



BOJ
Reports & Research Papers

Financial System FSR report



BANK OF JAPAN

OCTOBER 2016

The total of 10 major banks, 105 regional banks, and 256 *shinkin* banks covered in this *Report* is as follows (as at September 30, 2016).

The 10 major banks comprise Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, 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. The 105 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). The 256 *shinkin* banks are the *shinkin* banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as at September 30, 2016.

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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 Japan's financial system and facilitating communication with concerned parties on relevant tasks and challenges in order to ensure such stability.

The *Report* provides a regular and comprehensive assessment of Japan's financial system with a large emphasis on the macroprudential perspective. The macroprudential framework means 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 stability in the financial system and for providing guidance and advice to financial institutions through off-site monitoring and on-site examinations. 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.

In this October 2016 issue of the *Report*, potential vulnerabilities of the financial system in a low and negative interest rate environment, specifically, (1) the risk of overheating, in which financial institutions shift toward excessive risk taking, and (2) the risk of a gradual pullback in financial intermediation due to a persistent decline in profits, are quantitatively analyzed. In addition, in the chapter on macro stress testing, the resilience of internationally active banks against risks -- namely, an increase in foreign currency funding premiums and funding liquidity constraints -- is examined, reflecting the importance of securing stable foreign currency funding for Japanese banks.

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I. Executive summary: comprehensive assessment of the financial system

Developments in financial markets

In global financial markets, while investors' risk aversion temporarily heightened following the result of the U.K. referendum in late June -- in which a majority voted to leave the European Union (EU) -- calm gradually returned to markets thereafter. There are signs that search for yield activities are becoming active again, against the background of advanced economies' long-term interest rates at low levels. Careful attention should thus be paid to whether global fund flows suddenly change. Meanwhile, although there were phases during which developments overseas affected Japanese markets as seen particularly in stock price declines and the continued appreciation of the yen, highly accommodative financial conditions have been maintained with the Bank of Japan's introduction of "Quantitative and Qualitative Monetary Easing (QQE) with Yield Curve Control" in September 2016.

Examination of financial intermediation

The year-on-year growth rate in financial institutions' domestic loans outstanding has been around 2 percent, amid accommodative lending stances among financial institutions and demand for funds from a wide range of industries. Similarly, overseas loans have continued to show relatively high growth, particularly loans to advanced economies such as North America. As for securities investment, financial institutions have been stepping up their investments in risky assets, such as foreign bonds and investment trusts, while outstanding holdings of yen-denominated bonds remain at a high level. Institutional investors -- such as insurance companies and pension funds -- and depository institutions with a focus on market investment -- such as Japan Post Bank and central organizations of financial cooperatives -- have further increased their propensity to accumulate foreign bonds and other risky assets. Meanwhile, with regard to households' investment activities, moves to diversify their asset portfolios have lost momentum somewhat since the summer of 2015, partly due to the effects of lower stock prices and the stronger yen. In terms of financial intermediation through financial markets, equity financing has been lackluster against the backdrop of volatile stock prices, while an increasing number of firms have issued super-long-term bonds against the background of favorable issuing conditions in the corporate bond market. Under these circumstances, the funding environment among firms and households has been highly accommodative.

In light of the above financial intermediary activities, signs of overheating, such as excessive risk taking and credit growth, have not been observed on the whole.

Nevertheless, amid the continued low interest rate environment, banks have adopted the most proactive lending stance since the bubble period. Banks' increasingly proactive lending stance serves as an important transmission channel for monetary easing effects. However, if competition among financial institutions overly intensifies, banks' profit bases could become vulnerable, particularly through a deterioration in profitability on loans, bringing about financial system instability risks. Forthcoming developments in this regard therefore require careful vigilance. In addition, although the real estate market currently does not appear to show signs of overheating on the whole, it has been observed that some transactions in metropolitan areas took place at lofty prices and came with low investment yields, and the growth rate of banks' real estate loans has increased. Going forward, it is necessary to carefully examine whether capitalization rates among investors are declining excessively, or whether the occurrence of transactions executed at lofty prices is expanding to other regions.

Stability of the financial system

Japan's financial system has been maintaining stability. Indeed, financial institutions' capital adequacy ratios are sufficiently above regulatory requirements, and their capital levels are generally adequate relative to the amount of macro risks undertaken. The results of macro stress testing indicate that Japan's financial system is considered to have generally strong resilience against stresses. In terms of liquidity, financial institutions have sufficient yen funding liquidity. With regard to foreign currency liquidity, they have a liquidity buffer that can cover funding shortages, even if funding conditions become difficult for a certain period. It can also be confirmed that the soundness of financial institutions is sustained, even under a stress scenario where they cannot avoid the disposal of foreign currency-denominated assets. Nevertheless, financial institutions need to continue with efforts to bolster their stable foreign currency funding bases, as the share of market funding in their foreign currency funding is still large.

Potential vulnerabilities due to the decline in financial institutions' profitability

Financial institutions have sufficient capital bases at present, which will allow them to continue risk taking even if profitability remains subject to downward pressure for the time being. Going forward, if their portfolio rebalancing leads to an improvement in economic and price developments, this is in turn likely to bring about a recovery in core profitability. However, structural problems such as further population decline and aging are expected to continue exerting downward pressure on the profitability of regional financial institutions' deposit-taking and lending activities. Under these circumstances, if

the effects of negative interest rates are included and the recent trend of declining profits persists, the number of financial institutions experiencing an erosion of their loss-absorbing capacity could increase, leading to a weakening in the financial intermediation function.

At the same time, it is necessary to pay attention to the possibility that financial system stability will be impaired, in a case where financial institutions shift toward excessive risk taking, in view of maintaining their profitability, amid a decline in the profitability of their loans and securities investment mainly due to the effects of the negative interest rates.

As such, regarding potential vulnerabilities due to the declining profitability of financial institutions, it is necessary to examine both the risk of overheating -- excessive accumulation of macro risks and exuberant asset prices -- and the risk of a gradual pullback in financial intermediation due to a persistent decline in profits.

Challenges from a macroprudential perspective

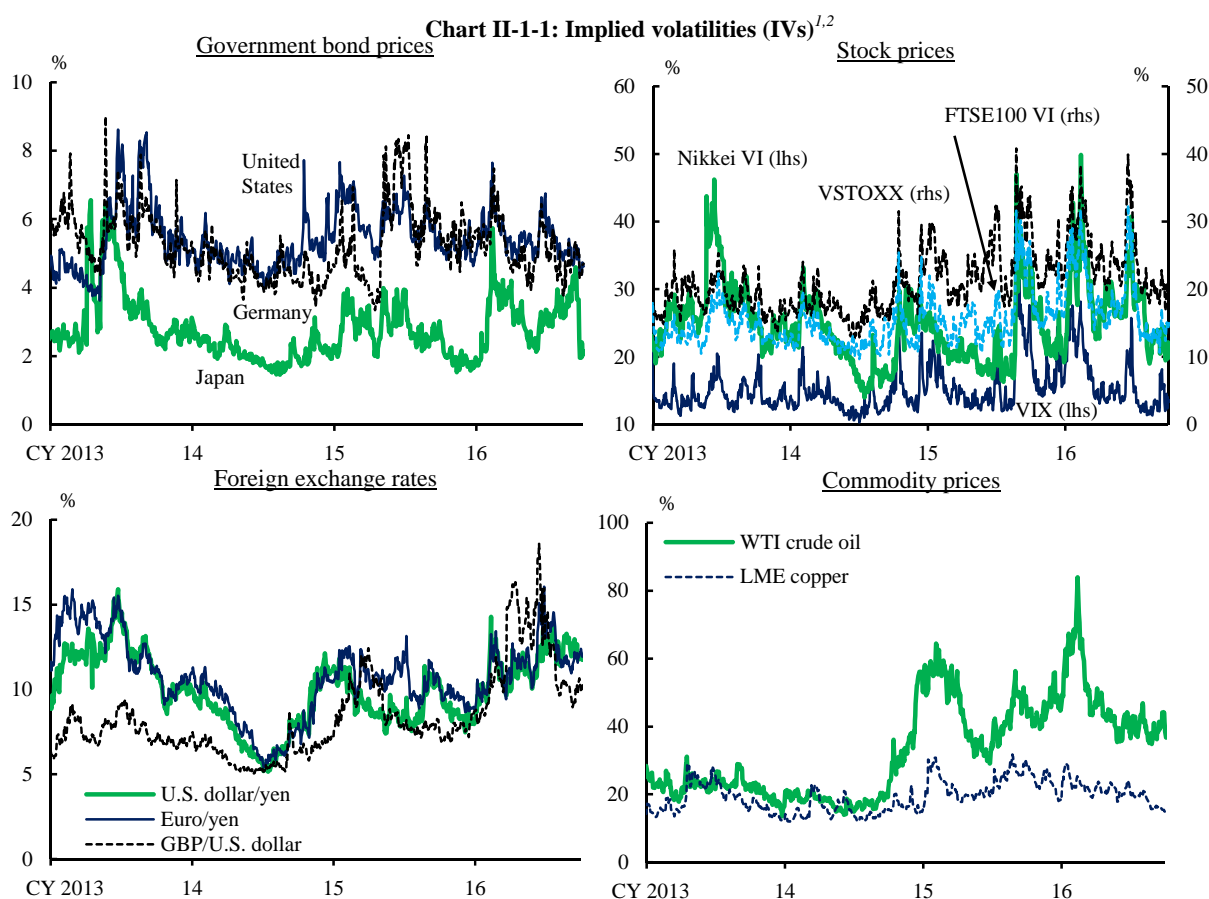
In order for Japan's financial system to ensure stability in the future, it is essential that financial institutions steadily respond to the accumulation of risks and structural changes that could become a source of potential vulnerability. To address declining profitability, they are expected to formulate business plans to stabilize and improve their profitability through, for example, strengthening their support for the regional economy and local firms, by enhancing financial intermediation capabilities. Another important challenge is to strengthen the ability to respond to risks in areas where Japanese financial institutions are proactively stepping up their risk taking, such as overseas business and market investment. In addition, given the increasing systemic importance of large financial institutions, further action is called for. This includes establishing a solid financial base and strengthening business management frameworks to respond to the accumulation of risks, as well as making preparations to respond in an orderly manner in times of stress. The Bank will continue to deal with these challenges on its part toward ensuring financial system stability, through its off-site monitoring and on-site examinations, among other efforts.

II. Risks observed in financial markets

This chapter summarizes developments in financial markets at home and abroad mainly during the first half of fiscal 2016 and examines risks observed.¹

A. Global financial markets

In global financial markets, while investors' risk aversion temporarily heightened following the result of the U.K. referendum in late June -- in which a majority voted to leave the EU -- calm gradually returned to markets thereafter. There are signs that search for yield activities are becoming active again, against the background of advanced economies' long-term interest rates at low levels. Careful attention should thus be paid to whether global fund flows suddenly change, amid large uncertainties remaining over the outlook for the global economy (Chart II-1-1).



Notes: 1. IVs of government bond prices are based on the following data: S&P JPX JGB VIX for Japan; CBOE CBOT 10-year U.S. Treasury Note Volatility Index for the United States; IV of the options on Euro-Bund futures traded on Eurex for Germany, calculated by Bloomberg. IVs of foreign exchange rates are calculated by Bloomberg. IV of crude oil is CBOE NYMEX WTI volatility index. IV of copper is calculated by Bloomberg.

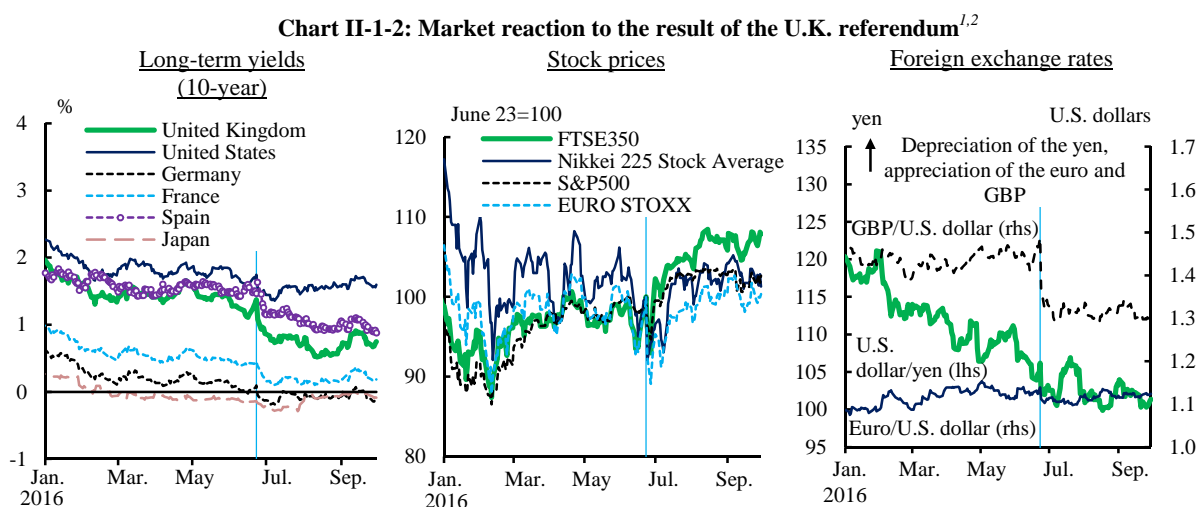
2. Data to September 30, 2016.

Source: Bloomberg.

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

Market reaction to the result of the U.K. referendum and future risks

Markets reacted substantially to the U.K. referendum in late June, in which a majority voted to leave the EU; long-term government bond yields declined and stock prices fell significantly. In the foreign exchange (FX) market, the British pound depreciated to a large extent, the U.S. dollar generally appreciated against most currencies, and the yen appreciated against the U.S. dollar and other currencies (Chart II-1-2). These developments were attributable to investors' increased risk aversion, reflecting factors such as the difficulty of discerning the process leading up to the U.K.'s departure from the EU and its impact on the real economy.



Notes: 1. The vertical lines indicate the U.K. referendum on June 23, 2016.
 2. Data to September 30, 2016.
 Source: Bloomberg.

Afterwards, calm gradually returned to markets, for example with global stock prices starting to rise. However, elevated uncertainties regarding the U.K.'s departure remain. The large decline in long-term interest rates for the U.K. and the euro area may reflect concern that the U.K. leaving the EU could negatively affect the real economy, in addition to factors such as increased expectations toward further monetary easing and search for yield activities among investors. Based on the economic outlook by the International Monetary Fund (IMF), which was revised after the U.K. referendum, the forecast of the growth rate of the world economy, especially for Europe, was revised downward somewhat, reflecting the effects of the U.K.'s decision to leave the EU (Chart II-1-3).

After the U.K. referendum, stock prices of banks in Europe declined to a relatively large extent and the conditional value-at-risk (CoVaR) of the European banking sector, a systemic risk indicator representing the degree of stress that the financial system is facing,

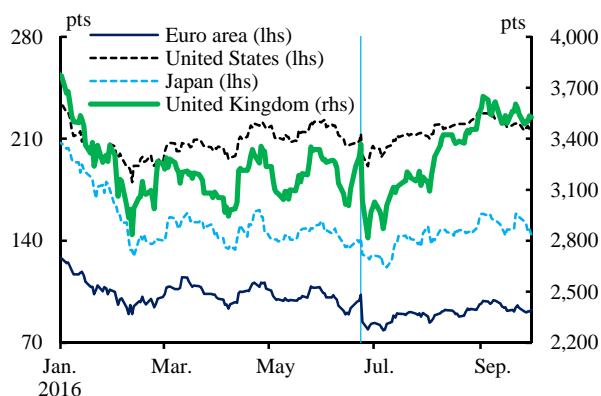
rose to a relatively large extent (Charts II-1-4 and II-1-5).² These developments seem attributable not only to (1) the direct impact of the referendum, but also to (2) concerns around the underlying weakness in profitability and non-performing loans of the European banking sector under a macro environment with low growth and low interest rates, both of which factors have again attracted attention as a result of the U.K.'s decision to leave the EU (Chart II-1-6).

Chart II-1-3: Projections for European economies^{1,2}

y/y % chg.				
	2014	2015	2016 Projection	2017 Projection
World	3.4	3.2	3.1 (- 0.1)	3.4 (- 0.1)
Euro area	0.9	2.0	1.7 (0.2)	1.5 (- 0.1)
Germany	1.6	1.5	1.7 (0.2)	1.4 (- 0.2)
United Kingdom	3.1	2.2	1.8 (- 0.1)	1.1 (- 1.1)

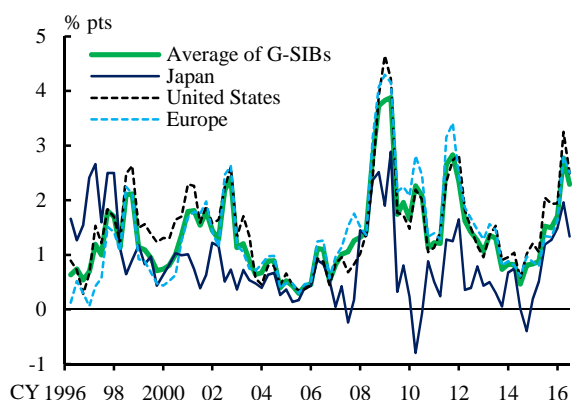
Notes: 1. Data for 2016 and 2017 are based on October 2016 WEO projections.
2. Figures in parentheses indicate the change from April 2016 WEO projections.
Source: IMF, "World economic outlook."

Chart II-1-4: Bank stock prices^{1,2,3}



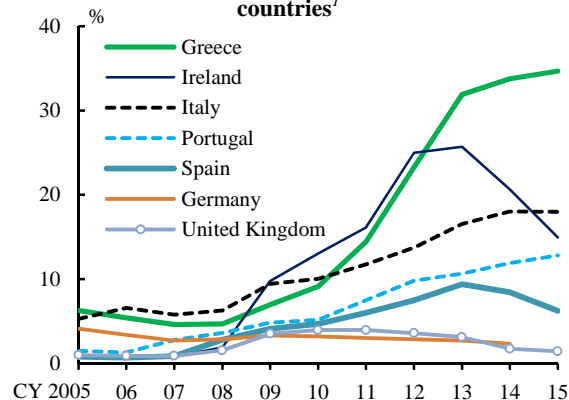
Notes: 1. The vertical line indicates the U.K. referendum on June 23, 2016.
2. Bank stock prices are based on the following data: the EURO STOXX Banks (price) Index for euro area; S&P 500 Banks Index for the United States; TOPIX Banks Index for Japan; FTSE All-Share Banks Index for the United Kingdom.
3. Data to September 30, 2016.
Source: Bloomberg.

Chart II-1-5: Systemic risk indicator (CoVaR)^{1,2}



Notes: 1. Includes G-SIBs.
2. Latest data as at end-September 2016.
Sources: Bloomberg; BOJ.

Chart II-1-6: Rate of banks' nonperforming loans to total loans in euro area countries¹



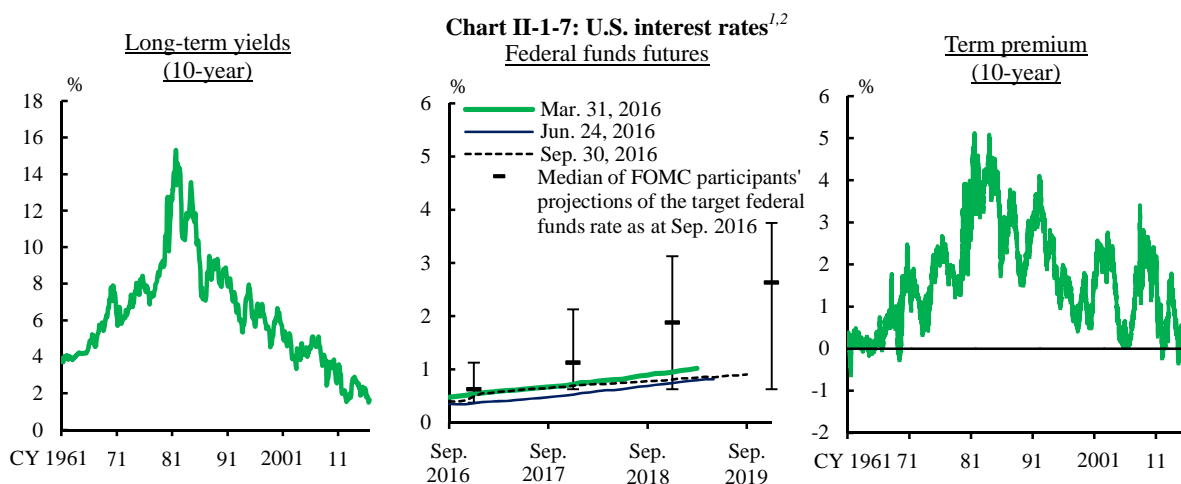
Note: 1. Latest data as at June 2015 for Italy and the United Kingdom, September 2015 for Greece and Portugal, December 2015 for Ireland and Spain, and December 2014 for Germany.
Source: IMF.

² The CoVaR is an indicator that gauges the extent of systemic risks materializing through two factors: the size of stresses facing individual financial institutions, and the degree of comovement between these stresses. For details, see Tobias Adrian and Markus K. Brunnermeier, "CoVaR," *American Economic Review*, vol. 106, no. 7, July 2016.

Meanwhile, in the U.K. real estate market, outflows from real estate funds were observed, reflecting concerns among investors that commercial real estate prices would decline following the U.K.'s departure from the EU, which led to some funds suspending redemptions in and after July. Thus far, further occurrences of such cases have been contained and no chain reaction of a credit crunch among institutional investors and financial institutions has been observed. However, real estate funds are generally leveraged through bank lending, and attention needs to be paid to the risk that the increase in withdrawal from the funds and the decline in real estate prices may have negative effects on the financial sector.

Increased expectations toward the continuation of low interest rates and their effect on capital flows

U.S. long-term interest rates had been more or less unchanged until around May. In June, however, they temporarily fell to a level below the trough registered in the middle of 2012. This is partly attributable to growing expectations among market participants that the pace of policy interest rate hikes by the Federal Reserve would be more gradual than anticipated, in response to weaker-than-expected labor statistics and in response to the result of the U.K. referendum. Thereafter, U.S. long-term interest rates have remained at extremely low levels from a long-term perspective, although a temporary rise in interest rates was observed reflecting economic indicators which came in above expectations.



Notes: 1. In the middle chart, the vertical bars indicate the range between the minimum and maximum of the FOMC participants' projections.

2. Latest data for long-term yields as at September 2016. Term premium data to September 30, 2016.

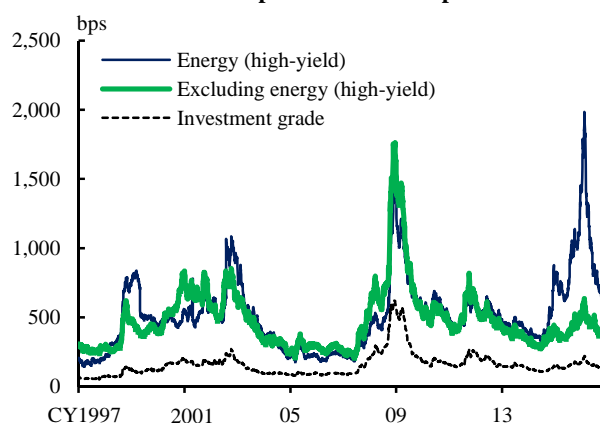
Sources: Bloomberg; FRB.

Looking at the background of the decline in U.S. long-term interest rates, while market expectations on the future path of short-term interest rates have factored in a moderate pace of U.S. policy rate hikes, the expected pace of increase has been much more gradual compared to projections by FOMC participants. The divergence in the outlook for U.S.

monetary policy between market participants and the authorities has widened, especially toward the end of the forecast period (Chart II-1-7).

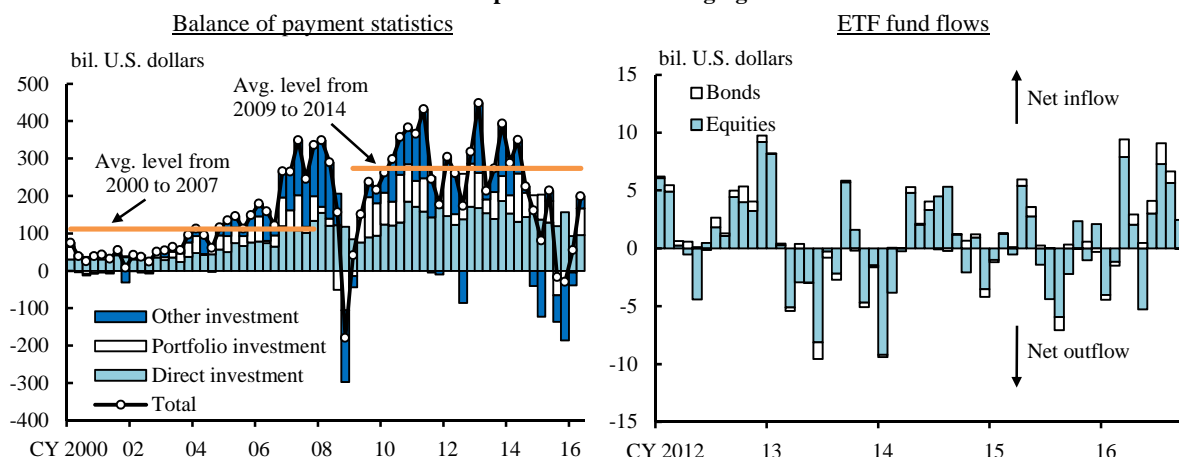
Amid long-term interest rates of advanced economies remaining at low levels, credit spreads for U.S. high-yield bonds have started to narrow, reflecting investors' search for yield activities (Chart II-1-8). Capital flows to emerging markets, which posted net outflows toward the second half of 2015, have shown signs of turning to net inflows again recently (Chart II-1-9). Spreads for emerging market corporate bonds have started to narrow, and emerging market stock prices and commodity prices have also started to rise once again, indicating investors' search for yield activities (Charts II-1-10 and II-1-11).

Chart II-1-8: Credit spreads of U.S. corporate bonds^{1,2}



Notes: 1. Calculated by Bank of America Merrill Lynch.
2. Data to September 30, 2016.
Source: Bloomberg.

Chart II-1-9: Capital flows into emerging markets^{1,2}



Notes: 1. In the left-hand chart, figures are the sum of 19 major emerging countries. Latest data as at the April-June quarter of 2016.
2. In the right-hand chart, figures are fund flows of ETFs listed on the U.S. stock exchange. Latest data as at September 2016.
Sources: Bloomberg; Haver Analytics.

However, elevated uncertainties remain over the outlook for the global economy, such as the effect of the U.K.'s departure from the EU and developments in emerging economies. Regarding projections of the future path of the U.S. interest rate, there is divergence between market participants and the authorities (Chart II-1-7). Taking this divergence

into account, there is a possibility that if market participants recognize uncertainties regarding the future path of interest rates, term premiums -- which currently remain at extremely low levels -- may widen and lead to a rise in long-term interest rates. This may rapidly reduce the risk appetite of global investors.

Bearing the above in mind, continued attention should be paid to the possibility that increased expectations toward the continuation of low interest rates may accelerate an inflow of funds to emerging markets and credit markets, and conversely, attention should be paid to the risk of unwinding, where funds rapidly flow out when such expectations subside.

Chart II-1-10: Credit spreads of EM corporate bonds^{1,2}

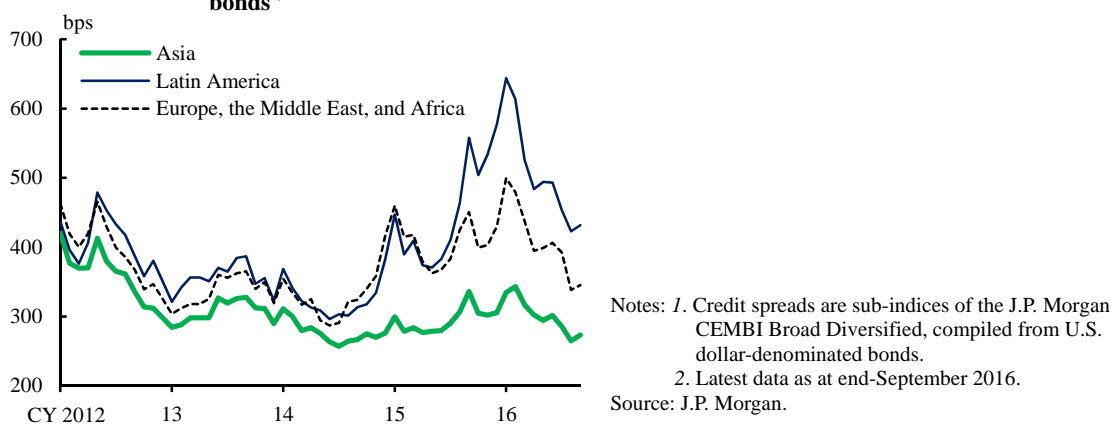
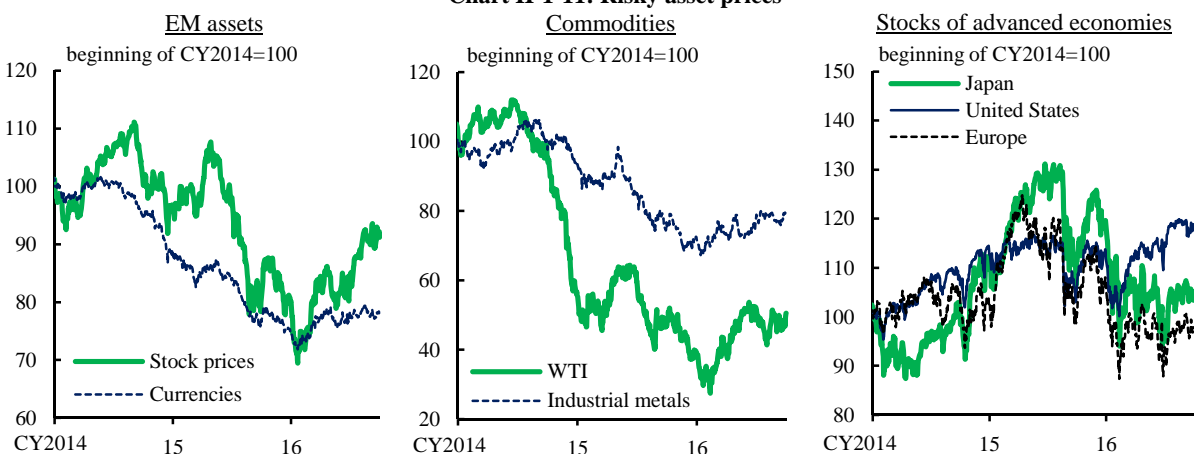


Chart II-1-11: Risky asset prices^{1,2}

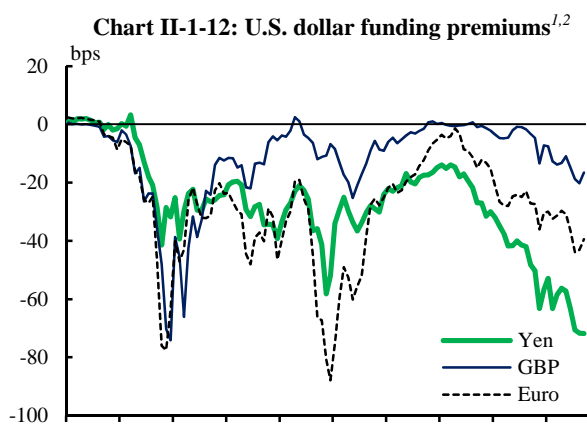


Notes: 1. MSCI Emerging Index for EM stock prices; J.P. Morgan EMCI Index for EM currencies; S&P GSCI Industrial Metals Index for industrial metals.
2. Data to September 30, 2016.
Source: Bloomberg.

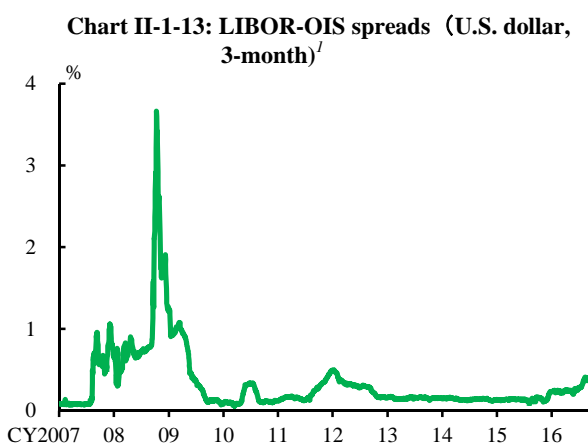
Developments in the U.S. dollar funding markets

Looking at developments in the U.S. dollar funding markets, dollar funding premiums in the FX swap and cross-currency basis swap markets have been rising since 2014, mainly

in Japan and the European countries (Chart II-1-12).³ LIBOR-OIS spreads have recently been widening somewhat (Chart II-1-13).



Notes: 1. Monthly average of 1-year cross-currency basis swaps.
2. Latest data as at September 2016.
Source: Bloomberg.



Note: 1. Data to September 30, 2016.
Source: Bloomberg.

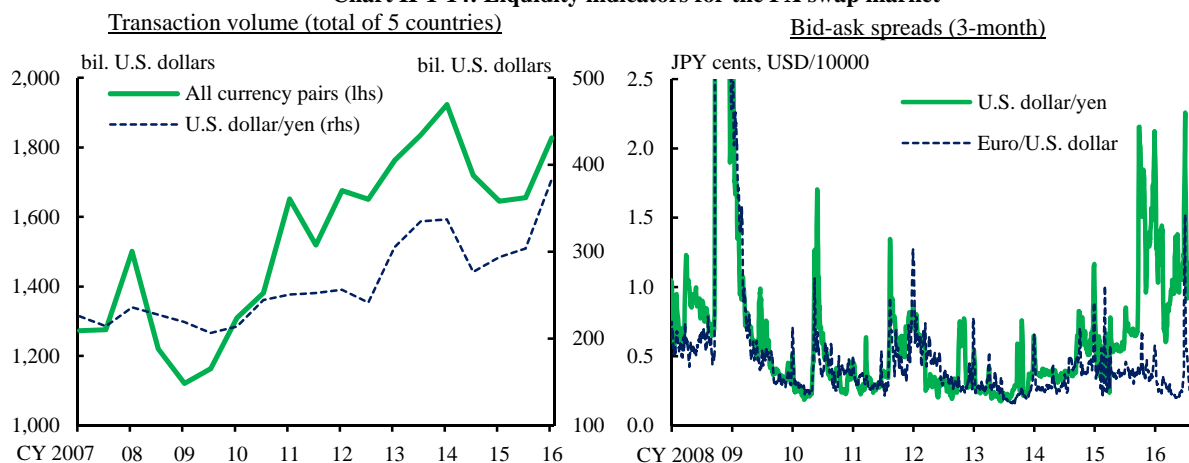
The widening of the dollar funding premium globally can be attributed to the following: (1) on the demand side, increased demand for the U.S. dollars in the FX swap market resulting from a divergence in the monetary policy between the United States and other advanced countries; (2) on the supply side, growing cautiousness of foreign reserves and other investors regarding the supply of the U.S. dollars, against the background of declines in commodity prices and depreciation in emerging currencies; and (3) the effects of regulatory reforms. For example, the leverage ratio requirement may be restraining the market-making activities of global financial institutions, and for prime money market funds (MMFs) -- suppliers of the short-term U.S. dollar -- their amounts outstanding have been decreasing due to the U.S. MMF reform. These factors seem to be playing a role in the tightening of the demand and supply balance in the U.S. dollar funding markets (see Chapter IV.C for details).

Liquidity indicators for the FX swap markets suggest that liquidity has been deteriorating on the whole. Transaction volume for the entire FX swap market is still below the level as at around the beginning of 2014, although the volume for the U.S. dollar/yen swap market, in which demand for raising the U.S. dollars is high, has been on an increasing trend. Bid-ask-spreads have been elevated compared to a while ago, especially for the U.S. dollar/yen, reflecting some global financial institutions' reduced appetite for market-making activities (Chart II-1-14). While there have not been constraints in

³ For detailed explanation on the widening of the U.S. dollar funding premium globally since 2014, see Chapter II of the April 2016 issue of the *Financial System Report* and Fumihiko Arai, Yoshiyumi Makabe, Yasunori Okawara, and Tepei Nagano, "Recent Trends in Cross-currency Basis," Bank of Japan Review, 16-E-7, September 2016.

availability yet, continued attention should be paid to developments in the demand and supply situation of dollar funding, as well as to the impact of regulatory reforms on the market.

Chart II-1-14: Liquidity indicators for the FX swap market^{1,2}



Notes: 1. In the left-hand chart, transaction volume for the total of 5 countries is the average transaction volume per day for London, NY, Singapore, Sydney, and Tokyo markets. Double counting of transaction volumes between the countries is not adjusted. Latest data as at April 2016.

2. In the right-hand chart, figures are 5-day backward moving average of intraday bid-ask spread. Intraday bid-ask spread is the average of the hourly bid-ask spread. Closing prices are used for days where hourly data were unavailable. Data to September 30, 2016.

Sources: Bloomberg; Foreign Exchange Committee of each country; BOJ.

