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Reports & Research Papers

Financial System FSR report



BANK OF JAPAN

OCTOBER 2015

The total of 10 major banks, 105 regional banks, and 258 *shinkin* banks covered in this *Report* is as follows (as of September 30, 2015).

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 258 *shinkin* banks are the *shinkin* banks that hold current accounts at the Bank of Japan.

This *Report* basically uses data available as of September 30, 2015.

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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 large emphasis on a 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, as an interim assessment halfway through the fiscal year, this issue highlights changes from the beginning of fiscal 2015 (i.e. the previous issue), especially for the sections on risk analysis in Chapter V and on tasks and challenges toward achieving financial stability in Chapter VII. Second, analyses on financial institutions' interest rate risks -- both on the yen and on foreign currencies -- and market risk associated with stockholdings, which were treated as separate topics, have been integrated under the category called "market risk." This reflects the Bank's response to the rising need to conduct a cross-sectional examination of the profiles of various risks, as financial institutions have been taking more risks by investing their funds to more diversified asset classes with regard to securities investment. Third, for areas in which financial institutions are actively enhancing their risk-taking stance (e.g., M&A-related loans, housing rental business, and securities investment), issues in the conduct of risk management have been presented in the boxes. Fourth, alongside improvements including refinement of the model for macro stress testing and revision of the method for setting scenarios, the Bank

has enhanced its disclosure of the methodologies and data so that these can be referred to by individual financial institutions when they conduct stress testing. The Bank is going to release the *Financial System Report Annex Series* as a supplementary volume on the narrative and logic behind the setting of scenarios, and has made main variables available for downloading from its web site. And fifth, taking into account the slowdown in the Asian economy and the heightening of market volatility since summer 2015, discussion on their effects on financial institutions and issues to be noted have been additionally provided in Chapter V's section on risk analysis and Chapter VI's on macro stress testing.

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I. Executive summary: comprehensive assessment of the financial system

Japan's financial system has been maintaining stability. Financial intermediation has operated more smoothly than before.

Functioning of the financial system

Financial institutions have remained geared toward taking more risks in their business operations with regard to lending at home and abroad. For domestic loans, financial institutions have been actively meeting the demand for funds from large firms due to their merger and acquisition activities as well as their business expansion at home and abroad. In addition, wide-spreading efforts by financial institutions have been observed in extending loans to low-rated borrowers with prospects for future growth or business recovery and to borrowers under credible revitalization programs. In this situation, domestic loans have continued to increase moderately, led by loans to firms among various firm sizes, industries, and regions. Banks have also been active in overseas lending with a view to supporting the global expansion of Japanese firms while capturing the financial needs in countries with high growth potential. Moreover, some Japanese banks have purchased loan receivables with the aim of expanding their overseas borrowers, particularly non-Japanese firms. Under these circumstances, banks' overseas loans have continued to show relatively high growth, but the pace of growth has recently slowed somewhat due to the deceleration of the Asian economy. As for securities investment, financial institutions have gradually been enhancing their risk-taking stance by investing to risky assets further, such as investment trusts, while maintaining a high level of outstanding amount of yen-denominated bonds.

Major institutional investors such as life insurance companies and pension funds have continued to increase their amount of investment in risky assets. With regard to financial intermediation through financial markets, equity financing remains at a high level while issuing conditions for CP and corporate bonds have been favorable.

Against these backgrounds, financial conditions among firms and households have become more accommodative. As for the means of household savings, deposits have been central to household financial assets. However, the share of risky assets has been increasing, as seen in the continued net inflow to investment trusts.

Stability of the financial system

Regarding developments in the above-mentioned financial intermediation, signs of

financial imbalances such as indications of overheating or excessively bullish expectations have not been observed. The real estate market does not appear to be in a state of overheating on the whole, although transactions are gradually being actively undertaken, albeit with regional differences.

Financial bases of financial institutions have been adequate on the whole. Their capital adequacy ratios are sufficiently above regulatory levels. The amount of risk that financial institutions bear has largely remained unchanged from the time of the previous *Report*, while financial institutions have increased their capital mainly due to their accumulation of retained earnings. Under these circumstances, a fine balance has continued to be kept between macro risks to which financial institutions are exposed and their financial bases, and the financial system generally has strong resilience against various stresses. In terms of funding liquidity, financial institutions have sufficient liquidity in yen funds. As for foreign currency-based funding, they continue to have funding structures with a large proportion of market funding, but progress has been made in banks' efforts to enhance their stable foreign-currency funding base. Banks hold a foreign-currency liquidity buffer that can cover funding shortages even if market funding becomes difficult for a certain period.

Meanwhile, from summer 2015 volatility rose in global financial markets amid growing concern about a slowdown in emerging economies, including Asia. Although the effects of developments in overseas markets -- including the decline in stock prices -- spread to Japan, effects on the financial bases of Japan's financial institutions and on the stability of Japan's financial system have been limited.

Challenges from a macroprudential perspective

In order to ensure financial system stability in the future, continued efforts are necessary to keep the fine balance between macro risks to which financial institutions are exposed and their financial bases, while steadily responding to structural changes in the financial system that might become a source of future fragility.

Financial institutions' macro risks have generally been restrained, even in a situation where these institutions have been geared toward taking more risks in their business operations in domestic and overseas lending as well as in securities investment. It should be noted, however, that this is largely attributable to the fact that benign financial conditions, i.e., low and stable credit costs and low market volatility, have been maintained in recent years. Meanwhile, exposure has continued to increase in various areas, such as credit, market, and funding liquidity. It is necessary for financial

institutions to continue making efforts to strengthen their ability to respond to risks in areas in which they are actively enhancing their risk-taking stance. Of particular importance for overseas operations are financial institutions' efforts to enhance their stable foreign-currency funding base and strengthen credit management in response to the expansion of assets, and for market investment, a cross-sectional and multi-dimensional understanding as well as management of the profile of risks. The increased systemic importance of large financial institutions and the decline in core profitability among regional financial institutions, structural issues that were discussed in previous *Reports*, have been unchanged.

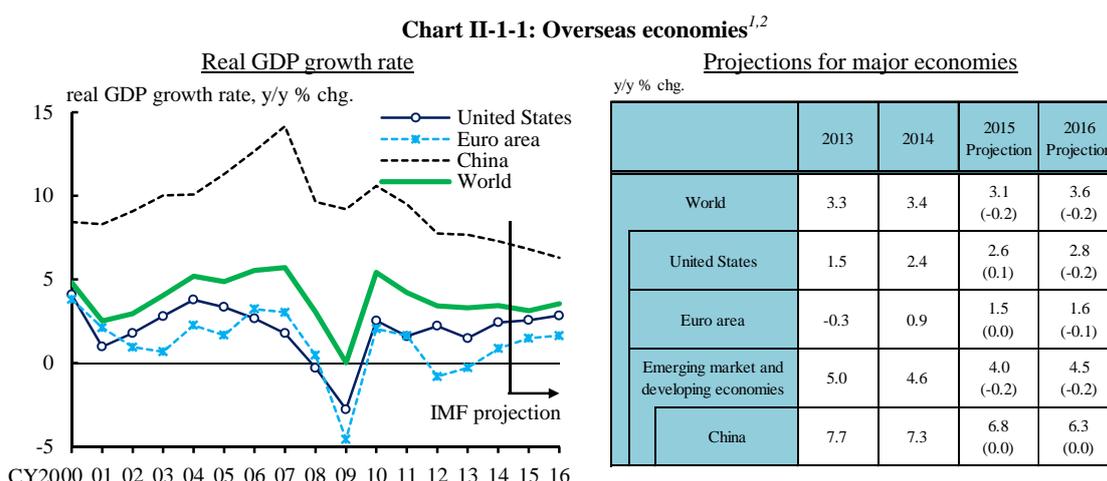
The Bank of Japan will tackle the above issues toward ensuring stability of the financial system, particularly through its off-site monitoring and on-site examinations.

II. Examination of the external environment

This chapter examines the external environment surrounding Japan's financial system, mainly during the first half of fiscal 2015.¹ It summarizes developments in overseas financial and economic conditions, followed by those in Japan's financial, economic, and fiscal conditions.

A. Developments in overseas financial and economic conditions

Overseas economies -- mainly advanced economies -- have continued to grow at a moderate pace, despite the slowdown in emerging economies (Chart II-1-1). On the monetary policy front, while a policy rate hike is coming into view in the United States, the policy of continuing with the asset purchase program has been maintained in the euro area.



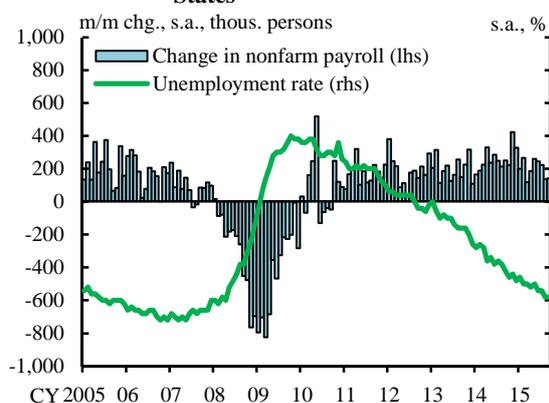
Looking at movements by major region, the U.S. economy has continued to recover, assisted by the firmness in household spending, although production activity of the industrial production sector has lacked vigor, mainly on the back of the appreciation of the U.S. dollar and the slowdown in emerging economies (Chart II-1-2). In global markets, attention is being placed on the timing of a policy rate hike by the Federal Reserve Board (FRB).

The European economy has continued to recover moderately (Chart II-1-3). However, attention continues to be paid to downside risks such as the outcome of its debt problem,

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

including the developments in Greece, and the effects of the slowdown in the Russian economy. The European Central Bank (ECB) has indicated that it will continue to implement its asset purchase program.

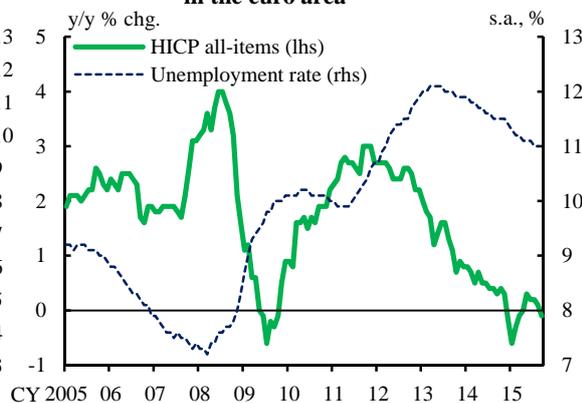
Chart II-1-2: Employment situation in the United States¹



Note: 1. The latest data are as of September 2015.

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 September 2015, and those for the unemployment rate are as of August 2015.

Source: Eurostat.

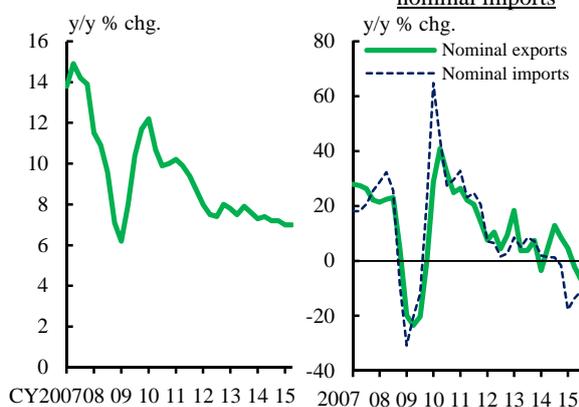
The Chinese economy -- with downward pressure from an overhang of production capacities and inventory adjustments in the manufacturing sector -- has continued to be in a state of deceleration (Chart II-1-4). Under these circumstances, other emerging and commodity-exporting economies as a whole have continued their subdued pace of growth.

In global financial markets, market participants have focused on differences in the direction of monetary policy among advanced economies. In this situation, volatility rose from summer 2015, as seen particularly in worldwide adjustments in stock prices, against the background of uncertainty regarding the situation in Greece and heightening concerns about the outlook for the Chinese and emerging economies. In the United States, stock prices have been relatively weak due to sluggish corporate performance, mainly reflecting the decline in crude oil prices and the appreciation of the U.S. dollar (Chart II-1-5). Long-term interest rates rose, mainly due to market participants' expectations of a policy rate hike by the FRB, but declined somewhat from the summer in response to a heightening of investors' risk aversion. The European market showed somewhat large fluctuations reflecting the situation in Greece, with stock prices of European countries falling somewhat sharply after hovering at high

levels. Long-term interest rates rose until summer 2015, partly reflecting that market participants' deflationary concern waned to some extent, but declined somewhat thereafter in response to the heightening of investors' risk aversion. In China, stock prices rose substantially from summer 2014 toward mid-June 2015, but dropped sharply thereafter (Chart III-1-4).

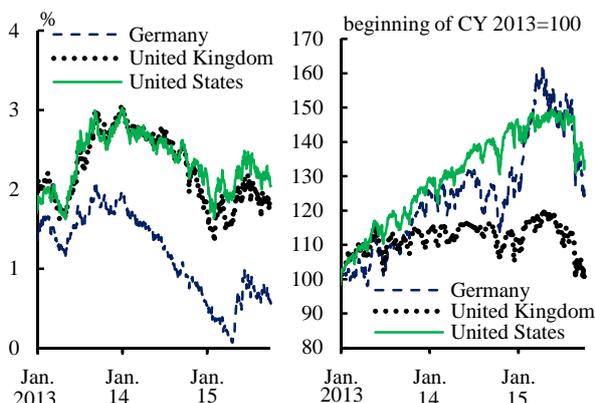
International commodity prices have generally remained weak. Crude oil prices temporarily rose from early spring 2015, but prices have moved downward again since the summer. Prices of nonferrous metals and other commodities have also remained weak (Chart III-1-8).

Chart II-1-4: China's real GDP, nominal exports, and nominal imports¹
Real GDP Nominal exports and nominal imports



Note: 1. The latest data are as of the April-June quarter of 2015 for real GDP, and the July-August 2015 average for nominal exports and nominal imports.
 Source: CEIC.

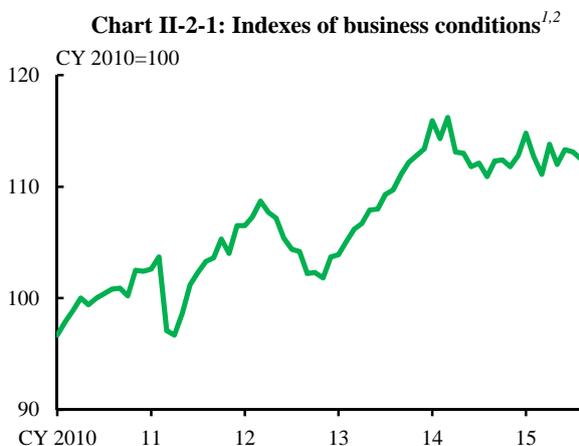
Chart II-1-5: Government bond yields and stock prices in advanced countries^{1,2}
Government bond yields Stock prices



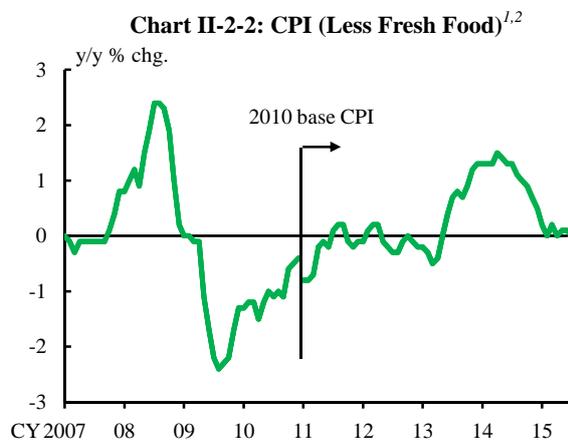
Notes: 1. The latest data are as of September 30, 2015.
 2. The left-hand chart shows 10-year government bond yields. In the right-hand chart, the DAX for Germany, the FTSE for the United Kingdom, and the S&P 500 is used for the United States.
 Source: Bloomberg.

B. Developments in Japan's financial, economic, and fiscal conditions

Japan's economy has continued to recover moderately, although exports and production have been affected by the slowdown in emerging economies (Chart II-2-1). Business fixed investment has been on a moderate increasing trend as corporate profits have continued to improve markedly. Private consumption has been resilient against the background of steady improvement in the employment and income situation. The year-on-year rate of change in consumer prices (all items less fresh food) is about 0 percent (Chart II-2-2). The Bank of Japan continues with quantitative and qualitative monetary easing (QQE), aiming to achieve the price stability target of 2 percent.



Notes: 1. The latest data are as of August 2015.
 2. This chart shows Coincident Index of Composite Indexes.
 Source: Cabinet Office, "Indexes of Business Conditions."

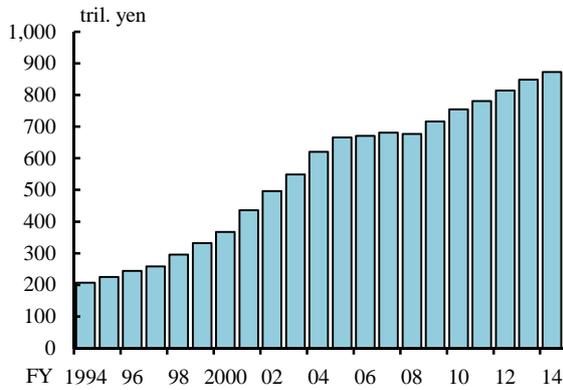


Notes: 1. The latest data are as of August 2015.
 2. Figures are estimated by adjusting the direct effects of the consumption tax hike in April 2014.
 Source: Ministry of Internal Affairs and Communications, "Consumer Price Index."

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-2-3). 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-2-4). 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 July 2015, the primary balance to GDP ratio for fiscal 2020 is still projected to show a deficit of around 1.0 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-2-5).

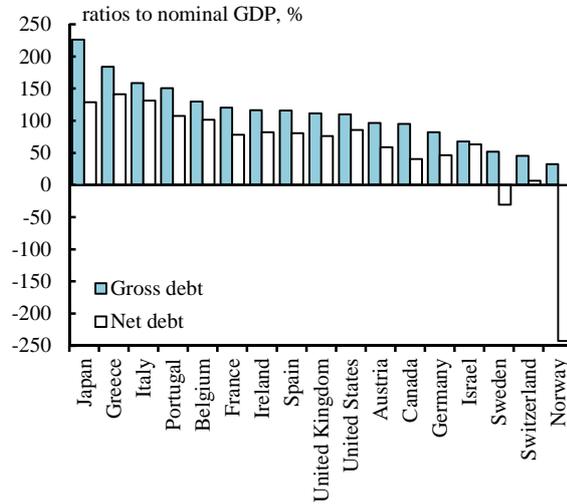
The heightening of volatility in global financial markets has also spread to Japan. Stock prices -- after registering a record high in June 2015 for the period following the financial crisis -- temporarily fell to a level last seen in January 2015. During this time, long-term interest rates have generally been stable.

Chart II-2-3: Government bonds outstanding¹



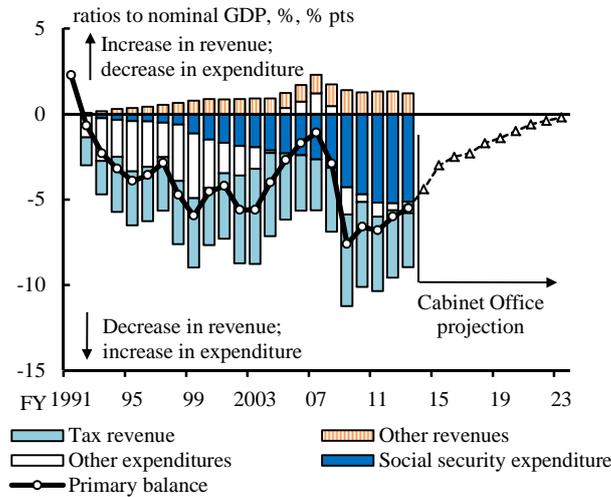
Note: 1. The data include FILP bonds.
Source: Ministry of Finance.

Chart II-2-4: General government debt to GDP ratio¹



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

Chart II-2-5: 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 Bank of Japan's 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 2014 to fiscal 2023 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.

III. Risks observed in financial markets

This chapter examines the risks observed in financial markets at home and abroad, mainly during the first half of fiscal 2015.

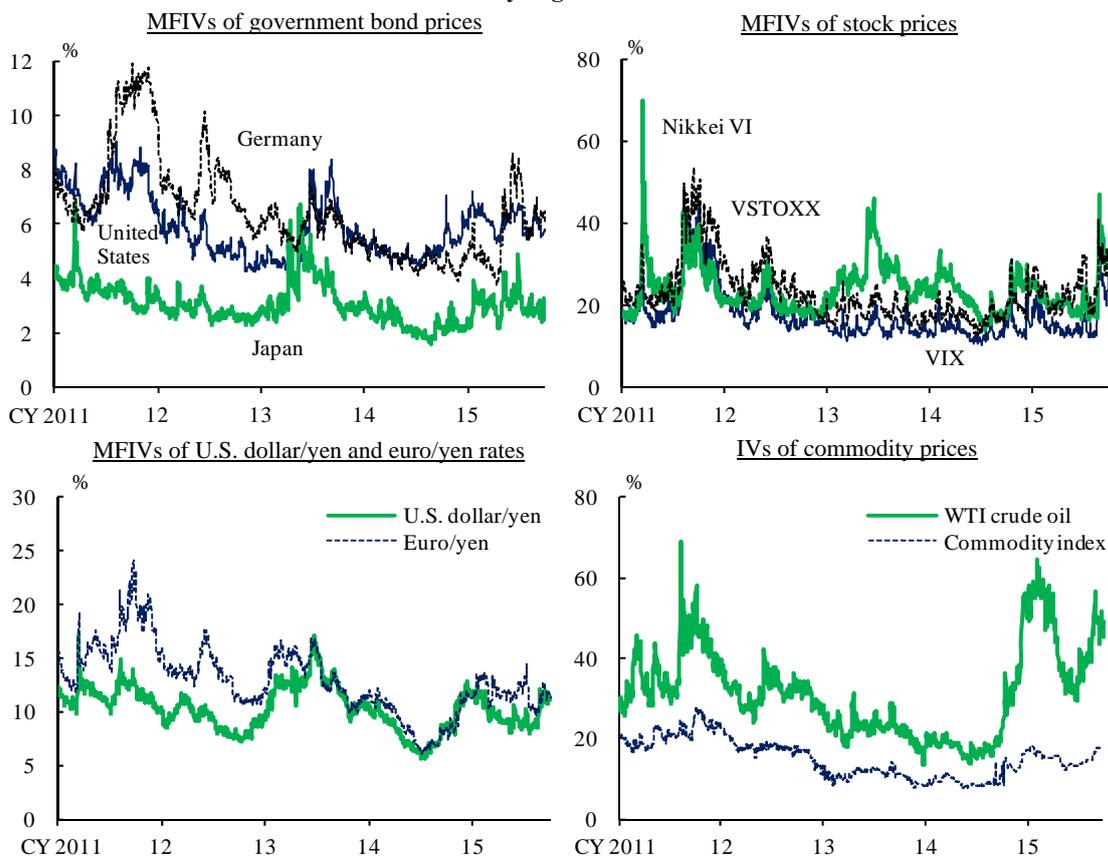
A. Global financial markets

Global financial markets showed signs of nervousness after the summer, such as stock prices edging down with volatility due to growing concerns over prospects for the emerging economies (Chart III-1-1).² In the emerging markets, the rate of decline for currencies and stock prices accelerated and credit spreads widened (Chart III-1-2). In the advanced markets, stock prices also declined and credit spreads on corporate bonds, especially for high-yield bonds widened as well (Chart III-1-3). Amid these conditions, there has been an unwinding of search for yield.

In terms of the outlook, attention should be paid as to whether the heightening of market participants' concern over the development of the world economy, particularly for the emerging economies, as well as the impact of the monetary policy of advanced economies on global financial markets, will affect the risk appetite of global investors and global capital flows.

² Model-free implied volatility (MFIV) is calculated by using price information from various futures options. Unlike standard implied volatility which is based on a particular option pricing model and has various values depending on exercise prices, MFIV can integrate volatility, which is not dependent on any pricing model, into one value. MFIVs of government bond prices and foreign exchange rates (U.S. dollar/yen and euro/yen rates) correspond to options market participants' expected change in government bond prices and foreign exchange rates for the next 3 months. The volatility index (VIX) of the Chicago Board Options Exchange, the VSTOXX of Eurex, and the Nikkei Stock Average Volatility Index (VI) of Nikkei Inc. are MFIVs that correspond to options market participants' expected rate of change in stock prices for the next month.

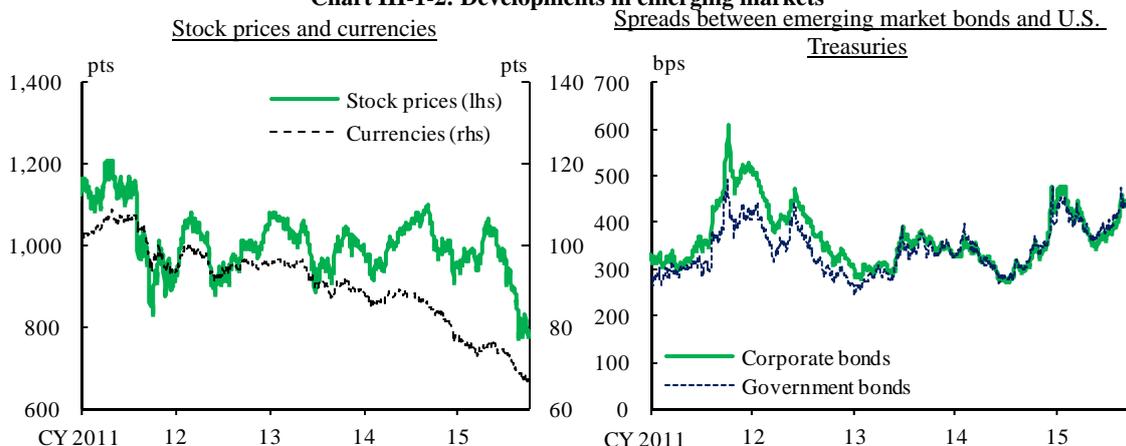
Chart III-1-1: Volatility in global financial markets^{1,2,3,4}



Notes: 1. MFIVs of government bond prices are calculated by using the following data: options on JGB futures traded on the Tokyo Stock Exchange before March 24, 2014 and on the Osaka Exchange from March 24, 2014 for Japan; options on U.S. Treasury futures traded on the Chicago Board of Trade for the United States; and options on Euro-Bund futures traded on Eurex for Germany. The results correspond to changes in government bond prices for the next 3 months.
 2. MFIVs of foreign exchange rates are calculated by using data on 3-month over-the-counter option prices.
 3. IV of commodity index is volatility index calculated by Bank of America Merrill Lynch. IV of crude oil is calculated by using options on WTI crude oil futures.
 4. The latest data are as of September 30, 2015.

Sources: Bloomberg; BOJ.

