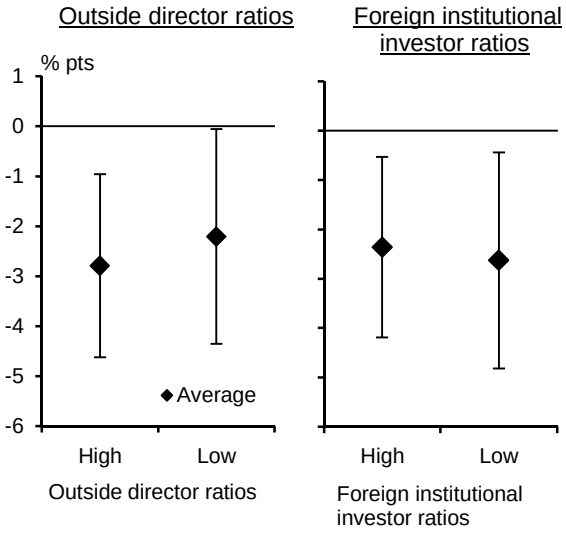
In addition to these changes in organizational structure, banks' governance has also been affected by changes in ownership structure. In recent years, while regional banks have been reducing cross-shareholdings with other financial institutions and client firms, their foreign institutional investor ratios, defined as the percentage of shares held by foreign institutional investors to total shares, have increased.[53] The average foreign institutional investor ratio has risen from 7 percent in fiscal 2010 to 10 percent in fiscal 2013, and to 12 percent in fiscal 2016 (Chart B2-2). Shareholders can influence management decisions directly by exercising their voting rights as well as indirectly by selling shares in the market as a means of manifesting their dissatisfaction. For two reasons, foreign institutional investors are likely to demand higher share returns and exert stronger pressure on the management of regional banks than domestic shareholders: (1) they tend to have less direct business ties with regional banks and therefore can be more effective as external monitors; and (2) their larger international portfolios allow them to relatively easily reallocate

[53] More specifically, the foreign institutional investor ratio here is defined as the ratio of ordinary shares held by foreigners other than individuals to total ordinary shares issued. These figures are reported in the regional banks' Annual Securities Reports.

their funds to investment in other countries' firms that have higher returns.[54]

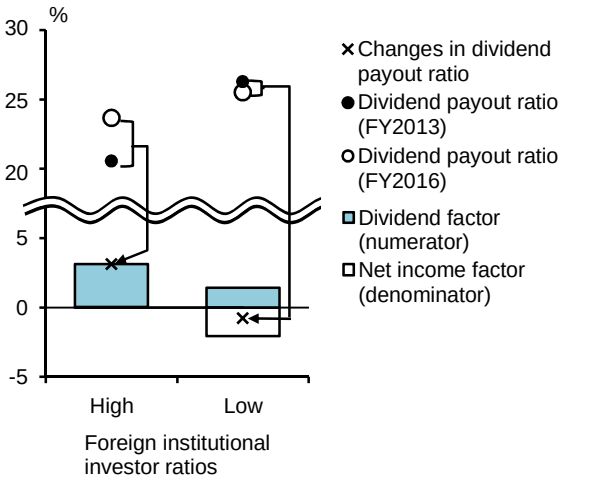
Thus far, these changes in corporate governance at regional banks have not necessarily led to improvements in their profitability.[55] In fact, no significant difference in core profitability can be found between two equally divided groups of regional banks, one with higher outside director ratios and the other with lower outside director ratios (Chart B2-3).[56] The same is true in the case where banks are equally divided according to their foreign institutional investor ratios. It is too early to draw a conclusion on how large the effects of changes in corporate governance on banks' profitability are, given that it has not been long enough since the changes were made. However, there seem to be some behavioral changes of banks that have been brought about by the changes in governance. For example, regional banks with relatively high foreign institutional investor ratios tend to raise their dividend payout ratio (total dividends / net income) (Chart B2-4). In addition, some of these banks have managed to make dividend payments by relying on the

**Chart B2-3: Governance structure and changes in core profitability**




Note: The 65 banks in the sample are divided into two groups based on the outside director ratio or foreign institutional investor ratio in fiscal 2013, and the change in ROE based on PPNR (excluding trading income and gains/losses on sales of investment trusts) from fiscal 2013 to 2016 is calculated for each group. The bar indicates one standard deviation.
Source: Nikkei, "NIKKEI ValueSearch"; published accounts of each bank; BOJ.