B. Japanese financial markets

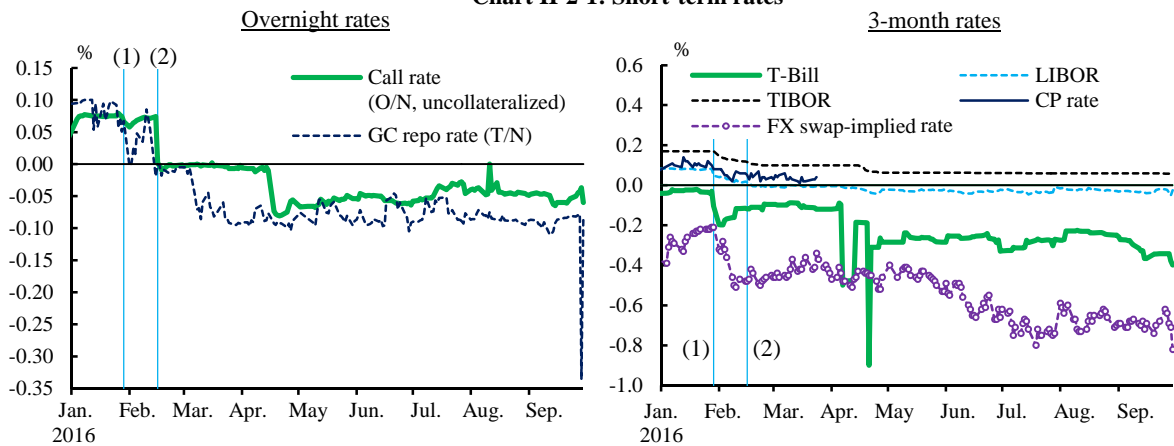
1. Money markets

Short-term interest rates -- on both overnight and term instruments -- have been at about 0 percent or in negative territory since the introduction of the Bank of Japan's QQE with a Negative Interest Rate.

For overnight rates, the uncollateralized call rate (O/N) remained marginally negative after a negative interest rate was applied to financial institutions' current account balances at the Bank from the February reserve maintenance period. Thereafter it plunged deeper into negative territory as investment trusts began lending cash at negative rates from April 18, after entering the April reserve maintenance period. The GC repo rate (T/N) remained more or less at a level slightly above minus 0.10 percent, along with fluctuations from events such as T-Bill issuance auctions. On the other hand, rates on term instruments generally remained at about 0 percent or in negative territory, while fluctuating due to supply and demand conditions during that time, such as investors' need to invest their excess cash (Chart II-2-1).⁴

⁴ For CP (issuance rates), data released by the Japan Securities Depository Center (JASDEC) was discontinued in late March 2016.

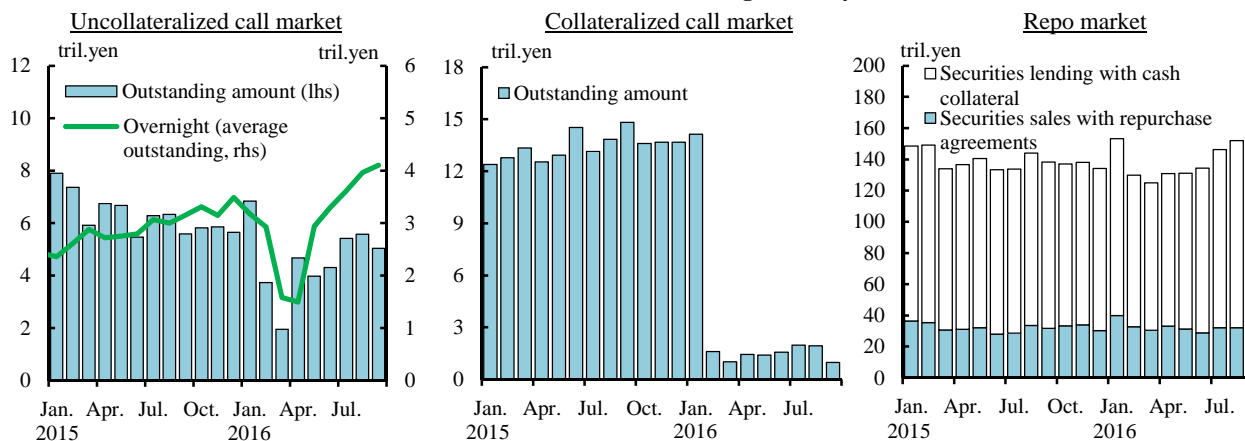
Chart II-2-1: Short-term rates^{1,2,3}



Notes: 1. In the left-hand chart, the horizontal axis indicates the start dates of transactions.
 2. (1) indicates the announcement of the introduction of QQE with a Negative Interest Rate; (2) indicates the effective start date of the negative interest rate.
 3. Data for the CP rate to March 24, 2016. Others to September 30, 2016.
 Sources: Bloomberg; Japan Bond Trading; JASDEC; JSDA; BOJ.

In money markets, the amount outstanding of the uncollateralized call market, which had declined significantly after the application of the negative rate, increased after entering the April reserve maintenance period, mainly in overnight transactions. This can be attributed to the fact that some major banks and regional banks, which had improved their IT systems in order to trade at negative rates, began borrowing, in addition to the fact that investment trusts began lending at negative rates. In repo markets, transaction volume has recovered and the amount outstanding has been increasing quite moderately, as major banks resumed borrowing cash from the middle of April. On the other hand, the amount outstanding of the collateralized call market continued to remain at low levels (Chart II-2-2).

Chart II-2-2: Amount outstanding in money markets¹

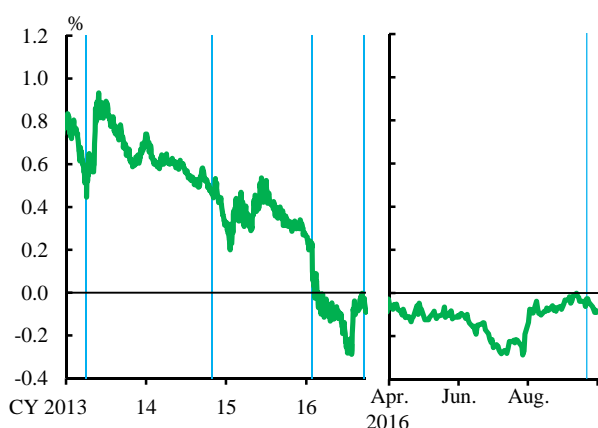


Note: 1. Latest data for the uncollateralized and collateralized call markets as at September 2016. Repo market data as at August 2016.
 Sources: JSDA; BOJ.

2. JGB markets

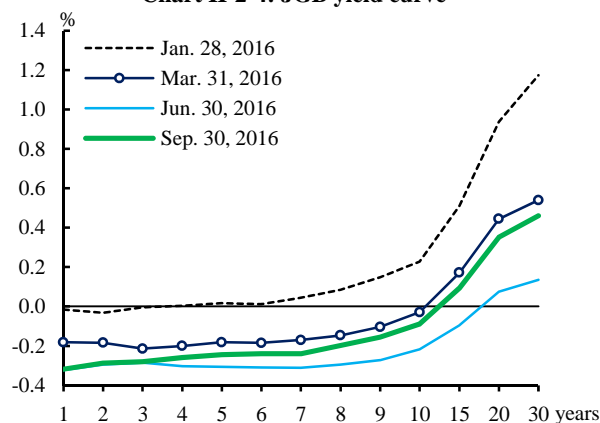
Long-term JGB yields declined further into negative territory, partly in response to the result of the U.K. referendum in late June. Thereafter, yields increased within negative territory toward September. Regarding the yield curve for JGBs, the decline in the longer end of the curve was relatively large and the curve as a whole has flattened since the end of January. Meanwhile, the Bank decided in September to introduce QQE with Yield Curve Control. There have not been large changes in the levels of long-term JGB yields and the yield curve, compared to before the introduction (Charts II-2-3 and II-2-4).⁵ Looking at JGB trading by investor type, foreign investors whose yen funding costs in the FX swap markets are significantly negative continued to invest in JGBs, thereby remaining as main net purchasers.

Chart II-2-3: Long-term JGB yields (10-year)¹



Note: 1. Data to September 30, 2016.
Source: Bloomberg.

Chart II-2-4: JGB yield curve



Source: Bloomberg.

Liquidity and functioning of the JGB market

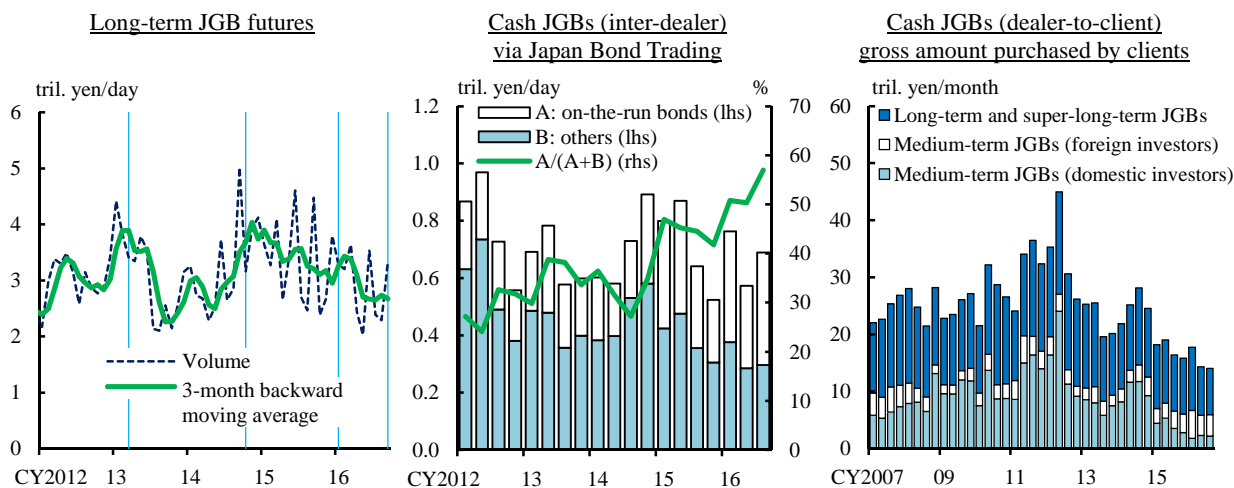
Since the introduction of QQE with a Negative Interest Rate, many indicators suggest that liquidity in the JGB market remains deteriorated. Here, we examine liquidity in the JGB market with the following indicators: transaction volume, bid-ask spreads, market depth, and resiliency.⁶

⁵ In the following section, the vertical lines in the charts indicate the introduction of QQE (April 4, 2013), the expansion of QQE (October 31, 2014), the introduction of QQE with a Negative Interest Rate (January 29, 2016), and the introduction of QQE with Yield Curve Control (September 21, 2016).

⁶ The Financial Markets Department of the Bank of Japan updates and releases liquidity indicators of the JGB markets, generally each quarter (<https://www.boj.or.jp/en/paym/bond/index.htm/#p02>). For the definition of each indicator, please refer to Tetsuo Kurosaki, Yusuke Kumano, Kota Okabe, and Tepei Nagano, "Liquidity in JGB Markets: An Evaluation from Transaction Data," Bank of Japan Working Paper, 15-E-2, May 2015.

Transaction volume for long-term JGB futures increased temporarily after the introduction of QQE with a Negative Interest Rate, but thereafter returned to the moderately declining trend previously observed. On the other hand, inter-dealer transaction volume for off-the-run cash JGBs is at low levels, and dealer-to-client transactions have also edged down, mainly in transactions of medium-term JGBs (2-year and 5-year JGBs) with domestic investors (Chart II-2-5).

Chart II-2-5: Transaction volume in the JGB market^{1,2}

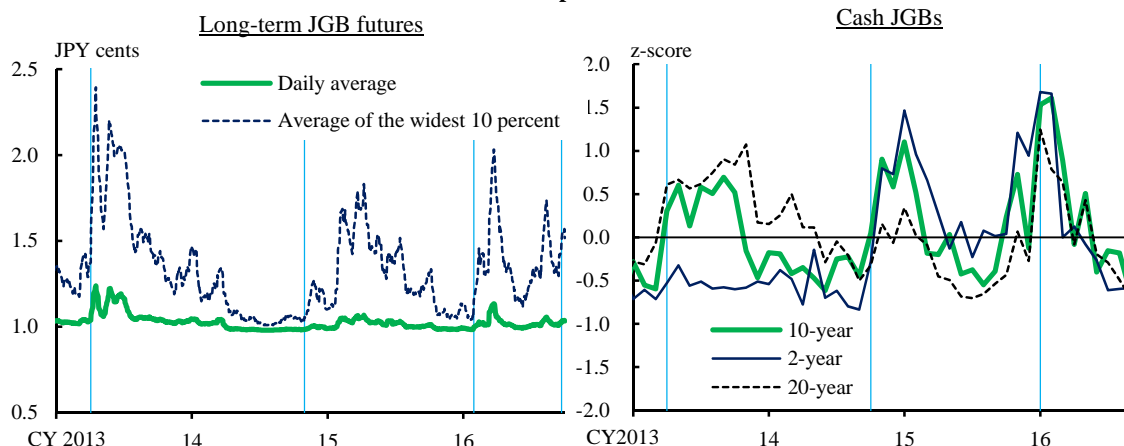


Notes: 1. In the right-hand chart, "clients" excludes government, BOJ, etc. Latest data as at July-August 2016.
 2. Latest data for JGB futures as at September 2016. JGB cash (inter-dealer) data as at July-September quarter of 2016.
 Sources: JSDA; Osaka Exchange; QUICK.

The bid-ask spreads for long-term JGB futures are still at a relatively high level, mainly for the average of the widest 10 percent. Fluctuations in bid-ask spreads for cash JGBs seem to be becoming larger since the second half of fiscal 2014 (Chart II-2-6). In terms of market depth and resiliency, each indicator for long-term JGB futures and cash JGB markets suggests that market liquidity remains deteriorated since the end of January 2016 (Chart II-2-7).

In an overall assessment, many indicators suggest that liquidity in the JGB market remains deteriorated since the introduction of QQE with a Negative Interest Rate. The diffusion indices for bond market functioning of the *Bond Market Survey* (August 2016) show that more respondents have cited low functioning, compared to the previous survey (Chart II-2-8). Since it is unclear at this point whether the worsening of liquidity indicators will be temporary as liquidity indicators tend to fluctuate widely, it is necessary to continue to closely monitor liquidity in the JGB market.

Chart II-2-6: Bid-ask spreads in the JGB market^{1,2}

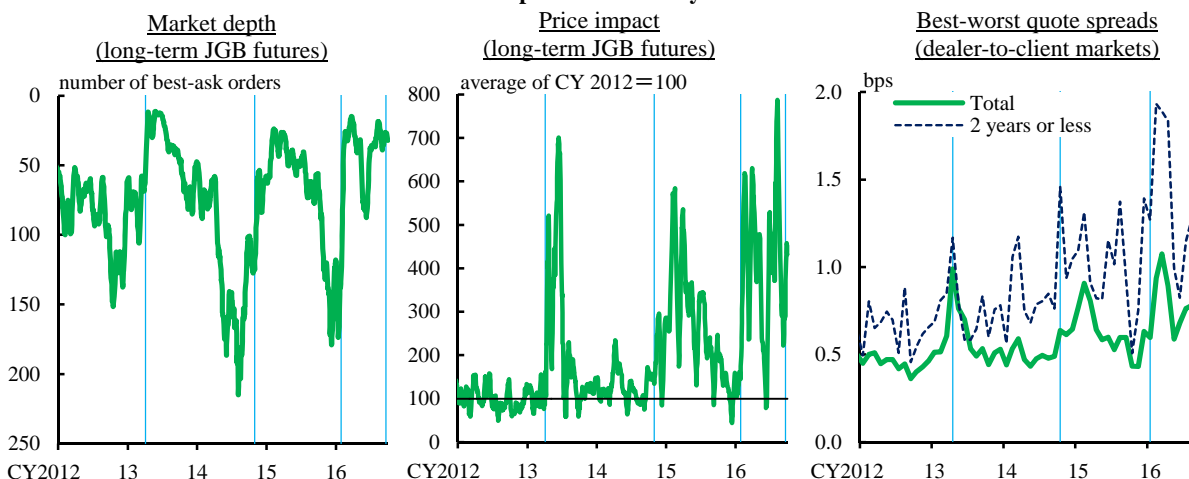


Notes: 1. In the left-hand chart, figures are calculated by using the bid-ask spread data with a 1-minute frequency within each business day. "Average of the widest 10 percent" is the average of the widest 10 percent of that data. 10-day backward moving average. Data to September 30, 2016.

2. In the right-hand chart, bid-ask spreads are divided by the standard deviation after subtracting the average bid-ask spreads after 2010. Latest data as at September 2016.

Sources: Nikkei Inc., "NEEDS"; Thomson Reuters Markets; BOJ.

Chart II-2-7: Market depth and resiliency in the JGB market^{1,2,3}



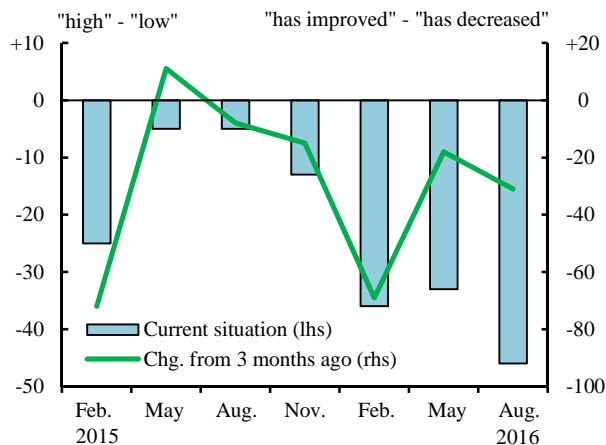
Notes: 1. In the left-hand chart, figures are calculated by taking the median of the number of orders at the best-ask price with a 1-minute frequency. 10-day backward moving average. Data to September 30, 2016.

2. In the middle chart, price impact is a measurement of how much impact a unit volume of transaction gives to the price. See Kurosaki et al. (2015) for details. 10-day backward moving average. Data to September 30, 2016.

3. In the right-hand chart, a portion of transactions with quite wide spreads is excluded from the calculation. Latest data as at September 2016.

Sources: Nikkei Inc., "NEEDS"; Yensai.com; BOJ.

Chart II-2-8: Bond market survey^{1,2}



Notes: 1. The degree of bond market functioning from the surveyed institutions' viewpoint.

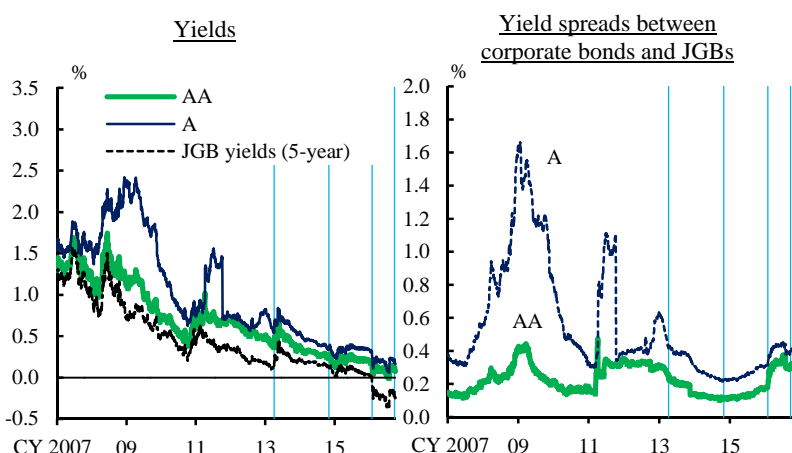
2. The latest survey was conducted from August 8-17, 2016.

Source: BOJ, "Bond Market Survey."

3. Credit and stock markets

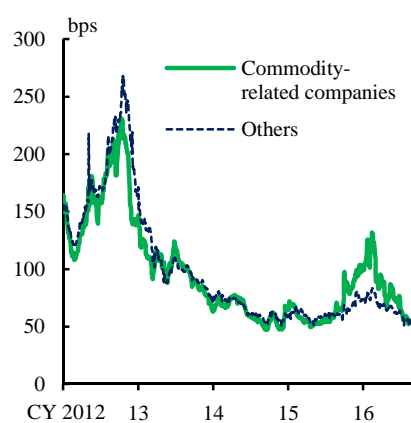
Credit spreads on corporate bonds have continued to be at low levels on the whole (Chart II-2-9). Since the end of January 2016, credit spreads have widened somewhat. This is because JGB yields had declined faster and further than the overall decline in corporate bond yields, and credit spreads on corporate bonds have narrowed again since August, when the yields on JGBs increased within negative territory. Meanwhile, credit default swap (CDS) premiums have narrowed, mainly for those related to commodities that had widened somewhat in the second half of fiscal 2015 (Chart II-2-10).

Chart II-2-9: Corporate bond yields^{1,2}



Notes: 1. Average yield spreads of bonds with a residual maturity of 3 years or more and less than 7 years. Rated by R&I.
2. Data to September 30, 2016.
Source: JSDA.

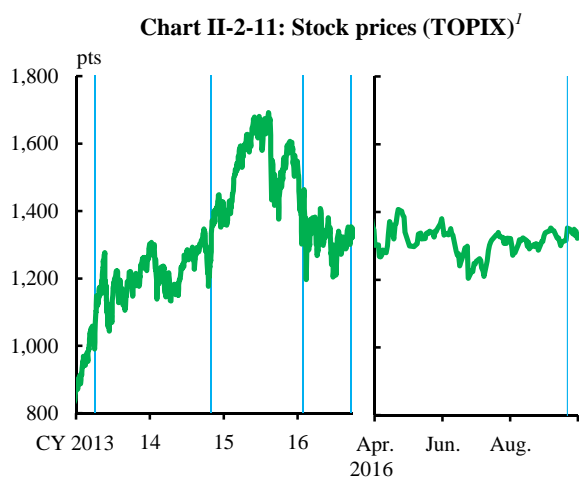
Chart II-2-10: CDS premiums^{1,2}



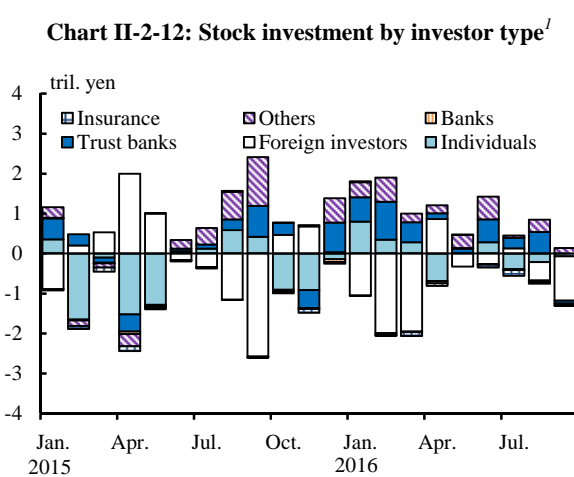
Notes: 1. "Commodity-related companies" is the simple average of trade firms and steel and oil companies. "Others" is the simple average of the remaining companies whose CDS premiums were quoted.
2. Data to September 30, 2016.
Source: Bloomberg.

Japanese stock prices had been more or less unchanged until early June, albeit with fluctuations. They then declined somewhat largely against the backdrop of the result of the U.K. referendum and the subsequent appreciation of the yen, but recovered after mid-July as calm gradually returned to the market. With these fluctuations smoothed out, stock prices have been more or less unchanged (Chart II-2-11).

A relatively large increase in the implied volatility of Japanese stock prices was temporarily observed immediately after the U.K. referendum, due partly to market participants' vigilance over the possible future decline in stock prices (Chart II-1-1). However, even at such times there was no investor type that actually became large net sellers of stocks (Chart II-2-12). Thereafter, excessive concern over the decline in stock prices gradually subsided as calm returned to markets. However, clear signs of net purchases were not observed in a situation where stock prices lacked clear momentum.



Note: 1. Data to September 30, 2016.
Source: Bloomberg.

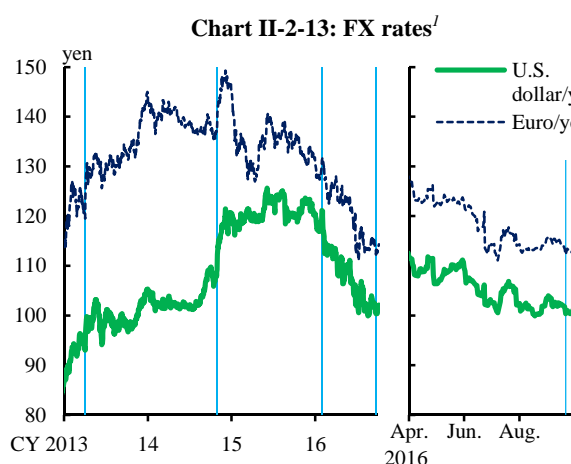


Note: 1. Latest data as at September 2016.
Source: Tokyo Stock Exchange.

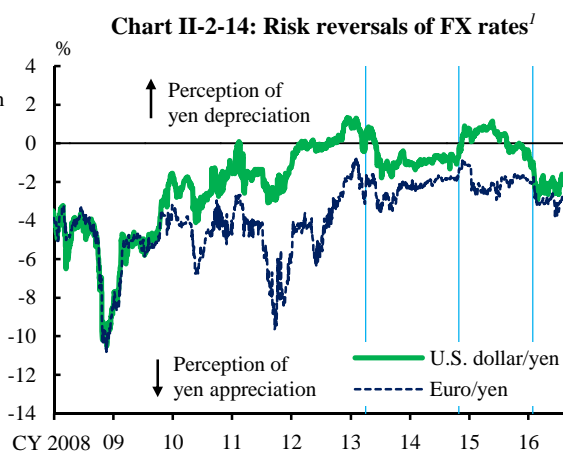
4. Foreign exchange markets

The yen appreciated against the U.S. dollar (Chart II-2-13). The volatility of yen exchange rates rose toward the end of June and has remained at relatively high levels thereafter (Chart II-1-1).

The yen appreciated further against the U.S. dollar, partly reflecting increased expectations that the pace of U.S. policy rate hikes would be moderate following the result of the U.K. referendum. The yen also appreciated against the euro since demand for the yen as a safe haven currency strengthened, following the result of the U.K. referendum. Risk reversals show market participants' continued vigilance over the yen's appreciation against the U.S. dollar. While concerns over the yen's appreciation against the euro, which intensified around the U.K. referendum, have been mitigated, vigilance over the yen's appreciation against the euro remains (Chart II-2-14).



Note: 1. Data to September 30, 2016.
Source: Bloomberg.



Note: 1. 1-year risk reversals. Data to September 30, 2016.
Source: Bloomberg.

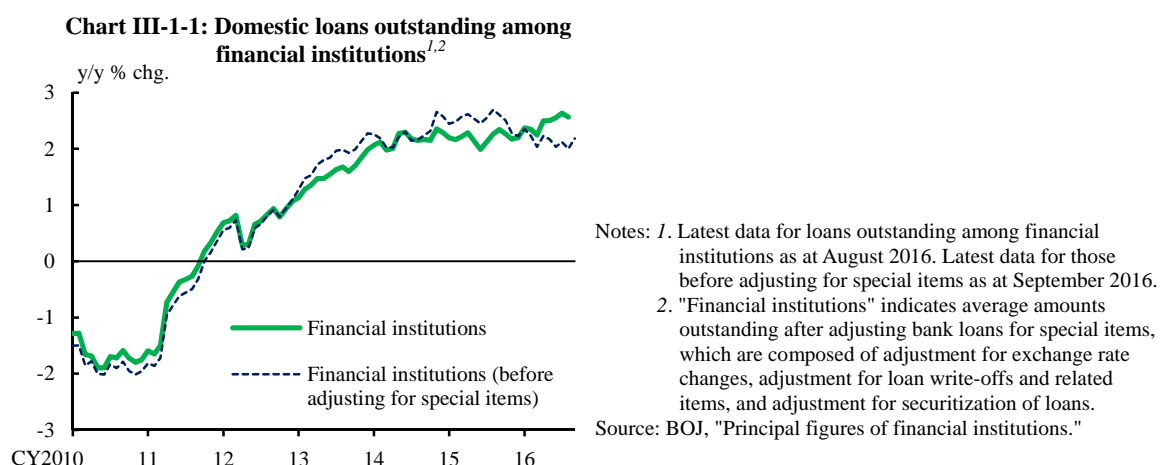
III. Examination of financial intermediation

This chapter examines the functioning of the financial system, based mainly on financial information in the first half of fiscal 2016. First, we outline developments in financial intermediation by financial institutions, such as banks and *shinkin* banks, and investment activities by institutional investors. We then summarize developments in households' investment in financial assets and assess the state of financial intermediation through financial markets. In the last part of this chapter, we examine if these activities show signs of overheating.

A. Financial intermediation by financial institutions

1. Domestic loans

The year-on-year growth rate in financial institutions' domestic loans outstanding has been around 2 percent (Chart III-1-1).

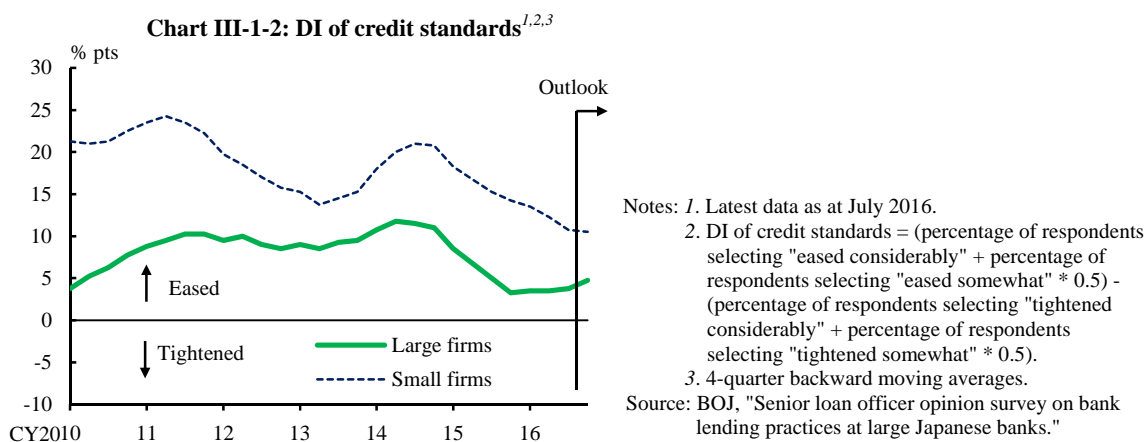


Lending stances of financial institutions and demand for funds

Financial institutions' lending stances have remained accommodative. In terms of loans to large firms, major banks in particular have remained proactive in engaging in lending activities, partly with a view to improving their non-interest income (fees and commissions related to domestic and foreign transactions and syndicated loans, etc.). They have been cooperating with their group companies to proactively meet demand for funds for merger and acquisition activities and business expansion at home and abroad, while being mindful of the increase in foreign currency funding costs. At the same time, as lending interest rates fall, some banks are focusing on products with relatively wider

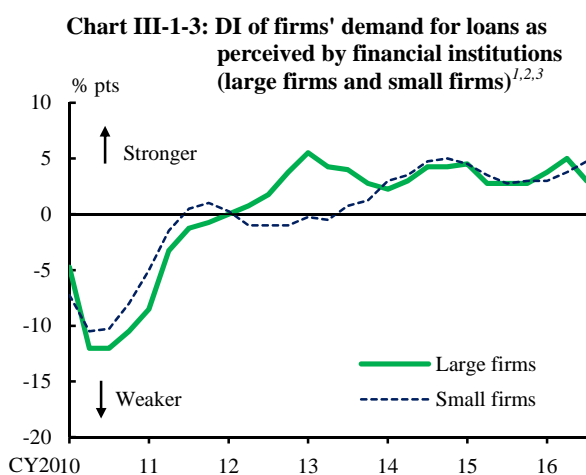
profit margins, such as subordinated loans. Also in terms of loans to small and medium-sized firms, financial institutions have been working on extending loans to local firms, including borrowers with lower credit ratings, while continuing to work together with local governments and other entities toward revitalization of local economies and to support, for example, start-up firms, business revitalization, succession of businesses, and firms' business matching. In particular, regional financial institutions have continued to focus on efforts to revitalize local economies and firms, with a view to maintaining and buttressing their own customer bases. As for loans to individuals, a number of financial institutions have stepped up their proactive lending stance in terms of providing housing loans. An increasing number of financial institutions have also been expanding activities that attract relatively wider profit margins, such as card loans. Meanwhile, they have been proactive in providing loans to individuals in the housing rental business. Loans to local governments have continued to increase, but some financial institutions have begun to take a careful stance due to their declining profitability.

Under these circumstances, the DI of credit standards indicates that the number of financial institutions that have "eased" their lending standards continues to exceed the number that have "tightened" their lending standards, although the gap has narrowed compared with before (Chart III-1-2).

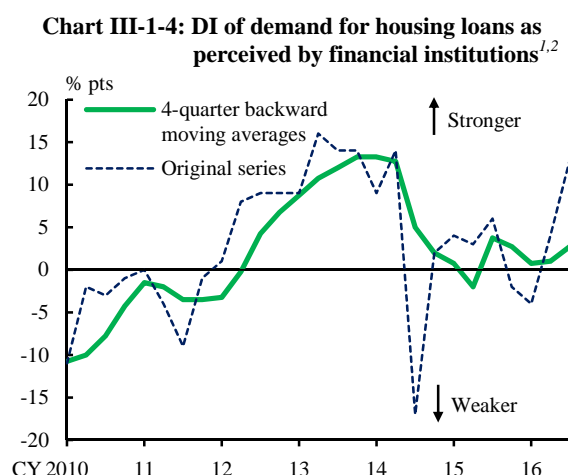


Demand for funds has increased moderately on the whole. Demand for funds related to M&A deals and for business fixed investment in the corporate sector has been increasing moderately, while the overall situation of maintaining ample internal reserves within the corporate sector has remained unchanged (Chart III-1-3). As interest rates remain at low levels, demand for hybrid financing (such as subordinated loans) aimed at bolstering the financial position of the borrower and for fixed mid- to long-term loans has been increasing. Looking at the household sector, housing loans, which account for a

large portion of the sector, have been increasing on the whole (Chart III-1-4).⁷ Demand for funds for housing rental businesses continues to be robust.



Notes: 1. Latest data as at July 2016.
 2. DI of firms' demand for loans = (percentage of respondents selecting "substantially stronger" + percentage of respondents selecting "moderately stronger" * 0.5) - (percentage of respondents selecting "substantially weaker" + percentage of respondents selecting "moderately weaker" * 0.5).
 3. 4-quarter backward moving averages.
 Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."



Notes: 1. Latest data as at July 2016.
 2. DI of demand for housing loans = (percentage of respondents selecting "substantially stronger" + percentage of respondents selecting "moderately stronger" * 0.5) - (percentage of respondents selecting "substantially weaker" + percentage of respondents selecting "moderately weaker" * 0.5).
 Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

Developments in loans by borrower classification

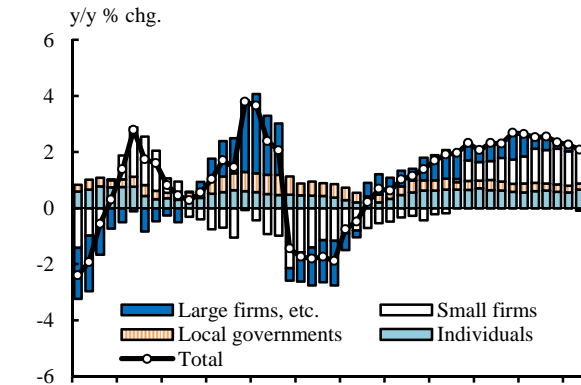
Financial institutions' loans have continued to grow, particularly loans to firms. Broken down by borrower classification, for loans to firms, loans to large firms have shifted to a slight decline while loans to small and medium-sized firms have continued to maintain the growth rate seen in the previous period (Chart III-1-5). Growth in loans to individuals has picked up slightly. Growth in loans to local governments has remained unchanged from the previous period.

As for loans to firms according to firm size, loans to large firms have shifted to a slight decline, mainly due to a decline in the amount of foreign currency-denominated loans (foreign currency-denominated impact loans) calculated in Japanese yen due to the yen's appreciation. However, excluding exchange rate effects, foreign currency-denominated impact loans have remained on an uptrend, particularly for loans related to mergers and acquisitions. Merger and acquisition activity by Japanese firms has continued to be brisk, across both cross-border mergers and acquisitions -- targeting foreign companies

⁷ In Chart III-1-4, the substantial increase in the DI is partly attributable to increased refinancing of housing loans.

(IN-OUT) -- and domestic mergers and acquisitions (IN-IN) (Chart III-1-6). Loans to small and medium-sized firms have continued to increase, in terms of lending for both business fixed investment funds and working capital.

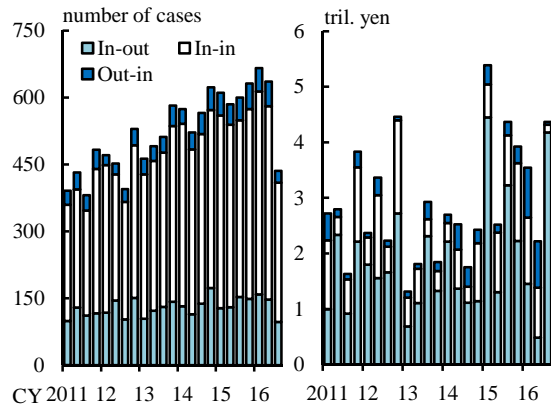
Chart III-1-5: Loans outstanding among financial institutions by type of borrower¹



Note: 1. Latest data as at end-June 2016. Overseas yen loans and domestic loans transferred overseas are excluded.