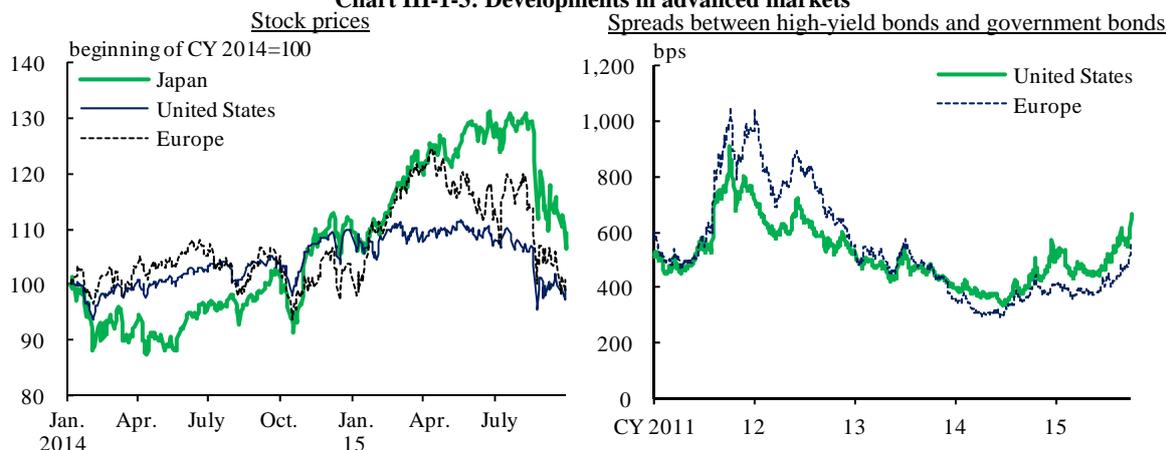
Chart III-1-2: Developments in emerging markets^{1,2,3}



Notes: 1. In the left-hand chart, MSCI Emerging Index for stock prices; J.P. Morgan EMCI Index for currencies.
 2. In the right-hand chart, The Bank of America Merrill Lynch Emerging Markets Liquid Corporate Plus Index for corporate bonds; J.P. Morgan Emerging Market Bond Index for government bonds.
 3. The latest data are as of September 30, 2015.

Source: Bloomberg.

Chart III-1-3: Developments in advanced markets^{1,2,3}

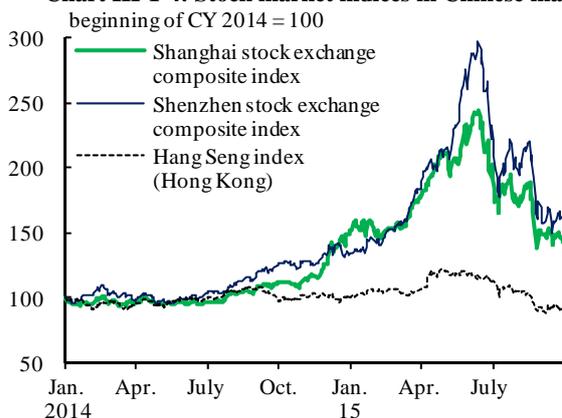


Notes: 1. In the left-hand chart, TOPIX for Japan; S&P500 for United States; EURO STOXX for Europe.
 2. In the right-hand chart, spreads on high-yields bonds are calculated by Bank of America Merrill Lynch.
 3. The latest data are as of September 30, 2015.
 Source: Bloomberg.

Developments in emerging economies and financial markets

In the emerging markets, currencies and stock prices as a whole followed a downward trend with volatility, especially after the summer (Chart III-1-2). In particular, Chinese stock prices continued to show unstable movements. After the rapid increases that have occurred since 2014, stock prices in 2015 declined sharply from the middle of June to the middle of July, and although they temporarily rebounded, prices again fell significantly after the middle of August (Chart III-1-4). Stock price valuation and stock price purchases on margin are somewhat higher than their historical averages (Chart III-1-5).

Chart III-1-4: Stock market indices in Chinese markets¹



Note: 1. The latest data are as of September 30, 2015.
 Source: Bloomberg.

Chart III-1-5: Various indicators of the Chinese stock market^{1,2}



Notes: 1. The left-hand chart shows the price premium of A-shares (stocks listed on the Shanghai or Shenzhen exchange) to H-shares (those listed on the Hong Kong exchange) for Chinese companies with both A-share and H-share listings.
2. The latest data are as of September 30, 2015.

Source: Bloomberg.

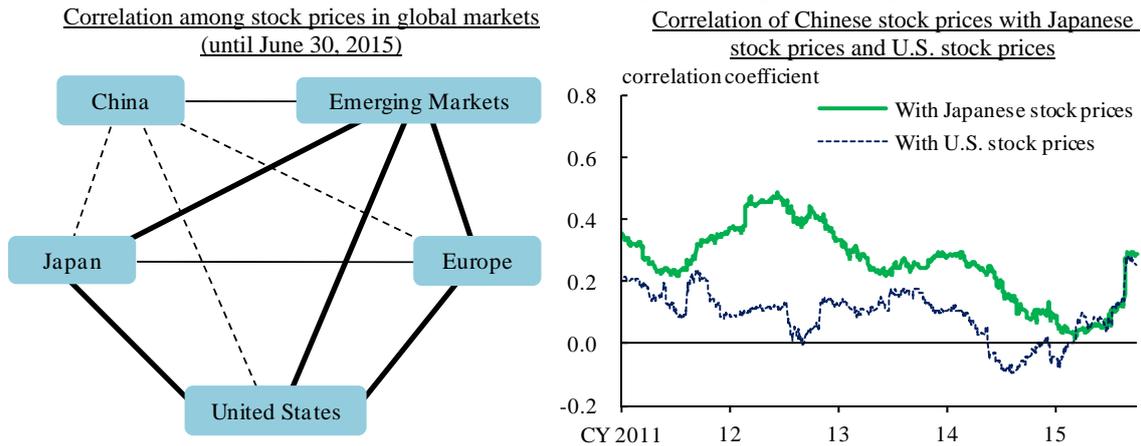
Direct impact of such fluctuations in Chinese stock prices on the global financial markets was initially fairly limited. This is thought to be because China's stock market is mostly made up of domestic individual investors, with relatively few foreign investors, and therefore the impact of the change in Chinese stock prices on the global economy through financial channels, such as foreign investors' realization of losses and accompanying changes in their risk appetite, were considered to be limited.

However, after July and especially after the plunge of Chinese stock prices after the middle of August, the correlation between stock prices in China and those of advanced economies heightened, due partly to market participants' concern that a deceleration of China's real economy will spread globally through the trade channel and a decline in commodity prices (Chart III-1-6). In Asian emerging economies -- which have a strong correlation with China's real economy -- stock prices turned to a decreasing trend as well (Chart III-1-7). Commodity prices also decreased due to market participants' anxiety over demand, particularly in the emerging economies, in addition to supply factors such as an increase in production by some OPEC members and shale oil production (Chart III-1-8).

Under such conditions, capital flows to emerging and commodity-exporting economies have continued to decline as a trend. Inflows of capital, obtained from balance of payment statistics, had been following a declining trend (Chart III-1-9). Recent developments in fund flows for exchange-traded funds (ETFs) in the United States confirm that outflows from funds for emerging and commodity-exporting markets have been notable since the summer (Chart III-1-10). It is necessary to pay attention to the

risk that a rapid outflow of capital from emerging and commodity-exporting economies could occur, reflecting the sentiment of market participants toward emerging economies and the monetary policy stance among advanced economies; such an outflow would subsequently put further downward pressure on currencies and stock prices of emerging and commodity-exporting economies.

Chart III-1-6: Correlation of Chinese stock prices with global stock prices^{1,2}

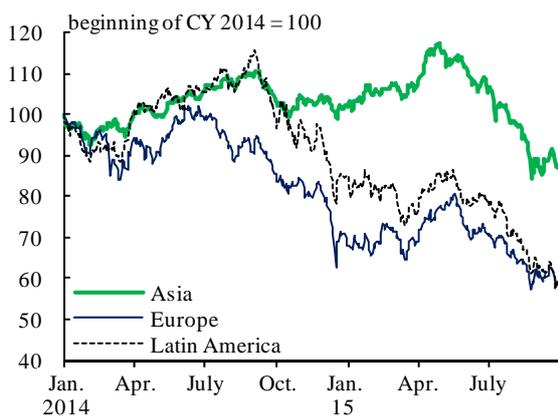


Notes: 1. The left-hand figure shows the correlation coefficient of daily earning rates from January 1, 2014 to June 30, 2015. Dashed lines indicate a correlation coefficient of less than 0.1, narrow solid lines indicate a correlation coefficient of between 0.1 and 0.4, and solid lines indicate a correlation coefficient of over 0.4. For the correlation coefficient of Japan and the United States, Japan and Europe, China and the United States, China and Europe, the United States and the emerging markets, and Europe and the emerging markets, the higher figure is adopted after comparing same-day and one-day ahead (adopted for United States and Europe) correlation coefficient.

2. In the right-hand chart, the data are the 200-day rolling correlation of daily earning rates. The latest data are as of September 30, 2015.

Source: Bloomberg.

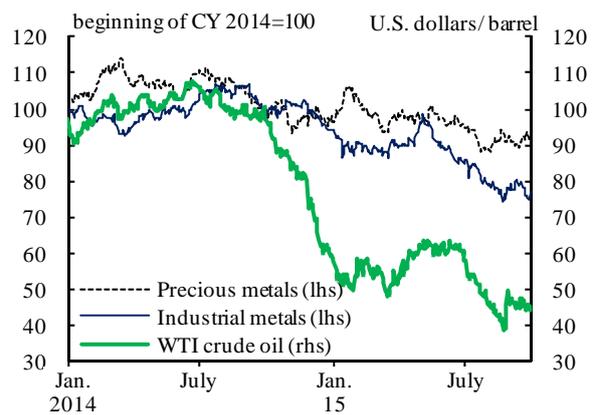
Chart III-1-7: Stock prices in emerging markets¹



Note: 1. MSCI Emerging Asia Index for Asia; MSCI Emerging Europe Index for Europe; MSCI Emerging Latin America Index for Latin America. The latest data are as of September 30, 2015.

Source: Bloomberg.

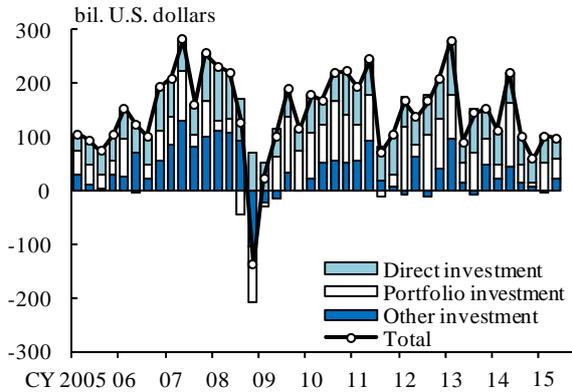
Chart III-1-8: Commodity prices¹



Note: 1. S&P GSCI Index for precious metals and industrial metals. The latest data are as of September 30, 2015.

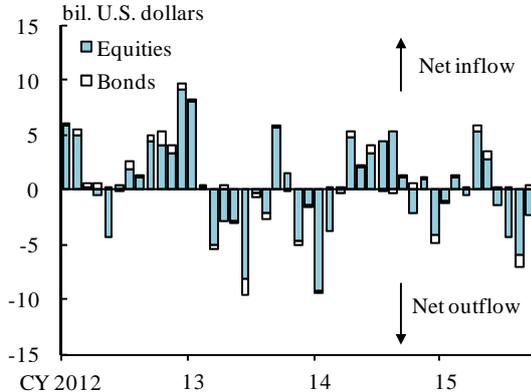
Source: Bloomberg.

Chart III-1-9: Capital flows into emerging markets based on balance of payments statistics^{1,2}



Notes: 1. Sum of 18 major emerging markets excluding China.
2. The latest data are as of the April-June quarter of 2015. Missing values are imputed with the previous quarter's values.
Source: Haver Analytics.

Chart III-1-10: Fund flows into emerging markets^{1,2}

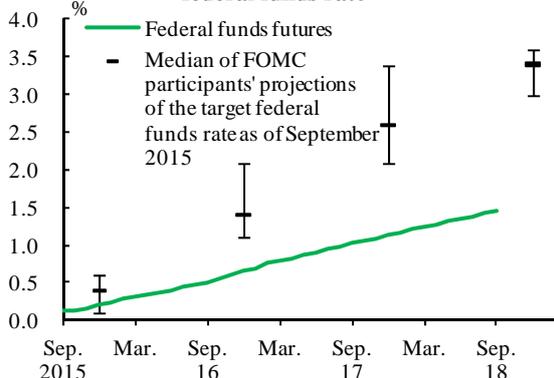


Notes: 1. Fund flows of ETFs listed on the U.S. exchange.
2. The latest data are as of September 2015.
Source: Bloomberg.

Outlook for U.S. monetary policy and its effects

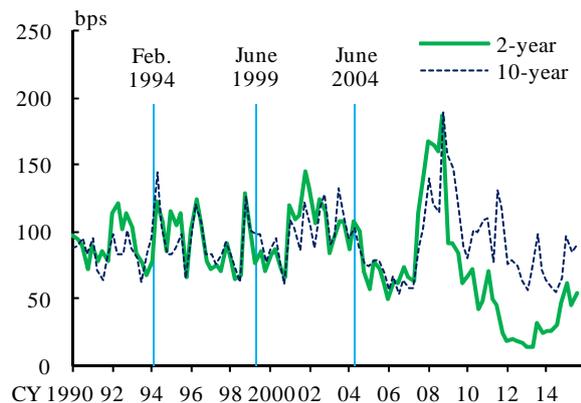
The federal funds futures curve continues to factor in a moderate rise in U.S. interest rates. However, the pace of interest rate rise according to market expectations is moderate compared with that of the federal funds rate as projected by the Federal Open Market Committee (FOMC). The divergence in the outlook for U.S. monetary policy between the authorities and the market, especially for the period ahead, has continued to be somewhat large (Chart III-1-11).

Chart III-1-11: Federal funds futures and FOMC participants' projections of the target federal funds rate^{1,2}



Notes: 1. The vertical bars indicate the central tendency of the projections.
2. The latest data are as of September 30, 2015.
Sources: Bloomberg; FRB.

Chart III-1-12: Volatility of U.S. interest rates^{1,2}



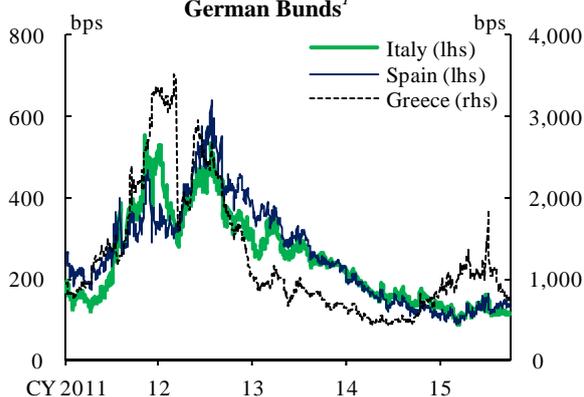
Notes: 1. 30-day rolling historical volatility. Vertical lines indicate past rate hikes by the FRB.
2. The latest data are as of September 30, 2015.
Source: Bloomberg.

Based on this divergence, there is a possibility that if market participants become aware of uncertainties regarding the future path of policy rates, volatility of U.S. interest rates -- which are at low levels compared with past rate hikes -- will rise, and term premiums, which are currently at extremely low levels, will also begin to increase (Chart III-1-12). In this regard, it must be noted that there are views that the structure of the U.S. bond market is changing, and that this is affecting the liquidity in the bond market (Chart III-2-11).

Outcome of the Greek debt problem and its effects

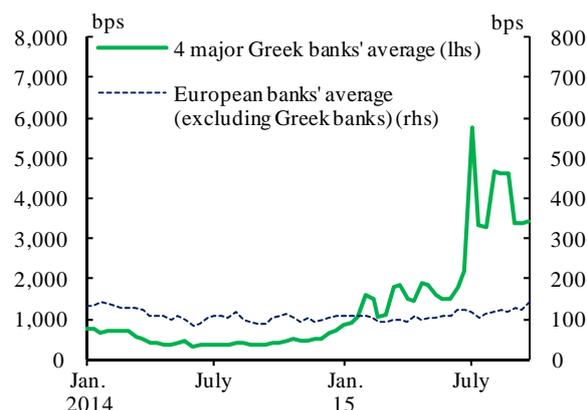
In Europe, in response to developments including the political situation in Greece, yields on Greek government bonds rose significantly and credit default swap (CDS) premiums of Greek banks increased rapidly toward the middle of July (Charts III-1-13 and III-1-14). Thereafter, although yields on Greek government bonds declined reflecting the approval of the third bailout package for Greece by the euro area member states, credit spreads of four major banks in Greece remained at a high level. In addition, market participants continue to pay attention to uncertainties regarding the political situation within Greece and the support framework for Greece by relevant countries and institutions. Bearing these in mind, the outcome of the Greek problem and its effect on the global financial markets should continue to be observed carefully.

Chart III-1-13: Spreads between selected peripheral European government bonds and German Bunds¹



Note: 1. The latest data are as of September 30, 2015.
Source: Bloomberg.

Chart III-1-14: CDS premiums of European banks^{1,2}



Notes: 1. The figures calculated for "4 major Greek banks' average" are simple averages of 5-year CDS premiums for 4 major Greek banks (Alpha Bank, Eurobank Ergasias, National Bank of Greece and Piraeus Bank). The sample for "European banks' average (excluding Greek banks)" includes the components of the STOXX 600 Banks index. Banks for which 5-year CDS premiums are not quoted are excluded.
2. The latest data are as of September 30, 2015.
Source: Bloomberg.

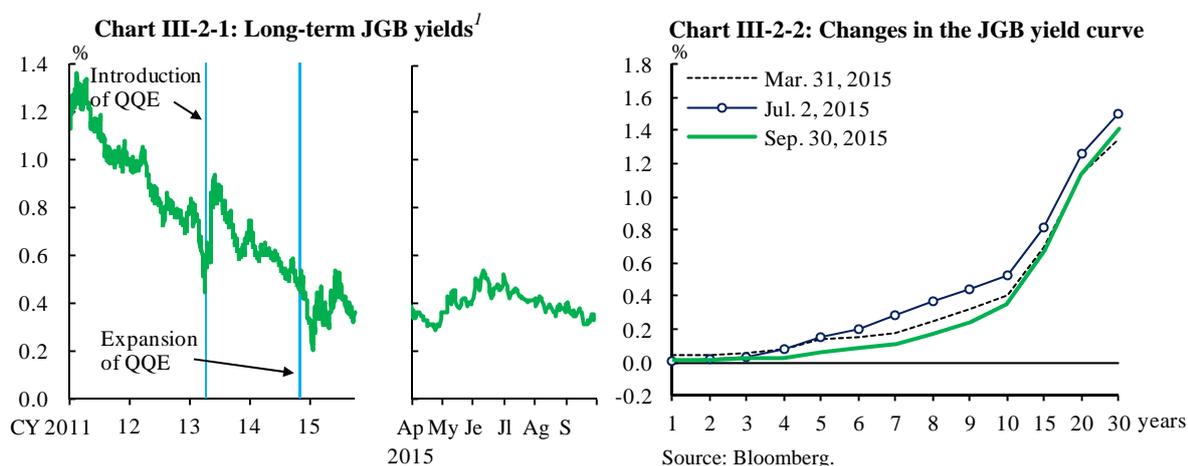
B. Japanese financial markets

Taking account of the foregoing discussion on developments in global financial markets, this section summarizes notable developments in the government bond, credit, stock, and foreign exchange markets in Japan, and examines the risks observed in these markets.

1. Government bond markets

Long-term JGB yields rose somewhat toward the summer, and declined thereafter. The volatility of government bond prices remained at a slightly high level toward the summer and declined moderately thereafter.

Yields on 10-year JGBs rose somewhat as U.S. and European long-term government yields increased somewhat largely toward the summer. From July, JGB yields declined against the background of a fall in crude oil prices and U.S. and European long-term government yields (Chart III-2-1).³ The yield curve rose as a whole toward the summer, and subsequently declined, particularly for the middle to long-term zone (Chart III-2-2). The implied volatility of JGB futures remained at a somewhat high level toward the summer, due partly to the relatively large fluctuations in U.S. and European long-term government yields, and declined somewhat thereafter (Chart III-1-1).

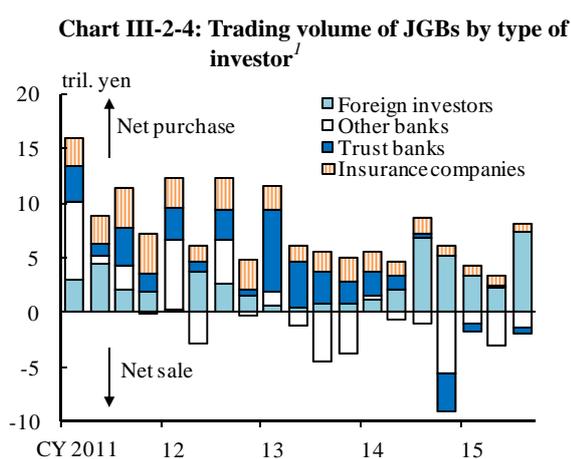
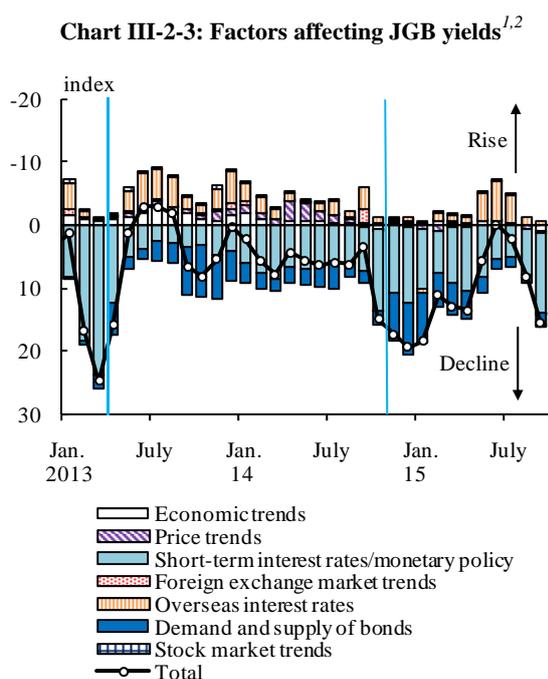


Note: 1. The latest data are as of September 30, 2015.
Source: Bloomberg.

³ In this section, the vertical lines in the charts indicate the introduction of QQE (April 4, 2013) and the expansion of QQE (October 31, 2014).

Factors affecting long-term JGB yields and risk reversals

According to the results of the survey conducted on market participants regarding factors affecting JGB yields, views that tightening in "demand and supply of bonds" will exert downward pressure on JGB yields subsided somewhat, partly because (1) the tendency to pay attention to "overseas interest rates" as a factor exerting upward pressure on Japanese long-term interest rates strengthened temporarily, and (2) foreign investors' appetite to purchase JGBs was reduced, reflecting the rise in U.S. and European long-term government yields (Chart III-2-3 and Chart III-2-4). However, since the summer, JGB purchases by foreign investors have been increasing once more, as overseas interest rates began to decline again and the U.S. dollar funding premiums in the U.S. dollar/yen cross-currency basis swap market increased. The number of market participants who point out that demand and supply conditions of JGBs have tightened has again increased.



Note: 1. The latest data are as of July-August 2015 (converted into quarterly amount).

Source: Japan Securities Dealers Association.

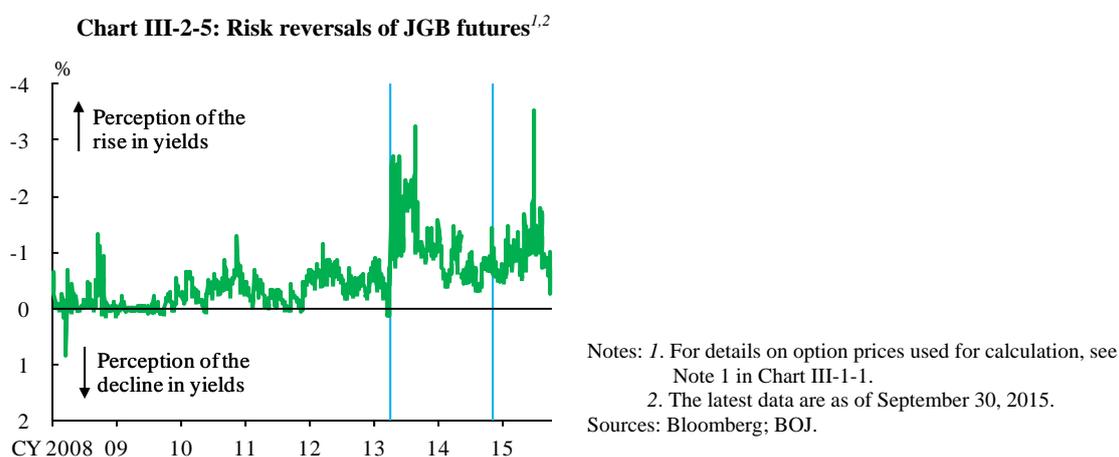
Notes: 1. The calculation formula is as follows. Among valid responses, the percentage of each factor chosen by market participants as the most important factor for JGB yields is multiplied by the impact of the factor on JGB yields (indexed with strong downward pressure = 100, downward pressure = 75, neutral = 50, upward pressure = 25, strong upward pressure = 0, then subtracting 50, which is "neutral").

2. The latest survey was conducted between September 17-24, 2015.

Sources: QUICK, "QUICK Monthly Market Survey <Bonds>"; BOJ.

These views on interest rates by bond market participants can also be captured from the

options market. Observing the skew of market participants' recognition of future risks from risk reversals (the difference in implied volatilities between call and put options), the skew has recently moderated, after an increase in market participants' concern over interest rate rise risks towards the summer (Chart III-2-5).



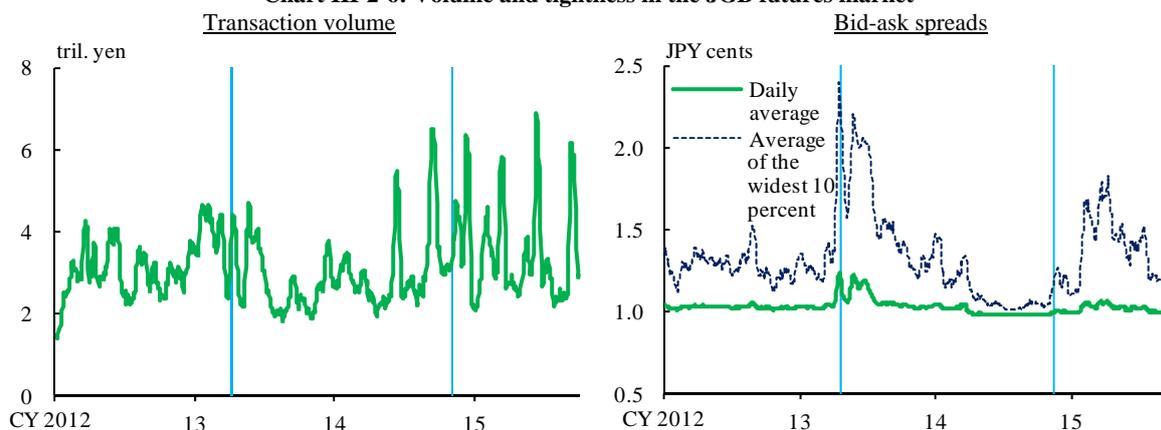
Indicators of liquidity in the JGB market

Next, we will examine liquidity in the JGB market from indicators observed in the JGB futures market, JGB cash market, and SC repo market.⁴

For the JGB futures market, the bid-ask spreads (the spread between the selling price and the buying price) continued to be at a tight level, and transaction volume maintained a relatively high level (Chart III-2-6). On the other hand, market depth, when examined in terms of the number of orders at the best ask price, became thin towards the beginning of 2015, and subsequently remained at a low level towards the summer. Although market depth recently seems to be recovering moderately, the level is still somewhat low compared with the level before the introduction of QQE. A similar trend can be observed when examining market resiliency in terms of the impact a unit volume of transactions has on the price (price impact) (Chart III-2-7).