**Chart B2-4: Foreign institutional investor ratios and changes in dividend payout ratios**




Note: The 65 banks in the sample are divided into two groups based on the foreign institutional investor ratio in fiscal 2013, and the average change in the dividend payout ratio from fiscal 2013 to 2016 is calculated for each group. The bar chart indicates the contribution of each factor to the change in the dividend payout ratio.
Source: Published accounts of each bank; BOJ.

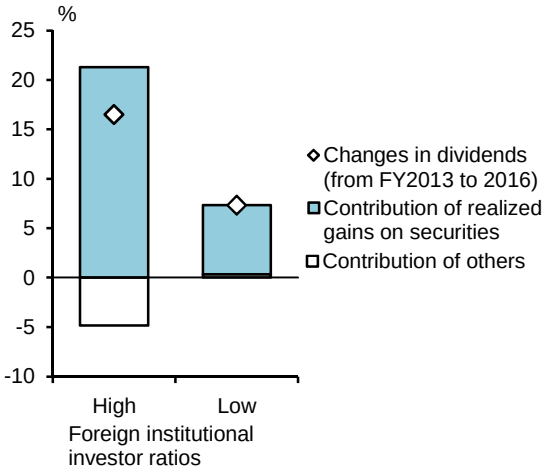
[54] It is likely that, for much the same reasons, domestic institutional investors also are able to exert relatively strong influence on management decisions, though maybe not to the same extent as foreign institutional investors. Because the percentages of total shares held by domestic institutional investors are not reported in Annual Securities Reports, it is difficult to gain an accurate overall picture of their presence in the ownership structure of regional banks. However, it is possible to calculate the percentages of shares held by "major" domestic institutional investors using the data reported in Annual Securities Reports, which list the 10 largest shareholders with their ownership percentages. Adding this percentage to the foreign institutional investor ratio yields an estimate of the "domestic and foreign institutional investor ratio." Using this instead of the foreign institutional investor ratio leaves the results of the analysis below essentially unchanged.

[55] The analysis that follows covers regional banks and regional financial groups (excluding subsidiary banks and those that have received public funds) for which continuous data from fiscal 2013 onward are available (65 banks in total).

[56] In order to rule out any possible reverse causality -- i.e., the possibility that differences in profitability give rise to differences in governance structures -- the analysis focuses on the relationship between the outside director ratio and the foreign institutional investor ratio as of fiscal 2013 and the changes in return on equity (ROE) in the following 3 years.

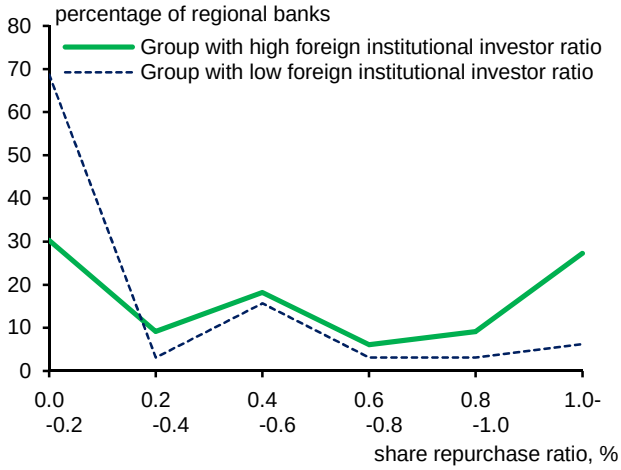
realization of gains on securities (Chart B2-5). Moreover, it seems that regional banks with higher foreign institutional investor ratios have also been more actively conducting share repurchases to reward their shareholders (Chart B2-6). Cross-sectional estimation results formally confirm that banks with higher foreign institutional investor ratios tend to be more active in making dividend payments and share repurchases (Chart B2-7).

**Chart B2-5: Changes in dividends and realized gains on securities**




Note: 1. The 65 banks in the sample are divided into two groups based on the foreign institutional investor ratio in fiscal 2013, and the average rate of changes in dividends from fiscal 2013 to 2016 is calculated for each group.
2. The bar chart indicates the contribution of each factor to the rate of change in dividends. "Contribution of realized gains on securities" is calculated as cumulative changes in (realized gains on securities) * (1 - effective tax rate) * (dividend payout ratio) divided by dividends in fiscal 2013. The data for realized gains on securities are the sum of gains/losses realized through sales of bonds, stocks, and investment trusts, or are treated as zero if the sum is negative.
Source: Published accounts of each bank; BOJ.