Source: BOJ.

Chart III-1-6: M&A related to Japanese companies^{1,2}



Notes: 1. Latest data as at July-August 2016.

2. "In-out" means the acquirer is a Japanese company and the target company is a foreign company.

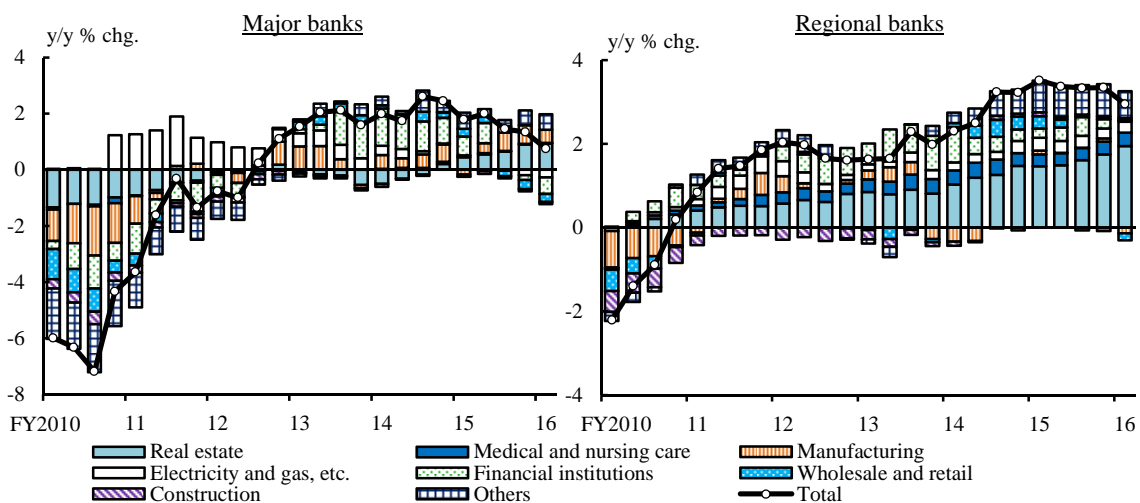
"In-in" means the acquirer is a Japanese company and the target company is a Japanese company.

"Out-in" means the acquirer is a foreign company and the target company is a Japanese company.

Source: RECOF.

By industry, loans to a large number of industries, including real estate, manufacturing, healthcare & welfare, transportation, and leasing, have been increasing (Chart III-1-7). Meanwhile, loans to the wholesale and retail industries have continued to decrease, mainly due to the fall in demand for funds related to resource development investment and working capital for importing firms given low commodity prices. Loans to financial services providers have swung to a decrease, as stock transactions conducted on margin have been sluggish in the securities industry.

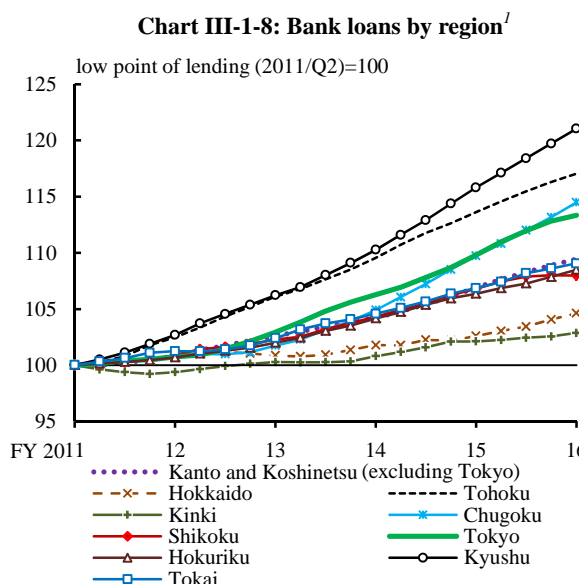
Chart III-1-7: Corporate loans outstanding among financial institutions by industry¹



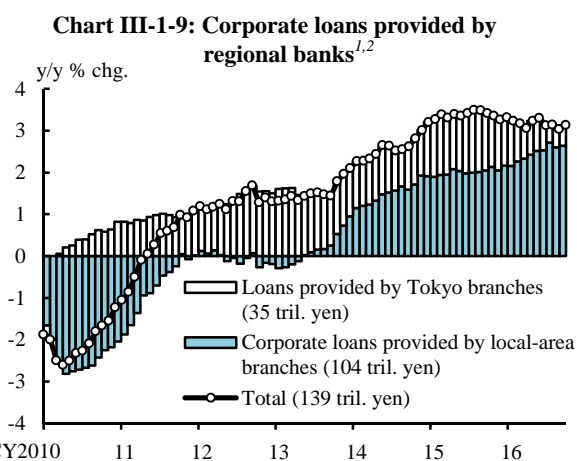
Note: 1. Latest data as at end-June 2016. Overseas yen loans and domestic loans transferred overseas are excluded.

Source: BOJ.

By region, loans have been growing in a large number of regions, including Kyushu, Tohoku, and Chugoku (Chart III-1-8). At regional banks, loans extended by regional banks' branches in Tokyo, including syndicated loans to large firms, have been growing at a slower pace, while loans to local firms have been growing at a faster pace (Chart III-1-9).

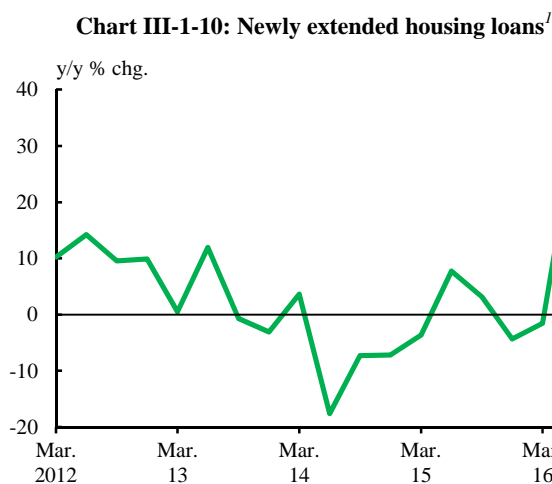


Note: 1. Latest data as at end-June 2016; 4-quarter backward moving averages.
Source: BOJ.

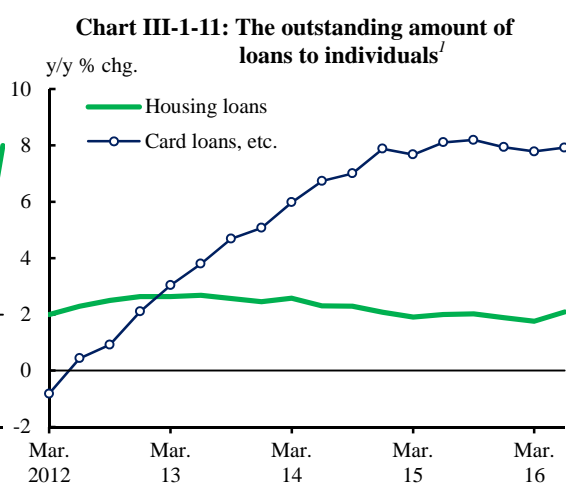


Notes: 1. Latest data as at September 2016.
2. Figures in parentheses indicate the amounts outstanding as at September 2016.
Source: BOJ.

In terms of loans to individuals, newly extended housing loans have increased sharply following the introduction of QQE with a Negative Interest Rate, mainly due to a spike in refinancing (Chart III-1-10).⁸ The growth rate of outstanding housing loans has increased somewhat. Outstanding card loans have continued increasing fairly briskly (Chart III-1-11).



Note: 1. Latest data as at end-June 2016.
Source: BOJ.



Note: 1. Latest data as at end-June 2016.
Source: BOJ.

⁸ In terms of statistics, loan refinancing by another bank is treated as a new loan.

Developments in real estate loans

Real estate loans have been growing at an even faster pace, and continue to exceed the growth rate of loans to firms in all industries (Chart III-1-12). The aggregate amount of real estate loans has surpassed the previous peak. By type of financial institution, the growth rate of major banks' lending has remained unchanged since the start of fiscal 2016 while remaining at a fairly high level. On the other hand, loan growth at regional financial institutions has accelerated (Chart III-1-13).

Chart III-1-12: Loans to the real estate industry among financial institutions¹

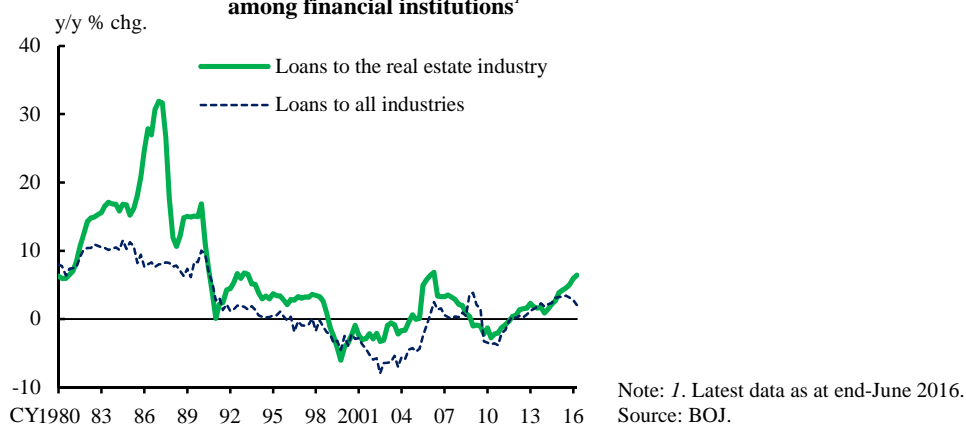
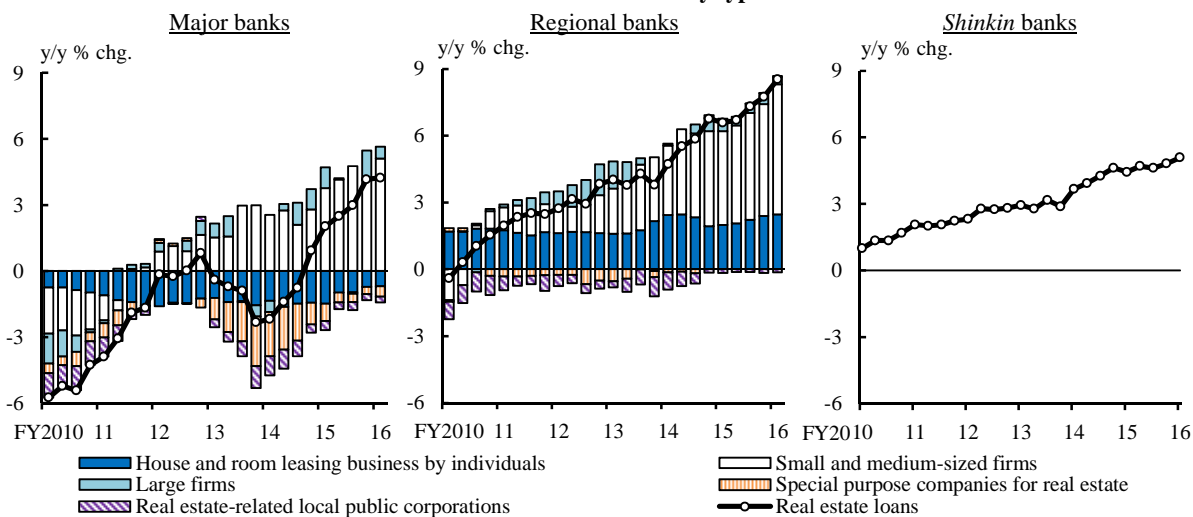


Chart III-1-13: Real estate loans by type of bank¹



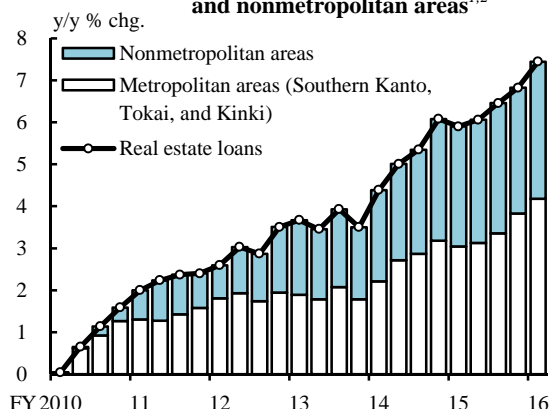
Note: 1. Latest data as at end-June 2016.
 Source: BOJ.

While recognizing both upside and downside risks resulting from the low interest rate environment, economic conditions at home and abroad, and other factors, major banks have continued to respond proactively to demand for funds from J-REITs and large real estate developers, among others.⁹ Regional financial institutions remain proactive in

⁹ In Chart III-1-13, J-REITs are included within the small and medium-sized firms category.

extending loans to small and medium-sized firms in the housing rental business, e.g., asset management companies founded by individuals and local real estate companies. By region, loans in nonmetropolitan areas, in addition to three major metropolitan areas (Southern Kanto, Tokai, and Kinki regions), have been growing at a faster pace (Chart III-1-14).

Chart III-1-14: Real estate loans among regional financial institutions in metropolitan and nonmetropolitan areas^{1,2}



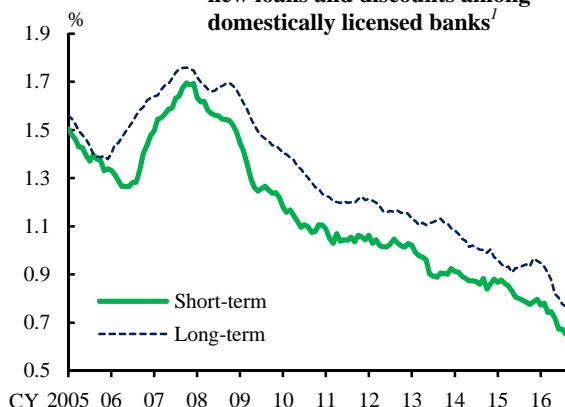
Notes: 1. Latest data as at end-June 2016.
2. For metropolitan areas, banks with head offices located in the Southern Kanto region, the Tokai region, and the Kinki region are included. For nonmetropolitan areas, banks with head offices located in other areas are included.

Source: BOJ.

Developments in loan and deposit interest rates

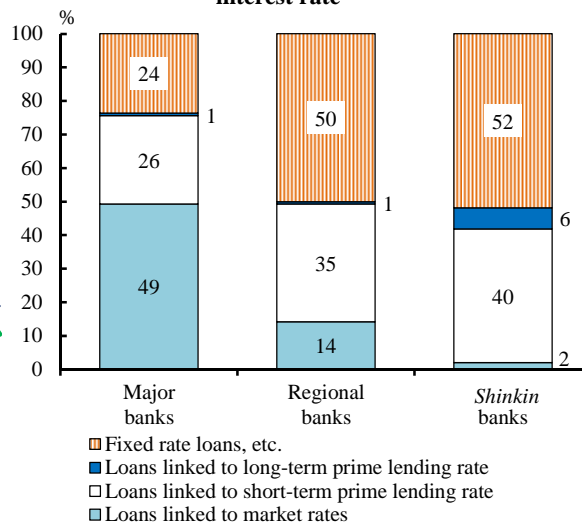
With the Bank of Japan proceeding with its monetary easing policy, financial institutions' domestic loan interest rates have continued to decline. Average contracted interest rates on new loans have declined, hovering around historically low levels (Chart III-1-15).

Chart III-1-15: Average contract interest rates on new loans and discounts among domestically licensed banks¹



Note: 1. Latest data as at August 2016; 6-month backward moving averages.
Source: BOJ, "Average contract interest rates on loans and discounts."

Chart III-1-16: Composition of loans by type of interest rate^{1,2}



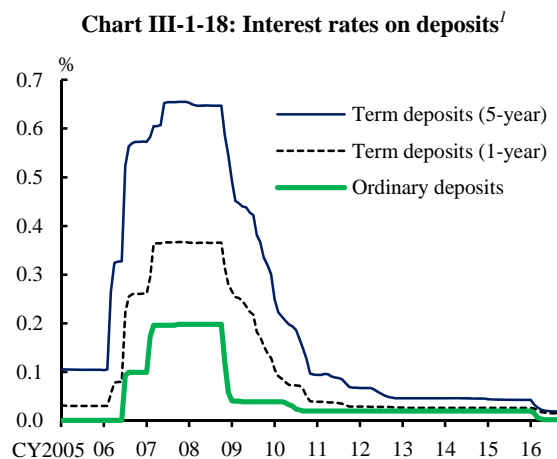
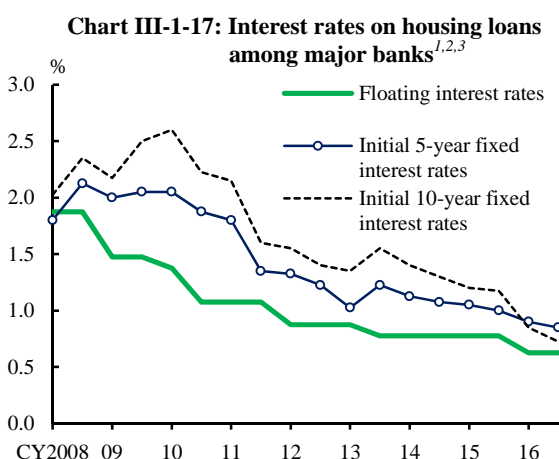
Notes: 1. Data as at end-June 2016.
2. Loans linked to market rates are loans that are linked to rates such as TIBOR.
Source: BOJ.

Of these, lending rates for corporate loans continue declining, mainly on the back of declines in reference rates such as TIBOR, more intense competition among financial institutions, and improvement in the financial situation as well as business performance of firms (Chart III-1-16). For housing loans, lending rates have also declined further (Chart III-1-17).

With these interest rate developments, some financial institutions have been taking steps to hold back on loans whose profitability has declined, while being more proactive in extending loans with wider profit margins, such as subordinated loans, loans to local firms, including those with lower credit ratings, and card loans. A shift toward fixed-rate loans with longer maturities is also in progress.

As some market interest rates, which serve as reference rates particularly for spread lending, have fallen into negative territory, financial institutions are working to adapt their lending business practices. Nevertheless, administrative costs have been increasing: some information systems are not yet equipped to handle negative interest rates, while financial institutions are working together with business firms and other entities to make adjustments to their handling of the lower limit of lending interest rates. As banks are still adapting to the negative interest rate environment, which is expected to require a certain amount of time and cost, these developments continue to bear close watching.

Meanwhile, **interest rates on deposits (term deposits and ordinary deposits) have remained at an extremely low level** (Chart III-1-18). At both major banks and regional banks, interest rates on ordinary deposits have dropped to near 0 percent.



Notes: 1. Includes Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, Sumitomo Mitsui Banking Corporation, Resona Bank, Saitama Resona Bank, Sumitomo Mitsui Trust Bank. The data are based on April and October figures for each year.

2. Interest rates are the median of preferential rates.

3. Latest data as at October 2016.

Sources: "Nikkin report"; Published accounts of each bank.

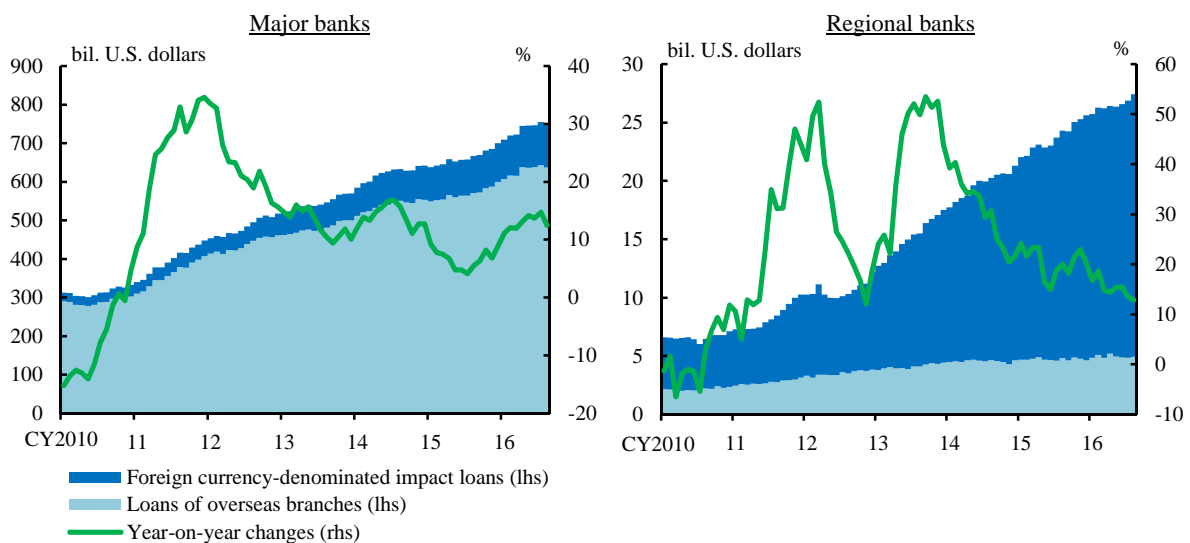
Note: 1. Interest rates on term deposits are simple averages posted at financial institutions. Data to September 26, 2016.

Source: BOJ.

2. Overseas loans

Banks' overseas loans have continued to show relatively high growth, particularly loans to advanced economies such as North America (Charts III-1-19 and III-1-20). In U.S. dollar terms, loans extended by major banks and regional banks have both increased by approximately 13 percent on a year-on-year basis (an annual increase of approximately 80 billion U.S. dollars for major banks and approximately 3 billion U.S. dollars for regional banks). In terms of major banks' loans by region, loans to North America have continued to increase steadily and supported overall loan growth, while loans to Europe have also increased with firm demand related to M&A deals. On the other hand, loans to Asia have remained more or less unchanged as competition with local and other foreign financial institutions has intensified in a situation where demand for funds has ebbed in tandem with slower economic growth. Under these circumstances, Japanese banks' overall share of international claims has continued to rise, particularly in the United States while that of Asia, which had sustained growth in the past, has recently leveled off (Chart III-1-21).

Chart III-1-19: Banks' foreign currency-denominated loans and loans by overseas branches^{1,2,3,4}



Notes: 1. Latest data as at August 2016.

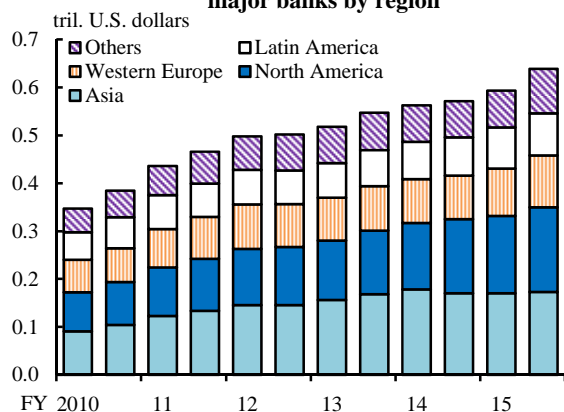
2. Loans by overseas branches include foreign currency-denominated impact loans in accounts held overseas.

3. Foreign currency-denominated impact loans indicate banks' foreign currency-denominated loans for residents.

4. Year-on-year changes represent the growth rate of loans extended by overseas branches and foreign currency-denominated impact loans.

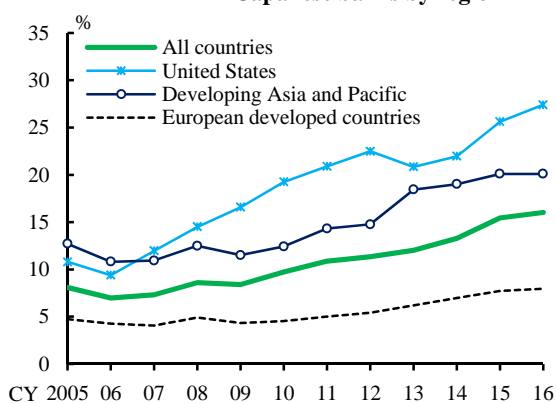
Source: BOJ.

Chart III-1-20: Overseas loans outstanding of three major banks by region¹



Note: 1. Latest data as at end-March 2016.
Sources: Published accounts of each bank.

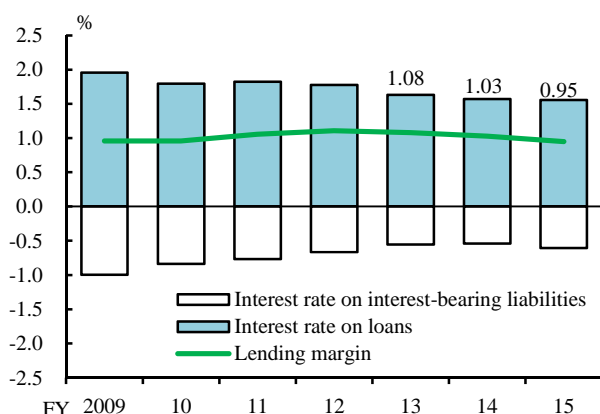
Chart III-1-21: Foreign claims share among Japanese banks by region^{1,2}



Notes: 1. The data are based on end-December figures for each year. Latest data as at end-March 2016.
2. This chart is based on foreign claims in the non-bank private sector (ultimate risk basis).
Source: BIS, "Consolidated banking statistics."

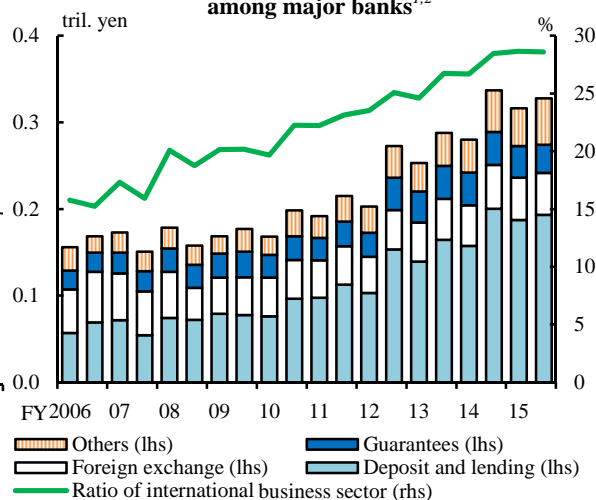
Banks have maintained a proactive stance on overseas business expansion on the whole. Recently, however, some have taken a cautious turn in their initial assessment of loans in terms of both creditworthiness and profitability. Banks have endeavored to exploit new lending opportunities and deepen relationships with prime borrowers, with a view toward supporting the global expansion of Japanese firms and establishing a global customer base through satisfying the financial needs of countries with high long-term growth potential. In the case of emerging economies, especially Asia, the lasting expectation regarding their medium-term growth potential has continued to lead banks to strive to expand their overseas network and their delivery of local financial services through acquisitions of, or investments in, overseas banks. Nevertheless, amid the recent slowdown in emerging economies and low commodity prices, among other developments, banks have become more cautious in their initial and interim assessment of the creditworthiness of loans. Meanwhile, mainly due to the rise in foreign currency funding costs and intensifying competition for prime borrowers, lending margins have been shrinking. Thus, some banks are trying to secure profitability by making their assessment of loan profitability more rigorous (Chart III-1-22). Under these circumstances, in order to improve their overall profitability, including in non-lending businesses, major banks have placed more emphasis on deepening their relationships with existing clients and increasing their fee and commission-based income by, for example, engaging in closer cooperation with group securities companies and other firms (Chart III-1-23).

Chart III-1-22: Lending margin in the international business sector among major banks¹



Note: 1. Cost of interest rate swaps is subtracted when calculating the funding costs and the lending margin.
Source: BOJ.

Chart III-1-23: Fees and commissions income in the international business sector among major banks^{1,2}



Notes: 1. Latest data as at the second half of fiscal 2015.

2. "Ratio of international business sector" is the ratio of net fees and commissions of the international business sector to total net fees and commissions.

Source: BOJ.

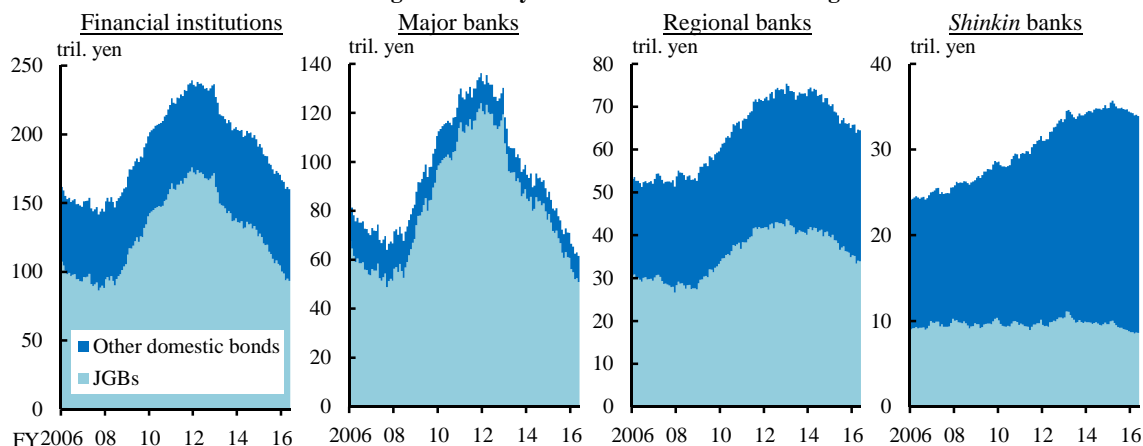
3. Securities investment

Yen-denominated bond investment by financial institutions is on a declining trend on the whole, although it remains at a high level compared with the past, particularly among regional financial institutions. Financial institutions have continued to augment their risk-taking stance by increasing their outstanding amount of investments in risky assets, such as foreign bonds and investment trusts.

The outstanding holdings of yen-denominated bonds -- including JGBs, municipal bonds, and corporate bonds -- have remained on a declining trend, as the Bank of Japan has continued large-scale purchases of JGBs. However, from a long-term perspective, the outstanding amount of bonds held by regional banks and *shinkin* banks remains at a high level (Chart III-1-24). Financial institutions tend to refrain from selling JGBs, while their yields have turned negative, even for long maturities, in order to (1) secure net interest income or hold onto unrealized gains and (2) keep their current account deposit balances at the Bank of Japan from increasing. At the same time, financial institutions tend to accumulate JGBs with longer maturities and take more risk when they purchase JGBs. Looking across various types of financial institutions, a continued decline of yen-denominated bondholdings at major banks can be observed, while regional banks have been on a moderate declining trend. While paring their JGB holdings in response to the decline in long-term JGB yields, regional banks and *shinkin* banks have accumulated

municipal bonds and corporate bonds, which offer relatively higher yields.

Chart III-1-24: Outstanding amount of yen-denominated bonds among financial institutions^{1,2}



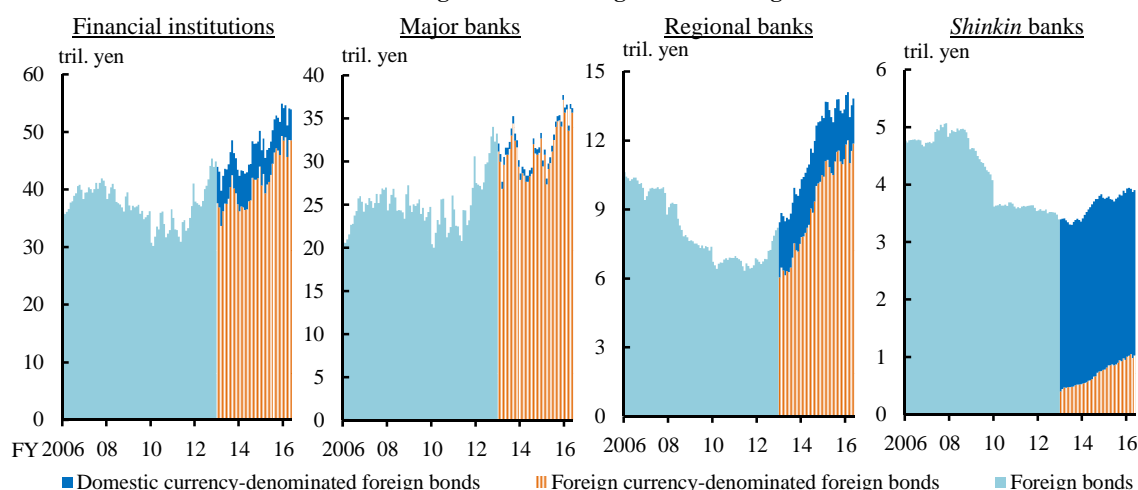
Notes: 1. Latest data as at end-August 2016.

2. The data are the sums of figures for domestic and overseas branches. The data are based on the amount outstanding at month-end.

Source: BOJ.

The outstanding holdings of foreign bonds (expressed in yen terms) have been on an increasing trend. However, due to the heightened volatility in global financial markets arising from the United Kingdom's decision to leave the EU and to the rise in foreign currency funding costs, a temporary restraint in foreign bond investment can be seen (Chart III-1-25). A breakdown by type of financial institution reveals that major banks and regional banks have kept their holdings more or less unchanged, after having increased their exposure from the very beginning of 2016. While a majority of foreign bond investment by *shinkin* banks continues to be denominated in yen, their holdings of foreign currency-denominated bonds have also been increasing.

Chart III-1-25: Outstanding amount of foreign bonds among financial institutions^{1,2,3}



Notes: 1. Latest data as at end-August 2016.

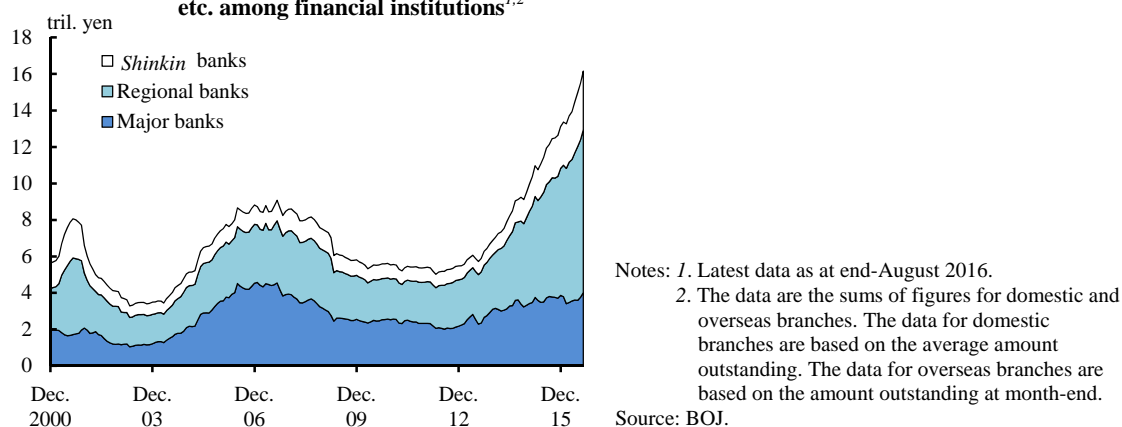
2. The data are the sums of figures for foreign currency-denominated and domestic currency-denominated foreign bonds. The data up to March 2010 are figures for foreign securities.

3. The data are the sums of figures for domestic and overseas branches. The data are based on the amount outstanding at month-end.

Source: BOJ.

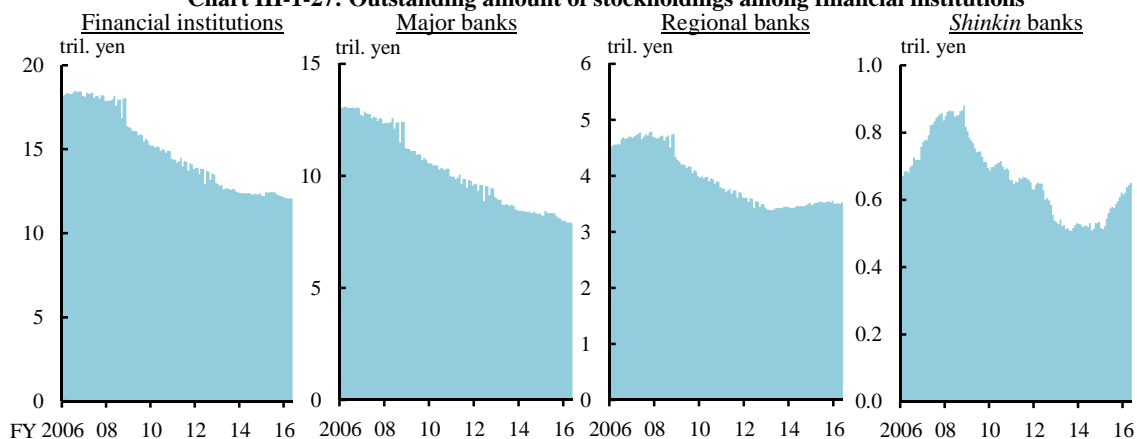
The outstanding holdings of investment trusts and other assets by financial institutions have continued to increase. Looking at the breakdown by bank type, although major banks have restrained their investment activity somewhat in light of the heightened volatility in global financial markets, regional financial institutions have increased their holdings of investment trusts and other assets that carry diverse risk factors, such as stock investment trusts, real estate investment trusts (REITs), and bond ladder funds both at home and abroad (Chart III-1-26).