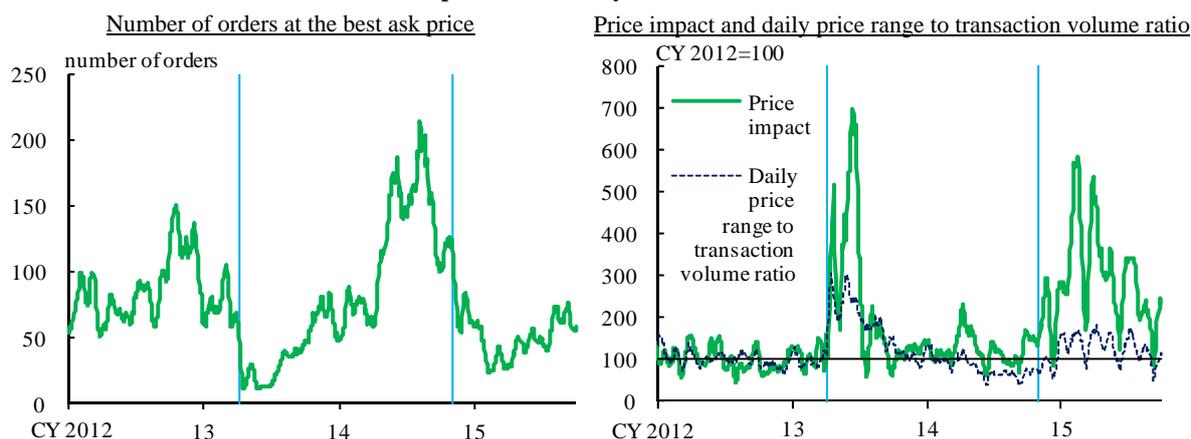
⁴ The Financial Markets Department of the Bank has been updating and releasing liquidity indicators in the JGB markets, generally each quarter, since August 2015. For details on indicators of liquidity in the JGB market, see Tetsuo Kurosaki, Yusuke Kumano, Kota Okabe, and Teppei Nagano, "Liquidity in the JGB Markets: Evaluation from Transaction Data," Bank of Japan Working Paper, 15-E-2, May 2015.

Chart III-2-6: Volume and tightness in the JGB futures market^{1,2,3}



Notes: 1. 10-day backward moving average.
 2. In the right-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.
 3. The latest data are as of September 30, 2015.
 Sources: Nikkei Inc., "NEEDS"; QUICK; BOJ.

Chart III-2-7: Depth and resiliency in the JGB futures market^{1,2}

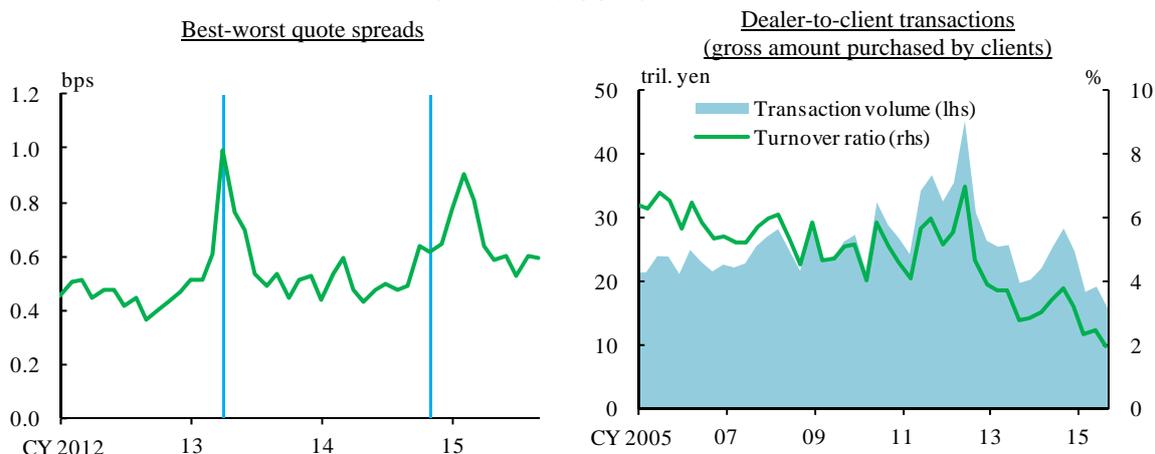


Notes: 1. In the left-hand chart, figures are calculated by taking the median of the number of orders at the best ask price with a 1-minute frequency. 10-day backward moving average. The latest data are as of September 2015.
 2. In the right-hand chart, price impact is a measurement of how much impact a unit volume of transaction gives to the price. In concrete terms, using Kalman filtering, we calculate the impact of net transaction volume, which is the difference between buyer-initiated and seller-initiated volume at 5-minute frequency, on the 5-minute price changes. Buyer-initiated (seller-initiated) transactions are those executed at bid (ask) price immediately before the transaction. 10-day backward moving average. The latest data are as of September 30, 2015.
 Sources: Bloomberg; Nikkei Inc., "NEEDS"; BOJ.

For the cash JGB market, the spread between best and worst rate quoted by dealers to their clients has been shrinking, suggesting that uncertainty in carrying out transactions with dealers at the estimated price has weakened among clients.⁵ However, dealer-to-client transaction volume continued to remain at low levels (Chart III-2-8).

⁵ Tightness in spreads between the best and worst rates suggests that a large number of securities companies are capable of carrying out transactions at around the best ask price at a given moment. This can be interpreted as the market having significant depth, in the sense that there are multiple potential counterparties at around the best ask price.

Chart III-2-8: JGB Cash market^{1,2}

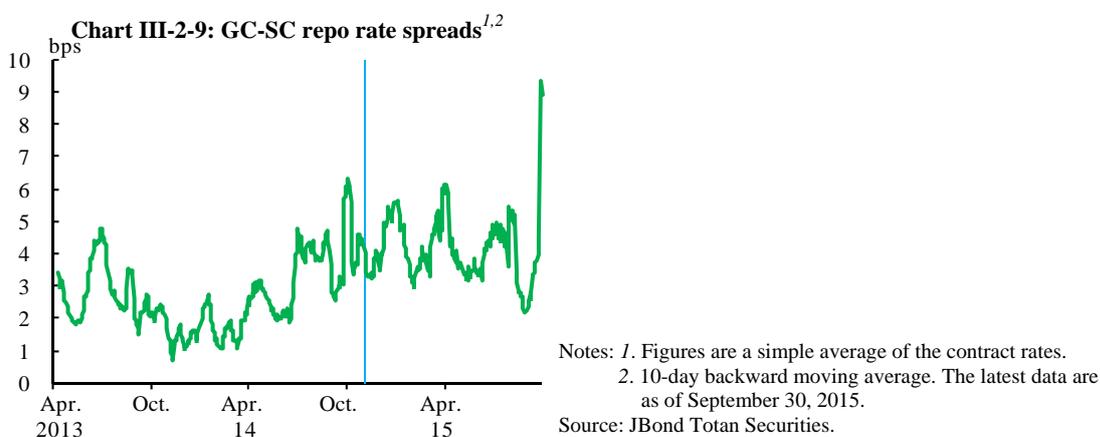


Notes: 1. In the left-hand chart, spread values which are higher than 10 bps are excluded from the calculation. The latest data are as of September 2015.

2. In the right-hand chart, the government, Japan Post Bank, Japan Post Insurance, BOJ, etc. are excluded from "clients." Turnover ratio is calculated by dividing the transaction volume by the outstanding amount. The latest data are as of July-August 2015 (converted into quarterly amount).

Sources: Japan Securities Dealers Association; Yensai.com; BOJ.

Looking at developments in the SC repo markets, GC-SC repo rate spreads as a whole continued to be wide, indicating increased scarcity in specific issues of JGBs (Chart III-2-9).



Notes: 1. Figures are a simple average of the contract rates.
2. 10-day backward moving average. The latest data are as of September 30, 2015.
Source: JBond Totan Securities.

Various liquidity indicators suggest that although there are some indicators which show that JGB market liquidity is relatively low compared to the historical average level, JGB market liquidity as a whole seems to be higher compared to the time when liquidity declined somewhat, immediately after the introduction of QQE and from the beginning of 2015 to the spring. These developments are consistent with the results of the survey conducted on bond market participants (Chart III-2-10).

Chart III-2-10: Bond market survey^{1,2,3}
Current situation Change from three months ago

(%, % pts)				(%, % pts)			
	Feb. 2015 Survey	May 2015 Survey	Aug. 2015 Survey ²		Feb. 2015 Survey	May 2015 Survey	Aug. 2015 Survey ²
DI ³	-25	-5	-5	DI ³	-72	+11	-8
1.High	5	13	10	1.Has improved	3	21	5
2.Not very high	65	69	74	2.Hasn't really improved	23	69	82
3.Low	30	18	15	3.Has decreased	75	10	13

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

2. The latest survey was conducted between August 7-14, 2015.

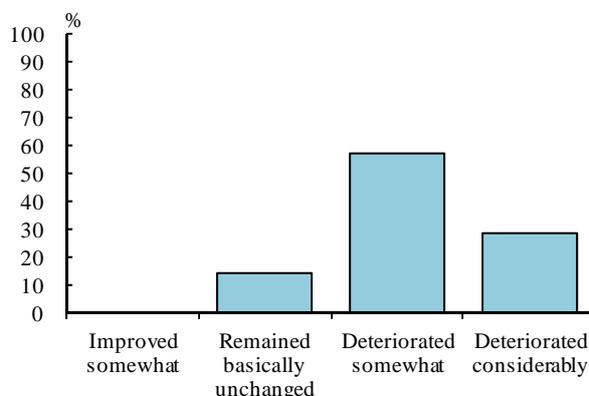
3. Diffusion Index of "1" minus "3" in percentage points.

Source: BOJ.

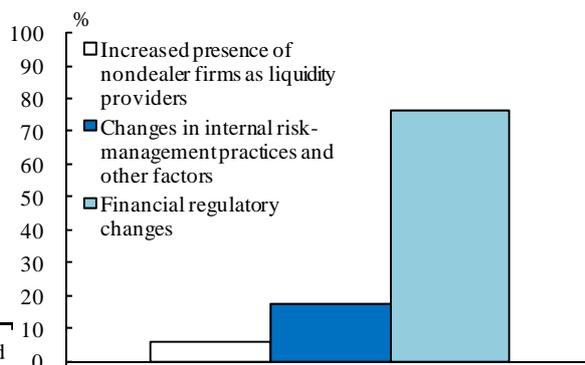
Nevertheless, **it is necessary to continue to closely monitor JGB market liquidity and functioning.** For example, some market participants -- based on the view that the JGB market structure has changed as a result of massive purchases of JGBs by the Bank -- pointed out the risk that liquidity and functioning of the JGB market might decrease rapidly when stress arises. Similarly, the possible decline in liquidity and functioning of government bond markets has also been drawing attention in the United States and Europe. Structural changes in the bond market such as an increase in high-frequency trading, strengthened financial regulations, and purchases of assets by central banks are often pointed out as factors behind the decline. For example, in a survey conducted by the FRB to major dealers, many pointed out that liquidity in the U.S. Treasury market has declined, and emphasized the effect of financial regulation as the cause (Chart III-2-11). Also, in a joint staff report on the flash rally of October 15, 2014 released by U.S. financial authorities including the FRB, structural changes in the U.S. Treasury market, including the growth in high-frequency trading, was pointed out as one of the causes of this flash rally.⁶

⁶ For details, see U.S. Department of Treasury, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, U.S. Securities and Exchange Commission, and U.S. Commodity Futures Trading Commission, "The U.S. Treasury Market on October 15, 2014," July 2015.

Chart III-2-11: Survey on liquidity and functioning of the U.S. government bond market
Relative to the second quarter of 2010



Most important reasons for deterioration

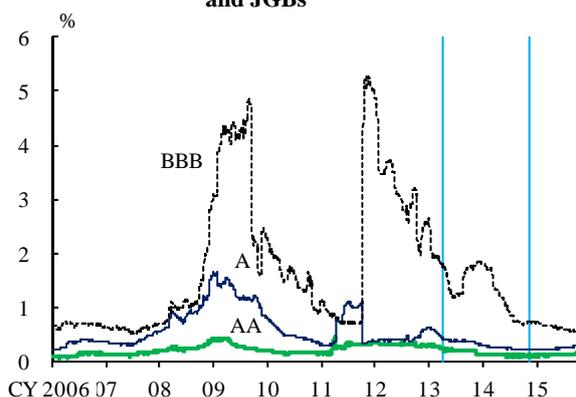


Source: FRB "Senior Credit Officer Opinion Survey on Dealer Financing Terms (June 2015 survey)."

2. Credit markets

Credit spreads on corporate bonds continued to be at low levels as a whole, although spreads on some issues have remained at a high level due to idiosyncratic factors (Chart III-2-12). Developments in long-term credit ratings confirm that financial conditions among firms and the market assessment of firms' credit worthiness have improved as a whole, as the number of upgrades has exceeded that of downgrades (Chart III-2-13).

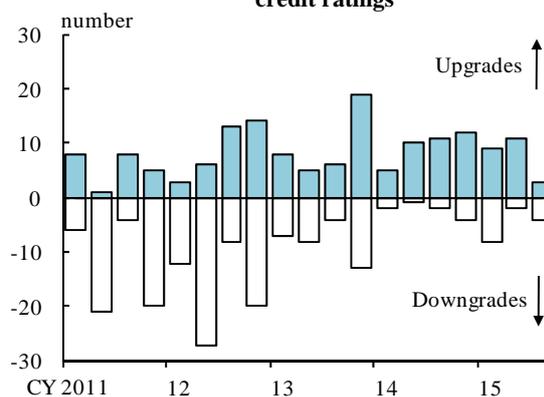
Chart III-2-12: Yield spreads between corporate bonds and JGBs^{1,2}



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 September 30, 2015.

Source: Japan Securities Dealers Association.

Chart III-2-13: Developments in long-term credit ratings^{1,2}



Notes: 1. Rated by R&I.

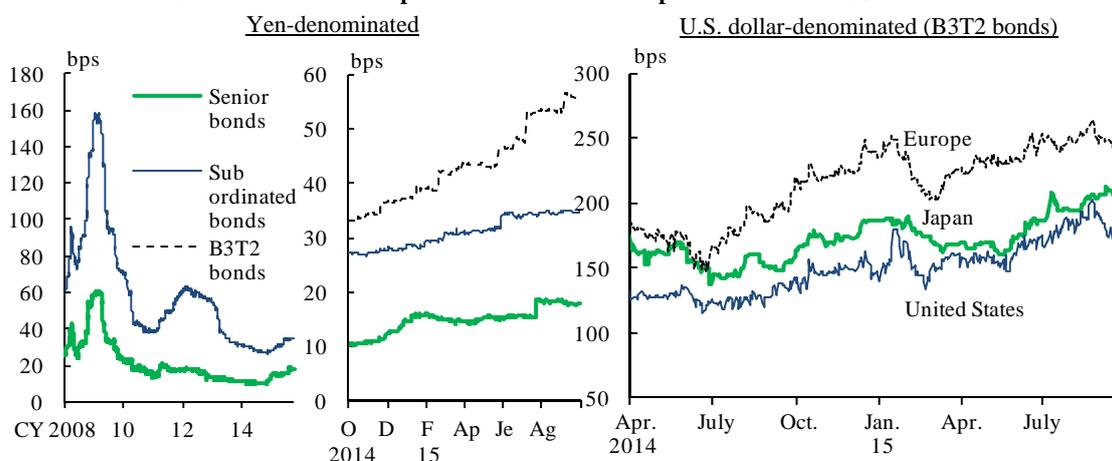
2. The latest data are as of July-September 2015.

Source: Bloomberg.

Credit spreads on both senior bonds and subordinated bonds have remained at low levels at major banks (Chart III-2-14). Yield spreads on yen-denominated Basel-III compliant Tier II bonds (B3T2 bonds), which were first issued in June 2014, widened

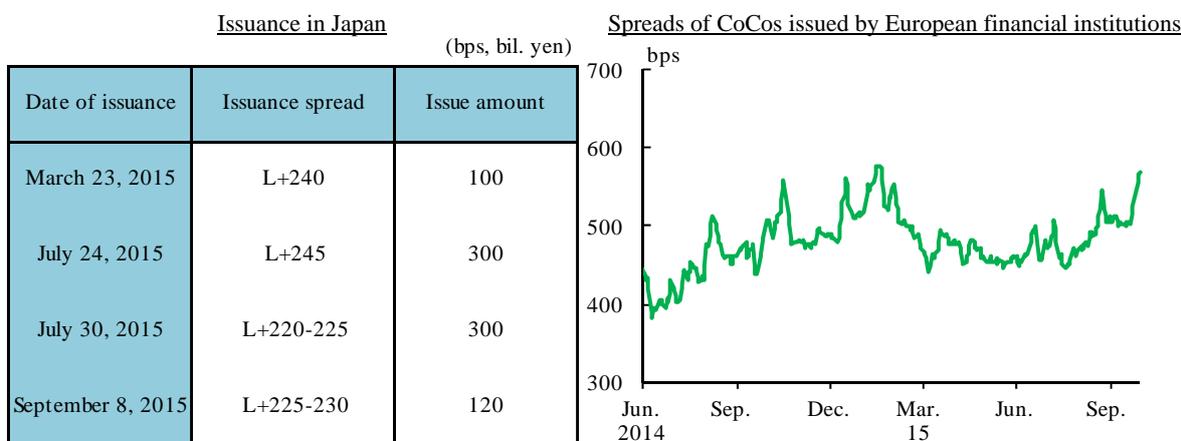
somewhat compared to the extremely tight levels seen immediately after the first issuance, in line with the increase in the number of issues. However, when compared with spreads for similar bonds issued by overseas financial institutions in the overseas markets, spreads for B3T2 bonds remain at low levels. As for the yen-denominated contingent convertible capital instruments to qualify as additional Tier I capital (AT1 CoCo bonds), the issuance spread was around 2.0 to 2.5 percent, which is at a low level compared to that of similar bonds issued by European financial institutions (Chart III-2-15).

Chart III-2-14: Yield spreads between bank corporate bonds and JGBs^{1,2,3}



Notes: 1. In the left-hand chart, 3 major banks (Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, 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 with residual maturity of more than 8 years and less than 11 years for 2 major financial institutions (Mizuho financial group and Sumitomo Mitsui financial group), 3 financial institutions (Bank of America, Citi and Wells Fargo), and 8 financial institutions (Santander, Barclays, BNP Paribas, BPCE, Credit Agricole, Deutsche Bank, HSBC and Societe Generale), respectively.
 3. The latest data are as of September 30, 2015.
 Sources: Bloomberg; Japan Securities Dealers Association; QUICK.

Chart III-2-15: Developments of AT1 CoCo bonds^{1,2}

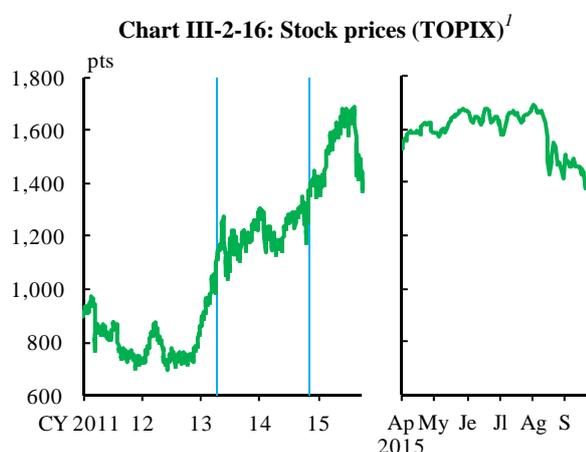


Notes: 1. In the right-hand chart, spreads are simple averages of U.S. dollar-denominated CoCo bonds on U.S. government bonds issued by 15 European G-SIFs.
 2. The latest data are as of September 30, 2015.
 Sources: Bloomberg; CAPITAL EYE.

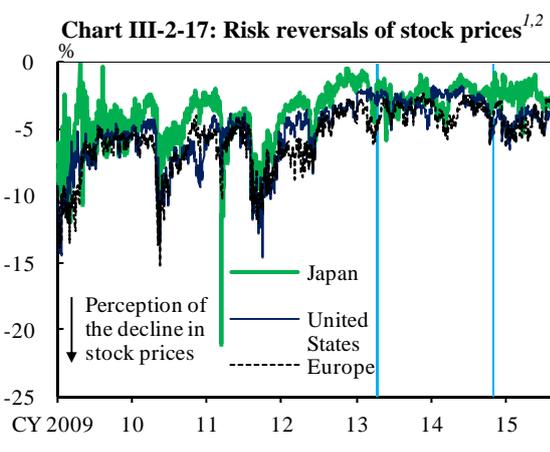
3. Stock markets

Japanese stock prices followed a moderate rising trend toward the summer and declined rather substantially thereafter. Volatility in the stock market has risen since the summer (Chart III-1-1).

Japanese stock prices followed a moderate rising trend toward the summer and declined rather substantially thereafter, due partly to the sharp decline in Chinese stock prices and heightened market concerns over the outlook for the global economy (Chart III-2-16). Risk reversals show that after summer 2015, market participants temporarily showed a rapid increase in vigilance against the risk of declining stock prices (Chart III-2-17).



Note: 1. The latest data are as of September 30, 2015.
Source: Bloomberg.



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 September 30, 2015.
Sources: Bloomberg; BOJ.

Breaking down the changes in Japanese stock prices since summer 2012 into price earnings (P/E) ratios and earnings per share (EPS), most of the changes can be explained by the expansion of EPS (Chart III-2-18). The current P/E ratio for Japanese stocks suggests that the stock prices are not overvalued when compared with past levels or with P/E ratios for overseas stocks (Chart III-2-19).

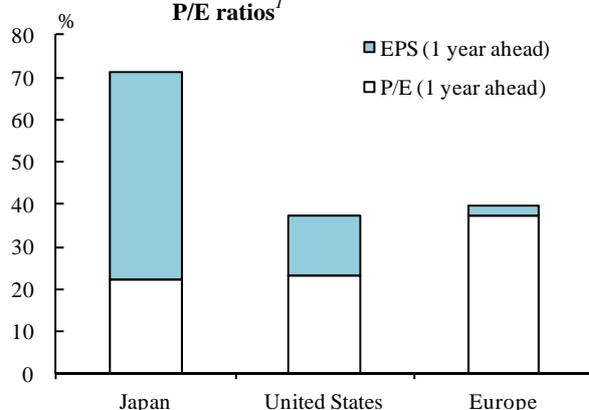
However, interpretations of stock price valuations should be made with caution. Many of the valuation metrics in Japan tend to fluctuate widely when compared with those of the United States and Europe, and furthermore, interpretations may change over time in line with changes in preconditions.

In addition, even if the valuation metrics do not show signs of overvaluation, in light of the continued strong correlation between stock prices at home and abroad, it should be

noted that it would be difficult for Japanese stock prices to avoid being affected by changes in market participants' views on the global economy and monetary policy, as suggested by the unstable movements since the summer (Chart III-1-6).

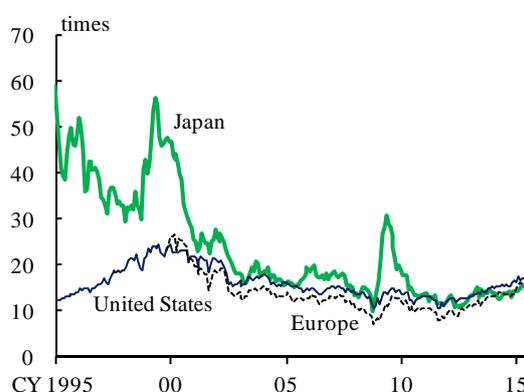
Looking at developments in households' stock investment with leverage, while margin trading has not been increasing significantly, there have been some movements to increase stock investment leveraged through different means compared with the past, such as leveraged investment trusts (Chart III-2-20). Attention should also continue to be paid to marginal changes in such investment stances.

Chart III-2-18: Breakdown of stock prices into EPS and P/E ratios¹



Note: 1. Logarithmic change from July 2012 to September 2015.
Source: Thomson Reuters Markets.

Chart III-2-19: P/E ratios^{1,2}



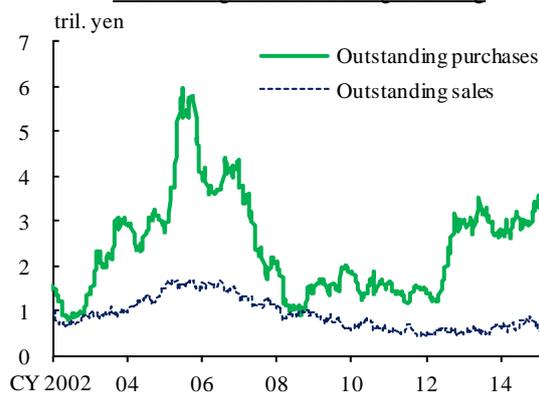
Notes: 1. TOPIX for Japan; S&P500 for United States; EURO STOXX for Europe. P/E ratios are calculated using expected EPS for the next 12 months.

2. The latest data are as of end-September 2015.

Source: Thomson Reuters Markets.

Chart III-2-20: Investment of households into leveraged stocks^{1,2}

Outstanding balance of margin trading

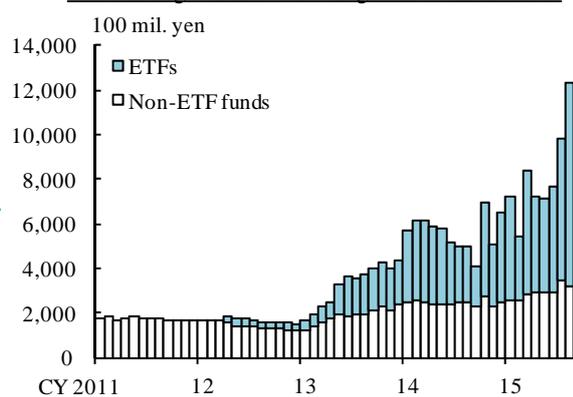


Notes: 1. In the left-hand chart, the latest data are as of October 2, 2015.

2. In the right-hand chart, leveraged investment trusts includes inverse funds. The latest data are as of August 2015.

Sources: Bloomberg; The Investment Trust Association, Japan; Japan Exchange Group.

