BOJ
Reports & Research Papers

Financial System Report

BANK OF JAPAN

APRIL 2016

The total of 10 major banks, 105 regional banks, and 256 *shinkin* banks covered in this *Report* is as follows (as of March 31, 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 of March 31, 2016.

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Preface

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.

Features of this Report

This issue of the *Report* encompasses five editorial and analytical features. First, taking into account the Bank's introduction of quantitative and qualitative monetary easing (QQE) with a negative interest rate, the policy effects on financial intermediation and financial system stability have been analyzed. Second, a section on "financial institutions' profitability" has been added to Chapter IV's assessment of financial institutions' macro risk profiles and financial bases. Third, analyses of the underlying factors and effects of developments in unsettled global financial markets since the summer of 2015 have been provided. Fourth, important risk factors -- foreign currency liquidity, commodity-related exposures, the real estate market, the systemic importance of large financial institutions, and the decline in profitability particularly among regional financial institutions -- have been analyzed from a new set of perspectives followed by the Bank's view on points of focus in risk management for financial institutions. And fifth, in Chapter V's section on macro stress testing, effects of a significant rise in foreign currency funding costs have been analyzed, taking into account the increase in Japanese financial institutions' overseas exposure.

Contents

I. Executive summary: comprehensive assessment of the financial system

Japan's financial system has been maintaining stability. Financial intermediation has continued to operate smoothly. While the heightened volatility particularly in global financial markets since the summer of 2015 has had a considerable impact on Japan, the effects on the stability and functioning of the financial system have been limited due in part to the Bank of Japan's quantitative and qualitative monetary easing (QQE) with a negative interest rate.

The external environment surrounding Japan's financial system and developments in financial markets

Looking at developments in global financial conditions, since the summer of 2015, investors' risk aversion has increased, mainly against the background of the decline in commodity prices, the slowdown in emerging and commodity-exporting economies, and market speculation concerning differences in the trajectory of monetary policies among advanced economies. Consequently, there was a significant heightening of financial market volatility through the first quarter of 2016, while in some regions, including Europe, concern about the financial conditions and the quality of assets of financial institutions increased. These impulses have been transmitted to Japan mainly in the form of a substantial decline in stock prices, continued yen appreciation, and a rise in foreign currency funding costs. Nevertheless, interest rates declined further owing to the effects of QQE with a negative interest rate, and the credit market has been stable relative to that of overseas markets. Meanwhile, Japan's economy has continued its moderate recovery trend, with strong fundamentals as seen from, for example, the narrowing trend in the primary fiscal balance.

Functioning of the financial system

Financial institutions' domestic loans have continued to grow at a 2.0-2.5 percent year-on-year rate, reflecting demand for funds in a wide range of industries, such as from large firms, to support their merger and acquisition activities, as well as from the real estate sector. Financial institutions have continued to adopt a positive stance toward undertaking more risk in their business operations, and have been active in lending to firms -- particularly small- and medium-sized firms -- including borrowers with lower credit ratings, while continuing to support, for example, start-up firms, business revitalization, and firms' business matching. Overseas loans have been growing at a

year-on-year rate of around 10 percent, as banks have also been active in overseas lending, with a view toward supporting the global expansion of Japanese firms and capturing overseas financial needs, while taking into account their ability to raise foreign currency funding. As for securities investment, financial institutions have been investing further in assets such as foreign bonds and investment trusts, while their outstanding holdings of yen-denominated bonds remain at a high level. Recently, however, some financial institutions have become more cautious regarding the extension of overseas credit, especially to emerging economies, and investment in assets such as stock investment trusts, due in large part to unsettled global financial conditions.

Institutional investors -- such as insurance companies and pension funds -- and depository institutions with a focus on market investment -- such as Japan Post Bank and the central organizations of financial cooperatives, have continued to reallocate their investments away from domestic bonds toward risky assets, such as foreign bonds, in response to a further decline in domestic interest rates. In terms of households' investment activities, basically there appears to be a continued tendency to increase investments in investment trusts and other risky assets, suggested by the widening use of Nippon Individual Savings Account (NISA) and wrap accounts. Recently, however, the trend among households to hold more risky assets has weakened, primarily reflecting unsettled global financial conditions. Meanwhile, with regard to financial intermediation through financial markets, equity financing has decreased recently in response to the decline in stock prices, although firms' proactive financing stance seems to have remained largely unchanged. Issuing conditions for CP and corporate bonds have remained favorable alongside developments such as a further decline in interest rates. Financial conditions among firms and households have become more accommodative.

Stability of the financial system

Regarding developments in financial intermediation mentioned above, signs of financial imbalances such as excessive risk taking and credit growth, and overheating in financial activity have not been observed.

The financial bases of financial institutions have been adequate on the whole. Their capital adequacy ratios are sufficiently above regulatory requirements. Although the amount of risk borne by financial institutions has increased mainly due to the heightened volatility in global financial markets, aggregate risks that financial institutions are undertaking still remain contained relative to their capital bases.

Examination through stress testing also indicates that the financial system is considered to have generally strong resilience against stresses. Moreover, financial institutions have sufficient yen funding liquidity. As for foreign currency funding, financial institutions have liquidity buffers that can cover possible outflows even if funding conditions become difficult for a certain period, and have made steady progress in efforts to bolster stable funding sources. Nevertheless, foreign currency funding costs are on a rising trend, in a situation where market funding continues to account for a large share of foreign currency funding. A broad range of domestic entities will likely continue working toward increasing their demand for foreign currencies. Therefore, careful attention should be paid to the liquidity situation in the foreign currency funding market, including the effects of international financial regulations.

The total credit-to-GDP ratio has remained unchanged. With regard to a wide range of financial activity indicators, including the total credit-to-GDP ratio, no large deviations from their trends have been observed. In the real estate market, transaction activity has been buoyant, albeit with regional differences, and the growth rate of financial institutions' real estate-related loans has been rising. However, developments in nationwide land prices and on other fronts suggest that the real estate market does not appear to be in a state of overheating on the whole.

Meanwhile, financial institutions' profits have been on a growing trend, and are exerting positive effects, particularly on the financial bases of financial institutions. The trend of growing profits has been maintained mainly due to the decrease in credit costs and gains from securities investments. However, spreads, as well as profits from domestic deposit-taking and lending activities, which form the core of financial institutions' profitability, have remained on a declining trend, given the continued decline in interest rates. Developments in core profitability warrant careful attention, as financial institutions' ability to absorb losses and take risks could be restrained if this trend persists.

QQE with a negative interest rate and the financial system

To summarize the above assessments from the viewpoint of the effects of QQE with a negative interest rate, it can be observed that market interest rates have declined further -- with even long-term interest rates entering negative territory, and a wide range of interest rates on deposits and loans have been declining. Under these circumstances, financial institutions and other entities have been prompted to take portfolio rebalancing a step further, including by taking an increasingly active stance toward lending. These

changes contribute to smoother functioning of the financial system.

Nevertheless, the transmission of the above effects is constrained by several factors. For example, a broad range of entities in financial markets have postponed their transactions as they have been in the midst of reviewing their investment strategies and operational arrangements, including their IT systems. Investors and firms have avoided transactions with a negative interest rate. As a result, signs of a holdup in the flow of funds have been observed, for example, a large sum of funds have remained within trust banks and major banks. Meanwhile, the heightened volatility in global financial markets after the beginning of 2016 has led to a decline in stock prices, yen appreciation, and an increase in foreign currency funding costs. It has also worked to restrain risk taking among financial institutions and other entities to some extent. The policy effects are expected to propagate further as these issues are resolved.

With regard to financial institutions' profits, although further downward pressure is likely to be experienced for the time being, financial institutions are likely to continue with proactive credit intermediation, as they have generally secured sufficient capital bases. If financial institutions' portfolio rebalancing activities lead 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 persisted, it could eventually lead to a weakening in their credit intermediation function. 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, with regard to the impact of QQE with a negative interest rate on financial stability.

Risks and challenges from a macroprudential perspective

In order to contribute to economic growth through the smooth operation of financial intermediation while ensuring future financial system stability, efforts are necessary for financial institutions to steadily respond to the accumulation of macro risks and structural changes in the financial system that could become a source of potential fragility.

From the viewpoint of the accumulation of macro risks, (1) Japan's financial system is increasingly exposed to developments in overseas economies, as well as the vagaries of financial markets at home and abroad. Increasing the financial system's robustness to the propagation of risks stemming from overseas as well as financial markets, and securing and enhancing a stable foreign currency funding base continue to be important

tasks, taking into account the growing trend in financial institutions' overseas loans and foreign securities investment, including those by institutional investors. Moreover, (2) the increasing systemic importance of large financial institutions and (3) the decline in profitability associated with domestic deposit-taking and lending operations can be considered structural changes in the financial system. The shrinking population and customer base -- in addition to the low interest rate environment -- is exacerbating the problem of low profitability of regional banking especially. QQE with a negative interest rate can be considered to exert significant effects on all three of the above-mentioned risks, as its effects propagate.

As for additional factors that may affect financial stability in the longer term, the following points can be brought up: (4) the sustainability of the shift "from saving to investment" in the household sector; (5) the proliferation of IT utilization in the finance field, including FinTech, as well as the increasing importance of cyber security protection.

Actions by the Bank of Japan

The Bank will make the following efforts toward ensuring financial stability, while providing support to financial institutions and other entities in adapting to the new environment of negative interest rates.

Through its off-site monitoring and on-site examinations, the Bank will encourage individual financial institutions to deal with the above-mentioned macro issues by ensuring their soundness. In doing so, the Bank will essentially focus on encouraging institutions to refine management practices that facilitate the adoption of a positive approach toward risk taking and global business expansion, taking into account that financial institutions' capital bases have remained adequate. With regard to large financial institutions, while keeping in mind their systemic importance, the Bank will encourage them to bolster their financial bases and improve their business management practices to guard against the manifestation of risks, and to make the necessary preparations to respond in an orderly manner in times of stress. With regard to regional financial institutions, in view of the importance of ensuring the stability and improvement of their profitability, the Bank will focus on assessments of their medium- to long-term profitability and discussions on future business plans based on these assessments. At the same time, the Bank will reinforce the efforts of regional financial institutions to further support regions and firms, as well as to improve their financial tools and risk management practices. At seminars and other events, the Bank will also

engage in themes that will contribute to the strengthening of financial intermediation functioning and business management practices. As part of its effort to respond to financial globalization, the Bank will increase its coordination with overseas central banks and other organizations, while deepening its understanding of developments in the overseas financial system and financial markets. With regard to international financial regulations, the Bank will contribute to efforts to establish standards and implement them, keeping in mind the need to strike a fine balance between the financial system's robustness and its smooth functioning. As for measures related to transaction activities, the Bank will act to ensure financial stability, including by demonstrating its lender-of-last-resort function when appropriate. In the context of the above measures, the Bank will continue with appropriate efforts to engage in coordination with related authorities, particularly the Financial Services Agency.

II. Examination of economic developments at home and abroad and risks observed in financial markets

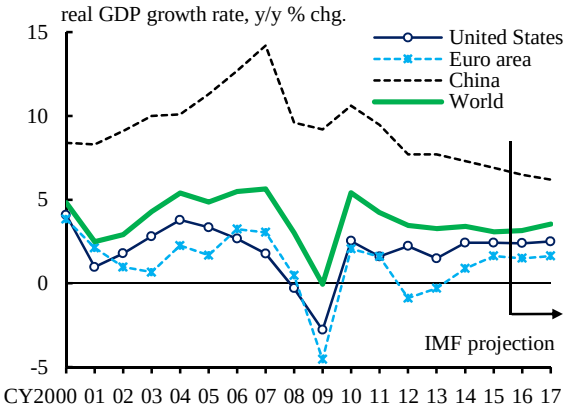
This chapter examines economic developments at home and abroad, mainly during the second half of fiscal 2015, as well as risks observed in Japanese and overseas financial markets.[1]

A. Economic developments at home and abroad

Overseas economies have continued to grow at a moderate pace, but the pace of growth has somewhat decelerated mainly in emerging economies (Chart II-1-1).

Chart II-1-1: Overseas economies[1,2]

Real GDP growth rate



Projections for major economies

y/y % chg.

	2014	2015	2016 Projection	2017 Projection
World	3.4	3.1	3.2 (-0.2)	3.5 (-0.1)
United States	2.4	2.4	2.4 (-0.2)	2.5 (-0.1)
Euro area	0.9	1.6	1.5 (-0.2)	1.6 (-0.1)
Emerging market and developing economies	4.6	4.0	4.1 (-0.2)	4.6 (-0.1)
China	7.3	6.9	6.5 (0.2)	6.2 (0.2)

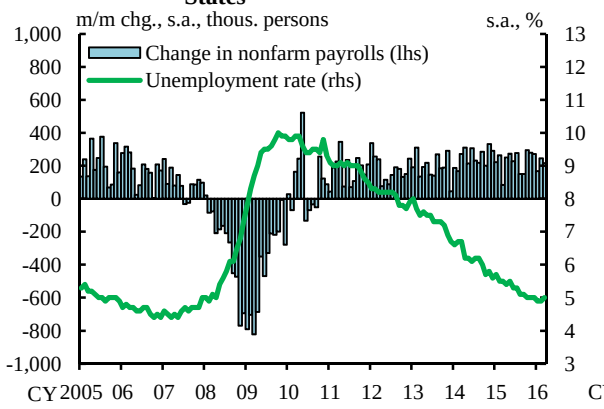
Notes: *1*. The post-2016 data are based on April 2016 WEO projections.
2. Figures in parentheses indicate the difference from January 2016 WEO projections.
Source: IMF, "World economic outlook."

Looking at developments by major region, the U.S. economy has been on a recovery trend, assisted by employment, income, and household spending, although the industrial production sector has been lackluster (Chart II-1-2). Since the policy rate hike by the Federal Reserve Board (FRB) in December 2015, attention in global markets has been focused on the pace of future rate hikes. The European economy has continued to recover moderately (Chart II-1-3). After cutting interest rates in December 2015, the European Central Bank (ECB) implemented an additional rate cut and expanded its asset purchase program in March 2016. The Chinese economy has maintained its stable growth on the whole, but the pace of growth has somewhat decelerated, mainly in terms of exports and production (Chart II-1-4). Under these circumstances, other emerging and commodity-exporting economies have also decelerated, mainly in terms of exports

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

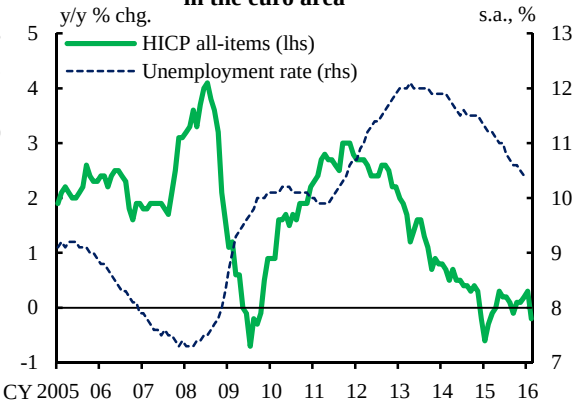
and production.

Chart II-1-2: Employment situation in the United States[1]



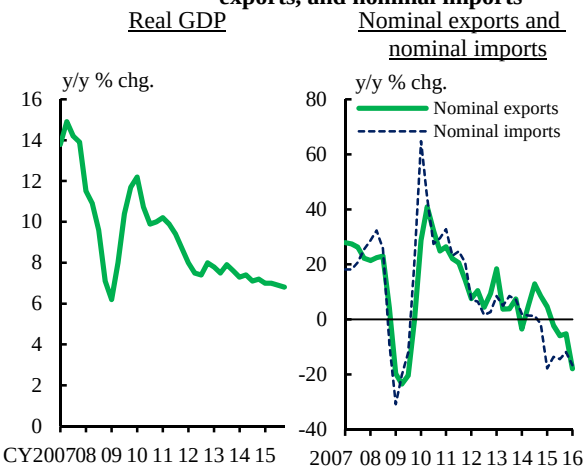
Note: *1*. The latest data are as of March 2016.
Source: U.S. Bureau of Labor Statistics.

Chart II-1-3: Unemployment rate and inflation rate in the euro area[1,2,3]



Notes: *1*. Regarding the euro area, the inflation rate is based on the area's composition in each period, and the unemployment rate comprises 18 countries.
2. The unemployment rate excludes conscripts on compulsory military duty.
3. The latest data for the inflation rate are as of February 2016, and those for the unemployment rate are as of January 2016.
Source: Eurostat.

Chart II-1-4: China's real GDP, nominal exports, and nominal imports[1]

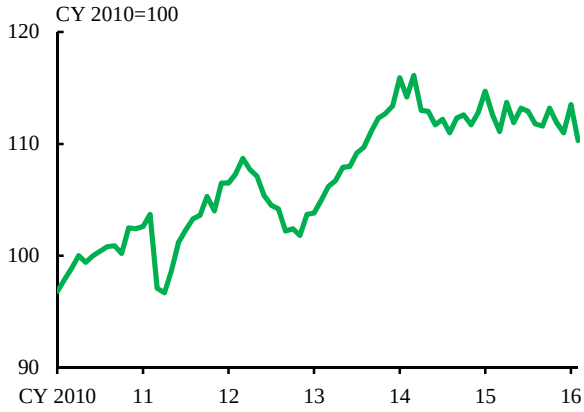


Note: *1*. The latest data are as of the October-December quarter of 2015 for real GDP, and January-February 2016 for nominal exports and nominal imports.
Source: CEIC.

Japan's economy has continued its moderate recovery trend, although exports and production have been sluggish due mainly to the effects of the slowdown in emerging economies (Chart II-1-5). Business fixed investment has been on a moderate increasing trend as corporate profits have been at high levels. Against the background of steady improvement in the employment and income situation, private consumption has been resilient. On the price front, the year-on-year rate of change in the CPI (all items less fresh food) is about 0 percent (Chart II-1-6). At the end of January 2016, the Bank of Japan decided to introduce "Quantitative and Qualitative Monetary Easing (QQE)

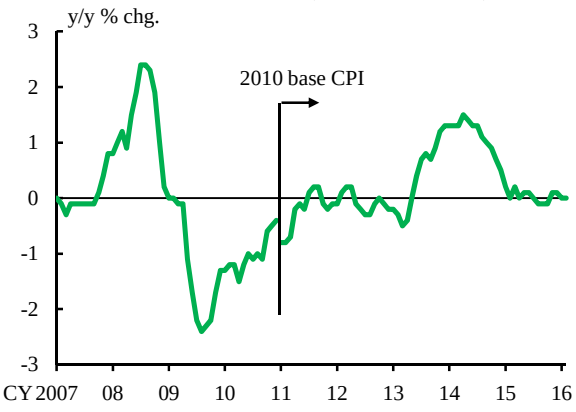
with a Negative Interest Rate" in order to achieve the price stability target of 2 percent at the earliest possible time.

Chart II-1-5: Indexes of business conditions[1,2]



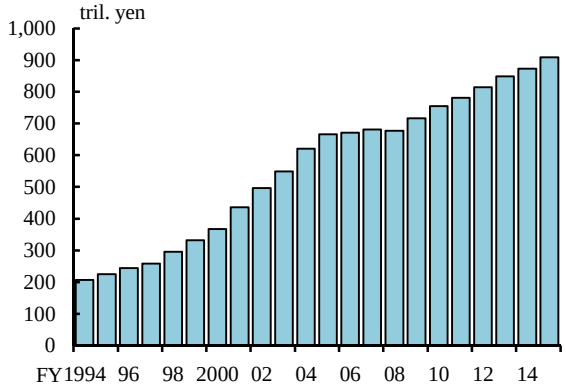
Notes: *1*. The latest data are as of February 2016.
2. This chart shows Coincident Index of Composite Indexes.
Source: Cabinet Office, "Indexes of Business Conditions."

Chart II-1-6: CPI (Less Fresh Food)[1,2]



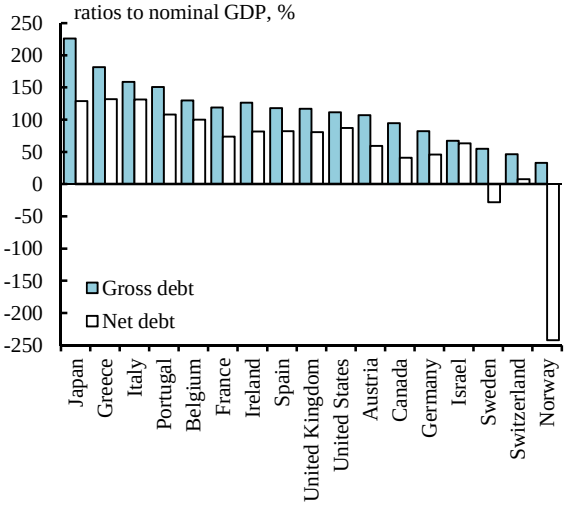
Notes: *1*. The latest data are as of February 2016.
2. Figures are estimated by adjusting the direct effects of the consumption tax hike in April 2014.
Source: Ministry of Internal Affairs and Communications, "Consumer Price Index."

Chart II-1-7: Government bonds outstanding[1,2]



Notes: *1*. The data are final results until fiscal 2014 and supplementary budget figures for fiscal 2015.
2. The data include FILP bonds.
Source: Ministry of Finance.

Chart II-1-8: General government debt to GDP ratio[1]

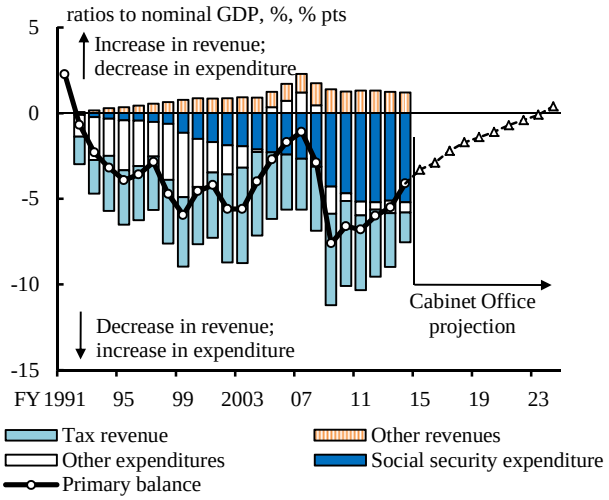


Note: *1*. The data are as of 2014.
Source: OECD.

Regarding fiscal conditions, government debt has continued to increase as a trend due to the primary balance deficit and the increase in national debt service expenditure (Chart II-1-7). Japan's government debt to gross domestic product (GDP) ratio is the highest among the member states of the Organization for Economic Cooperation and Development (OECD) on a gross basis, and is also at a high level on a net basis (Chart II-1-8). Under these severe fiscal conditions, the government has been working extensively to achieve economic revitalization and fiscal consolidation. Consequently, the primary balance deficit has narrowed. However, according to the

Economic and Fiscal Projections for Medium- to Long-Term Analysis ("the economic revitalization case") set forth by the government in January 2016, the primary balance to GDP ratio for fiscal 2020 is still projected to show a deficit of 1.1 percent, suggesting that further improvement in the fiscal balance is likely to be necessary in order to achieve the target of "Medium-term Fiscal Plan" generating a surplus in the primary balance by fiscal 2020 (Chart II-1-9).

Chart II-1-9: Primary balance[1,2,3]



Notes: *1*. The primary balance figures are ratios to nominal GDP. Breakdown figures show cumulative changes from fiscal 1991. The data are for central and local governments. Breakdown figures are the BOJ estimates.
2. "Social security expenditure" comprises the following items: social benefits other than social transfers in kind; social transfers in kind; current transfers from central and local governments to social security funds.
3. The primary balances from fiscal 2015 to fiscal 2024 are Cabinet Office estimates (economic revitalization case, sources of revenue or expenses for post-disaster restoration and rebuilding are not included).
Sources: Cabinet Office, "Economic and fiscal projections for medium to long term analysis," "National accounts"; BOJ.

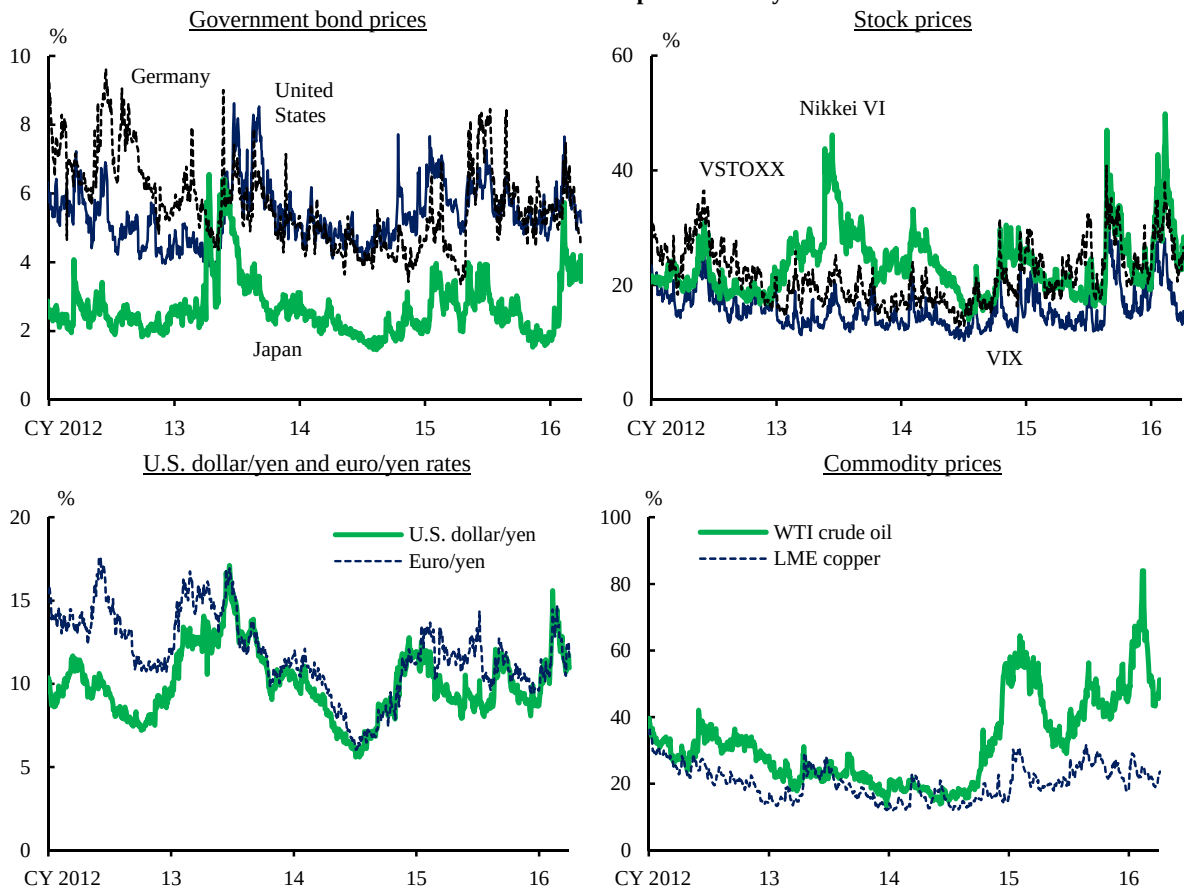
B. Global financial markets

Global financial markets have been unsettled, as prices for a wide range of risky assets declined with higher volatility (Charts II-2-1 and II-2-2). Amid increased awareness of uncertainties surrounding emerging and commodity-exporting economies, particularly China, and of the influences of the U.S. monetary policy response on the global financial markets, emerging market currencies and stock prices declined and commodity prices also edged down (Chart II-2-3). In particular, crude oil futures prices including forward month contracts declined significantly, suggesting growing concerns that oversupply would be protracted against the backdrop of the supply increase and sluggish growth in global demand.

This trend transmitted to stock prices of advanced economies amid market participants' concerns over the spillover effect of emerging economies' slowdown and the impact of a decrease in commodity prices on related sectors. As investors' risk aversion heightened, concerns about the financial strength, asset quality, and profitability of financial institutions intensified temporarily, especially for institutions in the euro area, partly

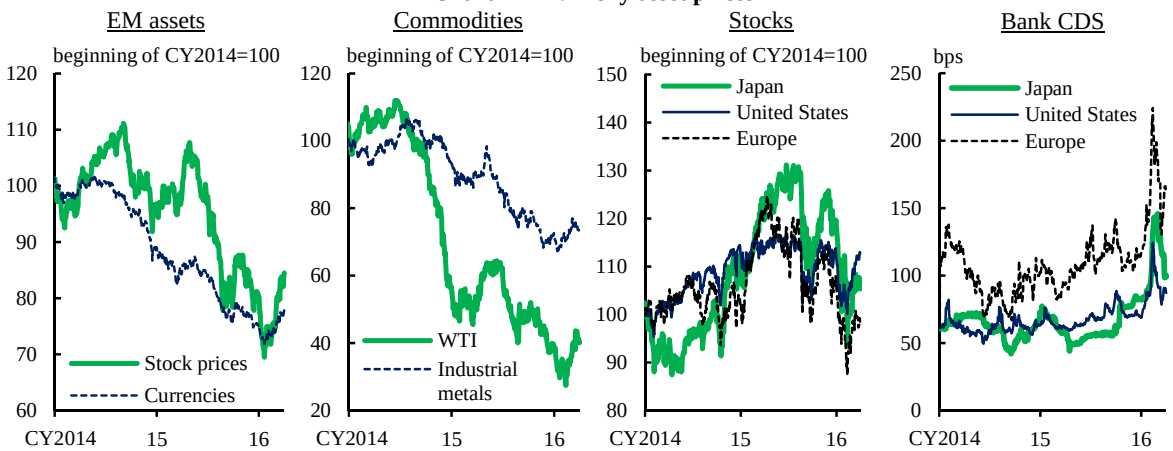
reflecting financial results of some banks.

Chart II-2-1: Implied volatility[1,2,3,4]



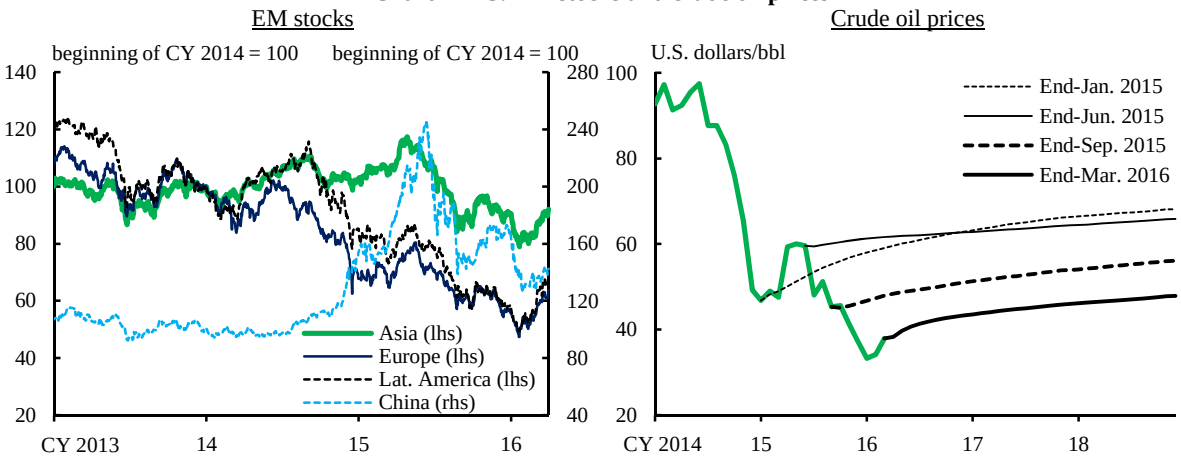
Notes: *1*. IVs of government bond prices are based on the following data: S&P JPX JGB VIX for Japan; CBOE CBOT 10 year U.S. Treasury Note Volatility Index for the United States; IV of the options on Euro-Bund futures traded on Eurex for Germany, calculated by Bloomberg.
2. IVs of foreign exchange rates are calculated by using data on 3-month over-the-counter option prices.
3. IV of crude oil is CBOE NYMEX WTI volatility index. IV of copper is calculated by Bloomberg.
4. The latest data are as of March 31, 2016.
Sources: Bloomberg; BOJ.

Chart II-2-2: Risky asset prices[1,2,3]



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. In the right-hand chart, the figures are simple averages of CDS premiums for senior bonds of major banks in each market.
3. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart II-2-3: EM stocks and crude oil prices[1]



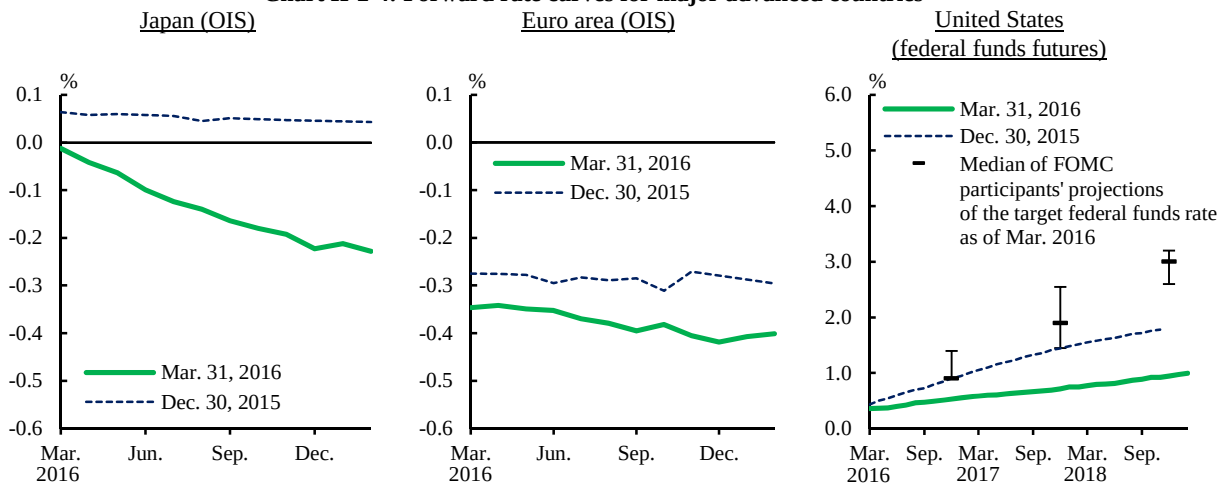
Note: *1*. MSCI Emerging Asia Index for Asia; MSCI Emerging Europe Index for Europe; MSCI Emerging Latin America Index for Latin America; Shanghai Stock Exchange Composite Index for China. The latest data are as of March 31, 2016.
Source: Bloomberg.

Amid volatile global financial markets, global capital flows had been largely changed.

As for the outlook, attention should be paid as to whether changes in the outlook for the global economy, especially for emerging economies, and the policy stance in major economies, will largely affect the risk appetite of global investors and global capital flows. For example, since the beginning of 2016, market expectations about the future path of the U.S. policy rate have been fluctuating (Chart II-2-4). If the pace of the rate hike is faster than current market expectations, as projected by the Federal Open Market Committee (FOMC), and if long-term interest rates rise, it would have a negative impact on the risk appetite of global investors and global capital flows, although the indicated sound economic environment has positive aspects. Careful attention should also be paid to the possibility that progress in regulatory reforms may affect market liquidity, especially in U.S. money markets.

From that perspective, it would be necessary to pay attention to capital flows, especially in the following three markets.

Chart II-2-4: Forward rate curves for major advanced countries[1,2]



Notes: *1*. In the left-hand and middle charts, figures are forward rates calculated from OIS rates.
2. In the right-hand chart, the vertical bars indicate the central tendency of the projections.
Sources: Bloomberg; FRB.

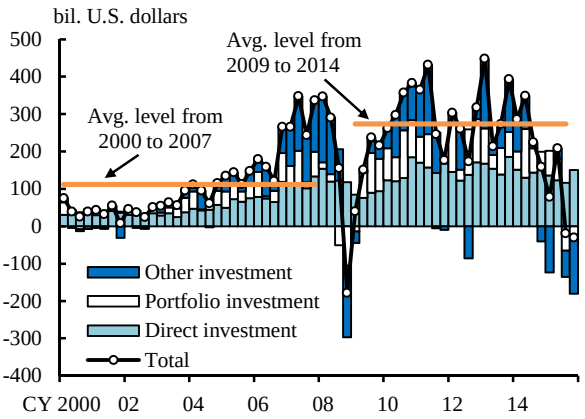
First is the emerging markets. In fact, emerging markets have recently faced capital outflows (Chart II-2-5). Capital inflows to emerging markets based on balance of payment statistics had remained at a high level even during the summer of 2013, but they turned negative after the July-September quarter of 2015. This indicates that capital outflows from emerging markets are occurring not only in short-term capital through funds, but also in capital for investing on a long-term basis. Cross-border bank lending to Asian and Latin American countries also declined.

In particular, attention needs to be paid to countries and sectors that are highly dependent on commodities. After the financial crisis, emerging economies, and commodity-related firms in particular, issued large amounts of U.S. dollar-denominated bonds, most of which were purchased by global investors. However, issuance of U.S. dollar-denominated corporate bonds by Latin American countries has been decreasing since 2015, as market concerns about commodity sectors have heightened. Redemption of these bonds will occur in the next few years (Chart II-2-6).

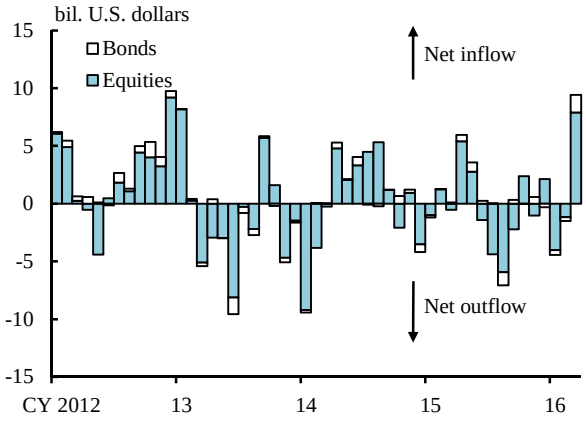
Meanwhile, credit spreads in Asian countries remain low, partly due to their low dependence on commodity sectors. Nevertheless, looking at the financial soundness of the corporate sector, the debt-to-GDP ratio has been increasing in some Asian countries (Chart II-2-7).

Chart II-2-5: Capital flows into emerging markets[1,2,3]

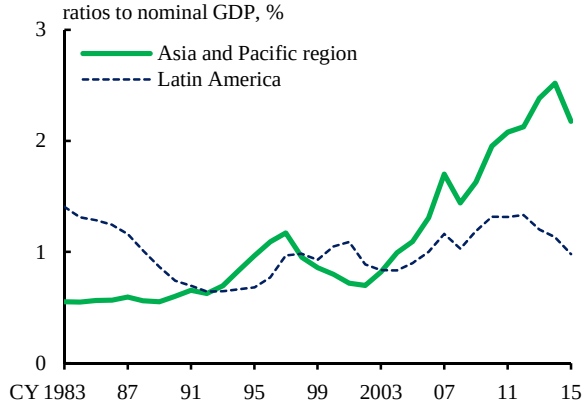
Balance of payment statistics



ETF fund flows



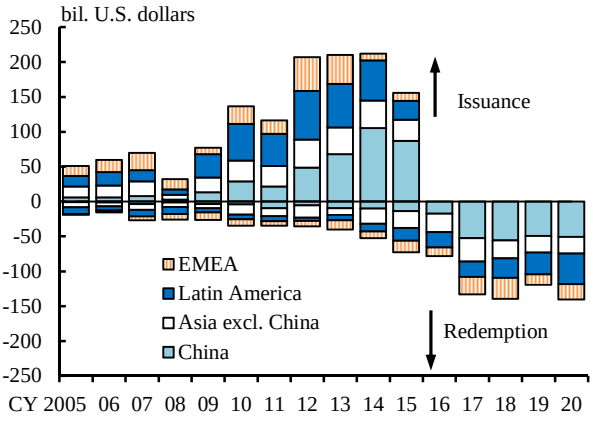
Claims on emerging countries to world GDP ratio



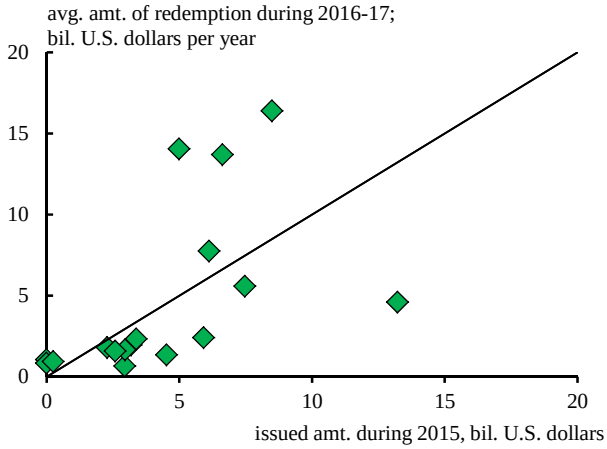
Notes: *1*. In the left-hand chart, figures are the sum of 19 major emerging countries. The latest data are as of the October-December quarter of 2015.
2. In the right-hand chart, figures are fund flows of ETFs listed on the U.S. stock exchange. The latest data are as of March 2016.
3. In the lower chart, .The latest data are as of September 2015. The data are based on claims of foreign banks. "Nominal GDP" indicates the world GDP.
Sources: BIS, "Consolidated banking statistics"; Bloomberg; Haver Analytics; IMF, "World economic outlook."

Chart II-2-6: U.S. dollar-denominated bonds issued by EM companies[1,2]

Issuance and redemption

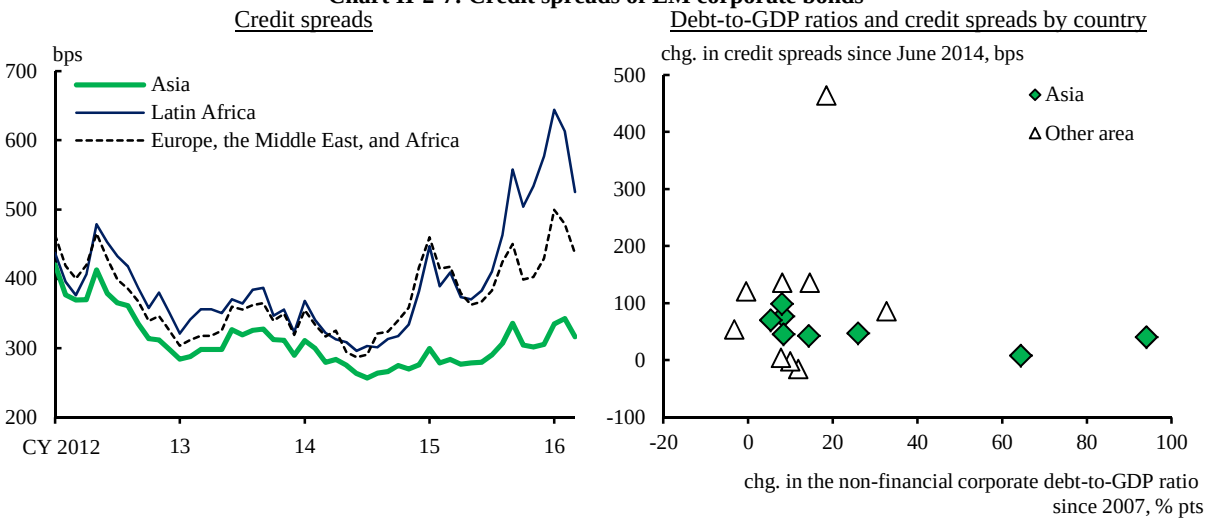


Issuance and redemption by country and region



Notes: *1*. Corporate bonds issued before December 31, 2015 are counted. EM includes China, seven Asian countries and regions excluding China (India, Indonesia, Malaysia, Philippines, South Korea, Taiwan, and Thailand), five Latin American countries (Argentine, Brazil, Chile, Mexico, and Peru) and six EMEA countries (Hungary, Poland, Russia, South Africa, Turkey, and Ukraine).
2. The right-hand chart excludes China and countries for which there are no issuance or redemption during the specified period.
Source: Dealogic.

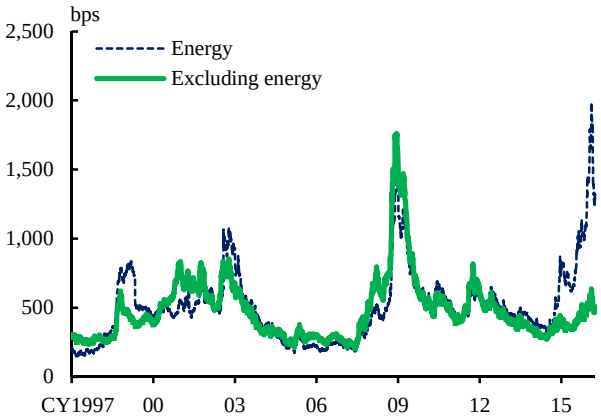
Chart II-2-7: Credit spreads of EM corporate bonds[1,2]



Notes: *1*. Credit spreads are sub-indexes of the J.P. Morgan CEMBI Broad Diversified, compiled from U.S. dollar-denominated bonds. *2*. The latest data are as of end-March 2016.
Sources: BIS; J.P. Morgan.

Second is the U.S. credit markets. In the United States, credit spreads for high-yield bonds in the energy sector temporarily rose to levels exceeding the 2008 financial crisis. Spreads for bonds in sectors excluding energy also rose moderately (Chart II-2-8).

Chart II-2-8: Credit spreads of U.S. high-yield bonds[1]

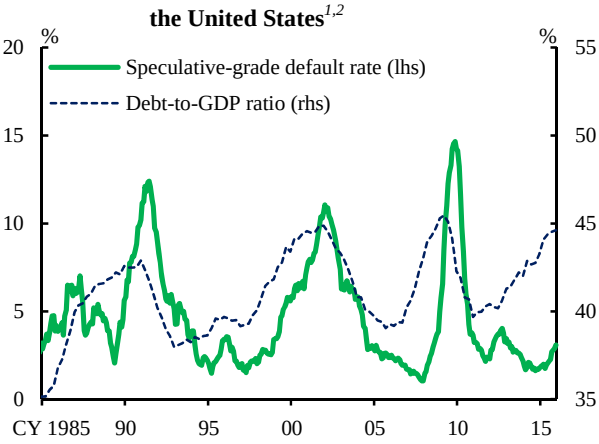


Note: *1*. Calculated by Bank of America Merrill Lynch. The latest data are as of March 31, 2016.
Source: Bloomberg.

Currently, the default rate of U.S. corporate bonds, including high-yield bonds, is stable at low levels, partly due to the low interest rate environment. However, it should be noted that in past rate-hike cycles the default rate tended to rise along with the rate hike, and that the current debt-to-GDP ratio for U.S. companies is historically high (Chart II-2-9).

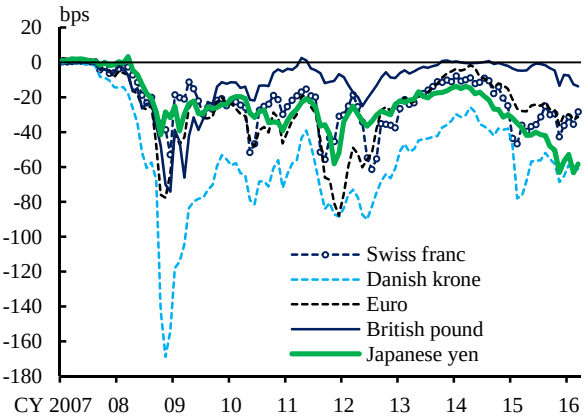
Third is the U.S. dollar funding market, especially the foreign exchange swap market. Since 2014, U.S. dollar funding premiums in the FX swap and cross-currency basis swap markets have been rising, mainly in European countries with a negative rate policy and in Japan (Chart II-2-10).

Chart II-2-9: Debt-to-GDP ratios and default rates in the United States[1,2]



Notes: *1*. Default rates are calculated based on the number of defaults. The latest data are as of February 2016.
2. Debt-to-GDP ratios are calculated based on non-financial corporations. The latest data of are as of end-December 2015.
Sources: Haver Analytics; Moody's.

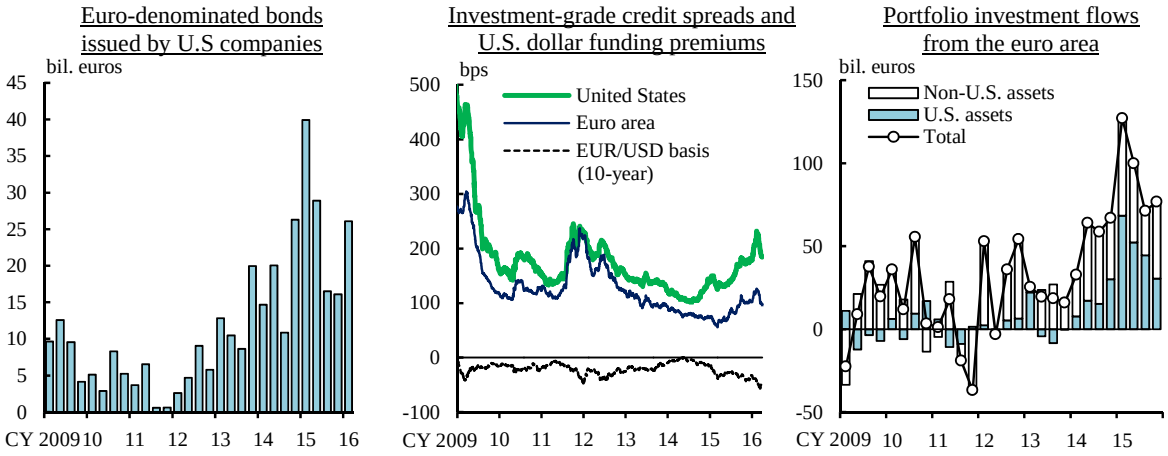
Chart II-2-10: U.S. dollar funding premiums[1,2]



Notes: *1*. Monthly average of 1-year cross-currency basis.
2. The latest data are as of March 2016.
Source: Bloomberg.

Demand for the U.S. dollar in the FX swap market has been increasing globally, against the background of the divergence of U.S. monetary policy from other advanced economies. In the euro area, issuance of euro-denominated bonds by U.S. corporates -- who tend to use cross-currency swaps to convert euros into U.S. dollars -- increased, reflecting the credit spread difference between the euro area and the United States. Outward portfolio investment from the euro area is also increasing (Chart II-2-11). As mentioned later (see Chapter IV.C), U.S. dollar demand in Japan is greater than demand in the euro area. Such funding demand for the U.S. dollar is likely to further increase globally if differences in the direction of monetary policy are strengthened.

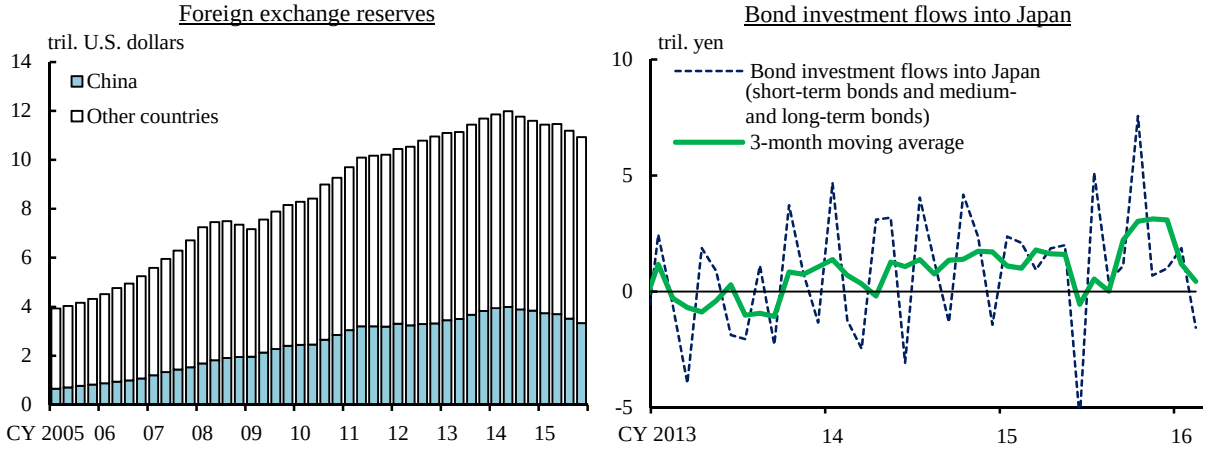
Chart II-2-11: U.S. dollar demand in the euro area[1,2,3]



Notes: *1*. In the left-hand chart, the latest data are as of the January-March quarter of 2016.
2. In the middle chart, investment-grade credit spreads are calculated by Bank of America Merrill Lynch. The latest data are as of March 31, 2016.
3. In the right-hand chart, the latest data are as of the October-December quarter of 2015.
Sources: Bloomberg; Dealogic; Haver Analytics.