Chart III-1-26: Outstanding amount of investment trusts, etc. among financial institutions^{1,2}



Meanwhile, financial institutions' stockholdings are on a gradual downward trend, as they continue to reduce their stockholdings aimed at maintaining business ties with firms (i.e., strategic stockholdings) (Chart III-1-27). Furthermore, major banks, including the three major Japanese financial groups, have announced guidelines on strategic stockholdings, for example, to reduce the outstanding amount of stockholdings within the next 5 years or so, such that it falls below a certain percentage of their capital. These banks have been implementing measures in line with these targets. Regional banks have also made progress in announcing guidelines on strategic stockholdings.

Chart III-1-27: Outstanding amount of stockholdings among financial institutions^{1,2,3,4}



Notes: 1. Latest data as at end-August 2016.
2. These charts are based on book value.
3. The data are the sums of figures for domestic and overseas branches. The data for major banks are the sums of figures for domestic branches. The data are based on the amount outstanding at month-end.
4. The data exclude foreign stockholdings.

Source: BOJ.

4. Financial institutions' balance sheet changes

Based on the developments in loans and securities investment examined above, financial institutions have continued to expand their balance sheets and increase risky assets other than JGBs.

The total assets and liabilities of financial institutions increased by 179 trillion yen in the period from December 2012, prior to the introduction of QQE, through August 2016 (Chart III-1-28). A breakdown shows that on the asset side, cash and deposits (mainly current account deposits at the BOJ) witnessed the most significant rise. In terms of the other asset classes, the total amount of domestic loans, overseas loans, and securities investment excluding JGBs increased by 96 trillion yen, while JGB holdings decreased by 73 trillion yen. The data suggest that portfolio rebalancing from JGBs (entailing yen interest rate risk) to other risky assets (entailing credit, equity-related, overseas interest rate risks, etc.) has continued to take place.

During this period, financial institutions' domestic loan-to-deposit ratio has remained on a downward trend. Among major banks in particular, the downtrend in the ratio has gathered pace following the introduction of QQE with a Negative Interest Rate, partly due to an increase in corporate deposits (Chart III-1-29).

Chart III-1-28: Changes in assets and liabilities among financial institutions¹

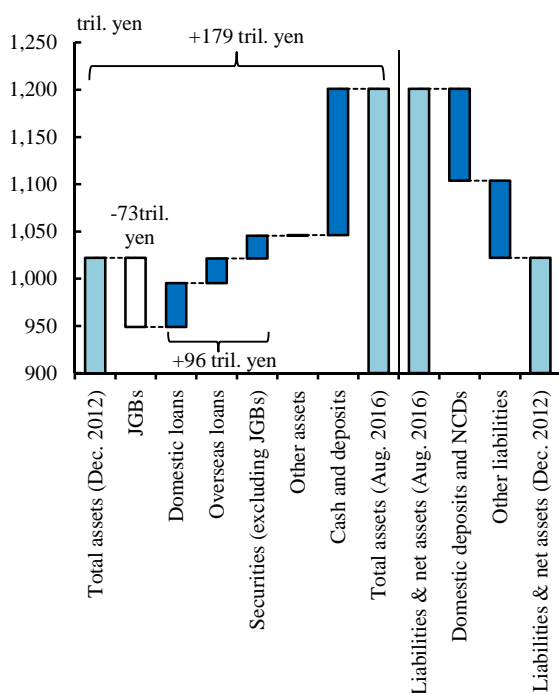
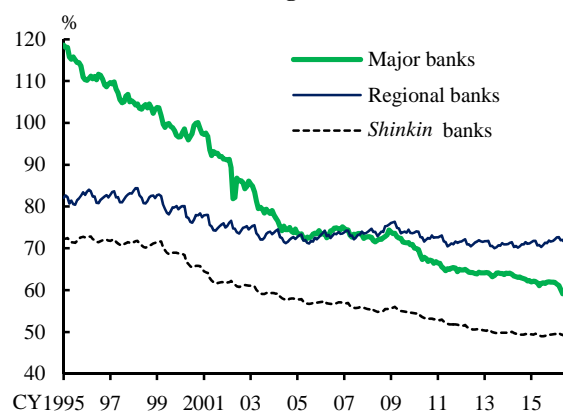


Chart III-1-29: Domestic loan-to-deposit ratio among financial institutions^{1,2,3}



Notes: 1. Latest data as at August 2016.
 2. Loan-to-deposit ratio = loans / deposits and NCDs
 3. The data are for domestic branches and based on the average amount outstanding.
 Source: BOJ.

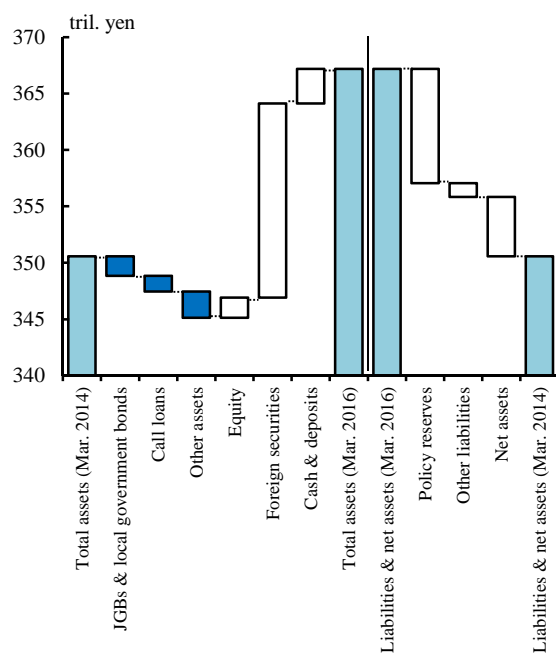
Note: 1. The data are the sums of figures for domestic and overseas branches. The data for domestic branches are based on the average amount outstanding. The data for overseas branches are based on the amount outstanding at month-end.

Source: BOJ.

B. Developments in investment by institutional investors

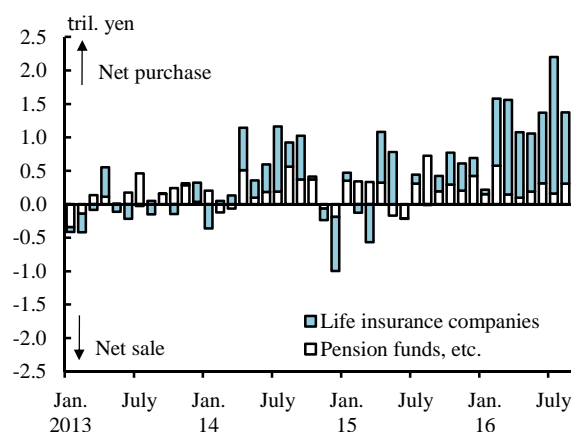
Since the introduction of QQE with a Negative Interest Rate, institutional investors -- such as life insurance companies and public pension funds -- and depository institutions with a focus on market investment -- such as Japan Post Bank and central organizations of financial cooperatives -- have further increased their propensity to accumulate foreign bonds and other risky assets in their investment portfolio.

Chart III-2-1: Changes in assets and liabilities among life insurance companies



Source: The Life Insurance Association of Japan.

Chart III-2-2: Medium- and long-term foreign bonds investment by institutional investors^{1,2}



Notes: 1. "Pension funds, etc." indicates trust accounts of banks and trust banks.

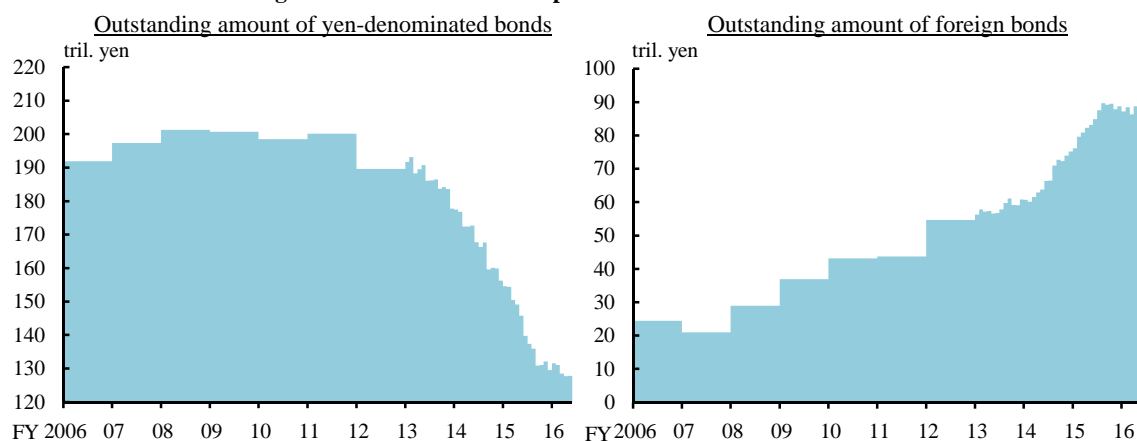
2. Latest data as at August 2016.

Source: Ministry of Finance.

As domestic interest rates have declined further, life insurance companies have focused on securing investment income by, for instance, accumulating overseas assets such as currency-hedged foreign bonds, and investing in areas in which relatively higher growth is expected (including fund investment) (Charts III-2-1 and III-2-2). In particular, since the introduction of QQE with a Negative Interest Rate, the trend of accumulating overseas assets has intensified further, partly reflecting the promotion of the sale of foreign currency-denominated savings-type instruments. As the prospect of further declines in interest rates became more apparent toward the summer of 2016, life insurance companies proactively shifted their investments from medium- and long-term JGBs to super-long-term JGBs, which form a significant part of their investment assets, so as to reduce the duration mismatch between their assets and liabilities. On the whole, however, partly due to the growing tendency to restrain the sale of yen-denominated savings-type products, life insurance companies are holding back on new purchases of

super-long-term JGBs. Meanwhile, depository institutions with a focus on market investment, such as Japan Post Bank and the central organizations of financial cooperatives, have continued to reallocate investments away from domestic bonds toward foreign bonds and other risky assets in response to the further decline in interest rates (Chart III-2-3). Looking at developments in pension funds, the Government Pension Investment Fund (GPIF) appears to have nearly completed rebalancing, which was aimed at attaining its basic portfolio. Other public pension funds, however, continue to increase the share of domestic and overseas stocks in their portfolios, while reducing the share of domestic bonds (Chart III-2-4). As the shortfall in their provisions for future benefit payments has grown, corporate pension funds have continued to adjust their portfolios to reduce the share of domestic bonds and increase their holdings of alternative assets, such as fund investment, with the aim of securing investment income, while they maintain a cautious investment policy on the whole.

Chart III-2-3: Outstanding amount of yen-denominated bonds and foreign bonds of Japan Post Bank and central organizations of financial cooperatives^{1,2,3}

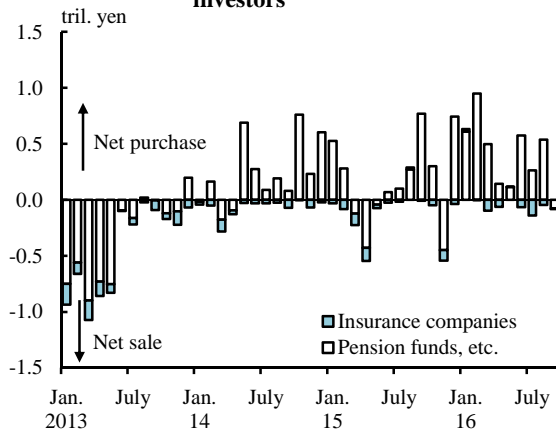


Notes: 1. Latest data as at end-August 2016.
 2. The data are the sums of figures for Japan Post Bank, Shinkin Central Bank, the Shinkumi Federation Bank, the Rokinren Bank, and the Norinchukin Bank.
 3. The data are based on the amount outstanding at month-end. The data for fiscal 2012 and before are as at the end of each fiscal year.

Source: BOJ.

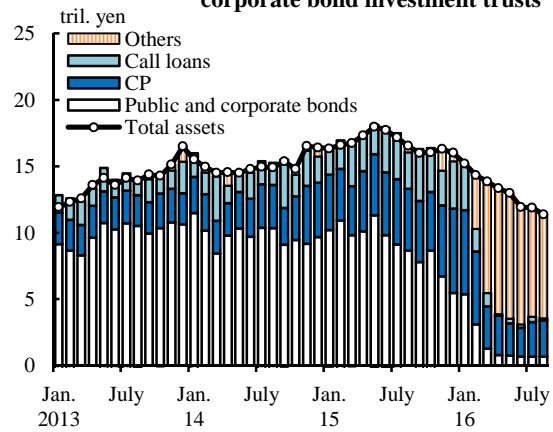
As long- and short-term interest rates have turned negative following the introduction of QQE with a Negative Interest Rate, the activities of investment trusts have also been affected (Chart III-2-5). Particularly early redemptions at money management funds (MMFs), which invest primarily in short-term money markets, have been widely observed. Their assets under management have plunged from 1.6 trillion yen at the end of 2015 to 0.4 trillion yen at the end of August 2016. At money reserve funds (MRFs), more than 90 percent of assets under management are now transferred to trust banks in the form of money trusts, as it has become difficult to earn positive yields from investing in the securities and call money markets.

Chart III-2-4: Stock investment by institutional investors^{1,2}



Notes: 1. "Pension funds, etc." indicates banking and trust accounts of trust banks.
 2. Latest data as at September 2016.
 Source: Tokyo Stock Exchange.

Chart III-2-5: Investment portfolio of public and corporate bond investment trusts¹

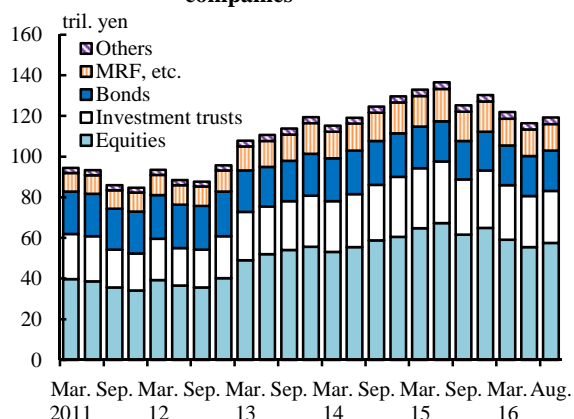


Note: 1. Latest data as at August 2016.
 Source: The Investment Trusts Association, Japan.

C. Developments in households' investment activities

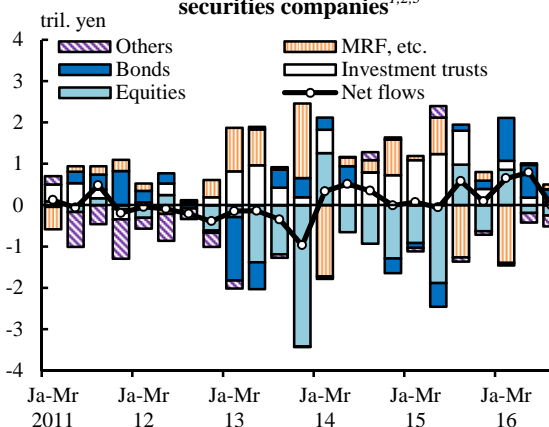
Households' moves to diversify their asset portfolios have lost momentum somewhat since the summer of 2015. Outstanding client assets held at securities companies have leveled off since their peak at the end of June 2015, partly due to the effects of lower stock prices and the stronger yen (Chart III-3-1). Excluding the effects of changes in stock prices and foreign exchange movements on the market values of financial assets, the inflow of individuals' funds to stock investment trusts has continued to be weak since the summer of 2015 (Chart III-3-2). On the other hand, the pace of inflow into bonds -- particularly JGBs with guaranteed minimum yields, issued exclusively to retail investors, and low-risk structured bonds -- has picked up. There are signs that these products are becoming preferred havens for households' investment funds, as they offer higher yields in comparison with bank deposits or public and corporate bonds, whose yields have declined further following the introduction of QQE with a Negative Interest Rate. Since MMFs and yen-denominated single-premium insurance -- both of which used to be part of cornerstones of household savings -- have increasingly experienced early redemptions and widespread sales suspension, respectively, JGBs for retail investors and structured bonds appear to have supplanted their role.

Chart III-3-1: Client assets held by major securities companies^{1,2,3}



Notes: 1. Latest data as at end-August 2016.
 2. Includes 18 major securities companies that hold current accounts at the BOJ.
 3. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes public and corporate bond investment trusts.
 Source: BOJ.

Chart III-3-2: Capital flows by product among major securities companies^{1,2,3}

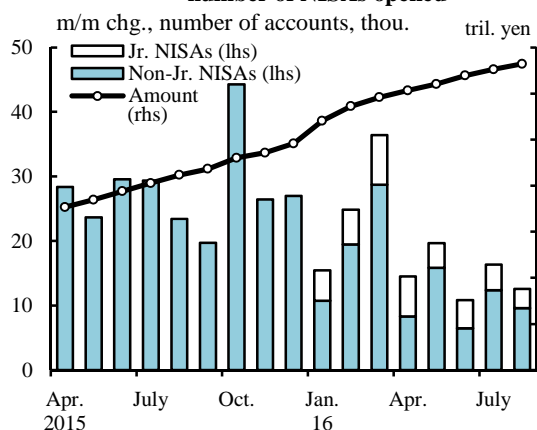


Notes: 1. Latest data as at July-August 2016.
 2. Includes 18 major securities companies that hold current accounts at the BOJ.
 3. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes public and corporate bond investment trusts.
 Source: BOJ.

Nevertheless, the trend of gradually increasing the share of risky assets in households' financial portfolio appears to have been maintained (see Box 1). Households are placing more emphasis on total returns, taking into account not only short-term returns such as dividends but also long-term unrealized gains. In addition, the number of tax-free accounts for small investments, Nippon Individual Savings Accounts (NISAs) and Junior NISAs, is steadily increasing (Chart III-3-3). These developments suggest heightened interest in stock investment. Financial institutions have continued to make efforts to increase their client assets, particularly by expanding the scope of products customers can choose from, including investment trusts, and expanding their service offerings, including wrap accounts. As a result, despite the slowdown of inflows to stock investment trusts, inflows to fund wraps have continued (Chart III-3-4). At the same time, more than 200 institutional investors have announced the introduction of the Japanese version of the Stewardship Code (Principles for Responsible Institutional Investors), and dialogue between firms and shareholders (shareholder engagement) is being pursued in earnest.¹⁰ Thus, the range of efforts by financial institutions is expected to promote asset formation activities of households in a diversified manner.

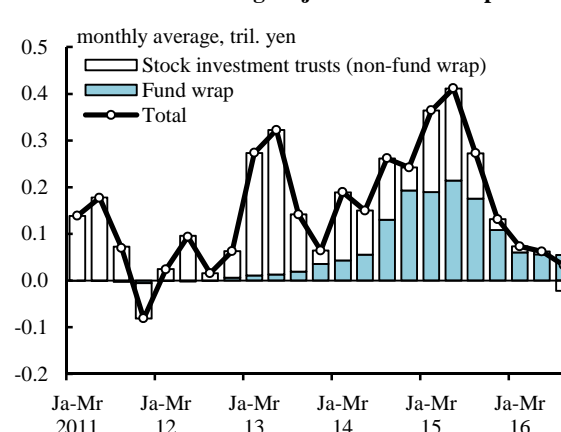
¹⁰ For more details, see Kae Kunishima, Junnosuke Shino, and Kei Imakubo, "A new trend in Japan's asset management business toward a shift from saving to investment," Bank of Japan Review, No. 16-E-10, September 2016.

Chart III-3-3: Purchases through NISAs and the number of NISAs opened^{1,2}



Notes: 1. Latest data as at August 2016.
 2. Includes 18 major securities companies that hold current accounts at the BOJ.
 Source: BOJ.

Chart III-3-4: Capital flows of stock investment trusts among major securities companies^{1,2}

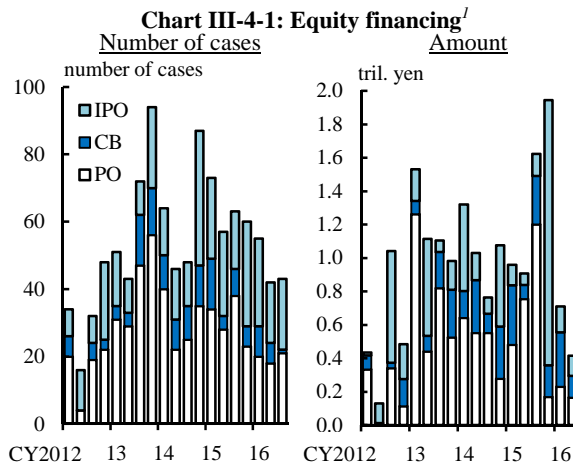


Notes: 1. Latest data as at July-August 2016.
 2. Includes 18 major securities companies that hold current accounts at the BOJ.
 Source: BOJ.

D. Financial intermediation through financial markets

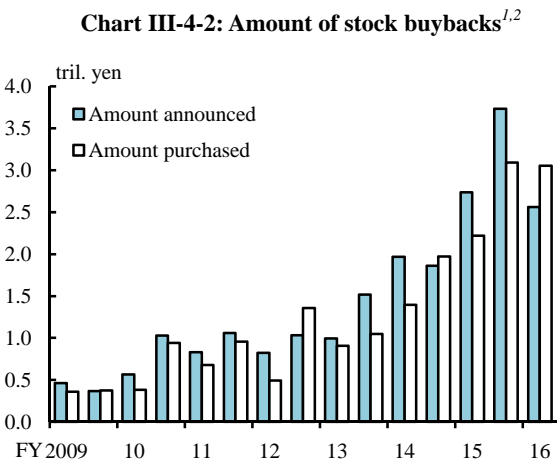
In terms of equity financing through the stock market, transactions have remained lackluster against the backdrop of volatile stock prices, although firms' proactive financing stance seems to have been largely unchanged (Chart III-4-1). A more detailed examination reveals that although firms continue to have a healthy appetite for financing investments with future growth potential and M&A activities in particular, they continue to hold back on stock issuance in public offerings (POs) and initial public offerings (IPOs) due to unstable stock markets. Meanwhile, the corporate governance code, which took effect in June 2015, is also seen to have had an impact on firms' funding activities. For example, with greater awareness regarding capital efficiency, more careful consideration is needed before POs are carried out. Similarly, reflecting heightened awareness regarding shareholder returns, firms' stock buybacks, both announced and executed, have remained at a high level also in fiscal 2016. In addition, recapitalized convertible bond (CB) issuance intended for stock buybacks has remained firm on the whole (Chart III-4-2).

Issuing conditions for CP and corporate bonds continue to be favorable, as seen from the further decline in yields on new issues. In this situation, the year-on-year rate of increase in the amount of CP outstanding has been somewhat positive (Chart III-4-3). Moreover, in the corporate bond market, an increasing number of firms have issued super-long-term bonds, as investors who seek absolute returns have shifted toward investing in super-long maturities and as firms' funding costs have declined (Chart III-4-4).



Note: 1. Latest data as at the July-September quarter of 2016.

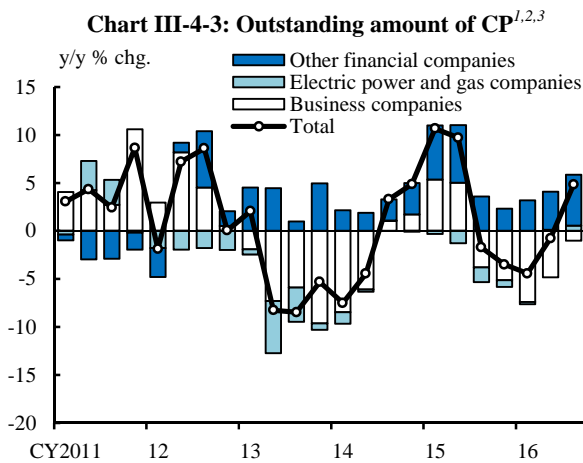
Source: I-N Information Systems.



Notes: 1. Latest data as at the first half of fiscal 2016.

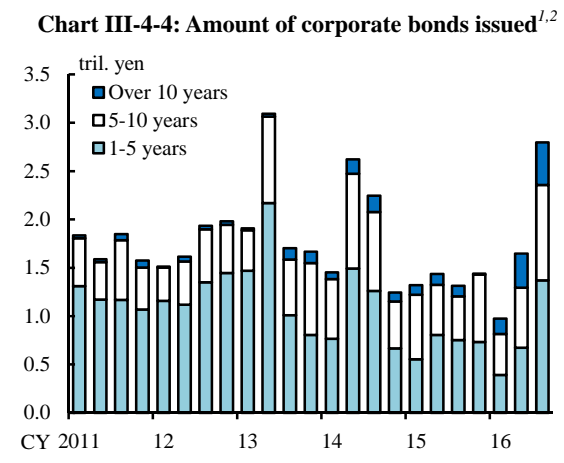
2. Stocks listed on the First Section of the Tokyo Stock Exchange. Based on the announcement date.

Source: I-N Information Systems.



Notes: 1. "Business companies" excludes electric power and gas companies and other financial companies.
 2. "Other financial companies" includes leasing companies, credit card companies, consumer finance companies, and securities finance companies.
 3. Latest data as at end-September 2016.

Source: JASDEC.



Notes: 1. The data exclude subordinated bonds.

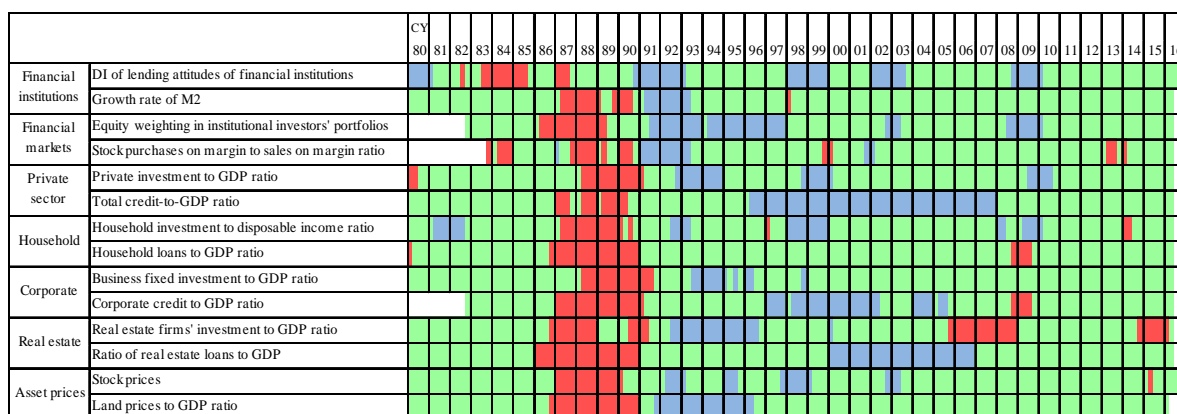
2. Latest data as at the July-September quarter of 2016.

Source: I-N Information Systems.

E. Financial Activity Indexes

The funding environment among firms and households has been highly accommodative, in light of the financial intermediary activities stated above. Under these circumstances, we examine whether there are signs of overheating in the financial system, which comprises firms, households, financial intermediaries, investors, and other entities.

Chart III-5-1: Financial Activity Indexes¹



Note: 1. Latest data for the DI of lending attitudes of financial institutions and stock prices as at the July-September quarter of 2016. Latest data for the land prices to GDP ratio as at the January-March quarter of 2016. Latest data for the other indicators as at the April-June quarter of 2016.

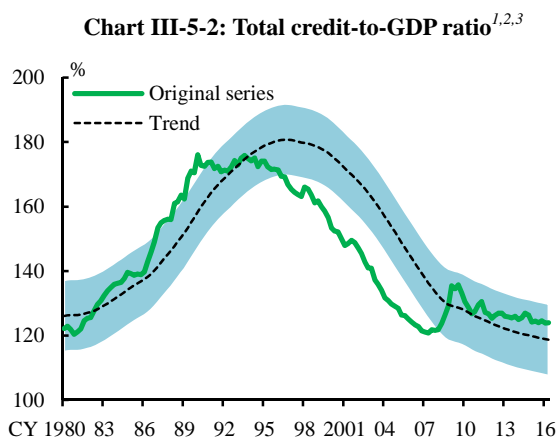
Sources: Bloomberg; Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index"; Ministry of Finance, "Financial statements statistics of corporations by industry"; Tokyo Stock Exchange, "Outstanding margin trading, etc."; BOJ, "Flow of funds accounts," "Loans and bills discounted by sector," "Money stock," "Tankan."

The Financial Activity Indexes (FAIXs) are indicators used to gauge financial imbalances across various financial activities. By examining 14 selected indicators, in terms of the deviation from their trends, signs of overheating can be identified. Presently, all 14 indicators are "green," showing that **many financial activities exhibit no significant deviation from their trends** (Chart III-5-1).¹¹ For example, based on the "total credit-to-GDP ratio," **credit volumes relative to the size of the economy, as seen from a macro perspective, have remained more or less unchanged** (Chart III-5-2).¹² Meanwhile, the "real estate firms' investment to GDP ratio," which had remained "red" for six consecutive quarters, has turned "green" this time round, as its positive deviation from the trend has narrowed. This is in spite of solid real estate investment, mainly against the backdrop of improvement in real estate supply and demand conditions and in

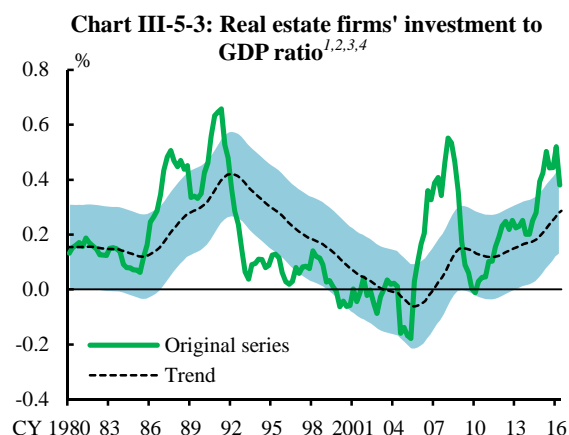
¹¹ Whether financial activity is overheating or contracting excessively is assessed based on how far individual indicators deviate from their historical trends. Shaded areas in Chart III-5-1 represent the following: (1) areas shaded in red (the darkest shaded areas) show that an indicator has risen above upper threshold, that is, it is tending toward overheating; (2) areas shaded in blue (the second darkest shaded areas) show that an indicator has declined below the lower threshold, that is, it is tending toward excessive contraction; (3) areas shaded in green (the most lightly shaded areas) show a limited tendency toward either extreme; and (4) 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.

¹² The total credit-to-GDP ratio is regarded as one of the key indicators that authorities worldwide should refer to in setting the level of the countercyclical capital buffer, which is introduced under the Basel III framework. Total credit includes loans extended by financial intermediaries and funding of debt securities, such as corporate bonds, from capital markets. Borrowers of funds include households and firms.

real estate markets, particularly in metropolitan areas (Chart III-5-3).¹³



Notes: 1. Latest data as at the April-June quarter of 2016; 4-quarter backward moving averages.
 2. The trend is calculated using the one-sided HP filter.
 3. Shaded areas indicate the root mean square of the deviation from trend.
 Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

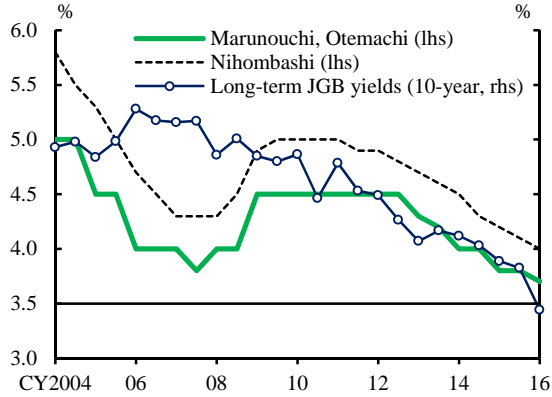


Notes: 1. Includes large firms in the real estate industry. Latest data as at the April-June quarter of 2016; 4-quarter backward moving averages.
 2. Original series = (business fixed investment [including land investment] + inventory investment) / nominal GDP.
 3. The trend is calculated using the one-sided HP filter.
 4. Shaded areas indicate the root mean square of the deviation from trend.
 Sources: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry."

Although the real estate market currently does not appear to show signs of overheating on the whole, some developments at the margin warrant attention. For example, as capitalization rates have declined and real estate prices have continued to increase in metropolitan areas, lofty transaction prices with low yields have been seen in some cases (Chart III-5-4). Moreover, it can be observed that J-REITs and other firms have been acquiring properties not just in metropolitan areas, but also in provincial regions (Chart III-5-5). As pointed out in this chapter, regional banks have stepped up equity investments in real estate funds further, including J-REITs, while the growth rate of banks' real estate loans has increased further. Thus, developments in real estate markets continue to warrant close monitoring henceforth as accommodative financial conditions remain in place.

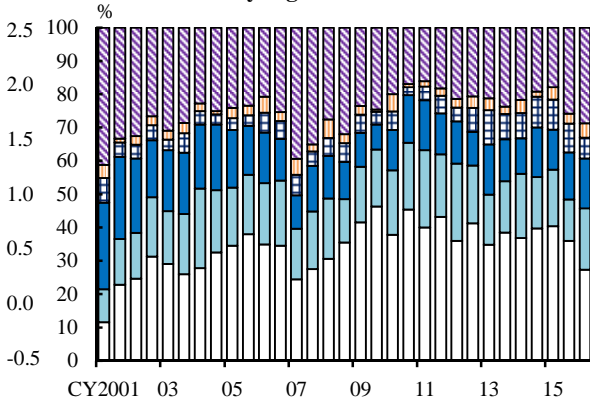
¹³ The recent decline in the "real estate firms' investment to GDP ratio" is attributable to the substantial increase in sales, losses, and transfers of other tangible fixed assets for large real estate firms' business fixed investment, as reported in the "Financial statements statistics of corporations by industry" for April-June 2016 published by the Ministry of Finance. Meanwhile, new investments in as well as acquisition and receipt of other tangible fixed assets have been increasing, suggesting that large real estate firms have continued to adopt an active investment stance. Given that data for real estate firms' investment are 4-quarter backward moving averages, effects of the recent substantial increase in sales, losses, and transfers are to remain for one year.

Chart III-5-4: Capitalization rates of office buildings in Tokyo metropolitan area¹



Note: 1. Latest data as at April 2016.
Sources: Bloomberg; Japan Real Estate Institute, "The Japanese real estate investor survey."

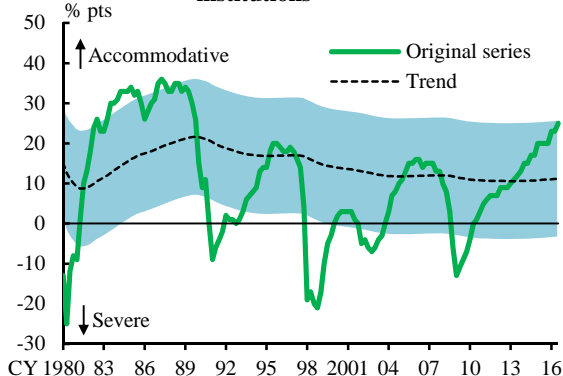
Chart III-5-5: Number of real estate transactions by region¹



Note: 1. Latest data as at the first half of 2016.
Source: Japan Real Estate Institute.

Meanwhile, the "DI of lending attitudes of financial institutions," a constituent of the FAIXs, has indicated that the net number of firms who perceive that financial institutions have "accommodative" lending attitudes has continued to increase. The DI, while remaining "green," is significantly approaching "red" (Chart III-5-6). Banks' increasingly proactive lending stance warrants vigilance: while it serves as an important transmission channel for monetary easing effects, it may also lower their degree of resilience to shocks if competition among financial institutions overly intensifies, by bringing about excessive risk taking or by making banks' profit bases vulnerable particularly through a deterioration in profitability on loans.

Chart III-5-6: DI of lending attitudes of financial institutions^{1,2,3,4}



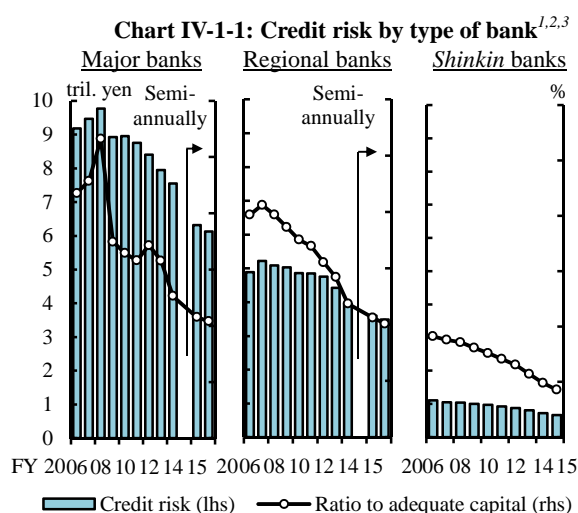
Notes: 1. Latest data as at the July-September quarter of 2016.
2. Includes all firm sizes and all industries.
3. The trend is calculated from the historical average.
4. Shaded areas indicate the root mean square of the deviation from trend.
Source: BOJ, "Tankan."