Outstanding balance of leveraged investment trusts

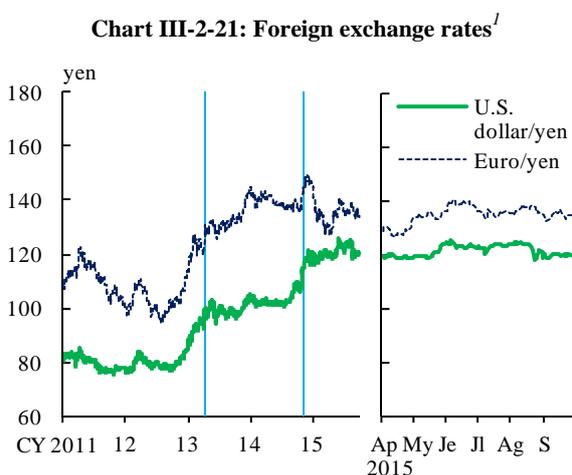


4. Foreign exchange markets

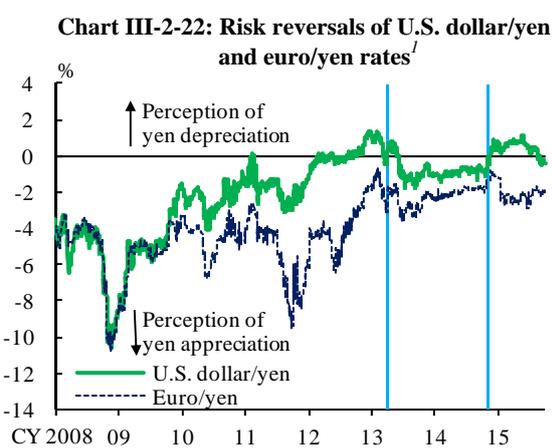
The yen depreciated moderately against the U.S. dollar toward the summer, but recently the yen has appreciated somewhat (Chart III-2-21). The volatility of the yen's exchange rates has been rising somewhat since summer (Chart III-1-1).

In foreign exchange markets, the yen depreciated moderately against the U.S. dollar toward the summer as the U.S. dollar strengthened against major currencies, reflecting factors such as market participants' views on the outlook for improvement in the U.S. economy and prospect of the normalization of U.S. monetary policy. However, since the summer, these movements are being unwound due to heightened concerns among market participants over the plunge in Chinese stock markets and the slowdown of the emerging markets, and a subsequent weakening in the prospect for the FRB's rate hike. As for the euro, it appreciated somewhat against most currencies, as market participants' cautiousness about the outlook for economy and prices in the euro area subsided, and the euro also appreciated slightly against the yen.

Looking at risk reversals, although they had been indicating a concern among market participants over further depreciation of the yen against the dollar since the expansion of QQE in autumn 2014, a slight concern over appreciation of the yen against the dollar has been observed after the summer (Chart III-2-22). Meanwhile, anxiety over the yen's appreciation against the euro has subsided somewhat.



Note: 1. The latest data are as of September 30, 2015.
Source: Bloomberg.



Note: 1. 1-year risk reversals. The latest data are as of September 30, 2015.
Source: Bloomberg.

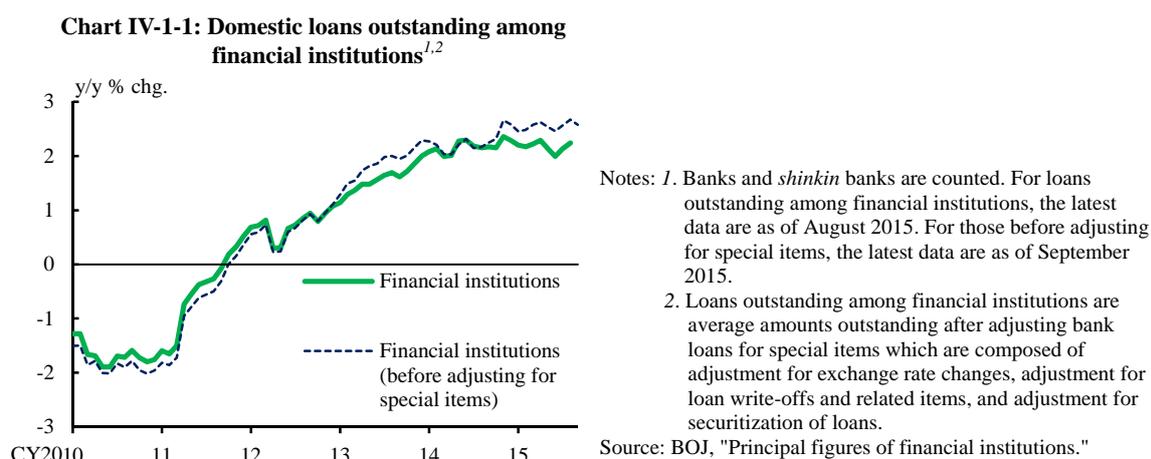
IV. Examination of financial intermediation

This chapter examines the functioning of the financial system, mainly based on financial information for the first half of fiscal 2015. First, we highlight developments in financial intermediation by financial institutions such as banks and *shinkin* banks, and in investment by institutional investors. We then look at financial intermediation through financial markets, before summarizing 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 at the time of the previous *Report* (Chart IV-1-1).



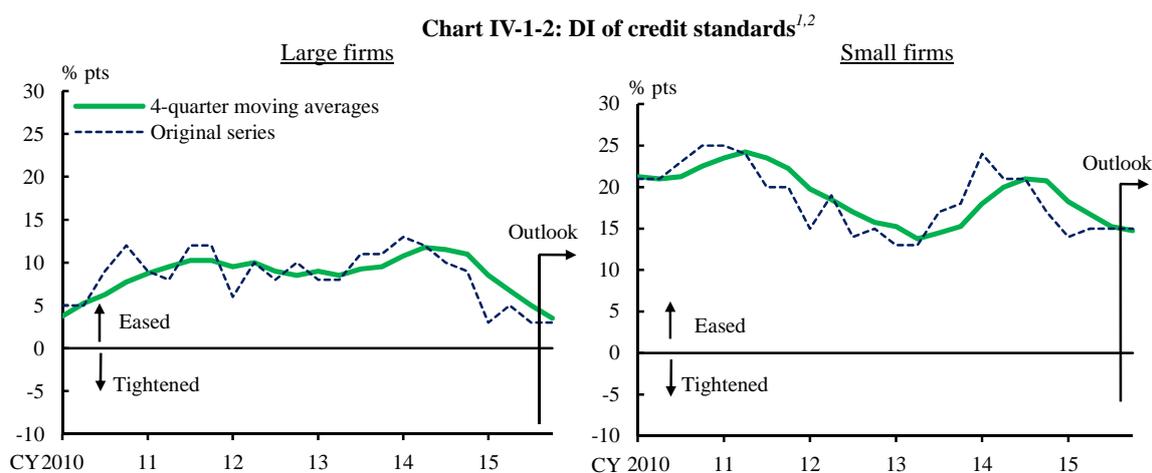
Lending stances of financial institutions and demand for funds

Financial institutions' lending stances have remained eased.

Looking at financial institutions' lending business, for corporate loans, (1) major banks in particular have sought to strengthen ties with their group companies to actively meet the demand for funds from large firms due to their merger and acquisition activities as well as their business expansion at home and abroad. They have also made efforts to improve their non-interest profit (fees and commissions related to foreign exchange,

derivatives, and syndicated loans, etc.) attached to lending transactions.⁷ In addition, (2) wide-spreading efforts by financial institutions have been observed, including regional institutions, in extending loans to low-rated borrowers with prospects for future growth or business recovery and to borrowers under credible revitalization programs. Meanwhile, (3) the active use of low-yield medium- to long-term funds aimed at supporting fixed investments and growing business areas has continued. With regard to loans for individuals, some financial institutions have made efforts to enhance supplementary services that are unrelated to interest rates, such as group credit life insurance with medical coverage, against the backdrop of the shrinking margins in interest rate spreads on housing loans. Others have continued to strengthen their efforts in areas such as credit card loans, on which interest rate spreads are relatively wide.

Figures for their DI of credit standards indicate that the number of financial institutions that have "eased" their lending standards continues to exceed the number of those that have "tightened" their lending standards, while the gap between the two has been narrowing (Chart IV-1-2).



Notes: 1. The latest data are as of July 2015.

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).

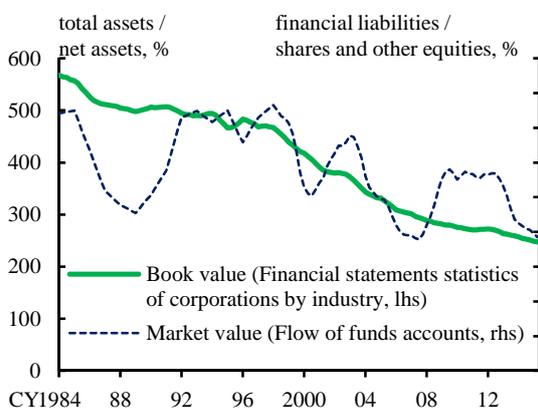
Source: BOJ, "Senior loan officer opinion survey on bank lending practices at large Japanese banks."

Demand for funds has increased moderately, mainly in the corporate sector which, as a whole, has been maintaining a large cash buffer. The demand has been increasing moderately overall against the background of economic recovery and easier lending stances of financial institutions (Charts IV-1-3 to IV-1-5). However, demand for working capital has been decreasing among commodity-importing firms and firms related to these industries, in line with the declines in crude oil and commodity prices

⁷ See Box 1 for overseas M&A-related loans by major banks and credit management.

since 2014. As housing investment recovers from the decline resulting from the front-loaded increase prior to the consumption tax hike, demand for funds in the household sector has shown signs of recovery (Chart IV-1-6).

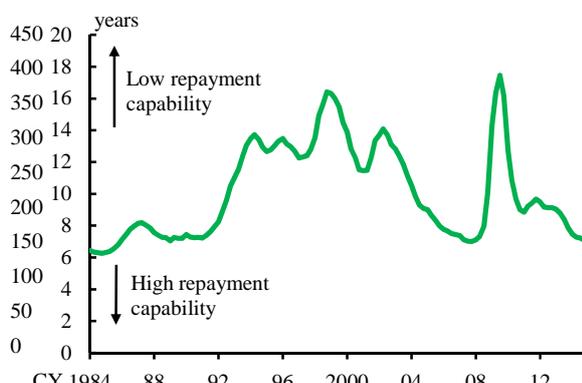
Chart IV-1-3: Firms' leverage ratio^{1,2,3}



- Notes: 1. Data based on book value = total assets / net assets. Data based on market value = financial liabilities / shares and other equities.
 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 old basis data in those periods.
 3. The latest data are as of end-June 2015; 4-quarter moving averages.

Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ, "Flow of funds accounts."

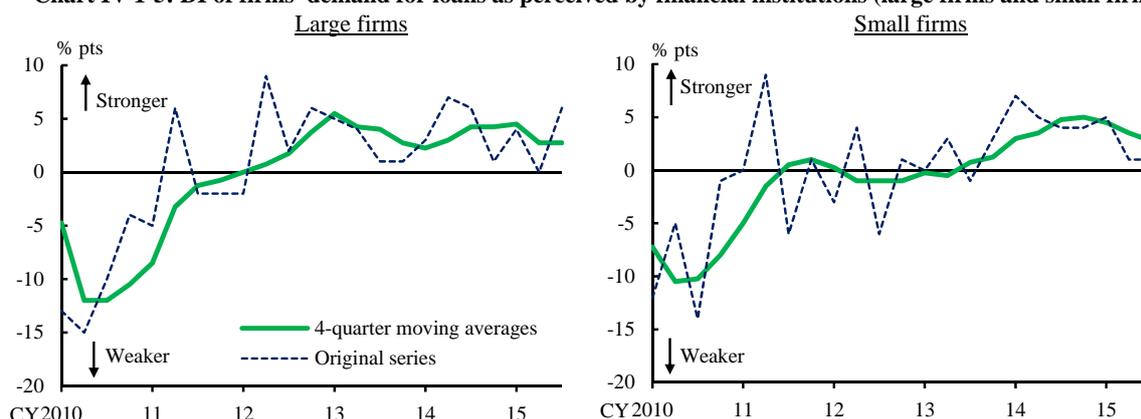
Chart IV-1-4: Firms' debt / cash flow^{1,2}



- 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 April-June 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."

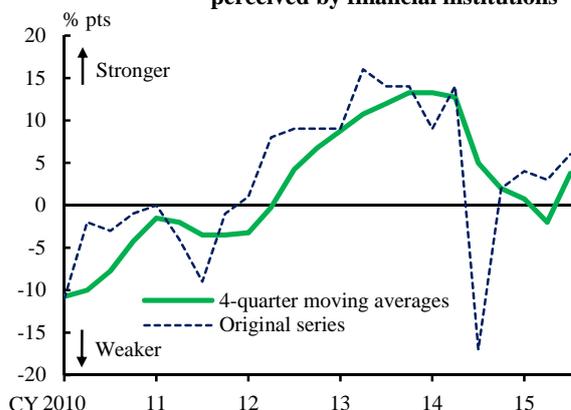
Chart IV-1-5: DI of firms' demand for loans as perceived by financial institutions (large firms and small firms)^{1,2}



- Notes: 1. The latest data are as of July 2015.
 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 IV-1-6: DI of demand for housing loans as perceived by financial institutions^{1,2}

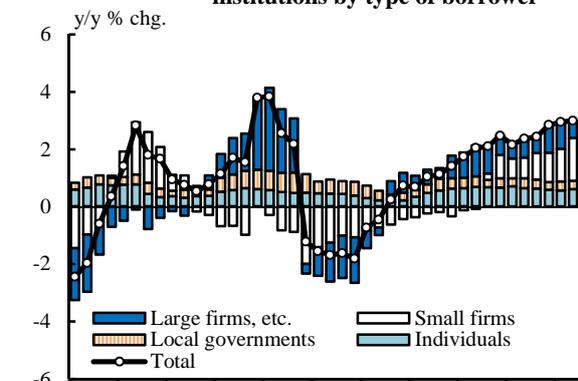


Notes: 1. The latest data are as of July 2015.
 2. DI of demand for housing loans = (percentage of respondents selecting "substantially stronger" + percentage of respondents selecting "moderately stronger" * 0.5) - (percentage of respondents selecting "substantially weaker" + percentage of respondents 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

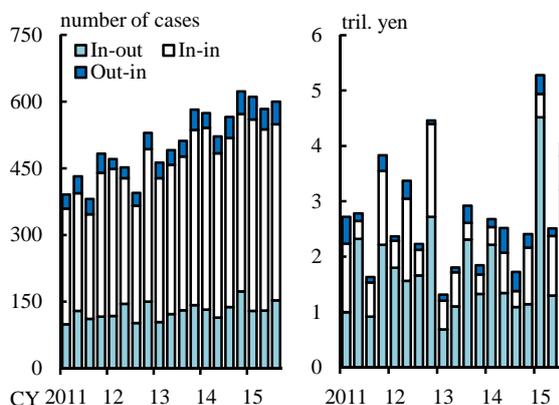
Loan growth among financial institutions has been led by loans to firms. Looking at loan growth since the beginning of fiscal 2015 by borrower classification, growth in loans to individuals was more or less unchanged from the previous quarter, and growth in loans to local governments has slowed somewhat (Chart IV-1-7). On the other hand, with regard to loans to firms, the increase in the outstanding amount of lending has been spreading across small firms and among various industries and regions.

Chart IV-1-7: Loans outstanding among financial institutions by type of borrower¹



Note: 1. Banks and *shinkin* banks are counted. The latest data are as of end-June 2015.
 Source: BOJ.

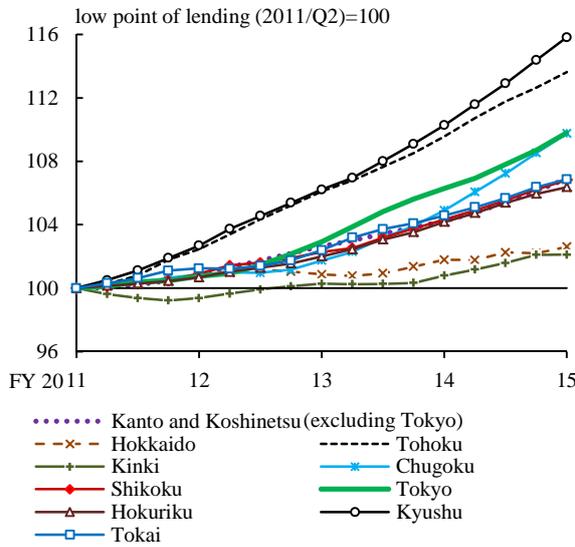
Chart IV-1-8: M&A among Japanese companies^{1,2}



Notes: 1. The latest data are as of the July-September quarter of 2015.
 2. "In-out" means the acquirer is a Japanese company and the target company is a foreign company.
 "In-in" means the acquirer is a Japanese company and the target company is a Japanese company.
 "Out-in" means the acquirer is a foreign company and the target company is a Japanese company.
 Source: RECOF.

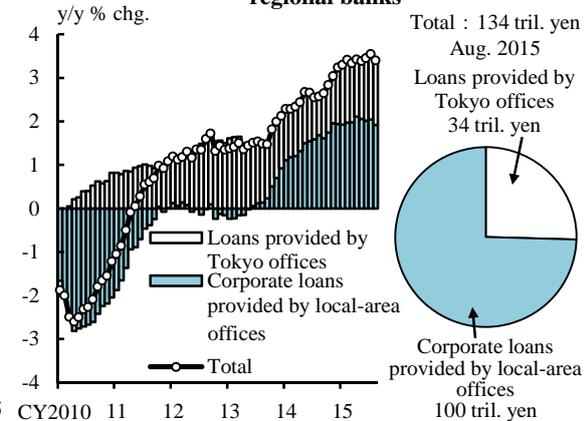
By firm size, as for loans to large firms, growth has remained steady as a trend, albeit with fluctuations, particularly in loans related to mergers and acquisitions, as well as in foreign currency-denominated impact loans targeted at firms' overseas activities.

Chart IV-1-10: Regional loans among banks¹



Note: 1. Major banks and regional banks are counted. The latest data are as of end-June 2015; 4-quarter moving averages.
Source: BOJ.

Chart IV-1-11: Corporate loans provided by regional banks¹

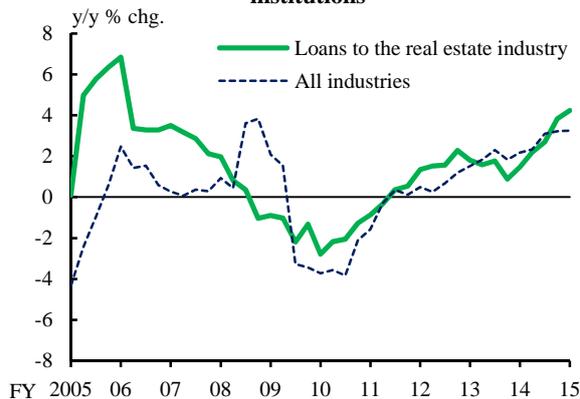


Note: 1. The latest data are as of August 2015.
Source: BOJ.

Developments in real estate loans

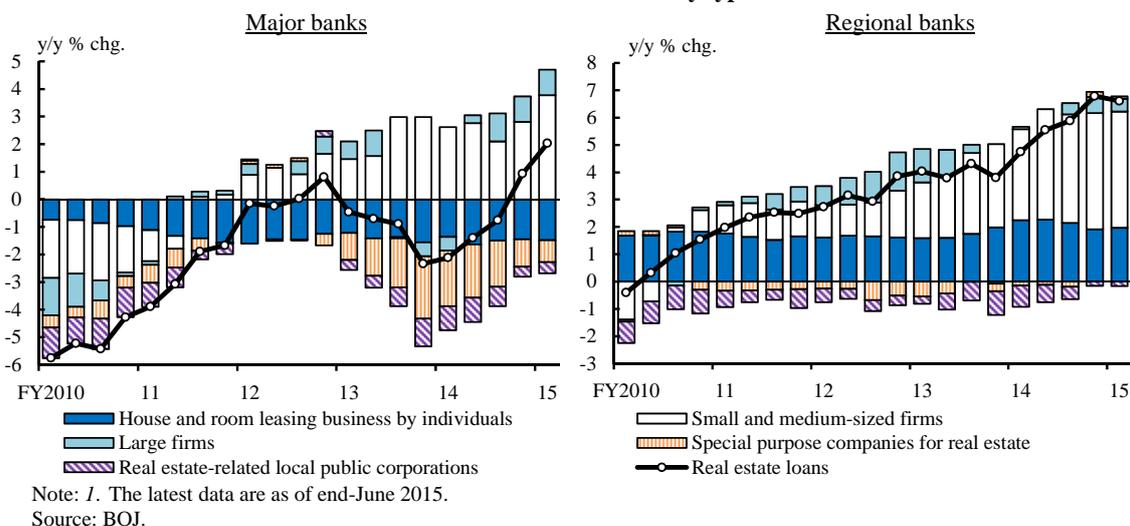
Real estate loans have recently been growing at a faster pace. The year-on-year rate of growth exceeded that for loans to firms in all industries for the first time in 2 years, yet compared to past growth rates the figure is not notably high (Chart IV-1-12). Loans by major banks increased since the beginning of 2015, while high growth has continued among loans by regional financial institutions (Chart IV-1-13).

Chart IV-1-12: Real estate loans among financial institutions¹



Note: 1. Banks and *shinkin* banks are counted. The latest data are as of end-June 2015.
Source: BOJ.

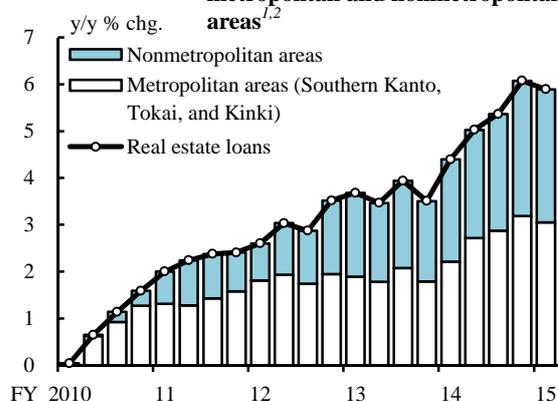
Chart IV-1-13: Real estate loans by type of bank¹



The increase in loans by major banks is mainly attributable to the increase in loans to large real estate developers and to J-REITs (statistically defined as small and medium-sized firms). While repayment of non-recourse loans -- loans to real estate private funds (SPCs) -- continues to exceed their extension, loans outstanding have been decreasing at a slower pace mainly due to an increase in the extension of new loans to foreign affiliated funds and to bridge-financing funds, which assume the sales of properties to affiliated J-REITs and other real estate companies.

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.⁹ By region, loans in nonmetropolitan areas in addition to three major metropolitan areas (Southern Kanto, Tokai, and Kinki regions) have been growing at a fast pace (Chart IV-1-14).

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



Notes: 1. Regional banks and *shinkin* banks are counted. The latest data are as of end-June 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.

⁹ See Box 2 for loans and credit management for the housing rental business.

Efforts toward increasing industrial vitality

Financial institutions have been steadily proceeding with efforts toward increasing industrial vitality, as major banks have been providing support for the business reconstruction of large firms, and financial institutions including regional institutions have been taking part in the improvement of business management among small firms and the fostering of growing businesses (Charts IV-1-15 and IV-1-16).

Chart IV-1-15: Loans for start-ups and new projects^{1,2,3}

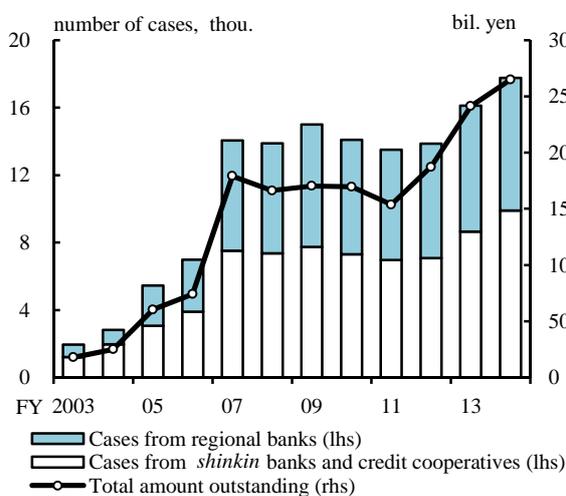
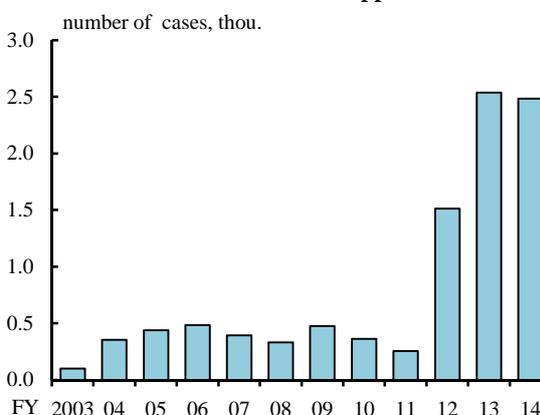


Chart IV-1-16: Number of completed business revitalization support projects by small and medium enterprise revitalization support councils



Source: Small and Medium Enterprise Agency.

- Notes: 1. Achievement during the term.
 2. Before fiscal 2006, specific loans with financial products that support start-ups are counted. From fiscal 2007 onward, exclusive and ordinal loans for start-ups are counted.
 3. Regional banks I, Regional banks II, shinkin banks, and credit cooperatives are counted for the total amount outstanding.

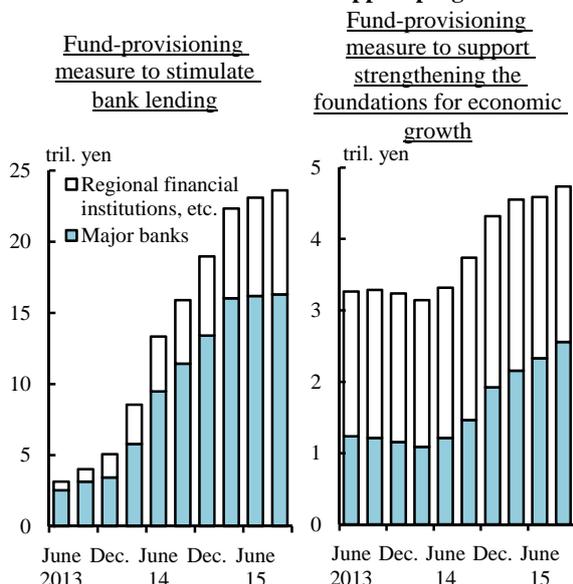
Sources: Community Bank Shinyo Kumiai; Financial Services Agency; National Association of Shinkin Banks; Regional Banks Association of Japan; Second Association of Regional Banks.

Loans by financial institutions utilizing the Bank of Japan's Stimulating Bank Lending Facility have also been increasing (Chart IV-1-17). The Bank has decided to enhance its Stimulating Bank Lending Facility, starting with its fund provisioning for fiscal 2015.¹⁰ Looking at utilization of the Bank's Growth-Supporting Funding Facility,

¹⁰ At the Monetary Policy Meeting (MPM) held in January 2015, the Policy Board of the Bank of Japan decided to enhance the Stimulating Bank Lending Facility and the Growth-Supporting Funding Facility, and to extend by one year the application period for these facilities, under which the last disbursement of new loans was scheduled to take place by end-June 2015. Specifically, (1) with regard to the main rules for the Growth-Supporting Funding Facility, the Bank would increase the maximum amount of funds that it could provide to each financial institution from 1 trillion yen to

the measure has been utilized in particular for loans extended to business areas such as environment and energy, medical and nursing care, social infrastructure, and business deployment in Asia (Chart IV-1-18).

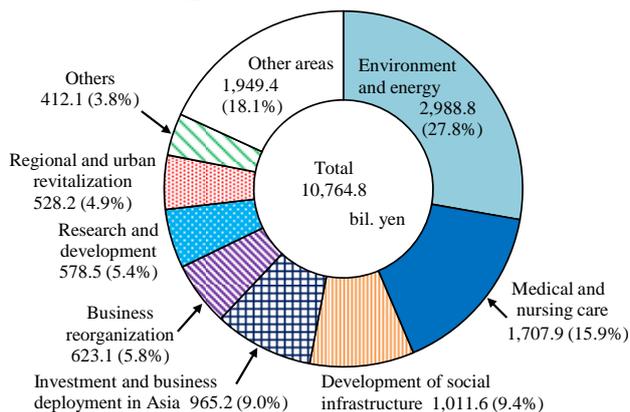
Chart IV-1-17: BOJ's loan support program¹



Note: 1. The latest data are as of September 2015. The data for fund-provisioning measure to support strengthening the foundations for economic growth are based on the main rules.