In terms of the U.S. dollar supply side of the FX swap market, emerging economies' foreign reserve managers and sovereign wealth funds may be restraining their supply of U.S. dollars due to a decrease in their assets under management, reflecting increased foreign exchange intervention and depressed commodity prices (Chart II-2-12).[2] It has been pointed out that the slowdown in bond investment flows to Japan in the summer of 2015 may be due to some foreign investors restraining their investment in currency-hedged JGBs. If U.S. interest rates rise and the dollar-appreciation trend strengthens, dollar supply from such investors may decrease.

Chart II-2-12: Foreign exchange reserves and the FX swap market[1,2]



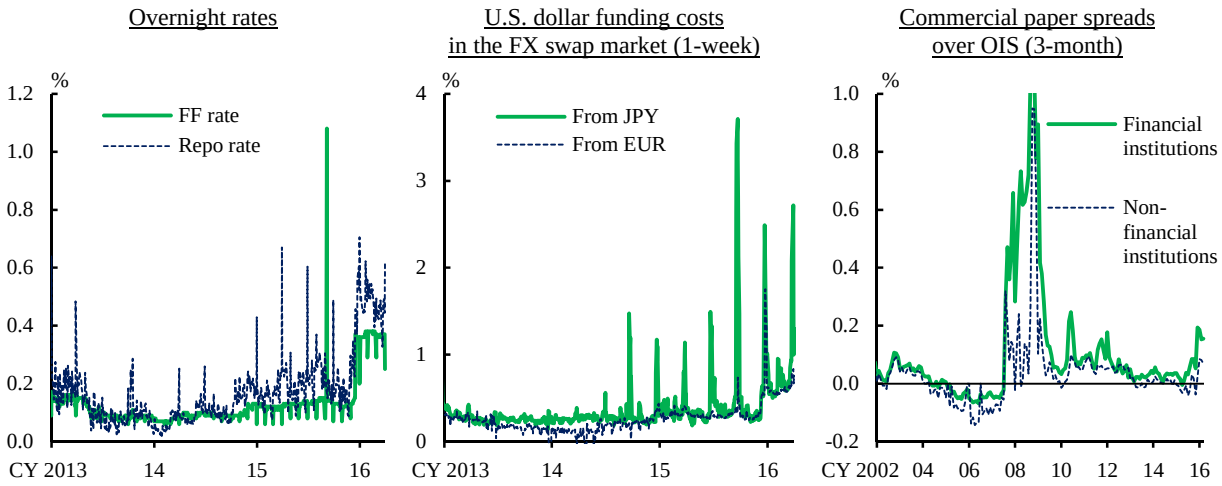
Notes: *1*. In the left-hand chart, the latest data are as of end-December 2015.
2. In the right-hand chart, the latest data are as of February 2016.
Sources: Haver Analytics; IMF; Ministry of Finance.

Furthermore, financial institutions' reduced appetite for arbitrage trading due to regulatory reforms may also be working toward declining market liquidity and limiting the supply of the U.S. dollar in the U.S. dollar money markets including FX swap markets. Specifically, market participants point out that global banks have reduced their arbitrage trading and market-making activities in the money markets, particularly due to the effects of the leverage ratio requirement.

In the U.S. money markets, a rise in quarter/month-end turn-rate has been observed in the GCF repo market and FX swap market -- in which there is relatively less diversity in market participants -- since around the middle of 2014. While there are few concerns on the dollar availability around the quarter-end, uncertainties regarding dollar rates have been increasing, and are also spreading to longer-term funding rates (Chart II-2-13).

[2] Real money investors with U.S. dollars, such as foreign reserve managers, sometimes invest in currency-hedged foreign currency assets to increase their returns on short-term investment. Taking the yen as an example, returns higher than those on U.S. Treasury Bills can be obtained when using holdings of the U.S. dollar to (1) borrow yen using the U.S. dollars as collateral in the FX swap market (supplying U.S. dollars in the FX swap market) and (2) purchase T-Bills in Japan.

Chart II-2-13: U.S. money market rates[1]



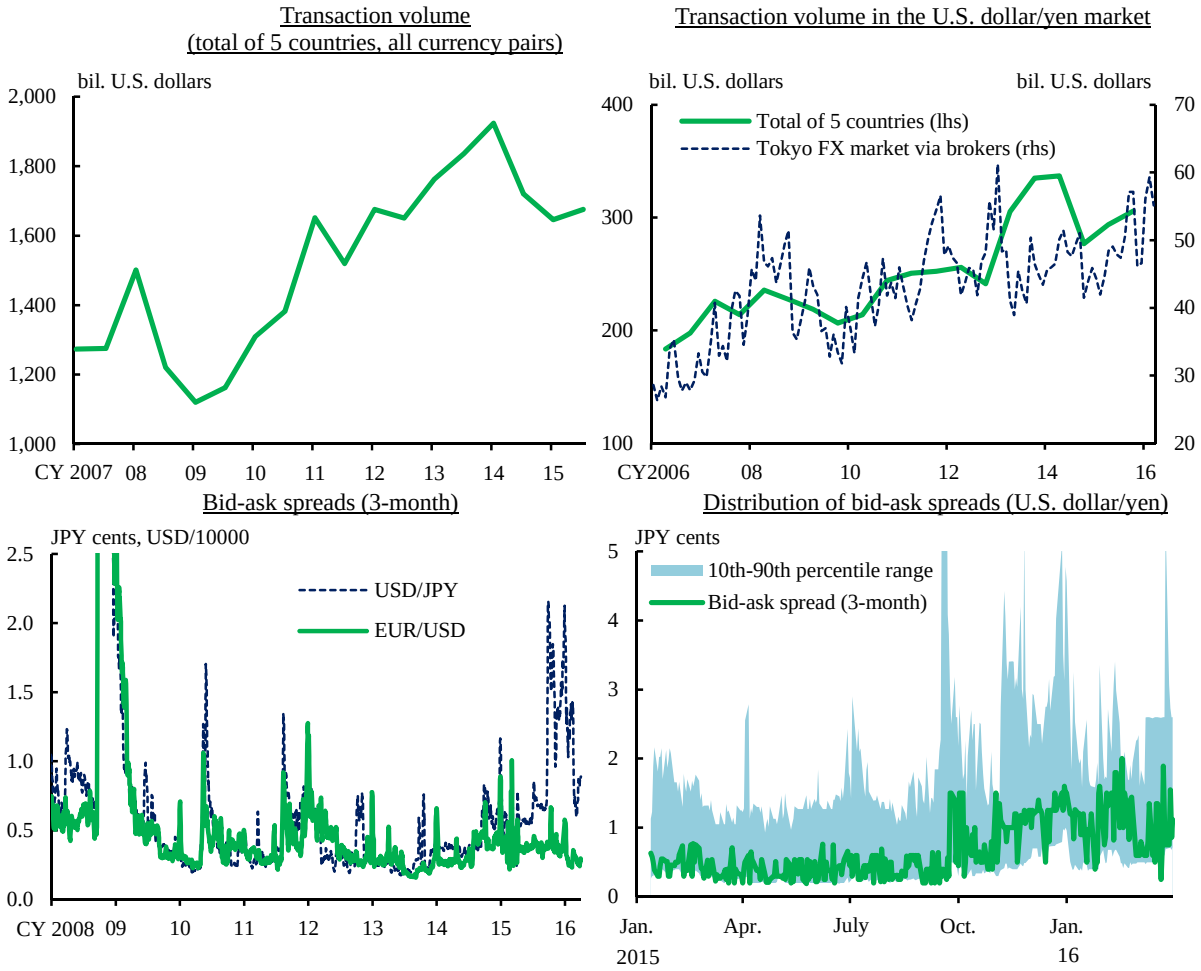
Note: *1*. The latest data are as of March 31, 2016 for the left-hand and middle charts; March 2016 for the right-hand chart.
Sources: Bloomberg; FRB; BOJ.

Under such conditions, liquidity indicators in FX swap markets have been deteriorating, albeit marginally. The transaction volume for the entire FX swap market seems to have been leveling off, although volume for the USD/JPY swap market -- in which there is strong demand for raising U.S. dollars -- has been increasing as a trend. Moreover, some market makers have become reluctant to take positions in the USD/JPY swap market as volatility at quarter-end has increased, and the bid-ask-spread for longer tenors has widened. Bid/ask prices by dealers also show that more dealers have become cautious to quote prices with narrow spreads, suggesting a deterioration in market depth (Chart II-2-14).

Looking forward from a somewhat longer perspective, improvement in the stability of financial institutions and financial systems through regulatory reforms would curb the risk of a rapid decline in market-making activities during times of stress, and would bring positive effects to market liquidity. Yet, in a phase where various regulations are gradually being implemented, a fair amount of time may be required for financial institutions and markets to absorb the impacts of these regulations and for such positive effects to be observed. In the course of a transition period to a new environment, careful attention should be paid to the liquidity and functioning of the market.[3]

[3] For details on global discussions regarding market liquidity (e.g., effects of financial regulations and change in market conditions), see the following studies by the Bank for International Settlements (BIS) and the Office of Financial Research (OFR). As an example, OFR (2015), while emphasizing the importance of regulatory reforms to address critical systemic vulnerabilities revealed by the financial crisis, introduced the market view that regulatory reforms also affected funding and market liquidity. BIS, "Fixed Income Market Liquidity," *CGFS papers* No. 55, January 2016. Office of Financial Research, *Financial Stability Report*, 2015.

Chart II-2-14: Liquidity indicators for the FX swap market[1,2,3,4]



Notes: *1*. In the upper two charts, 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 each transaction volumes between the countries is not adjusted. The latest data are as of October 2015.

2. In the upper right-hand chart, "Tokyo FX market via brokers" is the average transaction volume of FX swaps per day, including outright forwards. The latest data are as of March 2016.

3. In the lower left-hand chart, figures are 5-day 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. The latest data are as of March 31, 2016.

4. In the lower right-hand chart, the shaded area indicates the 10th-90th percentile range of bid-ask spreads by 24 foreign banks calculated on their daily closing prices. The solid line indicates the daily bid-ask spread of the entire FX swap market at 17:00 in New York. The latest data are as of March 31, 2016.

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

C. Japanese financial markets

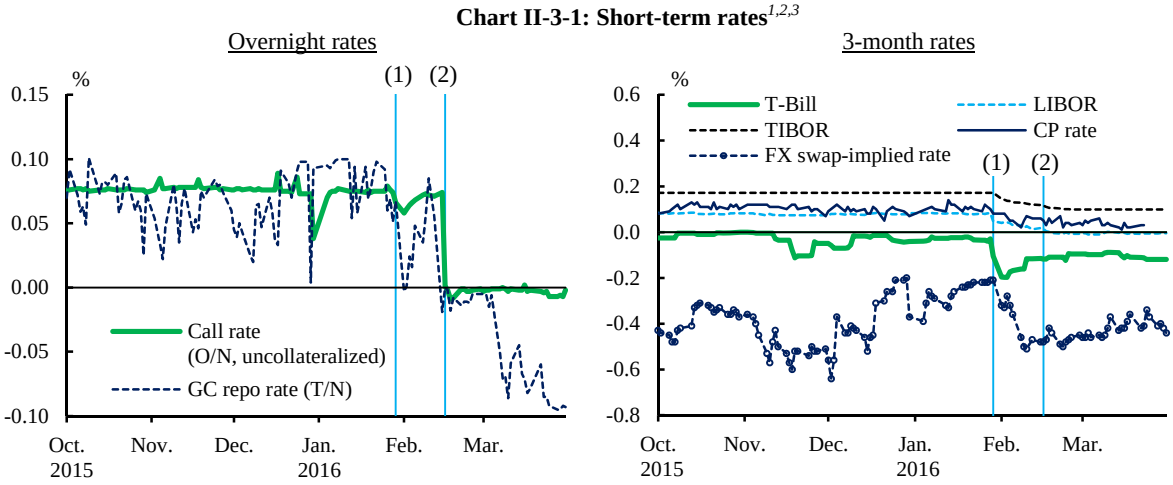
Volatile global financial markets have affected Japanese financial markets in the form of stock price declines, yen appreciation, and a rise in foreign-currency funding costs. However, interest rates have declined as a whole owing to QQE with a negative interest rate, and the credit markets have been stable relative to other economies.

1. Money markets

In the money markets, interest rates further declined after the negative interest rate of minus 0.1 percent on the Bank's current accounts came into effect on February 16, 2016.

For overnight rates, the call rate (O/N, uncollateralized) and the GC repo rate (T/N) declined to around zero after the negative interest rate came into effect on February 16, and the February reserve maintenance period (February 16 to March 15) commenced. The uncollateralized call rate turned marginally negative on the following day (17th), and has remained generally at the same level. The GC repo rate plunged deeper into negative territory with fluctuations. Interest rates on term instruments have moderately declined after the announcement of introducing QQE with a negative interest rate on January 29 (Chart II-3-1).

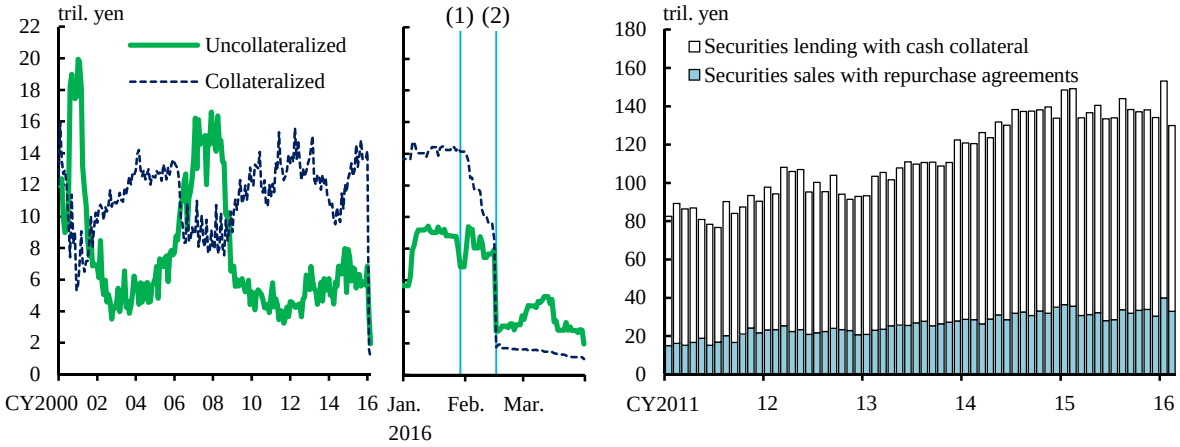
Chart II-3-1: Short-term rates[1,2,3]



Notes: *1*. In the left-hand chart, the horizontal axis indicates the start dates of the transactions.
2. (1) indicates the announcement of introducing QQE with a negative interest rate; (2) indicates the effective start date of the negative interest rate.
3. The latest data are as of March 23, 2016 for the CP rate; March 31, 2016 for others.
Sources: Bloomberg; Japan Bond Trading; JASDEC; JSDA; BOJ.

Amounts outstanding in call markets declined significantly after the introduction of a negative rate, although in repo markets the amount outstanding has not declined as much (Chart II-3-2). Both uncollateralized and collateralized transactions declined significantly on the effective date for the negative interest rate. The amount outstanding for the uncollateralized call market has been fluctuating somewhat, as it increased moderately toward the end of the February reserve maintenance period but decreased again in the first half of the March reserve maintenance period. The amount outstanding for the collateralized call market developed at low levels.

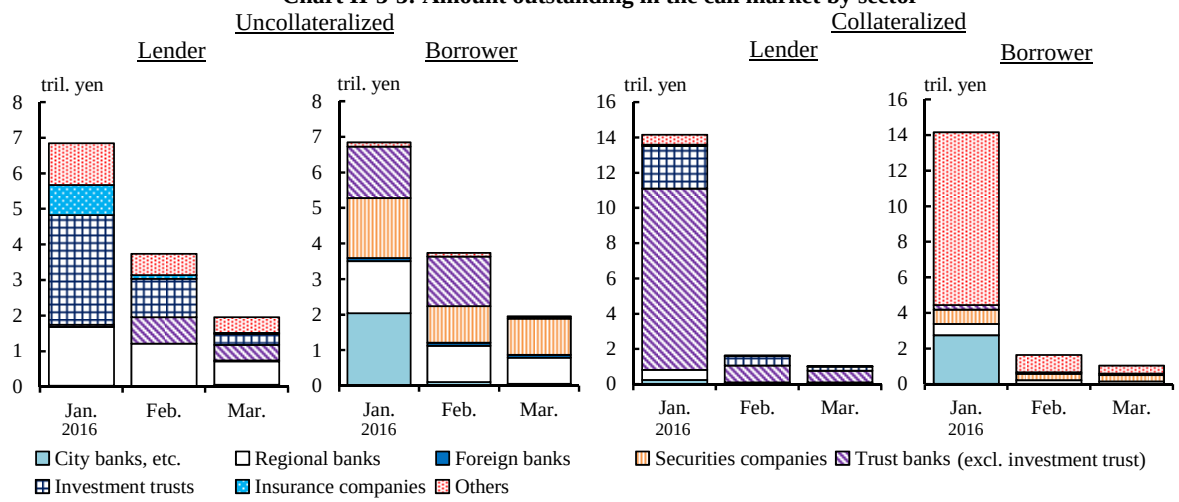
Chart II-3-2: Amount outstanding in money markets[1,2]



Notes: *1*. (1) indicates the announcement of introducing QQE with a negative interest rate; (2) indicates the effective start date of the negative interest rate.
2. The latest data are as of March 31, 2016 for the call market; end-February 2016 for the repo market.
Sources: Association of Call Loan and Discount Companies; JSDA.

The roster of lenders and borrowers has also changed. In the uncollateralized call market, "investment trusts" including MRFs and MMFs significantly reduced their lending due to difficulties in managing assets at a positive rate. Similarly, in the collateralized call market, in addition to investment trusts, "trust banks" also reduced their lending as a measure to manage idle money in their trust accounts. This idle money of investment funds and trust accounts was transferred to lending to banking accounts of "trust banks," and "trust banks" increased their lending in the uncollateralized call market. For the borrowers' side, "city banks" cut down their borrowings in the uncollateralized call market to suppress an increase in the Bank's current accounts upon concerns of a large inflow of corporate deposits. In the collateralized market, "others," including *tanshi* companies (money market dealers and brokers), also decreased their borrowings (Chart II-3-3). In addition, many financial institutions on both the lender and borrower sides have practical difficulties on trading at negative rates, such as systems not supported to handle negative rates. At the same time, in the repo market, while investment trusts decreased cash lending, city banks reduced cash borrowing. However, the amount outstanding in repo markets has not declined as much, mainly for the following reasons: (1) on the borrowers' side, securities companies' demand for funding has continued to be observed, and (2) on the lenders' side, cash lending has been observed by entities that have a large amount of negative-rate account (Policy-Rate Balance), such as trust banks whose idle money has been increasing.

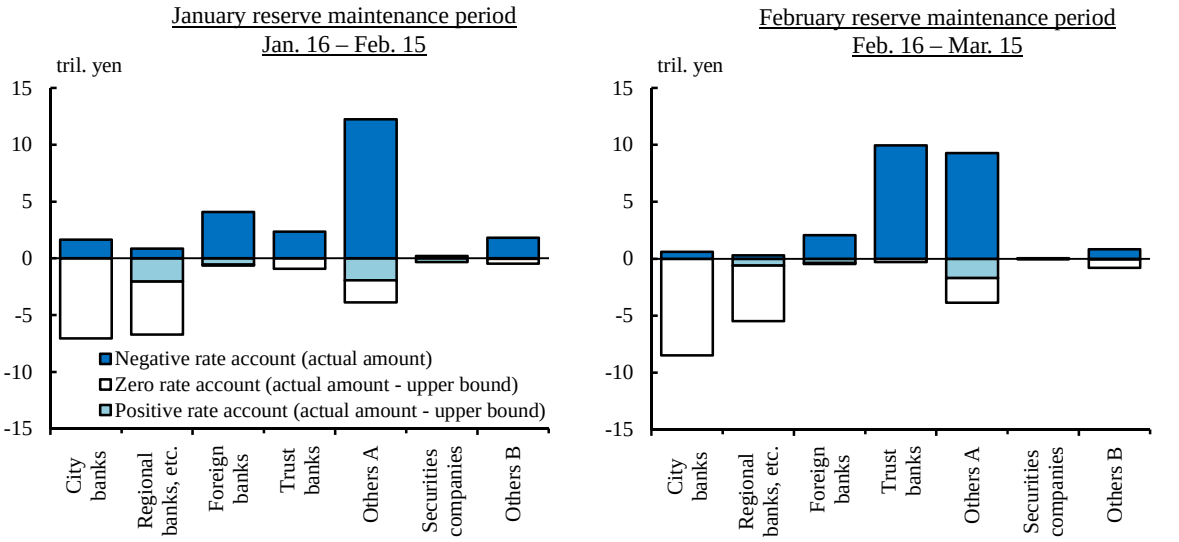
Chart II-3-3: Amount outstanding in the call market by sector[1]



Note: *1*. "Others" for the collateralized call market borrower includes *tanshi* companies. The data are based on the amount outstanding at the month-end.
Source: BOJ.

In the money markets, some transactions between financial institutions with current account balances applicable to the negative interest rate and those applicable to positive or zero interest rates have been observed. However, due partly to practical limits, there is still a considerable amount of unused balances to which positive or zero rates are applicable (Chart II-3-4).

Chart II-3-4: BOJ current account balances by sector[1,2]



Notes: *1*. "Others A" indicates other institutions subject to the reserve requirement. "Others B" indicates institutions not subject to the reserve requirement, excluding securities companies.
2. Figures for the January reserve maintenance period are calculated by hypothetically applying the "Framework for a Negative Interest Rate on Current Accounts at the Bank."
Source: BOJ.

With a view to smoothly implementing QQE with a negative interest rate, the Bank decided the following at the Monetary Policy Meeting (MPM) held in March: in light of

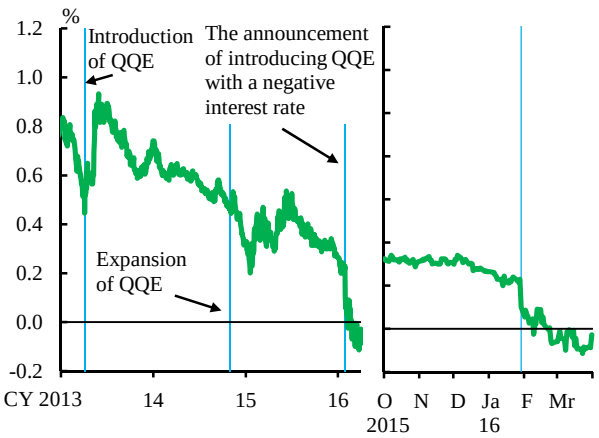
the role of MRFs in fund settlement for securities transactions, the amount outstanding of MRFs entrusted to a trust bank will be added to its Macro Add-on Balance, to which a zero interest rate will be applied (up to the amount outstanding of MRFs entrusted to this trust bank during the previous year).

In the meantime, various efforts are being implemented among market participants to handle negative interest rates (see Box 1). The Bank intends to continue to support market participants in their efforts toward improving market infrastructure, so that smooth financial transactions will be realized under the negative interest rate environment.

2. JGB markets

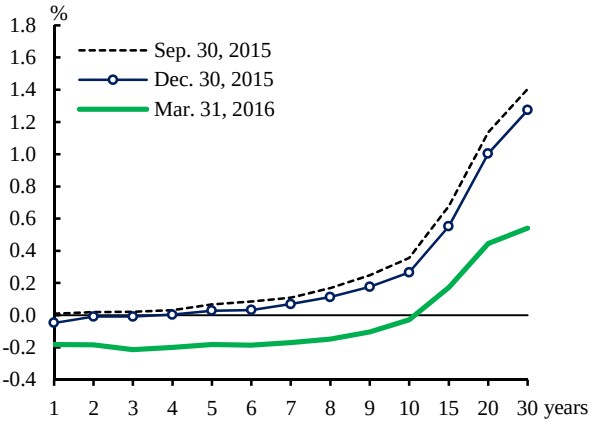
Since the announcement of introducing QQE with a negative interest rate, yields for JGBs have fallen across the curve, and yields on 10-year JGBs have been in negative territory (Charts II-3-5 and II-3-6).[4] **The volatility of government bond prices also increased after the introduction of QQE with a negative interest rate** (Chart II-2-1).

Chart II-3-5: Long-term JGB yields[1]



Note: *1*. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart II-3-6: JGB yield curve



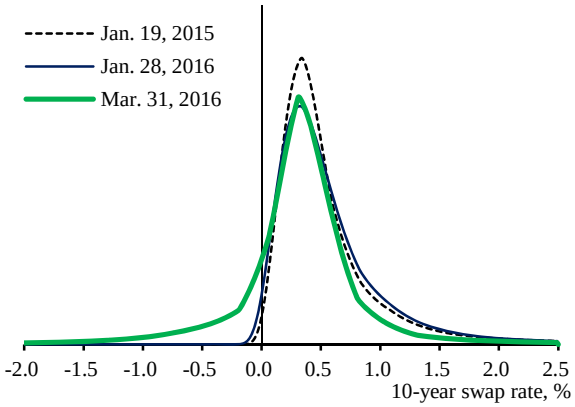
Source: Bloomberg.

The implied risk neutral density function of 10-year swap rates since the introduction of QQE with a negative interest rate suggests that market participants were vigilant to the risk of long-term interest rates becoming largely negative (Chart II-3-7). Looking at the trading volume of JGBs by type of investor, foreign investors whose JPY funding costs

[4] 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), and the announcement of introducing QQE with a negative interest rate (January 29, 2016).

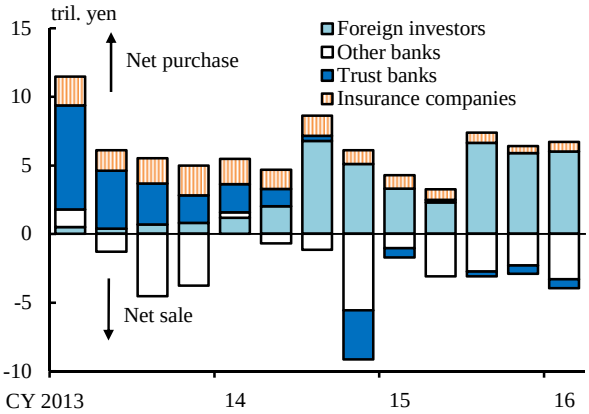
in FX swap markets are significantly negative remain net purchasers (Chart II-3-8).

Chart II-3-7: Implied distribution of 10-year swap rate[1]



Note: *1*. The density function is calculated from 2-year options on 10-year swaps.
Sources: Bloomberg; BOJ.

Chart II-3-8: Trading volume of JGBs by type of investor[1]



Note: *1*. The latest data are as of January-February 2016 (converted into quarterly amount).
Source: JSDA.

Liquidity and functioning of the JGB market

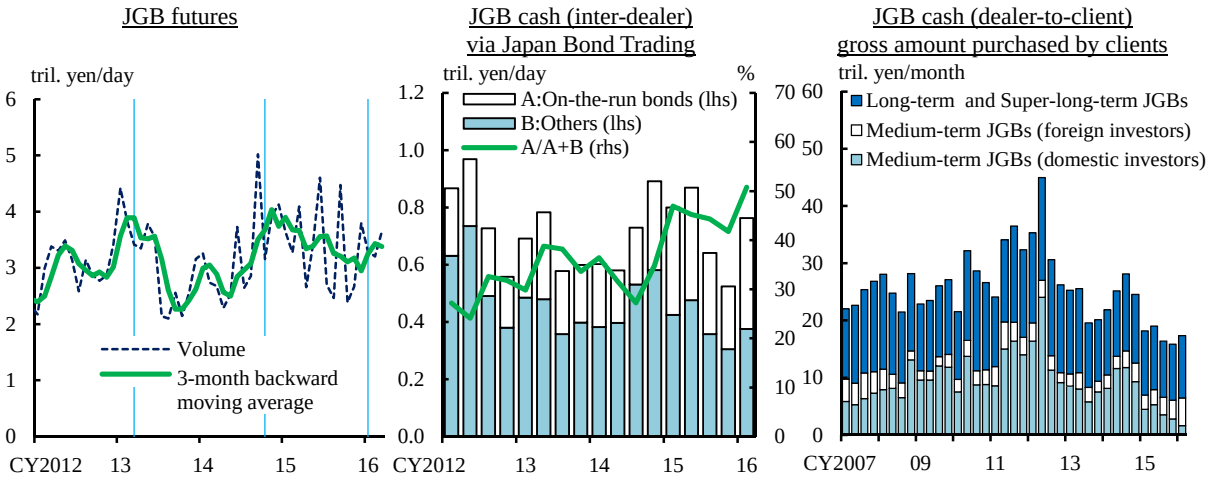
Since the announcement of introducing QQE with a negative interest rate, many liquidity indicators suggest that liquidity in the JGB market has deteriorated. We examine liquidity in the JGB market from the following indicators: transaction volume, bid-ask spreads, market depth, and resiliency.[5]

Transaction volume increased both for JGB futures and cash JGBs (inter-dealer, newly issued) after the introduction of QQE with a negative interest rate. On the other hand, inter-dealer transactions for off-the-run cash JGBs are at low levels. Dealer-to-client transactions are also at low levels, and, notably, dealers' transactions of medium-term JGBs (2-year and 5-year JGBs) with domestic investors are following a downward trend (Chart II-3-9).

Although the bid-ask spreads moderately tightened after widening toward the middle of February, they are still at a fairly high level. 2-year JGBs in particular are tending to become wider after the second half of fiscal 2014 (Chart II-3-10).

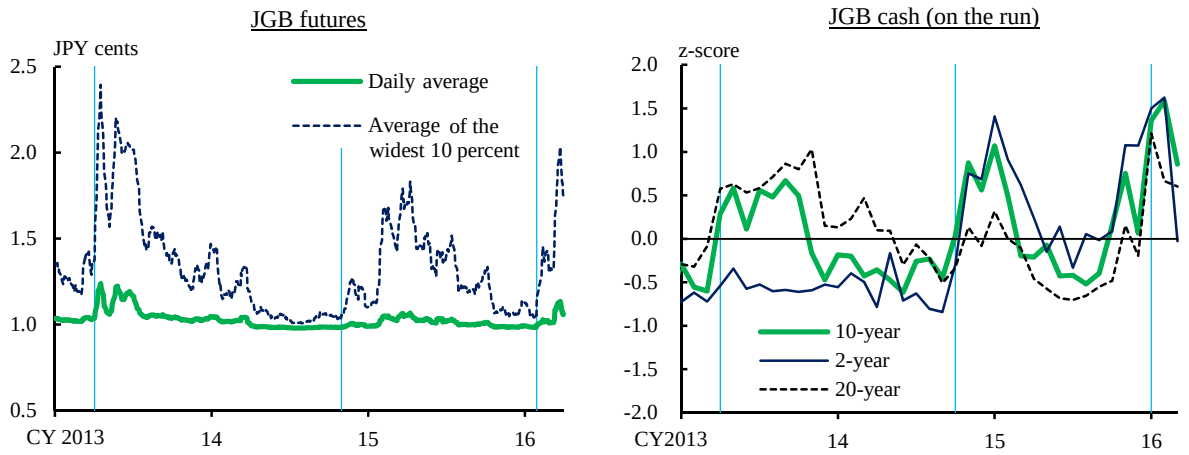
[5] The Financial Markets Department of the Bank of Japan updates and releases liquidity indicators of the JGB markets, generally each quarter. For the definition of each indicator, please refer to Tetsuo Kurosaki, Yusuke Kumano, Kota Okabe, and Teppei Nagano, "Liquidity in JGB Markets: An Evaluation from Transaction Data," Bank of Japan Working Paper, 15-E-2, May 2015.

Chart II-3-9: Transaction volume in the JGB market[1,2,3]



Notes: *1*. In the left-hand chart, the latest data are as of March 2016.
2. The middle chart shows transaction volume of 2-year, 5-year, 10-year, 20-year, 30-year, and 40-year JGBs. The latest data are as of the January-March quarter of 2016.
3. In the right-hand chart, "Others," which is the government, BOJ, etc., is excluded from "clients." The latest data are as of January-February 2016 (converted into quarterly amount).
Sources: Bloomberg; JSDA; QUICK.

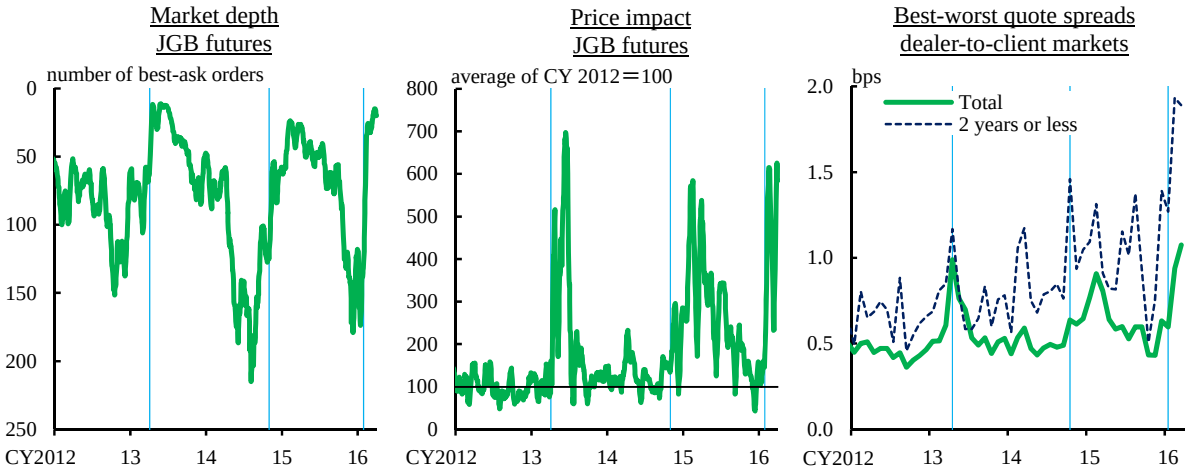
Chart II-3-10: Bid-ask spreads in the JGB market[1,2]



Notes: *1*. In the left-hand chart, figures are calculated by using the bid-ask spread data with a 1-minute frequency. "Average of the widest 10 percent" is the average of the widest 10 percent of that data. 10-day backward moving average. The latest data are as of March 31, 2016.
2. In the right-hand chart, bid-ask spreads are standardized by the standard deviation after subtracting the average bid-ask spreads after 2010. The latest data are as of March 2016.
Sources: Nikkei Inc., "NEEDS"; Thomson Reuters Markets; BOJ.

For market depth and resiliency, all indicators for JGB futures and cash JGB markets suggest that market liquidity has been deteriorating since the end of January 2016. In addition, for bonds with maturities of 2 years or less, best-worst quote spreads are widening as a trend (Chart II-3-11).

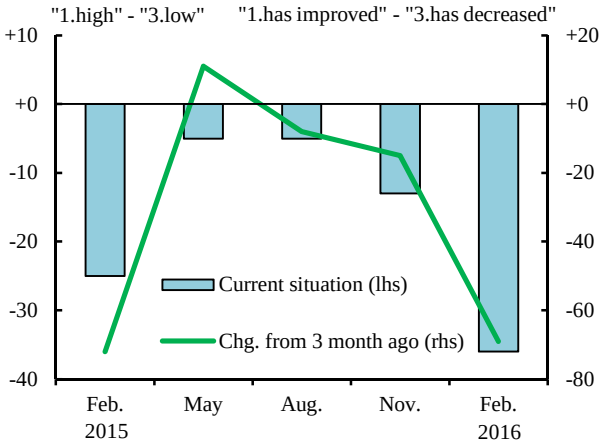
Chart II-3-11: Market depth and resiliency in the JGB market[1,2,3]



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. The latest data are as of March 31, 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 Note 5 for more details on the estimation methods. 10-day backward moving average. The latest data are as of March 31, 2016.
3. In the right-hand chart, a portion of transactions with quite wide spreads are excluded from the calculation. The latest data are as of March 2016.
Sources: Nikkei Inc., "NEEDS"; Yensai.com; BOJ.

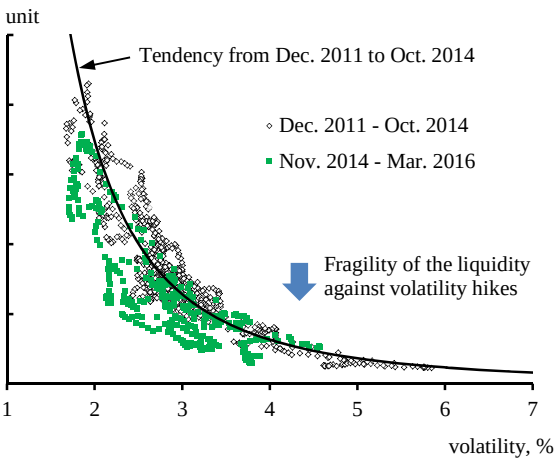
Judging from these as a whole, many indicators suggest that liquidity in the JGB markets has deteriorated since the announcement of introducing QQE with a negative interest rate. Moreover, for liquidity in off-the-run and short-term bond markets, some indicators suggest that it has been declining as a trend. In a survey conducted by the Bank on bond market participants, the number of respondents who point out that market liquidity is low has been increasing, including the November 2015 survey when liquidity indicators were at favorable levels (Chart II-3-12). This may be due to market participants' concerns toward the risk of a rapid deterioration in market liquidity and functioning at times of stress. In fact, market liquidity seems to have become more sensitive to market stress measured by volatility (Chart II-3-13). Bearing in mind the changes in the environment surrounding the JGB market, such as large-scale monetary easing, changes in financial regulation, and the increase in high-frequency trading in the futures market, it is necessary to continue to carefully monitor whether robustness of the JGB market toward stress is maintained, and whether market liquidity will not structurally decline.

Chart II-3-12: Bond market survey[1,2]



Notes: *1*. The degree of bond market functioning from the surveyed institutions' viewpoint.
2. The latest survey was conducted between February 8-16, 2016.
Source: BOJ, "Bond Market Survey."

Chart II-3-13: Market volatility and liquidity[1,2]

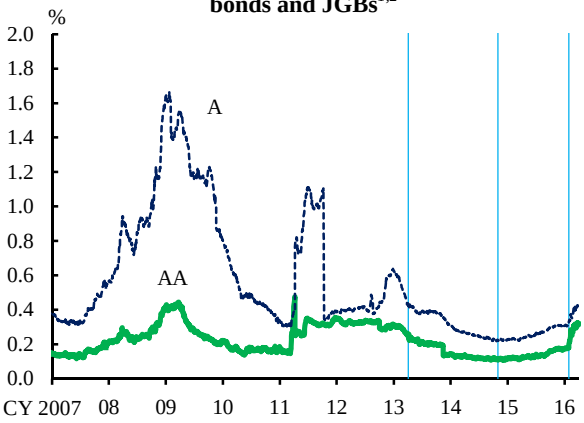


Notes: *1*. The horizontal axis indicates the implied volatility calculated from JGB futures options. The vertical axis indicates market depth in the JGB futures market.
2. The latest data are as of March 31, 2016.
Sources: Bloomberg; Nikkei Inc., "NEEDS"; BOJ.

3. Credit and stock markets

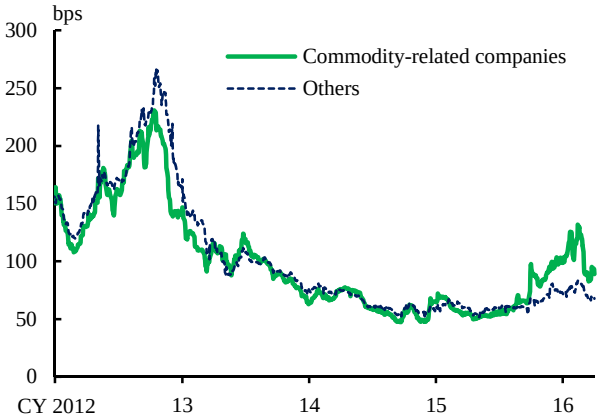
Credit spreads on corporate bonds continued to be at low levels as a whole, with limited effects of the widening of credit spreads in the global financial markets (Chart II-3-14). Since the end of January 2016, credit spreads have widened somewhat. However, this is because JGB yields had declined faster than corporate bond yields and there does not appear to be any major change in market evaluation of actual credibility of the companies. Credit default swap (CDS) premiums for some issues related to commodities widened somewhat, but the degree of widening is relatively limited compared to overseas (Chart II-3-15).

Chart II-3-14: Yield spreads between corporate bonds and JGBs[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. The latest data are as of March 31, 2016.
Source: JSDA.

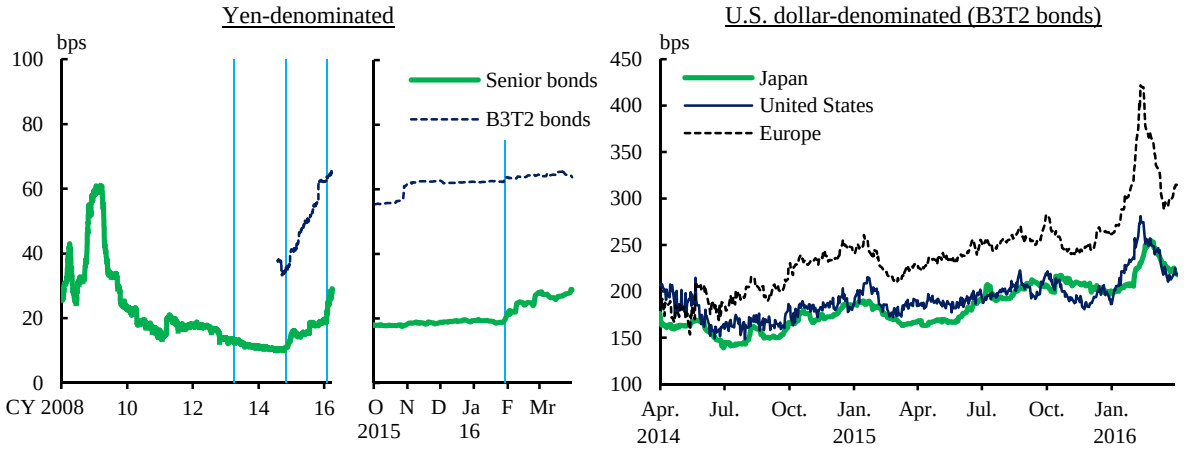
Chart II-3-15: CDS premiums[1,2]



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. The latest data are as of March 31, 2016.
Source: Bloomberg.

Credit spreads on major banks have widened somewhat, partly due to a sharp decline in JGB yields, but have remained at low levels (Chart II-3-16). Credit spreads on yen-denominated Basel-III compliant Tier II bonds (B3T2 bonds) widened somewhat compared to the extremely tight levels seen immediately after the first issuance. However, when compared with spreads for similar bonds issued by overseas financial institutions, spreads for not only yen-denominated but also U.S. dollar-denominated B3T2 bonds remain at the same or lower levels.

Chart II-3-16: Yield spreads between bank corporate bonds and government bonds[1,2,3]



Notes: *1*. In the left-hand chart, three major banks (Bank of Tokyo-Mitsubishi UFJ, Mizuho Bank, and Sumitomo Mitsui Banking Corporation) are counted. Yield spreads on "B3T2 bonds" are calculated by QUICK.
2. In the right-hand chart, figures calculated for Japan, the United States, and Europe are simple averages of B3T2 bonds for two major banks (Mizuho Bank and Sumitomo Mitsui Banking Corporation), four financial institutions (Bank of America, Citi, J.P. Morgan and Wells Fargo), and nine financial institutions (Barclays, BNP Paribas, BPCE, Crédit Agricole, Deutsche Bank, HSBC, RBS, Santander, and Societe Generale), respectively.
3. The latest data are as of March 31, 2016.
Sources: Bloomberg; JSDA; QUICK.

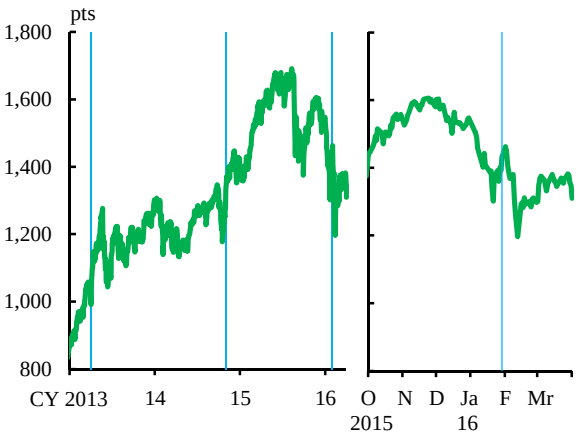
Japanese stock prices declined after the beginning of 2016 with a rise in volatility, as stock prices declined globally (Charts II-3-17 and II-2-1).

Breaking down Japanese stock prices by sector, commodity-related and foreign demand-related sectors declined largely amid increased awareness of uncertainties over overseas economies, decrease in commodity prices, and appreciation of the yen. A large decline in the financial sector was observed as European financial stocks showed signs of nervousness and as market participants became vigilant toward the effect of negative interest rates on financial sector profits. On the other hand, domestic demand-related stocks remained relatively stable (Chart II-3-18).

Observing the skew of market participants' recognition of future risks from risk reversals (the difference in implied volatilities between call and put options), market participants' concerns over the decline in stock prices strengthened temporarily after the beginning of 2016 (Chart II-3-19). Stock trading activity by type of investor shows that

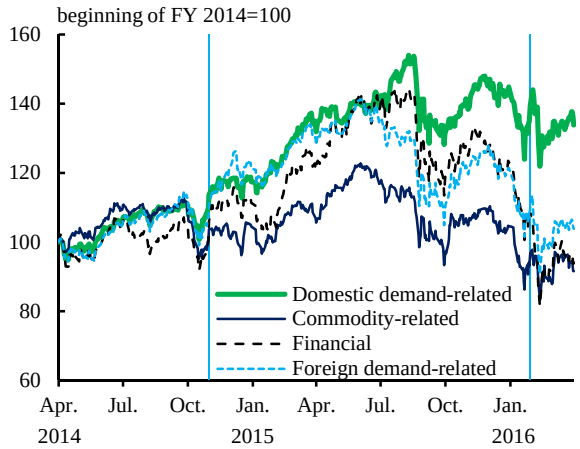
while foreign investors became sellers, individuals became purchasers. Nevertheless, with an increase in unrealized losses on stockholdings, inflows from contrarian individual investors through leveraged ETFs and margin trading seem to have been weak since the turn of 2016, compared to the summer of 2015 (Chart II-3-20). Current stock price valuations suggest that Japanese stock prices are not overvalued when compared with those for U.S. and European stocks (Chart II-3-21).

Chart II-3-17: Stock prices (TOPIX)[1]



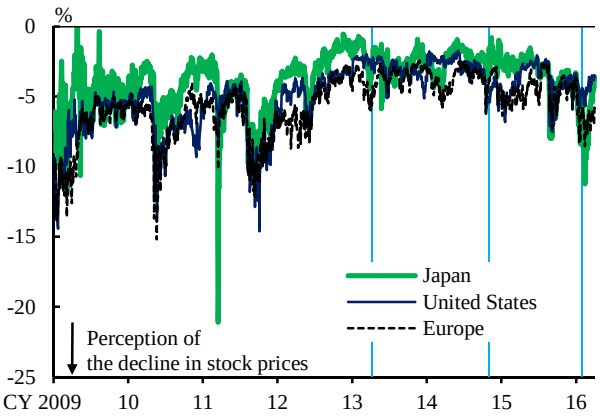
Note: *1*. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart II-3-18: Stock prices by sector[1,2]



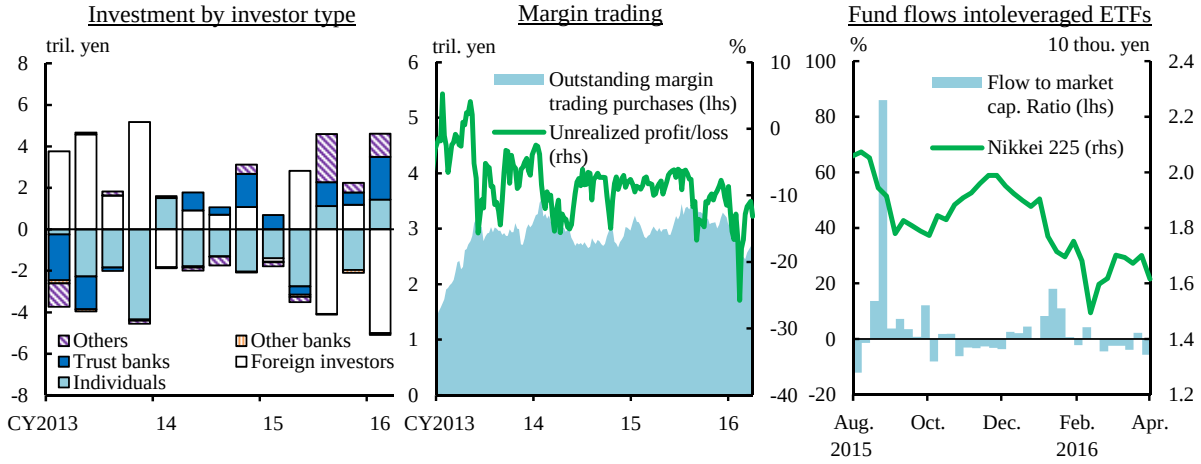
Notes: *1*. Figures are simple averages of the following sub-indices by sector: six indices (IT & services others, transportation & logistics, pharmaceutical, construction & materials, retail trade, foods) for domestic demand-related; five indices (electric appliances & precision instruments, automobiles & transportation equipment, raw materials & chemicals, machinery, steel & nonferrous metals) for foreign demand-related; two indices (banks, financial institutions excluding banks) for financial institutions; two indices (commercial & wholesale trade, energy resources) for commodity-related.
2. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart II-3-19: Risk reversals of stock prices[1,2]



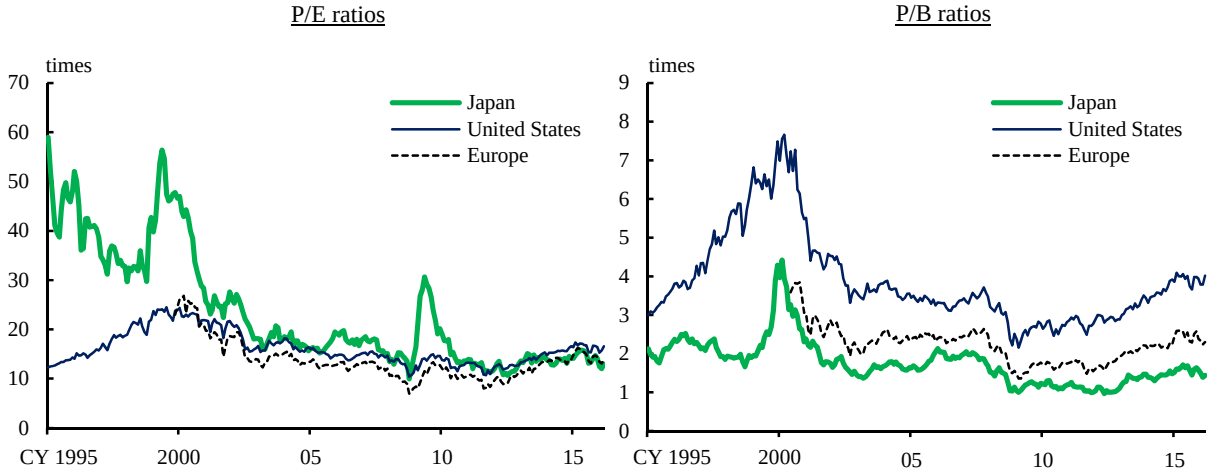
Notes: *1*. Nikkei 225 options for Japan; S&P 500 options for the United States; EURO STOXX 50 options for Europe.
2. The latest data are as of March 31, 2016.
Sources: Bloomberg; BOJ.

Chart II-3-20: Investors' activity in the stock market[1,2,3]



Notes: *1*. In the left-hand chart, the latest data are as of the January-March quarter of 2016.
2. In the middle chart, the latest data are as of April 1, 2016.
3. In the right-hand chart, the latest data are as of the week ending April 1, 2016.
Sources: Bloomberg; JPX; BOJ.

Chart II-3-21: P/E and P/B Ratios[1,2]



Notes: *1*. In the left-hand chart, figures are calculated using expected EPS for the next 12 months. The latest data are as of end-March 2016.
2. In the right-hand chart, financial institutions are excluded. The latest data are as of end-March 2016.
Sources: Bloomberg; Thomson Reuters Markets.