IV. Macro risk profile and financial bases of financial institutions

In addition to evaluating the soundness of financial institutions that constitute the financial system, it is necessary to conduct assessments from a macroprudential perspective to gauge the stability of the financial system. In this chapter, we first examine financial institutions' macro 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 collecting and analyzing banks' financial data, among other information sources, and then assess the adequacy of their financial bases (bank capital and funding liquidity) relative to risks at the current juncture. Furthermore, we examine the profitability of financial institutions from a long-term perspective, as this has an impact on their financial bases and their risk-taking capabilities.¹⁴

A. Credit risk

The amount of financial institutions' credit risk has decreased compared to the previous *Report*, due to an improvement in asset quality (Chart IV-1-1).¹⁵ The primary reason for the decrease, despite an increase in their domestic and overseas loans outstanding, is the improvement in the asset quality reflecting improved financial conditions among firms, as the economy has continued its moderate recovery trend.



Notes: 1. Credit risk is unexpected losses with a 99 percent confidence level.
 2. Includes credit that is subject to self-assessment.
 3. Adequate capital for internationally active banks from fiscal 2012 is CET1. Adequate capital for domestic banks from fiscal 2013 is core capital. The data do not take the phase-in arrangements into consideration. Adequate capital preceding the respective periods is Tier 1.

Source: BOJ.

¹⁴ It should be noted that most data used in our analysis, in the sections on credit risk and bank capital in particular, were current as at the end of March 2016. Regarding the sections on market risk and liquidity risk, the latest available data are used.

¹⁵ 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 possible outcomes in 1 year.

Quality of loans and credit costs

The quality of loans held by financial institutions has continued to improve. The amount of loans outstanding by borrower classification shows that the ratio of normal loans to total loans has risen further for every type of bank (Chart IV-1-2). **Although financial institutions' credit cost ratios have remained at extremely low levels on the whole, those on overseas loans have increased, mainly against the backdrop of low commodity prices** (Charts IV-1-3 and IV-1-4). While credit cost ratios at regional banks and *shinkin* banks have continued declining at a moderate pace, credit cost ratios at major banks turned to a rise for the first time in 3 years, mainly due to an increase in credit costs for some large domestic borrowers and overseas resource-related borrowers (Chart IV-1-5).

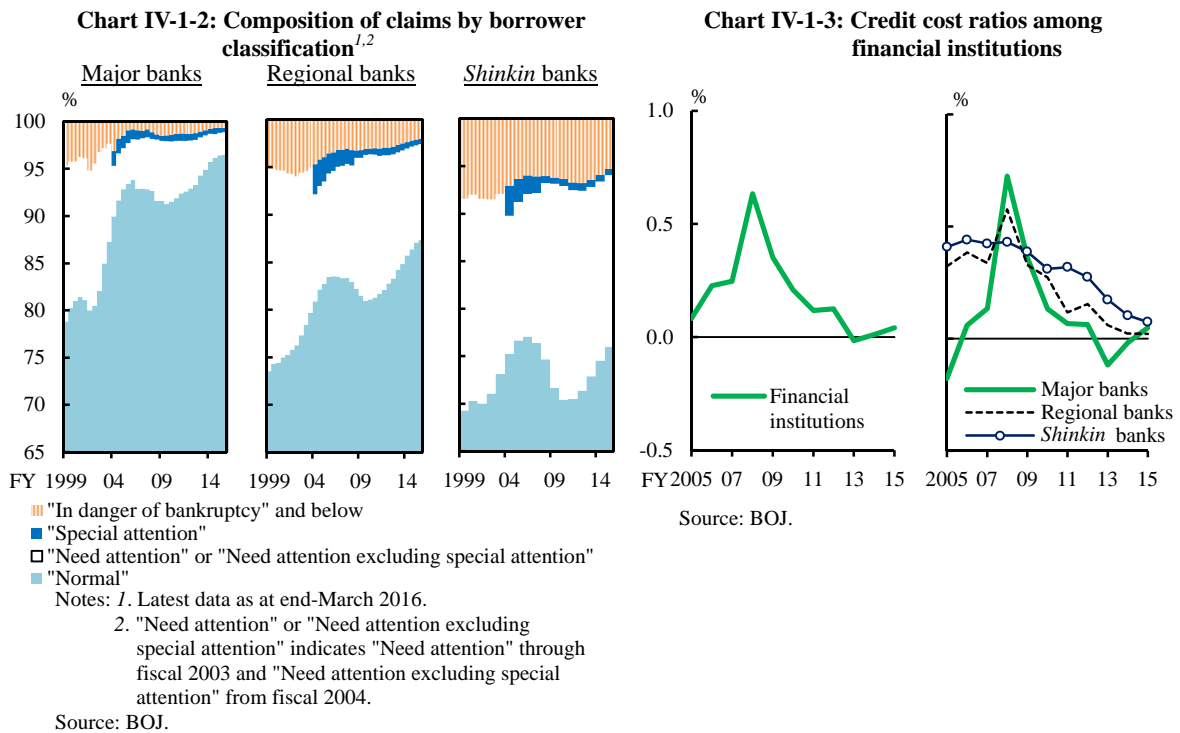
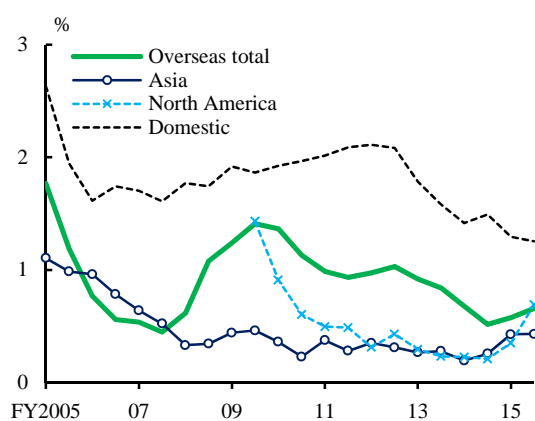


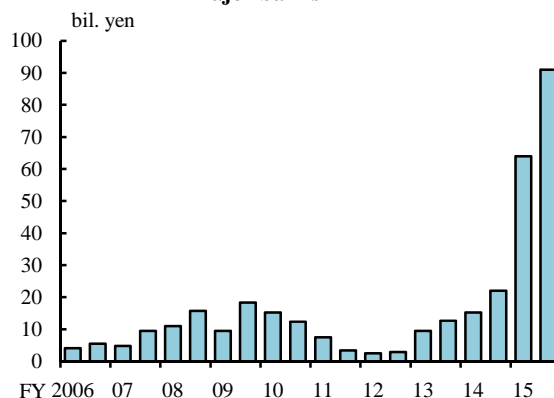
Chart IV-1-4: Nonperforming loan ratios for overseas lending¹



Note: 1. Data for the three major financial groups are shown (on a non-consolidated basis). Latest data as at end-March 2016.

Sources: Published accounts of each group.

Chart IV-1-5: Nonperforming loans in resource-related industries among major banks¹



Note: 1. Latest data as at end-March 2016. Semiannual.
Source: BOJ.

Tasks and challenges regarding credit risk management

The three key tasks and challenges for financial institutions regarding credit risk management are detailed below.

- (1) **It is necessary for financial institutions to improve their credit management capabilities in areas where they take an active stance in credit extension and in sectors with large amounts of loans outstanding.**

With regard to overseas-related loans, including resource- and M&A-related loans, there is some deterioration in the quality of credit extended, as indicated by, for example, an increase in the nonperforming loan ratio -- which had been declining -- mainly against the backdrop of low commodity prices. It is therefore necessary to continue assessing the creditworthiness of the borrowers in a timely manner and to manage the associated risks as appropriate.¹⁶

With regard to other loans that have undergone rapid growth, such as domestic real estate loans and loans related to medical and nursing care, financial institutions need to enhance their credit management, taking into account their assessment of the future business environment. In particular, with regard to loans to housing rental businesses, which have been increasing sharply at regional financial institutions, the examination of income and expenditure plans at the initial

¹⁶ For more details on the risk management of resource-related exposures, see Box 2 in the April 2016 issue of the *Report*, and for more details on the risk management of overseas M&A-related exposures, see Box 1 in the October 2015 issue of the *Report*.

screening and appropriate interim management have assumed greater importance, given the recent rise in vacancy rates in some regional housing rental markets (Chart IV-1-6).¹⁷ Moreover, as the extension of loans with long maturities to the housing rental business is not uncommon, it is essential to, among other factors, examine the financial impact of possible interest rate increases on income and expenditure in the future as well as to take forthcoming major repair and maintenance expenses into account.¹⁸

(2) It is necessary to conduct reviews of the estimated amount of credit risk and loan-loss provisions on a regular basis, taking into account changes in the portfolio characteristics and anticipated future developments.

In calculating loan-loss provisions, from a through-the-cycle point of view, financial institutions should appropriately factor in possible changes that may not have been reflected in past figures, bearing in mind that credit cost ratios and loan-loss provision ratios are at historically low levels.¹⁹

The share of large loans in credit portfolios has been rising, especially among major banks (Chart IV-1-7). When conducting credit risk management, taking this changing feature of credit portfolios into account, it is necessary to measure the risk of concentration of large exposures as well as conduct stress testing based on assumed future environmental changes, in order to gauge the amount of credit risk.

(3) It is necessary to make appropriate assessments of risk and return when originating loans in a negative interest rate environment.

Lending margins have been tightening further in a negative interest rate environment. As for housing loans, increasingly generous incentives are offered with respect to their interest rates, resulting in the rate of decline in lending margins

¹⁷ The denominator used to calculate the vacancy index used in Chart IV-1-6 includes the total number of units looking for tenants but 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 now included in the computation. Likewise, when vacancies are filled and the building becomes fully occupied, the index is pushed up, because the fully occupied buildings are no longer included in the computation. Caution should therefore be taken when interpreting short-term changes in the index.

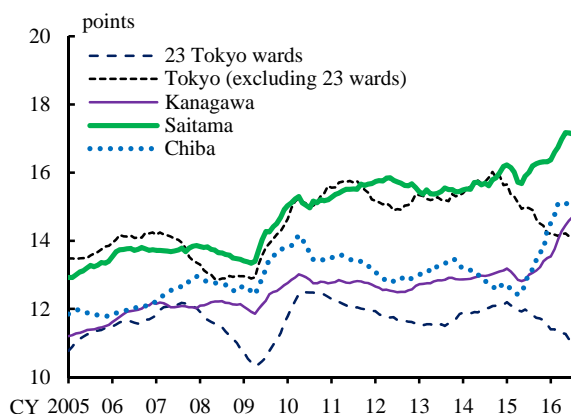
¹⁸ For loans to the housing rental business, see "Tasks and Challenges regarding Regional Financial Institutions' Loans for the Housing Rental Business and Credit Management: Findings of Survey Results," *Financial System Report Annex Series*, March 2016 (available in Japanese only).

¹⁹ On this issue, see "Recent Developments in Loan-Loss Provision Calculation by Regional Financial Institutions," *Financial System Report Annex Series*, August 2015 (available in Japanese only).

continuing to exceed that in credit costs. With regard to loans for top-rated firms and local governments, some new loans, which are considered to result in net losses, are being extended. Financial institutions need to once again establish a strong awareness among themselves of the importance of making appropriate assessments of risk and return when extending loans.

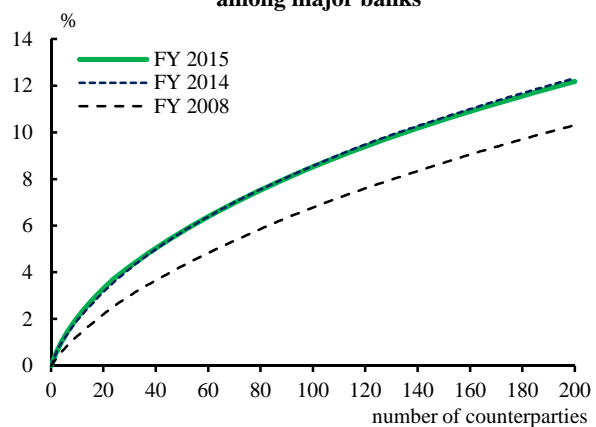
Moreover, in the negative interest rate environment, there is a growing need to review the profitability management framework, which has assumed positive market interest rates.

Chart IV-1-6: Vacancy indexes of rental housing^{1,2}



Notes: 1. Latest data as at July 2016.
 2. Vacancy index is the number of unoccupied rental units divided by the number of all rental units. The denominator excludes fully occupied housing and is estimated by TAS.
 Source: TAS, "Residential Market Report."

Chart IV-1-7: Cumulative share of credit amount among major banks¹



Note: 1. Cumulative share of credit amount to total credit amount, where the credits are sorted in descending order.
 Source: BOJ.

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.

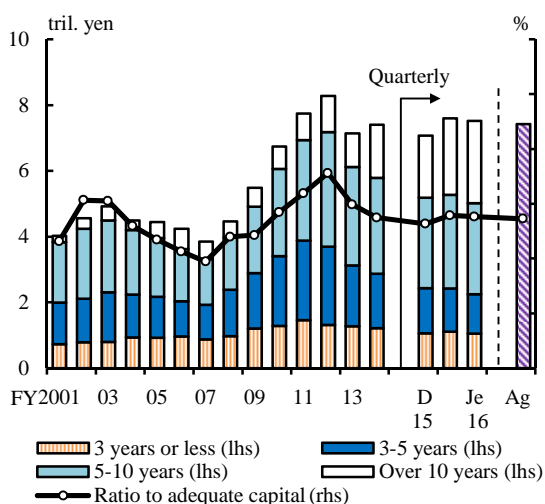
Yen interest rate risk

The amount of interest rate risk associated with financial institutions' yen-denominated bond investments has increased somewhat and remains at a high level compared with the past (Chart IV-2-1).²⁰ Specifically, the amount of yen interest rate risk as at the end of August 2016 was 7.4 trillion yen, up by 0.3 trillion yen from the

²⁰ The analysis here estimates changes in market value on bondholdings in the case of a "parallel shift" where interest rates for all maturities rise by 1 percentage point.

end of December 2015. This is due to moves among financial institutions to secure higher yields by further extending their duration of bondholdings in view of the decline in mid- to long-term JGB yields into negative territory, although the outstanding amount of yen-denominated bonds has decreased (Charts IV-2-2 to IV-2-4).

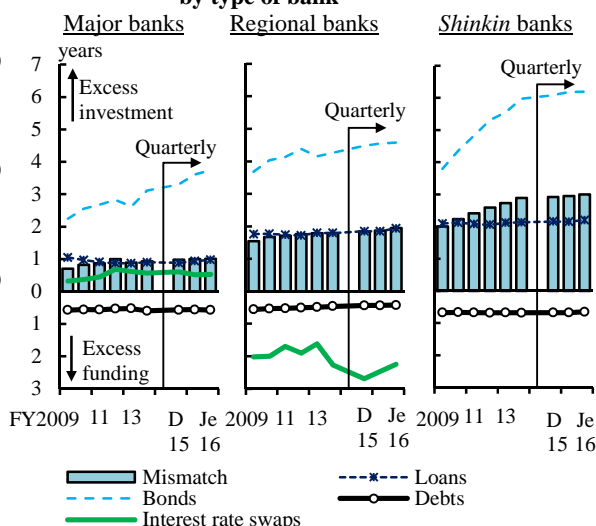
Chart IV-2-1: Interest rate risk associated with yen-denominated bondholdings among financial institutions^{1,2,3}



Notes: 1. Latest data as at end-August 2016. Data for end-August 2016 are estimated.
2. Interest rate risk: 100 basis point value in the banking book.
3. Convexity and higher order terms are taken into account.

Source: BOJ.

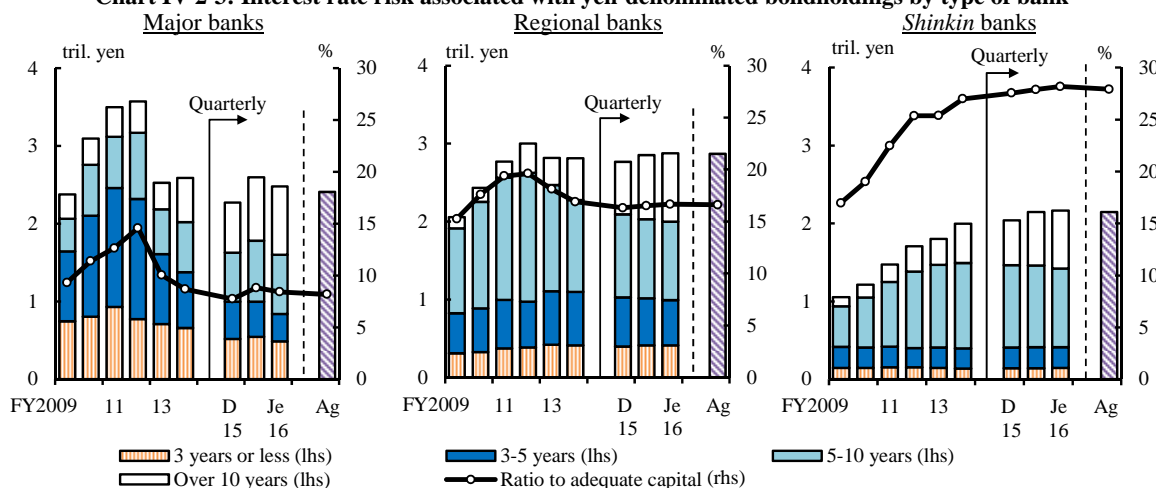
Chart IV-2-2: Average remaining maturity of yen-denominated assets and liabilities by type of bank¹



Note: 1. The 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. The average remaining maturity of interest rate swaps is the difference between interest rate swaps with interest receipts and those with interest payments.

Source: BOJ.

Chart IV-2-3: Interest rate risk associated with yen-denominated bondholdings by type of bank^{1,2,3}



Notes: 1. Latest data as at end-August 2016. Data for end-August 2016 are estimated.
2. Interest rate risk: 100 basis point value in the banking book.
3. Convexity and higher order terms are taken into account.

Source: BOJ.

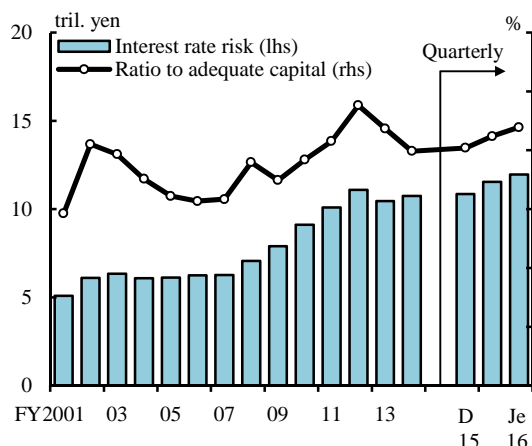
Chart IV-2-4: Effects of a rise in interest rates on the market value of yen-denominated bondholdings^{1,2}

tril. yen	Upward shift by 1 percentage point			Upward shift by 2 percentage points			Upward shift by 3 percentage points		
	End-Dec. 2015	End-Mar. 2016	End-June 2016	End-Dec. 2015	End-Mar. 2016	End-June 2016	End-Dec. 2015	End-Mar. 2016	End-June 2016
Financial institutions	-7.1	-7.6	-7.5	-13.5	-14.4	-14.3	-19.3	-20.7	-20.4
Banks	-5.0	-5.4	-5.4	-9.6	-10.4	-10.2	-13.8	-14.9	-14.5
Major banks	-2.3	-2.6	-2.5	-4.3	-4.9	-4.7	-6.2	-7.1	-6.7
Regional banks	-2.8	-2.9	-2.9	-5.3	-5.4	-5.5	-7.6	-7.8	-7.8
Shinkin banks	-2.0	-2.1	-2.2	-3.9	-4.1	-4.1	-5.5	-5.8	-5.8

Notes: 1. Assuming a parallel shift.
2. Convexity and higher order terms are taken into account.
Source: BOJ.

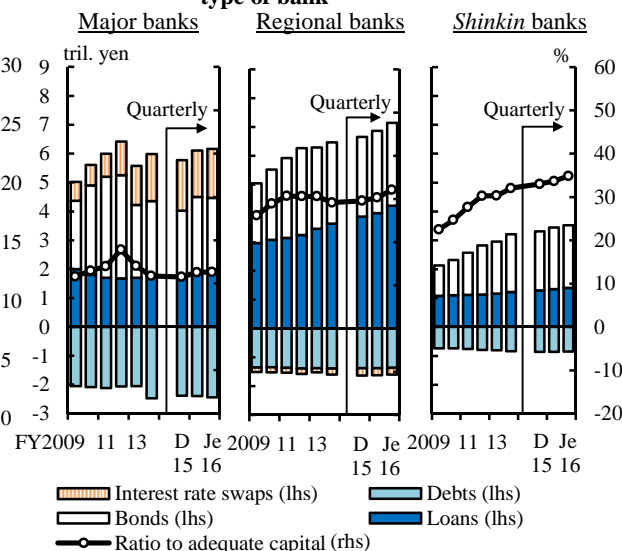
The amount of yen interest rate risk on financial institutions' balance sheets as a whole, including components such as loans and deposits in addition to bond investments, has increased somewhat since the previous *Report*, primarily due to longer bond duration and an increase in the amount of loans outstanding (Charts IV-2-5 and IV-2-6).²¹

Chart IV-2-5: Yen-denominated interest rate risk among financial institutions^{1,2}



Notes: 1. Interest rate risk: 100 basis point value in the banking book. For banks, off-balance-sheet transactions (interest rate swaps) are included.
2. Convexity and higher order terms are taken into account.
Source: BOJ.

Chart IV-2-6: Yen-denominated interest rate risk by type of bank^{1,2}



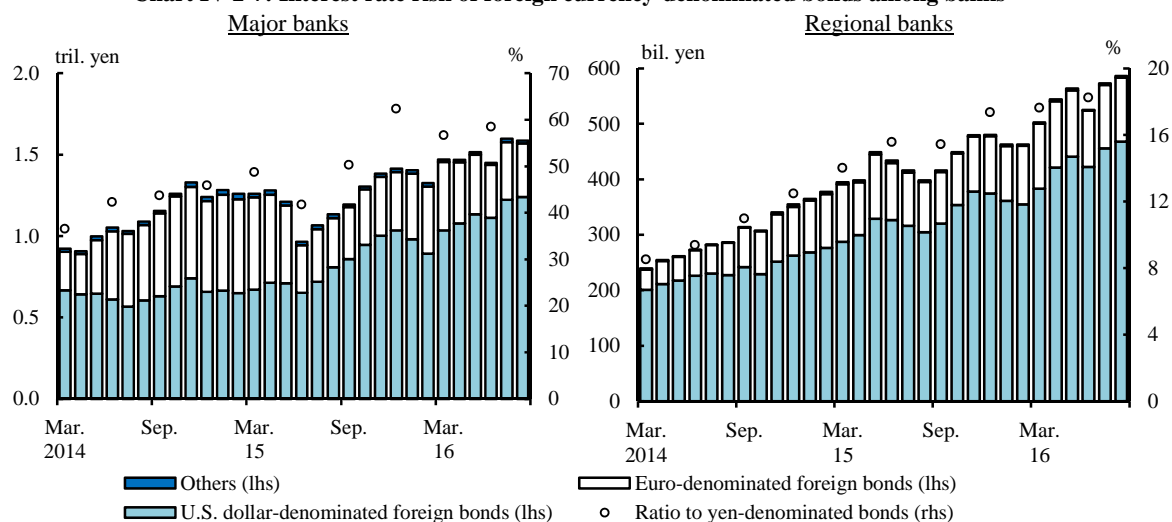
Notes: 1. Interest rate risk: 100 basis point value in the banking book. For banks, off-balance-sheet transactions (interest rate swaps) are included.
2. Convexity and higher order terms are taken into account.
Source: BOJ.

²¹ The 100 basis point value (bpv) is used to estimate changes in economic value associated with 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 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), yen-denominated liabilities, and yen interest rate swaps (only banks are accounted for). 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 calculating the effect of the 100 bpv on liabilities, hence so-called "core deposits" are not accounted for.

Foreign currency interest rate risk

The amount of interest rate risk associated with foreign currency-denominated bond investment by financial institutions has increased. In other words, the amount of risk for banks increased by 0.4 trillion yen compared with the end of February 2016, to 2.2 trillion yen as at the end of August 2016. In particular, because regional banks increased their outstanding bondholdings and extended their duration, the increase in the amount of risk among these institutions has been relatively large. The ratio of the amount of interest rate risk associated with foreign currency-denominated bonds to that associated with yen-denominated bonds has reached nearly 60 percent at major banks and nearly 20 percent at regional banks (Chart IV-2-7).

Chart IV-2-7: Interest rate risk of foreign currency-denominated bonds among banks^{1,2}



Notes: 1. Latest data as at end-August 2016.

2. Interest rate risk: 100 basis point value in the banking book. Off-balance-sheet transactions of major banks are included. Off-balance sheet transactions of regional banks are not included.

Source: BOJ.

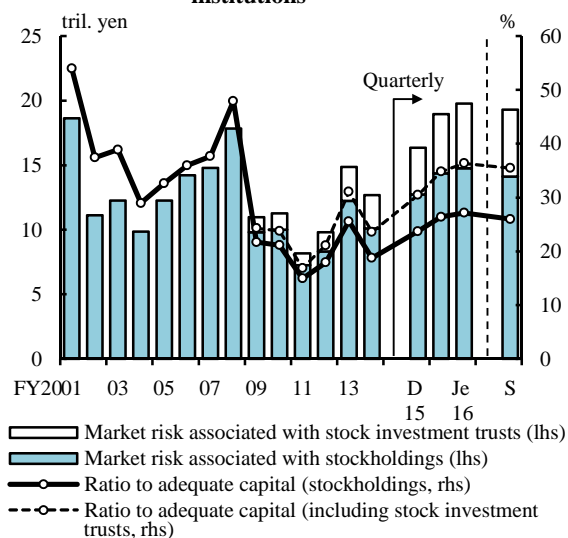
Market risk associated with stockholdings

The amount of market risk associated with stockholdings at financial institutions has increased (Chart IV-2-8). The amount of the risk calculated based on stock price developments through the end of September 2016 was 19.3 trillion yen, a 18.0 percent increase compared with the end of December 2015.²² Although the decline in stock prices since the end of 2015 caused a decrease in the amount of market risk, this effect was overwhelmed by the rise in market volatility (Chart IV-2-9). Meanwhile, although the outstanding amount of strategic stockholdings continues to be on a moderate declining trend, regional financial institutions have increased their holdings of stock

²² The market risk associated with stockholdings (including stock investment trusts) computed here is estimated using a VaR with a 99 percent confidence level and a 1-year holding period.

investment trusts as part of their portfolio diversification strategy, and their outstanding stockholdings, inclusive of stock investment trusts, have increased. As a result, the ratio of the amount of market risk associated with stockholdings to the amount of capital at major banks and regional banks has climbed to around 40 percent (Chart IV-2-10).

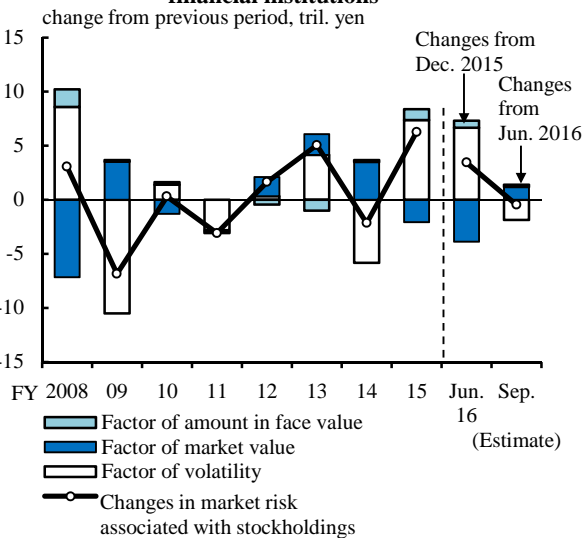
Chart IV-2-8: Market risk associated with stockholdings among financial institutions^{1,2,3,4}



Notes: 1. Latest data as at end-September 2016.
 2. Market risk associated with stockholdings and stock investment trusts: value-at-risk with a 99 percent confidence level and a 1-year holding period.
 3. Market risk associated with stockholdings and stock investment trusts excludes risk associated with foreign currency-denominated stockholdings and stock investment trusts. Pre-fiscal 2009 data for stock investment trusts are excluded from the figures.
 4. Latest data are estimated using outstanding amount of stockholdings and stock investment trusts as at end-August 2016 and stock prices as at end-September 2016.

Source: BOJ.

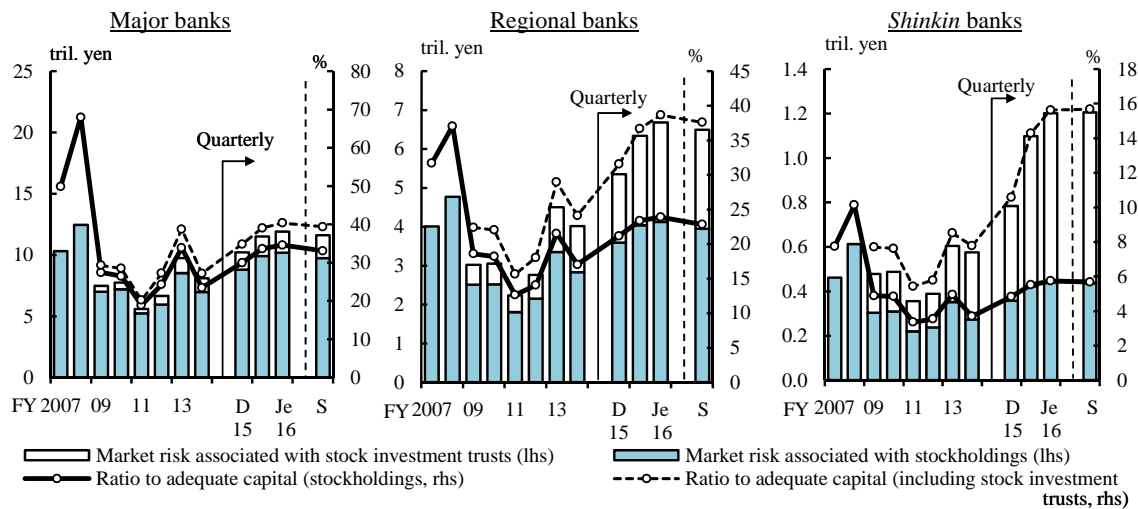
Chart IV-2-9: Decompositions of changes in market risk associated with stockholdings among financial institutions^{1,2}



Notes: 1. Market risk associated with stockholdings and stock investment trusts: value-at-risk with a 99 percent confidence level and a 1-year holding period.
 2. Market risk associated with stockholdings and stock investment trusts excludes risk associated with foreign currency-denominated stockholdings and stock investment trusts. Fiscal 2008 data for stock investment trusts are excluded from the figures.

Source: BOJ.

Chart IV-2-10: Market risk associated with stockholdings by type of bank^{1,2,3,4}



- Notes: 1. Latest data as at end-September 2016.
 2. Market risk associated with stockholdings and stock investment trusts: value-at-risk with a 99 percent confidence level and a 1-year holding period.
 3. Market risk associated with stockholdings and stock investment trusts excludes risk associated with foreign currency-denominated stockholdings and stock investment trusts. Pre-fiscal 2009 data for stock investment trusts are excluded from the figures.
 4. Latest data are estimated using outstanding amount of stockholdings and stock investment trusts as at end-August 2016 and stock prices as at end-September 2016.

Source: BOJ.

Tasks and challenges regarding market risk management

The two key tasks and challenges in market risk management for financial institutions are detailed below.

- (1) **Financial institutions need to develop a clear securities investment and asset-liability management (ALM) strategy, and be cognizant of the impact of changes in the profile of diverse risk factors from a cross-sectional perspective.**

In an environment characterized by prolonged low interest rates, financial institutions have begun to take on more diverse risks, including foreign currency interest rate risks, risks associated with stockholdings, and real estate and foreign exchange-related risks, in addition to maintaining a high level of yen interest rate risk by extending the duration. In particular, regional financial institutions with lower core profitability have a greater tendency to increase their investment in risky assets (see Box 2). Regional financial institutions can be expected to continue experiencing downward pressure on the profitability of domestic deposit-taking and lending activities as well as JGB investment, under the low interest rate environment, in addition to the structural problem of a shrinking population and customer base. Under such circumstances, accumulating risky assets is one option, in which case it becomes increasingly essential to gain a cross-sectional understanding of the impact of changing risk factors on their portfolios, and to

adapt the appropriate management and operational framework accordingly.

Specifically, financial institutions need to conduct a multi-dimensional analysis of changes in their financial positions such as the market value of assets and profits, by imposing risk scenarios based on the risk profile of their portfolios. The analysis should take into account changes in the market investment environment at each point in time, such as the increased volatility in global financial markets and the rise in foreign currency funding costs. Based on such analyses, financial institutions should engage in organizational discussion on measures that should be taken when stresses materialize. When engaging in the management of yen interest rate risks and ALM operations, financial institutions should also consider the possible influence that the negative interest rate environment has on interest rate determination in deposits, loans, and other transactions, as well as on the fluctuation pattern of market interest rates.

(2) Financial institutions need to properly re-evaluate the purpose and costs of strategic stockholdings, thereby continuing their efforts to reduce them.

Although strategic stockholdings have been on a moderate declining trend, the amount of market risk associated with stockholdings remains large enough to have considerable effects on banks' financial strength and profits. Strategic stockholdings have been accumulated over a long period, along with the development of transactional relationships between financial institutions and corporate firms. Given that moves to reduce such stockholdings are thought to be premised on gaining the understanding of their counterparties, it is important for financial institutions to steadily proceed with efforts to raise their objectivity in assessing the purpose and costs of their strategic stockholdings.

C. Funding liquidity risk

In this section, we assess funding liquidity risk, first in yen and then for foreign currencies.

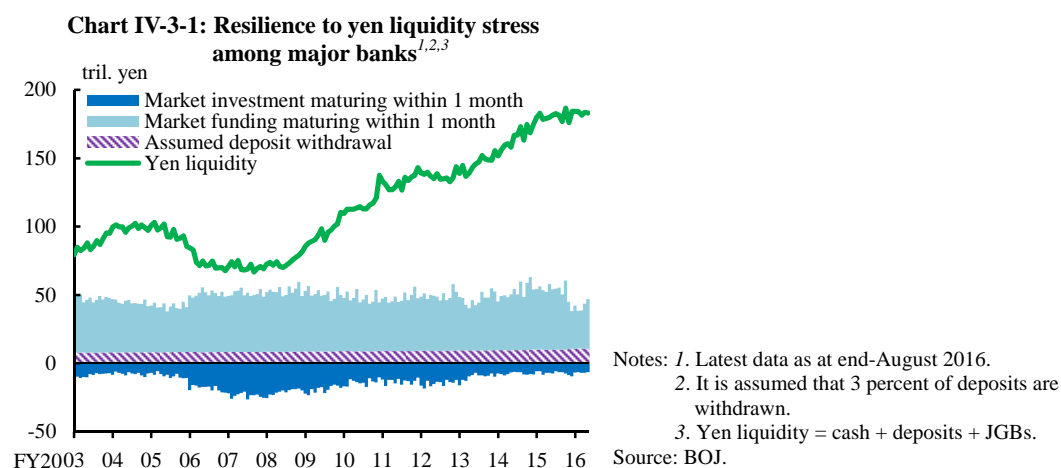
Yen funding liquidity risk

Financial institutions have sufficient yen funding liquidity.

The stability of the investment and funding structure of yen is high, mainly because: the majority of funding is sourced from stable retail deposits; the outstanding amount of deposits is far larger than total loans outstanding; and 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.

Even under stress situations, 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 (Chart IV-3-1).²³



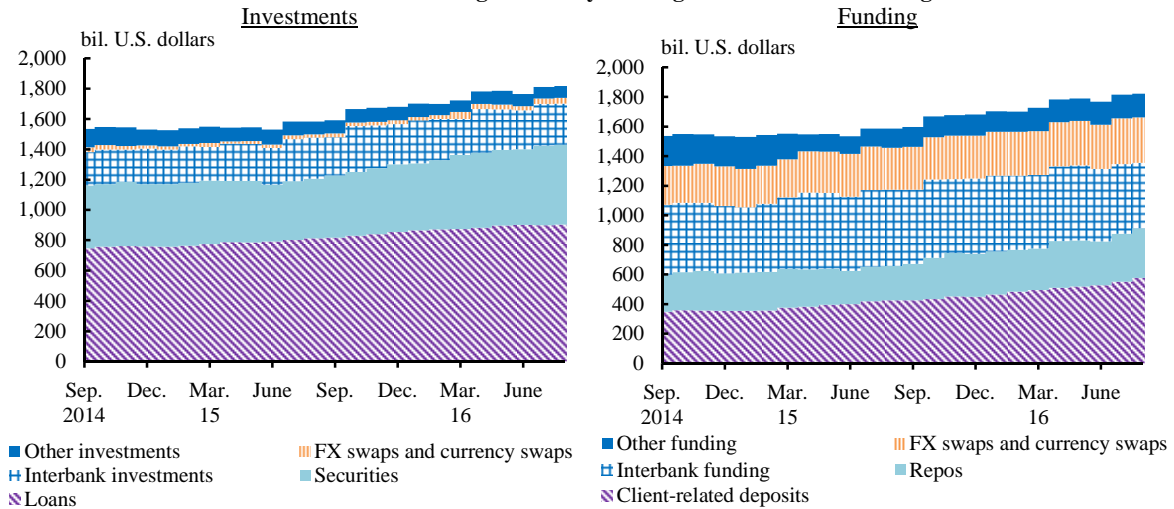
Funding liquidity risk for foreign currencies

Market funding accounts for a large share of foreign currency funding. However, financial institutions have a liquidity buffer that can cover funding shortages, even if market funding conditions become difficult for a certain period.