Source: BOJ.

Chart IV-1-18: BOJ's loan disbursements under the fund-provisioning measure to support strengthening the foundations for economic growth by area¹



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

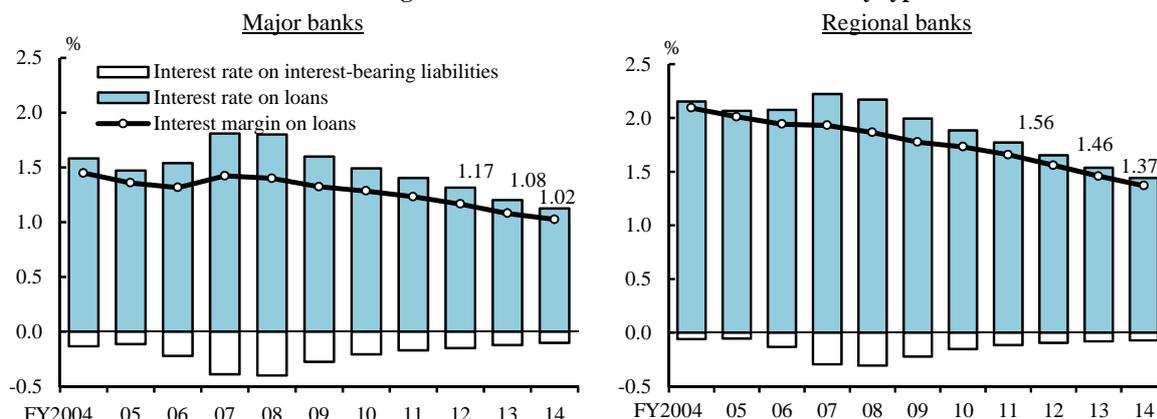
Source: BOJ.

Interest rate spreads on loans

The narrowing trend in financial institutions' interest rate spreads on domestic loans has continued (Chart IV-1-19). This is because pressure exerted by the supply of funds remains stronger than that exerted by demand, mainly due to further easing of lending stances of financial institutions, although demand for funds has been increasing moderately. Average contract interest rates on new loans and discounts have been following a moderately declining trend, mainly against the background of more intense competition among financial institutions, improvement in firms' financial conditions and business performance alongside economic recovery (an upgrade in internal credit ratings among financial institutions), and declines in base rates such as TIBOR rates (Chart IV-1-20).

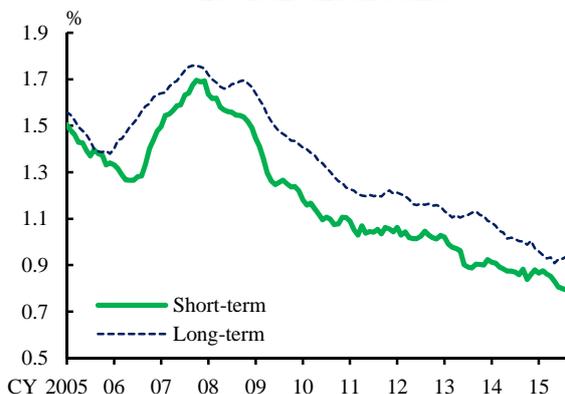
2 trillion yen, and would also increase the maximum amount outstanding of its fund-provisioning as a whole from 7 trillion yen to 10 trillion yen; and (2) as for the Stimulating Bank Lending Facility and the Growth-Supporting Funding Facility, the Bank would introduce a new framework for enabling financial institutions, which did not have a current account at the Bank, to use these facilities through their central organizations.

Chart IV-1-19: Interest margin on loans in the domestic business sector by type of bank¹



Note: 1. Interest rate swaps are subtracted from funding costs. Domestic business sector.
Source: BOJ.

Chart IV-1-20: Average contract interest rates on new loans and discounts¹

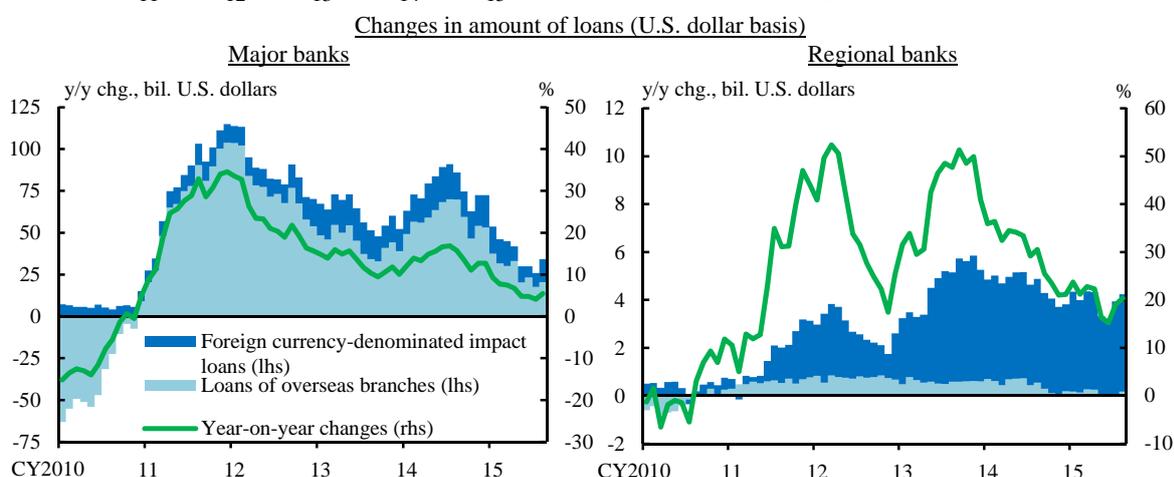
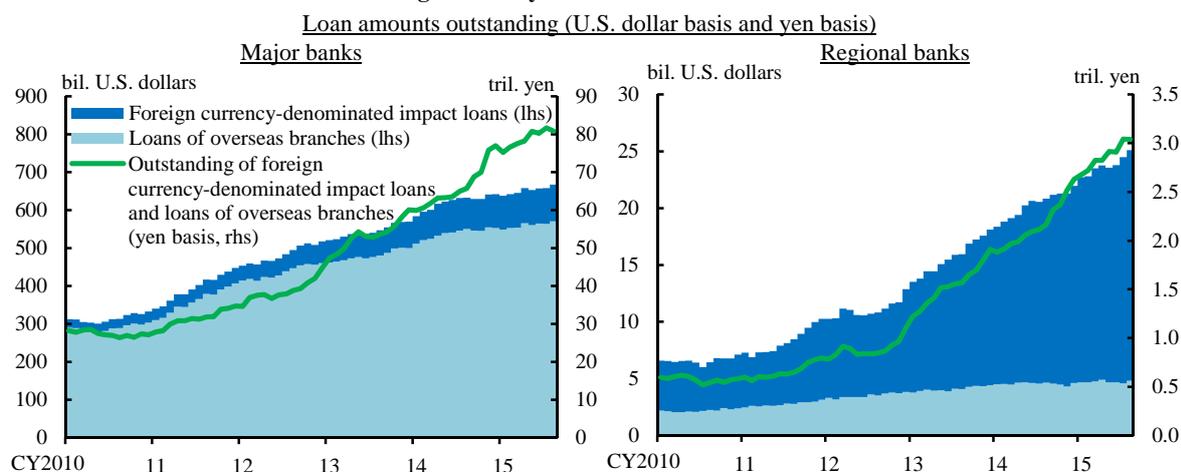


Note: 1. Domestically licensed banks are counted. The latest data are as of August 2015; 6-month moving averages.
Source: BOJ, "Average contract interest rates on loans and discounts."

2. Overseas loans

Banks' overseas loans have continued to show relatively high growth, but the pace of growth has slowed somewhat, particularly for loans to Asia (Chart IV-1-21). With regard to U.S. dollar-based loans, those of major banks have been increasing by around 5 percent (an annual increase of approximately 30 billion U.S. dollars) and those of regional banks by approximately 20 percent (an annual increase of approximately 4 billion U.S. dollars) on a year-on-year basis. Looking at major banks' loans by region, those to Europe have remained relatively weak and the pace of growth in loans to Asia, which had been high, has slowed due to the deceleration of local economies. Meanwhile, growth in loans to North America has remained firm (Chart IV-1-22).

Chart IV-1-21: Banks' foreign currency-denominated loans and loans of overseas branches^{1,2,3,4}

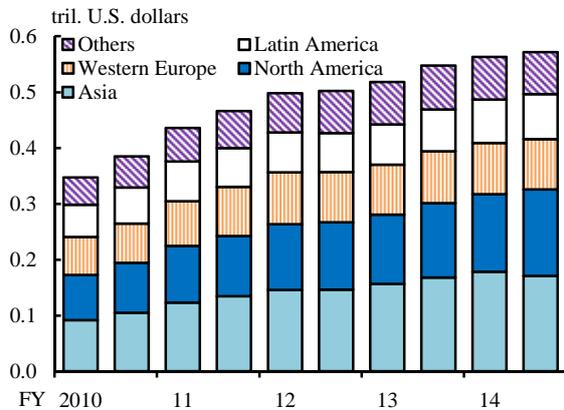


- Notes: 1. The latest data are as of August 2015.
 2. Loans of overseas branches partly include foreign currency-denominated impact loans in accounts held overseas.
 3. Foreign currency-denominated impact loans indicate banks' foreign currency-denominated loans for residence.
 4. Year-on-year changes represent the growth rate of loans made by overseas branches and foreign currency-denominated impact loans.

Source: BOJ.

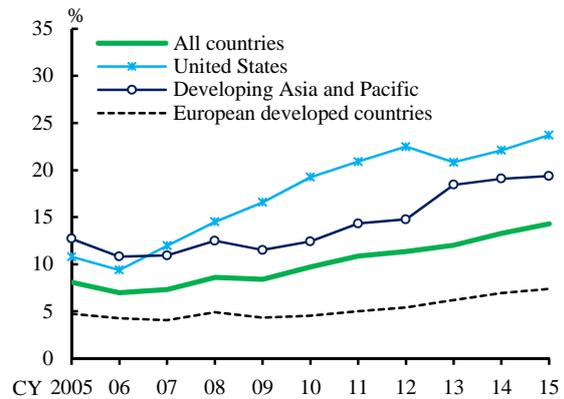
The share of Japanese banks in terms of international claims has continued to rise (Chart IV-1-23). The three major Japanese financial groups continue to increase their share in syndicated loan projects for which they serve as lead banks, albeit with fluctuations, particularly in resource development and infrastructure-related sectors (Chart IV-1-24). Nevertheless, competition has recently strengthened, partly reflecting some revival in the presence of European financial institutions.

Chart IV-1-22: Overseas loans outstanding of three major banks by region¹



Note: 1. The latest data are as of the second half of fiscal 2014.
Sources: Published accounts of each bank.

Chart IV-1-23: Foreign claims share among Japanese banks by region^{1,2}

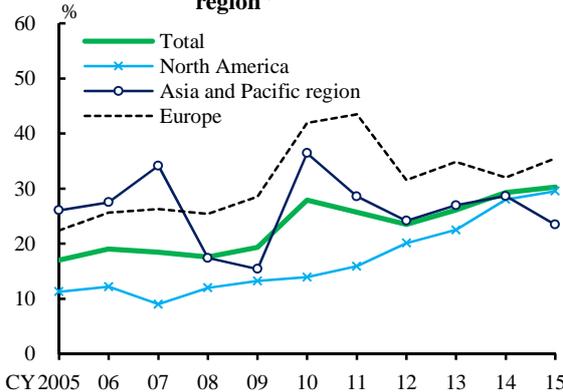


Notes: 1. The data are based on end-December figures for each year. The latest data are as of end-March 2015.

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."

Chart IV-1-24: Syndicated loans share of three major Japanese financial groups by region^{1,2}



Notes: 1. The latest data are as of the first half of 2015.

2. The figures represent syndicated loans for which the lead managers are three major financial groups as a share of all syndicated loans issued by foreign companies whose head offices are located in each area.

Source: Thomson Reuters Markets.

Banks have maintained their strong interest in expanding overseas lending. They have made efforts to increase lending to support the global expansion of Japanese firms and to capture the financial needs in countries with high growth potential. In the United States and Europe, some Japanese banks have purchased loan receivables with the aim of expanding their overseas borrowers, particularly non-Japanese firms. As for loans to Asia, although the pace of growth in lending has slowed, banks have also worked to expand their overseas network and bolster their local supply of financial services by acquiring and investing in foreign banks and other financial institutions under solid expectations for medium-term growth potential (Chart IV-1-25). **Nevertheless, the decline in commodity prices and the slowdown in emerging economies have led some banks to cautiously elevate the intensity of their initial screening and their**

interim management for their related credits.

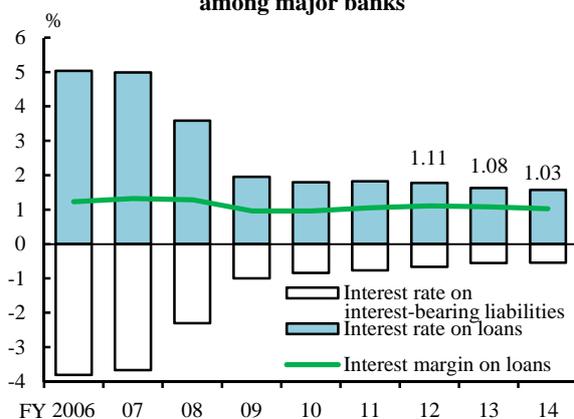
Chart IV-1-25: Recent major overseas acquisitions and opening of new branches by major banks

	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
The Bank of Tokyo-Mitsubishi UFJ	Feb. 2014	United States	Integration of BTMU's U.S. branch banking operations with Union Bank
	Apr. 2014	India	Opening of Bangalore Branch
	June 2014	China	Opening of Suzhou Branch
	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	China	Approval for Opening a Branch in Fuzhou
	July 2015	Dubai	Approval for Commence an Islamic Finance Business at Dubai Branch
Sumitomo Mitsui Banking Corporation	Jan. 2014	Ireland	Opening of Dublin Branch
	Mar. 2014	Indonesia	Additional Share Purchase of PT Bank Tabungan Pensiunan Nasional Tbk (BTPN)
	June 2014	Czech	Opening of Prague Branch
	Aug. 2014	Cambodia	Share Purchase of ACLEDA Bank
	Dec. 2014	Spain	Opening of Madrid Branch
	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 in United States
	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	
Sumitomo Mitsui Trust Bank	Dec. 2014	India	Share Purchase of Reliance Capital
	Sep. 2015	Thailand	Establishment of a Bank Subsidiary in Thailand

Sources: Disclosures of each bank.

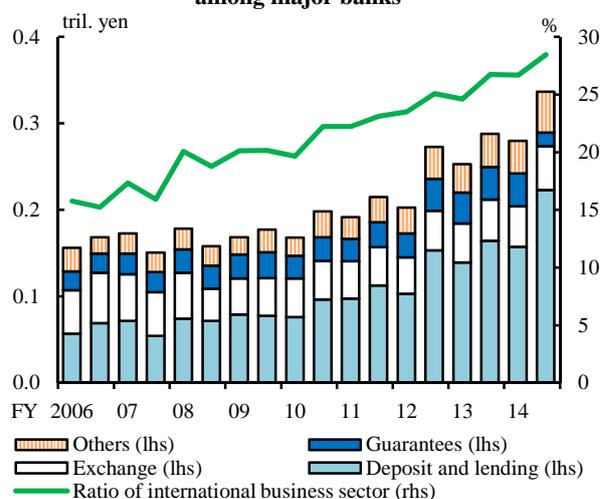
Interest rate spreads on overseas loans have recently narrowed somewhat as competition to acquire top-rated borrowers has strengthened (Chart IV-1-26). In this situation, major banks have been working to increase their fee and commission income through cooperation with group securities companies and other firms, with a view to also expanding their business abroad in areas other than lending (Chart IV-1-27).

Chart IV-1-26: Interest margin on loans in the international business sector among major banks



Source: BOJ.

Chart IV-1-27: Fee and commission income in the international business sector among major banks^{1,2}



Notes: 1. The latest data are as of the second half of fiscal 2014.
 2. "Ratio of international business sector" is the ratio of net fees and commissions in the international business sector as a percentage of total net fees and commissions.

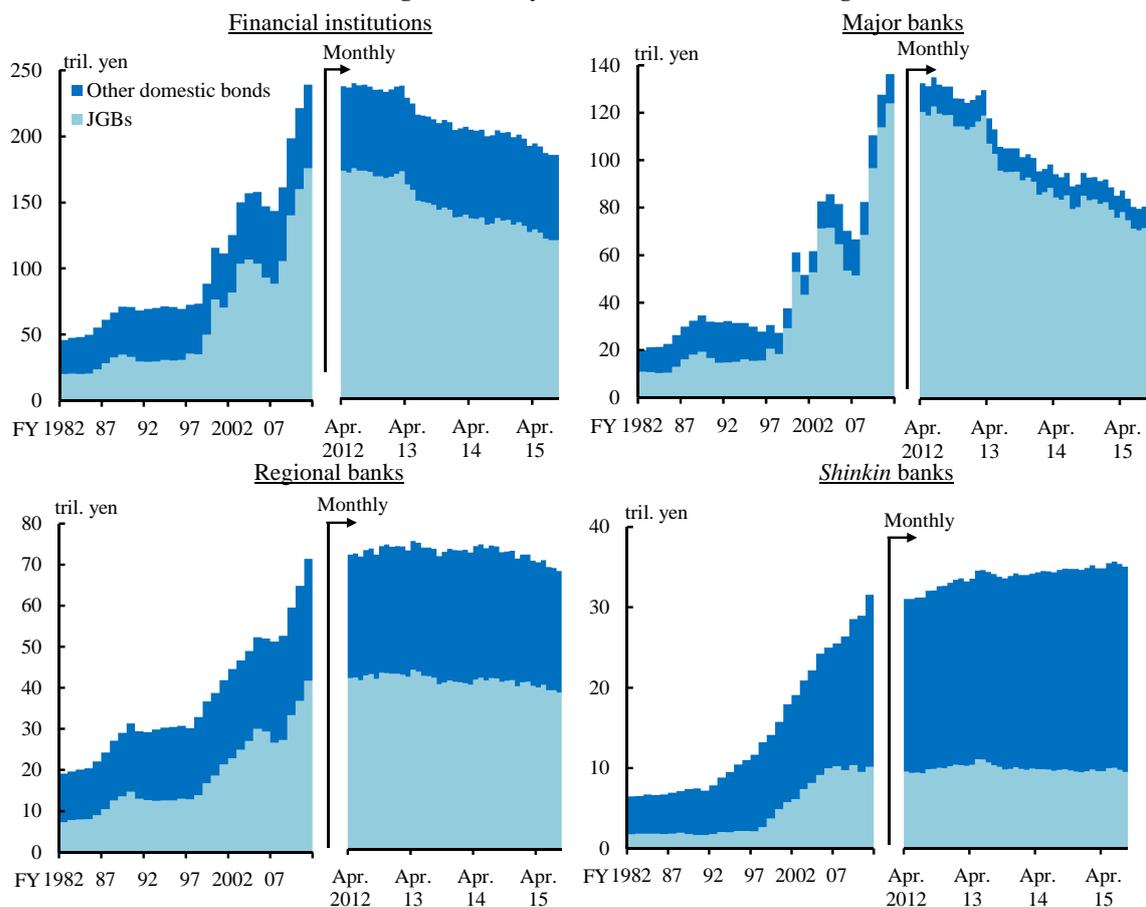
Source: BOJ.

3. Securities investment

Financial institutions have gradually been enhancing their risk-taking stance by investing to risky assets further, such as investment trusts, while maintaining a high level of yen-denominated bond investment.

The outstanding amount of yen-denominated bonds -- including JGBs, municipal bonds, and corporate bonds -- is at a high level from a longer-term perspective, although it has been on a declining trend, particularly at major banks (Chart IV-1-28). A breakdown of yen-denominated bondholdings by type of financial institution shows that the outstanding amount continues to be on a declining trend at major banks. Regional banks have either maintained or slightly reduced their amount on the whole, with the proportion of banks that have increased their amount of yen-denominated bonds and those that have reduced them offsetting each other. Meanwhile, *shinkin* banks have continued to increase their outstanding amount moderately.

Chart IV-1-28: Outstanding amount of yen-denominated bonds among financial institutions^{1,2}



Notes: 1. The latest data are as of end-August 2015.

2. The data are the sums of figures for domestic and overseas branches. The data for major banks from April 2012 are the sums of figures for domestic branches. The data are based on the amount outstanding at month-end.

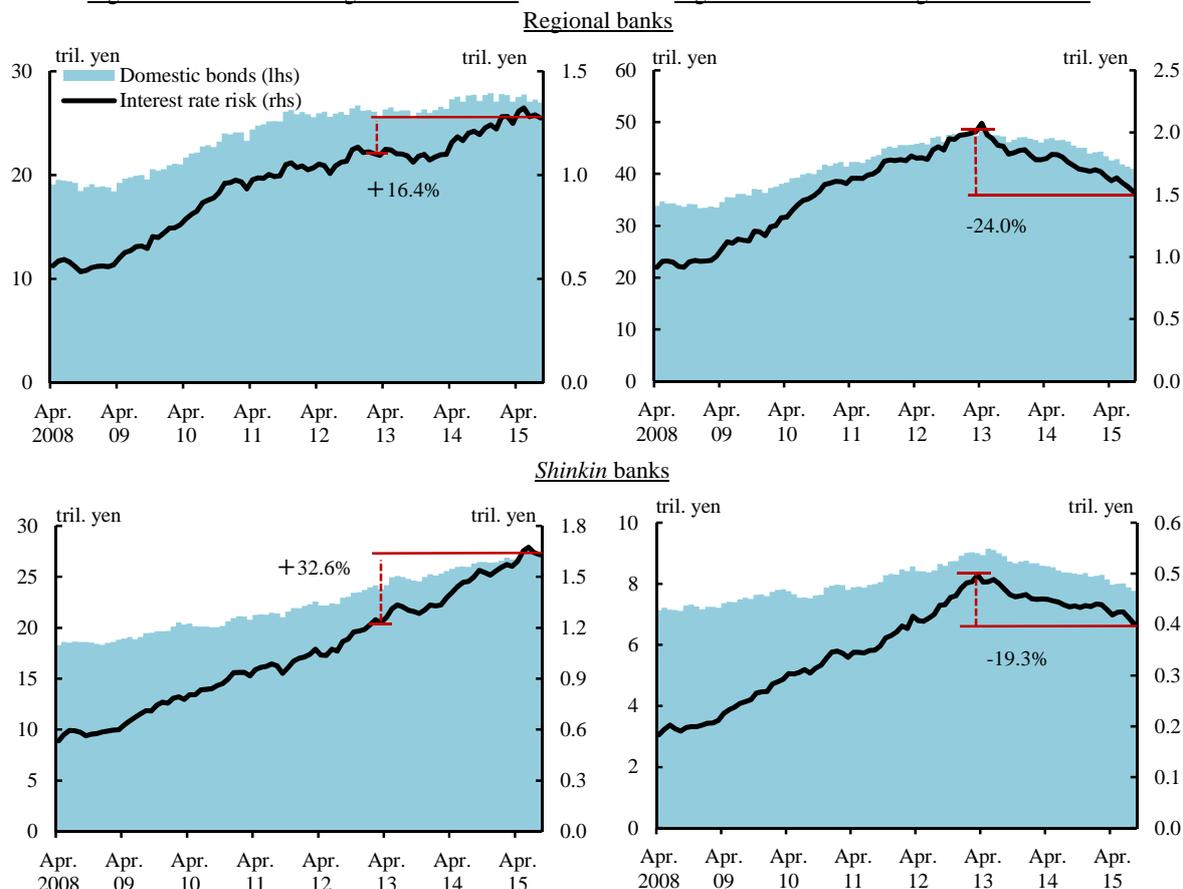
Source: BOJ.

The amount of interest rate risk associated with yen-denominated bond investment traces the outstanding amount. A number of regional financial institutions have been increasing their outstanding amount as well as prolonging duration with a view to securing interest rate spreads, and even among regional financial institutions that have reduced their outstanding amount some have increased their proportion of long-term bonds. The fact that interest rate risk has remained at a high level is partly attributable to the prolonged duration of bondholdings. Moreover, investment stance (yen interest rate risk taking) by financial institution indicates a growing heterogeneity (Chart IV-1-29, see Chapter V.B).

Chart IV-1-29: Developments in yen-denominated bond investment by regional financial institutions^{1,2,3}

Figures for those increasing interest rate risk

Figures for those reducing interest rate risk



Notes: 1. The latest data are as of end-August 2015.

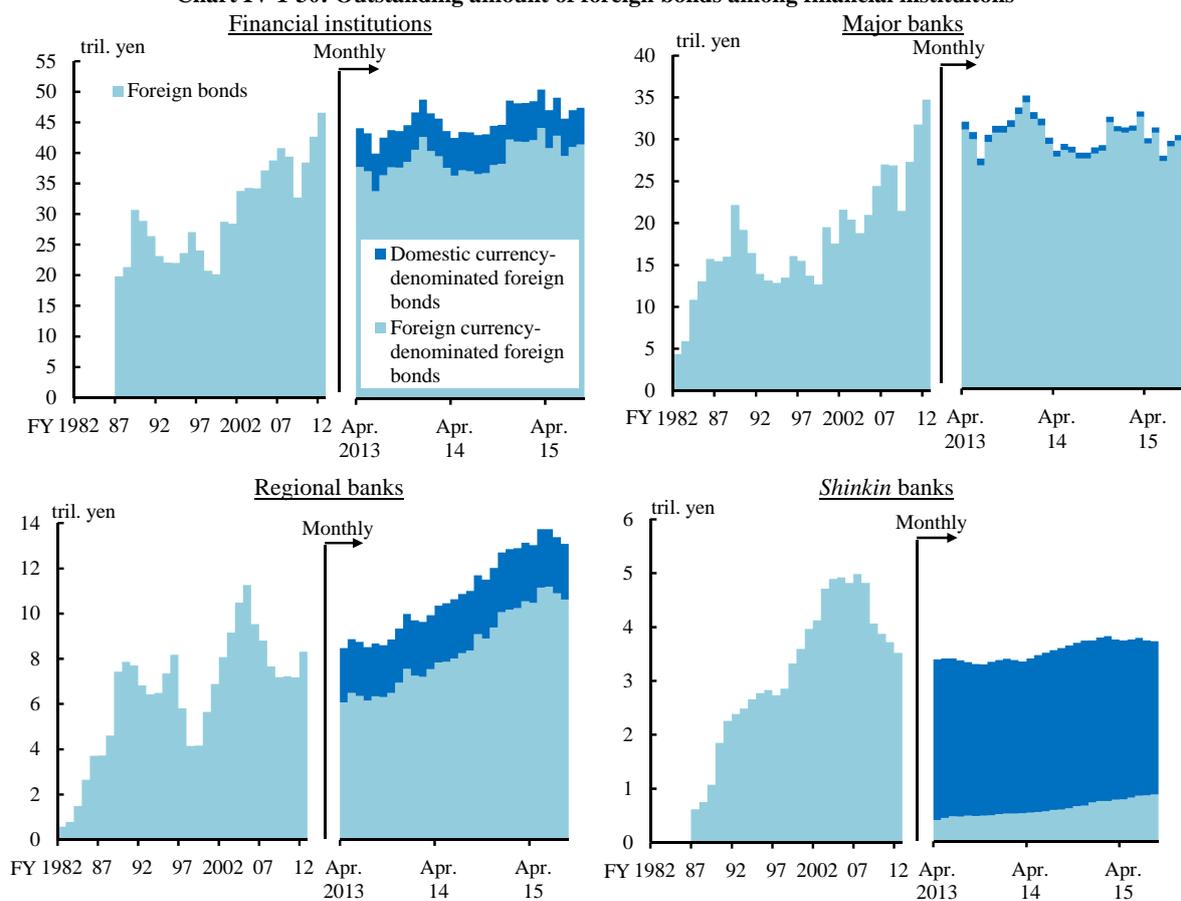
2. Interest rate risk: 100 basis point value in domestic bonds.