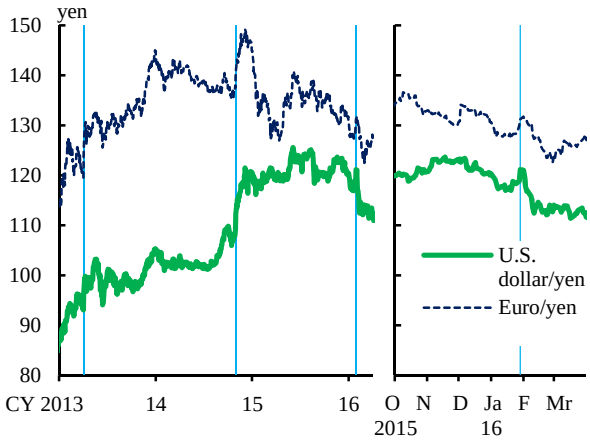
4. Foreign exchange markets

The yen appreciated against the U.S. dollar (Chart II-3-22). **The volatility of the yen's exchange rates rose somewhat after the beginning of 2016** (Chart II-2-1).

The yen strengthened against the U.S. dollar after the beginning of 2016, due to growing concerns for a slowdown in the global economy and normalization of U.S. monetary policy to become moderate. Risk reversals show that after the turn of the year, market participants showed a rapid increase in vigilance toward the yen's appreciation against the U.S. dollar (Chart II-3-23). The yen also appreciated against the euro due to

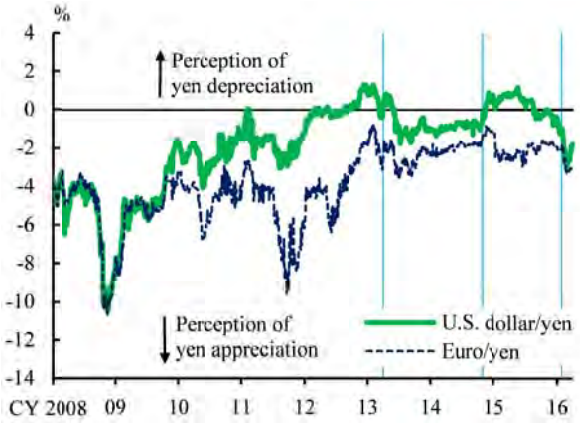
prospects for the ECB's further easing and widening of credit spreads in European financial institutions.

Chart II-3-22: Foreign exchange rates[1]



Note: *1*. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart II-3-23: Risk reversals of FX rates[1]



Note: *1*. 1-year risk reversals. The latest data are as of March 31, 2016.
Source: Bloomberg.

III. Examination of financial intermediation

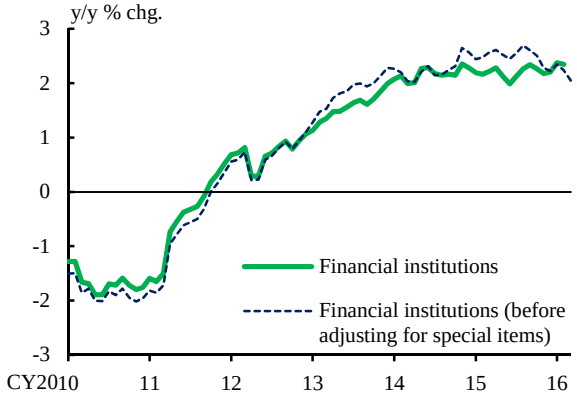
This chapter examines the functioning of the financial system, based mainly on financial information in the second half of fiscal 2015. First, we outline developments in financial intermediation by financial institutions, such as banks and *shinkin* banks, and investment activities by institutional investors. We then examine the state of financial intermediation through financial markets, before evaluating financial conditions among firms and households, as well as developments in their investment activities.

A. Financial intermediation by financial institutions

1. Domestic loans

The growth rate of financial institutions' domestic loans outstanding has been largely unchanged from the level observed in the previous *Report* (Chart III-1-1).

Chart III-1-1: Domestic loans outstanding among financial institutions[1,2]



Notes: *1*. For loans outstanding among financial institutions, the latest data are as of February 2016. For those before adjusting for special items, the latest data are as of March 2016.
2. Loans outstanding among financial institutions are average amounts outstanding after adjusting bank loans for special items which are composed of adjustment for exchange rate changes, adjustment for loan write-offs and related items, and adjustment for securitization of loans.
Source: BOJ, "Principal figures of financial institutions."

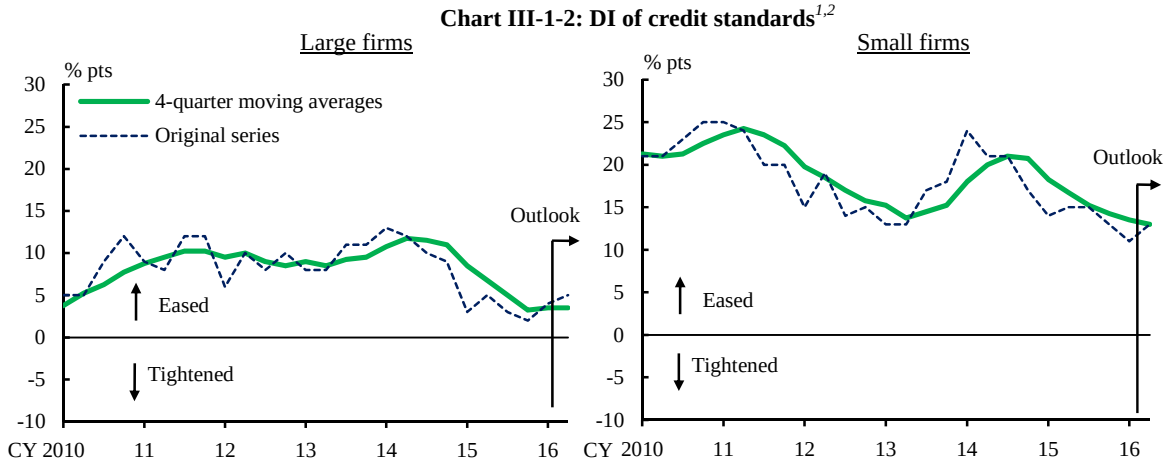
Lending stances of financial institutions and demand for funds

Financial institutions' lending stances have remained accommodative. In terms of loans to large firms, partly with a view to improving their non-interest income (fees and commissions related to foreign exchange, derivatives, and syndicated loans, etc.) associated with lending activities, major banks in particular have strengthened ties with their group companies to proactively meet demand for funds for merger and acquisition activities and business expansion at home and abroad. In terms of loans to small- and medium-sized firms, financial institutions have been working on extending loans, including to borrowers with lower credit ratings, while continuing to work together with

local governments and other entities toward revitalization of local economies, supporting, for example, start-up firms, business revitalization, succession of businesses, and firms' business matching. In addition, regional financial institutions have been strengthening efforts to revitalize local economies and firms, with a view to maintaining and buttressing their own customer bases. Regional financial institutions have also generally been active in lending to local governments. As for loans to individuals, financial institutions have maintained a proactive lending stance in terms of providing housing loans by lowering lending rates, while enhancing supplementary services, such as group credit life insurance that includes medical coverage. Financial institutions have also been expanding credit card loans, on which interest rate spreads are generally wider relative to corporate loans. Meanwhile, they have been active in providing loans to individuals in the housing rental business.

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 (Chart III-1-2).

Chart III-1-2: DI of credit standards[1,2]

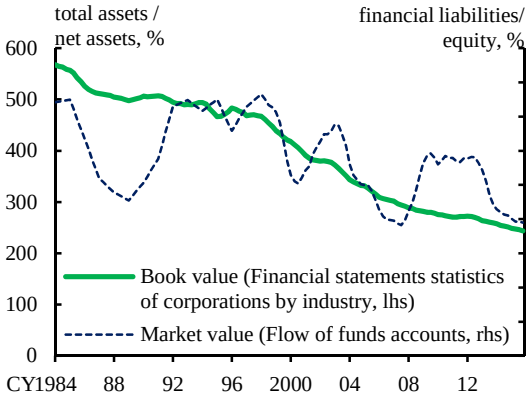


Notes: *1*. The latest data are as of January 2016.
2. DI of credit standards = (percentage of respondents selecting "eased considerably" + percentage of respondents selecting "eased somewhat" * 0.5) - (percentage of respondents selecting "tightened considerably" + percentage of respondents selecting "tightened somewhat" * 0.5).
Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

Demand for funds has increased moderately on the whole. Demand for funds in the corporate sector has been increasing moderately, amid the economic recovery, among other factors, while the overall situation of maintaining ample internal reserves within the corporate sector has remained unchanged (Charts III-1-3 to III-1-5). Within the household sector, housing loans, which account for a large portion of the sector, have been increasing at a slower pace recently, due to a decrease in sales mainly reflecting an

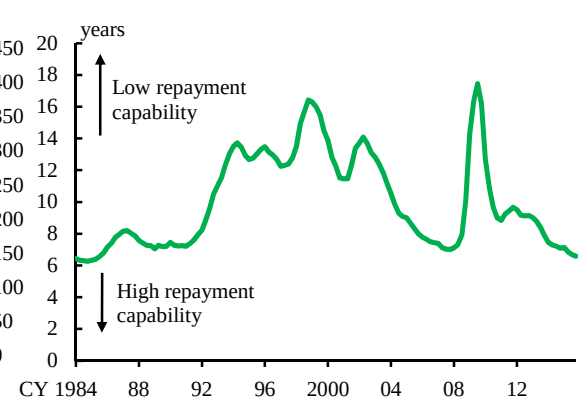
increase in condominium prices in the Tokyo metropolitan area (Chart III-1-6). However, since the implementation of QQE with a negative interest rate, there has been an increase in housing loan applications, mainly for refinancing, in response to the further decline in interest rates. Demand for funds for housing rental businesses continues to be robust.

Chart III-1-3: Firms' leverage ratio[1,2,3]



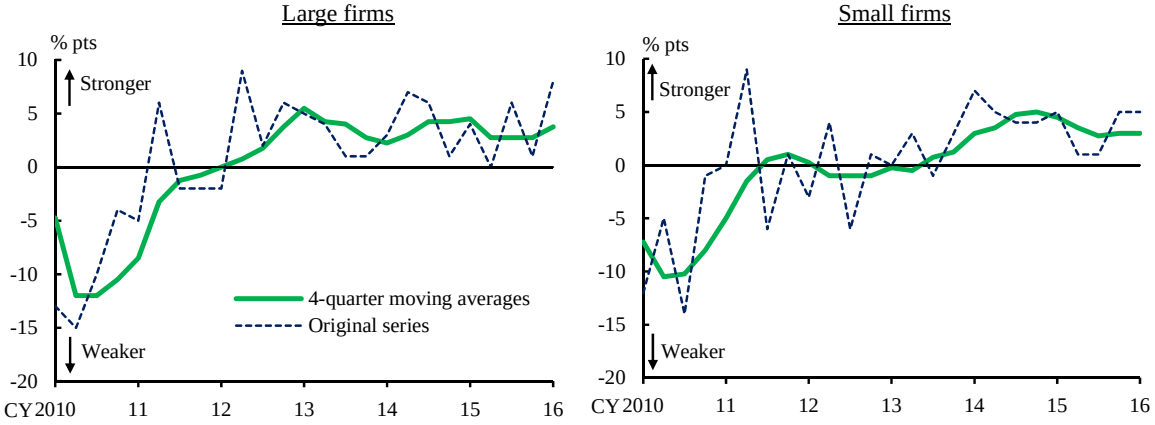
Notes: *1*. Data based on book value = total assets / net assets. Data based on market value = financial liabilities / equity.
2. Book value data are based on non-financial firms with capital of more than 10 million yen. Market value data from the January-March quarter of 1984 to the July-September quarter of 1997 are calculated by applying year-on-year rates of changes on the former basis data in those periods.
3. The latest data are as of end-December 2015; 4-quarter moving averages.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ, "Flow of funds accounts."

Chart III-1-4: Firms' debt / cash flow[1,2]



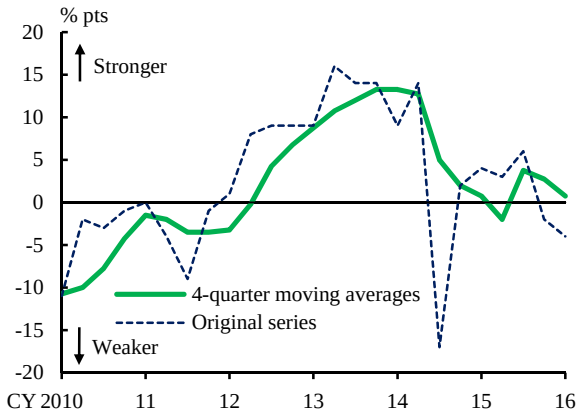
Notes: *1*. The data are based on non-financial firms with capital of more than 10 million yen. The latest data are as of the October-December quarter of 2015; 4-quarter moving averages.
2. Repayment capability = interest-bearing liabilities/ (operating profits + interest and dividends received, etc.).
Source: Ministry of Finance, "Financial statements statistics of corporations by industry."

Chart III-1-5: DI of firms' demand for loans as perceived by financial institutions (large firms and small firms)[1,2]



Notes: *1*. The latest data are as of January 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).
Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

Chart III-1-6: DI of demand for housing loans as perceived by financial institutions[1,2]



Notes: *1*. The latest data are as of January 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

Loans to firms have led loan growth among financial institutions. Looking at loan growth in the second half of fiscal 2015 by borrower classification, growth in loans to individuals was roughly unchanged from the previous period, while growth in loans to local governments has slowed somewhat (Chart III-1-7). Meanwhile, with regard to loans to firms, the increase in the amount of lending outstanding has been diffusing across small- and medium-sized firms, and has also been gradually broadening out to various industries and regions.

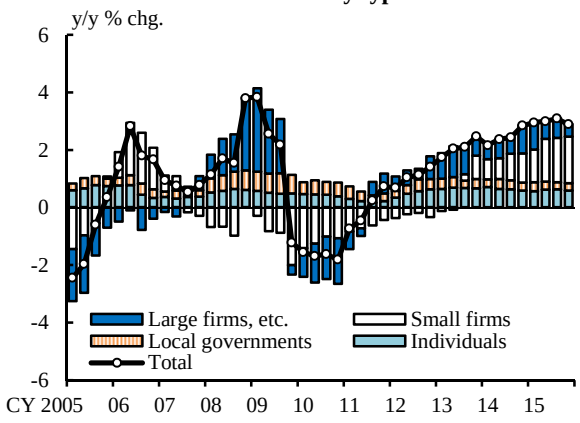
Looking at loans to firms according to firm size, growth in loans to large firms has remained essentially steady, albeit with some fluctuations, particularly for loans related to mergers and acquisitions, as well as foreign currency-denominated loans targeted at firms' overseas activities.[6] Merger and acquisition activity among Japanese firms has continued to be brisk, across both cross-border mergers and acquisitions -- targeting foreign companies (IN-OUT) -- and domestic mergers and acquisitions (IN-IN) (Chart III-1-8). Loans to small- and medium-sized firms have continued to increase, in terms of lending for both business fixed investment funds and working capital.

By industry, loans to a large number of sectors, including real estate, non-bank financing, and those categorized under "others," including leasing, have been increasing (Chart III-1-9). Meanwhile, loans extended by major banks to the wholesale and retail industries have decreased, mainly due to the decline in demand for funds related to

[6] The slight slowing in the rate of increase of loans to large firms in the second half of fiscal 2015 is partly attributable to the dissipation of the positive effects of the depreciation of the yen on the yen conversion of M&A-related loans denominated in foreign currencies (foreign currency-denominated impact loans).

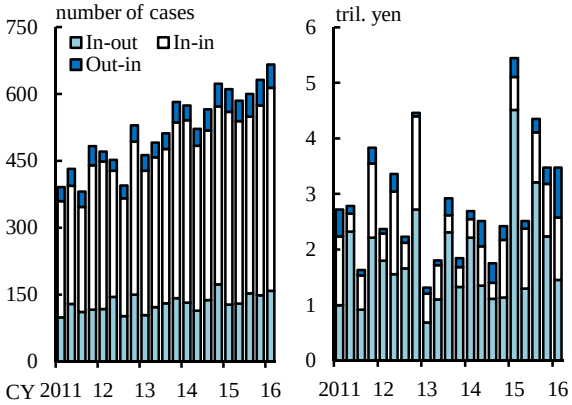
resource development investment and working capital for importing firms, amid the decline in crude oil and commodity prices.

Chart III-1-7: Loans outstanding among financial institutions by type of borrower[1]



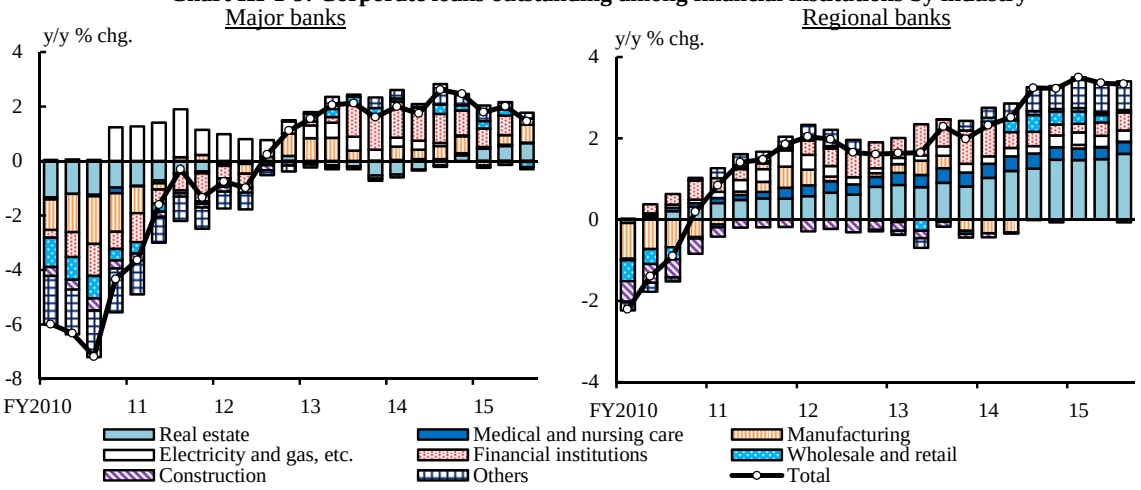
Note: *1*. The latest data are as of end-December 2015.
Source: BOJ.

Chart III-1-8: M&A among Japanese companies[1,2]



Notes: *1*. The latest data are as of the January-March quarter of 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.

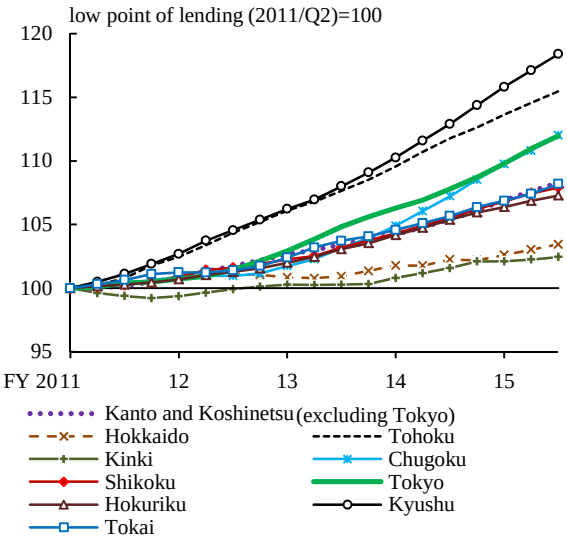
Chart III-1-9: Corporate loans outstanding among financial institutions by industry[1]



Note: *1*. The latest data are as of end-December 2015. Overseas yen loans, and domestic loans transferred overseas are excluded.
Source: BOJ.

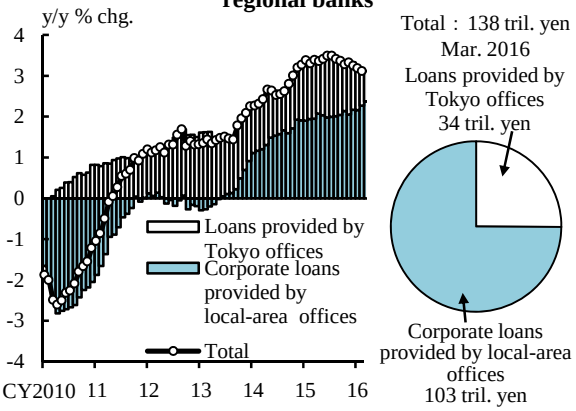
By region, loans have been growing in a large number of regions, including Kyushu, Tohoku, and Chugoku (Chart III-1-10). Loans extended by regional banks' branches in Tokyo have been growing at a somewhat slower pace, while loans to firms in other regions -- particularly local firms -- have been growing at a moderately faster pace (Chart III-1-11).

Chart III-1-10: Regional loans among banks[1]



Note: *1*. The latest data are as of end-December 2015; 4-quarter moving averages.
Source: BOJ.

Chart III-1-11: Corporate loans provided by regional banks[1]



Note: *1*. The latest data are as of March 2016.
Source: BOJ.

Loans by financial institutions utilizing the Bank of Japan's Loan Support Program have also been increasing (Chart III-1-12).[7,8] The Bank has enhanced its Growth-Supporting Funding Facility, among other measures, starting with its fund provisioning for fiscal 2016.[9] Looking at the utilization of the Bank's

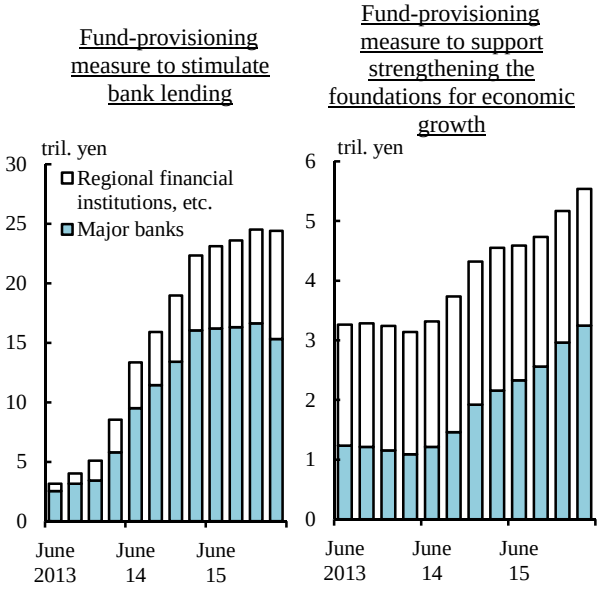
[7] With regard to the Stimulating Bank Lending Facility (for March 2016), which received applications after the introduction of QQE with a negative interest rate, several institutions have actively utilized the facility as a result of the change in the annual lending rate from 0.1 percent to 0 percent, while prepayments of loans have been observed in some cases amid possible collateral constraints. The outstanding amount of loans under the Bank's Loan Support Program has remained largely unchanged.

[8] At the Monetary Policy Meeting (MPM) held in March 2016, the Policy Board of the Bank decided that, with the aim of further supporting financial institutions' efforts to increase lending, in case where a financial institution increases the amount outstanding of borrowing from the Bank through the Loan Support Program and the Funds-Supplying Operation to Support Financial Institutions in Disaster Areas affected by the Great East Japan Earthquake, twice as much as the amount of increase in borrowing will be added to this financial institution's Macro Add-on Balance, to which a negative interest rate does not apply. It was decided that the above policy would take effect from the May 2016 reserve maintenance period.

[9] At the MPM held in December 2015, the Policy Board of the Bank extended by 1 year the application period for the Stimulating Bank Lending Facility and the Growth-Supporting Funding Facility, under which the last disbursement of new loans was scheduled to take place by end-June 2016 before the extension. Furthermore, the category "entities proactively investing in physical and human capital" was added to the list of possible areas to which financial institutions' investment or lending are recognized as eligible for the Bank's Growth-Supporting Funding Facility. At the MPM held in January 2016, the Policy Board decided to apply a zero interest rate to the Stimulating Bank Lending Facility, the Funds-Supplying Operation to Support Financial Institutions in Disaster Areas, and the Funds-Supplying Operation against Pooled Collateral, starting in March 2016.

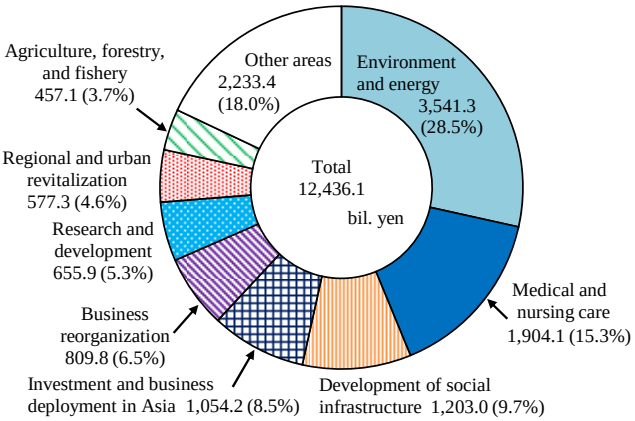
Growth-Supporting Funding Facility, utilization has been high in areas such as environment and energy, medical and nursing care, social infrastructure, and business operations in Asia (Chart III-1-13).

Chart III-1-12: BOJ's loan support program[1]



Note: *1*. The latest data are as of March 2016. The data for fund-provisioning measure to support strengthening the foundations for economic growth are based on the main rules.
Source: BOJ.

Chart III-1-13: BOJ's loan disbursements under the fund-provisioning measure to support strengthening the foundations for economic growth by area[1]

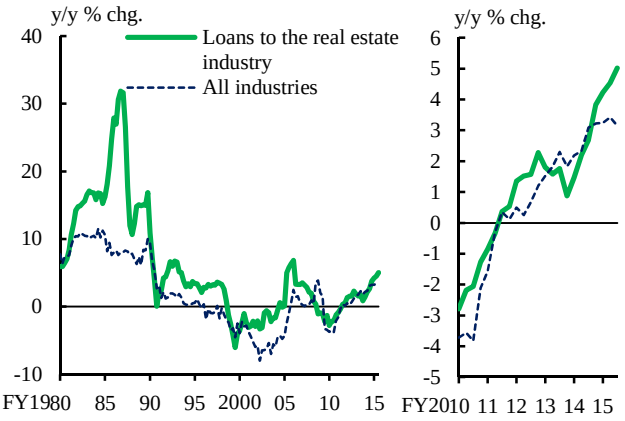


Note: *1*. Distribution of individual investment or lending in April 2010 - December 2015 by area for strengthening the foundations for economic growth. Main rules are counted.
Source: BOJ.

Developments in real estate loans

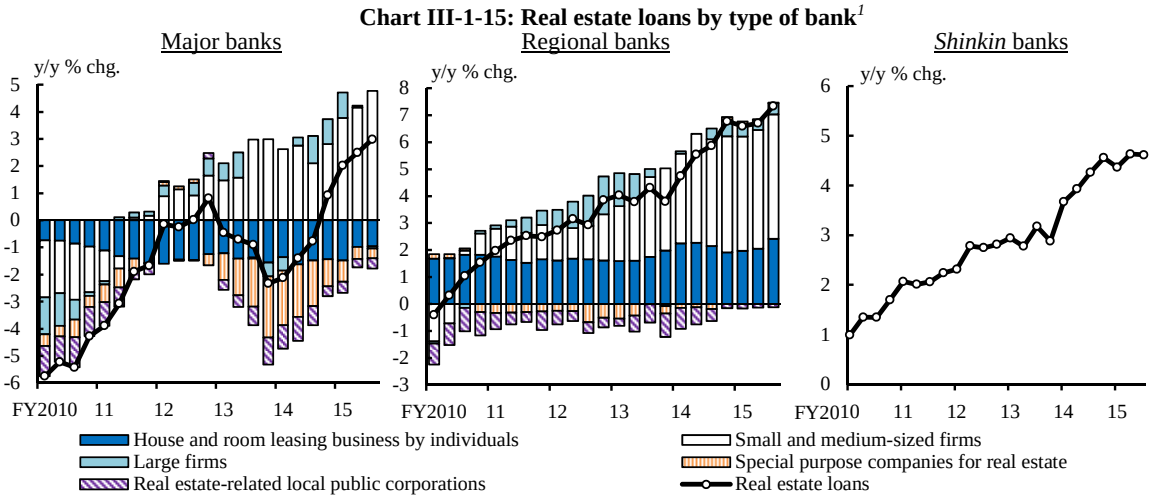
Real estate loans have been growing at an even faster pace, continuing to increase at a pace exceeding that of loans to firms in all industries (Chart III-1-14). The rate of growth in loans by both major banks and regional financial institutions has been increasing (Chart III-1-15).

Chart III-1-14: Loans to the real estate industry among financial institutions[1]



Note: *1*. The latest data are as of end-December 2015.
Source: BOJ.

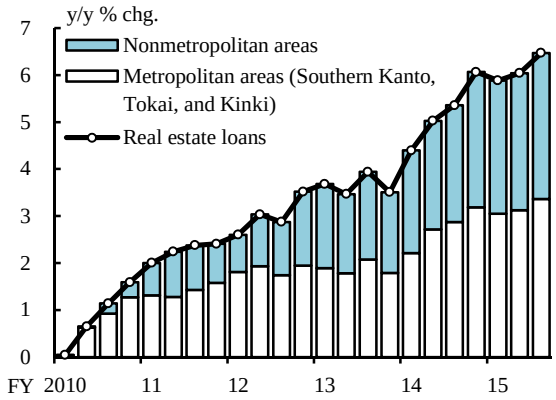
Chart III-1-15: Real estate loans by type of bank[1]



Note: *1*. The latest data are as of end-December 2015.
Source: BOJ.

The increase in loans by major banks is mainly attributable to J-REITs (classified as small- and medium-sized firms). Banks have also continued to respond proactively to demand for funds from large real estate developers as well as from private real estate funds (SPCs) sponsored mainly by foreign affiliated funds. Among regional financial institutions, loans to small firms in the housing rental business, i.e., asset management companies founded by individuals and local real estate companies have been growing at a faster pace. The recent growth in real estate loans has surpassed that observed during the real estate boom preceding the Lehman shock. 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-1-16).

Chart III-1-16: Real estate loans among regional financial institutions in metropolitan and nonmetropolitan areas[1,2]

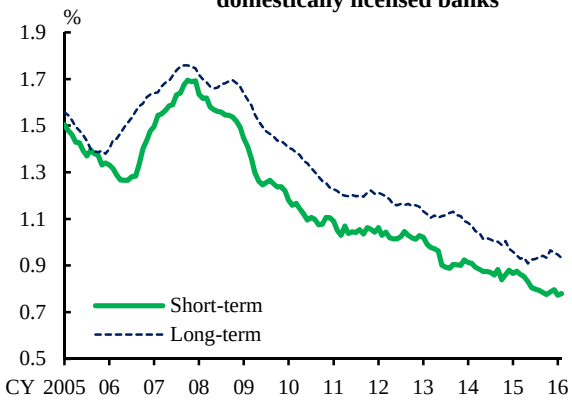


Notes: *1*. The latest data are as of end-December 2015.
2. For metropolitan areas, banks with head offices located in the Southern Kanto region, the Tokai region, and the Kinki region are counted, and for nonmetropolitan areas, banks with head offices located in other areas are counted.
Source: BOJ.

Developments in loan interest rates

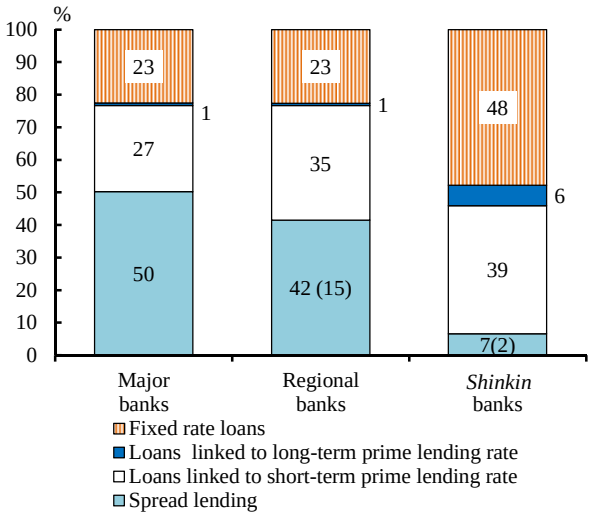
Interest rates applied to domestic loans by financial institutions have continued on a declining trend. Average contracted interest rates on new loans and discounts have continued to decline, mainly on the back of more intense competition among financial institutions, the improvement in the financial situation and business performance of firms alongside the economic recovery (resulting in upgraded internal credit ratings within financial institutions), and declines in reference rates, such as TIBOR (Chart III-1-17).

Chart III-1-17: Average contract interest rates on new loans and discounts among domestically licensed banks[1]



Note: *1*. The latest data are as of February 2016; 6-month moving averages.
Source: BOJ, "Average contract interest rates on loans and discounts."

Chart III-1-18: Composition of loans by type of interest rates[1,2]

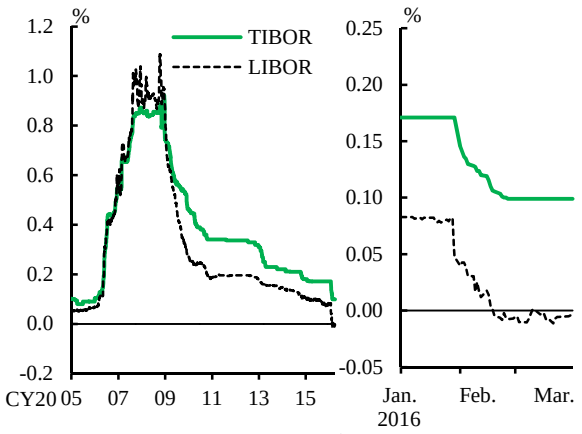


Notes: *1*. The latest data for major banks are as of end-December 2015, and those for regional banks and *shinkin* banks are as of end-September 2015.
2. "Spread lending" is loans which is linked to market rate. Figures in the parentheses of regional banks and *shinkin* banks are the share of spread lending linked to the short term market rate such as TIBOR.
Source: BOJ.

In response to the Bank's introduction of QQE with a negative interest rate, a broad range of financial institutions have been lowering their loan interest rates further. Interest rates on loans to firms have been declining, particularly for spread lending, which are linked to market interest rates such as TIBOR (Charts III-1-18 to III-1-20). Within spread lending, cases where the effective interest rate approached around 0 percent have been observed.[10] Interest rates on housing loans have also been lowered further, particularly for loans featuring a fixed interest rate in the initial period (Chart III-1-21).

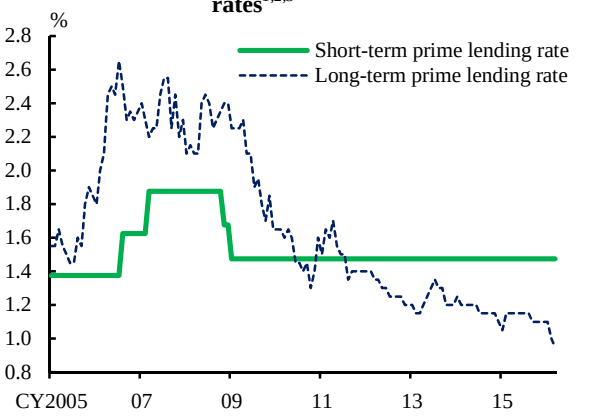
[10] Adjustments to provisions regarding the treatment of interest rates on loans are being made between financial institutions and borrowers, as existing loan contracts do not necessarily include provisions for negative interest rates.

Chart III-1-19: TIBOR and LIBOR (3-month)[1]



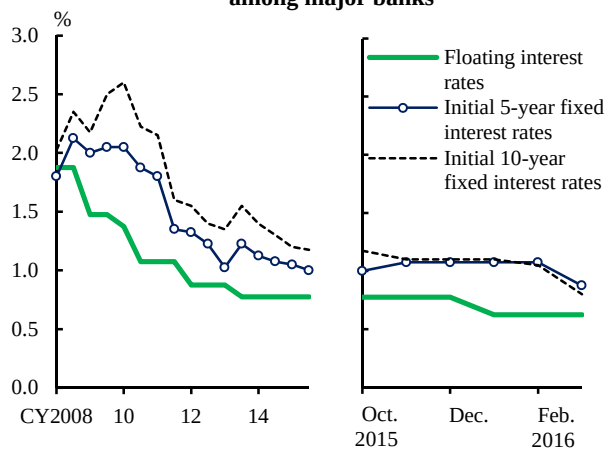
Note: *1*. The latest data are as of March 31, 2016.
Source: Bloomberg.

Chart III-1-20: Long- and short-term prime lending rates[1,2,3]



Notes: *1*. The data are based on the rates at month-end. The latest data are as of March 2016.
2. Short-term prime lending rate is the most frequent rate, which is the rate adopted by the largest number of city banks.
3. Long-term prime lending rate is the interest rate adopted and released by Mizuho Bank.
Source: BOJ.

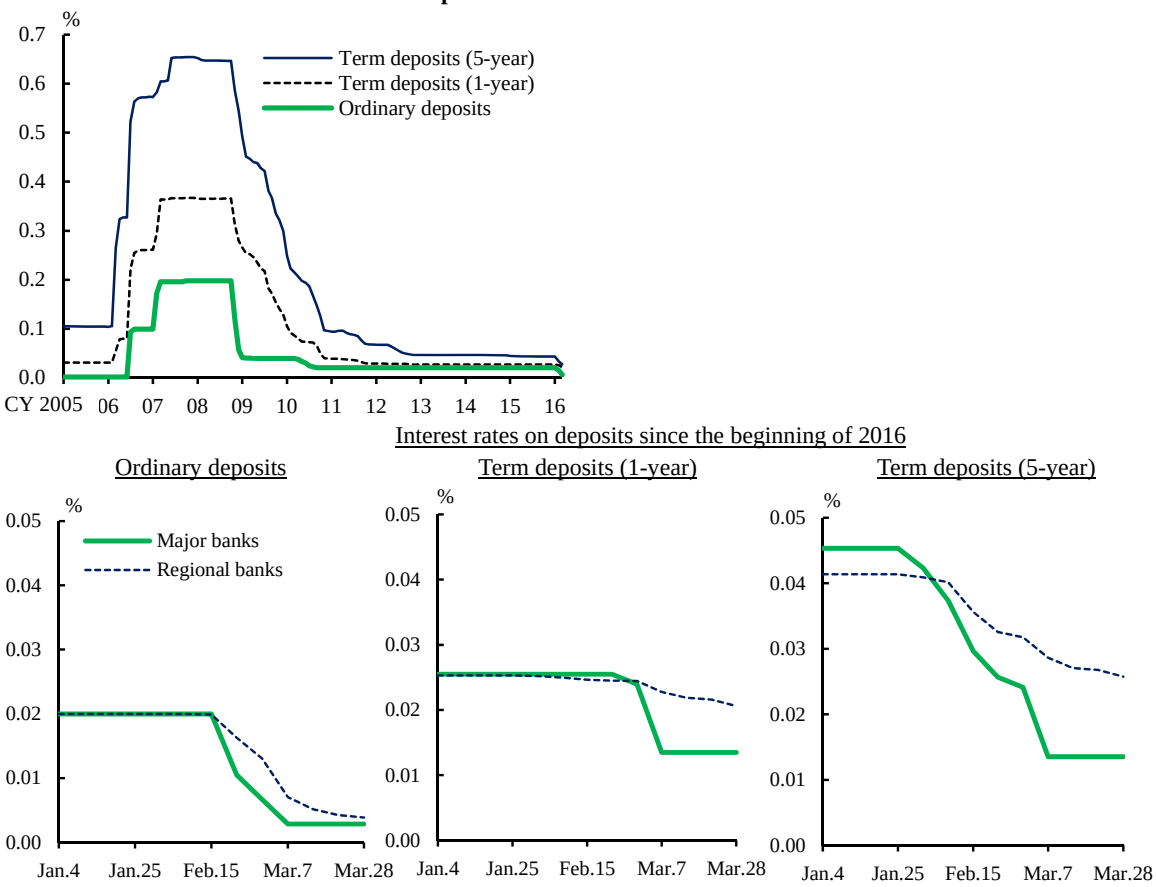
Chart III-1-21: Interest rates on housing loans among major banks[1,2,3]



Notes: *1*. Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, Sumitomo Mitsui Banking Corporation, Resona Bank, Saitama Resona Bank, and Sumitomo Mitsui Trust Bank are counted. The data on the left chart are based on April and October figures for each year. The data on the right chart are on a monthly basis.
2. The interest rates are the median of the preferential rates.
3. The latest data are as of March 2016.
Sources: "Nikkin report"; Published accounts of each bank.

Meanwhile, **there has been a growing move toward lower interest rates on deposits (term deposits and ordinary deposits)** (Chart III-1-22). It has also been observed that some banks, such as major banks, have lowered interest rates on ordinary deposits to around 0 percent.

Chart III-1-22: Interest rates on deposits[1]



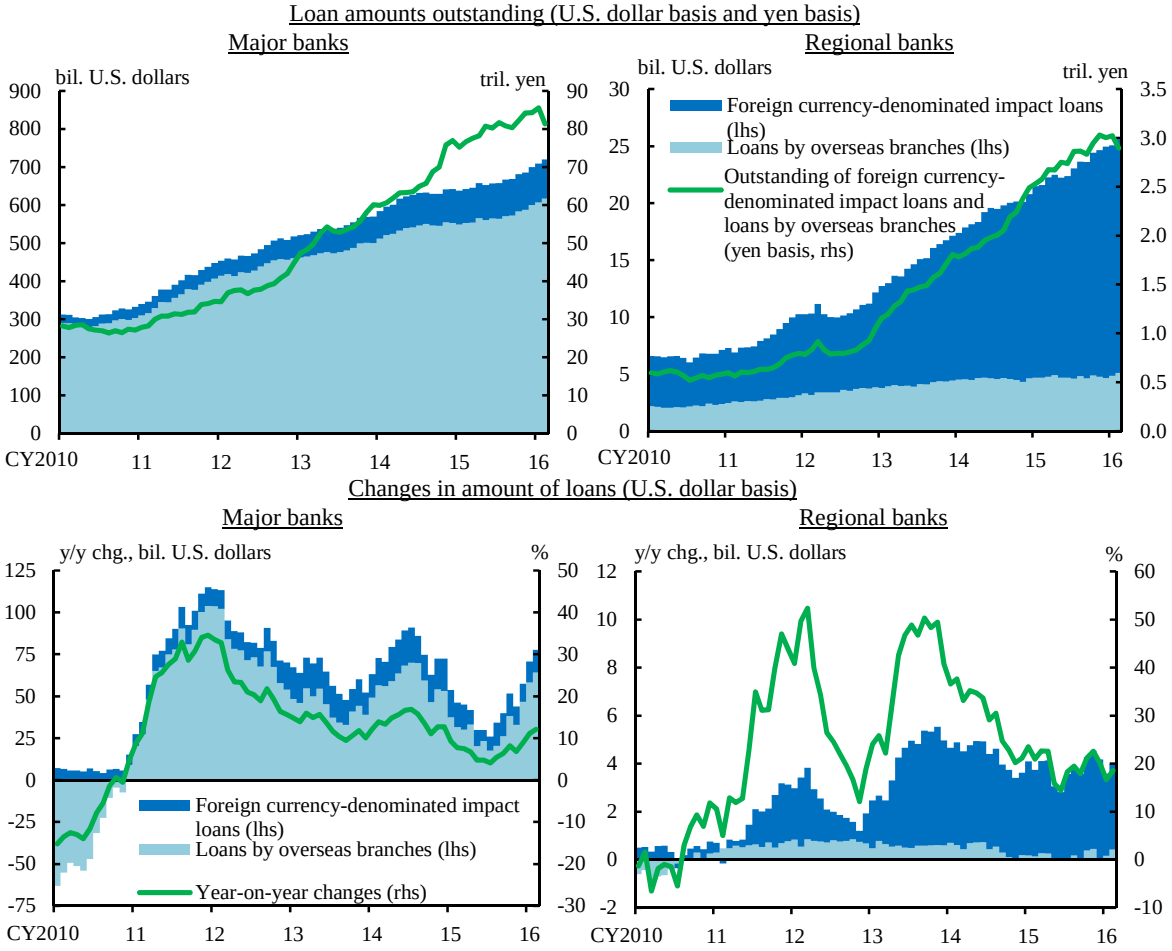
Note: *1*. Interest rates on time deposits are simple averages posted at financial institutions. The latest data are as of March 28, 2016.
Source: BOJ.

2. Overseas loans

Banks' overseas loans have continued to show relatively high growth, particularly loans to advanced economies, such as North America (Charts III-1-23 and III-1-24). Loans extended by major banks, measured in U.S. dollars, have increased by approximately 10 percent on a year-on-year basis (an annual increase of approximately 80 billion U.S. dollars) and those extended by regional banks increased by approximately 20 percent (an annual increase of approximately 4 billion U.S. dollars). In terms of major banks' loans by region, loans to North America and Europe have been increasing steadily, while loans to Asia have remained more or less unchanged, as loan demand has ebbed in tandem with slower economic growth. Under these circumstances, Japanese banks' share of international claims has continued to rise, particularly in North America. In Asia, despite a decrease in demand for funds and intensifying competition with European and other financial institutions, the market share of Japanese banks has

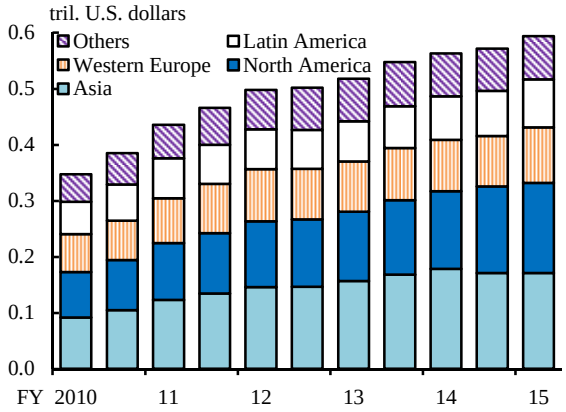
continued to rise due to their proactive business stance (Chart III-1-25).

Chart III-1-23: Banks' foreign currency-denominated loans and loans by overseas branches[1,2,3,4]



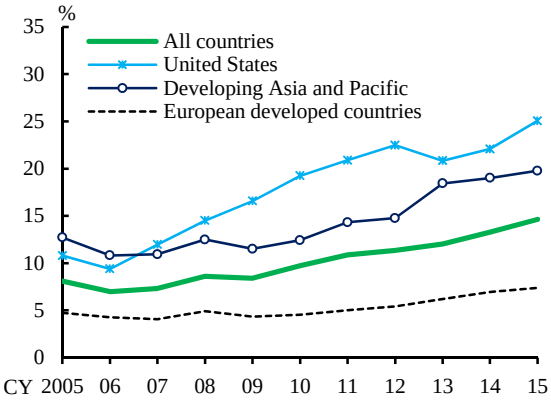
Notes: *1*. The latest data are as of February 2016.
2. Loans by overseas branches include foreign currency-denominated impact loans in accounts held overseas.
3. Foreign currency-denominated impact loans indicate banks' foreign currency-denominated loans for residents.
4. Year-on-year changes represent the growth rate of loans extended by overseas branches and foreign currency-denominated impact loans.
Source: BOJ.

Chart III-1-24: Overseas loans outstanding of three major banks by region[1]



Note: *1*. The latest data are as of the first half of fiscal 2015.
Sources: Published accounts of each bank.

Chart III-1-25: Foreign claims share among Japanese banks by region[1,2]



Notes: *1*. The data are based on end-December figures for each year. The latest data are as of end-September 2015.
2. This chart is based on foreign claims in the non-bank private sector (ultimate risk basis).
Sources: BIS, "Consolidated banking statistics"; BOJ, "The results of BIS international consolidated banking statistics in Japan."

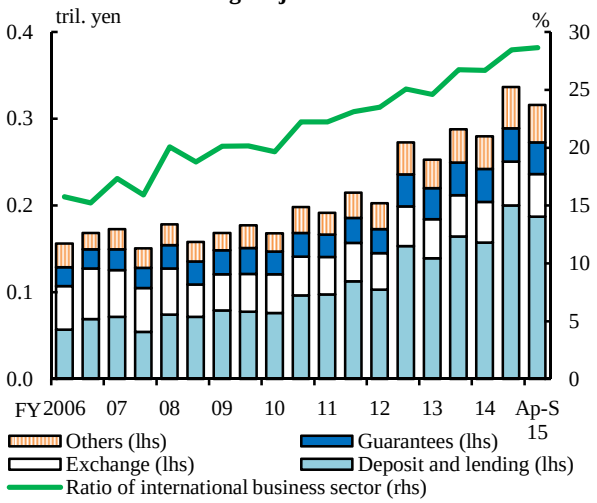
Banks have maintained a proactive stance on overseas expansion from a longer-term perspective. Recently, however, factors such as the slowdown in emerging economies, the decline in commodity prices, and the rise in foreign currency funding costs have led banks to take a cautious turn in terms of their initial and interim loan assessment. Banks have endeavored to exploit new lending opportunities and deepen relationships with prime borrowers, with a view towards supporting the global expansion of Japanese firms and capturing the financial needs in countries with high long-term growth potential in order to establish a global customer base. In the case of emerging economies, especially Asia, the enduring expectation in their medium-term growth potential, against the backdrop of ongoing progress in trade liberalization, etc., has continued to lead banks to strive to expand their overseas network and their delivery of local financial services, despite a recent rise in economic uncertainty in the near term (Chart III-1-26). Nevertheless, due to the recent step-back in business performance and possible deterioration in credit quality, amid the recent slowdown in emerging economies and decline in commodity prices, in addition to the rise in foreign currency funding costs, banks have become more cautious in their initial and interim assessment of the creditworthiness and profitability of loans. Under these circumstances, major banks have placed more emphasis on increasing their fees and commission-based income, by deepening their relationships with existing clients through closer cooperation with group securities companies and other firms, in order to improve their overall profitability, including in non-lending businesses (Chart III-1-27).

Chart III-1-26: Recent major overseas acquisitions and opening of new branches by major banks

	Time of announcement	Country	Outline
Mizuho Bank	Feb. 2015	United States	Acquisition of North American Asset Portfolio from RBS
	July 2015	Austria	Opening of Vienna Branch
	Aug. 2015	Myanmar	Opening of Yangon Branch
	Dec. 2015	Mexico	Approval for Establishing a Full Service Banking Institution in the United Mexican States
The Bank of Tokyo-Mitsubishi UFJ	Jan. 2015	Thailand	Integration of Bangkok Branch with Bank of Ayudhya
	Apr. 2015	Myanmar	Opening of Yangon Branch
	June 2015	Canada	Opening of Calgary Branch
	July 2015	Dubai	Approval for Commencing an Islamic Finance Business at Dubai Branch
	Jan. 2016	Philippines	Share Purchase of Security Bank
	Jan. 2016	Cambodia	Acquisition of Hattha Kaksekar Limited (HKL) by Bank of Ayudhya Public Company Limited
	Feb. 2016	China	Opening of Fuzhou Branch
Sumitomo Mitsui Banking Corporation	Mar. 2015	Hong Kong	Additional Share Purchase of the Bank of East Asia
	Mar. 2015	Mexico	Establishment of SMBC SOFOM (Finance Company)
	Apr. 2015	Colombia	Share Purchase of Financiera de Desarrollo Nacional S.A.
	Apr. 2015	Myanmar	Opening of Yangon Branch
	June 2015	Europe	Acquisition of European Asset Portfolio from General Electric Group
	July 2015	China	Approval for Opening a Branch in Dalian
	Aug. 2015	Cambodia	Additional Share Purchase of ACLEDA Bank
	Sep. 2015	Philippines	Opening of Manila Branch
	Oct. 2015	Indonesia	Share Purchase of Automotive Finance Companies of Sumitomo Corporation Group
Mitsubishi UFJ Trust and Banking Corporation	Feb. 2016	United States	Acquisition of Overseas Fund Management Company, Capital Analytics II LLC
Sumitomo Mitsui Trust Bank	Sep. 2015	Thailand	Establishment of a Bank Subsidiary in Thailand
	Dec. 2015	United States	Share Purchase Agreement of Marubeni's Freight Railcar Leasing Business in North America

Sources: Disclosures of each bank.