**Chart B2-6: Foreign institutional investor ratios and share repurchases**




Note: The 65 banks in the sample are divided into two groups based on the foreign institutional investor ratio in fiscal 2013, and the share repurchase ratio (the average from fiscal 2014 to 2016) is calculated for each group. The share repurchase ratio is the ratio of share repurchases (excluding disposal) to net assets.
Source: Nikkei, "NIKKEI ValueSearch"; published accounts of each bank; BOJ.

**Chart B2-7: Cross-sectional estimates: effects on shareholder returns**

| | Dependent variables | | |
|---|---|---|---|
| | Changes in dividend payout ratio [from FY2013 to 2016] | Changes in dividends [from FY2013 to 2016] | Share repurchase ratio [average from FY2014 to 2016] |
| Explanatory variable: foreign institutional investor ratio [FY2013] | 0.27 * (0.15) | 0.76 *** (0.20) | 0.03 *** (0.01) |
| Adj. $R^2$ | 0.04 | 0.18 | 0.13 |
| S.E. | 8.80 | 11.70 | 0.50 |

Note: 1. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Standard errors are given in parentheses.
2. The sample size for the estimation of "Changes in dividend payment ratio" is 65 and that of "Changes in dividends" and "Share repurchase ratio" is 63, with the top and bottom samples being excluded as outliers.
3. "Share repurchase ratio" is the ratio of share repurchases (excluding disposal) to net assets.

Currently, regional banks have ample capital bases. However, if they continue making excessive dividend payouts by relying on the realization of gains on securities without any increase in core profitability, decreases in interest and dividend income on securities could weigh on them. Furthermore, as unrealized gains on securities function as a capital buffer on an economic value basis, this decline could have an adverse effect on regional banks' resilience to stress. Regional

banks need to continue to engage in constructive dialogues with their shareholders on how they should reward them from a medium- to long-term perspective while increasing the effectiveness of their various measures to strengthen corporate governance in order to secure sustainable profits.

## Box 3: Determinants of small firms' default rate

This box quantitatively examines the determinants of small firms' default rate.[57] The following analysis covers approximately 500,000 small firms in the Credit Risk Database (CRD). Using the panel data of small firms from 2002 to 2016, we estimate a logit model in which the dependent variable is a dummy variable that shows whether a firm defaults or not (default: 1, otherwise: 0). The explanatory variables representing firms' financial condition include (1) the liquidity ratio (liquid assets / liabilities), (2) the leverage ratio (liabilities / total assets), (3) the inventory-sales ratio (inventories / sales), and (4) the operating return on assets (ROA). In addition, the following macroeconomic variables are also used as explanatory variables to take into account the business environment surrounding firms: (5) the output gap, (6) the market interest rate (5-year swap rate), and (7) import prices. To allow for the possibility that the statistical significance of variables and the size of parameters differ across industries, the estimation is conducted separately for each industry (construction, manufacturing, wholesale, retail, real estate, and other services).

Looking at the estimation results, the explanatory variables are statistically significant in almost all industries and demonstrate the expected signs (Chart B3-1). That is, firms' probability of default (PD) becomes higher if the financial burden increases as a result of a market rate hike, a rise in the leverage ratio, and an increase in the inventory-sales ratio. In addition, the PD rises when firms' ability to make interest payments comes under downward pressure arising from a decline in the ROA and a decline in the liquidity ratio. Moreover, a deterioration in the macroeconomic environment surrounding firms, such as an economic downturn or an increase in import prices (deterioration in the terms of trade), raises the PD. The model's explanatory power for actual past defaults is also generally satisfactory (Chart B3-2).

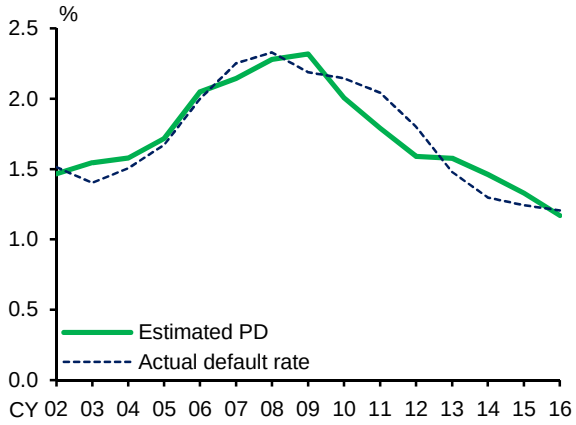
**Chart B3-1: Estimates: default function**