3. Increasing (reducing) interest rate risk represents banks and *shinkin* banks whose interest rate risk as of end-August 2015 is more (less) than those as of end-March 2013.

Source: BOJ.

The outstanding amount of foreign bonds, when converted into yen, has been more or less unchanged, albeit with fluctuations (Chart IV-1-30). A breakdown by type of financial institution shows that major banks have started to reduce their outstanding amount as they take a generally restraining stance amid awareness of growing uncertainty regarding developments in global financial markets since this April. Meanwhile, foreign bond investment by regional banks has been on an increasing trend. While a large portion of foreign bond investment by *shinkin* banks is yen-denominated, investment in foreign currency-denominated bonds has been increasing gradually.

Chart IV-1-30: Outstanding amount of foreign bonds among financial institutions^{1,2,3}



Notes: 1. The latest data are as of end-August 2015.

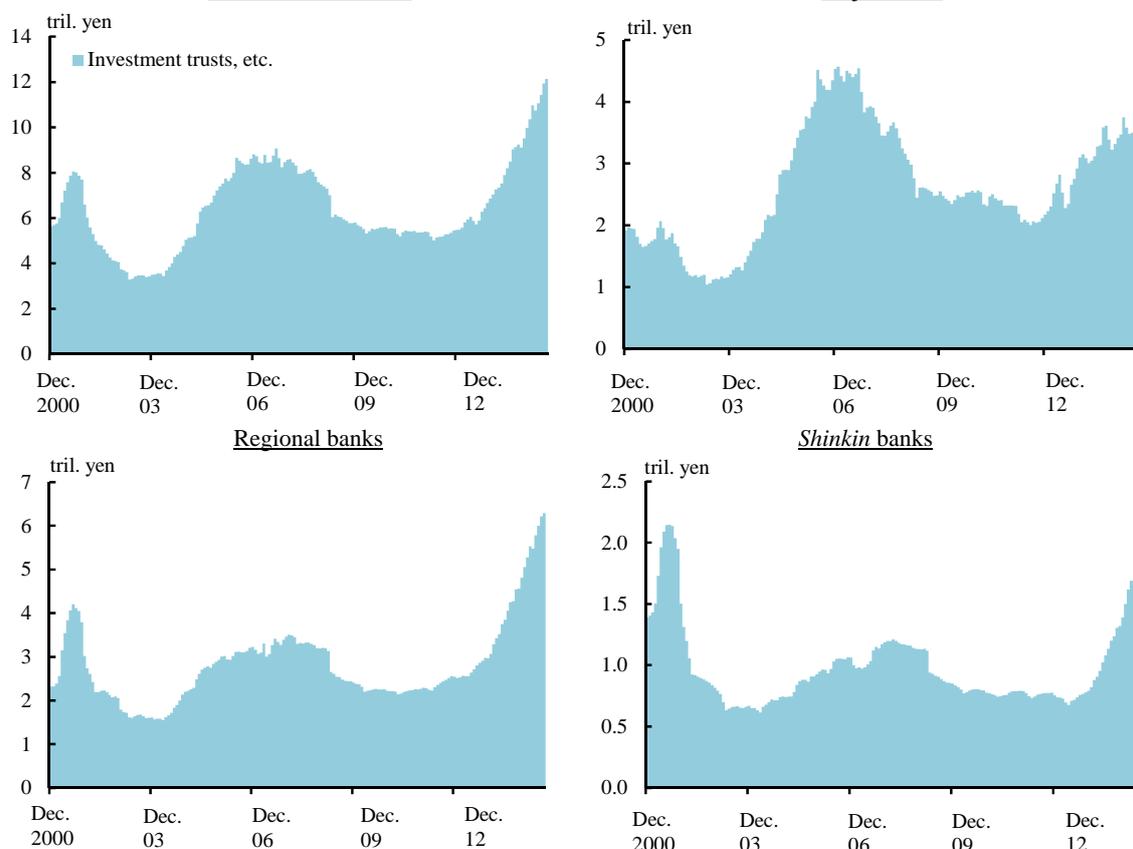
2. The data are the sums of figures for foreign currency-denominated and domestic currency-denominated foreign bonds.

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.

Investment trusts and other assets have continued to increase for all types of banks. Banks continue to further engage themselves in risk taking through investment in various financial assets, for example, stock investment trusts, real estate investment trusts (REITs), and bond ladder funds both at home and abroad, although the major asset class of investment varies depending on the type of bank (Chart IV-1-31).

Chart IV-1-31: Outstanding amount of investment trusts, etc. among financial institutions^{1,2}
Financial institutions Major banks



Notes: 1. The latest data are as of end-August 2015.

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.

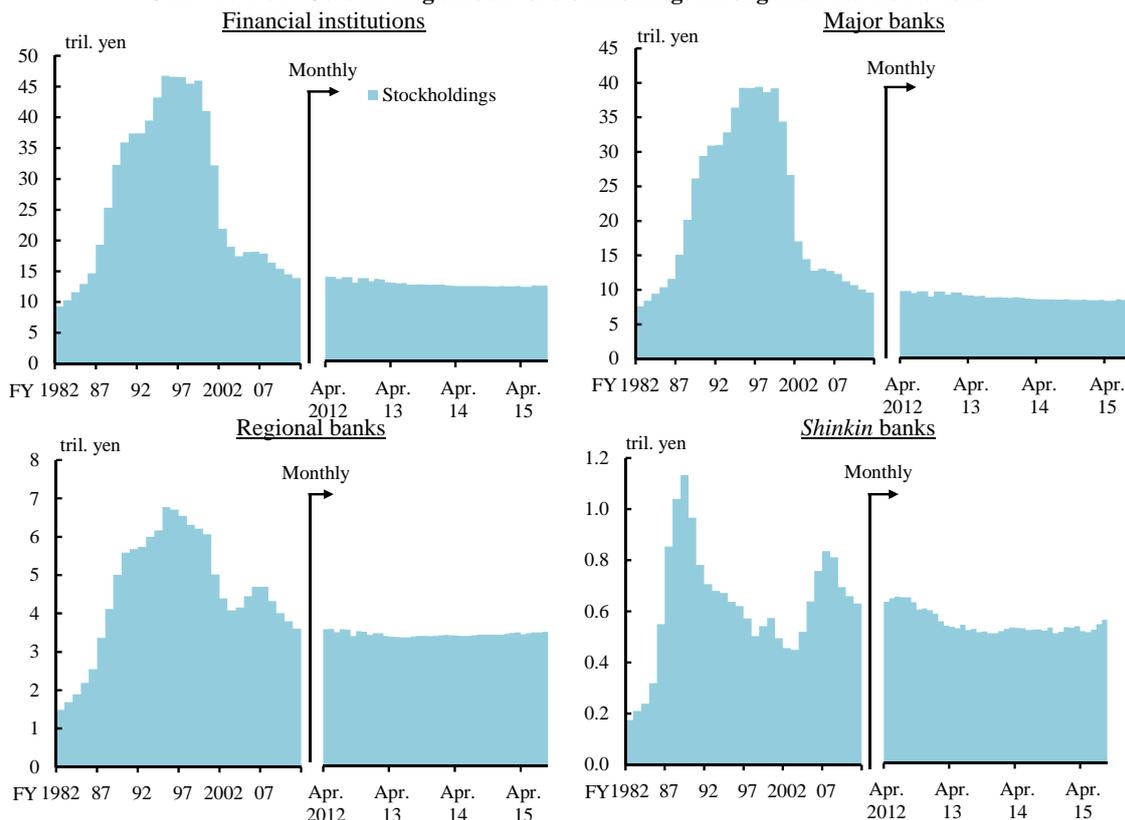
Source: BOJ.

From summer 2015, when volatility rose in global financial markets against the background of concerns about the slowdown in emerging economies, financial institutions bought investment trusts, observing the drop in stock prices. They also bought domestic and foreign bonds, expecting a future drop in interest rates, and sold a wide range of securities in order to adjust their profits and losses. Yet, as a whole, the outstanding amount of securities investment and associated risks have not changed materially.

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 IV-1-32). As the Corporate Governance Code came into effect in June 2015, major financial institutions -- including the three major Japanese financial groups and some regional banks -- disclosed their guidelines on strategic stockholdings as well as their logic behind the guidelines (Chart IV-1-33). These efforts are expected to play a role in improving the

soundness of financial institutions. Strategic stockholdings have been formed over the course of a long history of transaction relationships between financial institutions and business companies. Therefore, efforts by the financial institutions to offer more objective assessments for the rationale of their strategic stockholdings and to provide a deeper understanding of the background of the guidelines to the business companies, are important in making the guidelines viable.

Chart IV-1-32: Outstanding amount of stockholdings among financial institutions^{1,2,3,4}



- Notes: 1. The latest data are as of end-August 2015.
 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 2012 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 IV-1-33: Policy regarding strategic stockholdings published by financial institutions

		Time of announcement	Outline
Major financial institutions	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."
	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."
	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."

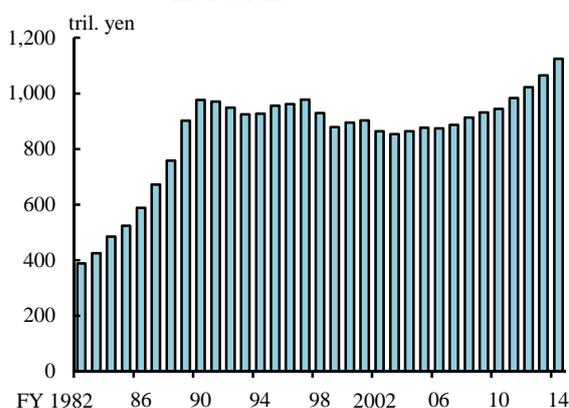
Sources: Published accounts of each group.

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

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

After starting to increase in fiscal 2007, total assets and liabilities of financial institutions have continued to increase while experiencing the introduction of QQE in April 2013, followed by its expansion at the end of October 2014 (Chart IV-1-34). In addition, no significant change has been observed in the trend of a widening gap in financial institutions' domestic loans and deposits (Chart IV-1-35).

Chart IV-1-34: Assets outstanding among financial institutions^{1,2}

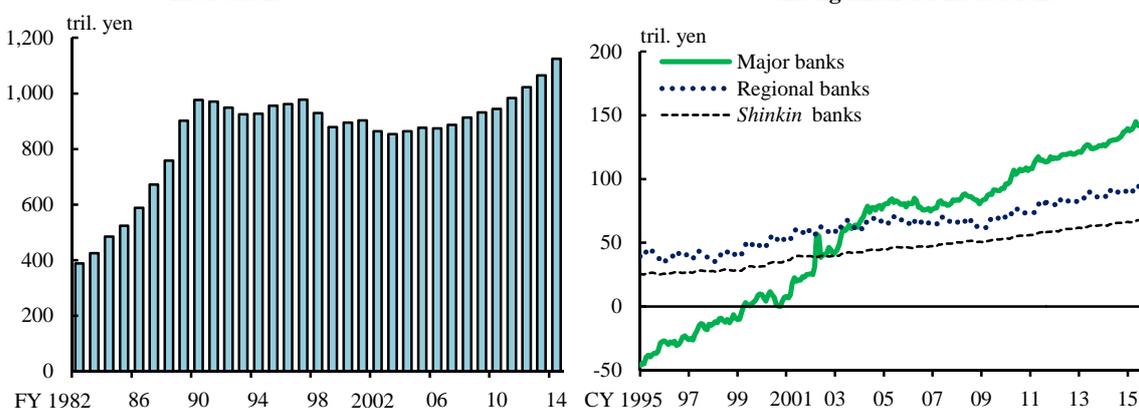


Notes: 1. Banks and *shinkin* banks are counted. The latest data are as of March 2015.

2. The data are based on the average amount outstanding.

Source: BOJ.

Chart IV-1-35: Domestic loan-to-deposit gap among financial institutions^{1,2,3}



Notes: 1. The latest data are as of August 2015.

2. Loan-to-deposit gap = deposits and NCDs – loans.

3. The data for domestic branches are based on the average amount outstanding.

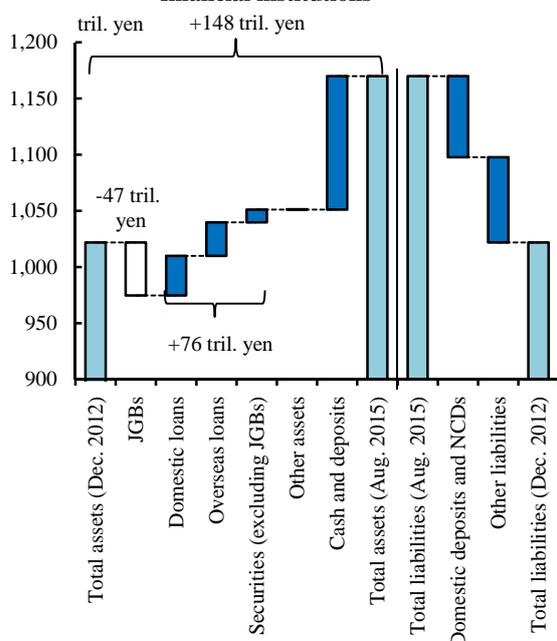
Source: BOJ.

The aforementioned total assets and liabilities of financial institutions, after increasing by 124 trillion yen in the 2-year period from December 2012 through December 2014, further increased by another 24 trillion yen in the period from the beginning of 2015 to August (Chart IV-1-36). A breakdown shows that on the asset side, cash and deposits (mainly BOJ current account deposits) increased, reflecting the Bank of Japan's monetary actions aimed at increasing the monetary base. For the other asset classes, domestic loans, overseas loans, and securities investment excluding JGBs increased while JGB holdings decreased. Looking at financial institutions as a whole, data suggest that a shift from JGBs (yen interest rate risk) to other types of risky assets, including credit, stock-related, and overseas interest rate risk, has been proceeding.¹¹ Meanwhile,

¹¹ At major banks and some regional banks, the continued relatively high growth in foreign currency impact loans (loans extended to residents that are denominated in foreign currencies) at domestic

on the liability side, domestic deposits including negotiable certificate of deposits (NCD) increased, along with other liabilities such as overseas deposits and borrowed money from the Bank of Japan.

Chart IV-1-36: Changes in assets and liabilities among financial institutions¹



Note: 1. Banks and *shinkin* banks are counted. 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

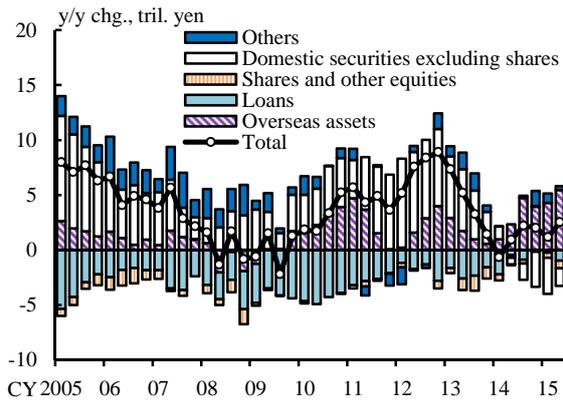
Major institutional investors such as life insurance companies and pension funds, having invested mainly in domestic long-term bonds, have continued to increase their share of investment in risky assets. Since fiscal 2014, while restraining their investment in super-long-term bonds (i.e. bonds with a maturity of greater than 10 years) in response to a further decline in long-term interest rates, institutional investors have increased their holdings of assets including foreign bonds and stocks in their portfolios with a view to strengthening their search for yield activity.

Life insurance companies were formerly active particularly in investment in super-long-term bonds, in order to narrow the duration mismatch between their assets and liabilities. However, since fiscal 2014, they have subdued purchases of super-long-term bonds in response to a further decline in long-term interest rates (Charts IV-2-1 and IV-2-2). They have been enhancing their risk-taking appetite, as suggested

branches has also been contributing to the increase in domestic loans.

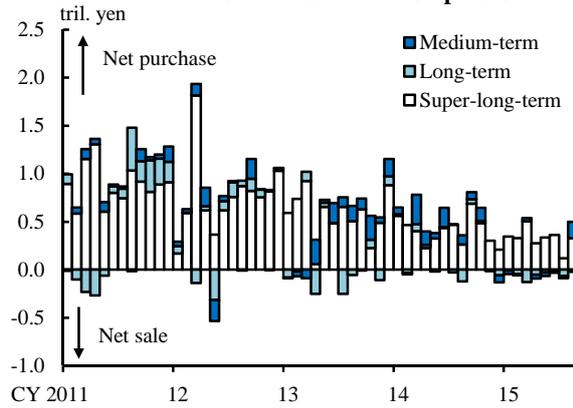
by the fact that they have continued to increase their investment in overseas assets such as foreign bonds, and have been more actively investing in areas in which relatively high growth is expected (through fund investment and other investments) (Chart IV-2-3). Life insurance companies have also been increasing the number of acquisitions of and investment in foreign insurance companies, to seize growth opportunities in overseas insurance markets (Chart IV-2-4).

Chart IV-2-1: Asset investments among life insurance companies^{1,2}



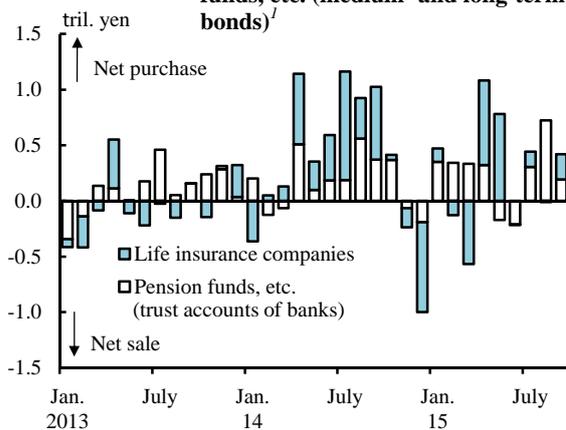
Notes: 1. The latest data are as of June 2015. This chart shows the sum of financial transactions in the last 4 quarters.
2. "Others" includes cash and deposits. "Loans" excludes repurchase agreements and securities lending transactions.
Source: BOJ, "Flow of funds accounts."

Chart IV-2-2: JGB investment among life and non-life insurance companies¹



Note: 1. The latest data are as of August 2015.
Source: Japan Securities Dealers Association.

Chart IV-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 September 2015.
Source: Ministry of Finance.

Chart IV-2-4: Recent major overseas expansions by insurance companies

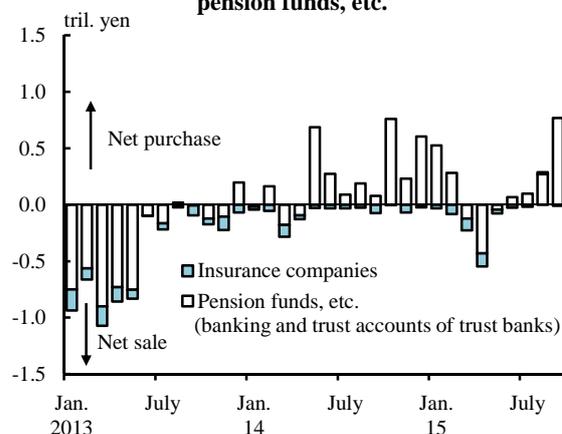
	Company name	Time of announcement	Size [Type]	Outline
Life insurance company	The Dai-ichi Life Insurance Company, Limited	June 2014	575 bil. yen [Acquisition]	Agreement to acquire 100% ownership of Protective Life Corporation, a listed U.S. life insurance group (Completion of acquisition as of Feb. 2015). Proceeds from the Public Offering and other financial ways estimated to be 264.1 billion yen are planned to be used in full as funds for the acquisition.
	Meiji Yasuda Life Insurance Company	July 2015	624.6 bil. yen [Acquisition]	Agreement to acquire a listed U.S. life insurance group, Stancorp Financial Group, Inc. The Acquisition will be financed through cash and cash equivalents in hand.
	Sumitomo Life Insurance Company	Aug. 2015	466.6 bil. yen [Acquisition]	Agreement to acquire a listed U.S. life insurance group, Symetra Financial Corporation. The Acquisition will be financed through cash and cash equivalents in hand.
Non-life insurance company	Sompo Japan Nipponkoa Holdings, Inc.	Mar. 2015	110 bil. yen [Equity]	SOMPO HOLDINGS has determined to acquire shares in SCOR SE, from Patinex AG, the largest shareholder of SCOR SE, representing approximately 7.8% of SCOR's outstanding share capital. SOMPO HOLDINGS will intend to subsequently acquire shares in SCOR, with the objective of acquiring 15% or more of SCOR's outstanding share capital.
	Tokio Marine Holdings, Inc.	June 2015	941.3 bil. yen [Acquisition]	Agreement to acquire HCC Insurance Holdings, Inc. The Acquisition will be financed through cash and cash equivalents in hand and borrowings.
	MS&AD Insurance Group Holdings, Inc.	Sep. 2015	642 bil. yen [Acquisition]	Agreement to acquire a listed UK Insurance Holding Company, Amlin. The Acquisition will be financed through cash and cash equivalents in hand and borrowings.

Sources: Disclosures of each insurance company.

Meanwhile, sales of yen-denominated saving products by life insurance companies have been relatively weak, mainly due to moves to restrain sales and a rise in insurance fees. On the other hand, their sales of foreign-currency denominated products have been favorable. These developments are expected to affect their investment activities.

Looking at developments in pension funds, public pension funds, including the Government Pension Investment Fund (GPIF), continue to increase weights on domestic and overseas stocks in their portfolios while reducing weights on domestic bonds (Chart IV-2-5). In addition, corporate pension funds, which in general maintain less risky investment policies, seem to have continued to make moves to enhance their investment returns, mainly by increasing alternative assets such as fund investment in their portfolio.

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

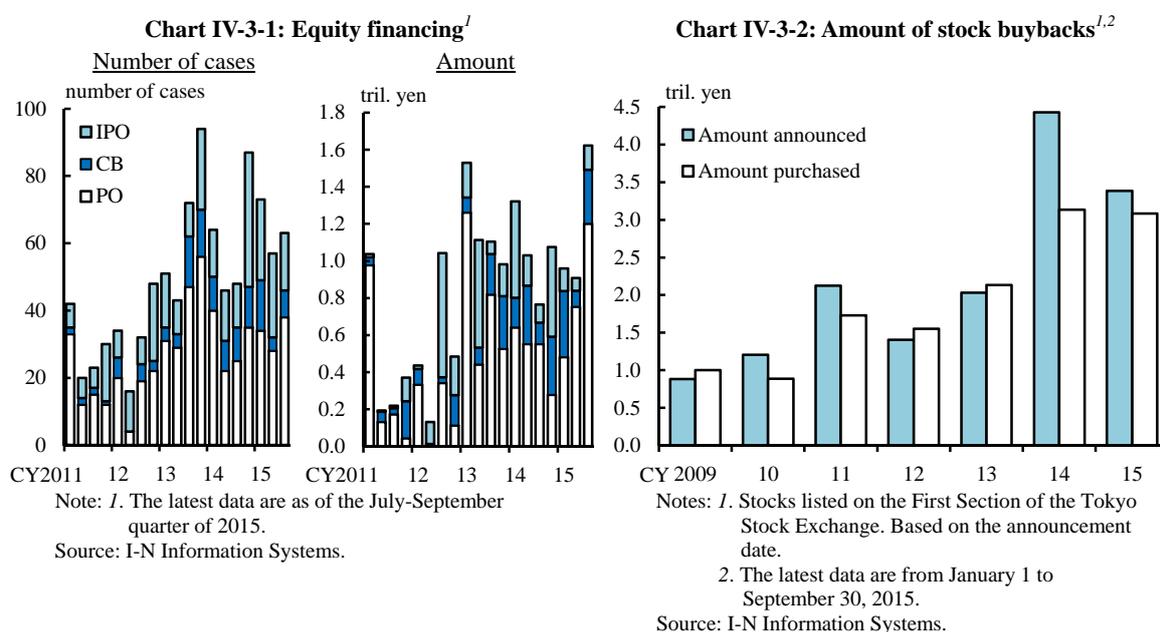


Note: 1. The latest data are as of September 2015.
Source: Tokyo Stock Exchange.

Under Japan's Stewardship Code established in February 2014, more institutional investors, i.e., insurance companies, pension funds, and asset investment companies, are promoting dialogue with firms they have invested in. These institutional investors aim to improve their medium- to long-term return by continuously enhancing the value of firms in which they invest. Firms are also showing a willingness to actively engage in dialogue with these institutional investors, in order to encourage medium- to long-term investment.¹²

C. Financial intermediation through financial markets

Equity financing through the stock market remains at a high level (Chart IV-3-1). A breakdown shows that initial public offerings (IPOs) have been at a high level due to fundraising across a wide range of industries against the background of improving business conditions. Firms' stock buybacks, both announced and executed, as well as recapitalized CB issuance, have remained at a high level, reflecting firms' heightened awareness of the increase in return on equities (ROE) and of shareholder returns, promoted by the introduction of the Corporate Governance Code (Chart IV-3-2).¹³



While a cautious stance has been maintained for public offerings (POs) under the

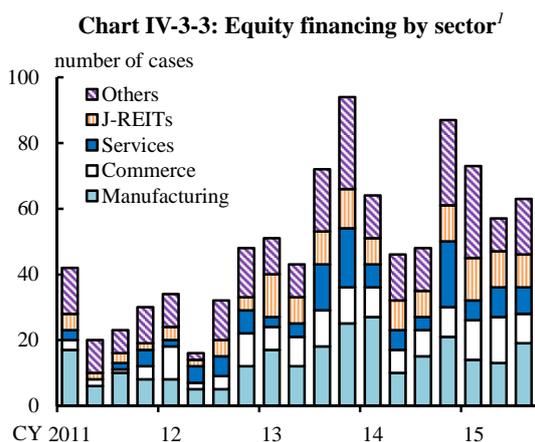
¹² The Corporate Governance Code came into effect for listed companies in June 2015. It is stipulated in the Code's main principles that "[i]n order to contribute to... the increase of corporate value over the mid- to long-term, companies should engage in constructive dialogue with shareholders even outside the general shareholder meeting."

¹³ Recently, CBs have been in many cases issued for firms' stock buybacks.