Chart III-1-27: Fee and commission income in the international business sector among major banks[1]



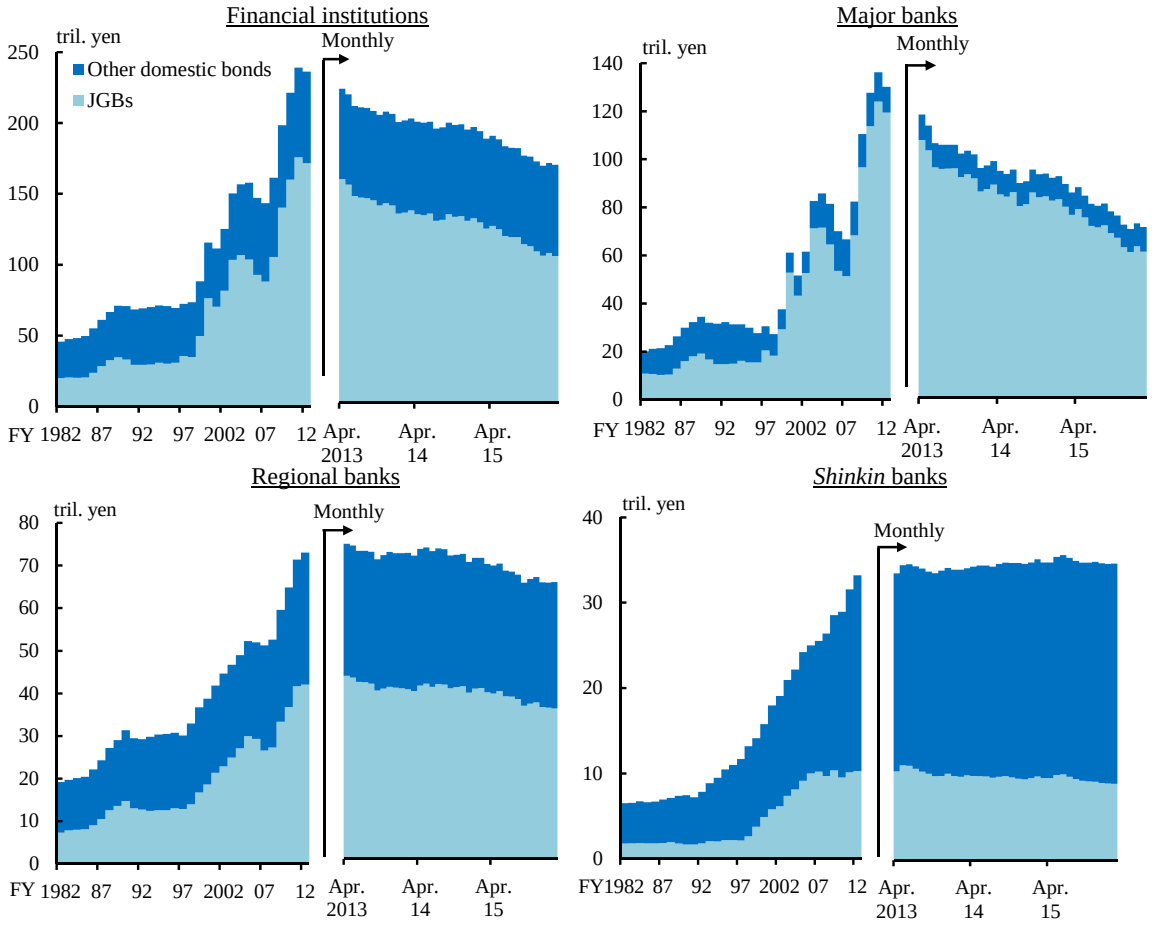
Note: *1*. "Ratio of international business sector" is the ratio of net fees and commissions of the international business sector to the total net fees and commissions.
Source: BOJ.

3. Securities investment

Yen-denominated bond investment by financial institutions is on a declining trend. However, it remains at a high level compared with the past. In addition, financial institutions have been augmenting their risk-taking stance, by making additional 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 -- remained on a declining trend, as the Bank of Japan continued large-scale purchases of JGBs. However, from a long-term perspective, the outstanding amount of bonds remains at a high level (Chart III-1-28). Looking across various types of financial institutions, a continued decline of yen-denominated bondholdings at major banks can be observed, while a moderate declining trend has become increasingly evident at regional banks. The outstanding amount of bondholdings at *shinkin* banks has turned flat recently, following a moderate increase. While reducing their JGB holdings in response to the decline in long-term government bond yields, *shinkin* banks have exhibited a greater tendency to accumulate municipal bonds and corporate bonds, which offer higher yields.

Chart III-1-28: Outstanding amount of yen-denominated bonds among financial institutions[1,2]

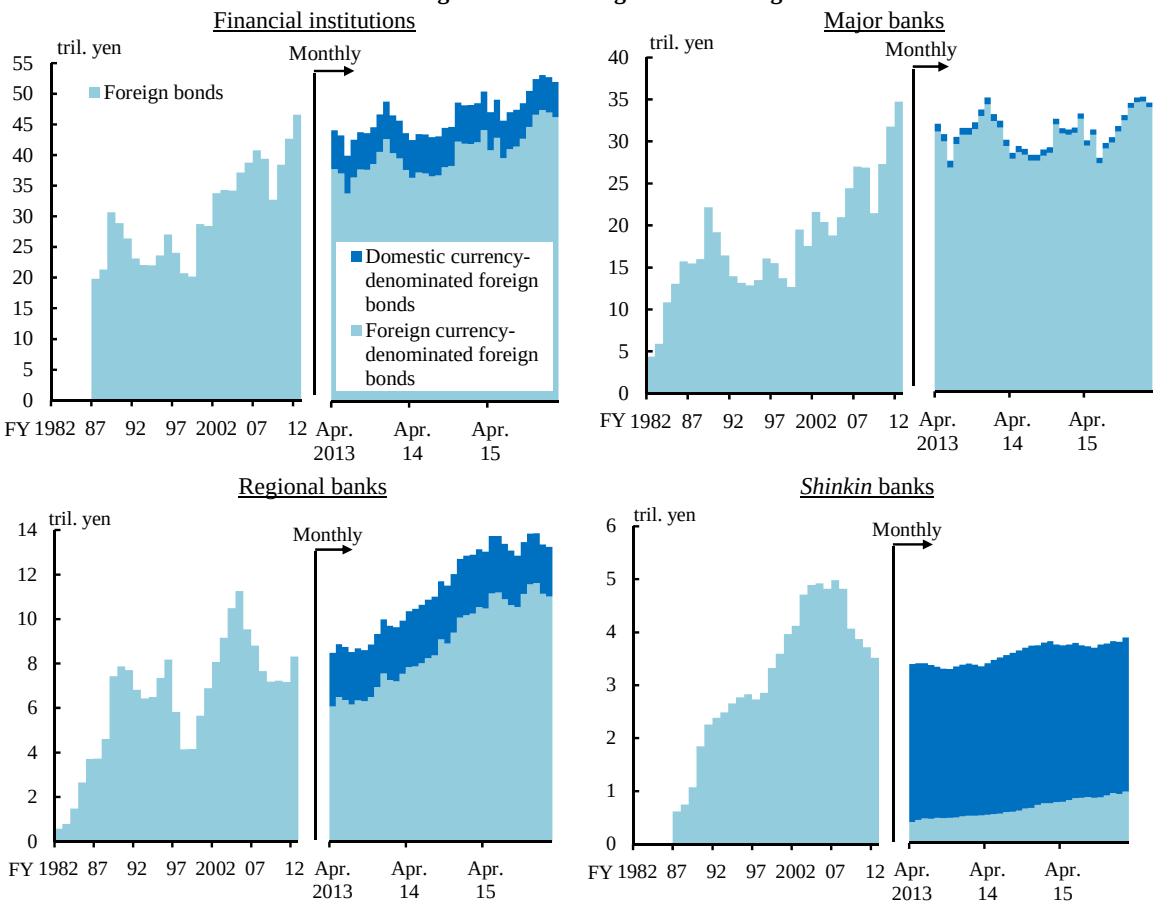


Notes: *1*. The latest data are as of end-February 2016.
2. The data are the sums of figures for domestic and overseas branches. The data for major banks from April 2013 are the sums of figures for domestic branches. The data are based on the amount outstanding at month-end.
Source: BOJ.

The outstanding holdings of foreign bonds, when expressed in yen terms, have been on an increasing trend, albeit with some variation (Chart III-1-29).[11] A breakdown by type of financial institution reveals that major banks have resumed increasing their foreign bondholdings once more, after having pared their exposure temporarily in the middle of 2015 in response to the heightened volatility in global financial markets. Similarly, regional banks' foreign bondholdings have reverted to an increasing trend, following a transitory period of caution, as was the case with major banks. While a large portion of foreign bond investment by *shinkin* banks continues to be denominated in yen, their holdings of foreign currency-denominated bonds have been increasing gradually.

[11] See Box 8 for issues concerning investments in foreign bonds.

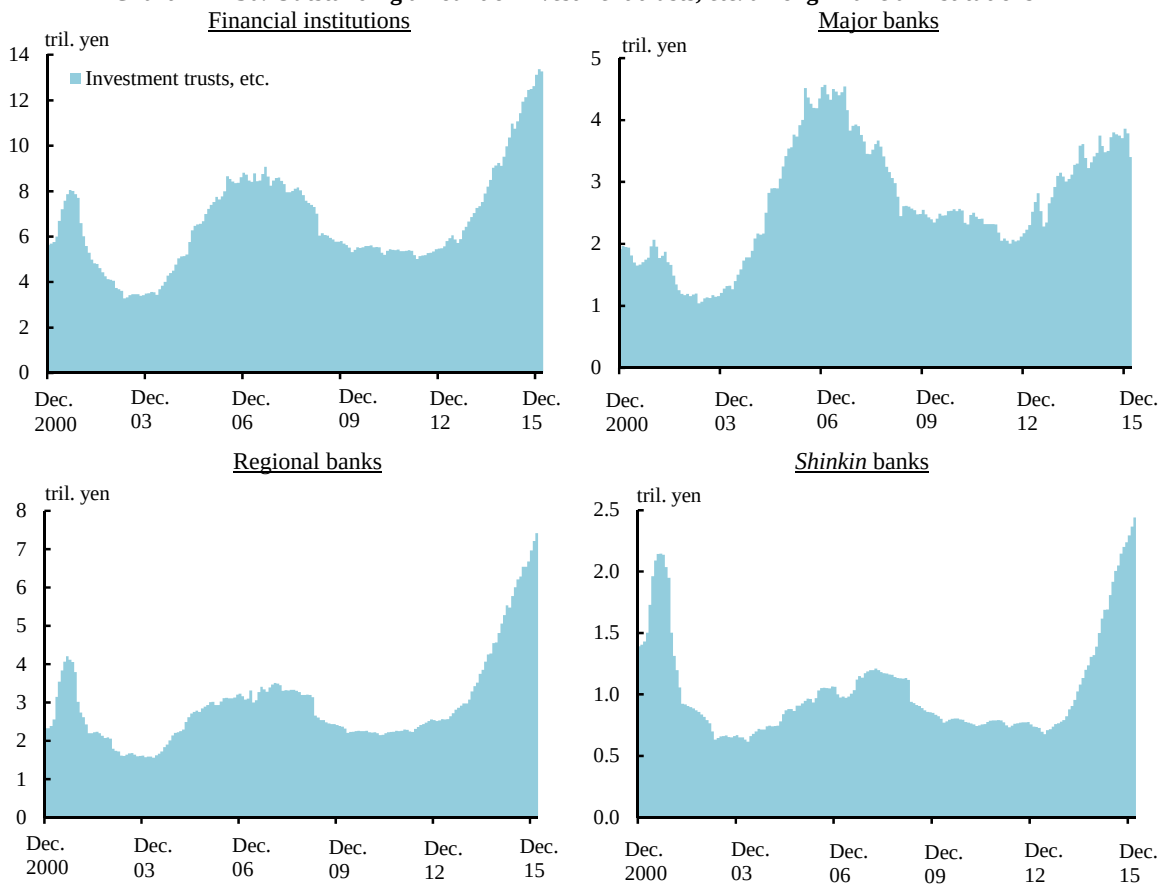
Chart III-1-29: Outstanding amount of foreign bonds among financial institutions[1,2,3]



Notes: *1*. The latest data are as of end-February 2016.
2. The data are the sums of figures for foreign currency-denominated and domestic currency-denominated foreign bonds.
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 have continued to increase. Looking at the breakdown by bank type, while major banks have roughly maintained their holdings, having restrained their investment activity in light of the heightened volatility in global financial markets, regional banks have demonstrated a tendency of increasing their investment in various financial assets, such as stock investment trusts, real estate investment trusts (REITs), and bond ladder funds both at home and abroad (Chart III-1-30).

Chart III-1-30: Outstanding amount of investment trusts, etc. among financial institutions[1,2]

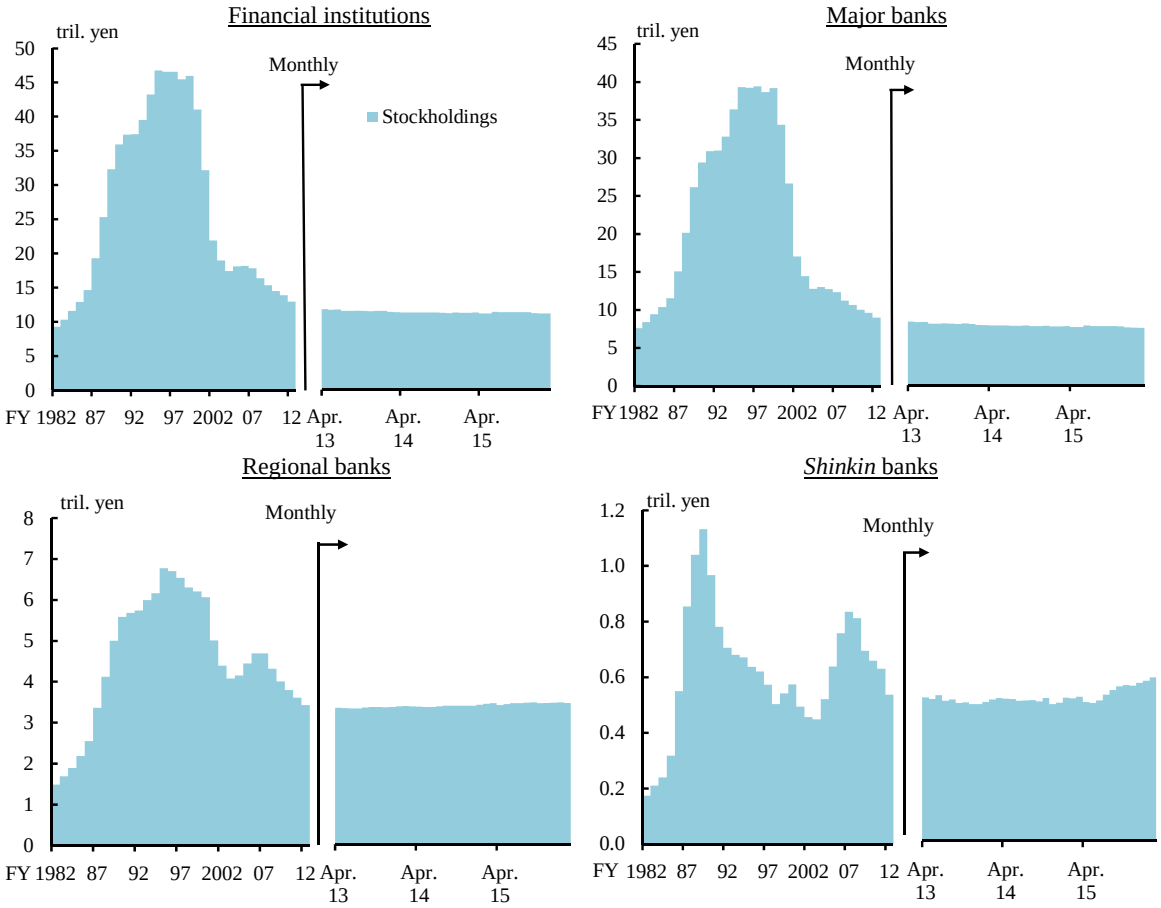


Notes: *1*. The latest data are as of end-February 2016.
2. The data are the sums of figures for domestic and overseas branches. The data for domestic branches are based on the average amount outstanding. The data for overseas branches are based on the amount outstanding at month-end.
Source: BOJ.

The above-mentioned trends in securities investment may be further promoted with the introduction of QQE with a negative interest rate. Given that government bond yields have turned negative even for longer maturities, more financial institutions seek to (1) refrain from selling government bonds where possible, and (2) in principle, hold back on new purchases of government bonds. Under these circumstances, many financial institutions indicate that they would accelerate investment in financial assets other than yen-denominated bonds although some of the proceeds from the redemption of JGBs would be reinvested in yen-denominated assets such as super-long-term government bonds and corporate bonds. Therefore, the shift from yen-denominated bonds to other risky assets may pick up further. Indeed, a step-up in activity has already been observed in foreign bond investment. However, a further shift toward investment trusts has been constrained for now by heightened volatility at home and abroad, particularly of stock prices.

Meanwhile, financial institutions' stockholdings are on a quite moderate downward trend, as they continue to reduce their stockholdings with the aim of maintaining business ties with firms (strategic stockholdings, Chart III-1-31). Furthermore, major financial institutions, including the three major Japanese financial groups, announced more specific guidelines on strategic stockholdings, as well as their approach toward formulating the guidelines, for example, to reduce the outstanding stockholdings within the next 5 years or so, such that it falls within a certain percentage of the financial institution's capital (Chart III-1-32). Regional banks have also made progress in announcing guidelines on strategic stockholdings, expressing their intention to either pare back or limit their strategic stockholdings.

Chart III-1-31: Outstanding amount of stockholdings among financial institutions[1,2,3,4]



Notes: *1*. The latest data are as of end-February 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 from April 2013 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.

Chart III-1-32: Policy regarding strategic stockholdings published by financial institutions

	Time of announcement	Outline
MHFG	June 2015	"As a basic policy, unless we consider these holdings to be meaningful, Mizuho Financial Group, Inc. and our core subsidiaries will not hold the shares of other companies as cross-shareholdings."
	Nov. 2015	"Aggregate of the necessary reduction amount is approx. 40% of the total Japanese stock portfolio (as of Mar. 2015)" "At least dispose of approx. 70% of the necessary reduction amount by Mar. 2019" "Aim to achieve 40 to 50% of the above disposal plan by Mar. 2017..."
MUFG	July 2015	"MUFG has adopted a basic policy that its Group banks…shall reduce the amount of shares held for the purpose of strategic investment, following sufficient consultation with the relevant corporate business clients."
	Nov. 2015	"Aim to reduce our equity holdings to approximately 10% of our Tier1 capital over the next 5 years"
SMFG	July 2015	"In principle, SMFG does not hold the shares of other listed companies where 'the rationale' to hold those shares cannot be recognised"
	Nov. 2015	"…we aim to have the assurance of reducing the current [Ratio of Stocks-to-CET1 capital] by half within approximately 5 years"

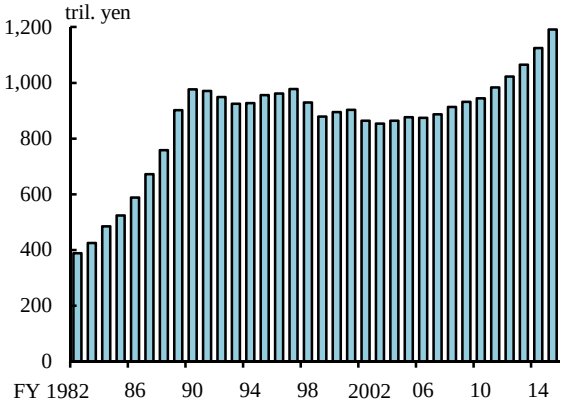
Sources: Published accounts of each group.

4. Financial institutions' balance sheet changes since the implementation of QQE

Reflecting on how the balance sheet of financial institutions has changed since the introduction of QQE about 3 years ago, (1) balance sheet expansion and (2) portfolio rebalancing from JGBs to other risky assets have been clearly observed.

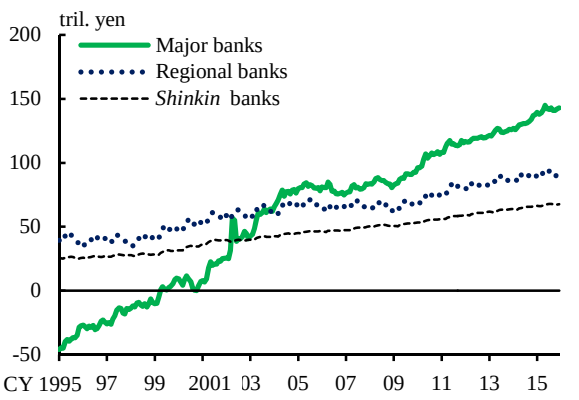
The total assets and liabilities of financial institutions started rising in fiscal 2007, with the rising trend gathering pace upon the introduction of QQE in April 2013 and its expansion at the end of October 2014 (Chart III-1-33). Meanwhile, the gap between financial institutions' domestic loans and deposits has continued to widen (Chart III-1-34).

Chart III-1-33: Assets outstanding among financial institutions[1,2]



Notes: *1*. The latest data are as of December 2015.
2. The data are based on the average amount outstanding. The latest data for overseas branches are based on the amount outstanding at month-end.
Source: BOJ.

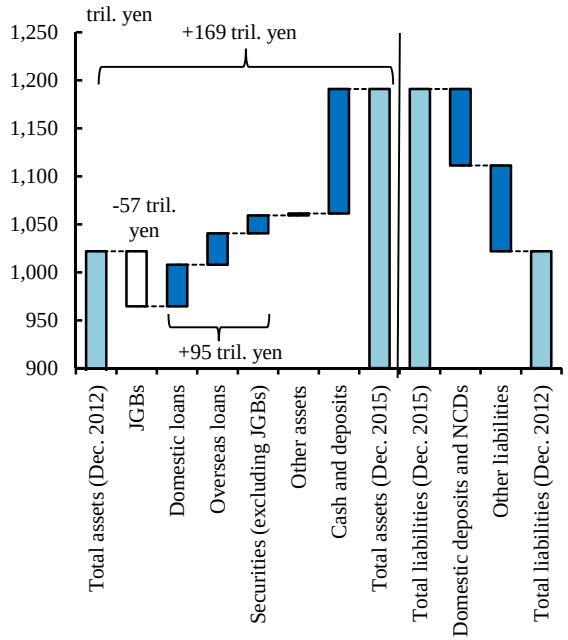
Chart III-1-34: Domestic loan-to-deposit gap among financial institutions[1,2,3]



Notes: *1*. The latest data are as of December 2015.
2. Loan-to-deposit gap = deposits and NCDs – loans.
3. The data for domestic branches are based on the average amount outstanding.
Source: BOJ.

The total assets and liabilities of financial institutions increased by 169 trillion yen in the period from December 2012, prior to the introduction of QQE, through December 2015 (Chart III-1-35). 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 95 trillion yen, while JGB holdings decreased by 57 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.[12]

Chart III-1-35: Changes in assets and liabilities among financial institutions[1]



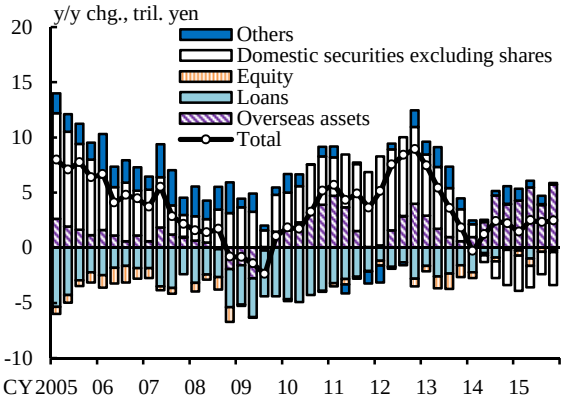
Note: *1*. The data are the sums of domestic and overseas branches. The data for domestic branches are based on the average amount outstanding. The data for overseas branches are based on the amount outstanding at month-end.
Source: BOJ.

B. Developments in investment by institutional investors

Institutional investors -- such as life 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 continued to boost the weight of risky assets in their investment portfolio.

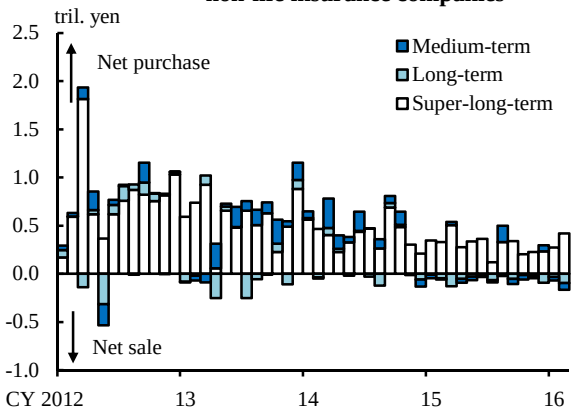
[12] At major banks and some regional banks, the continued relatively high growth in foreign currency impact loans (loans denominated in foreign currencies that are extended to residents) at domestic branches has also been contributing to the increase in domestic loans.

Chart III-2-1: Asset investments among life insurance companies[1,2]



Notes: *1*. The latest data are as of December 2015. This chart shows the sum of financial transactions in the last 4 quarters.
2. "Others" includes cash and deposits. "Loans" excludes repurchase agreements and securities lending transactions.
Source: BOJ, "Flow of funds accounts."

Chart III-2-2: JGB investment among life and non-life insurance companies[1]



Note: *1*. The latest data are as of February 2016.
Source: Japan Securities Dealers Association.

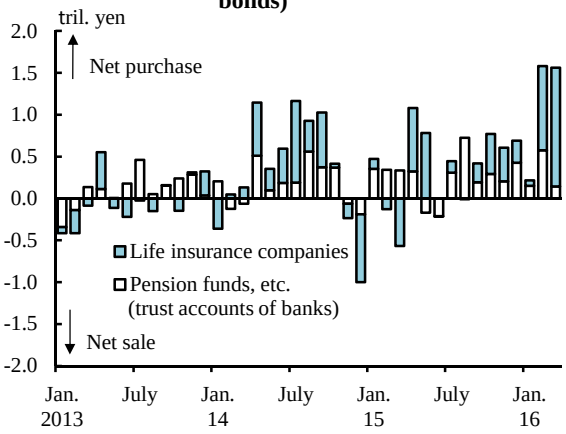
Life insurance companies were formerly active particularly in investment in super-long-term bonds, in order to reduce the duration mismatch between their assets and liabilities. However, since fiscal 2014, they have held back on purchases of super-long-term bonds in response to the decline in long-term interest rates (Charts III-2-1 and III-2-2). These companies have focused on securing investment income by, for instance, accumulating overseas assets, such as foreign bonds, and investing in areas, including fund investment, in which relatively higher growth is expected (Chart III-2-3).[13] Depository institutions with a focus on market investment, such as Japan Post Bank and the central organizations of financial cooperatives, have continued, over the medium term, to reallocate investments away from domestic bonds toward risky assets, such as foreign bonds, in response to the further decline in interest rates (Chart III-2-4). Looking at developments in pension funds, the Government Pension Investment Fund (GPIF) appears to have nearly completed its rebalancing, which was aimed at achieving its medium-term plan.[14] 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-2-5). While corporate pension funds maintain a cautious investment policy on the whole, they appear to have continued to

[13] A considerable portion of foreign exchange risk associated with foreign bond investment is hedged through currency and foreign exchange swap markets.

[14] The allocation of investment assets managed by the GPIF as of the end of December 2015 is as follows. Domestic bonds: 37.76 percent; domestic equities: 23.35 percent; foreign bonds: 13.50 percent; foreign equities: 22.82 percent. This portfolio is consistent with the medium-term plan last revised in October 2014: 35 percent (±10 percent), 25 percent (±9 percent), 15 percent (±4 percent), and 25 percent (±8 percent), respectively.

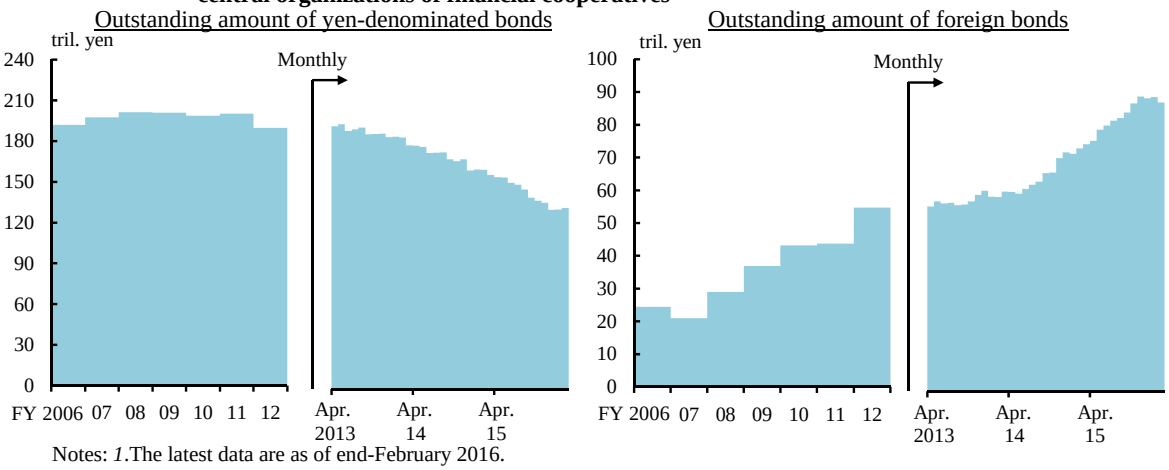
adjust their portfolios to reduce their share of domestic bonds and increase their holdings of alternative assets, such as fund investment, with the aim of securing investment income.

Chart III-2-3: Outward investment among life insurance companies and pension funds, etc. (medium- and long-term bonds)[1]



Note: *1*. "Pension funds, etc." indicates trust accounts of banks and trust banks. The latest data are as of March 2016.
Source: Ministry of Finance.

Chart III-2-4: Outstanding amount of yen-denominated bonds and foreign bonds of Japan Post Bank and central organizations of financial cooperatives[1,2]



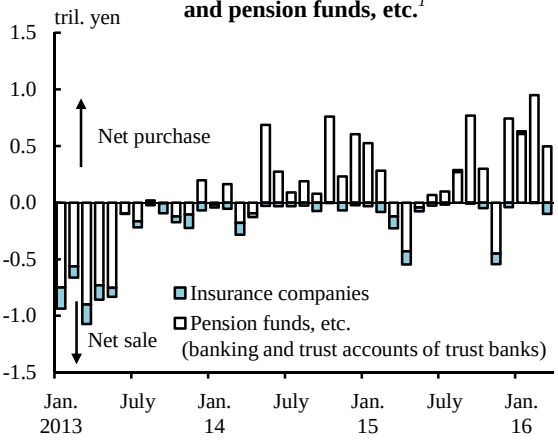
Notes: *1*.The latest data are as of end-February 2016.
2. The data are the sums of figures for Japan Post Bank, Shinkin Central Bank, the Shinkumi Federation Bank, the Rokinren Bank, and the Norinchukin Bank. The data are based on the amount outstanding at month-end.
Source: BOJ.

The further decline in long- and short-term interest rates has also had an effect on the activities of investment trusts (Chart III-2-6). Total net assets of public and corporate bond investment trusts have continued to decline since the summer of 2015, and the amount of public and corporate bonds as a share of total investment assets has also decreased.

Due to the further decline in interest rates following the introduction of QQE with a negative interest rate, the tendency among investors, including institutional

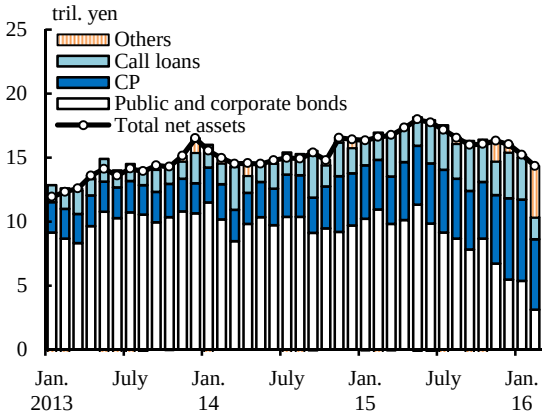
investors, to increase their holdings of foreign bonds and other risky assets is likely to strengthen. Meanwhile, reflecting the decline of interest rates to negative territory, including for bonds with long maturities, the following developments among financial products mainly devoted to bonds and money markets have been widely observed: (1) a suspension of sales and a rise in insurance fees for yen-denominated savings-type insurance products; and (2) early redemptions and suspension of issuances of money management funds (MMFs).[15] In addition, (3) money reserve funds (MRFs), which are restricted to investing in short-term assets, are shifting their surplus funds to cash trusts of trust banks, due to difficulties in investing in securities and call markets.

Chart III-2-5: Trading volume in Japanese stocks by insurance companies and pension funds, etc.[1]



Note: *1*. The latest data are as of March 2016.
Source: Tokyo Stock Exchange.

Chart III-2-6: Investments in public and corporate bond investment trusts[1]



Note: *1*. The latest data are as of February 2016.
Source: The Investment Trust Association, Japan.

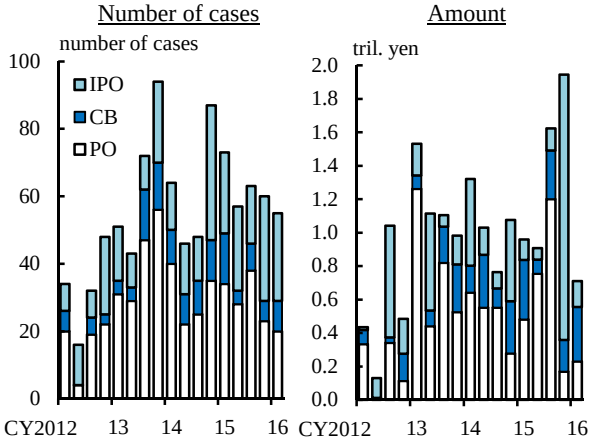
C. Financial intermediation through financial markets

In terms of equity financing through the stock market, firms' proactive financing stance seems to have remained largely unchanged, but the transaction volume of financing has recently decreased, mainly in response to the decline in stock prices (Chart III-3-1). A detailed examination shows that more firms are putting off public offerings (POs) in response to the decline in stock prices, although they continue to have a healthy appetite for financing fixed investments with future growth potential as well as merger and acquisition activities. The number and transaction volume of initial public offerings (IPOs) remained high until the end of 2015, partly due to the contribution from the Japan Post Group (totaling 1.4 trillion yen across three

[15] Sales of foreign currency-denominated savings-type insurance products have been healthy in recent years, and insurance companies that previously had not carried such products are contemplating commencing sales.

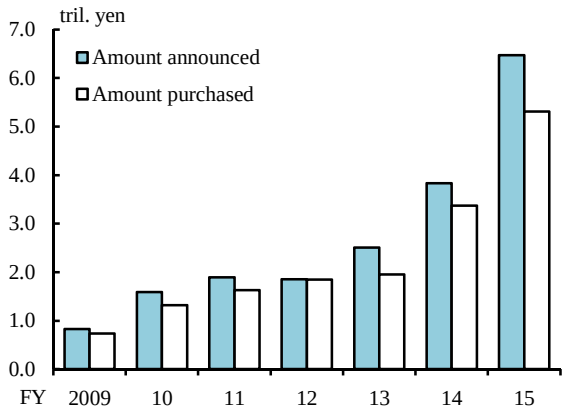
companies), but IPOs have recently declined somewhat as stock prices continued to fall. At the same time, firms' stock buybacks, both announced and executed, have remained at a high level, reflecting their heightened emphasis on shareholder returns, and a recapitalized convertible bond (CB) issuance has also remained firm on the whole (Chart III-3-2).[16]

Chart III-3-1: Equity financing[1]



Note: *1*. The latest data are as of the January-March quarter of 2016.
Source: I-N Information Systems.

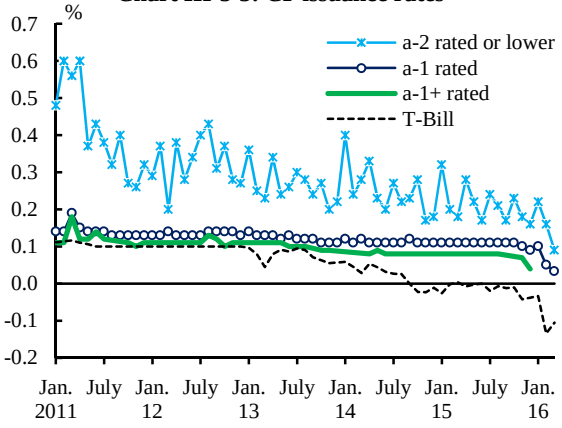
Chart III-3-2: Amount of stock buybacks[1]



Note: *1*. Stocks listed on the First Section of the Tokyo Stock Exchange. Based on the announcement date.
Source: I-N Information Systems.

Issuing conditions for CP and corporate bonds continue to be favorable, as seen from the further decline in yields on new issues (Chart III-3-3). Some firms have issued the longest-ever maturity corporate bonds or capital equivalent bonds. Nevertheless, the volume of CP and straight corporate bonds issued have been somewhat weak, mainly due to banks' proactive lending stance and some corporate bond investors' negative reaction toward issuance rates hovering around 0 percent (Charts III-3-4 and III-3-5).

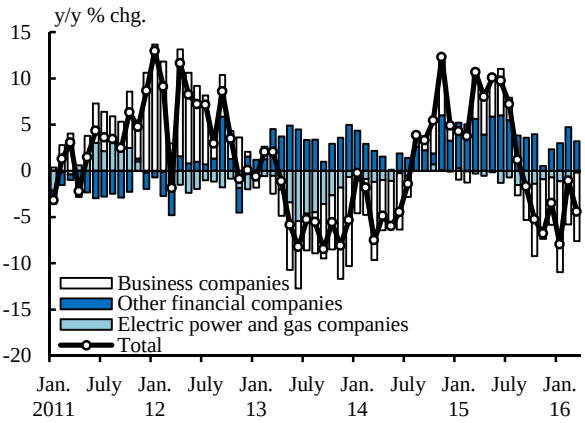
Chart III-3-3: CP issuance rates[1,2]



Notes: *1*. Monthly average 3-month rates weighted by issuance volume. Figures for March 2016 are simple averages of daily rates.
2. The latest data are as of March 2016.
Sources: Japan Bond Trading; Japan Securities Depository Center.

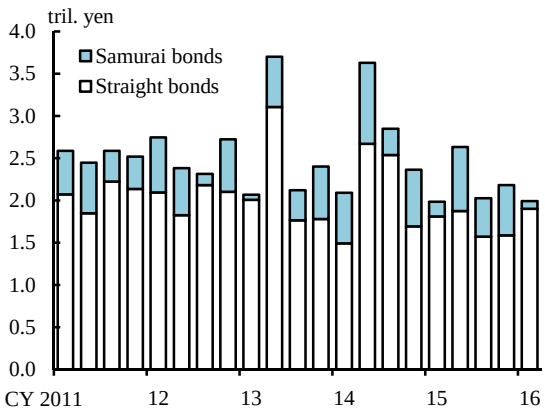
[16] Recently, CBs have been issued in many cases for the purpose of funding firms' stock buybacks.

Chart III-3-4: Outstanding amount of CP[1,2,3]



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. The latest data are as of end-March 2016.
Source: Japan Securities Depository Center.

Chart III-3-5: Amount of corporate bonds issued[1]

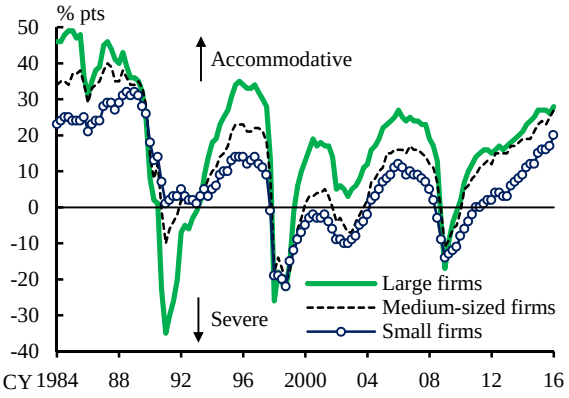


Note: *1*. The latest data are as of the January-March quarter of 2016.
Source: I-N Information Systems.

D. Financial conditions among firms and households

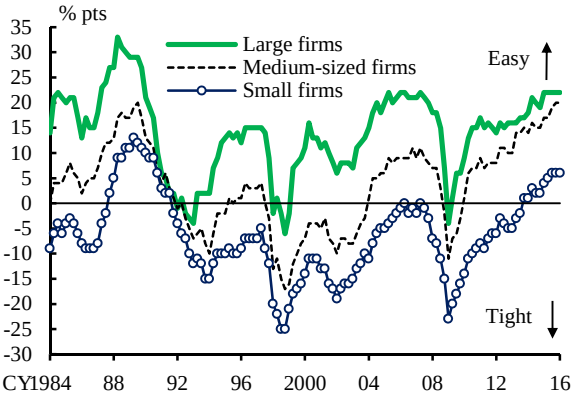
Financial conditions among firms and households have become more accommodative, in light of the financial intermediary activities stated above. Funding costs for firms and households have declined further, partly as a consequence of the introduction of QQE with a negative interest rate.

Chart III-4-1: DI of lending attitudes of financial institutions as perceived by firms[1]



Note: *1*. The latest data are as of March 2016.
Source: BOJ, "*Tankan*."

Chart III-4-2: DI of financial positions of firms[1]

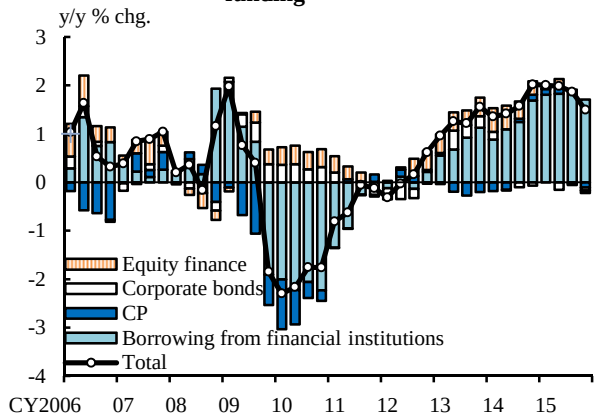


Note: *1*. The latest data are as of March 2016.
Source: BOJ, "*Tankan*."

Firms' perceptions of lending attitudes among financial institutions have remained on an improving trend. Regardless of firm size, firms' financial positions have been secure (Charts III-4-1 and III-4-2). The year-on-year rate of increase in the total volume of

firms' funding has been lowered somewhat from that observed in the previous *Report*, as the issuance of CP by resource-related companies has restrained, and as equity financing of non-financial firms decreased amid the listing of Japan Post Group, even as bank borrowing has increased (Chart III-4-3).

Chart III-4-3: Total outstanding amount of firm funding[1,2,3]

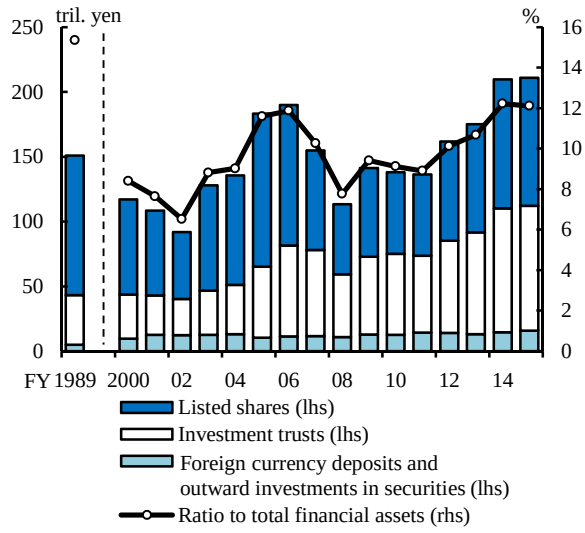


Notes: *1*. The latest data are as of end-December 2015.
2. "CP" and "Corporate bonds" issued by banks are excluded. Corporate bonds issued in overseas markets are included. "Borrowing from financial institutions" excludes borrowing by banks, financial institutions for cooperative organizations, and insurance companies.
3. "Equity finance" is equity of private nonfinancial corporations based on book value.
Sources: I-N Information Systems; Japan Securities Dealers Association; Japan Securities Depository Center; BOJ, "Flow of funds accounts," "Loans and bills discounted by sector."

E. Developments in households' investment activities

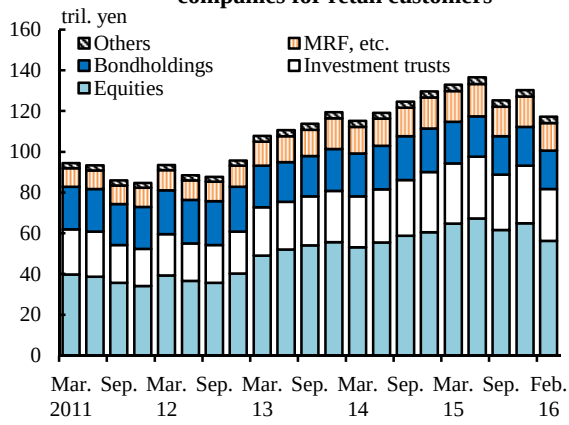
In terms of households' investment activities, the trend of gradually increasing the share of risky assets in their financial portfolio while preserving the primacy of deposits has largely been maintained. Recently, however, this trend seems to have lost momentum somewhat, mainly reflecting the unsettled global financial conditions (Chart III-5-1). The increase in outstanding client assets held at securities companies has also paused, particularly among stocks and investment trusts, partly due to fluctuations in market value (Chart III-5-2). Stripping out the effects of changes in stock prices and foreign exchange rates on the market values of financial assets, the inflow of individuals' funds to installment investment trusts and fund wrap accounts has continued but its pace has slowed (Charts III-5-3 and III-5-4).

Chart III-5-1: Risky assets held by households[1,2]



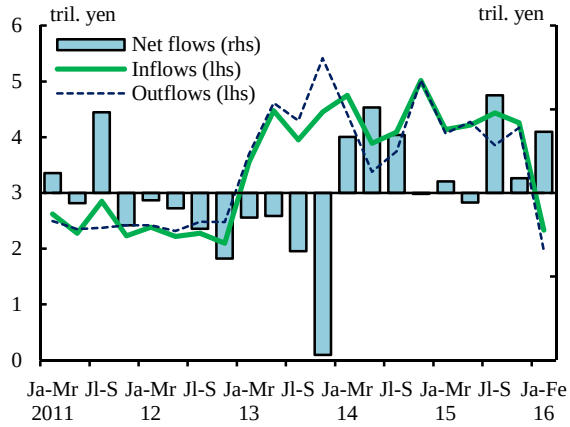
Notes: *1*. The latest data are as of end-December 2015.
2. This chart is based on market value.
Source: BOJ, "Flow of funds accounts."

Chart III-5-2: Client assets held by major securities companies for retail customers[1,2,3]



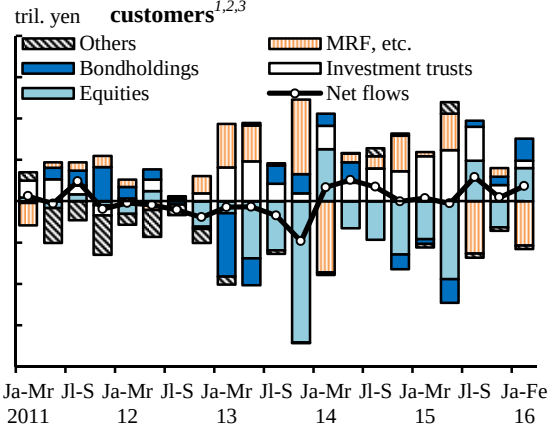
Notes: *1*. The latest data are as of end-February 2016.
2. Data for 18 major securities companies that hold current accounts at the BOJ are counted.
3. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes public and corporate bond investment trusts.
Source: BOJ.

Chart III-5-3: Capital flows among major securities companies for retail customers[1,2]



Notes: *1*. The latest data are as of the January-February quarter of 2016.
2. Data for 18 major securities companies that hold current accounts at the BOJ are counted.
Source: BOJ.

Chart III-5-4: Capital flows by product among major securities companies for retail customers[1,2,3]

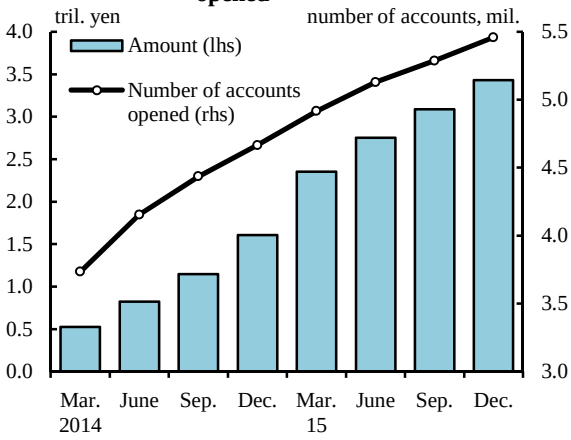


Notes: *1*. The latest data are as of the January-February quarter of 2016.
2. Data for 18 major securities companies that hold current accounts at the BOJ are counted.
3. "Investment trusts" indicates the sum of stock investment trusts and wrap products. "MRF, etc." includes public and corporate bond investment trusts.
Source: BOJ.

Households have gradually been embarking on more risk-taking behavior since 2012, amid an environment of rising stock prices, yen depreciation, and low interest rates. Alongside the listing of the three companies in the Japan Post Group in November 2015, the number of asset management accounts newly opened by customers has more than doubled compared with typical levels. The listing has also resulted in a large inflow of

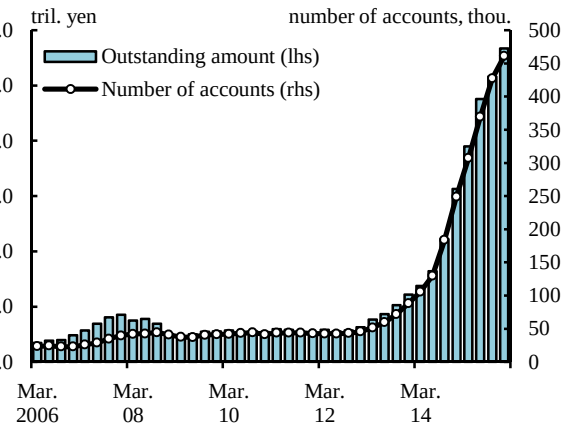
new funds, suggesting heightened interest in the stock market. As for financial institutions, they have continued to make efforts to expand their client asset base, particularly by expanding the scope of investment trusts customers can choose from, improving their services including wrap accounts, increasing the emphasis on customer-base expansion in assessing the performance of their employees, as well as strengthening coordination and further promoting the exchange of staff among banks and securities companies within the same group. Recently, some households have held back on carrying out transactions, in response to market disturbance at home and abroad. Nevertheless, the raft of efforts by financial institutions, combined with measures, such as the expansion of the investment limit on NISAs and the introduction of Junior NISA in January 2016, are expected to continue to underpin households' risk taking activities (Charts III-5-5 and III-5-6).

Chart III-5-5: Purchases through NISA accounts and the number of NISA accounts opened[1]



Note: *1*. Data for 9 major banks and 18 securities companies are counted.
Source: BOJ.

Chart III-5-6: Assets under management in wrap accounts[1]



Note: *1*. The latest data are as of end-December 2015.
Source: Japan Investment Advisers Association.

F. Financial intermediation and QQE with a negative interest rate

As only around 2 months have passed since the introduction of QQE with a negative interest rate, there is a limit as to the extent to which the policy effects can be observed in the data at this point in time. In the following section, we attempt a preliminary discussion of the current situation, in terms of the observed effects of QQE with a negative interest rate on financial intermediation.

QQE with a negative interest rate has been contributing to smoother financial system functioning in the following areas. First, (1) market interest rates have

declined further -- with even long-term interest rates entering negative territory. In response, (2) interest rates on deposits and loans set by financial institutions have seen widespread declines. Under these circumstances, (3) QQE with a negative interest rate has encouraged further portfolio rebalancing among financial institutions, including increasingly proactive efforts toward expanding lending activities. The further decline in interest rates has exerted similar effects on institutional investors, with some financial institutions and investors indicating their willingness to invest in more risky assets, particularly in foreign bonds.

Nevertheless, the transmission of the above effects is constrained by several factors. For example, (1) a broad range of entities in financial markets are in the process of adapting investment strategies and their operational arrangements including their IT systems, to the new environment of negative interest rates.[17] This process of adaptation is expected to require time and expense, given its unprecedented environment. In addition, (2) the heightening volatility in global financial markets from the beginning of 2016 has caused a decline in stock prices, yen appreciation, and an increase in the cost of foreign currency funding. These factors have worked to restrain risk taking somewhat among financial institutions and investors.