With respect to the investment and funding structure of foreign currencies, a large proportion of foreign currencies is invested in loans and foreign bonds with relatively long maturities, whereas a large share of funding comprises market funding, such as repos, foreign exchange and currency swaps, and interbank borrowings (Chart IV-3-2). However, foreign bonds largely consist of assets that can be liquidated through repo borrowings, sales, etc. Therefore, in assessing the stability of the investment and funding structure of foreign currencies, the "stability gap" -- the gap between the amount of illiquid loans and stable funding through, for example, client-related deposits, medium- to long-term foreign exchange and currency swaps, and corporate bonds -- serves as a useful indicator (Chart IV-3-3).

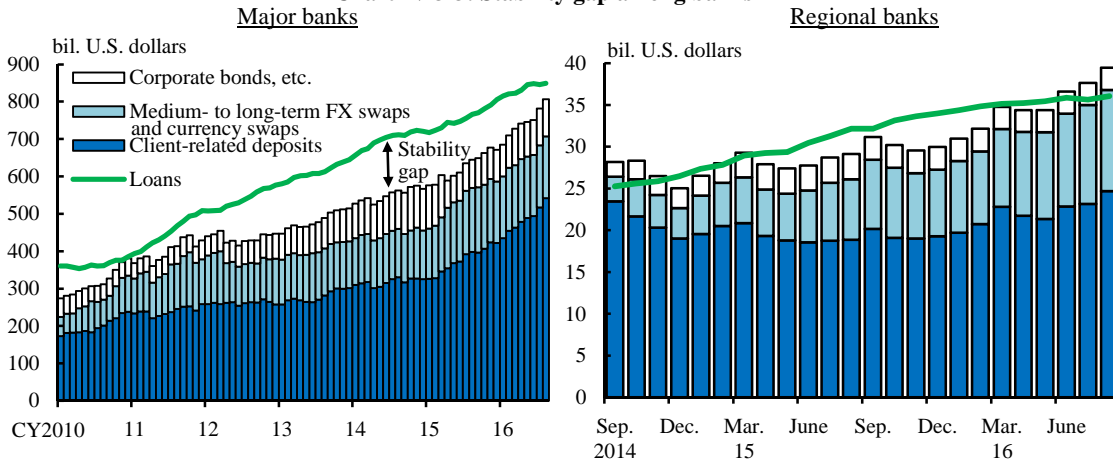
²³ In accordance with the concept of the Liquidity Coverage Ratio (LCR), here we assume an outflow of market funding with a maturity of 1 month or less and an outflow amounting to 3 percent of total deposits. In the computation of LCR, more complex stress situations than the one featured here are assumed, such as the withdrawal of committed facilities and the downgrading of credit ratings. Thus, it should be noted that the assumption for fund outflows under stress does not fully conform to the definition of the LCR.

Chart IV-3-2: Structure of foreign currency funding and investments among banks¹



Note: 1. Latest data as at end-August 2016.
Source: BOJ.

Chart IV-3-3: Stability gap among banks^{1,2,3}



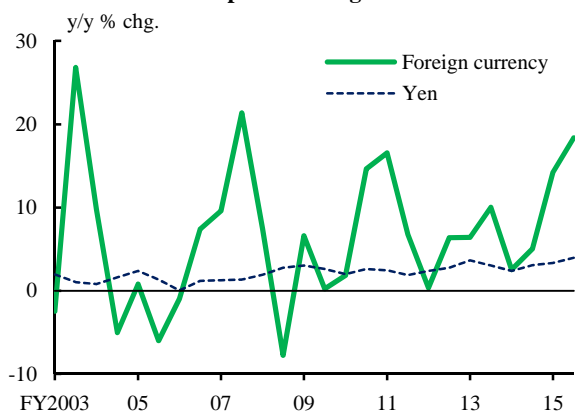
Notes: 1. The left-hand chart includes major banks classified as internationally active banks.
2. Latest data as at end-August 2016.
3. "Corporate bonds, etc." and "Medium- to long-term FX swaps and currency swaps" indicate funding maturing in over 3 months until March 2012 and funding maturing in over 1 year from April 2012.
Source: BOJ.

The stability gap has continued to narrow among major banks. While loans have continued to increase, this narrowing is partly attributable to banks' continued progress in bolstering funding bases, particularly through increasing client-related deposits. Nevertheless, it is important for banks to continue with their efforts to shore up the stability of their funding sources, as the stability gap still remains considerable in size, in addition to the fact that other risks remain, namely, uncertainties about the stability of client-related deposits and uncertainties about the liquidation of foreign currency-denominated assets, and the risk associated with the withdrawal of unused committed facilities.

Indeed, when looking at developments in foreign currency-denominated client-related

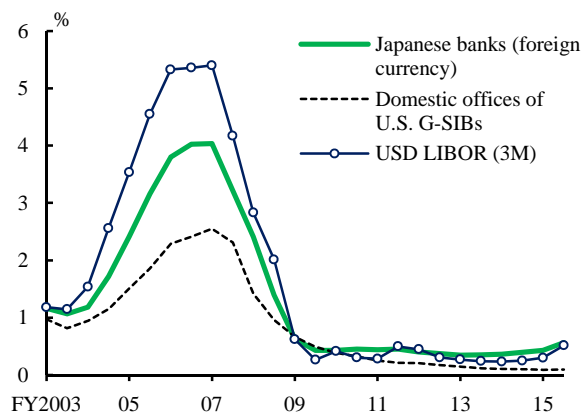
deposits, there have been episodes where abrupt outflows were observed (Chart IV-3-4). Furthermore, the yields on foreign currency deposits at Japanese banks, which exhibit high comovement with market interest rates, have risen recently (Chart IV-3-5). Financial institutions need to be vigilant to the fact that the stability of client-related deposits can be affected by numerous factors, such as depositor attributes, the offered level of deposit interest rates, and the credit situation of the bank, in addition to economic conditions at home and abroad, developments in foreign exchange markets, and market risk sentiment.

Chart IV-3-4: Foreign currency client-related deposits among banks¹



Note: 1. Latest data as at end-March 2016.
Source: BOJ.

Chart IV-3-5: Deposit funding rates^{1,2}



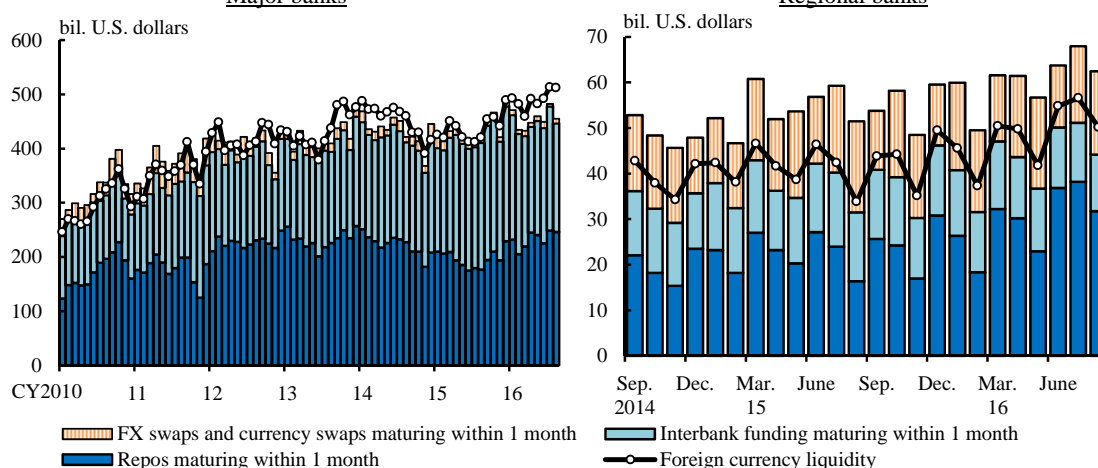
Notes: 1. Latest data as at the second half of fiscal 2015.
2. Japanese banks include major banks and regional banks. U.S. G-SIBs include U.S. banks identified as G-SIBs in 2015.
Sources: Bloomberg; FDIC; FSB; BOJ.

Meanwhile, at regional banks, the stability gap has been narrowing on the whole. Nevertheless, some regional banks have been actively accumulating foreign currency-denominated assets and need to continue working to bolster their stable funding bases.

As for the resilience of foreign currency funding to short-term stress, no significant problems have been observed, as both major banks and regional banks generally hold liquid assets to cover the outflow of funds expected under a stress situation (Chart IV-3-6).²⁴ However, continued efforts are required to enrich their risk management frameworks, considering uncertainties surrounding possible withdrawals from unused committed facilities, and outflows from client-related deposits, among others.

²⁴ We classify repo borrowings with remaining maturities of 1 month or less as liquid assets, based on the assumption that the collateral used is of high quality and that the total amount of funding with a maturity of 1 month or less can be rolled over using the same collateral. This exercise does not account for withdrawals from unused committed facilities, client-related deposits, or other outflows.

Chart IV-3-6: Resilience to foreign currency liquidity stress among banks^{1,2}
Major banks Regional banks



Notes: 1. Latest data as at end-August 2016.

2. Foreign currency liquidity = cash + deposits + unencumbered U.S. treasuries + repos maturing within 1 month.

Source: BOJ.

Foreign currency funding environment

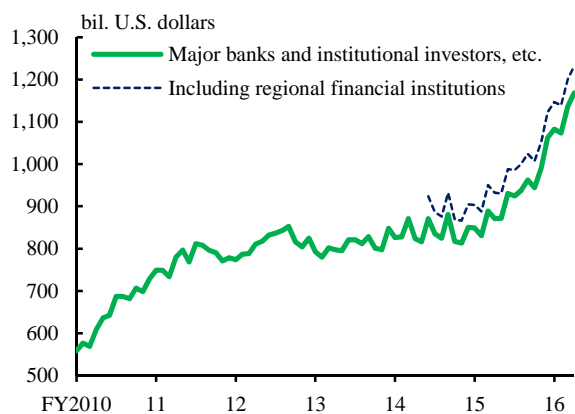
Recently, the funding premium in foreign currency funding markets has continued to widen, although there has been no constraint on availability. This is partly against the backdrop of the active accumulation of overseas assets (such as loans and securities) -- particularly U.S. dollar assets -- on the part of a wide range of Japanese financial institutions and institutional investors, alongside differences in the direction of monetary policy with that of the United States, which has boosted foreign currency funding (Chart IV-3-7). In addition, it is partly attributable to the effects of financial regulations. Indeed, short-term U.S. dollar funding costs have risen substantially in the foreign exchange and currency swap markets, while rises in issuance rates in the CD and CP markets have also been observed (Charts IV-3-8 and IV-3-9).

A breakdown of short-term U.S. dollar funding costs in the foreign exchange swap market into three factors, i.e., (1) the U.S. policy-linked interest rate (OIS), (2) the spread between the U.S. dollar inter-bank market interest rate and the policy-linked rate (LIBOR-OIS), and (3) deviations from the covered interest parity condition (i.e., U.S. dollar funding premiums) shows that the deviation from the covered interest parity condition has continued to widen, while the recent upswing in LIBOR has also contributed to higher foreign currency funding costs. The increase in LIBOR and CD & CP issuance rates has been partly attributed to a decline in the outstanding amount of Prime MMFs, which are a major provider of funds, following MMF reform in the United States (Chart IV-3-9).²⁵ As the amount of Japanese financial institutions' funding from

²⁵ U.S. MMFs can be classified into Government MMFs, which invest more than 99.5 percent of their

U.S. MMFs is relatively large, the availability of funding in the CD and CP markets and spillover effects on other funding markets need to be watched closely.

Chart IV-3-7: Amount of foreign currency funding via FX swaps and currency swaps by Japanese financial entities^{1,2,3,4}

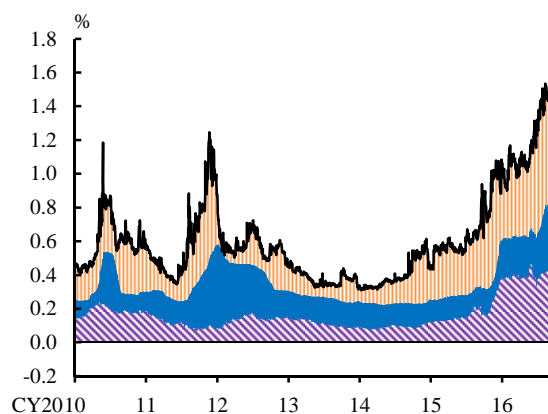


Notes: 1. Estimates by the BOJ. Latest data as at end-July 2016.

2. "Major banks and institutional investors, etc." includes major banks, Japan Post Bank, The Norinchukin Bank, Shinkin Central Bank (from end-September 2014), and life insurance companies.
3. Life insurance companies are members of The Life Insurance Association of Japan (latest data on members shows 41 companies).
4. Regional financial institutions are included from end-September 2014.

Sources: Bloomberg; The Life Insurance Association of Japan; Published accounts of each company; BOJ.

Chart IV-3-8: Breakdown of the short-term U.S. dollar funding costs (FX swaps)^{1,2}



- CIP deviation
- LIBOR-OIS spread
- USD OIS
- USD rate from JPY (3-month)

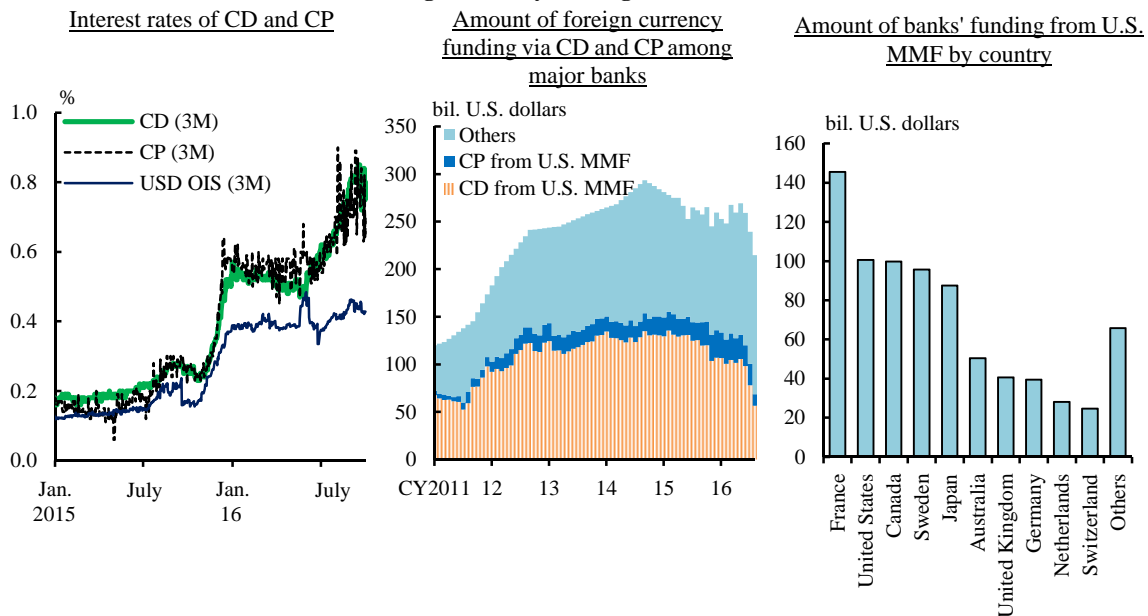
Notes: 1. Data to September 30, 2016.

2. USD OIS = a forecast of the U.S. policy rate, LIBOR-OIS spread = USD LIBOR – USD OIS, CIP deviation = USD funding costs – USD LIBOR.

Source: Bloomberg.

portfolios in cash, treasury bonds or repos secured by treasury bonds, and other MMFs (i.e., Prime MMFs). The U.S. Securities and Exchange Commission (SEC) is calling for the introduction of floating Net Asset Value (NAV) and a framework in which fees or restrictions may be imposed on the cancellation of Prime MMFs when there is a decline in liquidity of assets held (final rules came into effect on October 14, 2016, introduction of floating NAV applies only to institutional MMFs). As a result, there have been a withdrawal from Prime MMFs by investors and a shift of assets from Prime MMFs to Government MMFs by fund managers, which have sharply reduced the outstanding amount of Prime MMFs.

Chart IV-3-9: Foreign currency funding conditions in CD and CP markets^{1,2,3,4}



Notes: 1. Latest data as at September 30, 2016 for the left-hand chart, and end-August 2016 for the center chart. Data as at end-August 2016 for the right-hand chart.

2. CP rates in the left-hand chart are rates on commercial paper issued by financial institutions.

3. In the center chart, "Others" is on monthly basis from end-March 2015. Until end-February 2015, semiannual observations are converted into monthly data.

4. In the right-hand chart, amount of investment in banks from U.S. MMF is aggregated by country based on the location of banks' global headquarters. "Australia" includes New Zealand.

Sources: Bloomberg; FRB; OFR; SEC; BOJ.

Tasks and challenges regarding foreign currency liquidity risk management

The three key tasks and challenges for financial institutions in terms of foreign currency liquidity risk management are detailed below.

- (1) **Financial institutions need to persevere with efforts to secure stable funding bases in major foreign currencies, especially the U.S. dollar.**
- (2) **Financial institutions should work toward responding more effectively to market stresses through, for example, detailed management of liquidity risk taking into account the attributes of their assets and liabilities such as client-related deposits and committed facilities.**
- (3) **Financial institutions need to enhance liquidity risk management by bolstering stable funding bases in foreign currencies other than major currencies, including Asian currencies.**

D. Financial institutions' capital adequacy

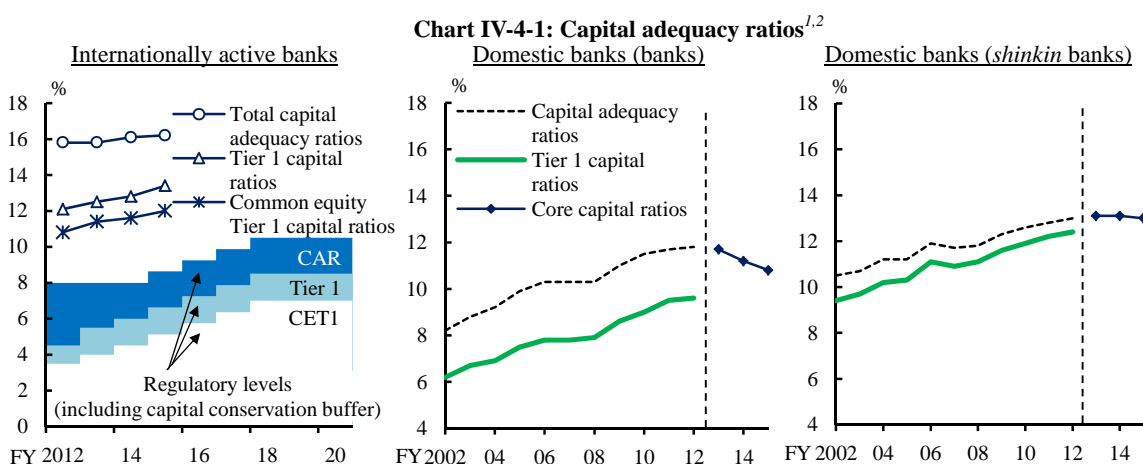
This section examines whether financial institutions' capital adequacy ratios fulfill regulatory requirements, and further, whether they maintain a sufficient capital base

against the various risks they undertake.

Capital adequacy ratios

Financial institutions' capital adequacy ratios are sufficiently above regulatory requirements.

As at the end of fiscal 2015, total capital adequacy ratios, Tier 1 capital ratios, and common equity Tier 1 capital ratios (CET1 capital ratios) at internationally active banks and core capital ratios at domestic banks significantly exceeded regulatory requirements (Chart IV-4-1). However, it should be borne in mind that international financial regulations such as the Basel III framework will gradually be implemented in full, and some issues, such as the methodology for the calculation of risk-weighted assets, involve new content on regulations that is yet to be finalized.²⁶



Notes: 1. CAR indicates total capital adequacy ratios. Latest data as at end-March 2016.

2. 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. Data take the phase-in arrangements into consideration. Data for banks are calculated on a consolidated basis.

Source: BOJ.

Capital adequacy relative to the amount of risk borne by financial institutions

Financial institutions' capital levels are generally adequate relative to the amount of

²⁶ 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 (determined according to their size and other characteristics) were introduced at the end of March 2016 (all of these requirements will be implemented in stages, with full implementation by 2019). As for domestic banks, they are currently allowed to consider all or a portion of certain instruments, such as non-convertible preferred stocks and subordinated bonds, as part of new core capital under the phase-in arrangements, but the proportion of these instruments that can be included will be reduced gradually in future. In addition, they will be required to exclude certain assets -- such as goodwill -- from core capital gradually under phase-in arrangements, with these assets subject to full deduction by the end of March 2019.

risk undertaken (Charts IV-4-2 and IV-4-3).²⁷ Capital levels and the size of buffers against the changes in the market prices of securities at domestic banks (as at the end of September 2016) remained more or less unchanged from a year ago for all types of financial institutions, with the accumulation of retained earnings contributing to an increase and the decline in stock prices contributing to a decrease. Meanwhile, the amount of risk borne by financial institutions has increased compared with a year ago, mainly due to the increase in market risk associated with stockholdings. On the whole, even after taking the above into account, **it can be judged that financial institutions currently have sufficient capacity to absorb losses and ability to take on risks.**

Chart IV-4-2: Risks borne by financial institutions and amount of adequate capital^{1,2,3}

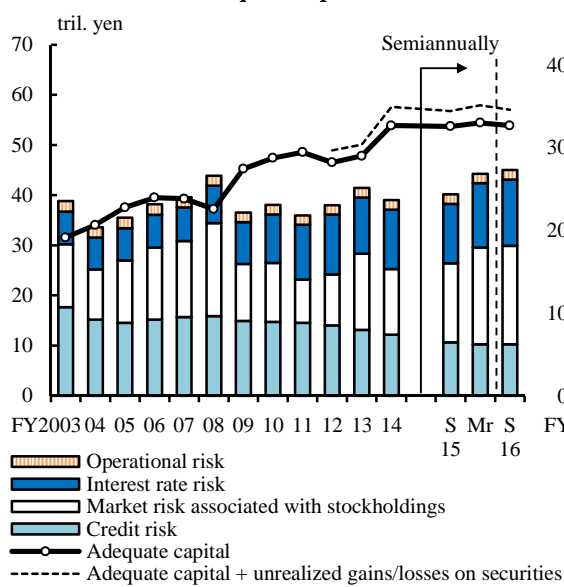
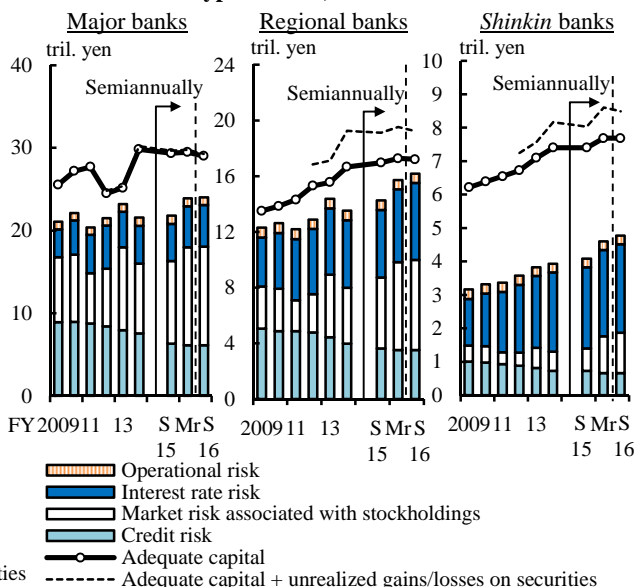


Chart IV-4-3: Risks borne by financial institutions and amount of adequate capital (by type of bank)^{1,2,3}



- Notes: 1. Latest data for "Market risk associated with stockholdings" and unrealized gains/losses on stockholdings are as at end-September 2016. Data for interest rate risk associated with bondholdings and unrealized gains/losses on securities (excluding on stockholdings) are as at end-August 2016, data for other interest rate risk (yen-denominated) are as at end-June 2016, and data for others are as at end-March 2016.
2. Pre-fiscal 2009 data for stock investment trusts are excluded from the figures. "Credit risk" includes risks of foreign currency-denominated assets. "Market risk associated with stockholdings" and interest rate risk (off-balance-sheet transactions are partly included) at major banks include foreign currency-denominated risk.
3. "Adequate capital + unrealized gains/losses on securities" is the sum of adequate capital and unrealized gains/losses on securities (tax effects taken into account) for domestic banks.

Source: BOJ.

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 match the internal calculations by financial institutions as part of their risk management process/framework. For the calculation methods used for each type of risk, see the Notes in Charts IV-1-1, IV-2-1, and IV-2-8. The amount of operational risk corresponds to 15 percent of gross profits. Adequate capital for internationally active banks from fiscal 2012 refers to CET1 capital. Adequate capital for domestic banks from fiscal 2013 refers to core capital. The data do not take the phase-in arrangements into consideration. Adequate capital preceding the respective periods refers to Tier 1 capital.

E. Financial institutions' profitability and its effects on financial system functioning and stability

Until this juncture, the analysis has examined the balance between financial institutions' financial bases and the aggregate risks they are currently undertaking. This section summarizes developments in financial institutions' profitability, which could affect their financial bases in the future, and examines how developments in their profitability could impact their financial intermediation.

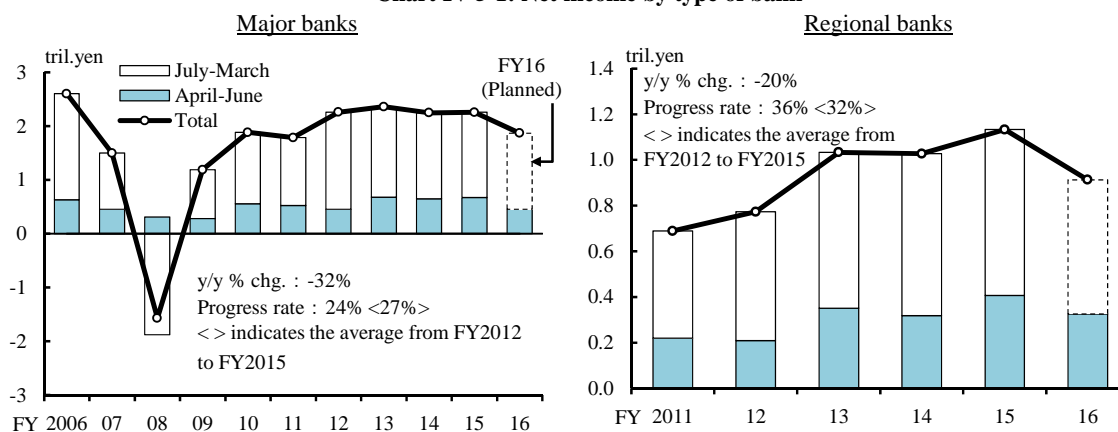
Financial institutions' profits have been at a high level from a long-term perspective, but changes have been observed in the factors that have lifted profits to date.

Despite a continued decline in profits from domestic loans, financial institutions have maintained profits at a high level largely due to: (1) a decline in credit costs; (2) an increase in securities-related profits and net fees and commissions such as investment trusts and insurance sales, alongside developments including a rise in stock prices; and (3) an increase in international operating profits, such as those derived from overseas loans. Nevertheless, banks' financial results for fiscal 2015 show that changes have been observed in the factors responsible for lifting profits. Among others, the following changes have been observed: (1) as the credit cost ratio is already fairly low, the scope for further falls is limited. Indeed, credit costs at major banks have begun to rise; (2) profits from fees and commissions, which had been increasing for some time, have begun to fall, mainly due to stagnant sales of investment trusts given the decline in stock prices and other factors; and (3) gross operating profits from international operations at major banks, a main driver of profit growth, have declined, due to the translation effects of foreign currency-denominated profits during a yen appreciation phase and to an increase in foreign currency funding costs.

The dissipation of factors supporting profit growth **has rendered the declining profitability of domestic deposit-taking and lending businesses more likely to directly affect overall profits.** Indeed, the financial results for the April-June quarter of fiscal 2016 showed a sharp decline in the financial institutions' profits, though remaining high from a long-term perspective. In addition to the above-mentioned factors, the sharp decline in profits is mainly due to the shrinking profit margins under a negative interest rate (Charts IV-5-1 and IV-5-2). While the introduction of negative interest rates has depressed the yield curve and hence lending rates, there is less scope to reduce deposit rates, since deposit rates are already close to zero. As a result, deposit and lending margins have narrowed, exerting downward pressure on financial institutions' profits. European countries that have similarly introduced negative interest rate policies have not witnessed such a large impact on the profitability of financial institutions, since deposit

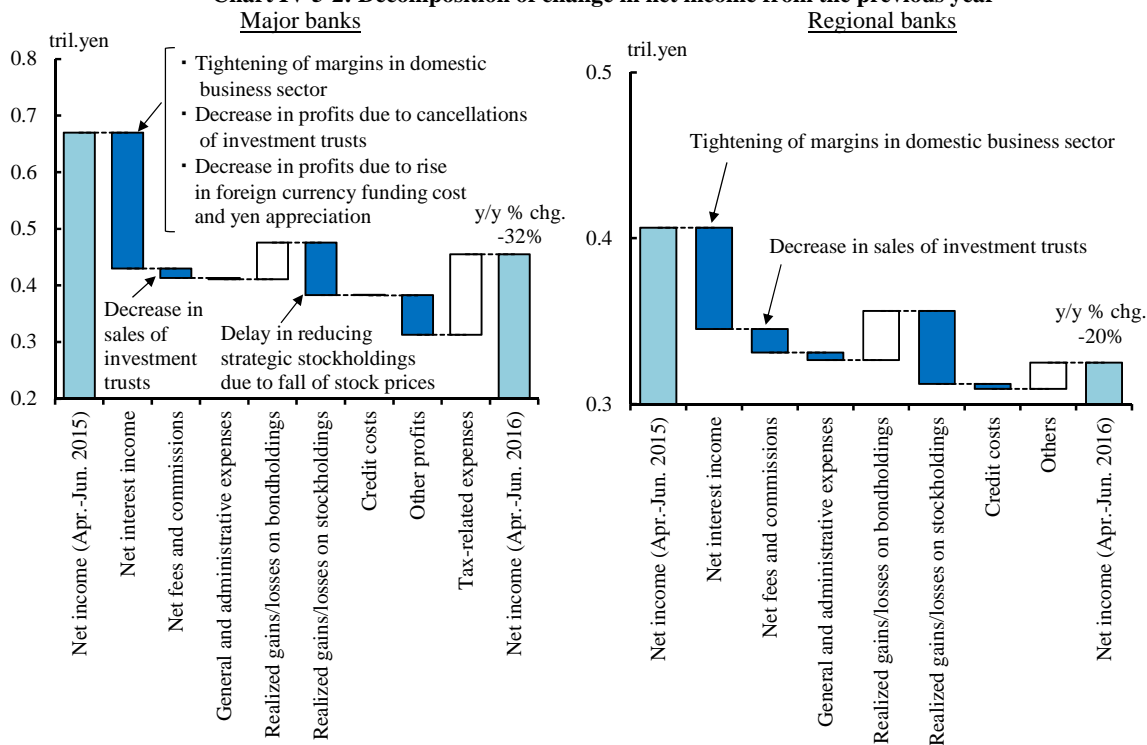
rates had room for further reduction, among other factors (see Box 3).

Chart IV-5-1: Net income by type of bank



Sources: Published accounts of each bank; BOJ.

Chart IV-5-2: Decomposition of change in net income from the previous year

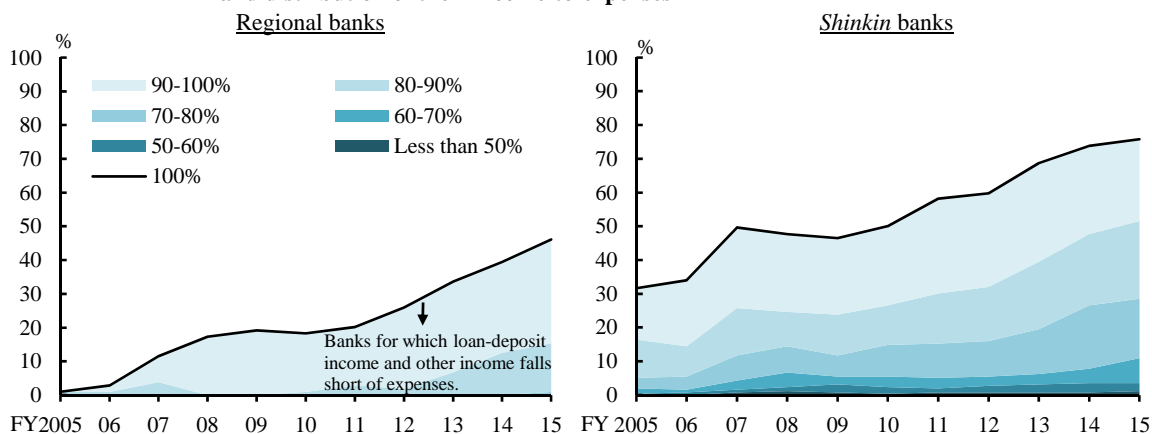


Sources: Published accounts of each bank.

As discussed above, **financial institutions have sufficient capital bases at present, which will allow them to continue risk taking even if profitability remains subject to downward pressure for the time being (see Box 2). Going forward, if financial institutions' portfolio rebalancing leads to an improvement in economic and price developments, this is in turn likely to bring about a recovery in core profitability. However, if the recent trend of declining profits persists, the number of financial institutions experiencing an erosion of their loss-absorbing capacity could increase,**

leading to a weakening in the financial intermediation function. In fact, the number of financial institutions -- in particular regional financial institutions -- that are unable to cover their expenses with income from deposit-taking and lending activities as well as fees and commissions has been increasing, and should a shock materialize, causing credit costs to increase, these institutions could more easily record losses, being unable to absorb the credit costs with pre-provision net revenue (excluding trading income) (Charts IV-5-3 and IV-5-4). It should also be recognized that structural problems, such as the shrinking and aging regional population, put long-term downward pressure on the profitability of deposit-taking and lending activities of regional financial institutions (see Box 4). From a long-term perspective, profitability, which is the source of capital accumulation for banks, has also had some degree of influence on the lending stances of these institutions (see Box 5). Should downward pressure continue to be exerted on bank profits, keeping banks from securing returns that meet their capital costs for a prolonged period, the effects could spill over to the financial intermediation function even if they currently hold a sufficient amount of capital, as future capital losses will be factored in, in a forward-looking manner. Going forward, considering that the profitability of deposit-taking and lending activities could fall further, developments in the financial intermediation function of financial institutions warrant careful vigilance from various angles (Chart IV-5-5). **At the same time, it is necessary to pay attention to the possibility that financial system stability will be impaired, in a case where financial institutions shift toward excessive risk taking in view of maintaining their profitability, amid a decline in the profitability of their loans and securities investment mainly due to the effects of low and negative interest rates.**

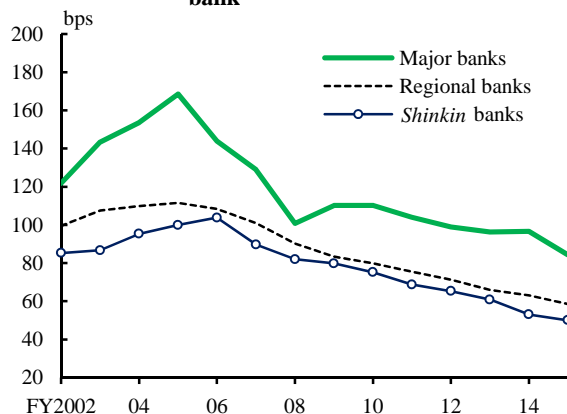
Chart IV-5-3: Ratios of banks for which loan-deposit income and other income falls short of expenses and distribution of their income-to-expenses¹



Note: 1. Income-to-expenses = (loan interest income + deposit interest income + net fees and commissions - deposit interest expenses) / general and administrative expenses

Source: BOJ.

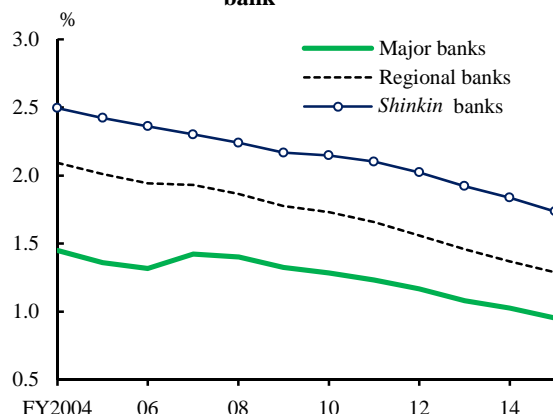
Chart IV-5-4: Break-even credit cost ratios by type of bank^{1,2,3}



- Notes: 1. Latest data as at fiscal 2015.
 2. Break-even credit cost ratios are the ratios above which credit costs exceed pre-provision net revenue (excluding trading income). Averages for each type of bank.
 3. Pre-provision net revenue (excluding trading income) for fiscal 2012 onward is calculated without profits due to cancellations of investment trusts.