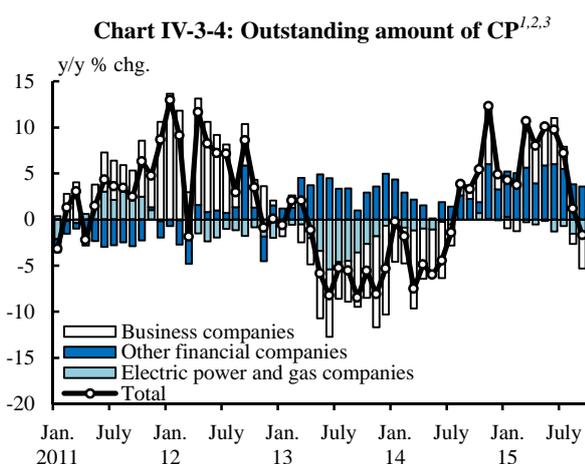
heightened awareness for capital efficiency, the amount of POs recently increased as proactive funding took place for carrying out investment and for mergers and acquisitions with future growth potential.

By industry, equity financing has been actively undertaken on the whole in a wide range of industries, such as J-REITs -- as seen in the continued high levels of POs and IPOs -- as well as manufacturing and commerce (Chart IV-3-3).

Issuing conditions for CP and corporate bonds have continued to be favorable. The year-on-year rate of change in the amount outstanding of CP has slowed yet issuance rates are stable at low levels (Charts IV-3-4 and IV-3-5). Issuance of straight corporate bonds has remained at a low level, mainly due to the fact that issuers have a large cash buffer and banks are maintaining an active lending stance (Chart IV-3-6). Nevertheless, issuing conditions can be considered favorable, as the amount of samurai bond issuance has been increasing somewhat and corporate bond spreads have remained at a low level.

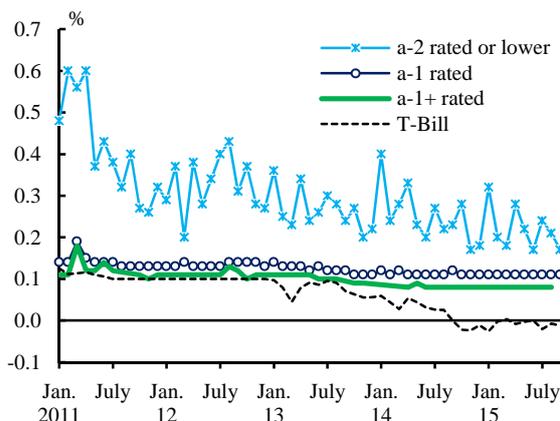


Note: 1. The latest data are as of the July-September quarter of 2015.
Source: I-N Information Systems.



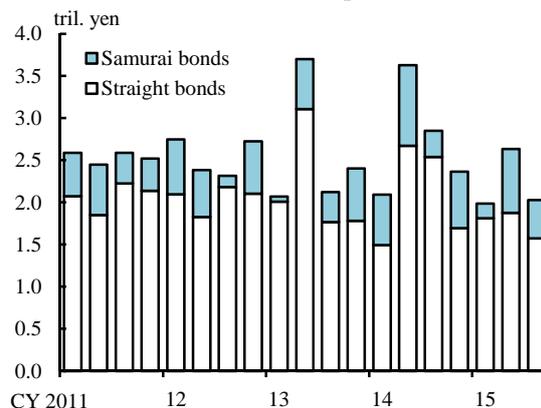
Notes: 1. "Business companies" excludes electric power and gas companies and other financial companies.
2. "Other financial companies" includes leasing companies, credit card companies, consumer finance companies, and securities finance companies.
3. The latest data are as of end-September 2015.
Source: Japan Securities Depository Center.

Chart IV-3-5: CP issuance rates^{1,2}



Notes: 1. Monthly average 3-month rates weighted by issuance volume.
2. The latest data are as of September 2015.
Sources: Japan Bond Trading; Japan Securities Depository Center.

Chart IV-3-6: Amount of corporate bonds issued¹

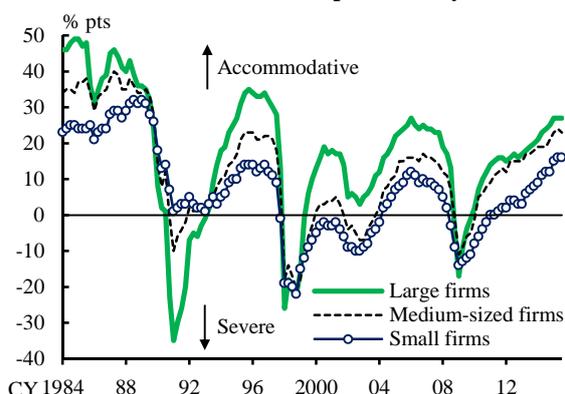


Note: 1. The latest data are as of the July-September quarter of 2015.
Source: I-N Information Systems.

D. Financial conditions among firms and households and developments in their investment activities

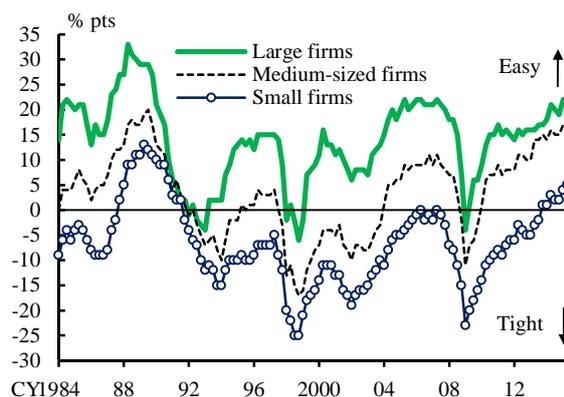
Financial conditions among firms and households have become more accommodative against the backdrop of financial intermediary activities stated above. Funding costs for firms and households, including the average contract interest rates on new loans and discounts as well as those on mortgage rates, have continued to exhibit a downward trend (Chart IV-1-20).

Chart IV-4-1: DI of lending attitudes of financial institutions as perceived by firms¹



Note: 1. The latest data are as of September 2015.
Source: BOJ, "Tankan."

Chart IV-4-2: DI of financial positions of firms¹

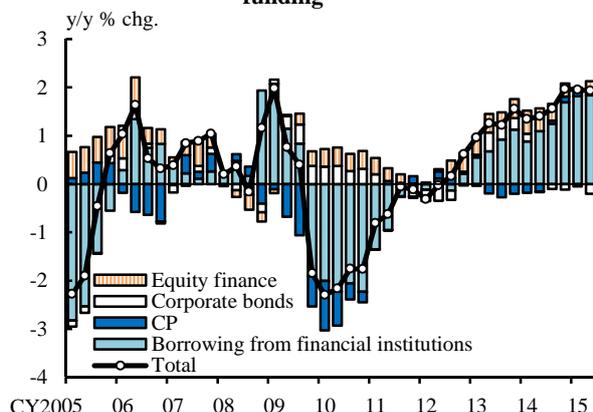


Note: 1. The latest data are as of September 2015.
Source: BOJ, "Tankan."

Lending attitudes of financial institutions as perceived by firms have become more accommodative, and firms' financial positions have continued to improve, regardless of

firm size (Charts IV-4-1 and IV-4-2). The year-on-year change in the amount of firms' funding has been largely unchanged from the level when the previous *Report* was published, as bank borrowing, CP, and equity financing have increased (Chart IV-4-3).

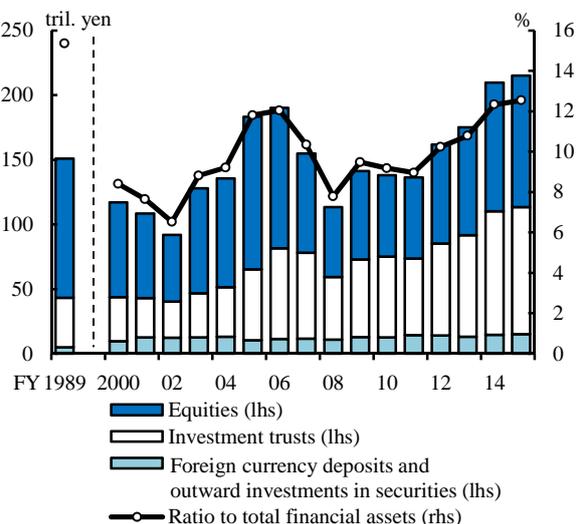
Chart IV-4-3: Total outstanding amount of firm funding^{1,2,3}



- Notes: 1. The latest data are as of end-June 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 shares and other equities 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."

Chart IV-4-4: Risky assets held by households^{1,2}

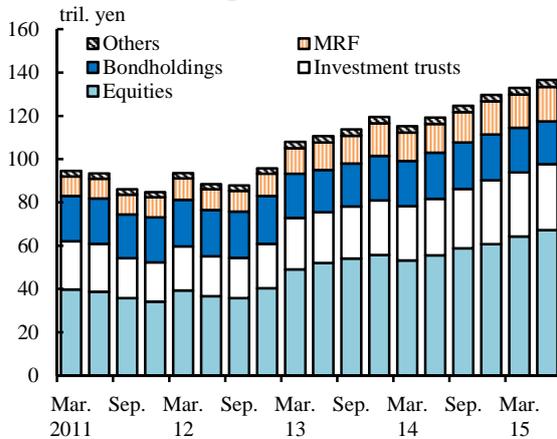


- Notes: 1. The latest data are as of end-June 2015.
 2. This chart is based on market value.
 Source: BOJ, "Flow of funds accounts."

Deposits have been central to household financial assets. However, the share of risky assets has been increasing, as seen in the continued net inflow to investment trusts (Chart IV-4-4). The outstanding amount of client assets held by securities companies has continued to increase, particularly among stocks and investment trusts (Chart IV-4-5). Some flow numbers, which are not affected by changes in the present values of financial assets due to changes in stock prices and foreign exchange rates, also suggest that there has been a steady inflow of individuals' funds to investment trusts and fund wrap accounts (Charts IV-4-6 and IV-4-7). Nevertheless, since the second half of fiscal 2014, during a phase in which the Nikkei 225 Stock Average rose to a level exceeding 20,000 yen for the first time in 15 years, individual investors have been among net sellers for stocks that they had purchased during past phases of stock price rises (Chart IV-4-8).¹⁴

¹⁴ Part of the revenue from the sales of stocks has either stayed in the Money Reserve Fund (MRF) or has been replaced by risky assets other than Japanese stocks through investment trusts and fund wrap accounts (Chart IV-4-7).

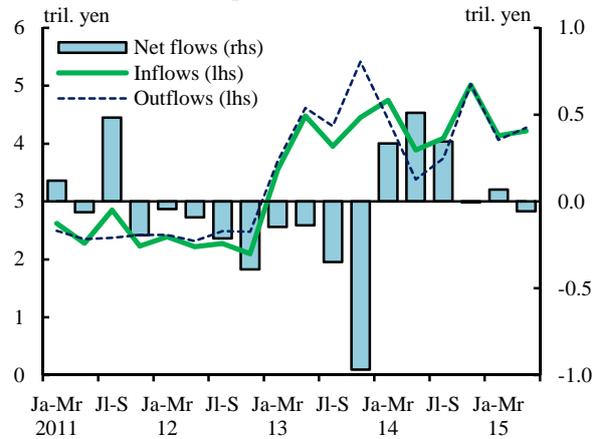
Chart IV-4-5: Client assets held by major securities companies for retail customers^{1,2,3}



Notes: 1. The latest data are as of end-June 2015.
 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" includes public and corporate bond investment trusts.

Source: BOJ.

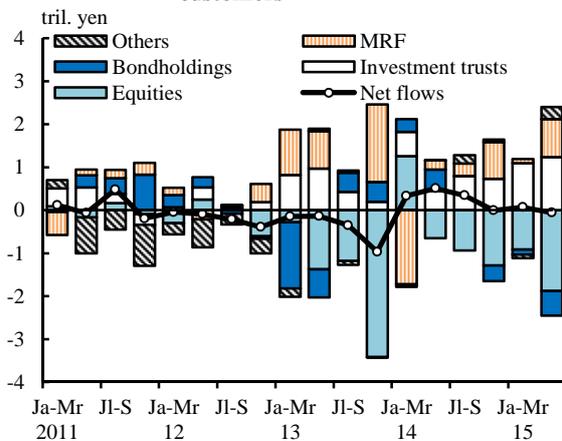
Chart IV-4-6: Capital flows among major securities companies for retail customers^{1,2}



Notes: 1. The latest data are as of the April-June quarter of 2015.
 2. Data for 18 major securities companies that hold current accounts at the BOJ are counted.

Source: BOJ.

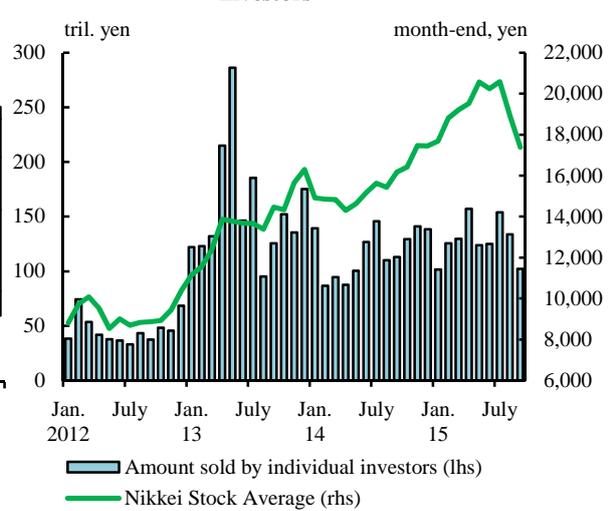
Chart IV-4-7: Capital flows by product among major securities companies for retail customers^{1,2,3}



Notes: 1. The latest data are as of the April-June quarter of 2015.
 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" includes public and corporate bond investment trusts.

Source: BOJ.

Chart IV-4-8: The Nikkei Stock Average and amount of stocks sold by individual investors¹

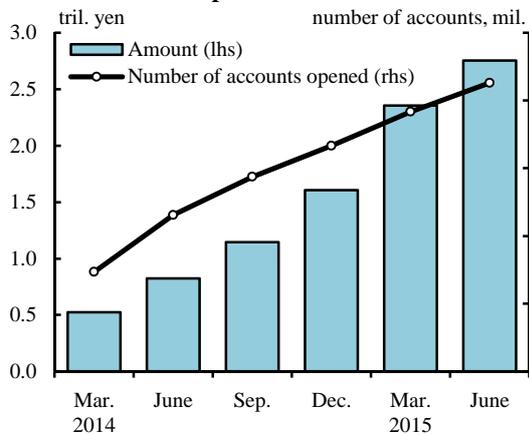


Note: 1. The latest data are as of end-September 2015.
 Sources: Bloomberg; Tokyo Stock Exchange.

Households are aiming at enhancing their risk-taking stance amid stock price rises, the yen's depreciation, and low interest rates since 2012. The introduction of Nippon Individual Savings Accounts (NISAs), as well as financial institutions' greater efforts to expand their customer bases and client assets, appear to continue encouraging such a trend (Charts IV-4-9 and IV-4-10). Among financial institutions, efforts to expand the

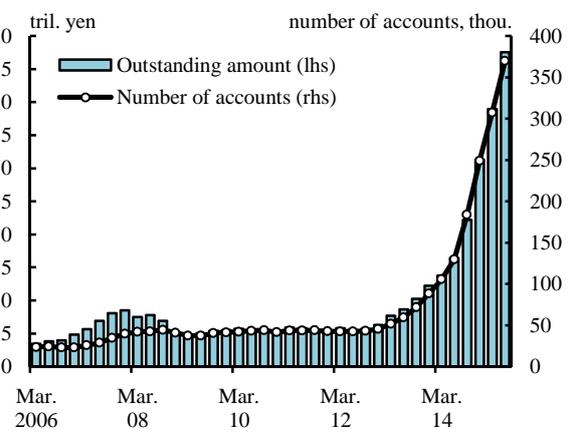
variety of investment trusts from which customers can choose, as well as to improve the quality of their services including wrap accounts, while increasing the contribution of customer-base expansion in performance reviews of their employees, have continued. With regard to large financial institutions, continued efforts are being made to expand client assets for their group as a whole by further promoting personnel exchanges and via the introduction and intermediation of customers among banks and securities companies within the group.

Chart IV-4-9: Purchases through NISA accounts and the number of NISA accounts opened¹



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

Chart IV-4-10: Assets under management in wrap accounts¹



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

V. Macro risk profiles and financial bases of financial institutions

In order to assess the stability of the financial system, in addition to examinations of member financial institutions' soundness, investigations from a macroprudential perspective are necessary. In this chapter, we examine: (1) financial institutions' macro risk profiles (size of risks accumulated, speed of accumulation, distribution of risks and its bias within the system); and (2) the adequacy of their financial bases relative to risks (bank capital and funding liquidity). It should be noted that most data used in our analysis -- the sections on credit risk and bank capital in particular -- are as of the end of March 2015. Regarding market risk and liquidity risk, however, the latest data after the end of March 2015 are used when available.

A. Credit risk

Financial institutions' credit risk has increased somewhat from that in the previous Report (the first increase in 9 half-year periods, since the first half of 2010) (Chart V-1-1).¹⁵ The amount of credit risk was up by 3.2 percent, from 11.8 trillion yen at the end of September 2014 to 12.2 trillion yen at the end of March 2015. **The amount of credit risk increased at major banks, although a declining trend has continued for regional banks and *shinkin* banks** (Chart V-1-2).

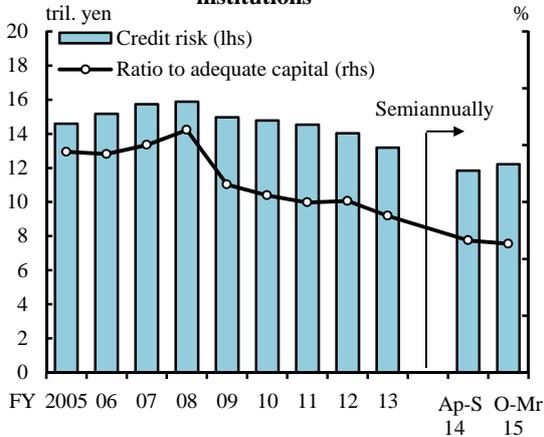
Regional banks and *shinkin* banks have continued the trend observed in recent years, characterized by a decline in the amount of credit risk amid an increase in loans outstanding. This is primarily due to improvement in the quality of financial institutions' assets, reflecting Japan's economic recovery and improved financial conditions among firms. The number of corporate bankruptcies has remained at a low level and the use of subrogation by credit guarantee corporations has been decreasing (Charts V-1-3 and V-1-4).

The recent upturn in the amount of credit risk at major banks reflects the fact that the effects of the increase in domestic and overseas lending and of an increase in the amount of expected losses exceeded the effects of restraining risks attributable to the improvements in the quality of loans, although similar economic conditions

¹⁵ Credit risk as defined here corresponds 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 with a 99 percent probability of occurrence in 1 year. We use default probability, calculated based on data on borrower classification of bank loans, and the rate of recovery of bank loans when losses occur.

apply to all types of banks.

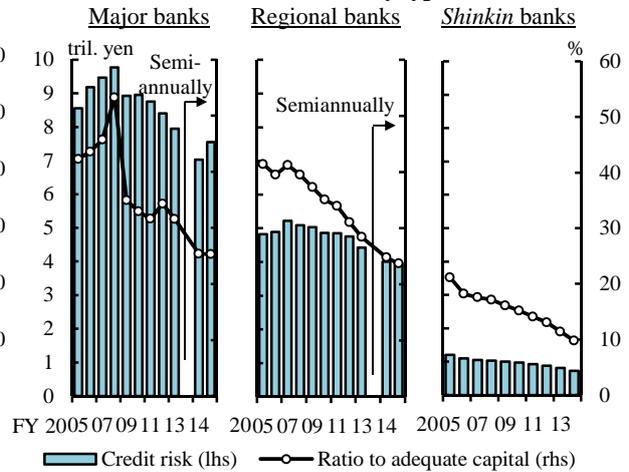
Chart V-1-1: Credit risk among financial institutions^{1,2,3,4,5}



- Notes: 1. Banks and *shinkin* banks are counted.
 2. Credit risk is unexpected losses with a 99 percent confidence level.
 3. Credit risk includes foreign currency-denominated assets.
 4. 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.
 5. For *shinkin* banks, figures for adequate capital and credit risk in the first half of fiscal 2014 are assumed to be unchanged from the end of fiscal 2013.

Source: BOJ.

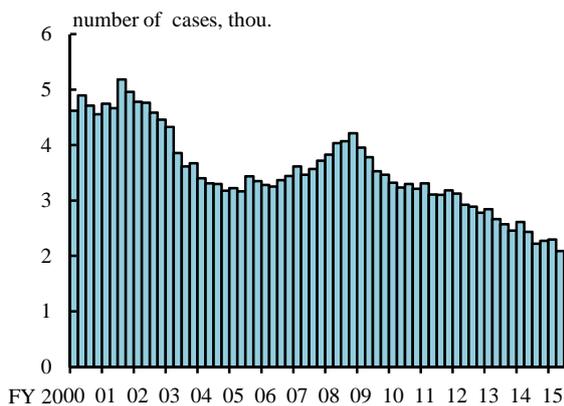
Chart V-1-2: Credit risk by type of bank^{1,2}



- Notes: 1. Credit risk is unexpected losses with a 99 percent confidence level.
 2. Credit risk includes foreign currency-denominated assets.

Source: BOJ.

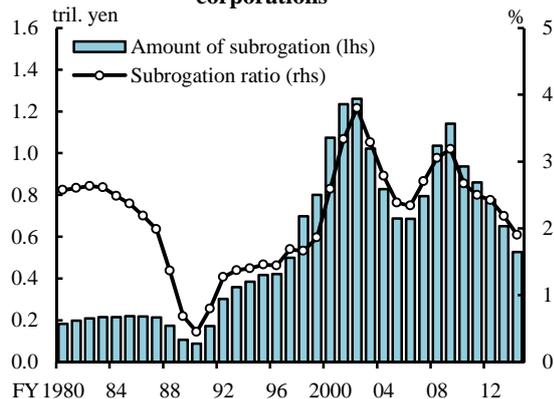
Chart V-1-3: Corporate bankruptcies¹



Note: 1. The latest data are as of the July-September quarter of 2015.

Source: Tokyo Shoko Research, Ltd.

Chart V-1-4: Subrogation by credit guarantee corporations^{1,2,3}

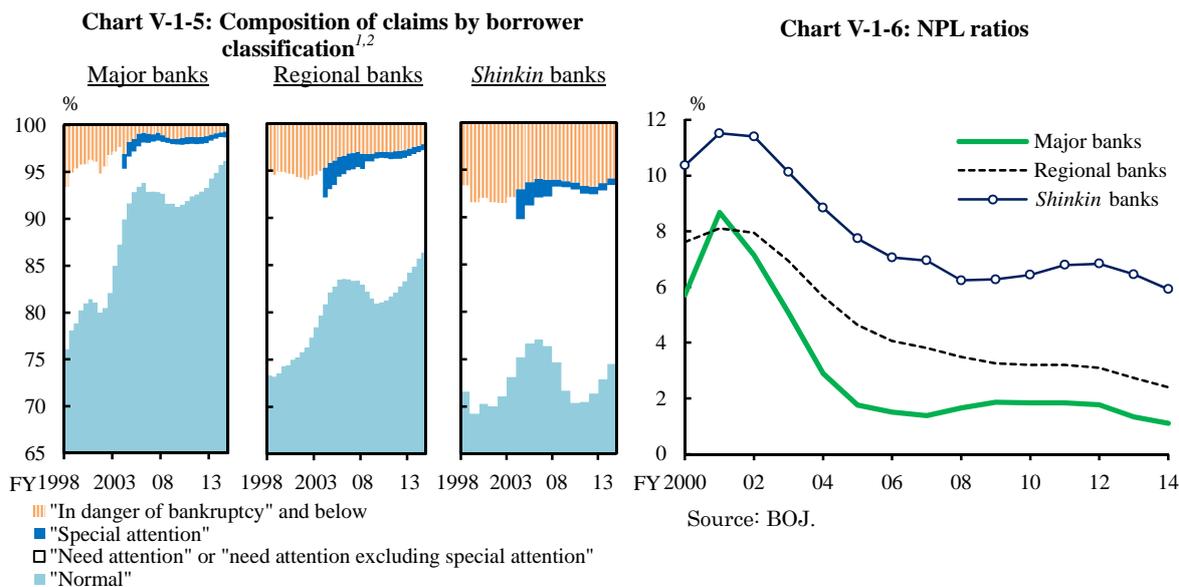


- Notes: 1. The latest data are as of end-March 2015.
 2. Subrogation is a legal doctrine whereby a credit guarantee corporation pays an insured financial institution for losses due to the borrower's bankruptcy.
 3. Subrogation ratio = amount of subrogation / outstanding guaranteed liabilities.

Sources: National Federation of Credit Guarantee Corporations; BOJ.

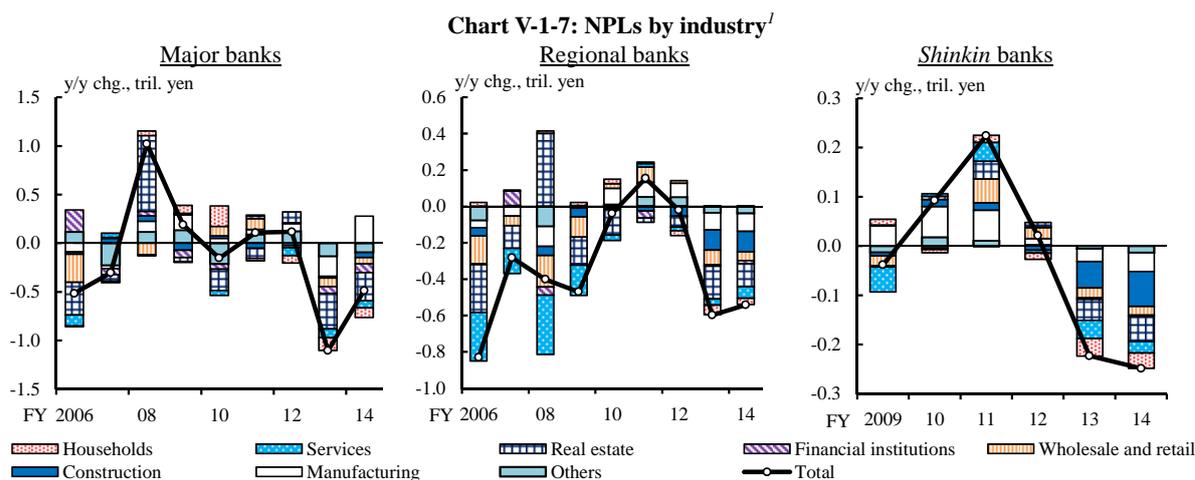
Quality of loans and credit costs

The asset quality (the quality of loans) of 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 V-1-5). The NPL ratio for each type of bank has declined (Chart V-1-6). The amount of NPLs has also declined for almost all types of industries (Chart V-1-7).