Furthermore, signs of a holdup in the flow of funds have also been observed: (1) a large sum of funds have remained within trust banks and major banks, as investors and firms have avoided investing in the financial markets at negative interest rates; (2) the suspension of subscriptions and the early redemption of investment trusts and insurance products which invest mainly in bonds have also been observed, due to the decline in investment yields; and (3) it is widely observed that some financial institutions, investors, and large firms have postponed transactions due to operational constraints and necessary arrangements, including IT-related issues. As articulated in Chapter II, (4)

[17] Various entities such as financial institutions, investors, and firms have been addressing operational issues regarding negative interest rates. As the introduction of negative interest rates had not necessarily been anticipated in many transactions, especially from the legal and accounting perspectives, there has been a need for various entities to conduct examinations to adopt new concepts and methods, and coordinate among one another. These include: (1) legal and contractual treatment of interest rates applied to market interest rate-based lending in the case where a related formula calculates a negative interest rate (the Financial Law Board published the relevant document on February 19, 2016); (2) treatment of hedging accounting in the case where borrowers engage in interest rate swaps to fix original variable interest rate payments (the Accounting Standard Board of Japan, ASBJ, published interim guidance on March 24, 2016); (3) treatment of discount rates applied to retirement benefit accounting (ASBJ published interim guidance on March 10, 2016); and (4) treatment of fees for money trusts that are subject to negative interest rates (see Box 1 for other issues on market practices). The Bank of Japan will continue to support these efforts as necessary.

some indicators are pointing to reduced market liquidity in money markets and JGB markets.

Based on the above, **the key to future propagation of the effects of QQE with a negative interest rate lies in the extent of progress in various areas adapting to negative interest rates, and developments in the overseas environment, among other factors.**

IV. Macro risk profiles and financial bases of financial institutions

In addition to evaluating the soundness of member financial institutions, 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 profiles (comprising the size of risks accumulated, the rate of accumulation, and the distribution of risks as well as its skewness within the system), 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.[18]

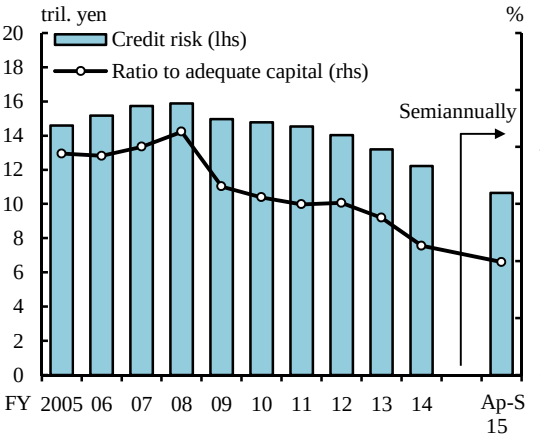
A. Credit risk

The amount of financial institutions' credit risk has decreased compared to the previous *Report,* due to an improvement in asset quality (Charts IV-1-1 and IV-1-2).[19] 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 continues to recover moderately. Reflecting this, the number of corporate bankruptcies has remained at a low level (Chart IV-1-3).

[18] 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 of end September 2015. Regarding the sections on market risk and liquidity risk, however, the latest data are used when available.

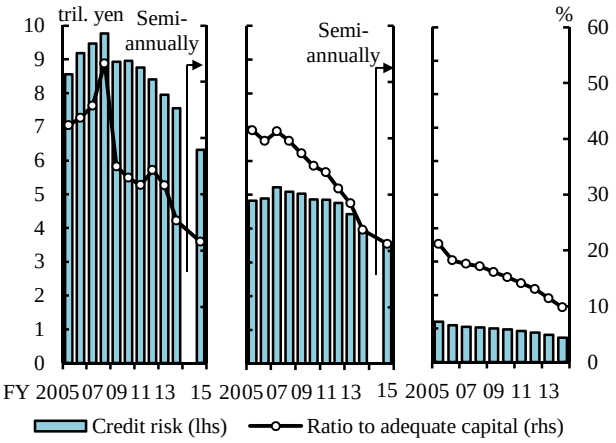
[19] Credit risk as defined here refers to unexpected losses. Unexpected losses are estimated by deducting the average amount of losses in 1 year (expected losses) from the maximum amount of losses envisaged within 99 percent of possible outcomes in 1 year. We use default probability, calculated based on data on borrower classification of bank loans, and the recovery rate of bank loans when losses occur.

Chart IV-1-1: Credit risk borne by financial institutions[1,2,3,4]



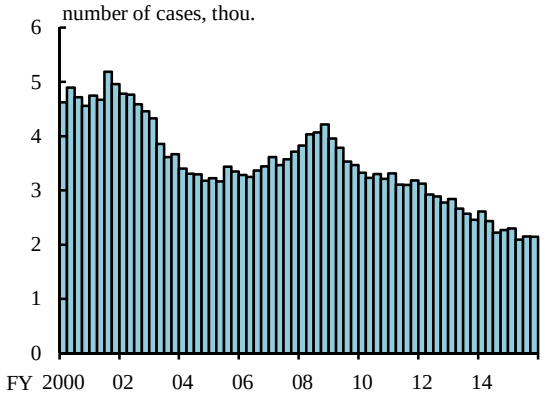
Notes: *1*. Credit risk is unexpected losses with a 99 percent confidence level.
2. Credit that is subject to self assessment is counted.
3. Adequate capital for internationally active banks from fiscal 2012 is CET I. Adequate capital for domestic banks from fiscal 2013 is core capital. The data do not take account of the phase-in arrangements. Adequate capital preceding the respective periods is Tier I.
4. For *shinkin* banks, figures for adequate capital and credit risk in the first half of fiscal 2015 are assumed to be unchanged from the end of fiscal 2014.
Source: BOJ.

Chart IV-1-2: Credit risk by type of bank[1,2,3]



Notes: *1*. The latest data for banks are as of the first half of fiscal 2015 (annualized), and those for *shinkin* banks are as of fiscal 2014.
2. Credit risk is unexpected losses with a 99 percent confidence level.
3. Credit that is subject to self assessment is counted.
Source: BOJ.

Chart IV-1-3: Corporate bankruptcies[1]

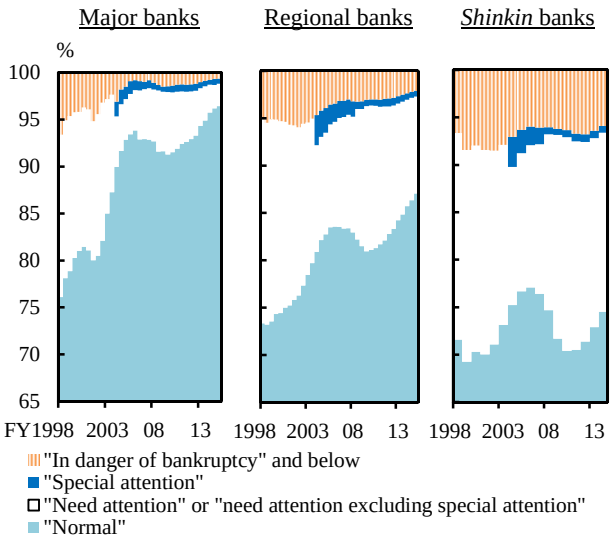


Note: *1*. The latest data are as of the January-March quarter of 2016.
Source: Tokyo Shoko Research, Ltd.

Quality of loans and credit costs

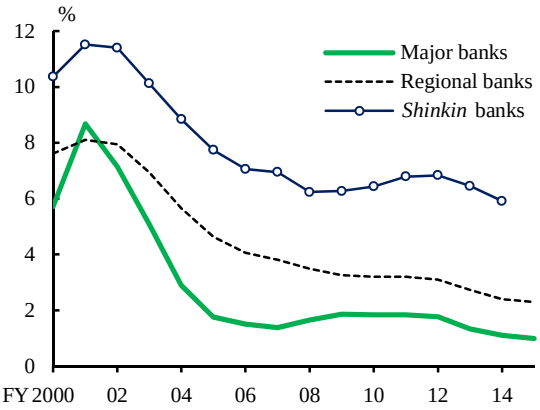
The quality of loans held by financial institutions has continued to improve. The amount of loans outstanding by borrower classification shows that the ratio of normal loans to total loans has risen further for each type of bank (Chart IV-1-4). Meanwhile, the nonperforming loan (NPL) ratio for each type of bank has declined (Chart IV-1-5).

Chart IV-1-4: Composition of claims by borrower classification[1,2]



Notes: *1*. The latest data for banks are as of end-September 2015, and those for *shinkin* banks are as of end-March 2015.
2. "'Need attention' or 'need attention excluding special attention'" indicates "need attention (including "special attention")" through fiscal 2003 and "need attention excluding special attention" from fiscal 2004 on ward.
Source: BOJ.

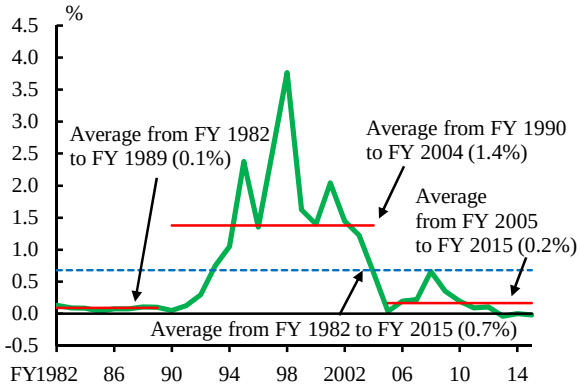
Chart IV-1-5: NPL ratios[1]



Note: *1*. The latest data for banks are as of end-September 2015, and those for *shinkin* banks are as of end-March 2015.
Source: BOJ.

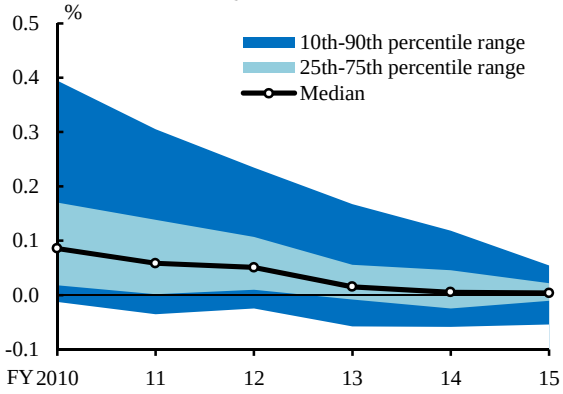
The credit cost ratio for financial institutions is at an extremely low level (Charts IV-1-6 and IV-1-7). By type of bank, the ratios for major banks and regional banks lie somewhere from around zero to negative territory, although the pace of decrease in credit costs has slowed (Chart IV-1-8). Under these circumstances, **loan-loss provision ratios -- already at their lowest level from a long-term perspective -- declined further** (Chart IV-1-9).

Chart IV-1-6: Credit cost ratio of banks[1]



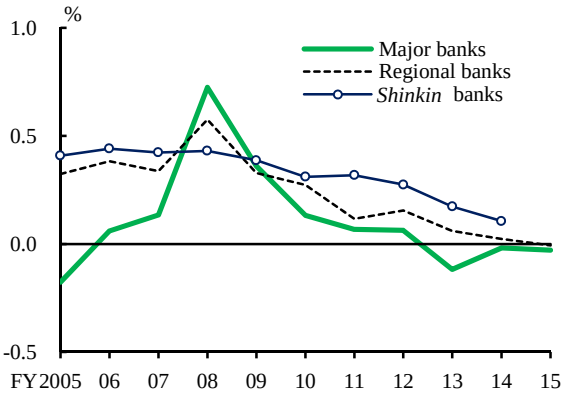
Note: *1*. The latest data are as of the first half of fiscal 2015 (annualized).
Source: BOJ.

Chart IV-1-7: Credit cost ratio of housing loans by banks[1,2]



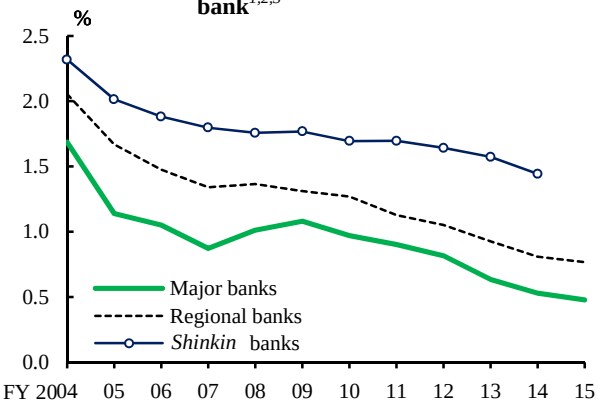
Notes: *1*. The latest data are as of the first half of fiscal 2015.
2. Credit cost ratio = (credit cost on a non-consolidated basis + credit cost on affiliated housing loan guarantee corporations) / (outstanding amount of housing loans without guarantees + outstanding amount of guaranteed loans on affiliated housing loans to guarantee corporations).
Source: BOJ.

Chart IV-1-8: Credit cost ratios by type of bank[1]



Note: *1*. The latest data for banks are as of the first half of fiscal 2015 (annualized), and those for *shinkin* banks are as of fiscal 2014.
Source: BOJ.

Chart IV-1-9: Loan-loss provision ratios by type of bank[1,2,3]



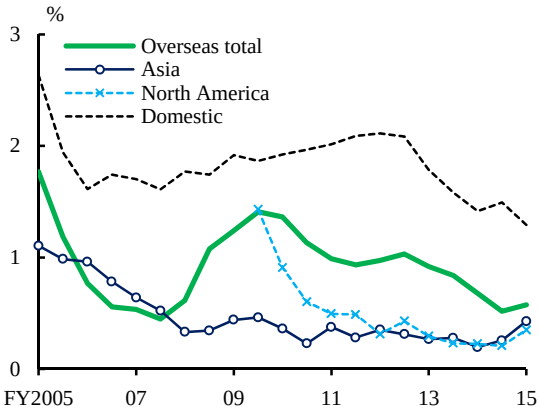
Notes: *1*. The latest data for banks are as of end-September 2015, and those for *shinkin* banks are as of end-March 2015.
2. These data include loans which apply the discounted cash flow method.
3. Loan-loss provision ratios are calculated by loan-loss provisions divided by total amount of claims (not the uncovered amount of claims).
Source: BOJ.

Credit risk associated with overseas loans

Credit risks associated with overseas loans remains subdued. Nevertheless, credit costs have been rising recently, albeit slightly -- particularly among commodity- and overseas-related loans, on which financial institutions have focused -- mainly against the backdrop of the decline in commodity prices and the slowdown in emerging economies.[20] In major borrowing regions such as North America and Asia, major banks' NPL ratios have risen slightly (Chart IV-1-10). By industry, the amount of commodity-related NPLs has been increasing recently although the amount remains small relative to the amount of total loans (Chart IV-1-11).

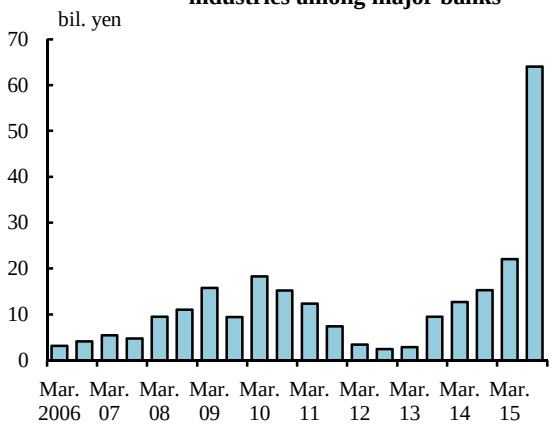
[20] The analyses of credit risks, loans outstanding by borrower classification, and credit cost ratios presented earlier include overseas loans, but the analysis here is focused solely on overseas loans.

Chart IV-1-10: Overseas NPL ratios[1]



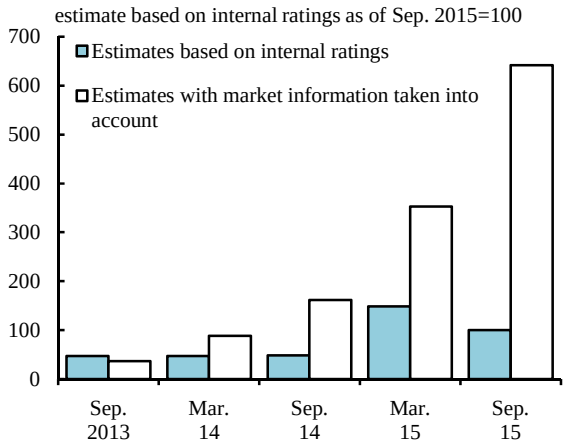
Note: *1*. The three major financial groups are counted on a non-consolidated basis. The latest data are as of end-September 2015.
Sources: Published accounts of each group.

Chart IV-1-11: NPLs in natural resources related industries among major banks[1,2]



Notes: *1*. The latest data are as of end-September 2015.
2. NPLs are the total amount of loans classified as "special attention" (substandard loans) and below under self-assessment.
Source: BOJ.

Chart IV-1-12: Expected losses on overseas lending to commodity sector[1,2]



Notes: *1*. The chart shows the expected losses estimated using a part of major banks' overseas lending to the commodity sector as a sample.
2. "Estimates based on internal ratings" is calculated with the banks' internal ratings on each debtor and the corresponding default probabilities. "Estimates with market information taken into account" is calculated using the expected default probability estimated from stock prices and financial data of the debtor.
Sources: Moody's; BOJ.

Tasks and challenges regarding credit risk management

Taking the above into account, **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 financial institutions take an active stance in credit extension. With regard to overseas loans including commodity- and M&A-related loans, it is necessary to assess the creditworthiness of the borrowers, taking into account the above-mentioned environmental changes, which could adversely affect the quality of credit, and to manage the associated risks as appropriate (see Box 2 for a discussion on the decline in commodity prices and risk management

of related exposures).[21] With regard to other loans, such as domestic real estate loans and loans related to medical and nursing care, financial institutions have to enhance their credit management, taking into account their long-term assessment of the business environment.[22]

(2) It is necessary to review the appropriateness of the estimated amount of credit risk and provisions regularly, taking into account anticipated future developments.[23] From a through-the-cycle point of view, financial institutions should appropriately factor in expectations on future developments that may not be reflected in past figures, mindful of the fact that credit cost ratios and loan-loss provision ratios are at low levels from a long-term perspective.

(3) It is necessary to make appropriate assessments of risk and return when originating or reviewing loans.

B. Market risk

1. Yen interest rate risk

Interest rate risk associated with yen-denominated bond investment

The amount of interest rate risk on yen-denominated bonds held by financial institutions remains at a high level compared with the past.[24] The amount of risk at the end of February 2016 was 7.5 trillion yen, roughly unchanged from that as of the

[21] The amount of expected losses arising from commodity related loans is calculated for overseas firms dealing in commodities, by using the expected default rate, which is in turn estimated from stock prices and other financial data. The calculated figures for losses are larger than those based on financial institutions' internal ratings, suggesting that recent market assessments have become considerably severe (Chart IV-1-12). It would be beneficial to utilize market data in a timely and appropriate manner when passing judgment on credit quality, taking into account both the possibility that the market is being overly pessimistic and the possibility that it is signaling future developments.

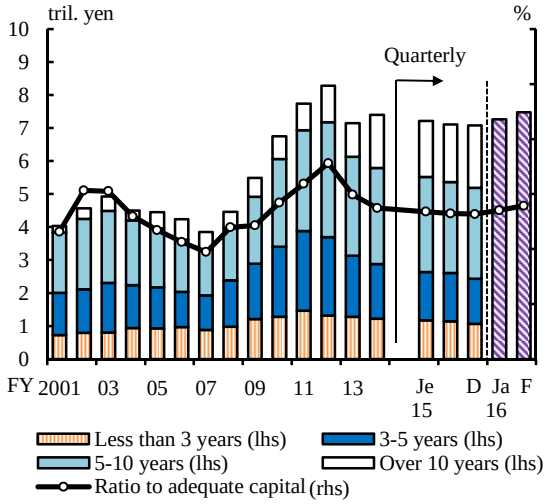
[22] For details, see " Tasks and Challenges regarding Regional Financial Institutions' Loans for the Housing Rental Business and Credit Management: Findings of Survey Results," *Financial System Report Annex Series* in March 2016 (available in Japanese only).

[23] On this issue, the Bank has released "Recent Developments in Loan-Loss Provision Calculation by Regional Financial Institutions," *Financial System Report Annex Series* in August 2015 (available in Japanese only). Since publication, more financial institutions have sought to examine the adequacy of existing provisions.

[24] The analysis here estimates capital losses on bondholdings when interest rates for all maturities rise by 1 percentage point.

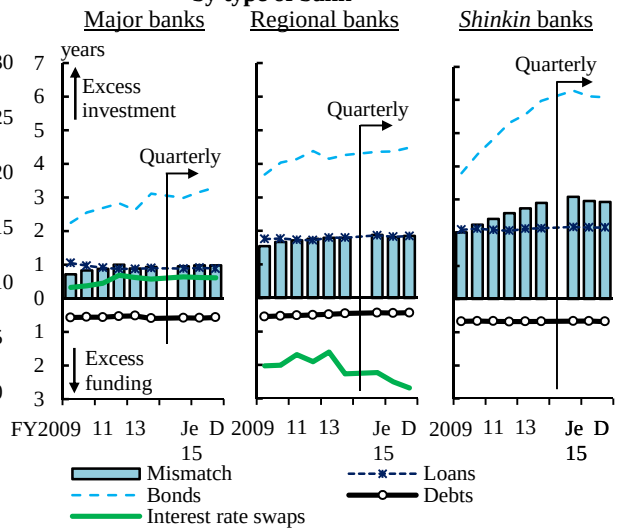
end of June 2015 (Charts IV-2-1 to IV-2-4). This is due to the longer duration of bond holdings, even as the outstanding amount of bonds decreased. The amount of risk as of the end of February 2016 remains at a relatively high level, although it stands approximately 10 percent below the most recent peak of 8.3 trillion yen attained at the end of March 2013.

Chart IV-2-1: Interest rate risk associated with yen-denominated bondholdings among financial institutions[1,2,3,4]



Notes: *1*. The latest data are as of end-February 2016.
2. Interest rate risk: 100 basis point value in the banking book.
3. Convexity and higher order terms are taken into account.
4. The data from end-January 2016 are estimated.
Source: BOJ.

Chart IV-2-2: Average remaining maturity of yen-denominated assets and liabilities by type of bank[1]



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: Effects of a rise in interest rates on capital losses on 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-June 2015	End-Sep. 2015	End-Dec. 2015	End-June 2015	End-Sep. 2015	End-Dec. 2015	End-June 2015	End-Sep. 2015	End-Dec. 2015
Financial institutions	-7.2	-7.1	-7.1	-13.8	-13.6	-13.5	-19.8	-19.5	-19.3
Banks	-5.1	-5.1	-5.0	-9.8	-9.7	-9.6	-14.1	-14.0	-13.8
Major banks	-2.3	-2.4	-2.3	-4.4	-4.5	-4.3	-6.4	-6.5	-6.2
Regional banks	-2.8	-2.7	-2.8	-5.3	-5.2	-5.3	-7.7	-7.4	-7.6
Shinkin banks	-2.1	-2.0	-2.0	-4.0	-3.9	-3.9	-5.7	-5.5	-5.5

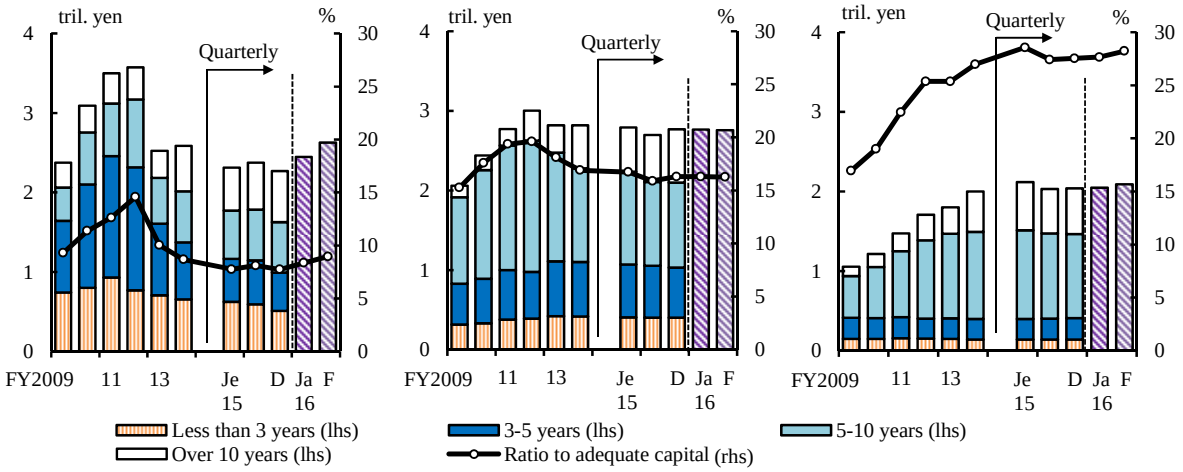
Notes: *1*. A parallel shift scenario is assumed.
2. Convexity and higher order terms are taken into account.
Source: BOJ.

Yen interest rate risk on balance sheets as a whole

The amount of yen interest rate risk on financial institutions' balance sheets as a whole, including bond investments as well as loans and deposits, has been nearly unchanged

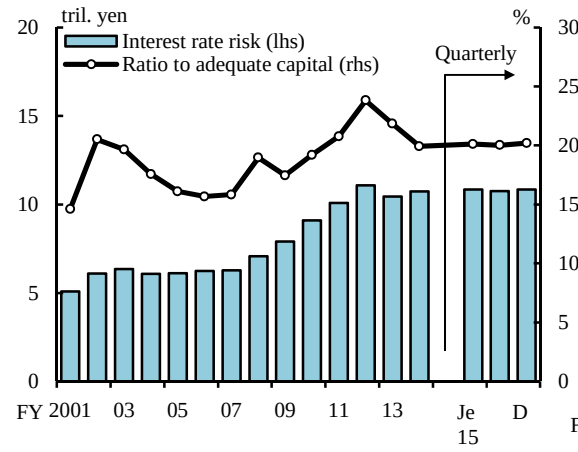
since the previous *Report* (Charts IV-2-5 and IV-2-6).[25]

Chart IV-2-4: Interest rate risk associated with yen-denominated bondholdings by type of bank[1]



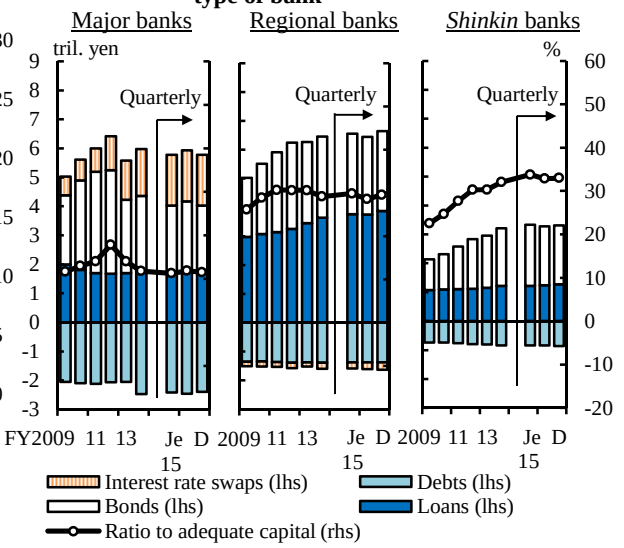
Note: *1*. The latest data are as of end-February 2016. Interest rate risk: 100 basis point value in the banking book. Convexity and higher order terms are taken into account. The data from end-January 2016 are estimated.
Source: BOJ.

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]



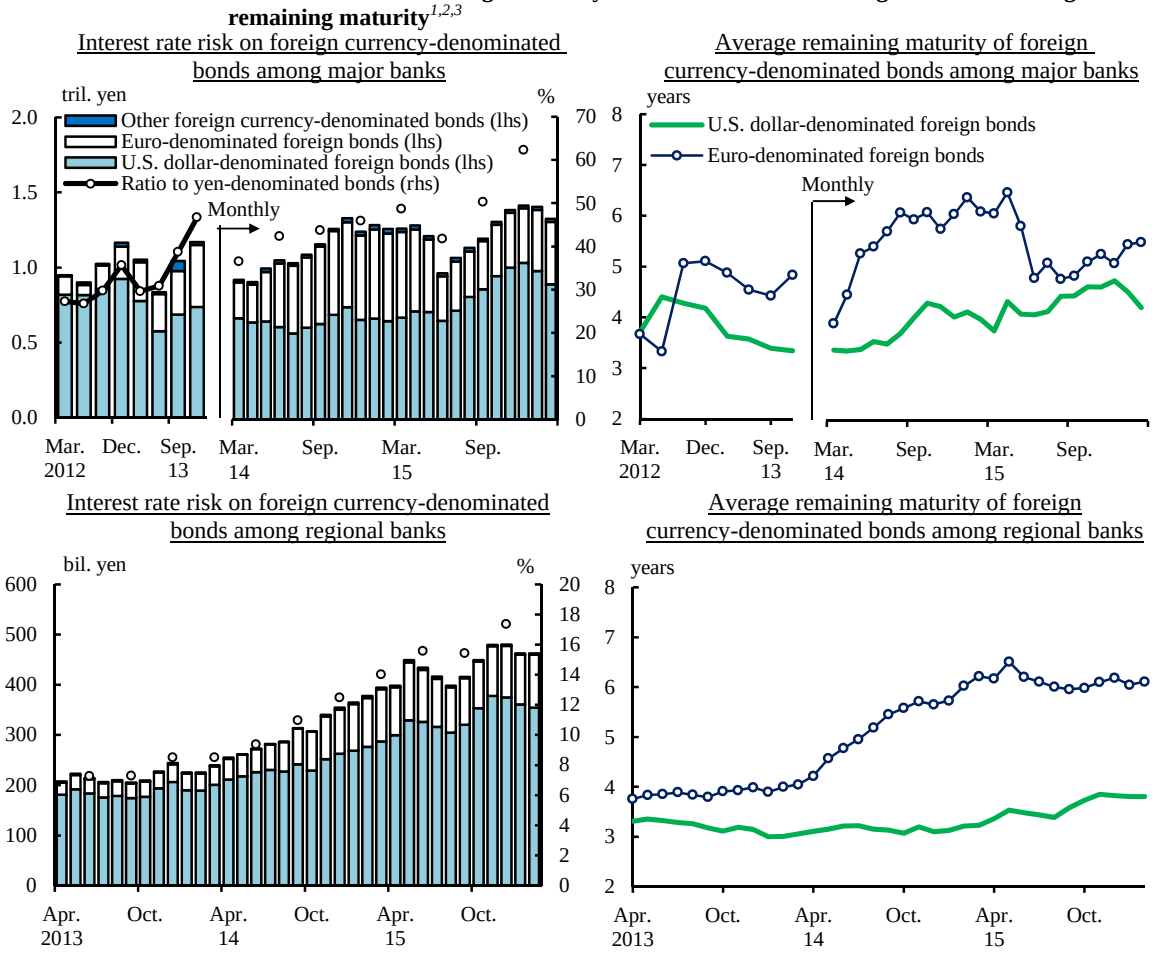
Notes: *1*. Interest rate risk: 100 basis point value in the banking book. For banks, off-balance-sheet transactions (interest rate swaps) are included.
2. Convexity and higher order terms are taken into account.
Source: BOJ.

[25] The 100 basis point value (bpv) is used to estimate losses 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 exercise, the 100 bpv only estimates 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 set the duration of demand deposits 3 months or less when calculating the effect of the 100 bpv on liabilities and do not account for core deposits.

2. Foreign currency interest rate risk

The amount of interest rate risk associated with foreign currency-denominated bond investment by financial institutions has demonstrated a clear increase compared with the previous *Report*. The amount of risk for banks (aggregating major banks and regional banks) increased by 16.7 percent compared with the end of August 2015, to 1.8 trillion yen as of the end of February 2016. This is primarily because major banks and regional banks increased their outstanding bond holdings, particularly of U.S. government bonds, while taking steps to extend their average duration (Chart IV-2-7). The ratio of the amount of interest rate risk associated with foreign currency-denominated bonds to that associated with yen-denominated bonds has reached just over 60 percent at major banks and almost 20 percent at regional banks.

Chart IV-2-7: Interest rate risk of foreign currency-denominated bonds among banks and average remaining maturity[1,2,3]

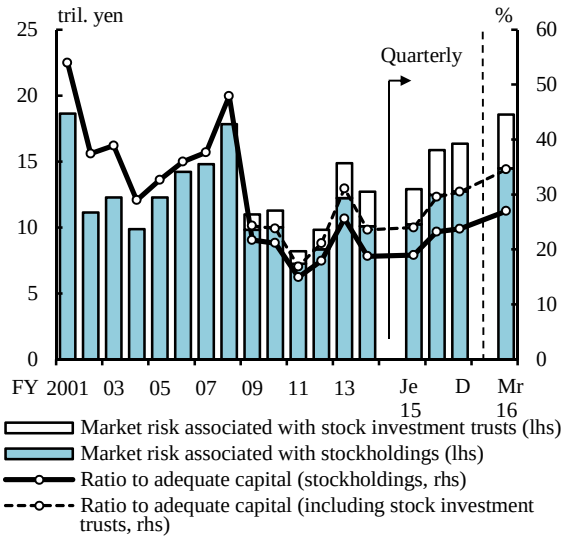


Notes: *1*. The latest data are as of end-February 2016.
2. Interest rate risk: 100 basis point value in the banking book. Off-balance-sheet transactions of major banks are included. Off-balance sheet transactions of regional banks are excluded.
3. Average remaining maturity is estimated by the interest rate risk.
Source: BOJ.

3. Market risk associated with stockholdings

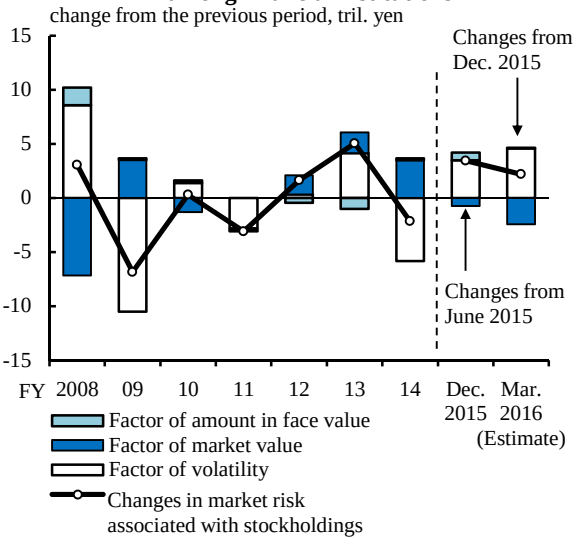
The amount of market risk associated with stockholdings at financial institutions has increased markedly since the previous *Report*. The amount of the risk calculated based on stock price developments through the end of March 2016 was 18.6 trillion yen, a 43.7 percent increase compared with that reported in the previous *Report* (Charts IV-2-8 to IV-2-10).[26] Although the decline in stock prices since the summer of 2015 reduced the amount of risk, this was overwhelmed by the rise in market volatility. Meanwhile, although the outstanding amount of strategic stockholdings continues to be on a moderate declining trend, financial institutions have increased their holdings of stock investment trusts as part of their market investment diversification strategy, and their outstanding stockholdings, inclusive of stock investment trusts, has increased (in book value terms).

Chart IV-2-8: Market risk associated with stockholdings among financial institutions[1,2,3,4]



Notes: *1*. The latest data are as of end-March 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 2008 data for stock investment trusts are excluded from the figures.
4. The latest data are estimated using outstanding amount of stockholdings and stock investment trusts at end-February 2016 and stock prices as of end-March 2016.
Source: BOJ.

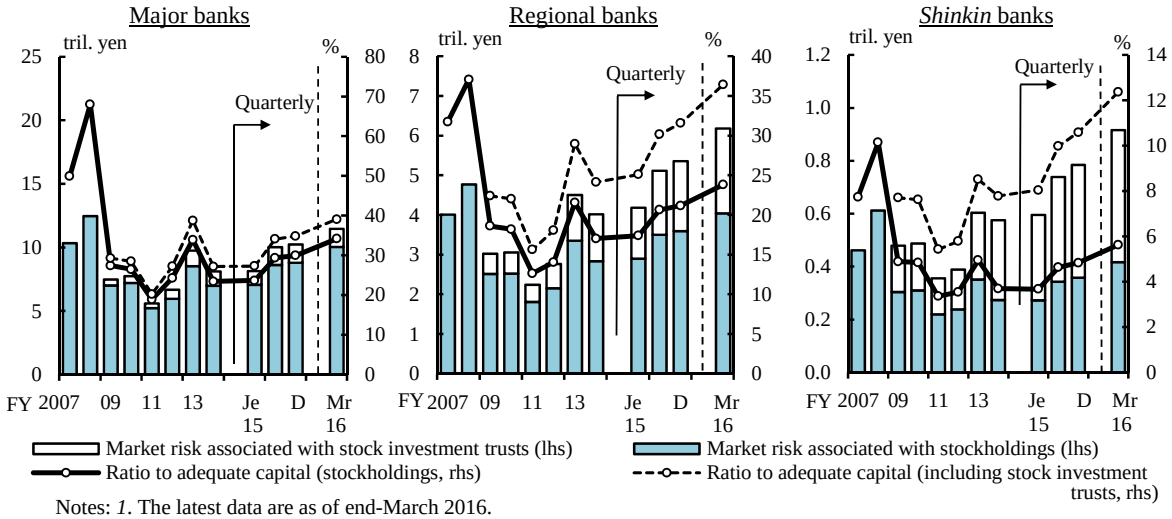
Chart IV-2-9: Decompositions of changes in market risk associated with stockholdings among financial institutions[1,2]



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.

[26] The market risk associated with stockholdings computed here is estimated using a VaR with a 99 percent confidence level and a 1-year holding period. It includes the risk associated with stock investment trusts.

Chart IV-2-10: Market risk associated with stockholdings by type of bank[1,2,3,4]



Notes: *1*. The latest data are as of end-March 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 2008 data for stock investment trusts are excluded from the figures.
4. The latest data are estimated using outstanding amount of stockholdings and stock investment trusts at end-February 2016 and stock prices as of end-March 2016.
Source: BOJ.

Tasks and challenges in market risk management

Taking the above into account, **the two key tasks and challenges in market risk management for financial institutions are detailed below.**

(1) Financial institutions need to undertake and manage risks appropriately, under 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 and multi-dimensional perspective.

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

It is considered crucial to have a holistic understanding of the impact of changes in the profile of risk factors, as financial institutions are now taking on more diverse risks, such as risks associated with foreign currency interest rates, stockholdings, real estate, and foreign exchange, in addition to already high levels of yen interest rate risk. In order for financial institutions to obtain such an understanding, it is important to apply suitably severe scenarios relevant to their portfolios, taking into account changes in the market investment environment, including the recent heightening of volatility in global financial markets. Under these scenarios, financial institutions should then analyze risks

from multiple dimensions, including fluctuations in the market value of assets as well as their effect on profits. Based on their findings, they should examine implementable actions in stress situations. With regard to yen interest rate risk, given that the risk remains at a high level compared with the past, it is necessary to consider the possibility that the evolution of interest rates may differ from that observed in the past, with the introduction of a negative interest rate.

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' capital strength and profits. Strategic stockholdings have been formed over a long period, along with the development of transactional relationships between banks and business companies. To reduce these stockholdings, banks should therefore endeavor to provide the business companies with a deeper understanding of the underlying logic behind the reduction of strategic stockholdings. At the same time, it is important for banks to provide a more objective assessment of the rationale behind their strategic stockholdings (Box 3 analyzes the effects of banks' strategic stockholdings on their funding costs).

C. Funding liquidity risk

In this section, we assess funding liquidity risk, first in yen and then foreign currencies, from two perspectives: (1) the stability of the investment and funding structure; and (2) the degree of resilience to short-term stress.[27]

Yen funding liquidity risk

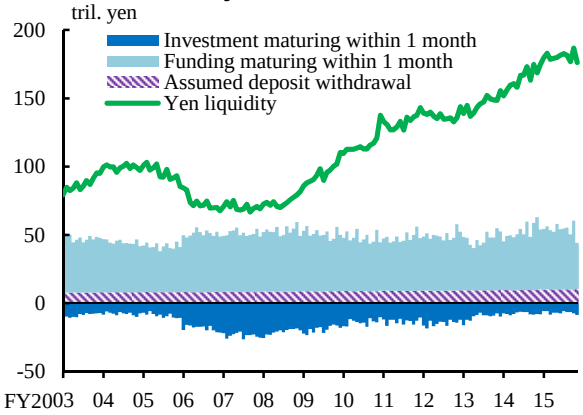
Financial institutions have sufficient yen funding liquidity.

The stability of the investment and funding structure of yen is quite 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.

[27] Based on the lessons learned from the global financial crisis in and after the summer of 2007, Basel III stipulates new regulations to enhance liquidity risk management by financial institutions in terms of both (1) the stability of the investment-funding balance structure (the net stable funding ratio, NSFR) and (2) the resilience against a short-term stress situation (the liquidity coverage ratio, LCR). Of these, the LCR has been applied to internationally active banks since end-March 2015.

As for the resilience of yen-based funding to short-term stress, it is assessed that financial institutions have a sufficiently high degree of resilience, as they hold liquid assets worth far more than the expected fund outflows under stress situations (Chart IV-3-1).[28]

Chart IV-3-1: Resilience to yen liquidity among major banks[1,2,3]



Notes: *1*. The latest data are as of end-February 2016.
2. It is assumed that 3 percent of deposits are withdrawn.
3. Yen liquidity = cash and deposits + JGBs.
Source: BOJ.

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 possible outflows, 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 with relatively long maturities and in foreign bonds, whereas a large share of funding comprises market funding, such as repos, currency and foreign exchange 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, it is useful to monitor the "stability gap" -- the gap between the amount of illiquid loans and stable funding through, for example, client related deposits, medium- to long-term currency and foreign exchange swaps, and corporate bonds (Chart IV-3-3).[29]

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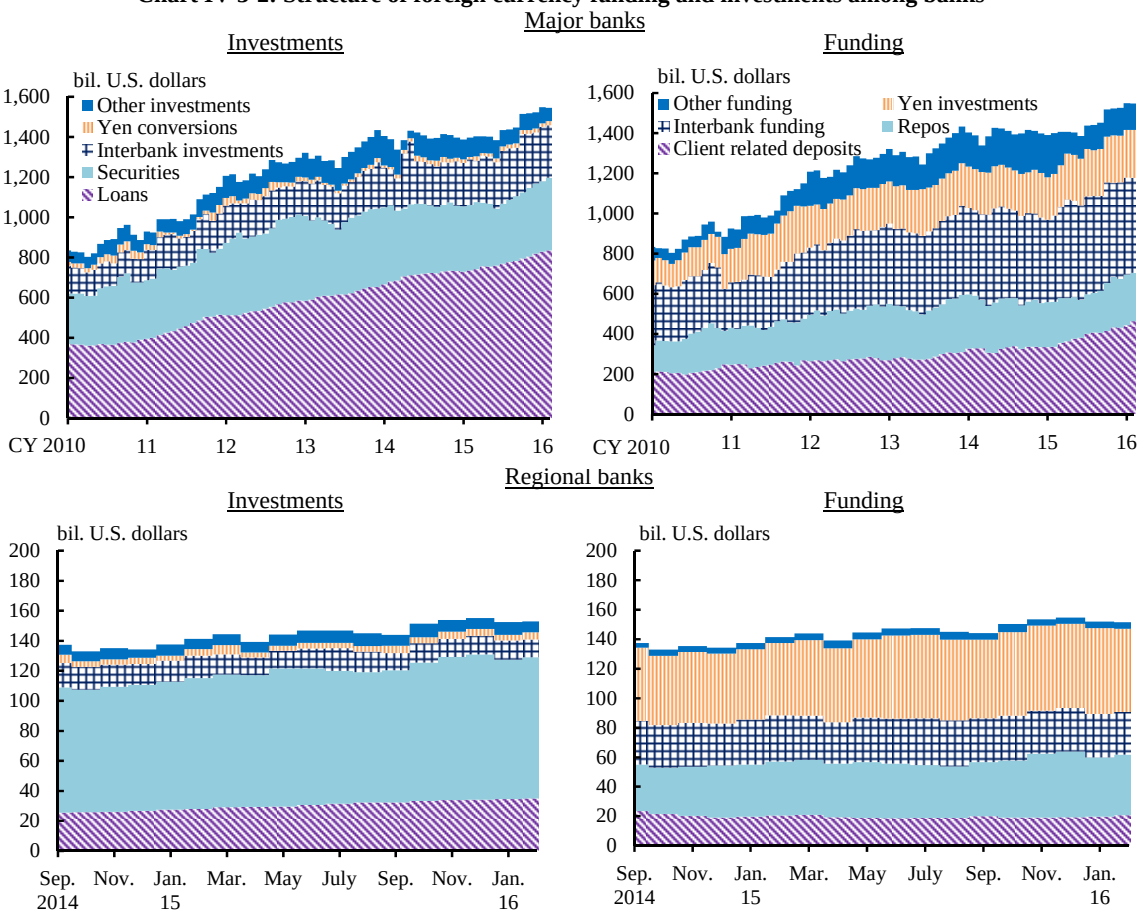
[28] In accordance with the concept of the LCR, we assume here an outflow of market funding with a maturity of 1 month or less and amounting to 3 percent of total deposits. In calculating the LCR, more complex stress situations than the one featured here are assumed, such as the withdrawal of committed credit lines, downgrading of credit, and outflow of collateral due to margin calls. Thus, it should be noted that the assumption for fund outflows under stress does not fully conform to the definition of the LCR.

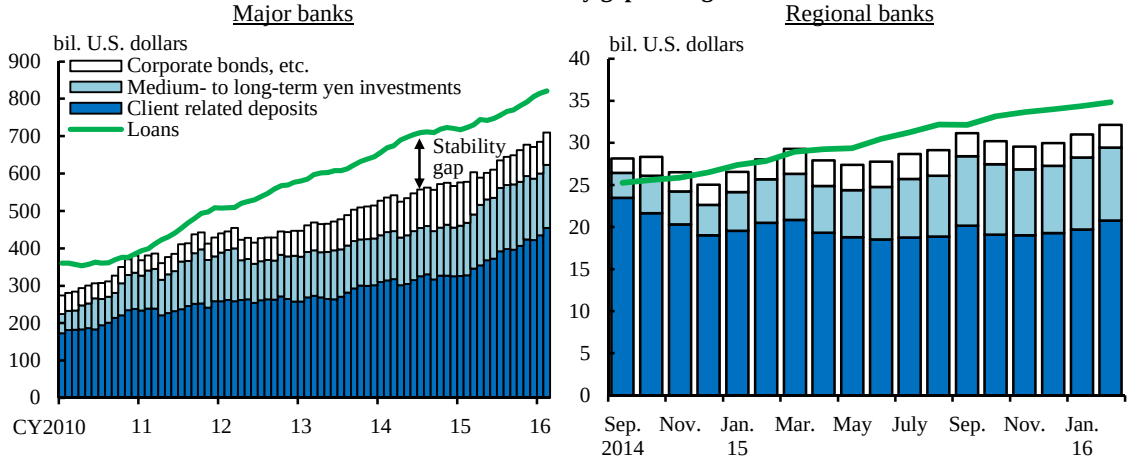
[29] With regard to medium- to long-term currency and foreign exchange swaps, particular attention should be paid to currency and foreign exchange swap arrangements that require reconciliation of

Chart IV-3-2: Structure of foreign currency funding and investments among banks[1]



Note: *1*. The latest data are as of end-February 2016.
Source: BOJ.

Chart IV-3-3: Stability gap among banks[1,2,3]



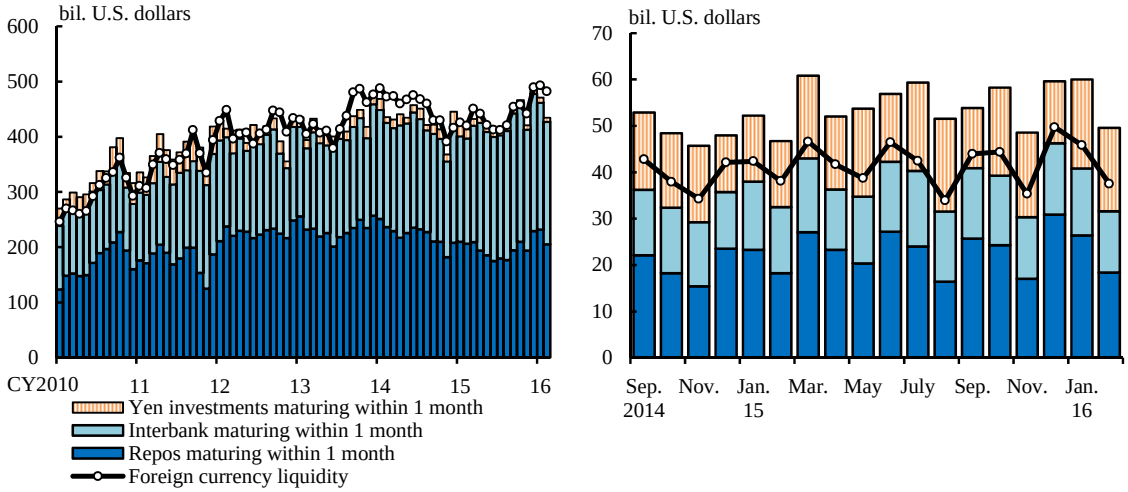
Notes: *1*. For major banks, internationally active banks are counted.
2. The latest data are as of end-February 2016.
3."Corporate bonds, etc." and "Medium- to long-term yen investments" for major banks indicate funding maturing in over 3 months until March 2012 and funding maturing in over 1 year from April 2012. "Corporate bonds, etc." and "Medium- to long-term yen investments" for regional banks indicate funding maturing in over 1 year.
Source: BOJ.

principal amounts during each periodic interest payment, as additional liquidity will be needed whenever the yen depreciates.

The stability gap has continued to narrow among major banks. While loans have continued to increase, this narrowing is attributable to banks' continued efforts to bolster stable funding sources, particularly through increasing client related deposits and medium- to long-term currency and foreign exchange swap funding. Nevertheless, it is important for banks to continue with their efforts to shore up the stability of their funding sources, as some stability gap and other risks still remain, namely, the risk concerning the stability of client related deposits, the risk of being unable to liquidate foreign bonds with low liquidity, and the risk associated with the withdrawal of committed credit lines. Meanwhile, at regional banks, the stability gap has been widening gradually, but the size of the gap remains small for now. Nonetheless, it should be noted that some regional banks that have been actively accumulating foreign currency assets need to work to augment their stable funding bases.

As for the resilience of foreign currency funding to short-term stress, both major banks and regional banks generally hold liquid assets to cover the outflow of funds expected under a stress situation (Chart IV-3-4).[30]

Chart IV-3-4: Resilience to foreign currency liquidity among banks[1,2]



Notes: *1*. The latest data are as of end-February 2016.
2. Foreign currency liquidity = cash and deposits + unencumbered U.S. treasuries + repos maturing within 1 month.
Source: BOJ.

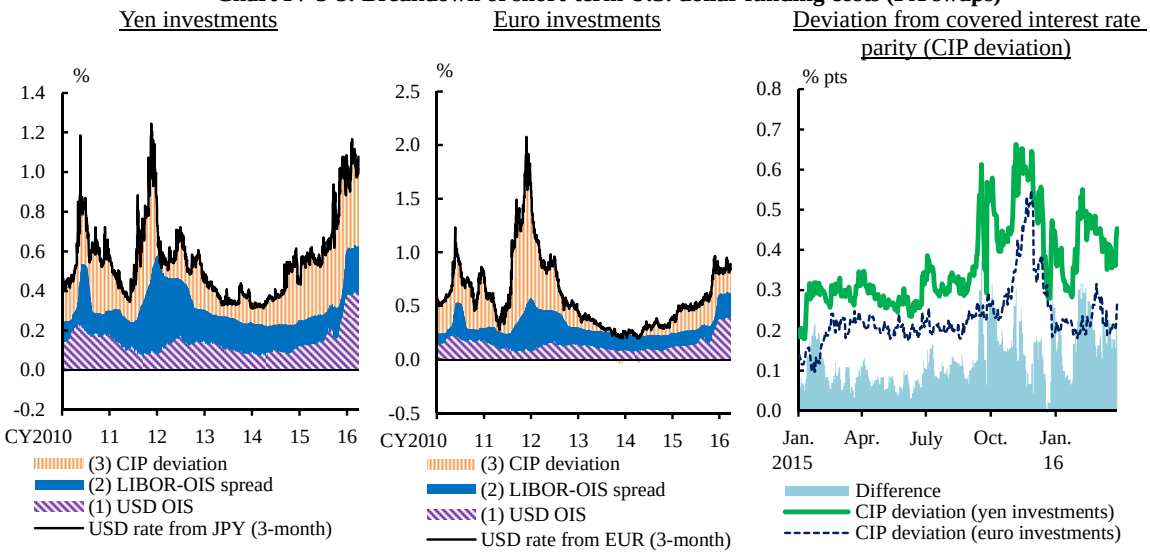
Foreign currency funding environment

Recently, the funding premium in the foreign currency funding markets has widened. U.S. dollar funding costs have risen substantially, particularly in the

[30] We designate repo borrowings with remaining maturities of 1 month or less as liquid assets, making the assumptions 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. However, it should be borne in mind that this exercise does not account for the unused committed credit line.