| | | Dependent variables: whether a firm defaults or not | | | | | |
|---|---|---|---|---|---|---|---|
| | | Construction | Manufacturing | Wholesale | Retail | Real estate | Other services |
| Explanatory variables | Liquidity ratio [%] | -0.020 | -0.033 | -0.018 | -0.022 | -0.016 | -0.019 |
| | Leverage ratio [%] | 0.003 | 0.002 | 0.005 | 0.004 | 0.007 | 0.003 |
| | Inventory-sales ratio [%] | 0.016 | 0.013 | 0.013 | 0.012 | — | — |
| | ROA [%] | -0.017 | -0.025 | -0.030 | -0.021 | -0.028 | -0.017 |
| | Output gap [%] | -0.027 | -0.023 | -0.020 | *0.001* | -0.015 | -0.036 |
| | 5-year swap rate [%] | 0.647 | 0.367 | 0.424 | 0.391 | 0.792 | 0.442 |
| | Import prices | -0.002 | 0.006 | 0.008 | 0.002 | *0.001* | 0.005 |
| Pseudo $R^2$ | | 0.094 | 0.113 | 0.094 | 0.075 | 0.063 | 0.076 |
| Sample size | | 1,872,710 | 1,873,263 | 1,143,024 | 890,519 | 319,084 | 2,501,872 |

Note: 1. A logit model is estimated to explain whether a firm defaults or not in year t based on firms' financial condition and macroeconomic variables in year t-1. The estimation period is from fiscal 2002 to 2016. As for the real estate industry, the year-on-year rate of change in commercial real estate prices is used for the estimation instead of the output gap.
2. The parameters with italicized numbers are not statistically significant at the 10 percent level. Other parameters are statistically significant at the 1 percent level.

[57] In this analysis, 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.

**Chart B3-2: Actual default rate and estimated probability of default (PD)**




Note: "Estimated PD" is calculated based on the estimated default function of a logit model. It is the average probability of defaulting within 1 year. "Actual default rate" is the ratio of small firms that defaulted within 1 year to the total number of small firms.
Source: CRD.

The PD shows a non-linear response to changes in firms' financial condition and the business environment (Chart VI-3-1). If we plot the estimated model in a chart where the vertical axis shows firms' PD and the horizontal axis represents an aggregate of the above explanatory variables, the relationship between the two takes the form of an S-shaped curve. That is, under a given macroeconomic environment, the PD of firms with favorable financial condition, i.e., firms that are located at the bottom of the S-shaped curve, hardly increases even under a negative shock. However, firms in weak financial condition, i.e., firms that are located along the steep part of the S-shaped curve, would see a substantial increase in their PD if a negative shock occurred. This is why low-return borrowers, who are analyzed in detail in Chapter VI (i.e., borrowers whose borrowing interest rate is low, albeit with a low ROA or with high leverage), are considered to be susceptible to negative shocks. Thus, it should be noted that, due to this non-linearity of the PD, financial institutions' credit costs would increase sharply in times of a stress event such as an economic downturn.

## Box 4: Empirical analysis of financial institutions' loans to low-return borrowers

As seen in Chapter VI, financial institutions have increased loans to low-return borrowers, particularly to middle-risk firms. Two main factors can be pointed out as the background to these developments. The first factor is the effects of monetary easing. The decline in market interest rates has promoted financial institutions' credit risk taking. The second factor is the intensified lending competition among financial institutions. With the number of firms declining year by year, financial institutions may be increasing their loans to firms with relatively high credit risk to secure a sufficient number of borrowers and maintain profits.

In order to quantitatively examine the extent to which these two factors have contributed to the increase in loans to low-return borrowers, we first conduct a panel estimation in which we regress the loan share of low-return borrowers at each financial institution on (1) the market interest rate (the 5-year JGB yield) and (2) the indicator for the degree of lending competition among financial institutions' branches (Chart VI-2-2). In addition, (3) the output gap is also included as an additional explanatory variable to control for the effects of business cycle fluctuations. For the estimation, two different specifications are employed: a fixed effect specification and a dynamic panel specification. The latter includes a one-period lag of the dependent variable as an additional explanatory variable in order to better capture dynamic adjustments by financial institutions.