Source: BOJ.

Chart IV-5-5: Lending margins by type of bank^{1,2,3}



- Notes: 1. Latest data as at fiscal 2015.
 2. Data for banks are for the domestic business sector. Data for *shinkin* banks are for all branches.
 3. Interest rate swaps are subtracted from funding costs.

Source: BOJ.

Regarding potential vulnerabilities due to the declining profitability of financial institutions, it is necessary to examine both the risk of overheating -- excessive accumulation of macro risks and exuberant asset prices -- and the risk of a gradual pullback in financial intermediation due to a persistent decline in profits. In addition to assuming risks in lending, securities investment, and other activities under the auspices of an appropriate risk management framework, financial institutions need to improve their profitability in the following ways: (1) expansion of business areas, including internationalization of business operations; (2) augmentation of non-interest income, such as fees and commissions (see Box 6); (3) operational innovation, including the use of information technology, and review of the cost structure; and (4) strengthening of regional industries and enhancement of the vitality of regional firms, among other measures.

V. Macro stress testing

This chapter assesses the stability of the financial system through macro stress testing. Macro stress testing involves examining financial institutions' capital adequacy and the resilience of the financial system dynamically, from a macro viewpoint, by estimating the extent of capital loss under specific stress events. The results of macro stress testing in this round indicate that **the financial system is considered to have generally strong resilience against economic and financial shocks originating from home and abroad.**

The two stress scenarios under consideration are the "tail event scenario" and the "tailored event scenario." The former is designed to assess the stability of the financial system through fixed-point observations, by applying an approximately equal degree of severe stress in every semiannual report. In particular, the level of stress is comparable to that observed at home and abroad during the Lehman shock. The latter is designed to be a multi-dimensional analysis of the vulnerabilities inherent in the financial system under different scenarios for each test. The scenario presented in this *Report* features constraints on the availability of foreign currency, in addition to a widening of foreign currency funding premiums. The formulation of this scenario reflects the importance of securing stable foreign currency funding for Japanese banks. Scenarios presented in this stress testing exercise are hypothetical, developed for the purpose of effectively conducting the above-mentioned examination and analysis. It should be noted that the scenarios presented are not an indication of the likelihood of outcomes for the economy, asset prices, or other factors, nor should they be interpreted as the Bank of Japan's outlook.

The subjects of the stress test are 115 banks and 256 *shinkin* banks (accounting for approximately 80 to 90 percent of total credit outstanding), and the duration of stress is assumed to be 2.5 years, from October-December 2016 through January-March 2019.²⁸ The simulation utilizes the Financial Macro-econometric Model (FMM) developed by the Financial System and Bank Examination Department of the Bank.²⁹

In the following sections, we discuss the procedure and results of the stress testing exercise.³⁰

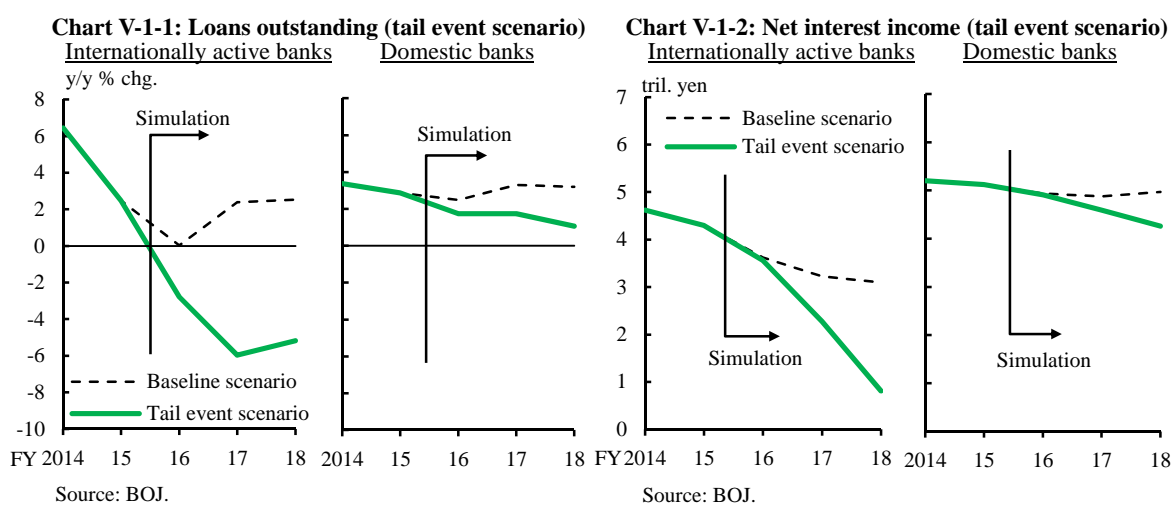
²⁸ The classification of banks into internationally active and domestic banks in macro stress testing is as at the end of March 2016.

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.

³⁰ For more details on the stress test, see "Macro Stress Testing in the *Financial System Report* (October 2016)," *Financial System Report Annex Series* (forthcoming).

1. Baseline scenario

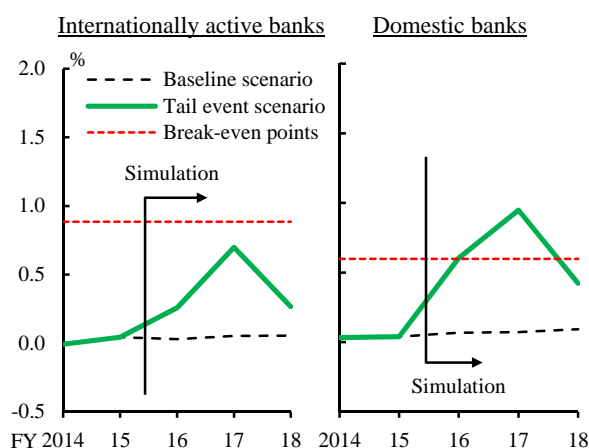
The baseline scenario is designed to serve as a benchmark for the assessment of the simulation results under the two stress scenarios. Based on baseline forecasts by the market and various organizations, the scenario assumes that "the growth rate of overseas economies increases moderately, as the steady growth in advanced economies spreads to emerging and developing economies, resulting in a moderate recovery for Japan's economy." In addition, JGB yields evolve, more or less in line with the yield curve after the introduction of the Bank's QQE with Yield Curve Control (as at late September 2016).



The baseline simulation results are as follows. The year-on-year growth rate of loans outstanding among financial institutions remains in positive territory, but net interest income continues to be depressed, especially for internationally active banks, amid a prolonged low interest rate environment (Charts V-1-1 and V-1-2). Credit costs remain at low levels, against the backdrop of the favorable financial conditions of firms (Chart V-1-3). As a result, capital adequacy ratios at both internationally active banks and domestic banks remain well above regulatory requirements at the end of fiscal 2018 (Chart V-1-4).³¹

³¹ The moderate decline in core capital ratios of domestic banks is due to the gradual phasing out of the effects of transitory arrangements for the calculation of their capital adequacy ratios adopted during the transition to new regulatory requirements (see Note 26).

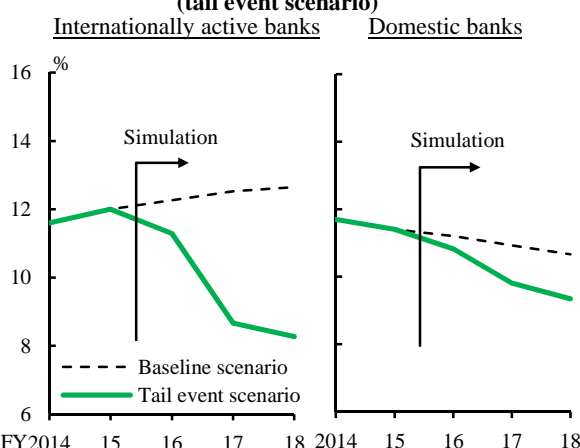
Chart V-1-3: Credit cost ratio (tail event scenario)¹



Note: 1. Break-even points as at fiscal 2015. Averages for each type of bank.

Source: BOJ.

Chart V-1-4: CET1 capital ratio and core capital ratio (tail event scenario)¹



Note: 1. The left-hand chart shows the CET1 capital ratio of internationally active banks. The right-hand chart shows the core capital ratio of domestic banks. These take the phase-in arrangements into consideration.

Source: BOJ.

2. Tail event scenario

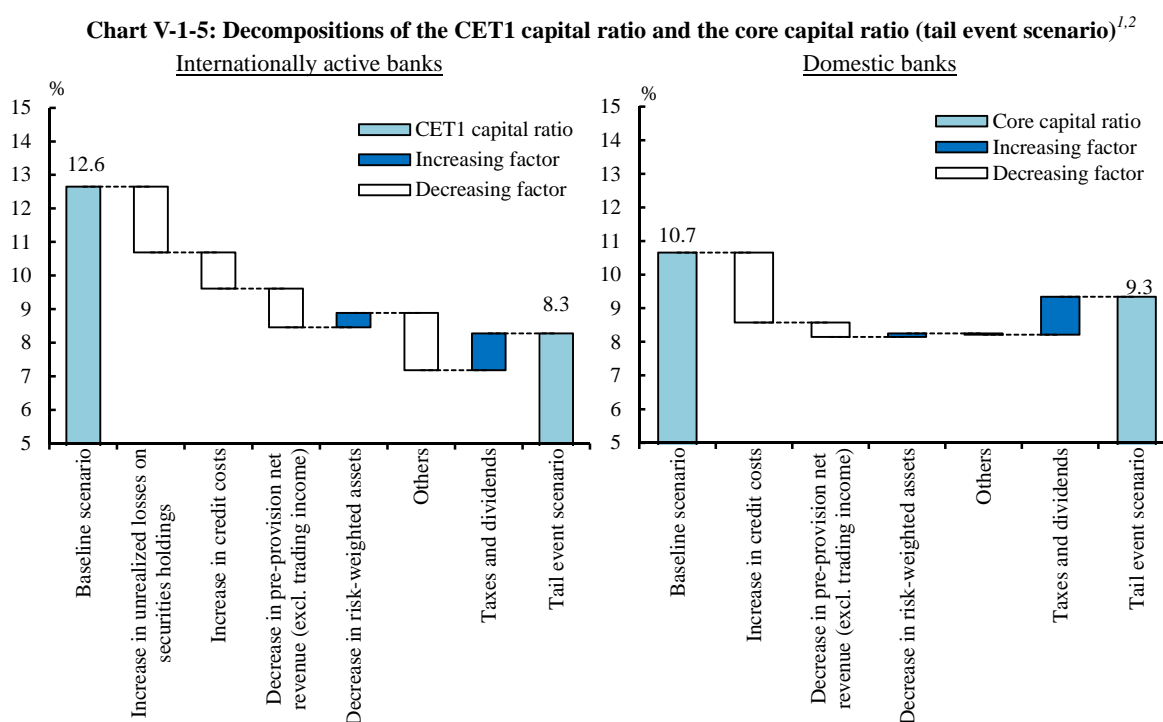
The tail event scenario envisages a situation whereby "Japan's output gap deteriorates to a level comparable to that seen during the Lehman shock." Because a significant economic slowdown occurs abroad, financial markets are buffeted by a substantial decline in stock prices (TOPIX), an appreciation of the yen against the U.S. dollar, and a decline in JGB yields.

The simulation results based on this scenario are as follows. In the corporate sector, financial conditions deteriorate due to a significant downturn in economic conditions both at home and abroad. As a result, credit cost ratios at internationally active banks increase to levels just below their break-even points, while credit cost ratios at domestic banks rise to levels well above their break-even points (Chart V-1-3). In addition, banks incur unrealized losses on securities holdings in response to declines in stock prices at home and abroad.

The year-on-year growth rate of overseas loans outstanding turns deeply negative, while the growth rate of domestic loans outstanding falls to close to 0 percent partly because the sharp decline in the profitability of such loans forces financial institutions to adopt a tighter lending stance (Chart V-1-1). While net interest income decreases substantially at internationally active banks, mainly due to the significant decline in overseas loans, the decline of net interest income experienced by domestic banks -- with a smaller share of overseas loans as a proportion of their total loans -- remains moderate (Chart V-1-2).

At internationally active banks, the capital adequacy ratio falls by 4.3 percentage points

compared to the baseline scenario, due to a decrease in pre-provision net revenue (excluding trading income) and an increase in unrealized losses on securities holdings. However, on average, the capital adequacy ratio still remains above regulatory requirements (Charts V-1-4 and V-1-5).³² Capital adequacy ratios for domestic banks decline by 1.4 percentage points, mainly due to an increase in credit costs, but remain well above regulatory requirements on average.



Notes: 1. "Increase in unrealized losses on securities holdings" takes tax effects into account. Data for end-March 2019.

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.

Source: BOJ.

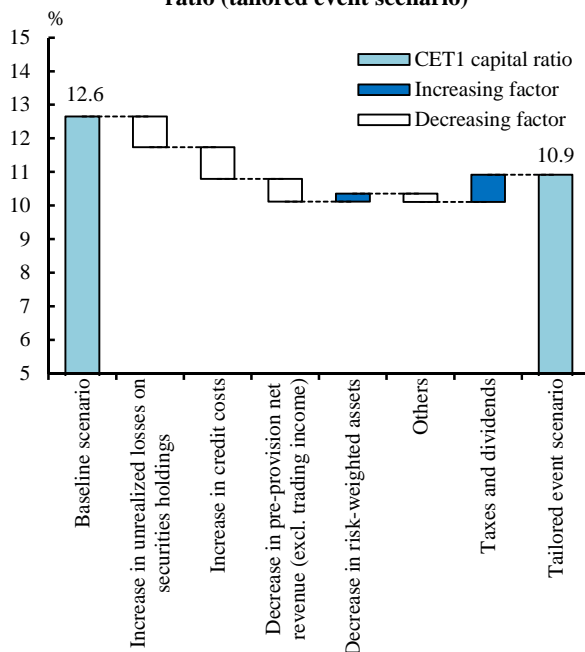
3. Tailored event scenario

The tailored event scenario in this *Report* is characterized not only by a widening of foreign currency funding premiums, but also constraints on the availability of foreign currency funding, as stresses in foreign currency funding markets occur. The formulation of this scenario is based on recognition of the importance of securing stable foreign currency funding, as Japanese banks have increased their overseas lending and market investment.

³² Within this model, based on the Basel III requirements, unrealized gains and losses on securities holdings are considered instruments and reserves of CET1 capital. Reflecting the phase-in arrangements accompanying the shift from the Basel II requirements, under which the share of such unrealized gains and losses in the adequate capital increases gradually, 100 percent allowance is scheduled for the end of fiscal 2017 onward. The decline in the CET1 capital ratio through fiscal 2017 can partly be attributed to this increase in the share of unrealized losses.

Specifically, term premiums for U.S. interest rates, which have remained muted until now, are assumed to widen by 200 basis points, due to rising uncertainty in global financial markets, among other factors. At the same time, conditions in foreign currency funding markets deteriorate, and foreign currency funding premiums widen by 50 basis points. Moreover, the availability of foreign currency market funding is also constrained, which triggers forced disposals on foreign currency-denominated loans in response to the shortage in foreign currency funding, resulting in capital losses. Upon a rise in long-term U.S. interest rates, the following developments affect Japan's economy through various trade and financial channels: (1) a temporary slowdown in overseas economies, reflecting the rise in interest rates; and (2) a repatriation of funds to advanced economies, including the United States, and the resultant adverse effects on emerging and other economies.

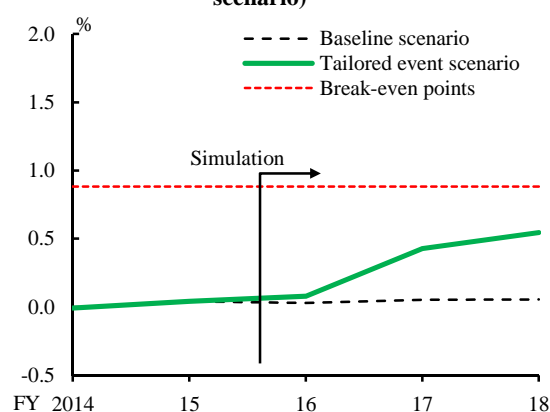
Chart V-1-6: Decomposition of the CET1 capital ratio (tailored event scenario)^{1,2}



Notes: 1. Includes internationally active banks. "Increase in unrealized losses on securities holdings" takes tax effects into account. Data for end-March 2019.
2. The CET1 capital ratio takes the phase-in arrangements into consideration.

Source: BOJ.

Chart V-1-7: Credit cost ratio (tailored event scenario)¹



Note: 1. Includes internationally active banks. Break-even points as at fiscal 2015. Average for internationally active banks.
Source: BOJ.

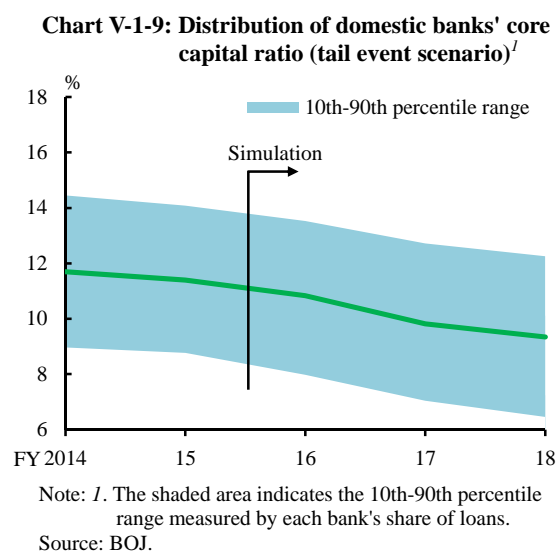
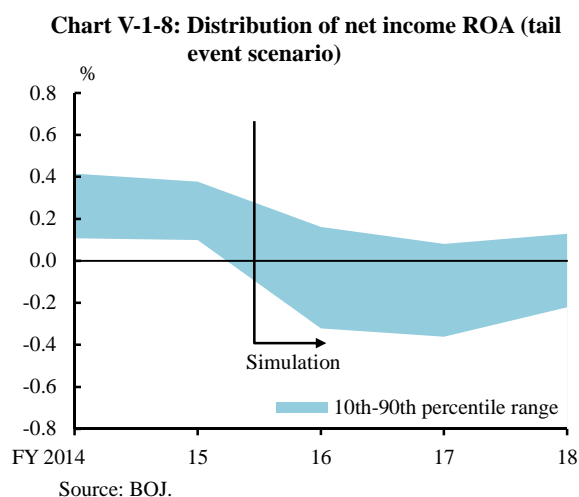
The stress test focuses on internationally active banks, for which foreign currency-denominated assets and liabilities account for a relatively large share of their balance sheet. The simulation results based on this scenario are presented below (Chart V-1-6). The rise in U.S. interest rates and decline in stock prices result in unrealized losses on securities holdings. Credit costs increase, due partly to the disposal of loans, while pre-provision net revenue (excluding trading income) contracts, due in part to the decrease in lending (Chart V-1-7). Mainly owing to these factors, the capital adequacy ratio (CET1 capital ratio) declines by around 1.7 percentage points, compared to the

baseline scenario. However, the capital adequacy ratio is maintained above regulatory requirements.

4. Issues in interpreting the results of macro stress testing

The above results suggest that at present, Japan's financial system has generally strong resilience against stresses. However, the following two points should be noted in interpreting the test results.

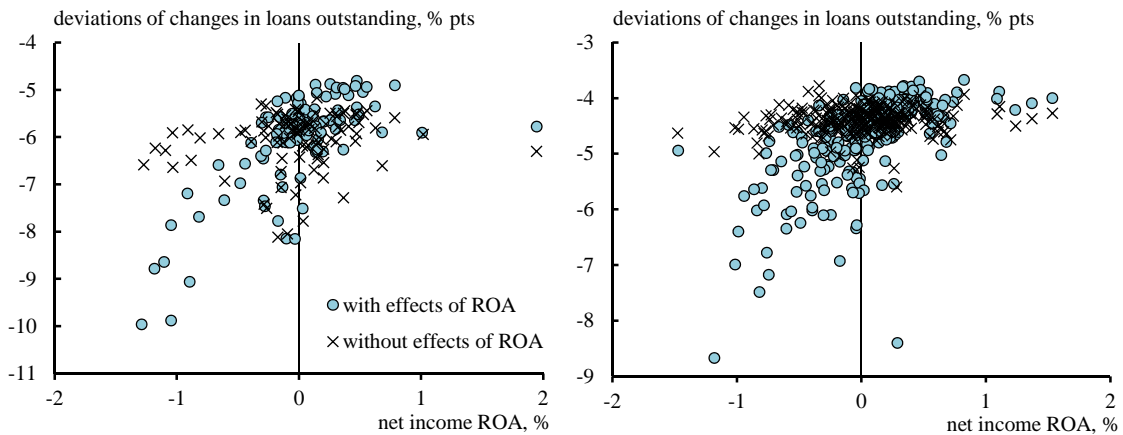
First, **even if financial institutions' capital adequacy ratios are above regulatory requirements, amid the occurrence of stresses, financial institutions' stance toward risk taking could retreat, for instance when net losses in their financial statements or unrealized losses on securities holdings are incurred. This could in turn adversely impact the financial intermediation function.** The simulation results for the tail event scenario show that more than 70 percent of the banks tested could temporarily record net losses (Chart V-1-8). Moreover, there is significant heterogeneity with regard to the capital adequacy ratios of domestic banks (Chart V-1-9). Financial institutions that record net losses or those whose capital adequacy ratios are comparatively low have been found to exhibit a tendency to tighten their lending stance to a greater extent than that predicted by the deterioration of their profitability and the impairment of their adequate capital (Chart V-1-10).



Second, **should the behavior of financial institutions lead to the materialization of negative externalities, the negative impact on the financial system could be amplified.** While the disposal of loans is assumed to incur a discount of 10 percent in the tailored event scenario, the impact on capital adequacy ratios depends largely on the discount on disposal. Although a discount of 10 percent may be a conservative estimate

for individual financial institutions' stress scenarios, if many financial institutions attempt to dispose of their assets simultaneously, the discount on disposal could be even larger. For instance, in the case where foreign currency funding markets come under stress, foreign currency funding constraints could be observed not only among Japanese financial institutions but also among financial institutions in other countries at the same time, which could result in a situation where disposals of foreign currency-denominated assets gather pace. The negative externalities stemming from such fire-sales could in turn cause the discount on disposal to deepen. As more loans then need to be disposed of to secure the same amount of foreign currency funds, the impact of the deeper discount in the disposal of loans on capital adequacy could become larger in a non-linear fashion (Chart V-1-11).

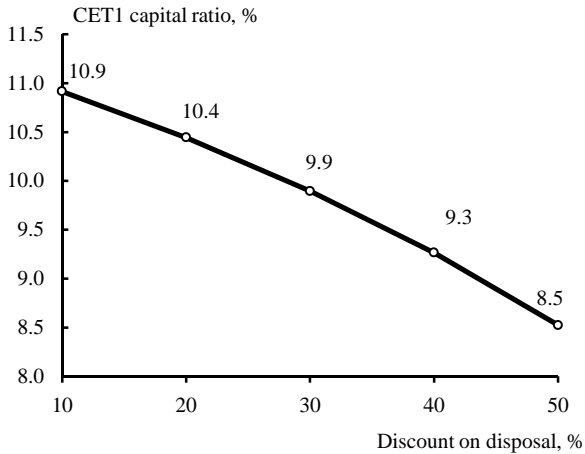
Chart V-1-10: Distribution of profitability and loans outstanding (tail event scenario)¹
Domestic banks (banks) Domestic banks (shinkin banks)



Note: 1. The vertical axis shows how the cumulative changes in loans outstanding to domestic firms from end-March 2016 to end-March 2019 deviate from the baseline scenario. Net income ROA = (cumulative net income from fiscal 2015 to fiscal 2017) / (total assets in fiscal 2017). "with effects of ROA" refers to the case where the Financial Macro-econometric Model incorporates non-linear effects of the level of financial institutions' net income ROA on their lending stance.

Source: BOJ.

Chart V-1-11: Discount on disposal and CET1 capital ratio (tailored event scenario)¹



Note: 1. Includes internationally active banks. Data for end-March 2019. The CET1 capital ratios take the phase-in arrangements into consideration.

Source: BOJ.

VI. Conclusion

Japan's financial system has been maintaining stability on the whole. In order to ensure stability in the future, it is essential to steadily respond to the accumulation of macro risks and structural changes in the financial system that could become a source of potential vulnerability. In view of the above, three challenges are detailed below.

From the viewpoint of the accumulation of macro risks, the challenge is to (1) strengthen the ability to respond to risks in areas where Japanese financial institutions are proactively stepping up their risk taking, such as overseas business and market investment.

Currently, the aggregate risks that financial institutions are undertaking remain contained relative to their capital bases. Japanese financial institutions have continued to increase their amount of overseas loans at a relatively fast pace and have ramped up their risk-taking activities through securities investment in risky assets such as foreign bonds and investment trusts, amid downward pressure exerted on profits deriving from domestic deposit-taking and lending activities (see Box 2). In addition, given the decline in the growth potential of Japan's economy as well as its low interest rate environment that has prevailed following the introduction of the negative interest rate policy, such risk-taking behavior on the part of financial institutions is expected to continue for the time being.

Meanwhile, the nonperforming loan ratio of overseas loans has begun to rise, partly reflecting low commodity prices, while volatile movements in global financial markets have been seen partly due to the referendum on the U.K.'s exit from the EU. As the exposure of Japanese financial institutions to overseas economies and global financial markets has risen, efforts to enhance the risk management framework in these areas are necessary. In view of the increasing trend in foreign currency funding costs, bolstering the stable foreign currency funding base also becomes a prioritized challenge.

The challenges from the perspective of structural changes in the financial system are to respond to (2) the increasing systemic importance of large financial institutions and (3) the decline in profitability associated with domestic deposit-taking and lending activities.

As part of their medium- to long-term strategy, large financial institutions have promoted integrated business strategies by group companies, namely, those related to the provision of a wide range of financial services, including active international business expansion

such as overseas merger and acquisition activities. These institutions have therefore grown in size as their risk exposures as well as sources of return have become more diversified and complex, and they have been increasing their influence on macro financial stability and economic activity. From the perspective of safeguarding financial system stability, further action by large financial institutions has been more strongly called for. This includes efforts to strengthen business management frameworks, including the development and utilization of management information systems to deal with increasingly complex risks, to establish a solid financial base sufficiently resilient against the accumulation of risks, and to make preparations to respond in an orderly manner in times of stress.

Meanwhile, the profitability of domestic deposit-taking and lending activities has been on a declining trend, against the backdrop of factors such as the domestic economy's falling growth potential and the continuation of the low interest rate environment following the introduction of the negative interest rate policy. Particularly for regional finance, with the structural changes to the business environment, such as the shrinking regional population and customer base, it seems to be more difficult to address the low profitability problem with cyclical recovery alone (see Box 4). If the declining trend in profitability persists, financial institutions' loss-absorbing capacity in terms of both profits and capital buffers may weaken, which could encumber their positive risk-taking and financial intermediation activities (see Box 5). Based on these considerations, the challenge for regional financial institutions, which are particularly highly dependent on domestic deposit-taking and lending activities as a source of profits, would be to seek to stabilize and improve their profitability by, for instance, diversifying their profit sources and strengthening their support for the regional economy and local firms by enhancing financial intermediation capabilities, and to improve their management efficiency by reviewing their cost structures (see Box 6).

In addition, the longer-term stability and functioning of the financial system are likely to be influenced by the sustainability of the diversification of asset portfolios in the household sector, the proliferation of IT utilization in financial businesses, including FinTech, as well as cyber security protection.

The Bank of Japan will continue to deal with these challenges toward ensuring financial system stability, through its off-site monitoring and on-site examinations, among other efforts.³³ Recent efforts by the Bank are detailed below.

³³ The previous *Report* -- issued in the beginning of fiscal 2016 -- highlighted the following areas as those that the Bank aimed to deepen its understanding of, and in which to exchange views with financial institutions, through its off-site monitoring and on-site examinations: (1) financial

As for financial institutions' overseas activities, the Bank is improving its surveillance of developments in loan extension in areas of focus for financial institutions, such as merger & acquisition and resource development-related loans, and loans to non-Japanese firms. At the same time, the Bank also exchanges views with financial institutions on conducting multi-faceted analyses, such as on how overseas economic developments and commodity prices affect the quality of their credit portfolios. Regarding foreign currency funding, the Bank has enhanced its surveillance of financial institutions' foreign currency liquidity risks, taking into account their international business strategies and increasingly stringent international financial regulations. While doing so, the Bank has encouraged institutions to improve their risk management practices by, for example, preparing robust contingency measures that can be deployed in times of stress. In addition, it has been proceeding with efforts to develop the framework for foreign currency liquidity provision in an emergency situation, such as foreign currency swap arrangements established with overseas central banks.³⁴ As for market investment risks, given that financial institutions are undertaking diverse risks in the low interest rate environment, the Bank is seeking to gain a deeper understanding of financial institutions' risk management frameworks and their planned responses in the event of the occurrence of market fluctuations, among other areas. It has also been holding discussions on conducting more robust risk management in line with the risk preferences of each financial institution.

As for the systemic importance of major banks, the Bank of Japan has encouraged them to enhance their understanding of the complex and global risks they are undertaking, including through the maintenance of a management information system, to implement more effective stress tests as one way of analyzing such risks, and to strengthen their ability to respond to the occurrence of crises. The Bank has also been analyzing the profitability of individual regional financial institutions, taking into account the impact of demographic factors, and has deepened and continued its dialogue with the relevant institutions on these medium- to long-term issues.

institutions' international operations; (2) financial institutions' ALM and investment in markets; (3) systemic risk characteristics of large financial institutions; (4) regional financial institutions' profitability; (5) loans to the real estate, medical, and nursing care sectors, which have been experiencing relatively high growth; (6) business operations related to the shift "from saving to investment"; (7) utilization of IT, particularly by financial institutions; (8) market-related businesses conducted by financial institutions and securities firms; and (9) the roles of foreign financial institutions' Japanese branches within their group. This policy remains unchanged for the second half of fiscal 2016.

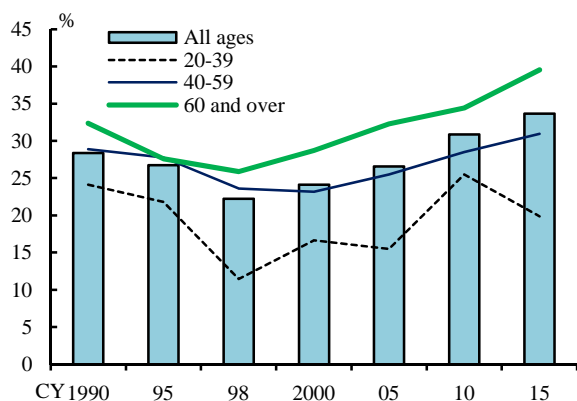
³⁴ The Bank stands ready to extend loans in U.S. dollars in case of an emergency, by utilizing its foreign currency-denominated assets. In March 2016, it signed a bilateral local currency swap agreement with the Reserve Bank of Australia, establishing provisions that allow for the extension of loans in Australian dollars in an emergency situation. These provisions have been established to contribute to financial system stability, by serving as a liquidity backstop in case of a critical situation.

Box 1: Changes in households' investment activities

Households' holdings of risky assets have remained on a moderate increasing trend. Results of the *Opinion Survey on Households' Financial Activities* show that the percentage of households (with at least two persons) holding risky assets (comprising stocks, investment trusts, and bonds) has increased from year to year (Chart B1-1). By age group, the share of such households has further increased not only in the 60-and-over age group, traditionally the main investors, but also in the 40-59 age group, comprising households in the asset formation phase, indicating that the base of investors has steadily expanded.

One of the reasons for the expansion of the investor base is that households are now using different criteria than before to select assets. In the past, Japanese households, having experienced financial system instability in the 1990s, had placed greater importance on the safety of financial products. Since then, as the uncertainty over the financial system receded and as the low interest rate environment persisted, the share of households giving precedence to the profitability of financial products has gradually increased (Chart B1-2). Compared to other households, households who emphasize profitability typically practice more proactive asset management, especially through their strong preference for stocks and investment trusts (Chart B1-3). Furthermore, once households invest in risky assets, they seldom withdraw from such investments, even if market prices fall and leave them with unrealized losses. Thus, the share of households holding risky assets has been increasing almost consistently since the 2000s (Chart B1-1).

Chart B1-1: Proportions of households holding risky assets^{1,2}

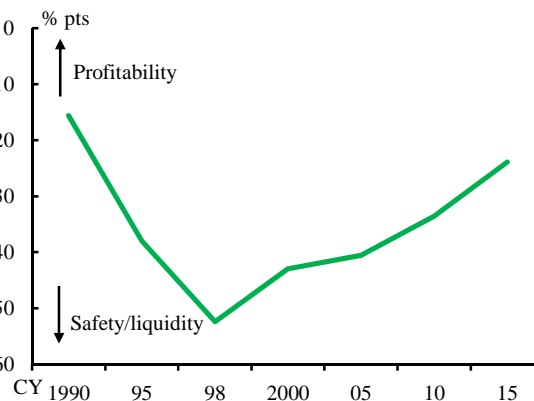


Notes: 1. For households holding savings-type financial assets (excluding assets for settlement).

2. Figure for 1998 is immediately following the default of Sanyo Securities (November 1997).

Source: Central Council for Financial Services Information.

Chart B1-2: DI of selection criteria for financial assets^{1,2,3}



Notes: 1. Respondents are households holding risky assets.

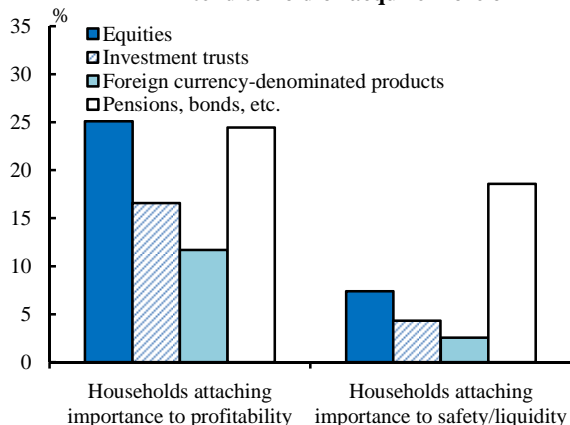
2. DI of selection criteria = percentage of households attaching importance to "profitability" - percentage of households attaching importance to "safety" or "liquidity".

3. Figure for 1998 is immediately following the default of Sanyo Securities (November 1997).

Source: Central Council for Financial Services Information.

More recently, there are signs that households' investment behavior has been changing. As an example, in the past an increase in investment returns tended to result in a higher cancellation rate for publicly-placed stock investment trusts (Chart B1-4). This relationship is thought to reflect households' tendency to lock in the capital gain on their investment trust holdings and reallocate the proceeds to investment trusts with greater dividend yields in the event of a rise in stock prices. Recently, however, the cancellation rate has been on a declining trend from its latest peak in 2013, and the link with investment returns has weakened. One of the reasons for the weaker link between the returns on investment trusts and their cancellation rate is thought to be the gradually increasing popularity of dollar-cost averaging investments, in which a fixed amount is invested monthly, in situation where more emphasis is being placed on long-term total returns. Household fund flows predicated on dollar-cost averaging investments can partly offset fund flows that may amplify stock market fluctuations. Thus, they could have a stabilizing influence on market movements when the market is headed down.

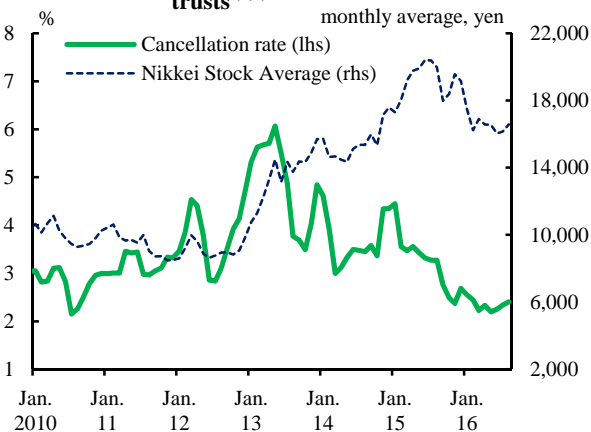
Chart B1-3: Financial products that households intend to hold or acquire more of^{1,2}



Notes: 1. Data show the proportion of households that intend to hold or acquire more of each product within 1-2 years. Multiple choices are allowed.
2. Data are averages for 2010-15.

Source: Central Council for Financial Services Information.

Chart B1-4: Cancellation rate of investment trusts^{1,2,3,4}



Notes: 1. Publicly-offered stock investment trusts excluding ETFs.
2. Cancellation rate = cancellations during current month/average total assets at the end of previous and current month.
3. Cancellation rate is calculated using 3-month backward moving average. Nikkei Stock Average is monthly average data.
4. Latest data as at August 2016.