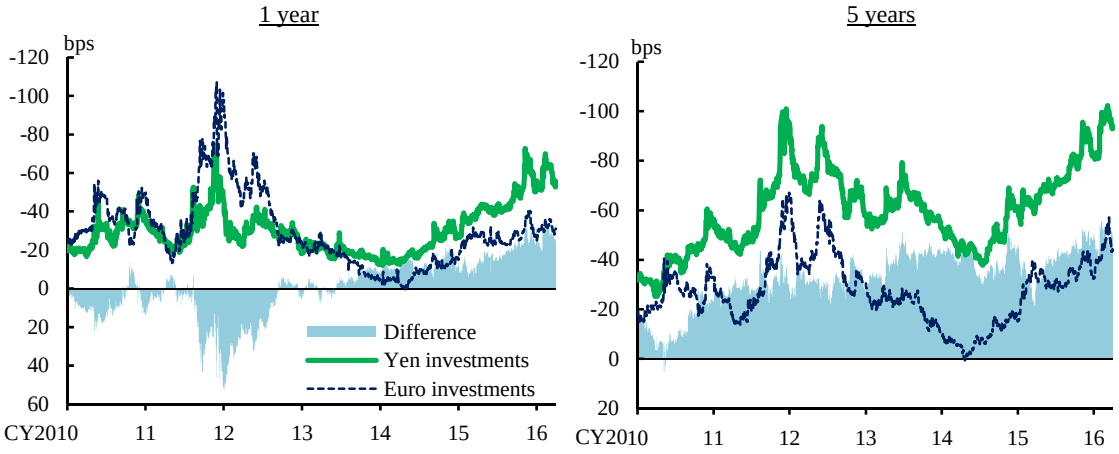
foreign exchange and currency swap markets. When comparing the cost of U.S. dollar funding through the foreign currency funding markets based on the yen and the euro, it can be observed that the funding premium for yen investments is higher than that for euro investments in both the short-term and long-term markets (Charts IV-3-5 and IV-3-6). A breakdown of the cost of short-term foreign exchange swaps into three factors, i.e., (1) the U.S. policy-linked interest rate (OIS), (2) credit spreads reflecting the risk of unsecured interbank lending (LIBOR-OIS), and (3) supply and demand conditions (represented by deviations from the covered interest parity condition), shows that the recent widening in the deviation from the covered interest parity condition is larger for yen investments than for euro investments (Chart IV-3-5).

Chart IV-3-5: Breakdown of short-term U.S. dollar funding costs (FX swaps)[1,2]



Notes: *1*. The latest data are as of March 31, 2016.
2. (1) USD OIS = forecast of the U.S. policy rate, (2) LIBOR - OIS spread = USD LIBOR - USD OIS, (3) CIP deviation = USD funding costs - (1) - (2).
Source: Bloomberg.

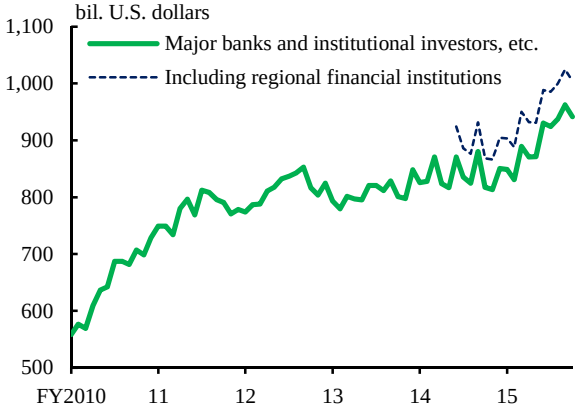
Chart IV-3-6: Medium- to long-term U.S. dollar funding premiums (cross-currency swaps)[1]



Note: *1*. The latest data are as of March 31, 2016. These charts indicate U.S. dollar funding premiums in cross-currency basis swaps.
Source: Bloomberg.

Possible drivers on the supply and demand side that typically trigger the widening of the currency and foreign exchange swap market funding premium for both the yen and the euro have already been discussed in Chapter II. In Japan, a wide range of entities -- including depository institutions with a particular focus on market investment and institutional investors including life insurance companies, in addition to banks -- have exhibited a growing tendency of increasing their overseas assets (including loans, securities investment, etc.), in a situation where Japan's yield curve has been at an extremely low level (Chart IV-3-7). Such a tendency may have contributed to the higher funding premium of yen investments relative to euro investments.

Chart IV-3-7: Yen investments by Japanese financial entities[1,2,3,4]



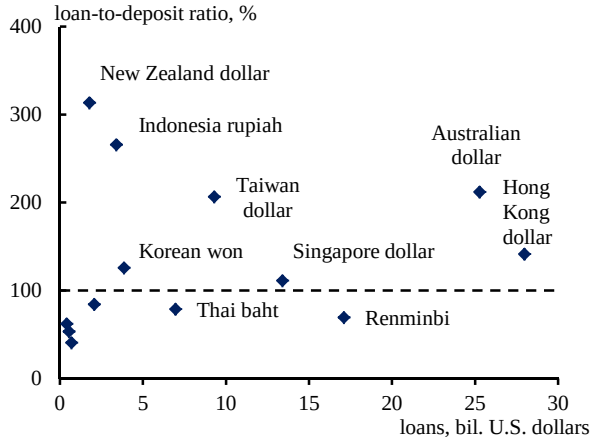
Notes: *1*. Estimates by the BOJ. The latest data are as of end-January 2016.
2. Major banks and institutional investors, etc. include Major banks, Japan Post Bank, The Norinchukin Bank, Shinkin Central Bank (from end-September 2014) and life insurance companies.
3. Life insurance companies are members of the Life Insurance Association of Japan (the latest number of members: 41 companies).
4. Regional financial institutions are counted from end-September 2014.
Sources: The Life Insurance Association of Japan; Published accounts of each company; BOJ.

Although constraints on the availability of funds have not been observed, there is a possibility that foreign currency funding conditions could continue to tighten. Currently, no significant constraints have been observed in terms of the availability of funds in the currency and foreign exchange markets, as their transaction volume has been on a moderately increasing trend (Chart II-2-14). Similar assessments have been made for other funding instruments, including CD and CP, for which the rise in funding costs has been limited compared to currency and foreign exchange swaps. Nevertheless, looking ahead, the appetite for overseas asset investment among a wide range of domestic entities may grow even stronger, reflecting a further decline in Japanese interest rates, even as the U.S. dollar funding environment has been on a tightening trend. In the meantime, as discussed in Chapter II, speculation surrounding developments such as the U.S. policy rate hike may affect the flow of funds associated with U.S. dollar money markets, while international financial regulations will gradually be phased in. Vigilance should be paid to the impact of regulatory reforms on major providers of funds, key institutional investors including U.S. Money Market Funds (MMF), in addition to the effects of regulations such as Basel III's leverage ratio on

financial institutions.

As for liquidity risk of local currencies, the proportion of local currency-denominated loans has continued to increase, particularly in Asia. However, when also considering the funding environment, some currencies have high loan-to-deposit ratios, such as the Australian dollar and the Hong Kong dollar. In addition, some currencies have foreign exchange swap markets of limited size, such as the South Korean won and the New Taiwan dollar (Chart IV-3-8).

Chart IV-3-8: Loans outstanding and loan-to-deposit ratio by currency of large banks[1]



Note: *1*. Five major banks are counted. The data are as of end-September 2015.
Source: BOJ.

Tasks and challenges regarding foreign currency liquidity risk management

Given the above, **the two 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, and strengthen their ability to respond to potential market stresses.

(2) Liquidity risk management of local currencies, especially Asian currencies, needs to be strengthened, and efforts need to be made to buttress financial institutions' stable funding bases.

D. Financial institutions' capital adequacy

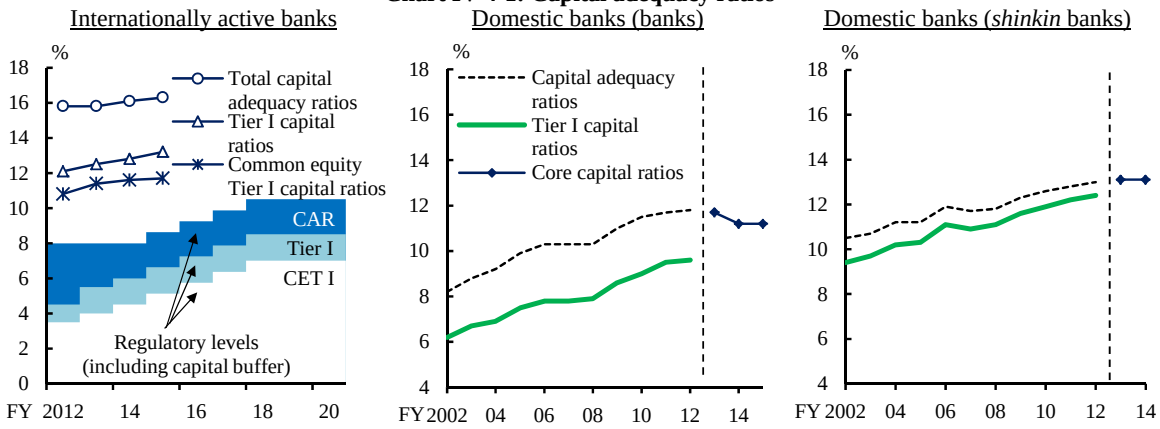
This section examines whether banks' capital adequacy ratios fulfill regulatory requirements, and further, whether they maintain a sufficient capital base against the various risks they undertake.

Capital adequacy ratios

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

As of the end of the first half of fiscal 2015, total capital adequacy ratios, Tier I capital ratios, and common equity Tier I capital ratios (CET I capital ratios) at internationally active banks significantly exceeded regulatory requirements (Chart IV-4-1).[31] Similarly, core capital ratios of domestic banks were sufficiently high. However, 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 and the required level of bank capital are yet to be determined. Internationally active banks -- systemically important financial institutions in particular -- need to persist with efforts to keep in line with international regulations as appropriate.

Chart IV-4-1: Capital adequacy ratios[1,2,3,4]



Notes: *1*. CAR indicates total capital adequacy ratios. The latest data for banks are as of end-September 2015, and those for *shinkin* banks are as of end-March 2015.
2. Internationally active banks and domestic banks are classified as of end-September 2015.
3. Data for banks are calculated on a consolidated basis.
4. The data take account of the phase-in arrangements.
Source: BOJ.

[31] For example, the minimum regulatory level applied to the CET I capital ratio for internationally active banks was raised to 4.5 percent at the end of March 2015. In addition, 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 for global systemically important banks (G-SIBs) of 1-2.5 percent <determined in accordance with their size and other characteristics> are individually scheduled to be raised from 2016 (all of these requirements will be implemented in stages, with full implementation taking effect in 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 the 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.

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

Financial institutions' capital levels have generally been adequate relative to the amount of risk undertaken (Charts IV-4-2 to IV-4-4).[32] Their capital levels (as of end-September 2015) have been more or less unchanged on the whole. By type of bank, capital held by major banks has decreased somewhat, as unrealized gains on securities at internationally active banks have shrunk, due to the decline in stock prices. At regional banks, capital levels have increased moderately, mainly due to the accumulation of retained earnings. However, domestic banks' unrealized gains on securities holdings -- which are not factored into the calculation of capital -- decreased, consequently causing the buffer against changes in the market value of securities to contract somewhat. Meanwhile, the aggregate amount of risk borne by financial institutions has increased somewhat since the end of fiscal 2014, mainly due to the increase in market risk associated with stockholdings.

Global financial markets have remained highly volatile since the second half of fiscal 2015. This is likely to be reflected in securities-related exposures in particular, in terms of changes in the amount of risk and banks' unrealized gains and losses relative to the aforementioned figures. Therefore, when estimating the extent of these subsequent changes, the amount of financial institutions' risk as of the end of March 2016 has increased by approximately 7.0 percent from that at the end of September 2015, while their capital level remained more or less unchanged as the increase in unrealized gains on bond holding offsets a decrease in unrealized gains on equity holdings. Nevertheless, financial institutions' capital level remains adequate relative to the level of risk they are exposed to. Taking the above into account, **it can be judged that the ability of all types of banks to absorb losses and take on risks continues to be at a high level.**

[32] 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 as presented here does not necessarily match the internal calculations made 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-2-5, 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 is CET I. Adequate capital for domestic banks from fiscal 2013 is core capital. The data do not take account of the phase-in arrangements. Adequate capital preceding the respective periods is Tier I.

Chart IV-4-2: Risks borne by financial institutions and amount of adequate capital[1,2,3,4]

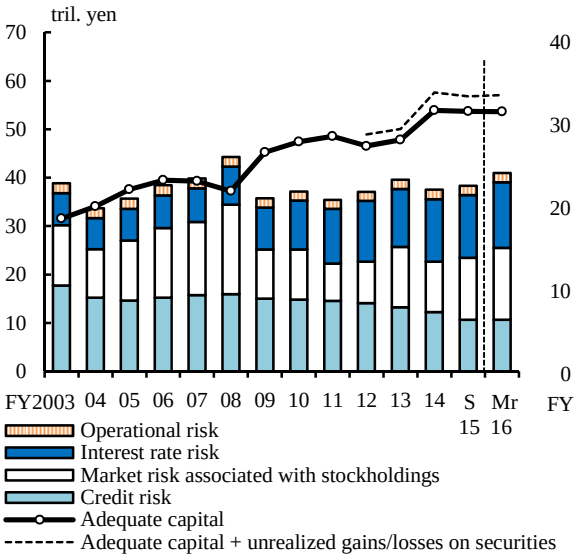
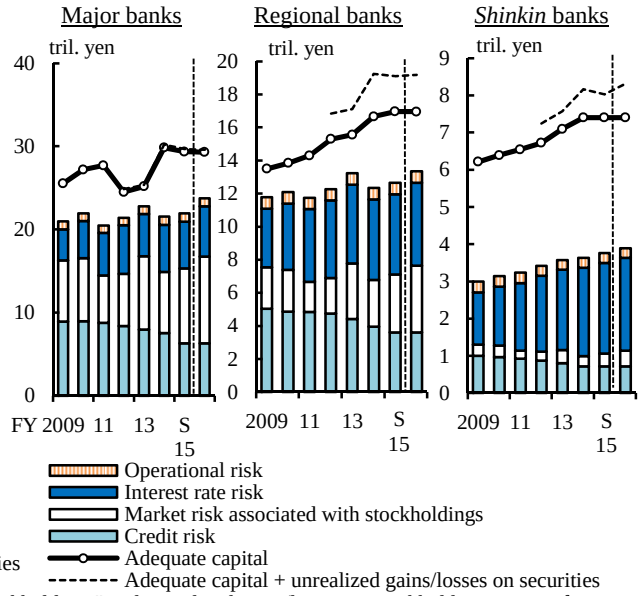


Chart IV-4-3: Risks borne by financial institutions and amount of adequate capital (by type of bank)[1,2,3,4]



Notes: *1*. The latest data for "market risk associated with stockholdings" and unrealized gains/losses on stockholdings are as of end-March 2016, those for interest rate risk associated with bondholdings and unrealized gains/losses on securities (excluding on stockholdings) are as of end-February 2016, those for other interest rate risk (JPY-denominated) are as of end-December 2015, and those for other data are as of end-September 2015.
2. Market risk associated with equity investment trusts is not counted. "Credit risk" includes foreign currency-denominated risk. "Market risk associated with stockholdings", and interest 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.
4. For *shinkin* banks, figures for adequate capital, credit risk, and operational risk on end-September 2015 and on end-March 2016 are assumed to be unchanged from end-March 2015.
Source: BOJ.

Chart IV-4-4: Risks borne by financial institutions and amount of adequate capital (figures)[1,2,3]

tril. yen

	Financial institutions		Major banks		Regional banks		*Shinkin* banks	
	End-Sep. 2015	End-Mar. 2016 (Estimate)	End-Sep. 2015	End-Mar. 2016 (Estimate)	End-Sep. 2015	End-Mar. 2016 (Estimate)	End-Sep. 2015	End-Mar. 2016 (Estimate)
Adequate capital	53.7	53.7	29.3	29.3	17.0	16.9	7.4	7.4
Amount of risk	38.3	41.0	21.9	23.8	12.6	13.3	3.8	3.9
Market risk associated with stockholdings	12.8	14.9	9.0	10.4	3.5	4.0	0.3	0.4
Unrealized gains/losses on securities (tax effects taken into account)	8.5	8.7	4.7	4.7	3.1	3.2	0.6	0.9
Unrealized gains/losses on bondholdings	1.5	2.5	0.3	0.6	0.8	1.1	0.5	0.8
Unrealized gains/losses on stockholdings	6.4	5.7	4.3	3.8	2.1	1.8	0.1	0.1

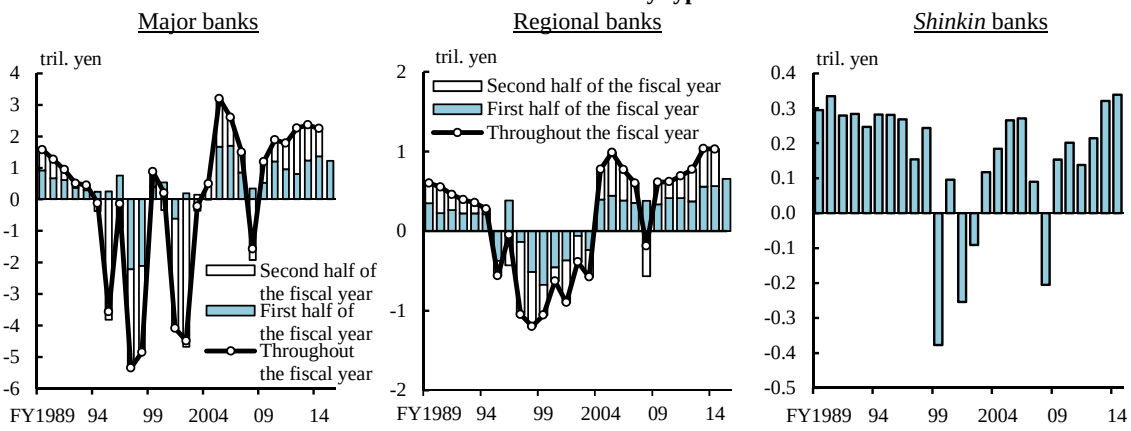
Notes: *1*. The definition of adequate capital and risk are referred to Chart IV-4-2.
2. Unrealized gains/losses on bondholdings are those on domestic bonds.
3. Unrealized gains/losses on securities at end-March 2016 consist of estimates of unrealized gains/losses on stockholdings at end-March 2016 and estimates of other gains/losses including on bondholdings at end-February 2016.
Source: BOJ.

E. Financial institutions' profitability, financial stability, and QQE with a negative interest rate

Thus far, we looked at 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 future, and the impact of QQE with a negative interest rate on their profitability.

Financial institutions' profits (net income) have been at a high level from a long-term perspective (Chart IV-5-1). Despite a continued decline in profits from domestic loans, financial institutions have maintained overall profits at a high level largely due to: (1) a decline in credit costs, amid a moderate economic recovery; (2) an increase in securities-related profits and in fees and commissions, particularly for sales of financial products, alongside a rise in stock prices; and (3) an increase in international operating profits, such as those derived from overseas loans.

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

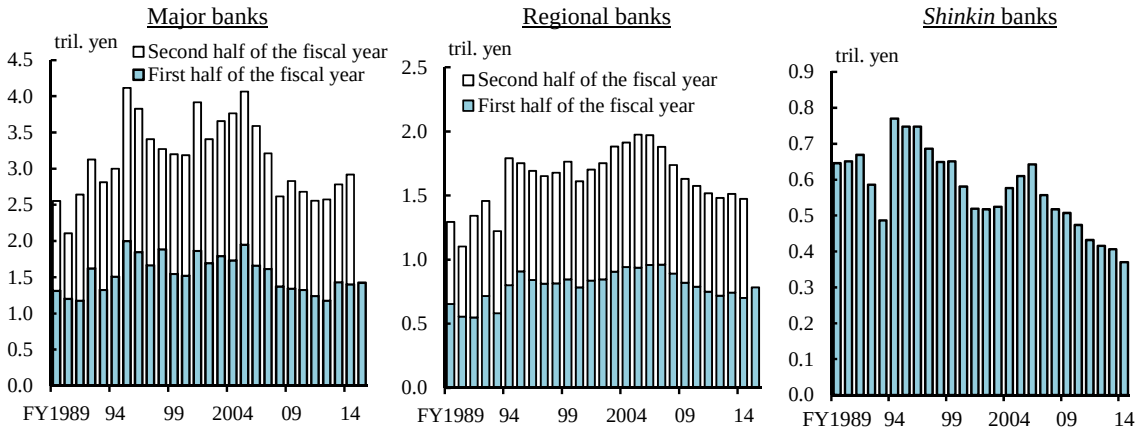


Note: *1*. The latest data for banks are as of the first half of fiscal 2015, and those for *shinkin* banks are as of fiscal 2014.
Source: BOJ.

Nevertheless, **the trend of declining core operating profits -- which represent financial institutions' core profitability -- has not abated, particularly among regional financial institutions, while developments among major banks have shown only slight improvement** (Chart IV-5-2). This trend can be primarily attributed to the continued narrowing of domestic lending spreads on loans in a low interest rate environment, even as the amount of outstanding domestic loans has been on the rise, partly due to financial institutions' proactive lending stance (Chart IV-5-3). For regional financial institutions, structural problems, such as regional population decline and the consequent decline in growth potential, have also contributed to their low profitability. If the decline in core profitability persists, the loss-absorbing capacity and risk-taking

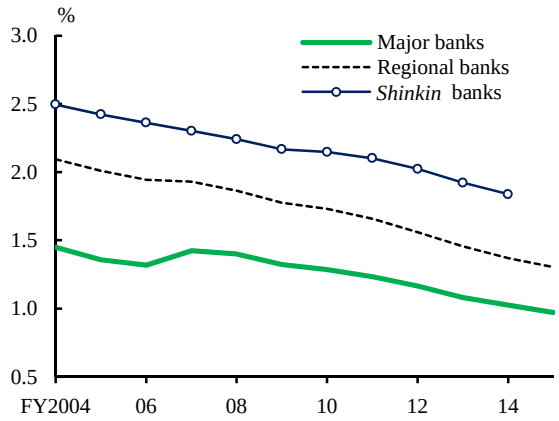
capability of these institutions may be restrained.

Chart IV-5-2: Profits from core business by type of bank[1]



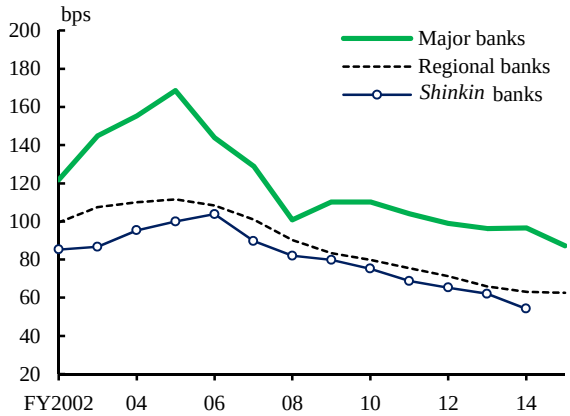
Note: *1*. The latest data for banks are as of the first half of fiscal 2015, and those for *shinkin* banks are as of fiscal 2014.
Source: BOJ.

Chart IV-5-3: Interest margin on loans by type of bank[1,2,3]



Notes: *1*. The latest data for banks are as of the first half of fiscal 2015, and those for *shinkin* banks are as of fiscal 2014.
2. The data for banks are of domestic business sector. The data for *shinkin* banks are of all branches.
3. Interest rate swaps are subtracted from funding costs.
Source: BOJ.

Chart IV-5-4: Break-even credit cost ratio by type of bank[1,2,3]



Notes: *1*. The latest data for banks are as of the first half of fiscal 2015, and those for *shinkin* banks are as of fiscal 2014.
2. Break-even credit cost ratios are the ratios above which credit costs exceed operating profits from core business.
3. Profits from core business from fiscal 2012 and onward are calculated without profits due to cancellations of investment trusts.
Source: BOJ.

QQE with a negative interest rate will exert greater downward pressure on financial institutions' profits for the time being. Although the direct impact stemming from the imposition of a negative interest rate on the Bank's current account deposits has been kept to a minimum due to the adoption of the "multiple-tier system," deposit and lending spreads will narrow alongside an overall decline in the yield curve.[33]

[33] The "multiple-tier system" that the Bank has adopted is a framework in which the outstanding balance of each financial institution's current account at the Bank is divided into three tiers, to each of which a positive interest rate, a zero interest rate or a negative interest rate is applied, respectively.

Consequently, further downward pressure will be exerted on profits. **Under these circumstances, there is an increasing possibility that a decline in core profitability may become more apparent, primarily due to: (1) the slowdown in the pace of decline in credit costs, which had supported the increasing trend of profit in recent years; and (2) heightened volatility in global financial markets since the summer of 2015 which has weighted on securities-related profits** (Chart IV-5-4).

As discussed above, **financial institutions have sufficient capital bases that will allow them to continue healthy risk taking, even though profitability will come under downward pressure for the time being. If financial institutions' portfolio rebalancing activities lead 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 persisted, financial institutions' loss-absorbing capacity could decline, eventually leading to a weakening in their financial intermediation function.**

Taking the above points into account, 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 with regard to the impact of QQE with a negative interest rate on financial stability. In addition to proactive risk-taking, particularly through lending and securities investment, under the auspices of an appropriate risk management framework, financial institutions need to take on the important challenge of raising their profitability on various fronts, ranging from (1) expansion of business areas, including internationalization of business operations; (2) operational innovation, including the use of information technology and reviewing the cost structure; and (3) (with regard to regional financial institutions) taking measures, particularly those aimed at strengthening regional industries and enhancing the vitality of regional firms.

Specifically, the system consists of the following: (1) the basic balance, under which a positive interest rate of 0.1 percent is applied to the total amount of current accounts (calculated by subtracting the amount of the required reserves held by financial institutions from the amount of the average outstanding balance of current accounts that all financial institutions held at the Bank during the reserve maintenance period of January-December 2015 (total amount of approximately 210 trillion yen); (2) the macro add-on balance, under which a zero interest rate is applied to the sum of the amount outstanding of the required reserves held by financial institutions, the Bank's provision of credit through the Loan Support Program and the Funds-Supplying Operation to Support Financial Institutions in Disaster Areas affected by the Great East Japan Earthquake, and the macro add-on balance, which is basically reviewed every 3 months (initial amount of approximately 40 trillion yen); and (3) the policy rate balance, under which a negative interest rate of 0.1 percent is applied to the outstanding balance of each financial institution's current account at the Bank in excess of the amounts outstanding of (1) and (2) combined (initial amount of approximately 10 trillion yen).

V. Macro risk indicators and macro stress testing

This chapter assesses the stability of the financial system from two perspectives: "macro risk indicators," namely the collation of indicators that may suggest signs of overheating or financial system instability; and "macro stress testing."

A. Macro risk indicators

In this section, we use three indicators: Financial Activity Indexes (FAIXs), Financial Cycle Indexes, and systemic risk indicators.

Financial Activity Indexes

The amount of aggregate credit has increased moderately, while the total credit-to-GDP ratio has been more or less unchanged (Charts V-1-1 to V-1-3).[34,35]

With regard to a wide range of financial activities, including the total credit-to-GDP ratio, **no large deviations from their trends have been observed.** 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 (Chart V-1-4).[36,37]

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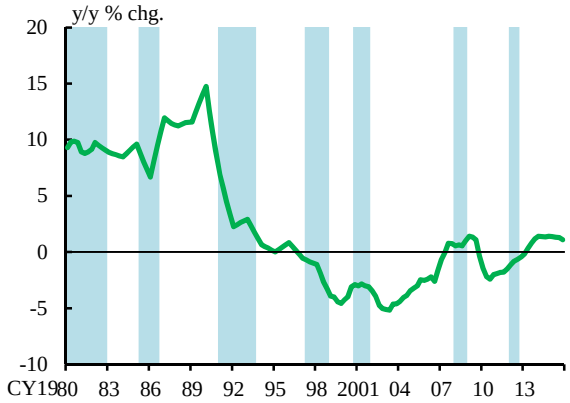
[34] The total credit-to-GDP ratio is regarded as one of the key indicators that authorities worldwide should refer to in setting the level of the countercyclical capital buffer, which is introduced under the Basel III framework. Total credit includes loans extended by financial intermediaries and funding of debt securities, such as corporate bonds, from capital markets. Borrowers of funds include households and firms. Investment trust beneficiary certificates issued by REITs have recently been excluded from debt securities in the original flow of funds data. Given this, investment trust beneficiary certificates issued by REITs have been excluded from total credit, beginning with this issue.

[35] When gauging overheating or excessive contraction of individual financial indicators selected as FAIXs, including the total credit-to-GDP ratio, it is necessary to examine how far the actual figure deviates from its long-term trend. Nevertheless, because there are various complications involved in estimating the long-term trend, the estimation results should be interpreted with some caution, regardless of which method is used. In this section, we use two methods commonly employed for estimating the trend: (1) the "two-sided HP filter," in which the Hodrick-Prescott (HP) filter is applied to data over the whole period; and (2) the "one-sided HP filter," in which the HP filter is applied to individual sets of data leading up to each period, with the most recently filtered value plotted. We then show the deviation of the actual figure from the long-term trend estimated by these two methods. In both estimation methods, we set the smoothing parameter of the HP filter (i.e., λ) at 400,000.

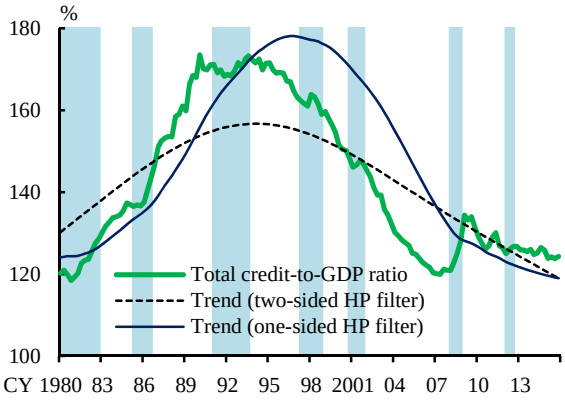
[36] The 14 indicators selected are those deemed most appropriate in assessing financial imbalances, similar to those observed during Japan's bubble period. For details on the FAIXs, see Yuichiro Ito, Tomiyuki Kitamura, Koji Nakamura, and Takashi Nakazawa, "New Financial Activity Indexes:

Chart V-1-1: Total credit[1]



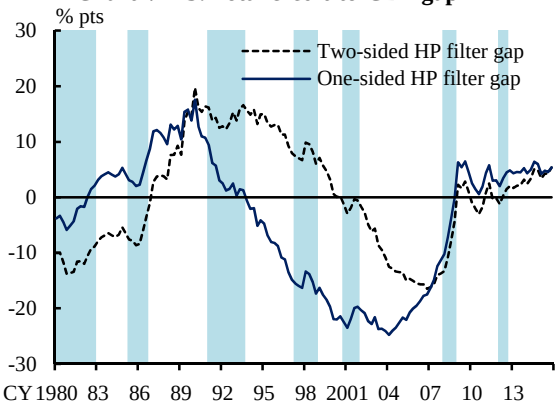
Note: *1*. Shaded areas indicate economic recession periods. The latest data are as of the October-December quarter of 2015; 4-quarter moving averages.
Source: BOJ, "Flow of funds accounts."

Chart V-1-2: Total credit-to-GDP ratio[1,2]



Notes: *1*. Shaded areas indicate economic recession periods. The latest data are as of the October-December quarter of 2015; 4-quarter moving averages.
2. The two-sided HP filter is a method for extracting a trend from all available data using the Hodrick Prescott filter. The one-sided HP filter is a method for extracting a trend from the data available for a time period using the Hodrick Prescott filter.
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Chart V-1-3: Total credit-to-GDP gap[1,2]

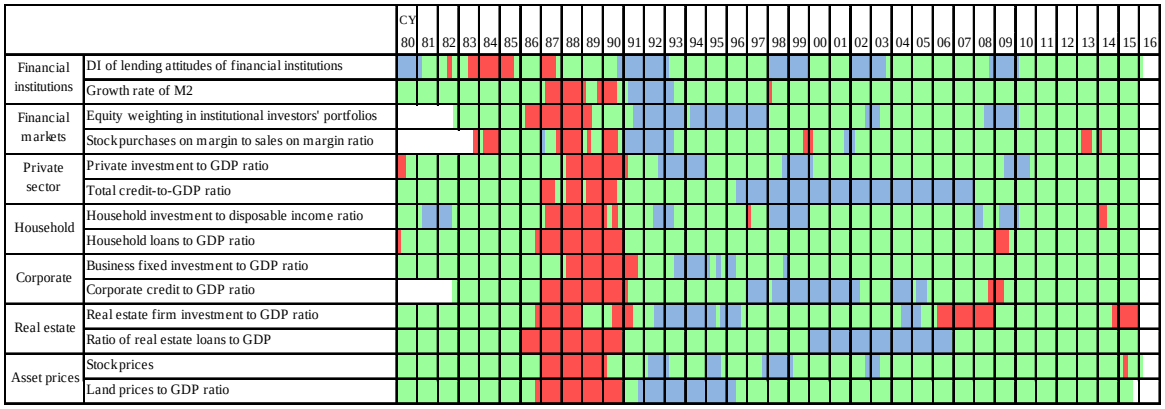


Notes: *1*. Shaded areas indicate economic recession periods. The latest data are as of the October-December quarter of 2015.
2. The total credit-to-GDP gap is the deviation from each trend of the total credit-to-GDP ratio.
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Early Warning System for Financial Imbalances in Japan," Bank of Japan Working Paper, No. 14-E-7, April 2014, and Koji Nakamura and Yuichiro Ito, "Detecting Financial Imbalances: Monitoring Financial Imbalances through the Financial Activity Indexes (FAIXs)," Bank of Japan Research Laboratory, No. 15-E-1, March 2015.

[37] 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 V-1-4 represent the following: (1) areas shaded in red (the darkest shaded areas) show that an indicator has risen above the 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.

Chart V-1-4: Heat map of Financial Activity Indexes[1]

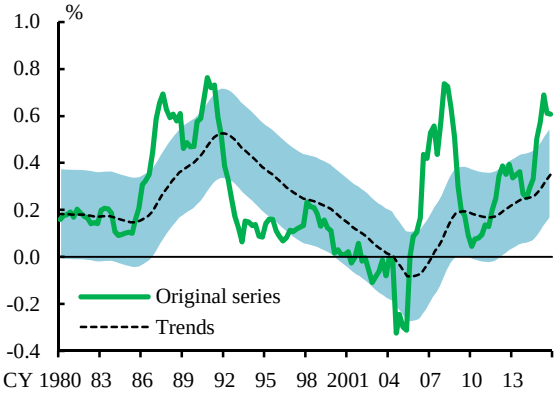


Note: *1.* The latest data for the DI of lending attitudes of financial institutions and stock prices are as of the January-March quarter of 2016. Those for the land prices to GDP ratio are as of the July-September quarter of 2015. Those for other indicators are as of the October-December quarter of 2015.

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*."

Compared with the previous *Report*, the signals from all 14 indicators have remained unchanged, with the real estate firms' investment to GDP ratio remaining "red" and the other 13 indicators remaining "green" (Charts V-1-5 and V-1-6).[38]

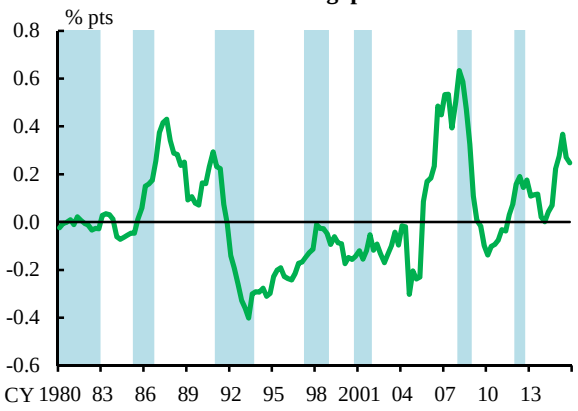
Chart V-1-5: Real estate firms' investment to GDP ratio[1,2,3,4]



Notes: *1.* Large firms in the real estate industry are counted. The latest data are as of the October-December quarter of 2015.
2. Original series = (business fixed investment + land investment + inventory investment) / nominal GDP.
3. Trends are calculated using the one-sided HP filter.
4. Shaded areas indicate the root mean square of deviation from trends.

Sources: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry."

Chart V-1-6: Real estate firms' investment to GDP ratio gap[1,2,3]



Notes: *1.* Shaded areas indicate economic recession periods. The latest data are as of the October-December quarter of 2015.
2. The real estate firms' investment to GDP ratio gap measures the degree of deviation from real estate firms' investment to GDP ratio trends.
3. Trends are calculated using the one-sided HP filter.

Sources: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry."

[38] For real estate investment data, the FAIXs use the sums of figures for investments in business equipment, land, and inventories by large firms in the real estate industry as reported in the "Financial Statements Statistics of Corporations by Industry" published by the Ministry of Finance.

Although the positive deviation of the real estate firms' investment to GDP ratio from its trend narrowed slightly compared with half a year ago, the ratio remains elevated. This reflects solid investment spending by major real estate companies, mainly against the backdrop of an improvement in real estate markets, particularly in metropolitan areas. On the other hand, the real estate loans to GDP ratio, the other FAIX indicator related to the real estate industry, remains "green." A comprehensive look at a wide range of information -- such as real estate transactions, price developments, and developments in real estate-related financing -- suggests that the real estate market currently shows no signs of overheating on the whole. However, developments in the real estate market including possible future effects of the negative interest rate environment continue to warrant attention, mainly because land prices and transaction values have been on a rising trend particularly in major metropolitan areas and, as already seen, the growth rate of real estate loans has been rising (see Box 4 for more details on the situation in the real estate market).

Financial Cycle Indexes

The Financial Cycle Indexes are diffusion indexes used to identify signs of instability in the financial system, and are constructed based on a method similar to that employed for the construction of the Cabinet Office's "Indexes of Business Conditions."[39] As an example, the leading index turns from positive to negative when the long-term trend for a majority of the eight component indicators either fall more quickly or improve more slowly, which suggests that the financial system might become unstable in the near future.

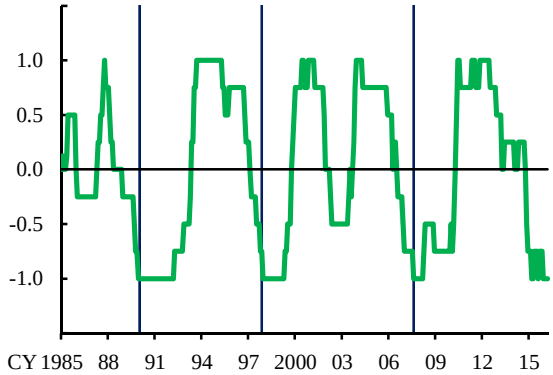
The leading Financial Cycle Index remains negative (Chart V-1-7).

All eight component indicators of the leading Financial Cycle Index turned negative. The leading Financial Cycle Index is determined by the developments of the long-term trends of the indicators. Currently, all indicators excluding "commodity prices" are at high levels and have shown slower improvement in their long-term trends. Past patterns suggest that simultaneous slowdowns of the long-term trends of the selected indicators have tended to anticipate financial system instability. Bearing these tendencies in mind,

[39] For details on the indexes, see Koichiro Kamada and Kentaro Nasu, "The Financial Cycle Indexes for Early Warning Exercise," Bank of Japan Working Paper, No. 11-E-1, April 2011. Financial Cycle Indexes are indicators constructed to detect cyclical changes in financial system conditions. In contrast, FAIXs are designed to detect instability in the financial system originating from large-scale financial cycles such as economic bubbles, which typically occurs only once every few decades.

information from various sources and analytical conclusions, including future developments in the Financial Cycle Indexes, need to be examined carefully.

Chart V-1-7: Financial Cycle Indexes (Leading index) [1,2,3]



Notes: *1*. The latest data are as of March 2016.
2. The left-hand, middle, and right-hand vertical lines respectively indicate the following "financial crisis" events according to Kamada and Nasu (2011): the collapse of Japan's asset price bubble (January 1990) ; the default of Sanyo Securities (November 1997) ; and the outbreak of the U.S. subprime problem (August 2007).
3. Financial Cycle Indexes (Leading index) includes the following eight series: stock prices in the banking, real estate, and construction sectors; the financial positions of firms; the lending attitude of financial institutions; current profit levels of firms; housing loans; and commodity prices.
Source: BOJ.

Systemic risk indicators

Systemic risk indicators are used to measure each financial institution's contribution to systemic risk, based on the volatility of individual stock prices of major global banks and the degree of their comovement. This section examines two systemic risk indicators: conditional value-at-risk (CoVaR) and marginal expected shortfall (MES) (Chart V-1-8).[40,41]

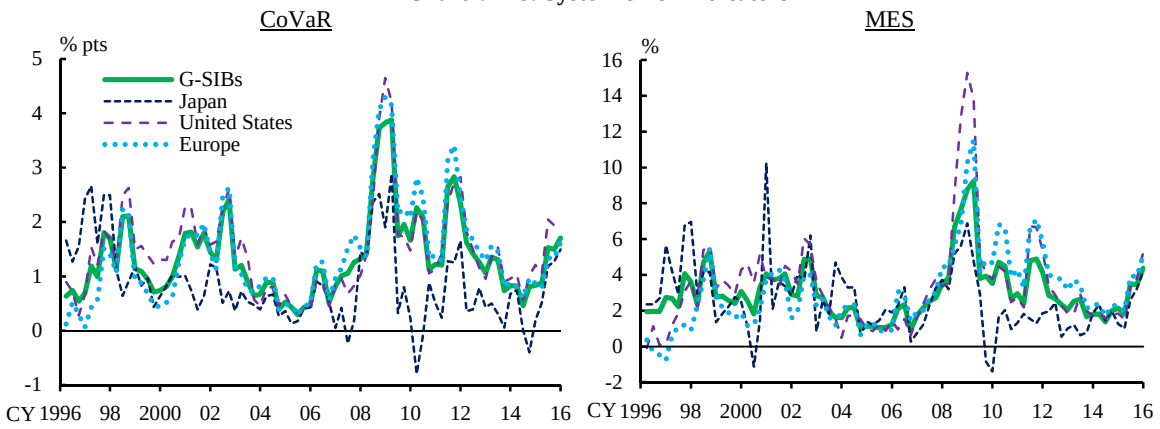
Systemic risk indicators have been rising since the summer of 2015. The rise in indicators for all three regions -- Japan, the United States, and Europe -- reflects the market's assessment that the recent decline in commodity prices, heightened volatility in global financial markets, and the slowdown in emerging economies, among others, can be regarded as common factors that affect the financial conditions, asset portfolios, and profitability of major financial institutions active globally. While previously having been at a low level relative to major European and U.S. banks, the CoVaR and the MES

[40] 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. Here, the CoVaR is estimated based on the stock prices of 30 major banks around the world (i.e., G-SIBs as of November 2014). For details, see Tobias Adrian and Markus K. Brunnermeier, "CoVaR," American Economic Review, forthcoming.

[41] The MES (Marginal Expected Shortfall) is defined as the conditional expected losses that individual financial institutions would incur given the stress in the overall financial system. It is another metric for measuring the extent of stress in the financial system as a whole and the degree of comovement of risks borne by individual financial institutions. As is the case for the CoVaR, the MES is estimated based on the stock prices of 30 major banks around the world. For details, see Viral V. Acharya, Lasse H. Pedersen, Thomas Philippon, and Matthew Richardson, "Measuring Systemic Risk," Federal Reserve Bank of Cleveland Working Paper, No. 10-02, March 2010.

of the three major financial groups in Japan have been elevated recently, which may reflect the substantial increase in their exposures to overseas economies through lending to emerging economies, including Asia, as well as through securities investment.

Chart V-1-8: Systemic risk indicators[1]



Note: *1*. G-SIBs are counted. The latest data are as of end-March 2016.
Sources: Bloomberg; BOJ.

Despite their recent rise, the levels of the systemic risk indicators are substantially lower than that observed at the time of the Lehman shock and during the European debt crisis. This may reflect the improved soundness of financial institutions as a whole, in line with progress in, for instance, international financial regulations, structural reform among banks in various countries, and the enhancement of bank resolution frameworks worldwide.

B. 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 indicates 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."[42] The former is designed to assess the stability of the

[42] For more details on the narrative and reasoning behind the formulation of scenarios, see "Designing Scenarios in Macro Stress Testing at the Bank of Japan," *Financial System Report Annex Series*, October 2015. For more details on the scenario assumptions in this issue of the *Report*, see "Designing Scenarios for Macro Stress Testing (*Financial System Report*, April 2016)," *Financial System Report*

financial system through fixed-point observations, by applying an approximately equal degree of stress in every semiannual report. In particular, the level of stress is comparable to that observed at home and abroad during the Lehman shock.[43] The latter is designed to be a multi-dimensional analysis of the vulnerabilities inherent in the financial system under different scenarios for each test.[44] The scenario presented in this *Report* features a significant rise in foreign currency funding costs, taking into account an increase in Japanese banks' overseas exposure to lending and market investment activities in recent years. 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 do not represent likely 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 258 *shinkin* banks (accounting for approximately 80 to 90 percent of total credit outstanding), and the duration of stress is assumed to be 3 years, from April-June 2016 through January-March 2019.[45] The Financial Macro-econometric Model (FMM) utilized in the simulation has the following characteristics: (1) the model accounts for the interaction between the financial system and the real economy; and (2) as data for individual financial institutions have been

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Annex Series, April 2016.
The data are available at http://www.boj.or.jp/en/research/brp/fsr/data/fsrb160422b.zip.

[43] Even under a comparable level of stress, the impact of the stress on the financial system could vary depending on financial institutions' risk profiles, their financial bases and other factors at the time of the stress test exercise. In this issue, the capital adequacy ratios based on the simulation results of a tail event scenario are lower than the levels seen in the previous *Report* (October 2015), mainly due to the following factors: (1) the weaker outlook for overseas economies and the decline in domestic interest rates, which exerted downward pressure on future profits; and (2) the decrease in unrealized gains on securities due to the recent decline in stock prices.

[44] Under this scenario, the intensity of the stress may not necessarily be as strong as that observed under the tail event scenario. Nevertheless, the tailored event scenario is developed to assess the manner in which risks materialize, or the mechanism through which the shock is transmitted, by utilizing additional data or by extending the model as necessary.

[45] Financial results of banks and *shinkin* banks are available until the end of September and March 2015, respectively. In this analysis, financial results are estimated until the end of March 2016 using the FMM. Macro stress testing starts from the end of March 2016. Capital adequacy ratios are calculated based on the Basel III requirements for internationally active banks. As for domestic banks including *shinkin* banks, these ratios are calculated in line with the new requirements introduced at the end of fiscal 2013. In calculating capital adequacy ratios based on the Basel III requirements, the phase-in arrangements accompanying the shift from the Basel II requirements are taken into account. Under the new requirements for domestic banks, unrealized gains/losses on securities holdings of domestic banks are not reflected in the estimation of these banks' capital adequacy ratios, and this requirement is applied to this section.

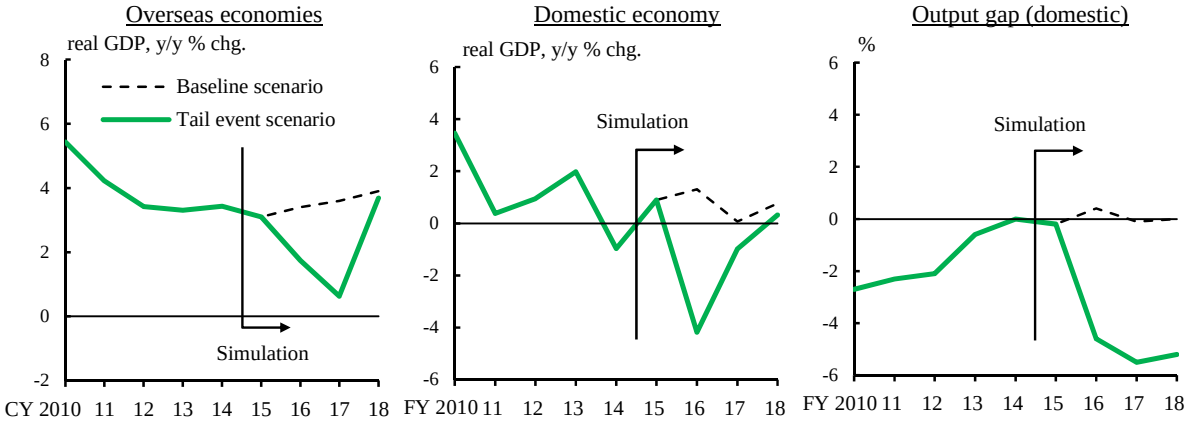
incorporated into the model, the heterogeneity among individual financial institutions can be analyzed, on top of performing analysis on an aggregated or averaged basis.[46]

In the following sections, we discuss the procedure and results of the stress testing exercise.[47]

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 forecasts by the International Monetary Fund (IMF) and the private sector, the scenario assumes that "overseas economies recover, with the upswing in advanced economies spreading to emerging and developing economies.[48] Japan's economy continues to recover at a moderate pace, albeit with fluctuations due to the influence of the consumption tax hike in fiscal 2017"(Chart V-2-1).[49] 10-year JGB yields move in line with the recent yield curve, following a decline in the first quarter of 2016 due to the introduction of QQE with a negative interest rate.

Chart V-2-1: Overseas economies and the domestic economy (tail event scenario)[1]



Note: *1*. Output gap from fiscal 2010 to fiscal 2014 is estimated by the BOJ. For simulation periods, output gap is estimated by the Financial Macro-econometric Model in each scenario and is not the BOJ's forecast.
Sources: Cabinet Office, "National accounts"; IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; BOJ.

The baseline simulation results are as follows. The year-on-year growth rate of loans

[46] Regarding the framework for macro stress testing, including the FMM, 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.

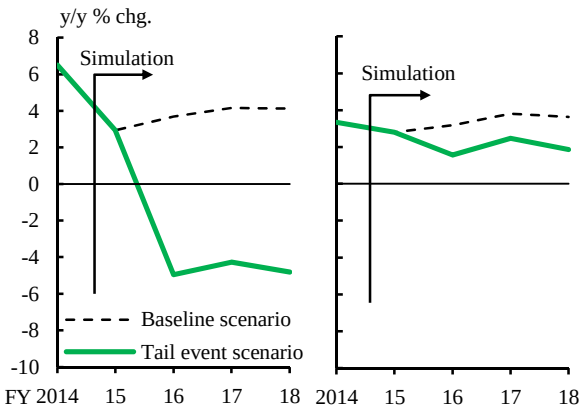
[47] The stress testing results outlined in this section should be interpreted with some degree of caution, as they are calculated based on certain assumptions and omit some elements.

[48] This assumption is based on the IMF forecasts available at January 2016.

[49] This assumption is based on ESP forecasts produced/published in February 2016.

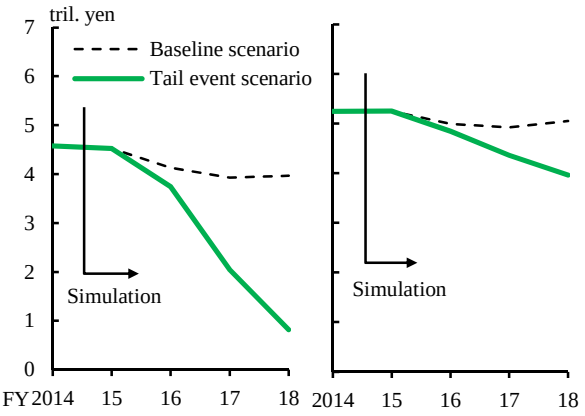
outstanding among financial institutions increases moderately due to declining loan interest rates, following the introduction of a negative interest rate, in addition to an improving economic environment at home and abroad (Chart V-2-2).[50] Although net interest income decreases somewhat due to the narrowing of lending spreads, the effects wane gradually (Chart V-2-3). Credit costs remain at low levels, as corporate profits continue to improve and their quick ratios and interest coverage ratios (ICRs) are kept at high levels (Charts V-2-4 and V-2-5). As a result, CET I capital ratios at internationally active banks remain well above regulatory requirements due to the accumulation of retained earnings (Chart V-2-6). At the same time domestic banks' core capital ratios decline moderately, partly because the transition for the phasing-in of new regulatory requirements for the calculation of capital adequacy ratios gradually proceeds. On the whole, however, even in fiscal 2018, core capital ratios for domestic banks are still well above regulatory requirements.

Chart V-2-2: Loans outstanding (tail event scenario)



Source: BOJ.