Looking at the estimation results (Model 1), the coefficient on the market interest rate is negative and statistically significant in both the fixed effect and the dynamic panel specifications (Chart B4-1). This supports the view that lower market rates have encouraged financial institutions to increase loans to firms with a relatively high credit risk. Moreover, the coefficient on the indicator for the degree of branch competition is positive and statistically significant in both specifications. This means that, the greater the intensity of lending competition among branches, the more that financial institutions increase loans to low-return borrowers. The coefficient on the output gap is also positive and statistically significant. This seems to reflect that (1) economic upturn has led financial institutions to be more complacent in their credit risk assessment against the backdrop of an improvement in firms' financial condition, and (2) the demand for loans by low-return borrowers, who have relatively scarce internal funds, has increased in line with economic expansion.

By using the estimation results, we decompose the cumulative changes in the loan share of low-return borrowers since fiscal 2010 (Chart B4-2). The result suggests that the decline in the market interest rate, the intensified competition among financial institutions, and the improvement in the output gap have all contributed to the increase in the loan share of low-return borrowers. In particular, the intensified competition has recently made the largest contribution. Thus, it seems that the excessive number of financial institutions' branches relative to the number of firms has led financial institutions to increase loans to low-return borrowers.

Next, we examine how differences in financial institutions' financial condition (profitability and capital) affect their lending to low-return borrowers. To start with, we add financial institutions' core profitability (ROA calculated using PPNR excluding trading income, or "core ROA" for short) to the above estimation as an explanatory variable. Generally speaking, the weaker financial institutions' profitability, the stronger their incentive becomes to increase loans to low-return borrowers to maintain profit levels.[58] Moreover, the extent to which financial institutions actually increase loans to low-return borrowers likely depends on their risk-taking ability, which can be represented by

[58] In this context, Box 2 in the October 2016 issue of the *Report* pointed out that (1) the weaker financial institutions' core profitability, and (2) the higher their capital adequacy ratio, the more they increase investment in risky assets such as investment trusts and foreign bonds in order to compensate for decreased profits.

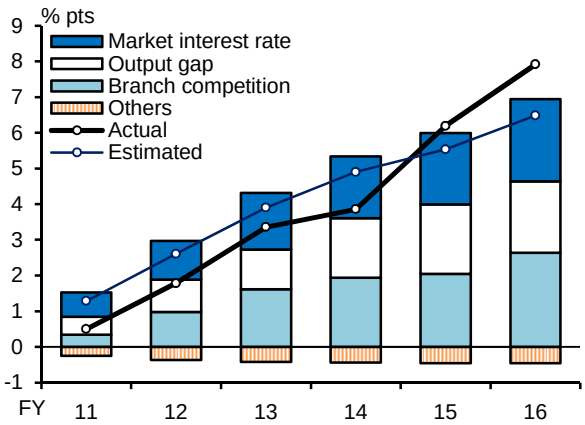
their capital adequacy ratio. We therefore estimate an alternative specification that includes, as an explanatory variable, the cross-term of a financial institution's core profitability and a dummy variable indicating whether its capital adequacy ratio is high or low, as well as the capital adequacy ratio itself. This cross-term allows us to examine how the sensitivity of loans to low-return borrowers with respect to the lender's core ROA differs depending on whether the lender's capital adequacy ratio is above or below a certain value.[59]

**Chart B4-1: Estimates: determinants of loans to low-return borrowers**

| | | Dependent variables: loan share of low-return borrowers [%] | | | |
|---|---|---|---|---|---|
| | | Model 1 | | Model 2 | |
| | | Dynamic panel | Fixed effect | Dynamic panel | Fixed effect |
| Explanatory variables | Degree of branch competition [# of branches per thousand firms] | 3.709*** (1.105) | 4.773*** (1.184) | — | — |
| | Core ROA [%] | — | — | -3.125*** (1.197) | -1.774*** (0.576) |
| | Low capital dummy × core ROA [%] | — | — | 2.220** (1.064) | 3.209*** (0.339) |
| | Capital adequacy ratio [%] | — | — | 0.118* (0.0652) | 0.111*** (0.0399) |
| | Output gap [%] | 0.350*** (0.0652) | 0.574*** (0.0743) | 0.396*** (0.0506) | 0.737*** (0.0210) |
| | 5-year JGB yield [%] | -1.830*** (0.436) | -2.185*** (0.495) | -2.099*** (0.303) | -3.577*** (0.176) |
| | Lagged dependent variable | 0.461*** (0.0700) | — | 0.665*** (0.0600) | — |
| S. E. | | 4.99 | 6.97 | 3.81 | 6.36 |