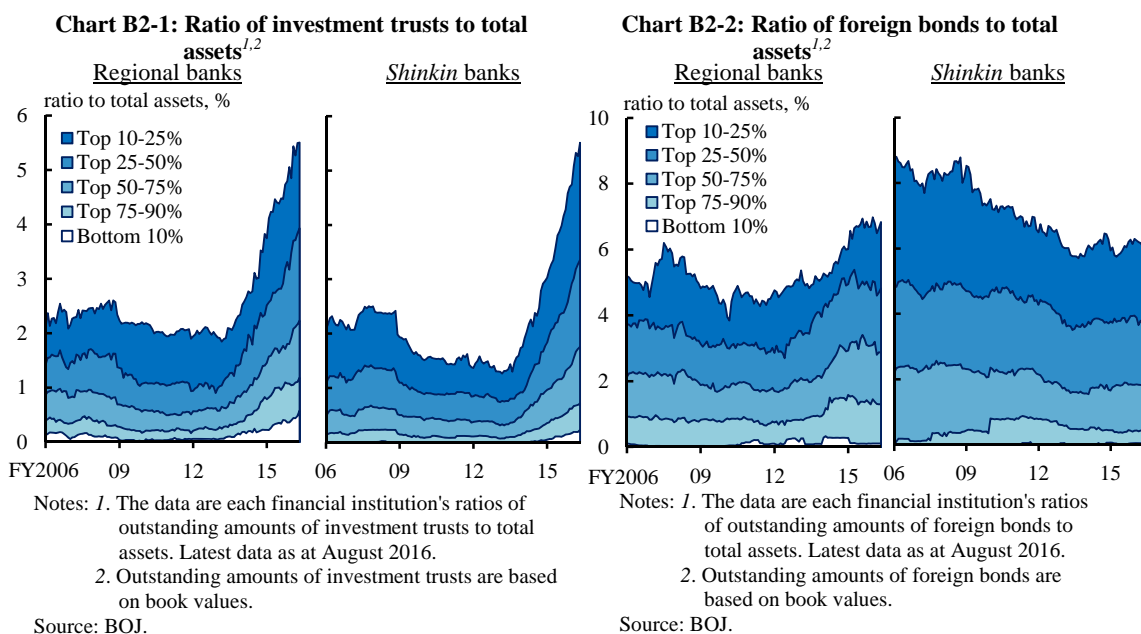
Sources: Bloomberg; The Investment Trusts Association, Japan.

Changes in the investment environment, such as securities companies' sales strategies and developments of various institutional frameworks, also encourage households to make long-term investments. Sales strategies have changed from encouraging investors to frequently switch from one trust to another to encouraging them to build up existing portfolios of investment trusts and/or use discretionary investment services. Instead of earning sales commissions based on transaction volumes, securities companies have put

more emphasis on trust fees, which are based on the size of clients' assets in custody. In terms of the legal framework, the Nippon Individual Savings Account (NISA), introduced in 2014, is spurring investments due to tax incentives for investments involving small contributions.

Box 2: Securities investment by regional financial institutions

Due to a declining trend in lending margins, which constitute the core profits of regional financial institutions, they are taking a more proactive stance toward investment in risky assets, such as investment trusts and foreign bonds (Charts B2-1 and B2-2).



This development is interpreted as a rebalancing of the portfolios of regional financial institutions in response to the decline in profit margins on loans. The extent of rebalancing could vary from bank to bank, depending on their core profitability and financial strength. To verify this, the following panel estimation (including fixed effects) was carried out.

$$\Delta(\text{Risky asset-to-total assets ratio}_{i,t}) = \lambda \cdot \Delta(\text{Lending margin}_{i,t}) + \text{Constant}$$

Here, i denotes each financial institution (i.e., regional bank, *shinkin* bank), t denotes each fiscal year, and Δ denotes the first difference (the extent of change). The dependent variable is the investment trust outstanding-to-total asset ratio, which shows a clear uptrend, while the independent variable is the lending margin of each financial institution.³⁵ The parameter λ denotes the extent to which each financial institution increases or decreases risky assets (investment trusts) in response to a change in the lending margin, and varies with the financial strength and core profitability of each financial institution.³⁶

³⁵ The lending margin is represented by the 3-year backward moving average, based on the assumption that securities investment decisions are taken based on an assessment of the medium-term profit environment.

³⁶ Specifically, it is represented by the following equation:

The estimation results are summarized in the following three points (Chart B2-3):

- ✓ When lending margins contract, a financial institution whose capital adequacy ratio is high, i.e., has sufficient financial strength, tends to increase risky asset holdings -- the parameter λ is negative and statistically significant.
- ✓ In particular, a financial institution whose core profitability is poor due to the subdued state of its main business, such as deposit-taking and lending activity, tends to increase its risky assets to a greater extent in order to compensate for its lackluster profits -- the parameter λ is deeply negative.
- ✓ Conversely, a financial institution with poor financial strength is less likely to increase its risky assets even when lending margins contract.

Chart B2-3: Estimation results (estimated values of λ)^{1,2}
Regional banks Shinkin banks

		Core profitability				Core profitability	
		Low	High			Low	High
Financial strength	High	-4.90 ***	-2.73 ***	Financial strength	High	-3.07 ***	-0.78 **
	Low	-1.59	0.58		Low	-0.90	1.39 *

Notes: 1. The estimation period is from fiscal 2006 to fiscal 2015. Estimation with fixed effects.
 2. ***, **, and * indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.
 Source: BOJ.

In recent years, the core profitability of regional financial institutions has been on a declining trend. The share of banks where the sum of profits from deposit-loan activities and income from fees and commissions -- the core components of pre-provision net revenue (excluding trading income) -- fails to cover expenses has increased from year to year. At present, nearly 50 percent of regional banks and nearly 80 percent of *shinkin* banks fall into this category (Chart IV-5-3). In terms of their financial strength, however, as many regional financial institutions have sufficient financial buffers at present (i.e., their capital adequacy ratio is high), there is a high possibility that they will maintain a proactive stance on investment in risky assets to compensate for their declining core profitability. On the other hand, from a longer-term perspective, the analysis in this box suggests that if the decline in core profitability persists and the financial strength of banks continues to be eroded, the number of financial institutions that cannot increase their investments in risky assets could rise.

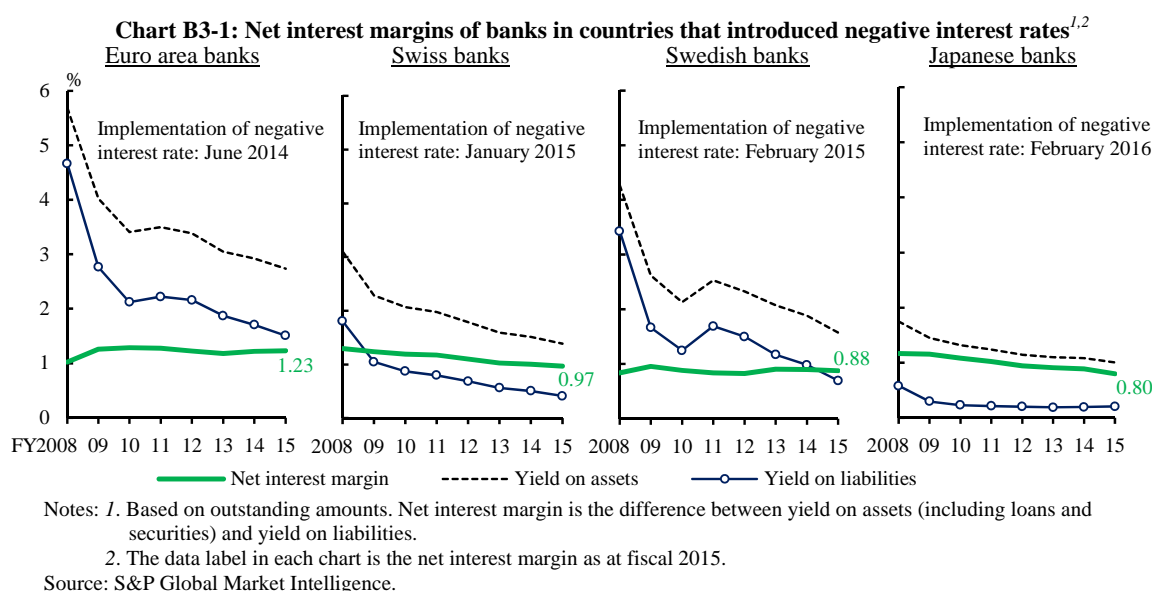
$$\lambda = \alpha + \beta(\text{Financial strength}_{i,t}) + \gamma(\text{Core profitability}_{i,t})$$

Here, the dummy variable for financial strength takes the value of 0 when the capital adequacy ratio is less than 8 percent, and 1 when it is 8 percent or above. The dummy variable for profitability takes the value of 0 when net operating profits (excluding securities-related items) is negative, and 1 when positive.

Box 3: The profit structure of banks in countries adopting negative interest rate policies

In this box, we assess the effects of a negative interest rate on bank profits. To do so, we compare the profit structures of banks in the European countries that have adopted negative interest rate policies ahead of Japan (the euro area, Switzerland, and Sweden) with those of Japanese banks.

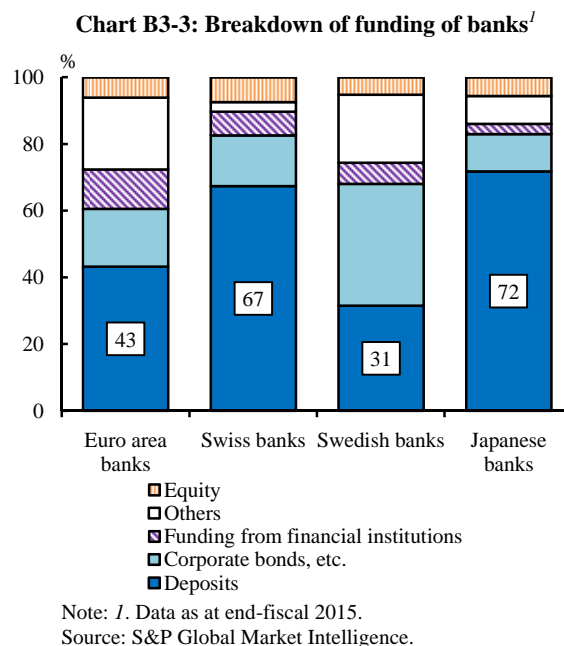
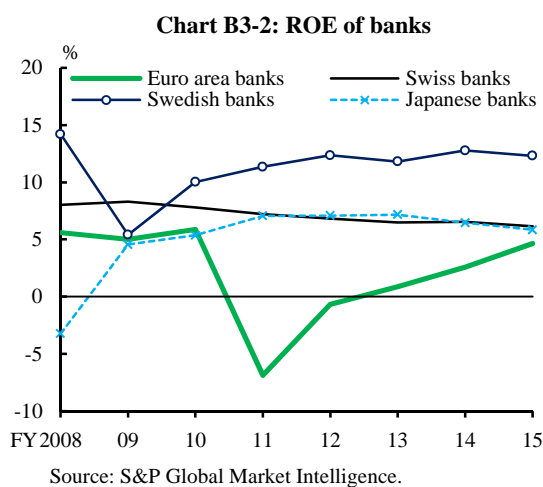
After the introduction of negative interest rate policies in Europe, the net interest margin (here, "yield on assets including loans and securities – yield on liabilities") of European banks has been more or less unchanged. That is, yields on assets have declined, but so have yields on liabilities (Chart B3-1).³⁷ As a result, the return on equity (ROE) did not decrease significantly, at least through fiscal 2015, partly due to the monetary easing-induced decrease in credit costs (Chart B3-2).



European banks were able to avoid a compression of profit margins due in part to the following: (1) deposit interest rates were high when negative interest rates were introduced, so there was room to cut them; and (2) the share of deposits thought to be incompatible with the application of a negative interest rate as a proportion of total liabilities was small (i.e., the share of market-based funding, which is less constrained by the zero lower bound, was large) at European banks (excluding Swiss banks) (Chart B3-3). Recently, a shift to reduce deposit interest rates *de facto* by charging account

³⁷ Charts B3-1, B3-2, and B3-3 include banks headquartered in the country or region mentioned. Figures are reported on a consolidated basis. Japanese banks comprise 84 banks, mainly major banks or regional banks. Euro-area banks comprise 108 banks excluding Deutsche Bank; Swiss banks comprise 25 banks excluding Credit Suisse and UBS; and Swedish banks comprise 5 banks.

maintenance fees, etc. has also been observed.



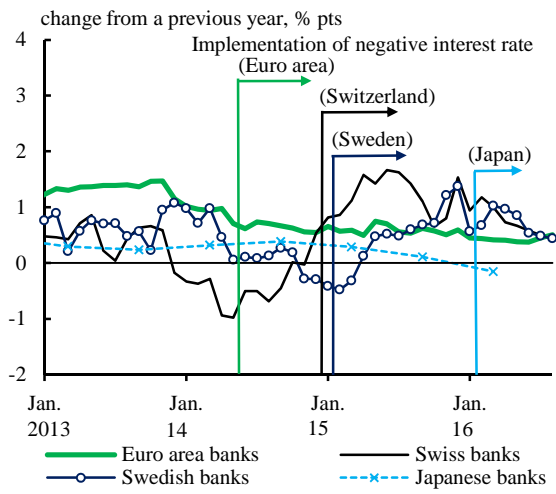
In contrast, low or zero interest rates had persisted for a longer time in Japan than in Europe. Japanese banks' deposit rates were already low when the negative interest rate policy was introduced. Furthermore, the share of deposits in total funding was high. As a result, the effect of negative interest rates on Japanese banks' profit margins tended to be larger compared to European banks. However, if low or negative interest rates similarly persist for a long time at European banks, this would gradually remove room for cutting deposit rates, which is likely to intensify downward pressure on profit margins.

Another difference between European and Japanese banks is that banks in Switzerland and Sweden have seen a rising share of housing loans as a proportion of total loans, following the introduction of negative interest rate policies. The rising share of housing loans, which generate relatively high yields, has helped keep profit margins from contracting (Chart B3-4). It is likely that the marked rise in real estate prices resulting from monetary easing has contributed to the increase in housing loans. In contrast, Japanese banks have been offering housing loan interest rates more favorable to the borrower. As such, after credit costs are taken into account, the profitability of housing loans has gradually been declining.

In addition, the different competitive landscapes facing financial institutions could also have a large effect on bank profit margins. For example, Sweden, which has a banking sector with a significant degree of market concentration (degree of oligopoly in the market), has kept profit margins from contracting due to a decline in lending rates (Chart B3-5). In contrast, market concentration is lower in Japan, and thus a reduction in lending

rates through competition among financial institutions may be more likely.

Chart B3-4: Housing loan to total loan ratio^{1,2}

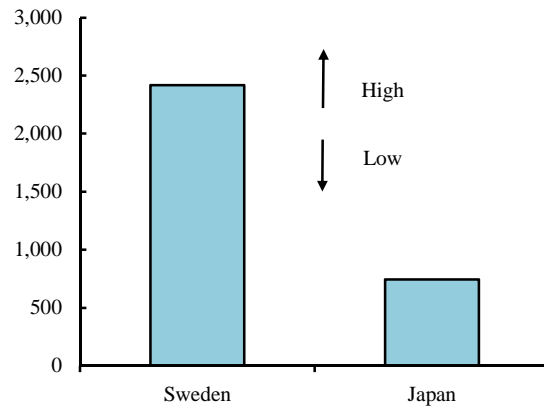


Notes: 1. Latest data for Japan as at March 2016. Data for Switzerland as at July 2016, and data for other countries as at August 2016.

2. Includes domestic loans by banks in the region or the country. Loans to financial institutions are excluded.

Sources: ECB; SNB; Statistics Sweden; BOJ.

Chart B3-5: Loan market concentration^{1,2}



Notes: 1. Data as at end-fiscal 2015.

2. Herfindahl index is estimated based on the loan share of financial institutions etc. in Sweden and Japan (including loans to outside the country). Includes 18 financial entities in Sweden and 130 financial entities in Japan.

Source: S&P Global Market Intelligence.

Box 4: Background of shrinking deposit and lending margins at regional financial institutions

In the past 10 years, deposit and lending margins at regional financial institutions have declined by approximately 0.6 percentage point on the whole. However, the degree of decline has varied widely from one institution to another (Chart B4-1). This is against the background that the profit margins of financial institutions are largely affected by regional characteristics, such as demographics.

This box quantitatively assesses factors behind the decline in profit margins by presenting the results of a panel estimation covering *shinkin* banks -- results for regional banks are broadly similar. The independent variables for the estimation of deposit and lending margins are as follows:

(1) **Market interest rate** (10-year JGB yields)

As it is difficult to set deposit rates below 0 percent, deposit spreads, a constituent of deposit and lending margins (i.e., market interest rate minus deposit interest rate), narrow alongside lower market interest rates.

(2) **Regional economic conditions** (value of shipments of manufactured goods by prefecture, etc.)

As demand for funds rises in tandem with economic recovery, loans to borrowers with lower credit ratings would also increase, thus widening deposit and lending margins.

(3) **Population growth rate in financial institutions' operating areas** (population growth rate in municipalities in which their headquarters and branches are located)

Sales of micro, small, and medium-sized firms with narrow sales channels (especially those in nonmanufacturing) depend on the area's population (i.e., population density). Hence, firms' demand for loans declines when the population shrinks, which puts downward pressure on loan interest rates.

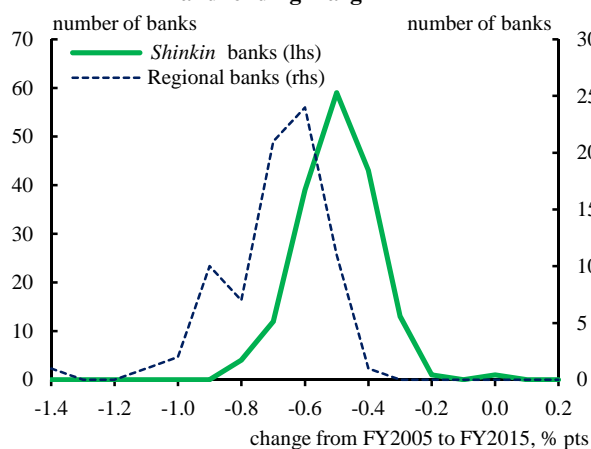
(4) **Financial institutions' loan-to-deposit ratio**

When deposits outpace loans, financial institutions try to invest the surplus funds by lowering loan interest rates further in an effort to stimulate loans, which tends to depress profit margins. For example, in areas where the aged form a large segment, deposits tend to be high, while demand for housing loans is low, leading to a low loan-to-deposit ratio.³⁸

³⁸ Financial institutions' loan-to-deposit ratio depends on the share of postal savings, in addition to the extent of population aging in the region, among other factors. As the correlation between the growth rate of the regional population and the loan-to-deposit ratio is not necessarily high, multicollinearity is avoided. In order to alleviate the endogeneity between the loan-to-deposit ratio and the deposit and

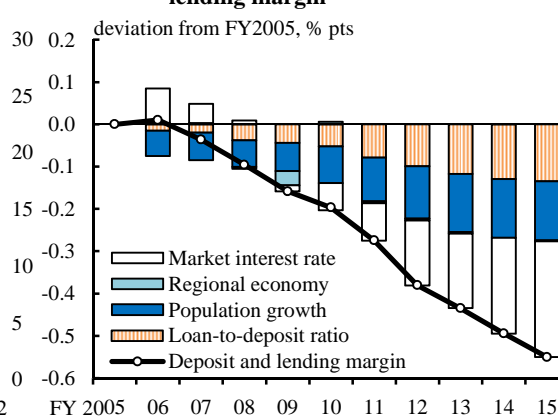
The panel estimation finds that these four variables are statistically significant and have the correct sign.³⁹ When changes in deposit and lending margins over the past 10 years are decomposed into its contributory factors, it can be confirmed that the fall in the population growth rate and in the loan-to-deposit ratio, in addition to the decline in interest rates, have played a key role (Chart B4-2). The total contribution from population decline and the decline in the loan-to-deposit ratio alongside an aging population was similar in degree to that from the decline in interest rates. On the other hand, regional economic factors have not exerted a large effect on margins, except during the Lehman shock.

Chart B4-1: Histogram of changes in deposit and lending margin¹



Note: 1. The banks which are involved in merger from fiscal 2000 onward are excluded from the sample.
Source: BOJ.

Chart B4-2: Factor decomposition of deposit and lending margin^{1,2}



Notes: 1. Estimation period is from fiscal 2001 to fiscal 2015.
2. Deposit and lending margin is the average in *shinkin* banks and the fitted value of the model.
Source: BOJ.

Next, we forecast developments in deposit and lending margins over the next 10 years under two scenarios, with the parameters estimated earlier (Chart B4-3).⁴⁰ The first scenario is the "recovery scenario." In this scenario, Japanese regional economies recover at a pace similar to that during the so-called *Izanami* economy, which lasted from 2002 through early 2008. The market interest rate is assumed to rise to 2 percent by 2022. The second scenario is the "sluggish growth scenario," under which regional economies grow slowly at the average pace that prevailed over the past 15 years, which includes the effects of the Lehman shock. In this case the market interest rate rises to only 1 percent

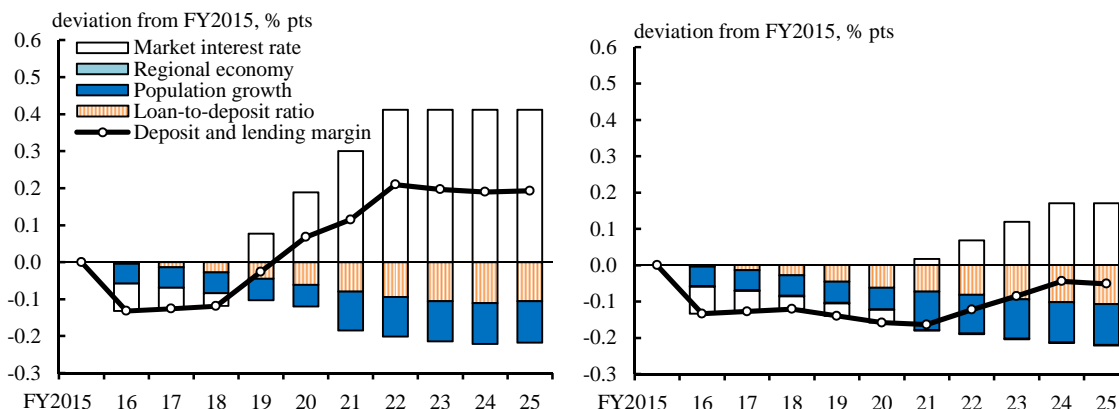
lending margin, a one-term lag is applied to the loan-to-deposit ratio in the panel estimation.

³⁹ The panel estimation includes fixed effects. The estimation period is from fiscal 2001 to fiscal 2015. The estimation covers 172 *shinkin* banks that were not involved in any mergers from fiscal 2000 onward.

⁴⁰ Changes in total population and the ratio of the aged population are based on estimates by the National Institute of Population and Social Security Research. The loan-to-deposit ratio is forecasted by using a separate model based on interest rates and the economic outlook, in addition to demographic effects.

by 2024. In both scenarios, the present number of financial institutions is assumed to be maintained, and competition remains intense.

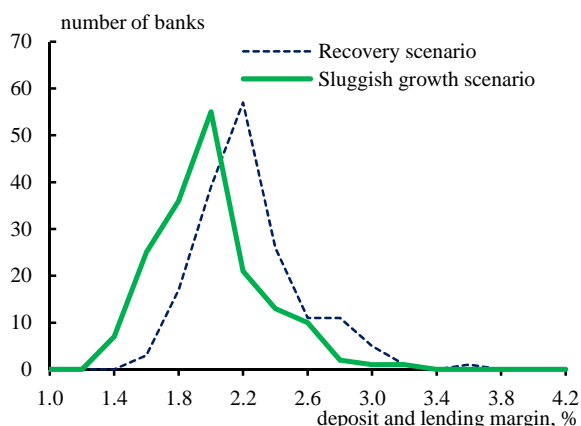
Chart B4-3: Simulation results of deposit and lending margin¹
 Recovery scenario Sluggish growth scenario



Note: 1. Deposit and lending margin is the average in *shinkin* banks is the fitted value of the model.
 Sources: National Institute of Population and Social Security Research; BOJ.

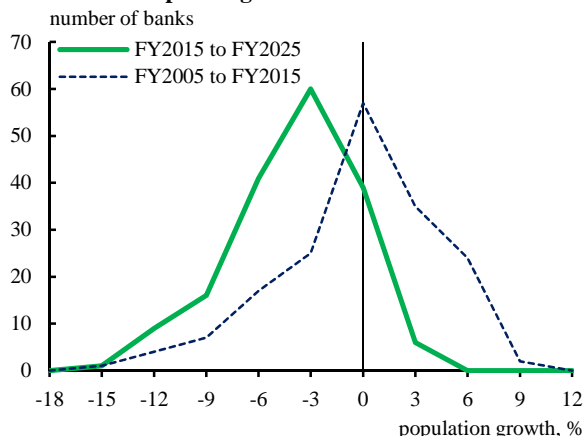
The results of the forecasting exercise show that in the "recovery scenario," population decline and the decline in the loan-to-deposit ratio alongside the aging population exert downward pressure on deposit and lending margins. Nonetheless, margins gradually recover with an increase in the market interest rate, and reach a level somewhat above the present level in fiscal 2025, 10 years from now. Conversely, in the "sluggish growth scenario," deposit and lending margins remain below the present level, because the increase in the market interest rate is limited. In addition, the distribution of deposit and lending margins of *shinkin* banks in the "sluggish growth scenario" in fiscal 2025 shows that the number of *shinkin* banks with narrow margins is higher (Chart B4-4). For *shinkin* banks experiencing a higher rate of population decline in their operating areas, margins are seen to come under greater downward pressure (Chart B4-5).

Chart B4-4: Distribution of predicted deposit and lending margins¹



Note: 1. Data for fiscal 2025.
 Source: BOJ.

Chart B4-5: Distribution of population growth in operating areas of *shinkin* banks



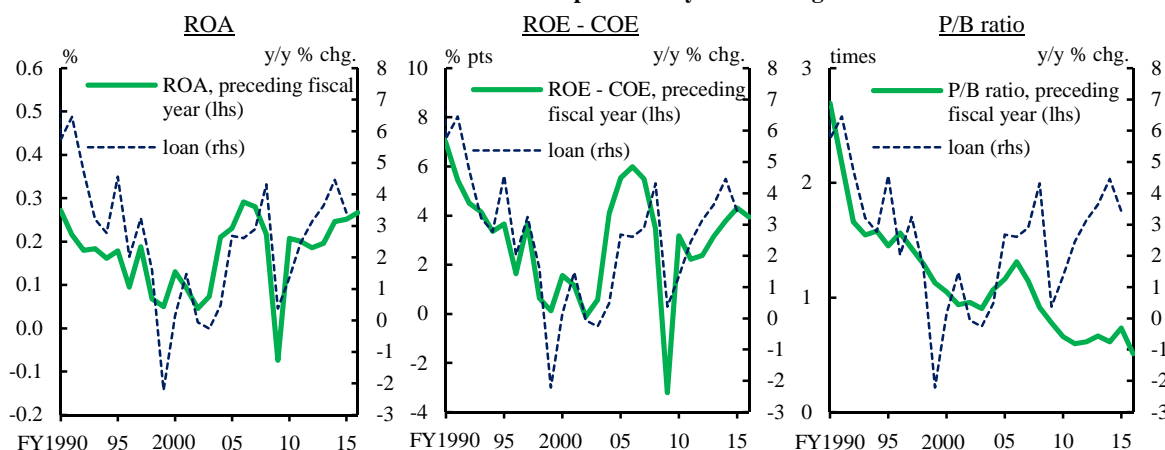
Sources: Ministry of Internal Affairs and Communications;
 National Institute of Population and Social Security Research.

Even in the "recovery scenario," regional economic factors hardly contribute to the expansion of deposit and lending margins of *shinkin* banks (Chart B4-3). This reflects the possibility that the economic recovery did not diffuse sufficiently widely to include the client firms of *shinkin* banks during the model estimation period (from fiscal 2001 to fiscal 2015). In order to widen margins, it is important for financial institutions to enhance business matching and support expansion of sales channels to improve firms' productivity, so that their client firms can partake in the fruits of economic recovery.

Box 5: Bank profitability and loan supply incentives

There is a positive correlation between a bank's profitability and its loan supply (Chart B5-1).⁴¹ This relationship can be interpreted in two ways. From a "loan supply" perspective, a bank's profitability exerts effects on its incentive to extend loans. From a "loan demand" viewpoint, a deterioration in the macroeconomic environment could depress the demand for loans, thereby lowering the profitability of bank lending.

Chart B5-1: Bank profitability and lending^{1,2}



Notes: 1. Data are the median of regional banks sampled. Latest data as at end-fiscal 2015.

2. COE (i.e., cost of equity, total dividend / market capitalization) is calculated based on the dividend discount model. ROA and ROE are calculated based on actual values of net income.

Sources: Bloomberg; BOJ.

In order to examine the relationship between a bank's profitability and its loan supply, we conduct a panel estimation (including fixed effects) on regional banks, based on the following equation.⁴²

$$\begin{aligned} \text{Rate of change in bank loans}_{i,t} \\ = \alpha (\text{Bank profitability}_{i,t-1}) + \beta (\text{Nominal GDP growth rate}_t) + \text{Constant} \end{aligned}$$

Here, i denotes each bank, and t denotes each fiscal year. When a bank's profitability has a positive effect on its incentive to provide loans, $\alpha > 0$, and when changes in the macroeconomic environment positively affect the demand for loans, $\beta > 0$. The

⁴¹ This box analyzes 36 regional banks, for which stock prices are available for an extended period (from March 1987 to March 2016).

Based on a stock yield model, the equation "P/B (price-to-book) ratio = ROE (return on equity) / COE (cost of equity)" can be obtained after simplification. However, in recent years, the P/B ratio has remained far below 1.0, suggesting incompatibility with an ROE (based on actual performance) greater than the COE. Since the Lehman shock, market expectations for banks' ROE have continued to fall short of actual outcomes. Such a bearish outlook appears to be responsible for the low P/B ratios of banks.

⁴² In order to alleviate endogeneity between bank profitability and bank lending, a one-period lag is applied to the profit ratio.

estimation results show that both parameters (α and β) are positive and statistically significant (Chart B5-2). It confirms that bank lending may be depressed not only through a deteriorating macroeconomic environment, which leads to a reduction in loan demand, but also through a decrease in bank profitability, which in turn leads to a cutback in the incentive to extend loans.

Chart B5-2: Panel estimation results for bank profitability and lending^{1,2}

Explanatory variable	model 1	model 2	model 3
Bank profitability	ROA (%)	3.23***	
	ROE - COE (% pts)		0.05***
	P/B ratio (times)		0.48***
Nominal GDP growth rate (%)	0.84***	0.88***	0.85***
Adj-R ²	0.37	0.36	0.34

Notes: 1. Estimation period is from fiscal 1987 to fiscal 2015.

2. *** indicates that the variables are statistically significant at the 1 percent level.

Source: BOJ.

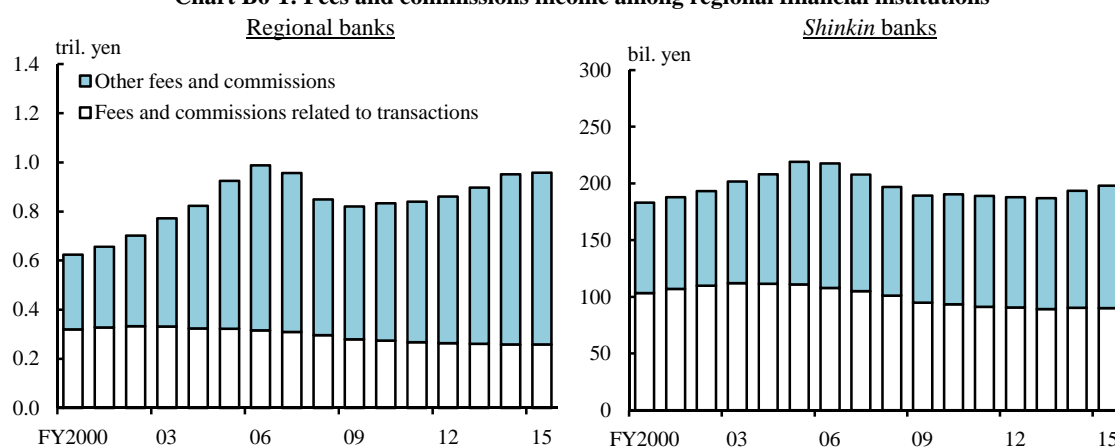
Based on the above analysis, the relationship between a bank's profitability and its incentive to extend loans can be summarized as follows.

When it becomes difficult for a bank to secure returns commensurate with its cost of capital (i.e., when the ROE is below the COE), its capacity to build up retained earnings wanes. As a result, the bank could become cautious about taking risks even if it currently has sufficient capital, and adopt a more guarded stance toward lending. In particular, when the low interest rate environment is expected to be prolonged, banks could regard a situation where securing returns commensurate with the cost of capital becomes more difficult as normal, and hence further restrain loan supply to brace themselves for future capital impairment. In this respect, the low P/B ratios in recent years may be a reflection of the belief held by market participants that "it has become difficult for banks to earn returns commensurate with the cost of capital, over an extended period." Although the relationship between banks' P/B ratios and their loan supply is weaker than before, how the low P/B ratios of banks at present will affect their future lending behavior warrants close monitoring (Chart B5-1).

Box 6: The relationship between fees and commissions income and net interest margins in regional financial institutions

Regional financial institutions' fees and commissions income has been on a moderate increasing trend in recent years (Chart B6-1). A breakdown shows that while income related to domestic and foreign transactions has decreased gradually, commissions on sales of financial products (i.e., investment trusts, insurance products, etc.) have increased.

Chart B6-1: Fees and commissions income among regional financial institutions¹



Note: 1. "Other fees and commissions" includes fees and commissions related to sales of financial products such as investment trusts and insurance products.

Source: BOJ.

Because sales of investment trusts also depend on stock prices and other market-based factors, it is important for financial institutions to make efforts to increase their sales capacity toward securing their customer base, in order to turn fees and commissions income into a stable source of profit. Particularly for financial institutions experiencing significant reductions in net interest margins, increasing such non-interest income is one of its priorities.

Given the above, we assess whether regional financial institutions are making efforts to increase fees and commissions income to compensate for the decline in net interest margins, by conducting a panel estimation based on the following equation:

$$\begin{aligned} \text{Rate of change in fees and commissions income}_{i,t} \\ = \alpha(\text{Change in net interest margins}_{i,t-1}) + \beta(\text{Rate of change in stock prices}_t) \\ + \text{Constant} \end{aligned}$$

Here, i denotes each financial institution (i.e., regional banks and *shinkin* banks) and t denotes each fiscal year. The estimation results suggest the following two points (Chart B6-2). First, the rate of change in stock prices has a statistically significant effect on the rate of change in fees and commissions income ($\beta > 0$), and hence, commissions on

sales of investment trusts, etc. depend on changes in the market environment. Second, as net interest margins contract, financial institutions endeavor to increase fees and commissions income to compensate ($\alpha < 0$). It can be confirmed that the greater the contraction of net interest margins, the more proactive financial institutions are in increasing fees and commissions income. This suggests that financial institutions are working to increase their non-interest income, even after controlling for changes in the market environment.

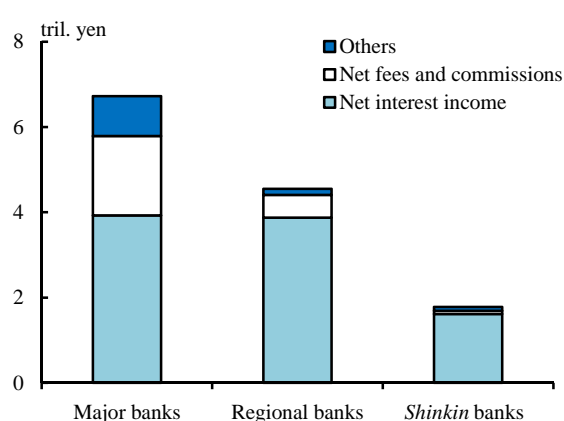
Chart B6-2: Estimation results^{1,2,3}

	Regional banks	Shinkin banks
Change in net interest margins	-21.06 ***	-14.31 ***
Rate of change in stock prices	0.15 ***	0.04 ***

Notes: 1. Estimation period is from fiscal 2007 to fiscal 2015. Estimation with fixed effects.
 2. The net interest margins used as an independent variable are represented by a 3-year backward moving average.
 3. *** indicates statistical significance at the 1 percent level.

Source: BOJ.

Chart B6-3: Breakdown of gross profits¹



Note: 1. Data as at fiscal 2015.

Source: BOJ.

Nevertheless, the share of fees and commissions income in gross operating profits is notably small at regional financial institutions compared with that at major banks (Chart B6-3). Fees and commissions income at *shinkin* banks, in particular, comprises less than 5 percent of gross operating profits. The estimation results obtained in the above analysis show that the figure representing the propensity toward augmenting fees and commissions income (the size of parameter α) in response to a reduction in net interest margins at *shinkin* banks is small compared with that of regional banks. An important management task for financial institutions continues to be to press on steadily with measures aimed at increasing fees and commissions income, and to diversify and stabilize their profit sources.

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 comprises 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 equities such as 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 equities such as preferred equities that meet certain conditions.

Risky assets are financial institutions' risk-weighted assets.