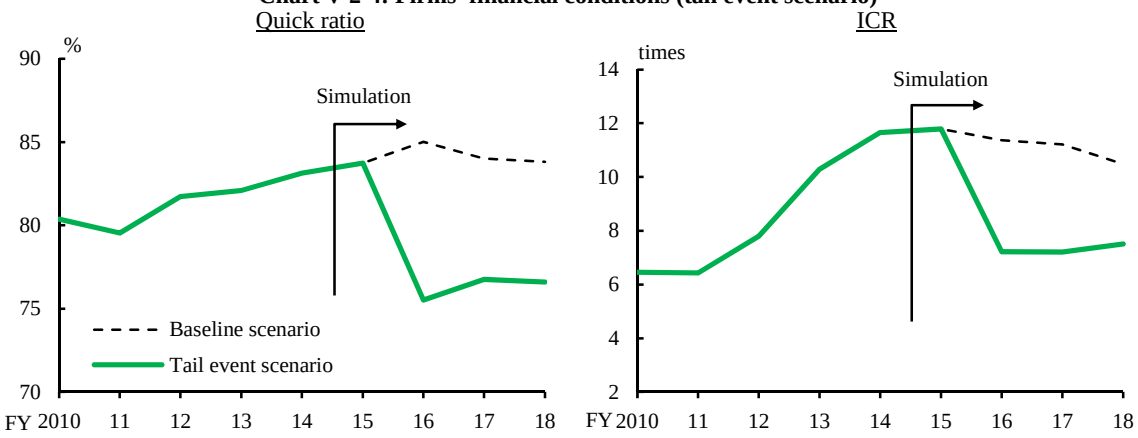
Chart V-2-3: Net interest income (tail event scenario)



Source: BOJ.

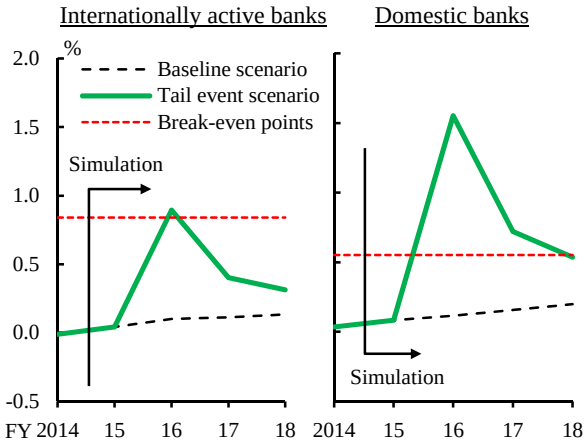
[50] Looking at overseas credit cycles, however, some firms have continued with deleveraging in emerging Asian economies (Chart II-2-5). It is therefore necessary to pay attention to the large uncertainty regarding developments in overseas loans.

Chart V-2-4: Firms' financial conditions (tail event scenario)[1,2]



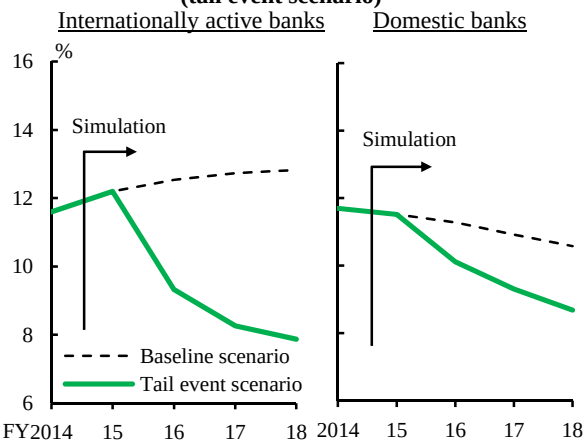
Notes: *1*. Quick ratio = (cash and deposits + bills and accounts receivable + securities) / liquid liabilities.
2. ICR = (operating profits + interest and dividends received, etc.) / interest payments, etc.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ.

Chart V-2-5: Credit cost ratio (tail event scenario)[1]



Note: *1*. Break-even points are as of the first half of fiscal 2015. For *shinkin* banks, they are assumed to be unchanged from fiscal 2014.
Source: BOJ.

Chart V-2-6: CET I capital ratio and core capital ratio (tail event scenario)[1]



Note: *1*. The left-hand chart shows the CET I 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 around minus 7 to minus 8 percent -- comparable to the extent of deterioration seen during the Lehman shock --" four quarters after the first quarter of fiscal 2016.[51] Because a significant economic recession or slowdown occurs both home and 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 10-year JGB yields

[51] In order for the situation assumed in the scenario to materialize, a trigger event normally takes place. For this particular simulation, however, the nature of the trigger event is not specified.

(Chart V-2-1). The magnitude of these movements is set at a level consistent with the severity of the economic downturn assumed in the scenario, in line with past experiences.

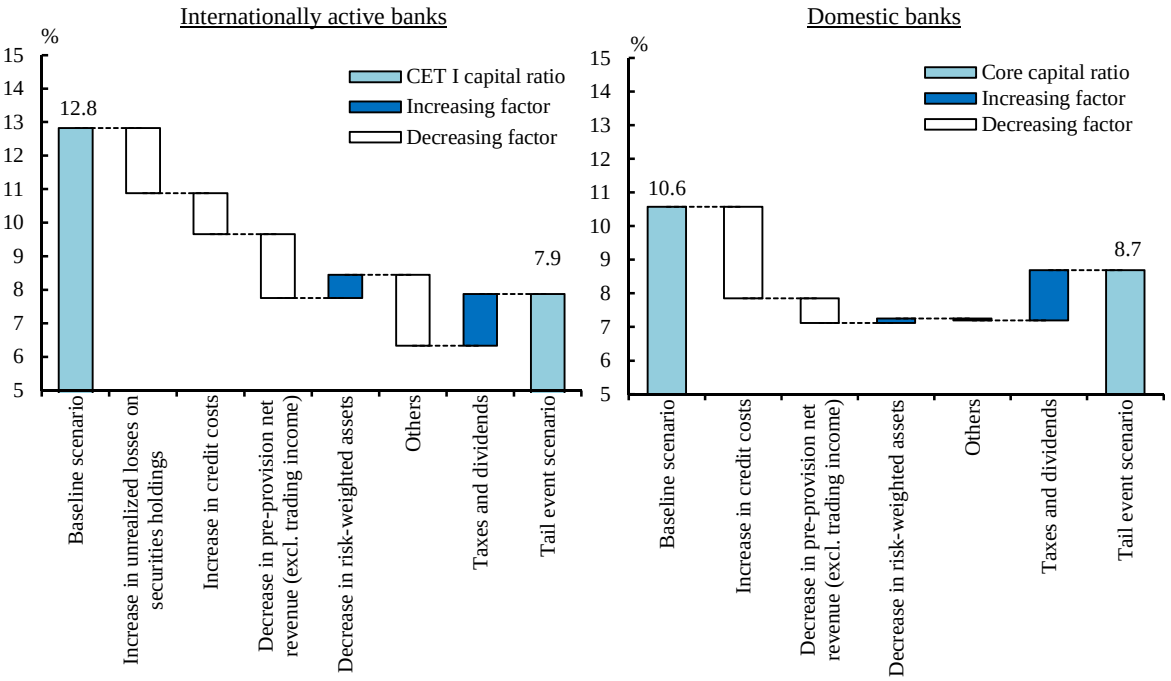
The simulation results based on this scenario are as follows. In the corporate sector, financial conditions deteriorate and the credit cost ratios of financial institutions exceed their break-even points, due to a significant deterioration in economic conditions both at home and abroad (Charts V-2-4 and V-2-5). Moreover, internationally active 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 declines substantially, while the growth rate of domestic loans outstanding remains positive, partly due to the decline in lending interest rates, thereby providing support to the domestic economy (Chart V-2-2). While net interest income decreases substantially at internationally active banks, mainly due to the significant decline in overseas loans, the decline experienced by domestic banks -- with a smaller share of overseas loans -- remains moderate in comparison (Chart V-2-3).

At internationally active banks, the capital adequacy ratio falls by 5.0 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.[52] The capital adequacy ratios for domestic banks decline by 1.9 percentage points, mainly due to an increase in credit costs. On average, however, they are still well above regulatory requirements (Charts V-2-6 and V-2-7).

[52] Within this model, based on the Basel III requirements, unrealized gains and losses on securities holdings are considered as instruments and reserves of CET I 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 capital increases gradually, 100 percent allowance is scheduled for the end of fiscal 2017 onward. The decline in the CET I capital ratio through fiscal 2017 can partly be attributed to this increase in the share of unrealized losses.

Chart V-2-7: Decompositions of the CET I capital ratio and the core capital ratio (tail event scenario)[1,2]

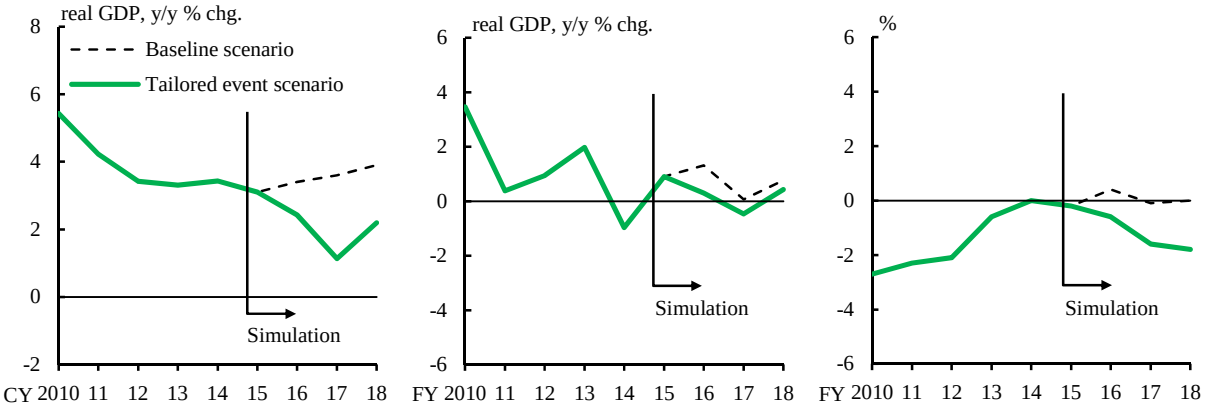


Notes: *1*. "Increase in unrealized losses on securities holdings" is calculated by taking account of tax effects. The data are as of end-March 2019.
2. The left-hand chart shows the CET I capital ratio of internationally active banks. The right-hand chart shows the core capital ratio of domestic banks. These take the phase-in arrangements into consideration.
Source: BOJ.

3. Tailored event scenario

The tailored event scenario in this *Report* is characterized by "a rise in Japanese banks' foreign currency funding costs." We assume a widening in term premiums for overseas long-term interest rates and a widening in funding premiums for currency and FX swaps as sources of the rises in foreign currency funding costs, and the magnitude is assumed to be sufficiently large to discern the impact of the stress on banks' profit and capital adequacy. Since a large portion of foreign currency funding by Japanese banks is in U.S. dollars, term premiums for U.S. long-term interest rates are assumed to widen by 200 basis points and U.S. dollar funding premiums, particularly in currency and foreign exchange swap markets, by 50 basis points. By incorporating a rise in long-term interest rates, the following spillover mechanisms through various trade and financial channels to Japan's economy can be envisaged: (1) a temporary slowdown in overseas economies, reflecting the interest rate rise; and (2) a repatriation of funds to advanced economies, including to the United States, and the resulting adverse effects on emerging and other economies (Chart V-2-8).

Chart V-2-8: Overseas economies and the domestic economy (tailored event scenario)[1]



Note: *1*. Output gap from fiscal 2010 to fiscal 2014 is estimated by the BOJ. For simulation periods, output gap is estimated by the Financial Macro-econometric Model in each scenario and is not the BOJ's forecast.
Sources: Cabinet Office, "National accounts"; IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; BOJ.

Furthermore, the analysis takes into account factors such as Japanese banks' U.S. dollar funding structure, the regional composition of overseas loans, and the varied pattern of the materialization of credit costs in overseas loans by region.[53] Given the characteristics of this scenario, the analysis focuses only on internationally active banks.

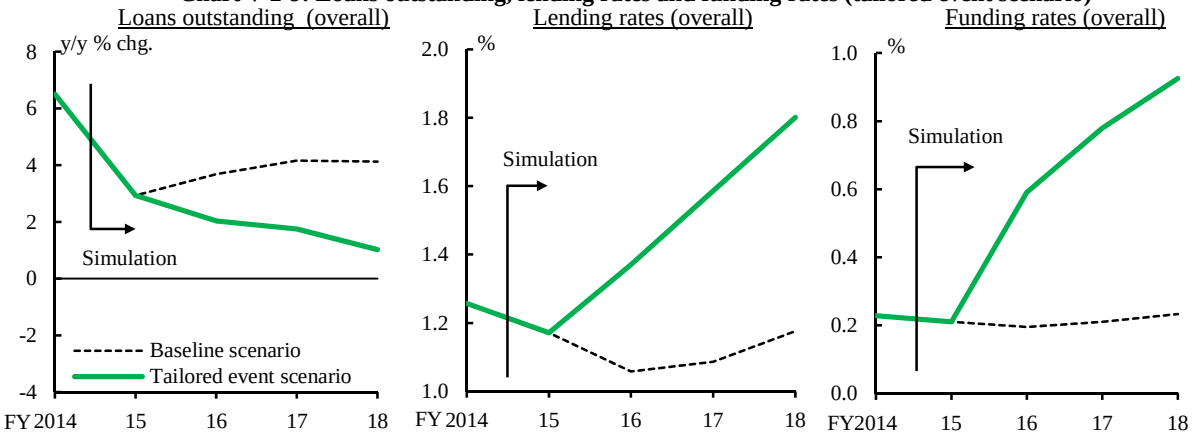
The simulation results based on this scenario are as follows. The growth rate of loans outstanding declines substantially, mainly due to the decline in overseas loan growth reflecting the slowdown in overseas economies (Chart V-2-9).[54] In addition, lending spreads on foreign currency-denominated loans narrow substantially following a rise in foreign currency funding costs. Consequently, net interest income decreases (Charts V-2-10 and V-2-11). The credit cost ratio rises considerably, mainly due to an increase in credit costs for overseas loans (Chart V-2-12). In addition, banks incur unrealized losses on securities holdings due to a decline in stock prices corresponding to the

[53] Specifically, we analyze the effects of the rise in U.S. interest rates and the widening of U.S. dollar funding premiums on net interest income across five major banks that have considerable overseas lending, by applying those effects on their dollar-denominated investments and funding after segregating them from their overall investment and funding positions. Furthermore, with regard to the credit costs of overseas loans, changes in the borrower classification transition matrix resulting from the increase in corporate default probability in Asia, North America, Europe, and other regions amid a deceleration in overseas economies have been calculated separately. For details, see "Designing Scenarios in Macro Stress Testing at the Bank of Japan," *Financial System Report Annex Series*, October 2015.

[54] It is assumed in this scenario that due to their low liquidity, existing foreign currency-denominated loans cannot be reduced, although banks may refrain from extending new foreign currency-denominated loans. Rather, banks are forced to rely on high-cost foreign currency funding to maintain their outstanding foreign currency-denominated loans.

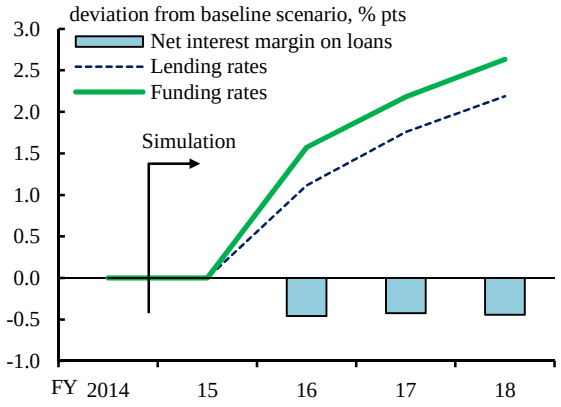
economic slowdown at home and overseas. Under these circumstances, the capital adequacy ratio (CET I capital ratio) declines by around 3.5 percentage points compared to the baseline scenario, but is maintained above regulatory requirements (Chart V-2-13).

Chart V-2-9: Loans outstanding, lending rates and funding rates (tailored event scenario)[1]



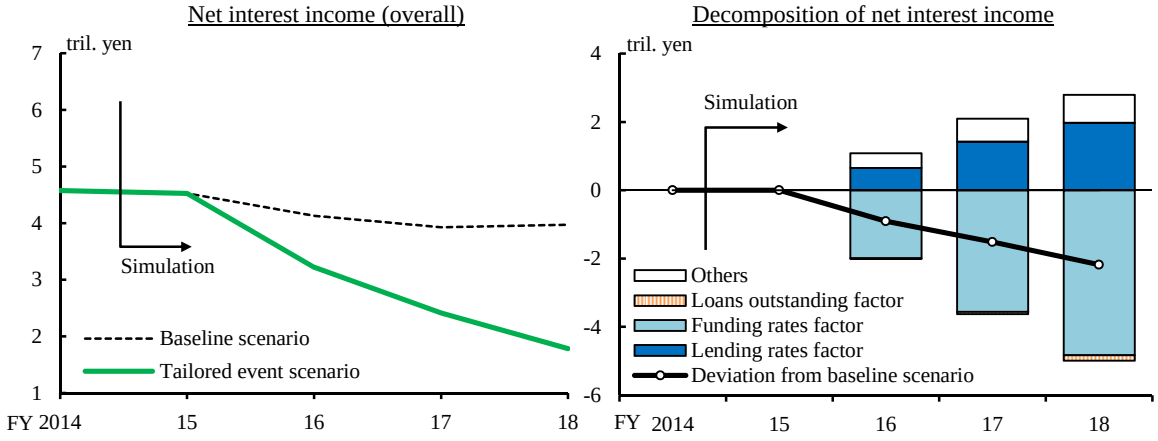
Note: *1*. Internationally active banks are counted.
Source: BOJ.

Chart V-2-10: Dollar-denominated lending rates and funding rates (tailored event scenario)[1,2]



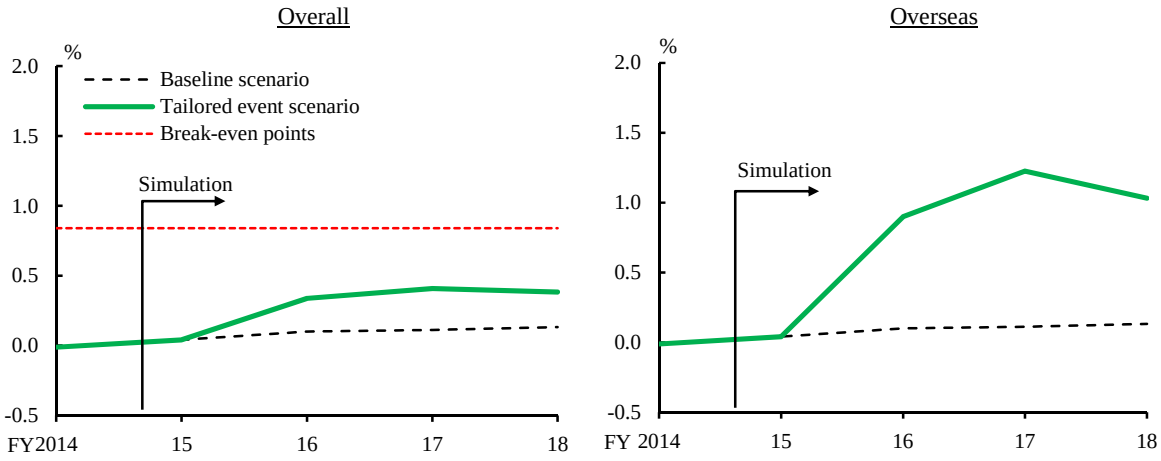
Notes: *1*. Five major banks with a considerable share of overseas loans are counted.
2. Lending rates and funding rates are weighted according to the banks' share of dollar-denominated loans and funding in tailored event scenario.
Source: BOJ.

Chart V-2-11: Decomposition of net interest income (tailored event scenario)[1]



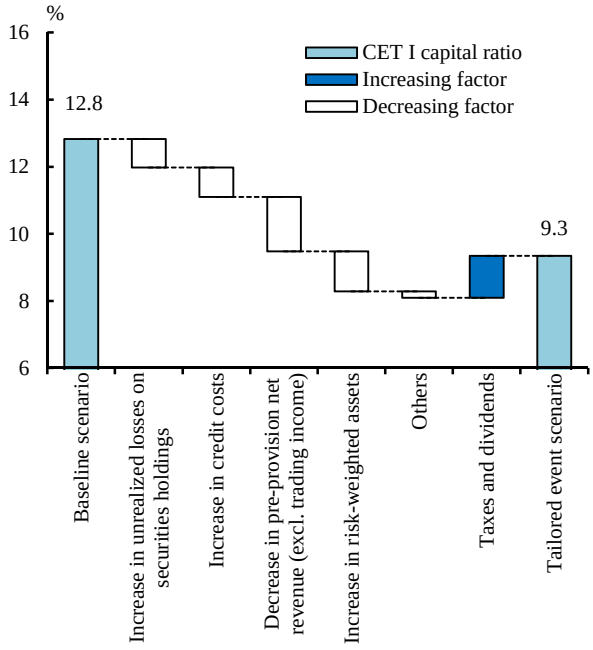
Note: *1*. Internationally active banks are counted.
Source: BOJ.

Chart V-2-12: Credit cost ratio: overall loans and overseas loans (tailored event scenario)[1,2,3]



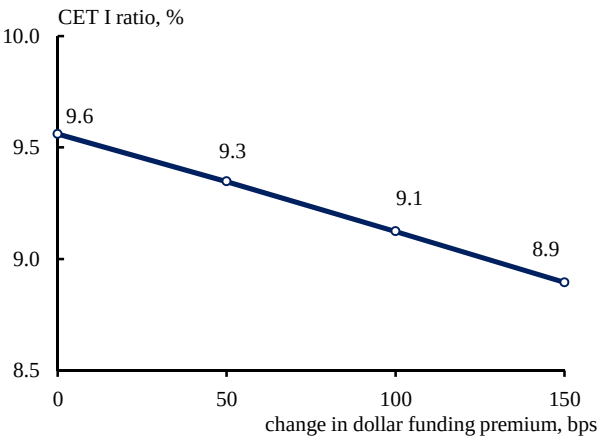
Notes: *1*. Internationally active banks are counted. Break-even points are as of the first half of fiscal 2015.
2. Overseas credit costs under the baseline scenario are estimated with loan volume share of overseas loans.
3. Credit costs under the tailored event scenario are calculated using estimated baseline credit costs and credit costs due to stresses to transition probabilities of each region.
Source: BOJ.

Chart V-2-13: Decomposition of the CET I capital ratio (tailored event scenario)[1,2]



Notes: *1*. Internationally active banks are counted. "Increase in unrealized losses on securities holdings" is calculated by taking account of tax effects. The data are as of end-March 2019.
2. The CET I capital ratios take the phase-in arrangements into consideration.
Source: BOJ.

Chart V-2-14: Dollar funding premium and capital ratio (tailored event scenario)[1]



Note: *1*. Internationally active banks are counted. The data are as of end-March 2019. The CET I capital ratios take the phase-in arrangements into consideration.
Source: BOJ.

The simulation exercise under the tailored event scenario suggests that the effects on the capital adequacy ratios are relatively small, because the size of the economic downturn

at home and abroad is not as large as that assumed under the tail event scenario. Nevertheless, the simulation suggests that the tailored event, namely, a rise in foreign currency funding costs, certainly impacts lending spreads on overseas loans, net interest income, and capital adequacy ratios. The simulation results indicate that as funding premiums widen, the magnitude of the decline in capital adequacy ratios becomes larger correspondingly (Chart V-2-14).

4. Issues in interpreting the results of macro stress testing

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

First, economic or financial shocks can affect the stability of the financial system, depending on their speed and magnitude, as well as the underlying causes.[55]

Second, the negative effects could be greater than those indicated by the stress test, in the event of a dramatic decline in market liquidity, a concerted unwinding of risks, or credit contraction among financial institutions. For example, the analysis does not envisage a scenario in which many financial institutions are forced to reduce their assets at the same time due to funding constraints caused by a deterioration in market functioning and other factors.[56] On the contrary, if market participants including institutional investors behave differently from banks and *shinkin* banks in terms of risk taking, their behavior could mitigate the negative effects described above and contribute to stabilizing the financial system instead.

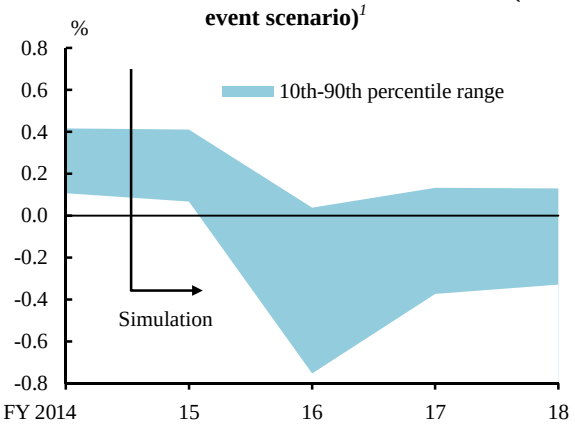
Third, even if financial institutions' capital adequacy ratios are above regulatory requirements, as stresses occur, for instance, financial institutions incur net losses in their financial statements or unrealized losses on securities holdings, which could impair their risk-taking stance and their financial intermediation function. In addition, even if the financial system as a whole maintains sufficient capital, the impact on

[55] If fluctuations in interest rates, the volatility in stock prices, or the size of the economic downturn are greater than that assumed under the stress scenario, if these conditions persist, or if multiple shocks interact in a complex manner, the negative effects could become more pronounced than those reflected in this *Report*.

[56] The tailored event scenario painted in this round does not envisage a situation in which an increasingly severe credit contraction occurs, causing foreign currency funding to become difficult and ultimately resulting in financial institutions' losses due to the fire sale of illiquid assets such as loans.

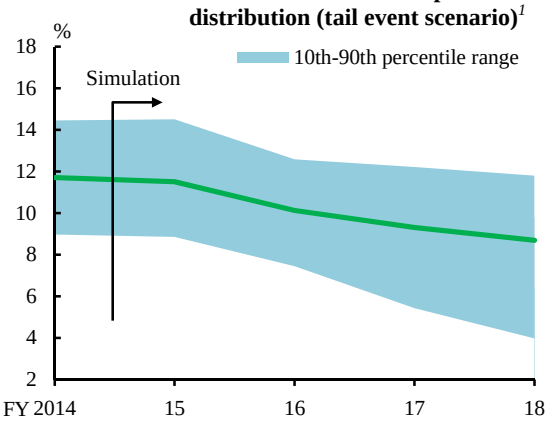
certain individual financial institutions could be more significant than others. The results of the tail event scenario indicate that more than 80 percent of financial institutions temporarily record net losses, and that there is significant heterogeneity with regard to their capital adequacy ratios (Charts V-2-15 and V-2-16).

Chart V-2-15: Net income ROA distribution (tail event scenario)[1]



Note: *1*. The vertical axis shows net income ROA.
Source: BOJ.

Chart V-2-16: Domestic banks' core capital ratio distribution (tail event scenario)[1]



Note: *1*. The shaded area indicates 10th-90th percentile range measured by each bank's share of loans.
Source: BOJ.

VI. Toward ensuring future financial stability

As discussed in the previous chapters, Japan's financial system has been maintaining stability, and financial intermediation continues to operate smoothly. **In order to contribute to economic growth through the smooth operation of financial intermediation while ensuring future financial system stability, efforts are necessary to steadily respond to the accumulation of macro risks and structural changes in the financial system that could become a source of potential fragility.** In view of the above, three thematic points related to financial stability risks and challenges are detailed below.[57]

Risks and challenges from a macroprudential perspective

The first thematic point is that Japan's financial system is increasingly exposed to economic developments overseas, as well as the vagaries of financial markets at home and abroad.

Financial institutions' overseas loan growth has continued to be relatively high. With regard to securities investment, financial institutions have carried out further risk taking activities -- through investment in risky assets such as foreign bonds and investment trusts -- while maintaining their holdings of yen-denominated bonds at a high level relative to the past. Financial institutions are expected to maintain a positive risk orientation in their business activities, in light of the downward pressure exerted on profits originating from domestic deposit-taking and lending activities. Institutional investors and other market participants are becoming more active with regard to overseas investment activities. Meanwhile, significant changes in the global flow of funds as well as supply and demand conditions in the foreign currency funding market have begun to take place, amid the unsettled global financial markets. Against this backdrop, foreign currency funding costs are on a rising trend.

Currently, the aggregate risks that financial institutions are undertaking remain contained relative to their financial bases. Nevertheless, the financial system's robustness to the propagation of risks stemming from abroad as well as financial markets remains important, as negative impulses -- namely, from a concerted unwinding of risks and from an adverse feedback loop between the financial system and the real

[57] The first thematic point deals with the accumulation of macro risks, while the second and third thematic points pertain to structural changes in the financial system.

economy -- could be more severe than expected.[58] Meanwhile, individual financial institutions face challenges to strengthen risk management in areas of lending and securities investment, in which they have adopted a proactive stance. Another challenge is to buttress stable foreign currency funding base. Details pertaining to those points were discussed in Chapter IV.A through C.

The second thematic point is the increasing systemic importance of large financial institutions. Large financial institutions have actively pursued international business expansion, including overseas merger and acquisition activities and business strategies with regard to the provision of a wide range of financial services by group companies. These institutions therefore have an increasing influence on macro financial stability and economic activity as they have expanded in size further, even as their sources of profit and risk exposures have grown more diversified and complex (see Box 5). Alongside international efforts aimed at averting the "too big to fail problem," the relevant financial institutions face the challenge of enhancing their ability to respond to systemic risks. This challenge encompasses maintaining a sound financial base and adopting business management practices to guard against a manifestation of risks, and making the necessary preparations to respond in an orderly manner in times of stress.

The third thematic point is the decline in profitability associated with domestic deposit-taking and lending activities. In the event that such a decline persists, financial institutions' loss-absorbing capacity may weaken, constraining their risk-taking activities and their proactive financial intermediation. Moreover, the shrinking population and customer base, which is a structural problem, is exacerbating the problem of low profitability of regional banking (see Box 7). Taking these factors into account, the challenge for regional financial institutions, which are highly dependent on domestic deposit-taking and lending activities for their main source of profits, would be to formulate their business plans to stabilize and improve their profitability while

[58] Regional financial institutions have been increasing their exposure to a common factor, namely, fluctuations in financial markets, as many have taken an increasingly active stance with regard to securities investment, amid a widening of the loan-to-deposit gap and a narrowing of domestic lending spreads. Moreover, these institutions have increased their lending to large firms in major metropolitan areas, such as syndicated loans, in response to the decline in demand for funds in local areas. These developments point to increasing exposure to a common factor for these institutions. Under these circumstances, there may be increased homogeneity among actions by individual banks and *shinkin* banks, and the correlation and comovement in profits and stock prices have been strengthening (see Box 6). Regional financial institutions originally exhibited limited comovement, mainly due to regional differences in economic conditions. Such strengthening of comovement among regional financial institutions can be considered to have significant implications, including implications on macro financial stability.

strengthening their ability to support the regional economy and local firms through financial intermediation activities.

QQE with a negative interest rate can be considered to exert significant effects on all three of the above-mentioned risks. By encouraging an overall decline in interest rates, QQE with a negative interest rate exerts further downward pressure on the profits of financial institutions, while affecting asset prices and the risk-taking behavior of a broad range of entities, including financial institutions and investors.

Meanwhile, **the longer-term stability and functioning of the financial system can be affected by the sustainability of the shift "from saving to investment" in the household sector, the proliferation of IT utilization in financial businesses, including FinTech, as well as cyber security protection.**

The household sector's shift "from saving to investment" is meant to lead to greater financial system stability, by reshaping the structure of Japan's flow of funds, which hitherto remains highly dependent on indirect financing and financial institutions' risk taking. The proliferation of IT utilization in financial businesses, including FinTech, may increase competition in the provision of financial services, by transcending industrial and regional boundaries, in addition to its contribution to generating new value-added and efficiency gains. Financial institutions need to employ appropriate business strategies to respond to these environmental changes.[59]

Actions by the Bank of Japan

The Bank will make the following efforts toward ensuring financial stability, while providing support to financial institutions and other entities in adapting to the new environment of negative interest rates.

Through its off-site monitoring and on-site examinations, the Bank will encourage individual financial institutions to deal with the above-mentioned macro issues, by ensuring their soundness. In doing so, the Bank will essentially focus on encouraging institutions to refine management practices that facilitate the adoption of a positive approach toward risk taking and global business expansion, taking into account that financial institutions' capital bases have remained adequate on the whole. With regard to large financial institutions, while keeping in mind their systemic importance, the Bank will encourage them to (1) bolster their financial bases and improve their business

[59] For details, see "New Possibilities of Financial Services Brought About by Progress in IT and Cyber Security," *Financial System Report Annex Series*, March 2016 (available in Japanese only).

management practices to guard against the manifestation of risks and (2) make the necessary preparations to respond in an orderly manner in times of stress, in terms of both capital and liquidity, understanding their global and complex risk profiles in a timely manner. With regard to regional financial institutions, in view of the importance of ensuring the stability and improvement of their profitability, the Bank will focus on (1) assessments of their medium- to long-term profitability and (2) discussions on future business plans based on these assessments. At the same time, the Bank will (3) reinforce the efforts of regional financial institutions to further support regions and firms, as well as to improve their financial tools and risk management practices. At seminars and other events, the Bank will also engage in themes that will contribute to the strengthening of financial intermediation functioning and business management practices.[60] As part of its effort to respond to financial globalization, the Bank will increase its coordination with overseas central banks and other organizations, while deepening its understanding of developments in the overseas financial system and financial markets. With regard to international financial regulations, the Bank will contribute to efforts to establish standards and implement them, keeping in mind the need to strike a fine balance between the financial system's robustness and its smooth functioning. As for measures related to transaction activities, the Bank will act to ensure financial system stability, including by demonstrating its lender-of-last-resort function when appropriate.[61] In the

[60] The Bank has been engaged in various initiatives, with a view to reinforcing financial institutions' support for regions and industries' drive to enhance their vitality and backing up financial institutions' business management practices during fiscal 2015: (1) large-scale seminars pertaining to support for start-up firms, agri-finance, and corporate governance reform; (2) workshops on the advancement of financial technology and management through the utilization of IT; (3) regional seminars and workshops on the financing of public-private partnerships (PPPs), support for start-up firms, profit management, and business strategies utilizing IT. The Bank plans to continue with these efforts in fiscal 2016.

[61] The Bank has a lender-of-last-resort function with regard to both collateralized and uncollateralized yen funds. Moreover, it stands ready to extend loans in U.S. dollars in case of an emergency, by utilizing its foreign currency-denominated assets. In March 2016, it signed a bilateral local currency swap arrangement 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. Furthermore, in March 2016, the Bank -- in line with the implementation of Basel III and other international financial regulations -- revised the eligibility criteria for the selection of its current account holders, requiring internationally active banks to meet high capital adequacy and liquidity standards.

Meanwhile, the Bank will sell stocks of individual firms that were purchased from financial institutions with a view to reducing the amount of stockholding risks, from November 2002 through September 2004 and from February 2009 through April 2010 starting April 2016 as scheduled, considering that the intended goal has been achieved (the time of completion of sales will be extended from end-September 2021 to end-March 2026, in order to minimize the possible effects of sales on the stock market). This measure was decided in December 2015.

context of the above measures, the Bank will continue with appropriate efforts to engage in coordination with related authorities, particularly the Financial Services Agency.

In carrying out its off-site monitoring and on-site examinations, the following are areas that the Bank will focus on in securing a sound understanding of the actual situation and exchanging views with financial institutions, with a view to responding to tasks and challenges from a macroprudential perspective.

(1) financial institutions' international operations: business strategies by country and currency; the investment and funding structure, as well as the situation regarding customer bases; credit risk management, including the concentration of large exposures and country risk; efforts toward buttressing the stable foreign currency funding base; effectiveness of contingency plans regarding foreign currency liquidity, etc.;

(2) financial institutions' ALM and investment in markets: understanding risk profiles in a timely manner; obtaining a multidimensional understanding of risks, for example, by individual risk factor, and scenario analysis; formulating practical responses to possible changes in market conditions; pricing and volume strategies of domestic deposits and loans, etc.;

(3) systemic-risk characteristics of large financial institutions: business management structure of group companies as a whole (including risk appetite frameworks) and developments in management information systems; recovery plans along with stress testing associated with financial institutions' capital levels, profits, and liquidity; contents of contingency plans; capital policy and plans for securing liquidity; responses to international financial regulations; understanding the ground situation regarding overseas branches, subsidiaries, and related firms; efforts to increase the industrial strength and revitalization of client firms, particularly large firms, etc.. With regard to stress testing, the Bank will make comparisons between financial institutions' results with the test results based on its own model, as well as conduct further analyses. It will also deepen discussions on the development of scenarios, enhancement of database, and standard practices regarding models;

(4) regional financial institutions' profitability: the current situation and the outlook for their customer bases, asset-liability structure, and profitability; policy measures aimed toward strengthening profitability; the development of financial tools and risk management frameworks to support their efforts to enhance the vitality of regions and firms (efforts to support start-up firms, investment and lending to growth areas,

business revitalization, succession of businesses, financing of PPPs, and firms' business matching, etc.);

(5) other areas: (1) with regard to domestic loans to the real estate, the medical and the nursing care sectors, which have been experiencing relatively high growth and related asset prices; (2) business operations related to the shift "from saving to investment" among financial institutions and securities firms: business plans, developments in sales of financial products; (3) utilization of IT, particularly by financial institutions: IT strategies, system development plans and process management, recent efforts regarding cyber security; (4) market-related businesses conducted by financial institutions and securities firms (e.g., market making, management of related risks, and market liquidity); (5) the roles of foreign financial institutions' Japanese branches within their group (management of yen liquidity of the group as a whole, the role of Japanese branches in risk management and their groups' reconstruction plans, branches' relationship with headquarters, etc.)

Box 1: Measures toward improving market infrastructure for financial transactions under negative interest rates

In the short-term money market, the number of transactions has greatly decreased since a negative rate was applied to part of the Bank of Japan's current account balances on February 16, 2016. This decrease can be partly attributed to the constraints in market infrastructure, in addition to the fact that revision of trading policies among market participants and changes in market structure based on the environmental change are still underway.

Specifically, for transactions in which a negative rate was not expected, such as call transactions and CP transactions, the following issues have been identified: (1) transactions cannot be made or have to be manually processed because related IT systems are unsupported; and (2) market participants feel hesitant to trade at negative rates before understanding the treatment of trades under the current market system and conventions.

Under such circumstances, relevant parties in the short-term money market have begun discussing and taking specific measures toward improving market infrastructure for financial transactions under negative rates.

(Discussions by market participants)

The Study Group for Activation of Short-term Money Market (hereinafter "SGASMM"), consisting of representatives from each type of financial institution involved in the short-term money market, conducted a survey on transactions at negative rates and their impact on market infrastructure from the point immediately after the announcement of introducing QQE with a negative interest rate. After the regular February meeting, held shortly after the application of a negative interest rate to the Bank's current account balances, members exchanged views on recent market developments and identified and shared trading constraints at negative rates based on the results of the survey. These discussions will continue to be held, as needed.

(IT systems support)

To enable transactions at a negative rate, the Association of Call Loan and Discount Companies completed improvement of the Confirmation System for Short-term Money Market Transactions, which is the main means for exchanging and matching confirmations of call transactions intermediated by *tanshi* companies on March 22.

To enable issuance of CP at a negative rate, Japan Securities Depository Center, Inc., completed the update of the system responsible for CP settlement in the book-entry transfer system and delivery versus payment (DVP) settlement conducted through the Bank of Japan Financial Network System (BOJ-NET), on April 4.

(Treatment of market system and conventions)

SGASMM confirmed procedures for receiving and paying negative interest in call transactions. Specifically, it was confirmed that following current market conventions (e.g., "The Guideline to Interbank Short-term Money Market Transactions" created by the Association of Call Loan and Discount Companies), negative interest will be deducted from the principal amount.

SGASMM also summarized each market participant's interpretation of accounting procedures for negative rates, and shared this among market participants.

If reforms of market infrastructure continue to proceed, constraints in the entire market regarding IT systems and transaction practices will be resolved and efficiency in trading at negative rates will increase. Furthermore, efforts by the market as a whole to adapt to the new environment will encourage each market participant to revise its trading policies and develop its internal IT system.

It is also important to continue consideration of whether measures can be taken to further improve the efficiency of market transactions, while grasping changes in the market conditions such as changes in market structure. To enable smooth transactions under negative rates, the Bank will continue to support efforts by relevant parties in improving their financial infrastructure.

Box 2: The decline in commodity prices and risk management of commodity-related exposures

Crude oil prices have declined drastically since the summer of 2014 -- in February 2016, they fell to the lowest level since 2003. While some signs of a bottoming out have been observed recently, commodity prices as a whole remain weak (Chart II-2-2). As commodity prices have been depressed for a protracted period, there have been several cases where market prices have fallen below the break-even price for commodity-related projects. This has led to impairment losses for resource development projects over time, which has in turn adversely affected the profitability of project sponsors and related development companies. Under these circumstances, external ratings for resource development companies and commodity-exporting economies have deteriorated, as have market-based assessments, such as stock prices and credit default swaps (CDS).

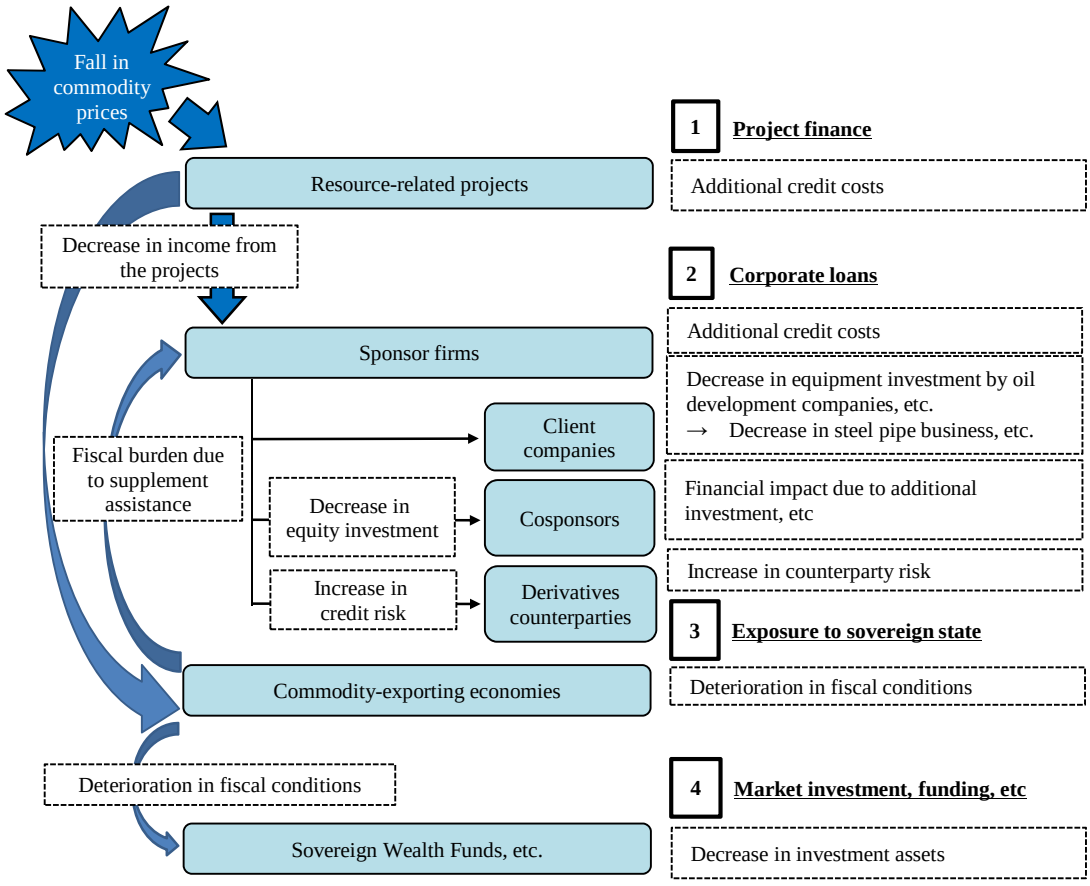
While major banks have recently taken a cautious stance toward commodity-related credit, the amount of outstanding credit to the commodity-related sector is considerable. Exposures to the commodity sector generally takes the form of either (1) project financing (repayment is dependent on the projects' future cash flows) or (2) corporate loans to resource development companies (repayment is dependent on the company's future cash flows and other factors). Within outstanding commodity-related loans, the share of corporate loans to non-Japanese resource development companies is the largest. In terms of credit extended to the commodity-related sector by major banks, some signs of deterioration in their asset portfolios have been observed, with project financing credit costs materializing in some instances (Chart IV-1-11).

In the event that the decline or weakness in commodity prices is prolonged, credit costs associated with commodity-related exposures could increase in a non-linear fashion, depending on the degree of the concentration of break-even prices for individual projects to which credit has been extended. The resource development industry has rather complex risk profiles, with a particular feature being strong interconnectedness among various entities. These entities include resource development companies and companies carrying out drilling or pipeline operations, as well as commodity-exporting economies sponsoring or guaranteeing resource development projects. For this reason, it is vital to examine the variety of the risks and the channels through which risks spread following commodity price declines.

The simplified chart below illustrates the channels through which risks spread following

a plunge in commodity prices (Chart B2-1). First, individual resource development projects are adversely affected. Projects that have a relatively high break-even price could lead to a materialization of credit costs. While several risk control measures, such as sponsor guarantees and financial covenants are usually arranged in project finance, credit costs could still materialize in a number of projects, if commodity prices decline further and remain depressed for a prolonged period.

Chart B2-1: Effects of the fall in commodity prices on commodity-related exposure



Second, if cash flows were to deteriorate across a number of projects, there would be a considerable impact on the financial position of the sponsors (resource development companies, etc.). If the financial position of resource development companies deteriorates, credit costs for corporate loans to the companies concerned could materialize. If resource development companies drastically reduce their business fixed investment, the impact could be transmitted to their counterparts, such as those involved in pipeline operations. In addition, a deterioration in the financial situation of an individual resource development company could adversely affect other joint sponsors. Furthermore, if the resource development companies were engaged in derivatives transactions, the deterioration of the companies' credit standing would have an impact

on counterparty credit risk.

Third, continued commodity price declines would have adversely affected the fiscal position of commodity-exporting economies. If the financial situation of a state-owned resource development company deteriorates, additional investments could be made by the commodity-exporting economy. Furthermore, financial markets could also be affected, if external assets are pared back or if the sovereign wealth funds of commodity-exporting economies reduced their external assets amid a deterioration in the fiscal position of commodity-exporting economies.

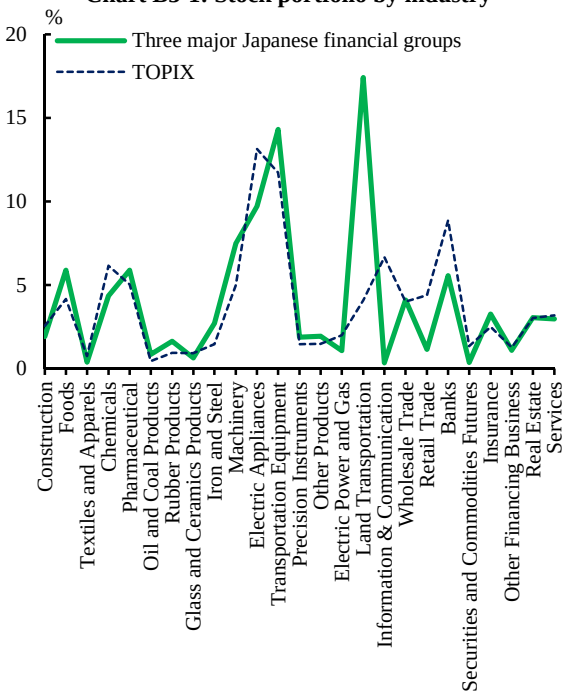
In case of a further decline in commodity prices, major banks have been conducting enhanced stress tests with regard to commodities in order to quantify their impact on credit costs. Given the complexity of resource development-related risks, it is vital that stress tests incorporate several channels through which risks spread, such as those described above. Lenders will then need to utilize market information and other available information to make informed judgments on the credit situation.

Box 3: Impact of financial institutions' strategic stockholdings on their funding costs

In this box, we examine one aspect of the consequences of financial institutions' strategic stockholdings, by analyzing their impact on shareholder capital costs. Internationally active banks are covered.

Strategic stockholdings are thought to push up the shareholder capital costs of financial institutions. It is generally recognized that banks bear credit risk through ordinary loans when they hold firms' stocks strategically, in addition to bearing market risks. Such an assumption is thought to be rather valid, since the intent of strategic stockholdings is to cultivate transactional relationships, including loans. Unlike conventional stock investment, strategic stockholdings are regarded as long-term holdings, and it could be difficult to liquidate the stockholdings in a flexible manner. The market is likely to factor this risk into the share price valuation of financial institutions. In the case of the three major banks, their strategic stock portfolio is extremely similar in composition to the market portfolio, and the movements of their stock prices have become increasingly linked to stock market gyrations as a whole (Chart B3-1). Due to the cumulative effect of these factors, investors are believed to demand a risk premium, whose size depends on the extent of strategic stockholding by financial institutions.

Chart B3-1: Stock portfolio by industry[1]



Note: *1*. The stocks are for strategic stockholdings reported in each group's securities report as of end-March 2015.
Sources: Bloomberg; published accounts of each group.

On the other hand, considering that the firms in which banks have strategic

stockholdings also strategically hold financial institutions' stock in a cross-stockholding structure, it is possible that the presence of long-term shareholders reduces the volatility of the share prices of financial institutions, leading to the opposite conclusion of lower shareholder capital costs.

In this box, we estimated which of the above influences has had a larger effect, using CAPM theory. Specifically, using approximately ten years of data on internationally active banks, we conducted panel data analyses to estimate the elasticity of a financial institution's shareholder capital cost (denoted as β) in relation to fluctuations in the stock market as a whole, by estimating the rolling β and observing how it varies over time in response to the variation of strategic stockholdings.

Step 1: Estimation based on CAPM β

$$\text{Excess return of each bank}_{i,t} = \text{Constant}_i + \beta_{i,t}(\text{Excess return of TOPIX}_t) + \text{Residual}_{i,t}$$

Step 2: Panel estimation of the determinant of β

$$\hat{\beta}_{it} = \text{Constant} + \gamma\text{Capital adequacy ratios}_{i,t-1} + \delta\text{Total assets}_{i,t-1} + \varphi\left(\frac{\text{Amount of strategic stockholdings}}{\text{Capital}}\right)_{i,t-1} + \text{Cross section dummy}_i + \text{Time dummy}_t + \text{Residual}_{i,t}$$

As a result, the elasticity φ of shareholder capital cost in relation to the strategic stockholdings was found to be positive and statistically significant. This indicates that financial institutions' strategic stockholdings do play a role in increasing shareholder capital costs in aggregate (Chart B3-2).

Chart B3-2: Estimation results[1,2,3,4]

	Estimate 1	Estimate 2
Constant	-5.710	-3.176
Capital ratio (%)	-0.000	0.022
Total assets (Log)	0.381	0.217
Stockholdings / Capital (%)	0.013 *	0.017 *
Number of banks	13	13
Observations	461	461
R^2	0.706	0.811
Fixed effect	yes	yes
Time effect	no	yes

Notes: *1*. Estimation based on quarterly data for internationally active banks excluding Regional bank II.
2. Estimation period is from the April-June quarter of 2006 through the July-September quarter of 2015.
3. * indicates that the figures are statistically significant at the 10 percent levels.
4. The p values are calculated using the Bootstrap robust standard errors.
Sources: Bloomberg; QUICK; BOJ.

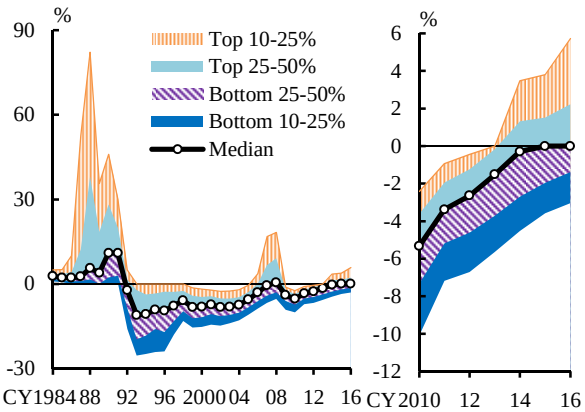
According to the results of this analysis, assuming that the excess return of the market portfolio over the risk-free rate is 9.1 percent, the cost of capital is lowered from 11.0 percent to 10.0 percent if the ratio of strategic stockholdings is lowered by 6.2 percent points to 10 percent relative to total capital (the average among the 13 internationally active banks is 16.2 percent currently). Based on these results, when evaluating the overall merits of financial institutions' strategic stockholdings, it would be useful to consider their impact on shareholder capital costs.