Note: 1. ***, **, and * indicate statistical significance at the 1 percent, 5 percent, and 10 percent levels, respectively. Standard errors are given in parentheses.
2. To avoid an endogeneity problem, all explanatory variables are lagged by 1 year and the model is estimated by GMM using lagged variables as instrumental variables. The estimation period is from fiscal 2005 to 2016.
3. Core ROA is calculated as the 2-year moving average of the ratio of PPNR (excluding trading income) to total assets.

**Chart B4-2: Decomposition of the loan share of low-return borrowers**




Note: 1. The chart shows the decomposition of cumulative changes in the loan share of low-return borrowers since fiscal 2010 based on the estimation result for Model 1 (dynamic panel). The contribution of the lagged dependent variable is decomposed into that of each explanatory variable by using recursive substitution.
2. "Others" indicates the contribution of the initial value (the actual change in the loan share of low-return borrowers from fiscal 2009 to 2010).

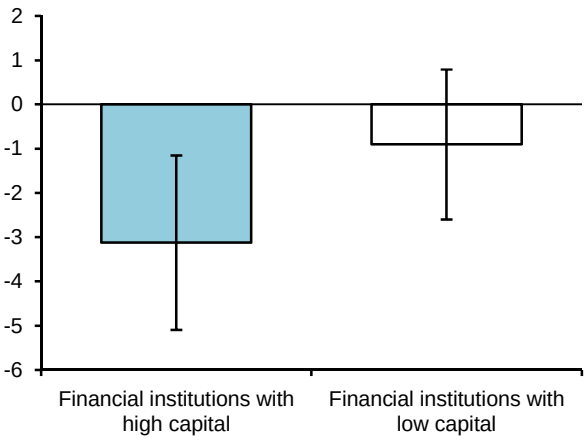
The estimation results (Model 2) show the following findings (Chart B4-1).[60] First of all, the

[59] A capital adequacy ratio of 8 percent is generally considered as the benchmark for financial institutions' financial strength. However, because few financial institutions in our sample have a capital adequacy ratio below 8 percent, here we use a capital adequacy ratio of 9 percent as the threshold. Financial institutions with a capital adequacy ratio between 8 and 9 percent are likely to be more cautious about their risk taking through increased loans so as to avoid the possibility of their capital adequacy ratio falling below 8 percent.

[60] Unlike in Model 1, we exclude the indicator for the degree of competition among financial institutions' branches in Model 2 in order to avoid multicollinearity, since financial institutions' core ROA tends to decrease as competition among financial institutions intensifies.

coefficient on the core ROA is significantly negative, providing evidence of the risk-taking incentive mechanism. That is, the weaker a financial institution's core profitability, the more it increases loans to low-return borrowers. In addition, the coefficient on the capital adequacy ratio is significantly positive. This suggests that, in terms of risk-taking ability, the higher a lender's capital adequacy ratio, the more it increases loans to low-return borrowers. Moreover, the coefficient on the cross-term of the core ROA and the capital dummy is also significant, suggesting that the sensitivity of loans to low-return borrowers with respect to a lender's core ROA differs depending on its capital adequacy ratio. Specifically, whereas the coefficient on the core ROA is significantly negative for financial institutions with a high capital adequacy ratio, it is insignificant for financial institutions with a low capital adequacy ratio (Chart B4-3). In other words, whereas financial institutions with a sufficient capital base tend to be more active in extending loans to low-return borrowers in response to downward pressure on their core profitability, financial institutions with a relatively weak capital base do not change their lending behavior even when their core profitability declines. This pattern appears to be substantially different from that in the period of the Japanese financial crisis that lasted through the early 2000s, when financial institutions with less capital buffer engaged in so-called "forbearance lending" to avoid the default of low-return borrowers.

**Chart B4-3: Sensitivity of the loan share of low-return borrowers with respect to core ROA**




Note: 1. Calculated based on the estimation result for Model 2 (dynamic panel). The error bar indicates a 90 percent confidence interval.
2. "Financial institutions with high capital" and "Financial institutions with low capital" indicate financial institutions whose capital adequacy ratio is 9 percent or more, and less than 9 percent, respectively.

# 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.