Box 4: The situation in the real estate market

The latest financial activity indexes show that the positive deviation of the "real estate firms' investment to GDP ratio" from its trend has persisted and has continued to signal "red," unchanged from the last report. This box will examine the recent situation in the real estate market from a broad perspective, including transaction and price developments, as well as financial situation.

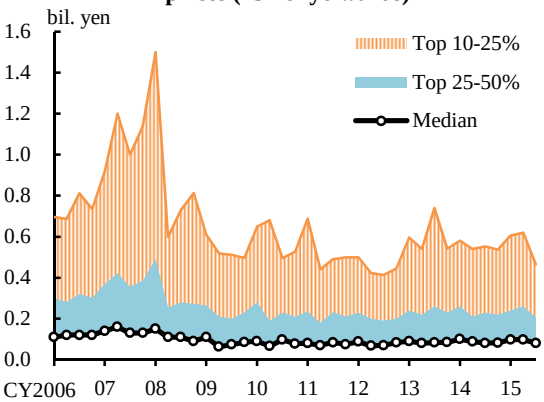
The fall in real estate prices across the nation has begun to dissipate, and the number of grids that show price increases has indeed increased. The distribution of the growth rates of commercial land prices (appraisal values) as monitored at the same locations and the distribution of transaction prices for commercial real estate properties has been skewed moderately to the right, although the degree of skewness remains small compared to the previous two real estate booms (Charts B4-1 and B4-2). Against the backdrop of large falls in vacancy rates for office properties in central Tokyo, the bullish outlook for rental prices have caused investors to adopt a more positive stance, which has led expected yields to hit record lows in an increasing number of areas, although actual rental price hikes remain moderate for now (Charts B4-3 and B4-4). The decline in expected yields has also been observed in major cities in regional areas. However, the yield spread has not decreased for J-REITs, indicating their continued cautious stance on property acquisitions as a whole (Chart B4-5).

Chart B4-1: Distribution of year-on-year rates of change in commercial land prices[1,2]



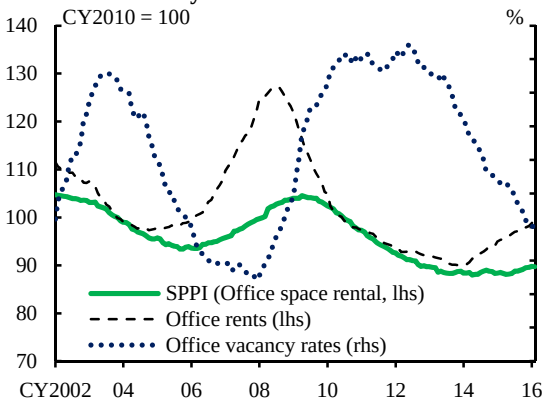
Notes: *1*. The data are based on figures at the beginning of January for each year. The latest data are as of the beginning of January 2016.
2. Year-on-year rates of change in individual land prices in commercial areas.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land market value publication."

Chart B4-2: Distribution of individual commercial property transaction prices (23 Tokyo wards)[1]



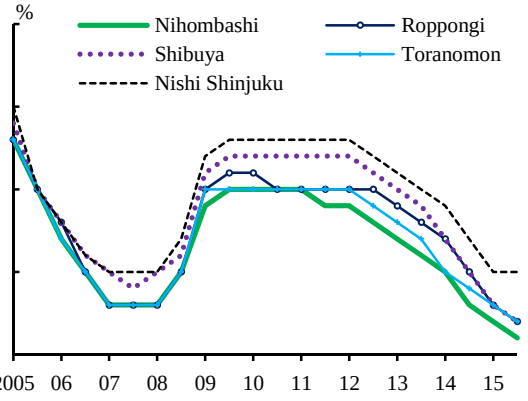
Note: *1*. The latest data are as of the July-September quarter of 2015.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Real estate transaction-price information."

Chart B4-3: Office rents and vacancy rates in the Tokyo area[1,2,3]



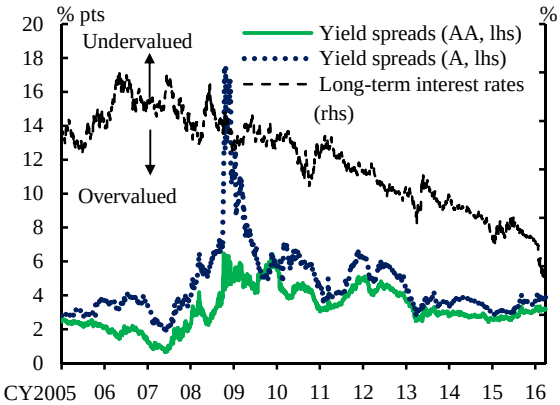
Notes: *1*. The latest data are as of February 2016.
2. Rents and vacancy rates are averages of offices in the Tokyo business district (Chiyoda-city, Chuo-city, Minato-city, Shinjuku-city, and Shibuya-city in Tokyo).
3. The effect of the consumption tax hike on SPPI is excluded.
Sources: Miki Shoji Co., Ltd.; BOJ, "Services Producer Price Index."

Chart B4-4: Capitalization rate of office buildings in Tokyo metropolitan area[1]



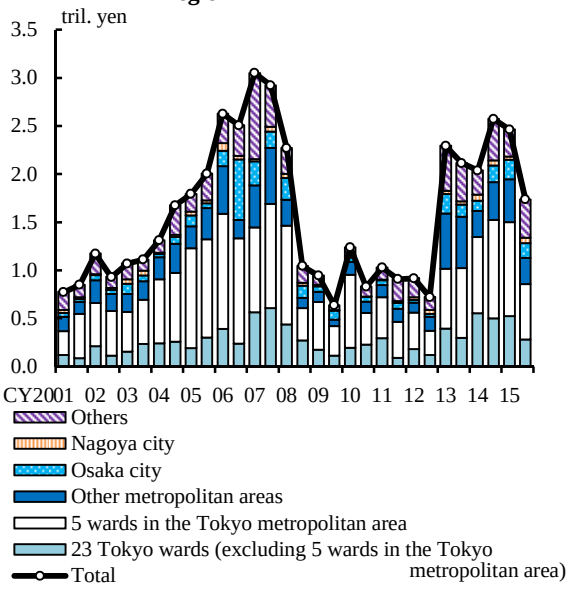
Note: *1*. The latest data are as of October 2015.
Source: Japan Real Estate Institute, "The Japanese real estate investor survey."

Chart B4-5: Yield spreads of J-REITs[1,2]



Notes: *1*. The latest data are as of March 31, 2016.
2. Yield spreads = J-REIT dividend yields - long-term interest rates (10-year JGBs).
Sources: Bloomberg; Japan Bond Trading; QUICK.

Chart B4-6: Value of real estate transactions by region[1]

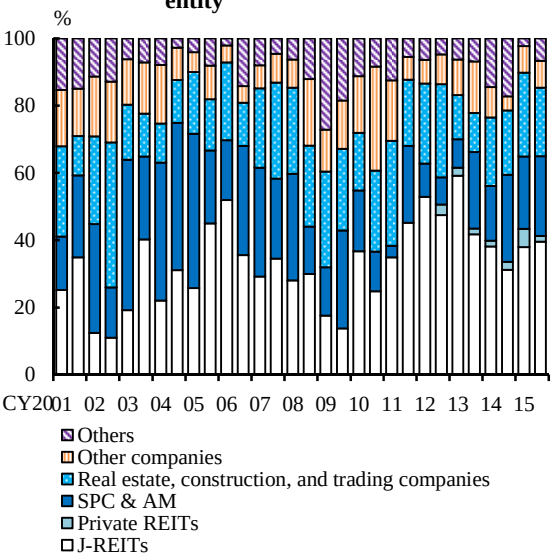


Note: *1*. The latest data are as of the second half of 2015.
Source: Japan Real Estate Institute.

The total value of real estate transactions has been elevated since 2013, but has decreased slightly more recently in the second half of 2015 (Chart B4-6). The main driver is the pullback in transactions in central Tokyo, where the growth rate of land prices has been relatively high, partly because J-REITs which accounted for a large share of total transactions have pulled back on high-value transactions (Chart B4-7). During this period, trading activity by overseas investors has continued to be firm, but

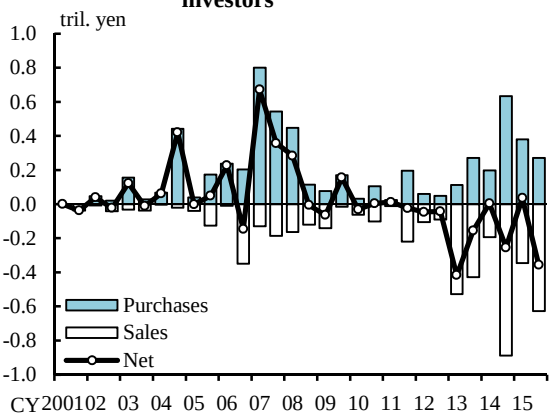
they have been net sellers recently, partly due to the resale of properties acquired in the mid-2000s (Chart B4-8).

Chart B4-7: Real estate transactions by type of entity[1]



Note: *1*. The latest data are as of the second half of 2015.
Source: Japan Real Estate Institute.

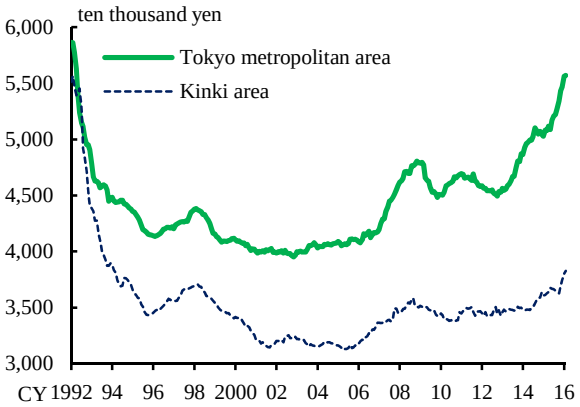
Chart B4-8: Real estate transactions by foreign investors[1,2]



Notes: *1*. The latest data are as of the second half of 2015.
2. The definition of foreign investors is based on the criteria of Japan Real Estate Institute.
Source: Japan Real Estate Institute.

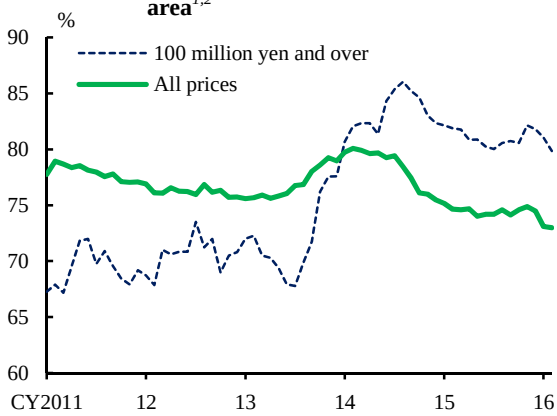
There has been a distinct increase in the price of new condominiums, mainly in the Tokyo metropolitan area (Chart B4-9). The higher prices reflect an increase in the costs of construction materials and labor, in addition to the rise in urban land prices. Under such circumstances, the contract ratio and the number of properties for sales have been relatively subdued as a whole. However, in the high-end property segment, the contract ratio and the number of properties for sales have been high, reflecting strong demand from foreigners and high net-worth individuals (Chart B4-10).

Chart B4-9: New condominium average sales prices[1,2]



Notes: *1*. The latest data are as of February 2016.
2. 12-month moving averages.
Source: Real Estate Economic Institute Co., Ltd.

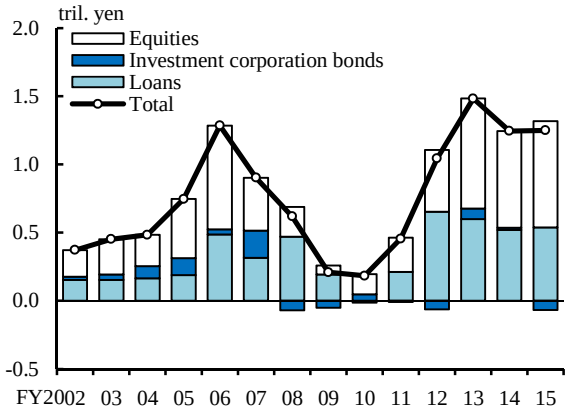
Chart B4-10: Contract ratio of new condominiums by price range in Tokyo metropolitan area[1,2]



Notes: *1*. The latest data are as of February 2016.
2. 12-month moving averages.
Source: Real Estate Economic Institute Co., Ltd.

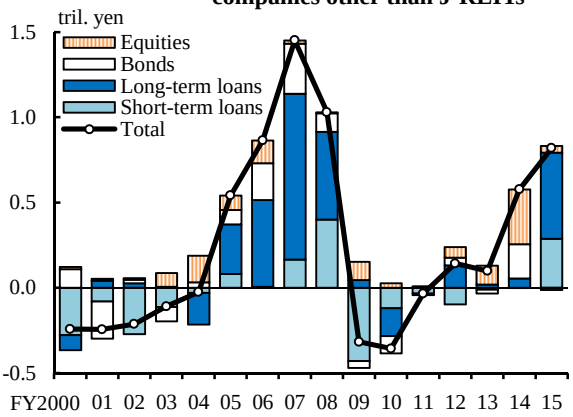
From a financial viewpoint, J-REITs have continued to raise funding at high levels, but leverage has not increased (Chart B4-11). Meanwhile, listed real estate companies (mainly large corporations) other than J-REITs have significantly increased their debt financing recently. Investments by these companies are the main driver behind the increase in the abovementioned "real estate firms' investment to GDP ratio" (Chart B4-12). Furthermore, the distribution of the year-on-year changes in the outstanding amounts of interest-bearing debts of small- and medium-sized real estate companies with low credit ratings continued on an upward trend, and has recently been approaching the level attained during the past boom period (Chart B4-13). Meanwhile, the default rate in the real estate industry remained low (Chart B4-14).

Chart B4-11: Financing by J-REITs[1,2]



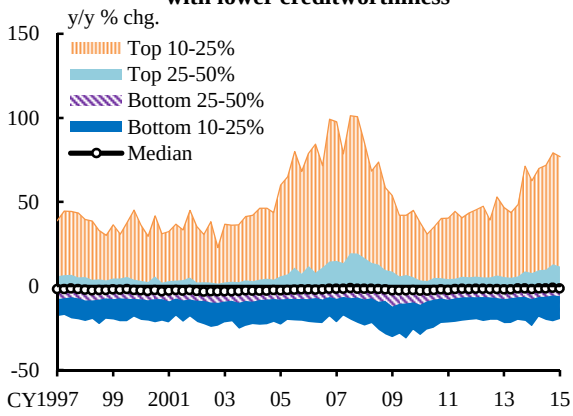
Notes: *1*. The latest data are as of April 2015-January 2016.
2. The amount of financing for each firm is aggregated for the month during which its account is published. This chart indicates the total volume of funds raised by firms on an annual basis.
Source: Nikkei Needs.

Chart B4-12: Financing by listed real estate companies other than J-REITs[1,2]



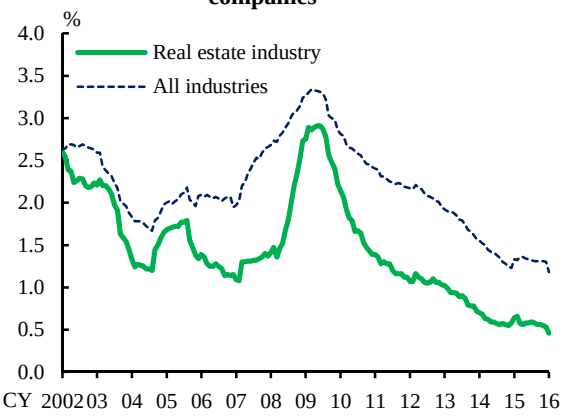
Notes: *1*. The latest data are as of April 2015-January 2016.
2. The amount of financing for each firm is aggregated for the month during which its account is published. This chart indicates the total volume of funds raised by firms on an annual basis.
Source: Nikkei Needs.

Chart B4-13: Debt financing by real estate companies with lower creditworthiness[1,2]



Notes: *1*. The latest data are as of the January-March quarter of 2015.
2. Percentage changes from the previous year in long- and short-term borrowings of real estate companies are aggregated in their account-closing month and compiled on a quarterly basis.
Source: CRD.

Chart B4-14: Default rate among real estate companies[1]



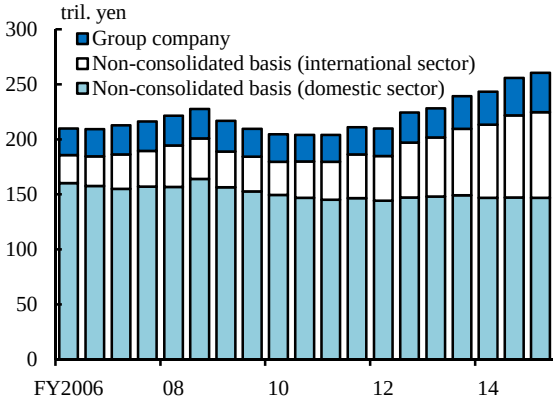
Note: *1*. The latest data are as of January 2016.
Source: Risk Data Bank of Japan, Ltd., "RDB enterprise default ratio."

In summary, the real estate market is not in an overheating state as a whole. However, signs of a gradual vitalization continue to be observed from the rising trend of land prices and transaction value, mainly in major cities, and the expansion of real investments and debt financing by large real estate companies. Furthermore, construction and redevelopment work including those related to the Tokyo Olympic Games are expected to continue. Under these circumstances, the situation in the real estate market, including the potential upcoming impact of the negative interest rate environment, warrants careful vigilance.

Box 5: The rising systemic importance of large financial institutions

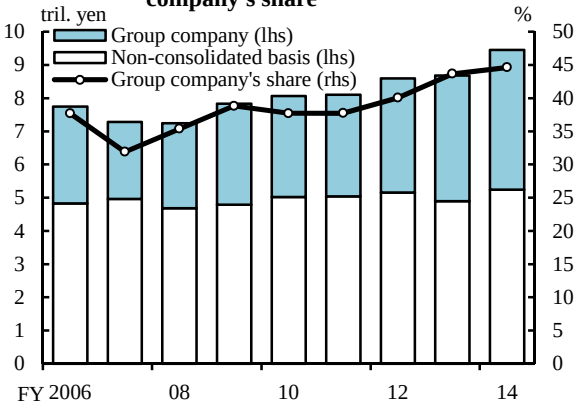
Large financial institutions have been actively pursuing group-wide financial strategies, including overseas mergers and acquisitions, which has resulted in the growth and diversification of operations, sources of profit, and risks (Charts B5-1 and B5-2). In light of the sizable role they play in financial intermediation and the financial markets, sound business management practices among large financial institutions are crucial for the stability of the financial system. This box will review the characteristics of Japanese G-SIBs (comprising three major financial groups) from a macroprudential perspective, by looking at changes both over time and in comparison with other G-SIBs.[62]

Chart B5-1: Breakdown of loans among three major Japanese financial groups[1,2]



Notes: *1*. The latest data are as of the first half of fiscal 2015.
2. "Group company" figures are differences between whole group companies and non-consolidated basis figures.
Source: BOJ.

Chart B5-2: Gross profits among three major Japanese financial groups and group company's share[1]

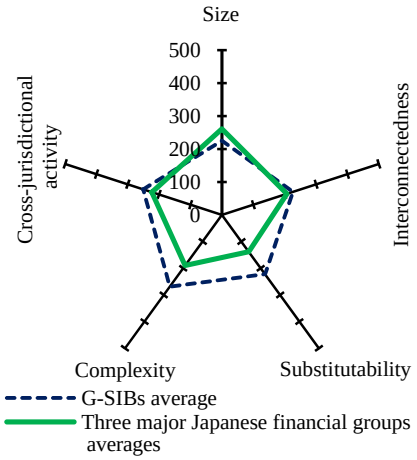


Note: *1*. "Group company" figures are differences between whole group companies and non-consolidated basis figures.
Source: BOJ.

Comparing the three major financial groups with other countries' G-SIBs, based on the indicators used for G-SIB assessment (G-SIB score) by the FSB and the Basel Committee on Banking Supervision, the average score of the three major financial groups is lower than the G-SIB average across the five categories, except for the "size" category. In particular, their scores are not so high compared with all other G-SIBs with regard to indicators such as "complexity" and "interconnectedness" (Chart B5-3).

[62] G-SIBs (global systemically important banks) are identified by the Financial Stability Board (FSB) and the Basel Committee on Banking Supervision. The assessment methodology is based on scores in twelve indicators related to five categories (cross-jurisdictional activity, size, interconnectedness, substitutability/financial institution infrastructure, and complexity).

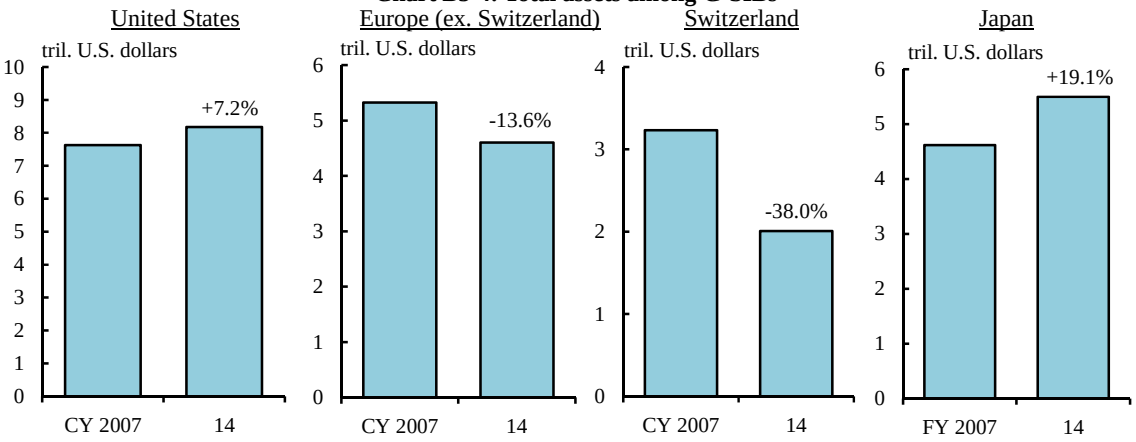
Chart B5-3: G-SIB scores[1]



Note: *1*. Data for three major Japanese financial groups are as of fiscal 2014. Data for other G-SIBs are as of 2014.
Source: S&P Global Market Intelligence.

However, in terms of the change in asset size before and after the Lehman shock, the asset size of Japanese G-SIBs grew significantly while that of U.S. and European G-SIBs have generally been restrained, with cases of relatively large reductions in asset size for individual G-SIBs observed (Chart B5-4). Under these circumstances, Japanese banks' share of cross-border claims has continued to rise (Chart B5-5).

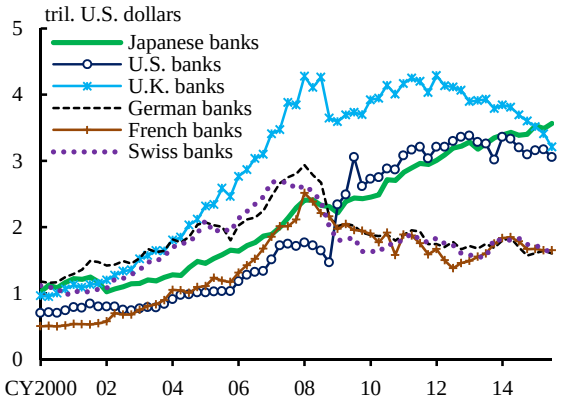
Chart B5-4: Total assets among G-SIBs[1]



Note: *1*. Out of the G-SIBs, 5 banks in the U.S., 2 banks in Europe (ex. Switzerland), 2 banks in Switzerland, and 3 banks in Japan are counted.
Sources: Published accounts of each bank.

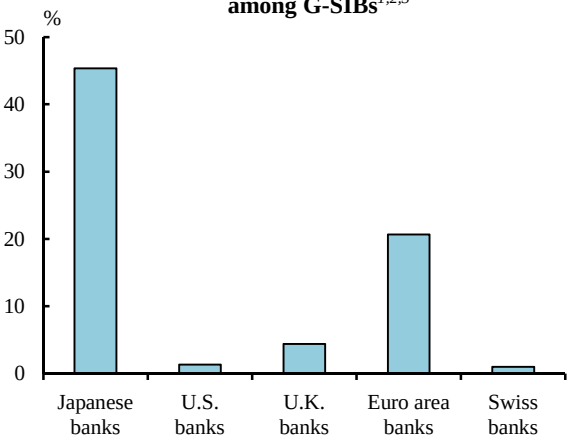
The risk profiles of Japanese G-SIBs not necessarily captured in the G-SIB score include: (1) a large proportion of cross-border claims is foreign currency-denominated and highly dependent on market funding (Chart IV-3-2); (2) stockholdings are large both in absolute terms and relative to the amount of capital (Chart B5-6); and (3) the share of concentrated exposures to non-financial corporations has been high and has exhibited an increasing trend in recent years (Chart B5-7). In addition, off-balance-sheet overseas claims, such as credit commitments are on an increasing trend, and have risen to approximately 40 percent of on-balance-sheet claims (Chart B5-8).

Chart B5-5: International claims by bank nationality[1,2]



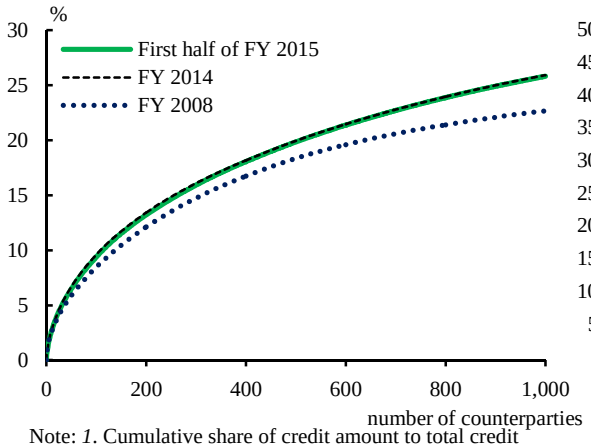
Notes: *1*. The latest data are as of end-September 2015.
2. For German and French banks, claims to euro area are excluded.
Source: BIS, "Consolidated banking statistics."

Chart B5-6: Outstanding amount of stockholdings to Tier I ratios among G-SIBs[1,2,3]



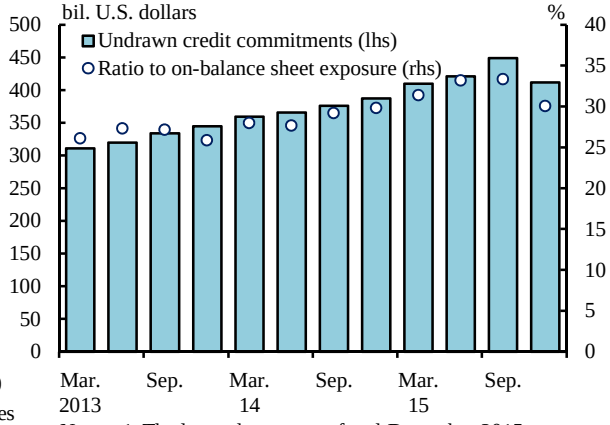
Notes: *1*. The data for Japanese banks are as of end-March 2015. Other data are as of end-December 2014.
2. Out of the G-SIBs, 3 banks in Japan, 6 banks in the U.S., 4 banks in the U.K., 7 banks in the euro area, and 2 banks in Switzerland are counted.
3. The amount of stockholdings is based on market value. For those other than Japanese banks, stock (or the items which include stock) of available-for-sale securities are counted.
Sources: Published accounts of each bank.

Chart B5-7: Cumulative share of credit amount among major banks [1]



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

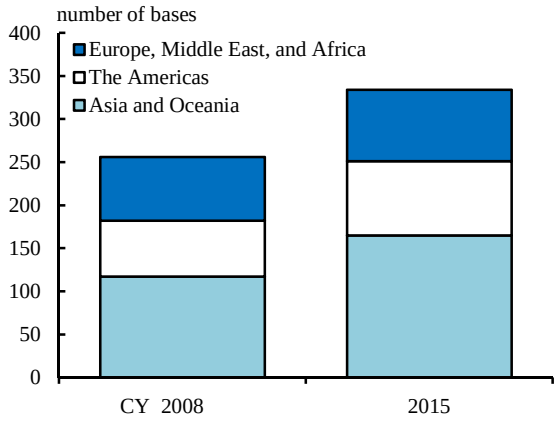
Chart B5-8: Undrawn credit commitments among three major Japanese financial groups[1,2]



Notes: *1*. The latest data are as of end-December 2015.
2. International claims to all sectors (ultimate risk basis).
Source: BOJ.

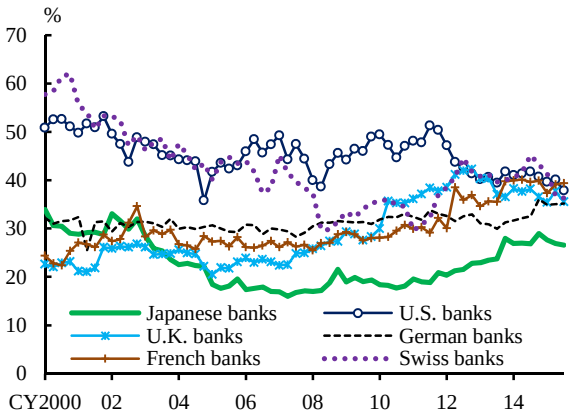
Each of the three major financial group's organizational structure and internal transaction structure is becoming more complex, as they expand their businesses globally through M&A activities or business partnerships (Charts B5-9 and B5-10).

Chart B5-9: Number of overseas bases among three major Japanese financial groups[1]



Note: *1*. The data are based on end-June figures for each year.
Sources: Published accounts of each group.

Chart B5-10: Ratio of related office claims to cross border claims[1]



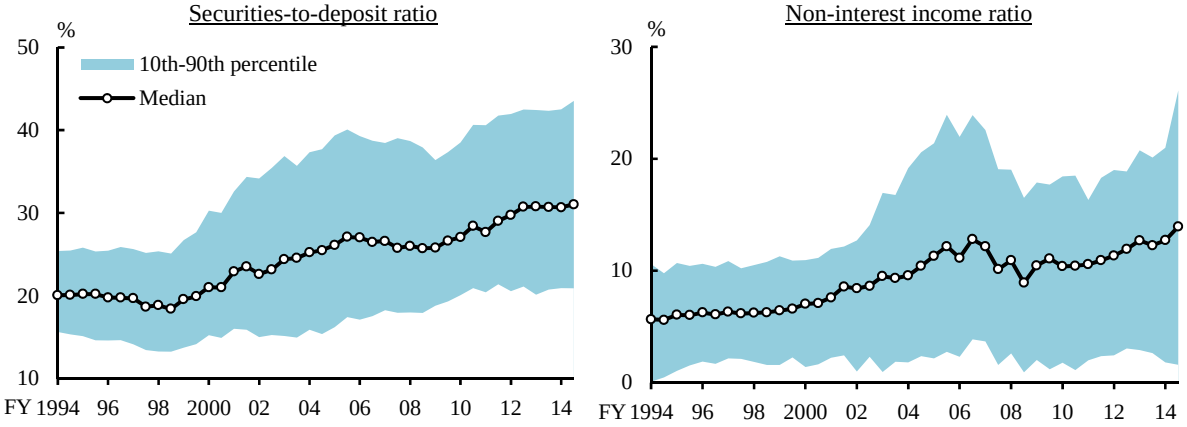
Note: *1*. The latest data are as of end-September 2015.
Source: BIS, "Locational banking statistics."

On account of the recent evolution of Japanese G-SIBs, there is a need to establish governance frameworks and information systems, as well as to enhance their risk management frameworks that are in tune with their business environment.

Box 6: The increased degree of comovement in profits and stock prices among regional banks

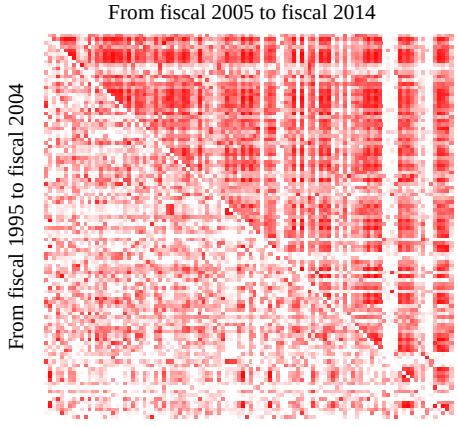
Confronted with declining profits from lending activities, regional banks have responded by being more actively involved in securities investment, and are seeking ways of increasing their non-interest income, such as through fees and commissions related to investment trusts (Chart B6-1). Because these actions will render profits more sensitive to market fluctuations, they are expected to contribute to an increasing degree of comovement in profits among regional banks.

Chart B6-1: Regional banks' securities-to-deposit ratio and non-interest income ratio[1,2]



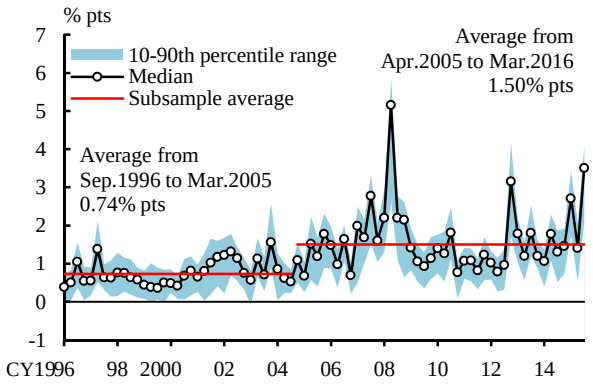
Notes: *1*. 104 regional banks are counted. The latest data are as of fiscal 2014.
2. Non-interest income ratio is the ratio of non-interest income to interest income.
Source: BOJ.

Chart B6-2: Correlation coefficients of regional banks' profits[1]



Note: *1*. A correlation matrix of 104 regional banks' net income before taxes. Darker color indicates higher correlation.
Source: BOJ.

Chart B6-3: Regional banks' CoVaR[1,2,3]

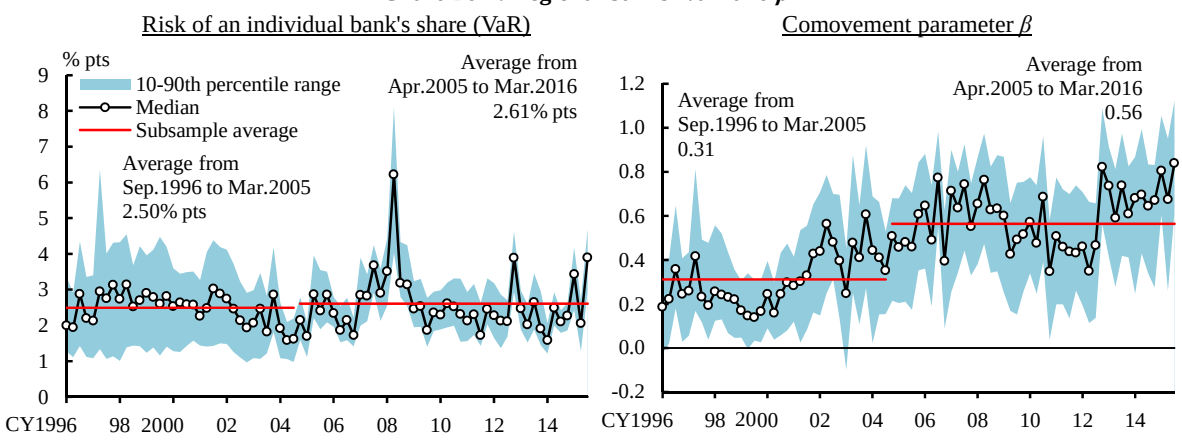


Notes: *1*. CoVaR of an individual bank is calculated by multiplying VaR of each bank's share price by the comovement parameter β.
2. Estimation period is from April 1996 to March 2016. 59 regional banks are counted.
3. CoVaR is estimated using rolling samples of the last 100 days.
Sources: Bloomberg; BOJ.

Indeed, a comparison of the degree of correlation among regional banks' profits over the past 20 years -- between the first half of the period (the first half of fiscal 1995 through the second half of fiscal 2004) and the second half (the first half of fiscal 2005 through the second half of fiscal 2014) -- shows that the degree of comovement in their profits has increased (Chart B6-2).

This increase in comovement in profits is also expected to lead to an increase in comovement in stock prices among regional banks. In order to confirm this, the CoVaR, an indicator of systemic risk, was calculated based on data from 59 regional banks for which long-term historical data on stock prices were available.[63] The calculation reveals that the CoVaR has increased from the mid-2000s (Chart B6-3). In identifying the cause, fluctuations in the CoVaR were broken down into (1) the amount of risk within individual banks and (2) comovements between the risk of individual banks and regional banks as a whole (referred to here as β) (Chart B6-4). The results confirm that, while there was no significant change in the amount of risk within individual banks, parameter β -- indicating the degree of comovement -- has been rising overall.

Chart B6-4: Regional banks' VaR and β[1,2,3]



Notes: *1*. Estimation period is from April 1996 to March 2016. 59 regional banks are counted.
2. VaR and β are estimated using rolling samples of the last 100 days. VaR is the difference between 95 percentile VaR and 50 percentile VaR.
3. β is estimated using a quantile regression of an estimation equation that explains a return of regional banks' total market capitalization with a return of an individual regional bank's market capitalization. The estimation equation includes a return of TOPIX as a control variable.
Sources: Bloomberg; BOJ.

Furthermore, according to panel data estimates, as the securities-to-deposit ratio or as the dependence on non-interest income (e.g., fees and commissions related to investment trusts) rises, comovements between the risk of a bank and the amount of risk for regional banks as a whole (parameter β) also increase (Chart B6-5). In other words, more active securities investment and the increase in non-interest income in recent years

[63] See Note 40 in Chapter V for more details on the CoVaR.

have contributed to an increase in comovement in profits and stock prices for regional banks, via the financial market channel.

Chart B6-5: Panel analysis on comovement parameter β[1,2]

Dependent variable: β	Coef.
Non-interest income/ interest income	0.20*
Securities-to-deposit ratio	0.37**

Notes: *1*. ** and * indicate statistical significance at the 5 percent and 10 percent levels, respectively. Sample period is from the second half of fiscal 1997 to the first half of fiscal 2015. 59 regional banks are counted.
2. Explanatory variables include time fixed-effect dummies, bank fixed-effect dummies, and control variables.
Source: BOJ.

It is both appropriate and necessary for individual financial institutions to broaden their sources of profit from traditional lending activities to securities investment and fee- and commission-based business. However, if the strategies and behavior of each bank becomes too homogenous, common risk factors such as turbulent market conditions may simultaneously weigh on regional banks, giving rise to the possibility of a worse-than-expected macro impact stemming from the adverse feedback loop between economic and financial activity. Taking this viewpoint into account, the Bank of Japan will be monitoring financial institutions' accumulation of risks from a macro perspective.

Box 7: The link between population changes in the operating area of *shinkin* banks and their profitability

It is thought that population decline has been a long-term structural factor behind the recent decline in core profitability among regional financial institutions. Below, a sample of 175 *shinkin* banks throughout Japan, which may be sensitive to demographic changes due to restrictions on operating areas and business lines, are examined, to assess the impact of changes in population within the operating area of *shinkin* banks on balance sheet components, such as total assets, deposits and loans.[64]

Taking deposits as an example, the estimated equation is as follows.

$$\begin{aligned}&\text{Rate of change of deposits in } shinkin \text{ bank}_{i,t}\\&= \text{Constant} + \beta\left(\text{Rate of change of population of sales area of } shinkin \text{ bank}_{i,t-1}\right)\\&+ \gamma\left(\text{Rate of change of control variable of } shinkin \text{ bank}_{i,t}\right) + \text{Residual}_{i,t}\end{aligned}$$

The dependent variables are the rate of change of each *shinkin* bank's total assets, deposits and loans from 2010 to 2014. The independent variable is the rate of change of population in each *shinkin* bank's operating area from 2005 until 2010. Some control variables capturing regional economic trends at the prefecture where each *shinkin* bank is headquartered are added as well.

In conventional analyses, the demographic factor that each *shinkin* bank is subject to is typically proxied by data on the population of the municipality or prefecture where the bank is headquartered. In this analysis, however, two more granular population datasets, a dataset obtained by weighting the population of municipalities containing branches of each *shinkin* bank by the number of branches[65] and a dataset obtained by the population data of the business area that each *shinkin* bank operates in were compiled afresh for the analysis, so that the demographic factor that each *shinkin* bank is subject to can be captured more accurately.[66]

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[64] Institutions headquartered in Fukushima, Miyagi and Iwate prefectures, which were severely affected by the 2011 Great East Japan Earthquake, and institutions involved in mergers since 2000 were excluded from the sample.

[65] For a study, utilizing a similar data construction method, see Yasuhiro Horie, "*Jinko Gensho Shakai to Chiiki Kinyukikan Keiei*," *Keizaigaku Kenkyu*, Kyushu University Economics Association, 2015.

[66] As of the end of fiscal 2014. Business area reported to the Financial Services Agency by each *shinkin* bank.

The estimation results show that the β coefficients for total assets, deposits and loans were positive and statistically significant across all specifications, confirming that the balance sheets of *shinkin* banks are affected by demographic factors in their respective operating areas (Chart B7-1). For example, the results of "(ii) population data obtained by weighting the population of the municipalities containing branches of a *shinkin* bank by the number of branches," which captures the granular population fluctuations within the operating areas of each *shinkin* bank, suggests that *shinkin* banks subject to a 1 percent decrease in population within their sales area have 1.0 percent less growth in total assets, 1.2 percrent less growth in loans and 0.9 percent less growth in deposits than *shinkin* banks based in areas where the population had remained unchanged.

Chart B7-1: Effects of population growth on *shinkin* banks (estimation results)[1,2]

%

	(i) Population growth in municipalities where headquarters are located	(ii) Population growth in municipalities where headquarters or branches are located	(iii) Population growth in municipalities where each bank reports to the Financial Services Agency as its business area	(iv) Population growth in prefectures where headquarters are located
Growth rate of total assets	0.95 **	1.01 ***	1.13 ***	1.30 ***
Growth rate of lending	1.04 **	1.19 ***	1.37 ***	1.38 ***
Growth rate of deposits	0.93 **	0.92 ***	0.80 ***	0.95 ***

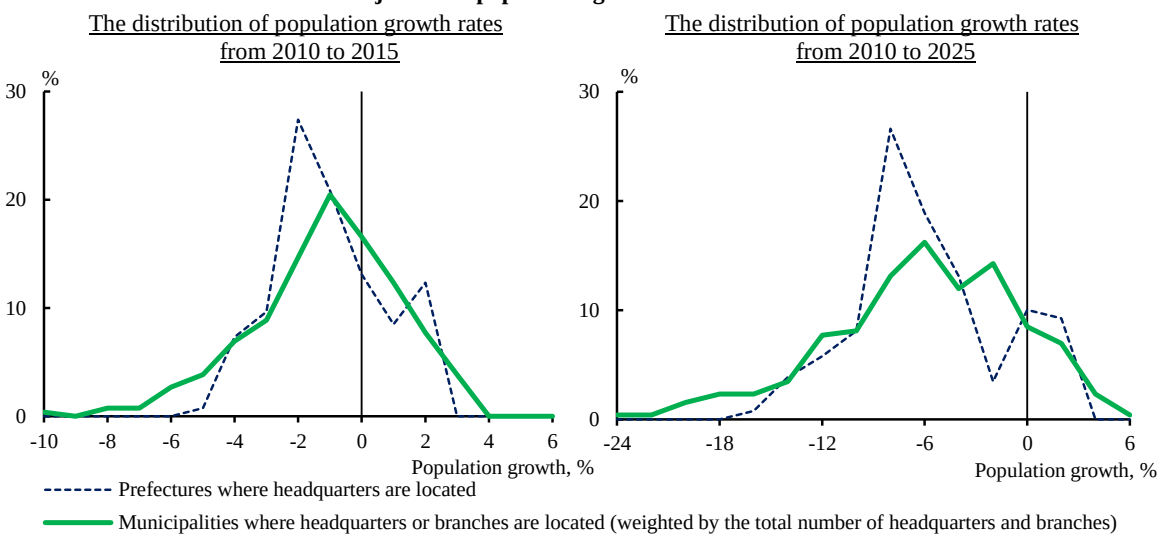
Notes: *1*. *** and ** indicate statistical significance at the 1 percent and 5 percent levels, respectively.
2. The growth rates from 2010 to 2014 of the value of manufactured goods shipments and large-scale retail store sales value are used as control variables.
Sources: Ministry of Economy, Trade and Industry, "Census of Manufacture," "Yearbook of the Current Survey of Commerce"; Ministry of Internal Affairs and Communications, "Population Estimates"; BOJ.

By combining the estimation results with population forecasts at municipal levels, it is possible to individually estimate the impact of future population changes in the operating areas of each *shinkin* bank in the sample on their balance sheets. The estimated impact may vary significantly depending on which definition is used to proxy population dynamics within the operating area of each *shinkin* bank. The cross-sectional distribution of the estimated population growth rates from 2010 to 2025 exhibits greater left-skewness under definition (ii), which is likely to be more granular and precise than definition (iv), which is used widely. This observation suggests that the customer bases of certain *shinkin* banks could be severely affected by population decline (Chart B7-2).

The analysis performed here confirmed the effect of population changes on the deposits and loans of regional financial institutions using a sample of *shinkin* banks, a category

believed to be relatively susceptible to the impact of demographic changes in the region. The business footprint of regional financial institutions is influenced by various factors, including population trends and industrial structures. However, this analysis suggests that [1] future population decline may have some negative effect on the business footprint of regional financial institutions, and [2] it is useful to utilize more granular data, such as municipal-level data, to evaluate changes in banks' business footprint and incorporate such effects into long-term management plans. The Bank of Japan will raise awareness of the medium- and long-term outlook of the business foundations and profitability of regional financial institutions, exchange opinions with them, and utilize the results of such analysis through its off-site monitoring and on-site examination.

Chart B7-2: Projection of population growth of *Shinkin* banks' business area[1]



Note: *1*. Fukushima Prefecture is not counted since no forecast value is available.
Sources: National Institute of Population and Social Security Research, "Population and Household Projection"; The Japan Financial News Co., Ltd.; BOJ.

Box 8: Considerations regarding foreign bond investment

As seen in Chapter III, foreign bond investment by financial institutions has been on a rising trend, and there are some signs that a further pickup will be seen in the future.[67] In view of this, this Box summarizes some considerations regarding the expected return on foreign bond investment.

Income from bond investment in the banking book comes primarily from three components, namely, (1) the deposit spread, (2) term spreads, and (3) the credit and liquidity risk premium (Chart B8-1).[68] In the case of foreign bond investment, on the funding side it is difficult to conceive a deposit spread, due to the high proportion of market funding. For U.S. dollar-denominated funding, in particular, a premium is required and the premium itself has been trending upward especially since the second half of 2015. Notwithstanding this, investing in U.S. Treasuries is expected to lift interest income for the time being, due to the relatively high term spreads for U.S. Treasuries compared with investment in yen-denominated bonds currently.

Chart B8-1: Sources of income in bond investment

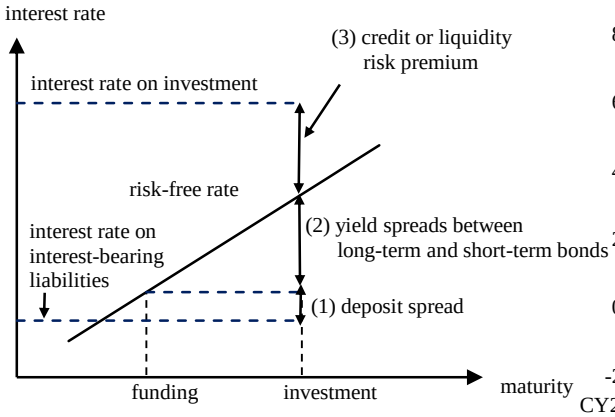
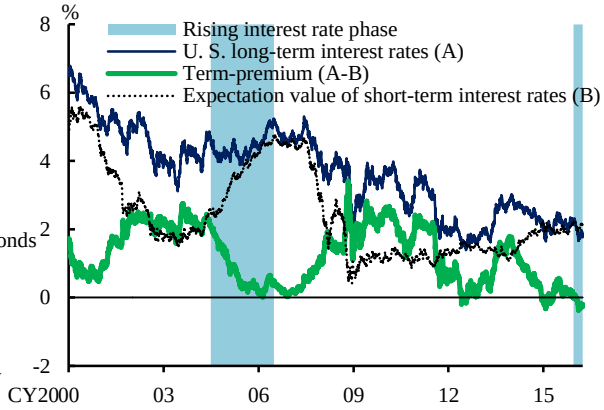


Chart B8-2: Term-premium and U.S. long-term interest rates[1]



Note: *1*. The latest data are as of March 31, 2016.
Sources: Bloomberg; Fed.

The Federal Reserve Bank of New York, however, estimates that the term premium for U.S. Treasuries has been around 0 percent recently (Chart B8-2). This implies that if future short-term interest rates move in line with market expectations, interest income can be secured for the first half of the investment period. However, during the second

[67] For information on securities investment by regional financial institutions, see "Regional Financial Institutions' Securities Investment and Their Challenges for Risk Management," *Financial System Report Annex Series*, March 2016 (available only in Japanese).

[68] In practice, financial institutions often invest in bonds with the aim of obtaining capital gains, but for the purpose of discussion this Box does not consider cases in which profits are generated through trading activity.

half of the investment period, the term spreads would be reversed and interest income would turn negative. In addition, the expected return on investments in U.S. Treasuries is affected by developments in foreign exchange markets. Yen-denominated interest income on investment in U.S. Treasuries has been pushed up by the depreciation of the yen over the past few years, but if the depreciating trend were to be reversed, interest income would be depressed instead.[69]

Over the long term, interest income from investments in U.S. Treasuries will naturally depend on interest rate developments in future and other factors, but considering the above-mentioned points, it is important that financial institutions carefully manage not only the variation of the bonds' present value but also the variation in interest income over the investment period. Specifically, they should (1) clarify their investment stance based on an adequate recognition of future variations in interest income caused by future developments in interest rates and (2) regularly review their scenario analyses based on the evolution of actual interest rates during the investment period (Chart B8-3). It is important that financial institutions manage the risk of changes in interest income through the use of such analyses, and make investment decisions based on the risk recognition as well as managing the risk of changes in the present value of their bondholdings.

Chart B8-3: Developments in profits of 5-year U. S. government bond investment assuming a 1 million U.S. dollar investment[1,2]

ten thousand U. S. dollars

	Mar. 2016-Mar. 2017	Mar. 2017-Mar. 2018	Mar. 2018-Mar. 2019	Mar. 2019-Mar. 2020	Mar. 2020-Mar. 2117	Cumulative profits
Case (A) Short-term interest rates will not change from current levels.	0.73	0.73	0.73	0.73	0.73	3.63
Case (B) Short-term interest rates will rise based on market expected rates.	0.58	0.26	-0.01	-0.26	-0.49	0.09

Notes: *1*. Profits are calculated as interest income of 5-year U. S. government bonds minus U. S. dollar funding costs (3-month Libor). Case (B) is calculated based on the implied forward rates, and U. S. dollar funding costs are calculated as averages for each year.
2. These figures are calculated based on the data toward the end of March 2016.
Source: Bloomberg.

In the case of foreign credit investment, in addition to the above considerations, it is also necessary to manage credit risk. Foreign credit investment by financial institutions is often carried out via fund investment. In addition to screening conducted at the initial

[69] When financial institutions invest in U.S. Treasuries, it is common to hedge the foreign exchange risk related to the principal tranche by using repos and currency and foreign exchange swaps, but even in such cases the interest income tranche is often exposed to foreign exchange risk.

investment stage, it is crucial to continuously monitor changes in credit quality through interim management during the investment period, so as to make effective investment decisions and appropriately estimate expected return. When measuring the aggregate amount of risk in their investment portfolio, it is common for financial institutions to consider diversification effects for both interest rate risk and credit risk. However, the correlation between those risks, which underpins the diversification effect, may not necessarily be stable. On this basis, financial institutions need to carefully monitor changes in the correlation among different risk factors.

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 I (CET I) capital ratio = CET I capital / risky assets

CET I capital comprises common equities and retained earnings.

Risky assets are financial institutions' risk-weighted assets.

Tier I capital ratio = Tier I capital / risky assets

Tier I capital includes CET I capital and equities such as preferred equities that meet certain conditions.

Total capital adequacy ratio = Total capital / risky assets

Total capital includes Tier I 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.