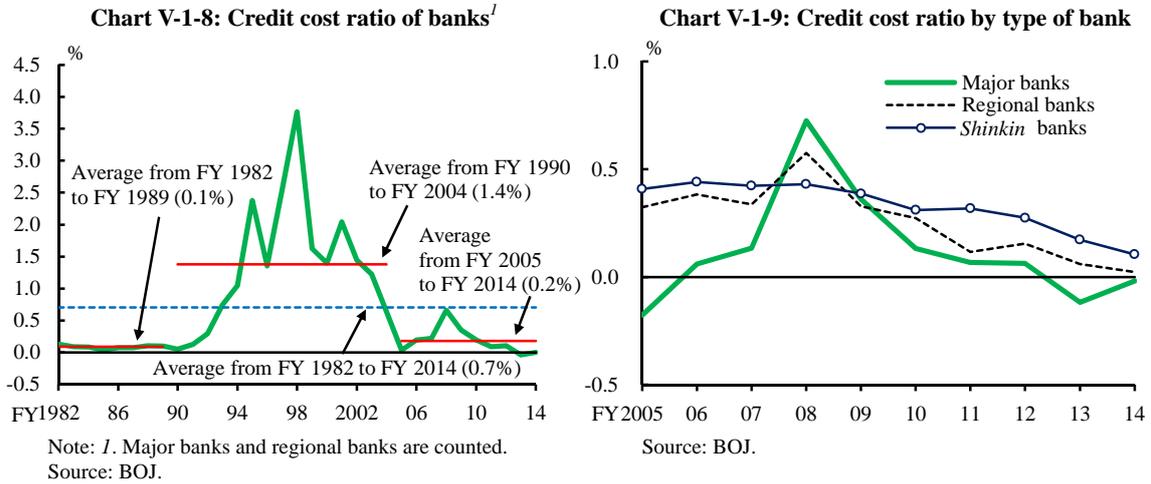
Notes: 1. The latest data are as of end-March 2015.
2. "Need attention" or "need attention excluding special attention" indicates "need attention" through fiscal 2003 and "need attention excluding special attention" from fiscal 2004.

Source: BOJ.



The credit cost ratio of financial institutions is at an extremely low level (Chart

V-1-8). By type of bank, the credit cost ratio for regional banks and *shinkin* banks reached a historically low level, as far as can be confirmed from the available time-series data (Chart V-1-9). For major banks, the ratio has been negative for two consecutive years, while the magnitude of negative figures has shrunk.



Under these circumstances, the loan-loss provision ratios -- already at their lowest level from a long-term perspective -- declined further (Chart V-1-10). The amounts outstanding of loan-loss provisions have continued to decline for both general and special loan-loss provisions for each type of bank (Chart V-1-11).

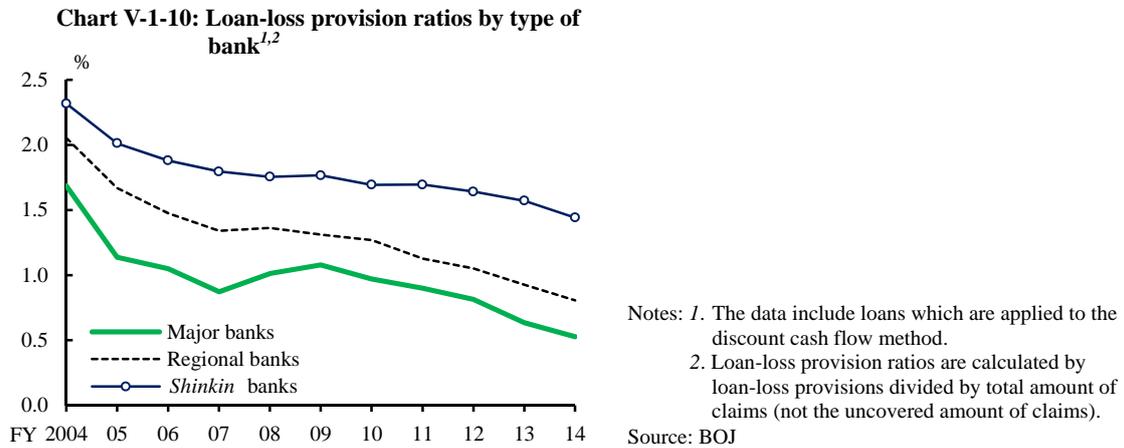
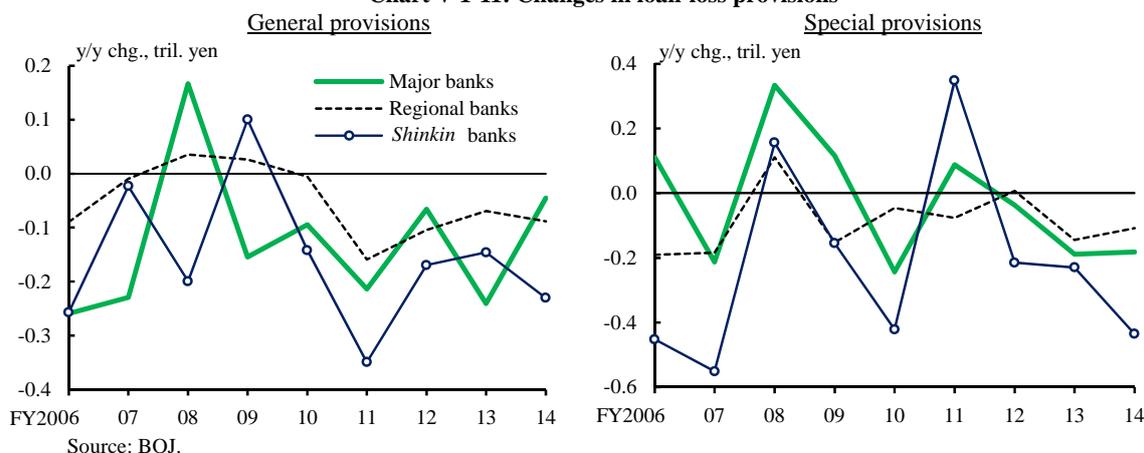


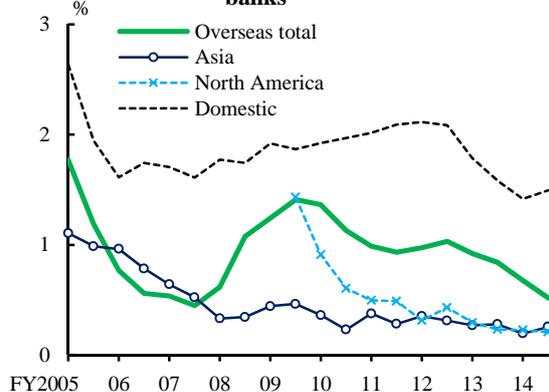
Chart V-1-11: Changes in loan-loss provisions



Credit risk associated with overseas loans

Credit risk associated with overseas loans still remains subdued.¹⁶ Major banks' NPL ratios in major borrowing regions such as North America and Asia have been lower than those for domestic loans (Chart V-1-12). Nevertheless, growth in Asian economies including China has recently been slowing, and concern over a further slowdown has heightened since summer 2015. Careful attention needs to be paid to the effects of these developments on financial institutions' overseas loans.

Chart V-1-12: Overseas NPL ratios of major banks¹



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

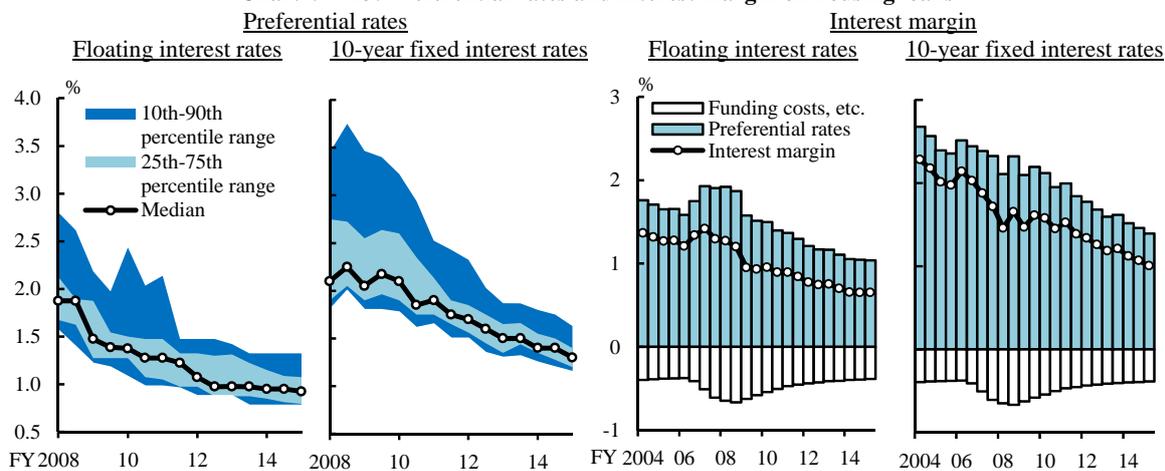
Spreads, credit costs, burden of debt repayments, and profitability related to housing loans

The profitability of housing loans continues to decline. Financial institutions have

¹⁶ The analyses of credit risks, loans outstanding by borrower classification, and credit cost ratios presented above include overseas loans, but the analysis here is solely focused on overseas loans.

increased discounts for their preferential rates on housing loans, and the lending spreads on these loans have continued to narrow (Chart V-1-13).

Chart V-1-13: Preferential rates and interest margin on housing loans^{1,2}



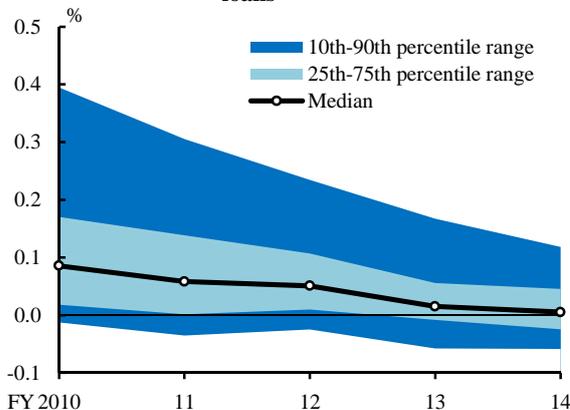
Notes: 1. Major banks and regional banks are counted. The latest data are as of April 2015. Interest margin is assessed at the time of extension.

2. "Funding costs, etc." are the sum of the funding rate and the group credit life insurance premium (assumed to be 0.3 percent).

Sources: Japan Financial News, "Nikken report"; BOJ.

Meanwhile, credit costs associated with housing loans have also declined (Chart V-1-14). However, profitability after taking credit costs into account is considered to be declining, as the pace of decline in lending spreads has exceeded that in credit costs. While banks' credit cost ratio declined by 8 basis points (median) from fiscal 2010 to fiscal 2014, lending spreads declined by 27 basis points for variable rates and by 42 basis points for 10-year fixed rates. Recently, the debt-to-income (DTI) ratio for new housing loans has generally remained unchanged. Nevertheless, it should be noted that the probability of default has a tendency to rise sharply in a non-linear fashion in the event that the DTI ratio exceeds a certain level.¹⁷

Chart V-1-14: Credit cost ratio of housing loans^{1,2}



Notes: 1. Major banks and regional banks are counted. The latest data are as of fiscal 2014.

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 loan guarantee corporations).

Source: BOJ.

¹⁷ See Charts IV-1-17 and IV-1-18 in the April 2015 issue of the Report.

Changes since the previous Report

As discussed above, **the situation surrounding the subdued macro credit risk borne by financial institutions remains largely unchanged from that observed at the time of the previous Report.** That is, loan-loss provision ratios continue to decline in a situation where financial institutions have eased their lending stances with regard to both domestic and overseas lending. This is primarily due to the extremely low levels of credit costs from a long-term perspective, brought about by an improvement in the quality of loans. Lending spreads on loans have also continued to decline. **However, there have been some signs suggesting the possibility that the subdued trend in credit costs will change in the future:** (1) the amount of credit risk has turned to an increase for the first time in 4 and a half years, particularly among major banks; (2) the reversal of loan-loss provisions, which has depressed credit costs over the past few years, has more or less halted; and (3) the pace of growth in Asian economies including China has been slowing, and market concern over a further slowdown has recently been strengthening. At present, these developments have not affected actual credit costs. However, depending on future developments, it is possible that these developments will eventually affect business conditions for some areas that financial institutions have been actively promoting, such as overseas loans, mergers and acquisitions, and loans related to resource development.

Tasks and challenges regarding credit risk management

Taking into account the above, **the following three points continue to be the key tasks and challenges regarding credit risk management of financial institutions.**¹⁸

- (1) It is necessary for financial institutions to improve their credit management capabilities in areas where active engagement in credit extension has been observed.
- (2) It is necessary to continuously examine the adequacy of how the amount of credit risk is estimated and provisions are calculated, taking into account expectations for future developments.¹⁹ Financial institutions should appropriately factor in

¹⁸ The three tasks and challenges raised here are basically unchanged from the previous Report. For details, see Chapter IV of the April 2015 issue of the *Report*.

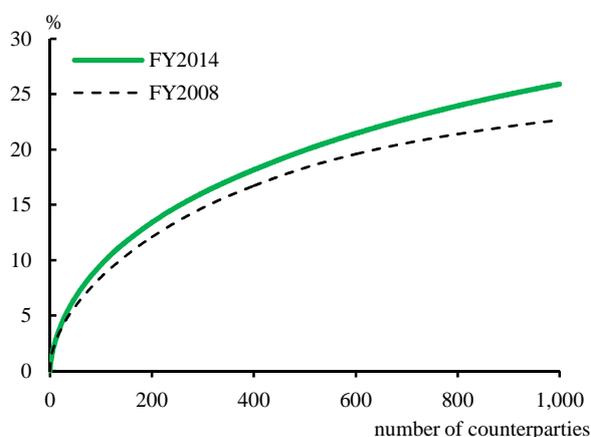
¹⁹ In relation to this challenge, the Bank has released "Recent Developments in Loan-Loss Provision Calculation by Regional Financial Institutions," *Financial System Report Annex Series*, August 2015 (available only in Japanese).

expected effects on future developments that are not reflected in past figures and smooth out the effects of business cycles.

(3) It is necessary to make appropriate assessments of risk and return in loans.

In relation to these tasks and challenges, Boxes 1 and 2 discuss recent developments in M&A-related loans -- which have been increasing among major banks -- and loans for the housing rental business -- which have been growing at a faster pace particularly among regional financial institutions -- respectively, and address issues regarding credit management. At the same time, as major banks have been actively engaged in such areas as overseas resource development and project financing, as well as in loans to non-Japanese firms and in M&A-related loans, their overseas exposure has been increasing, with a gradual increase in large exposures (Chart V-1-15). In conducting risk management, while taking into account such changes in portfolio characteristics, it is necessary for banks to grasp the size of credit risks in a timely and appropriate manner by, for example, gauging the risks of concentration to large exposures, conducting stress testing on the assumption of future environmental changes, and by developing early-warning methods (Chart V-1-16). From this viewpoint, Box 3 discusses some examples of more advanced credit risk analysis.

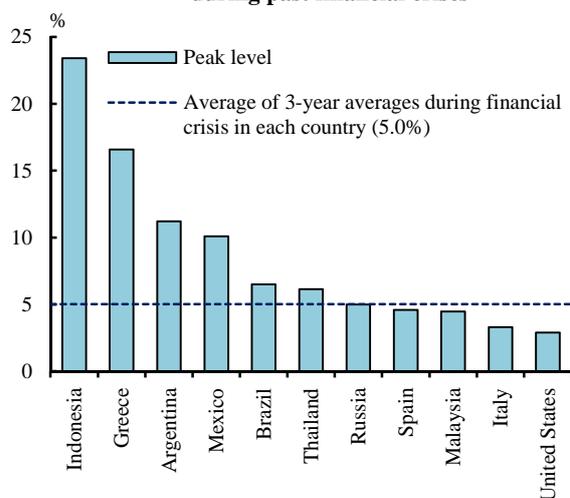
Chart V-1-15: Cumulative share of credit amount^{1,2}



Notes: 1. Major banks are counted.
2. Cumulative share of credit amount to total credit amount, where the credits are sorted in descending order.

Source: BOJ.

Chart V-1-16: Credit cost ratio in each country during past financial crises^{1,2}



Notes: 1. The financial crisis in each area/country refers to the European debt crisis (from 2011 to 2013) in the euro area, the Lehman crisis (from 2008 to 2010) in the U.S., the default crisis (from 2001 to 2003) in Argentina, and the Asian currency crisis and its contagion (from 1998 to 2000) in Asia and the other areas.

2. Credit cost ratios in the chart are defined as follows. Those in the euro area are provision expenses and impairment charges to loans and receivables. Those in the U.S. are total net loan charge-offs to total loans. Those in Asia and other countries are provision expenses to total loans.

Sources: ECB, "Consolidated banking data"; Federal Financial Institutions Examination Council; Jack Glen, Camilo Mondragon-Velez, "Business cycle effects on commercial bank loan portfolio performance in developing economies"; Sarawan Angklomkiew, Jason George, Frank Packer, "Issues and developments in loan loss provisioning: the case of Asia", BIS Quarterly Review, December 2009.

B. Market risk

1. Yen interest rate risk

Interest rate risk associated with yen-denominated bond investment

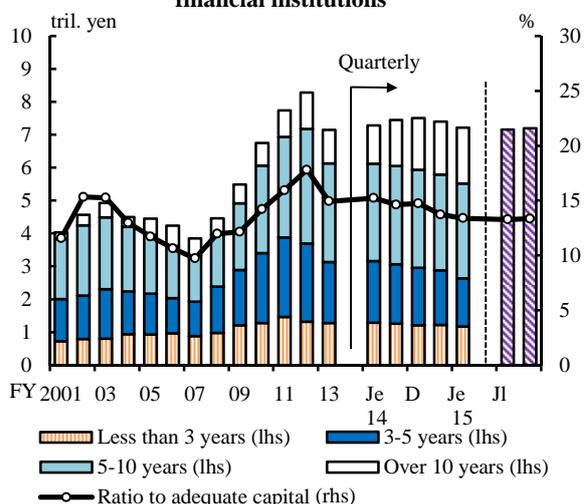
The amount of interest rate risk on yen-denominated bonds held by financial institutions remains at a relatively high level from a long-term perspective, although it has decreased somewhat from the level observed in the previous Report.²⁰ The amount of risk was down by 4.2 percent, from 7.5 trillion yen at the end of December 2014 to 7.2 trillion yen at the end of August 2015 (Charts V-2-1 to V-2-3).²¹ The amount of risk decreased more slowly than did the outstanding amount of bonds during this period (a 6.8 percent decrease from end-December 2014), because a considerable number of regional banks and *shinkin* banks have prolonged the duration of their bondholdings, as seen in Chapter IV (Charts V-2-4 and V-2-5). The amount of risk as of the end of August 2015 is at a level approximately 10 percent below the latest peak of 8.3 trillion yen reached at the end of March 2013. Heterogeneity in the

²⁰ The analysis here uses capital losses on bondholdings in the case of a "parallel shift" of (100 bpv) -- in which interest rates for all maturities rise by 1 percentage point -- as an indicator of interest rate risk.

²¹ The estimates for the amount of interest rate risk on yen-denominated bonds at the end of quarters are calculated using standardized datasets prepared by financial institutions on their bondholdings by remaining maturity. On the other hand, the estimates at the latest month(s), including at the end of August 2015, are extrapolated using internal risk calculations by individual financial institutions. For details on the accounting standards for financial institutions' bondholdings, see Box 9 in the October 2012 issue of the *Report*.

risk-taking stance of individual financial institutions has increased, in a situation where the overall amount of risk remains at a high level (Chart IV-1-29).

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



Notes: 1. Banks and *shinkin* banks are counted. The latest data are as of end-August 2015. The data from end-July 2015 are estimated.
2. Interest rate risk: 100 basis point value in the banking book.
3. Convexity and higher-order terms are taken into account.

Source: BOJ.

Chart V-2-2: Effects of a rise in interest rates on capital losses on yen-denominated bondholdings¹

Upward shift by 1 percentage point

tril. yen		Parallel shift scenario			Steepening scenario		
		End-Dec. 2014	End-Mar. 2015	End-June 2015	End-Dec. 2014	End-Mar. 2015	End-June 2015
	Financial institutions	-7.5	-7.4	-7.2	-4.8	-4.7	-4.7
	Banks	-5.5	-5.4	-5.1	-3.3	-3.2	-3.1
	Major banks	-2.7	-2.6	-2.3	-1.6	-1.5	-1.3
	Regional banks	-2.8	-2.8	-2.8	-1.8	-1.8	-1.8
	<i>Shinkin</i> banks	-2.0	-2.0	-2.1	-1.5	-1.5	-1.6

Upward shift by 2 percentage points

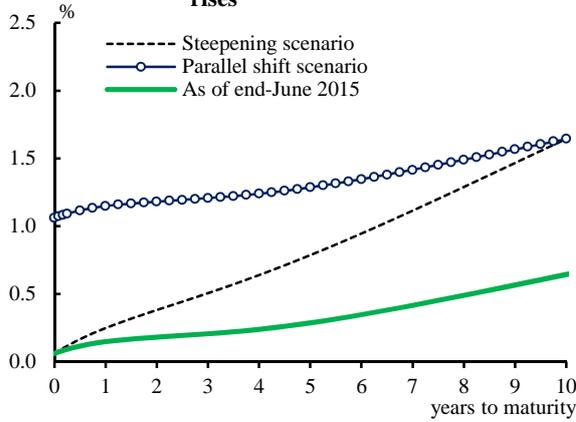
tril. yen		Parallel shift scenario			Steepening scenario		
		End-Dec. 2014	End-Mar. 2015	End-June 2015	End-Dec. 2014	End-Mar. 2015	End-June 2015
	Financial institutions	-14.4	-14.2	-13.8	-9.1	-9.0	-9.0
	Banks	-10.6	-10.4	-9.8	-6.3	-6.2	-5.9
	Major banks	-5.2	-5.0	-4.4	-3.0	-2.8	-2.6
	Regional banks	-5.5	-5.4	-5.3	-3.4	-3.4	-3.4
	<i>Shinkin</i> banks	-3.7	-3.8	-4.0	-2.8	-2.8	-3.0

Upward shift by 3 percentage points

tril. yen		Parallel shift scenario			Steepening scenario		
		End-Dec. 2014	End-Mar. 2015	End-June 2015	End-Dec. 2014	End-Mar. 2015	End-June 2015
	Financial institutions	-20.7	-20.4	-19.8	-13.1	-12.9	-12.8
	Banks	-15.3	-14.9	-14.1	-9.1	-8.9	-8.5
	Major banks	-7.5	-7.2	-6.4	-4.2	-4.0	-3.7
	Regional banks	-7.9	-7.8	-7.7	-4.9	-4.8	-4.8
	<i>Shinkin</i> banks	-5.4	-5.4	-5.7	-4.0	-4.1	-4.3

Note: 1. Convexity and higher-order terms are taken into account.
Source: BOJ.

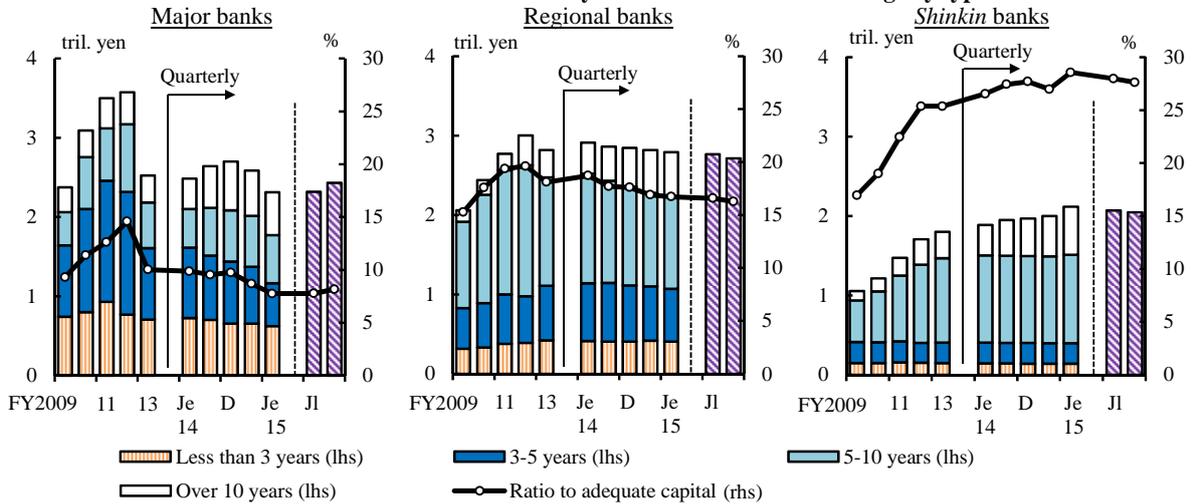
Chart V-2-3: Assumptions for the yield curve in the case of yen-denominated interest rate rises¹



Note: 1. A parallel shift scenario represents a situation in which yields on all maturities shift upward from the baseline by 1 percentage point. A steepening scenario represents a situation in which the 10-year interest rate shifts upward from the baseline by 1 percentage point.

Sources: Bloomberg; BOJ.

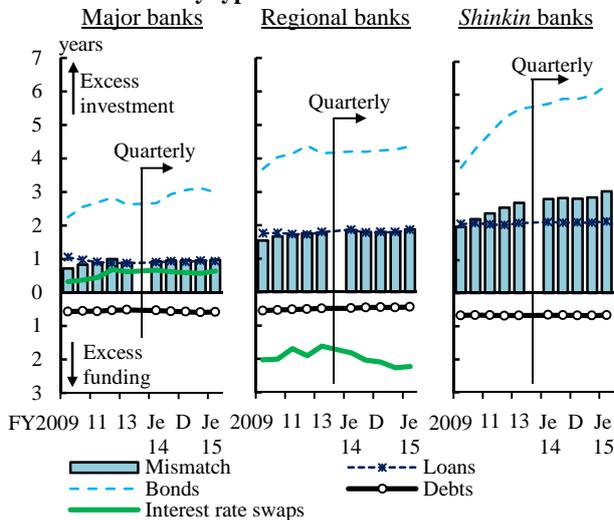
Chart V-2-4: Interest rate risk associated with yen-denominated bondholdings by type of bank^{1,2,3}



Notes: 1. The latest data are as of end-August 2015. The data from end-July 2015 are estimated.
2. Interest rate risk: 100 basis point value in the banking book.
3. Convexity and higher-order terms are taken into account.

Source: BOJ.

Chart V-2-5: Average remaining maturity of yen-denominated assets and liabilities by type of bank¹



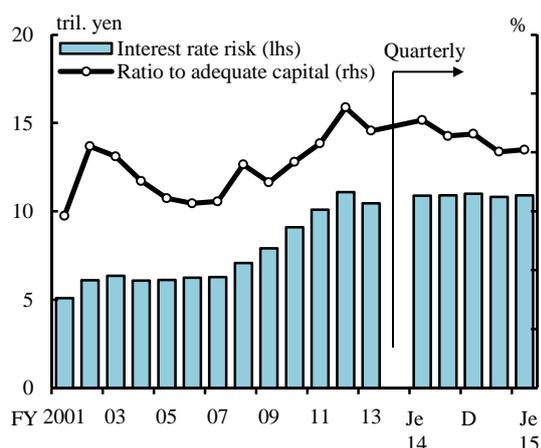
Note: 1. The mismatch is the difference between the average remaining maturity of assets and that of liabilities. The average remaining maturity of assets is the weighted average of loans, bonds, and interest rate swaps with interest receipts. The average remaining maturity of liabilities is the weighted average of debts and interest rate swaps with interest payments. The average remaining maturity of interest rate swaps is the difference between interest rate swaps with interest receipts and those with interest payments.

Source: BOJ.

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 more or less unchanged since the previous *Report* (Charts V-2-6 and V-2-7).²² While the amount of interest rate risk on yen-denominated bonds declined, the amount of yen interest rate risk on balance sheets as a whole has remained constant. This is attributable to a widening of the maturity mismatch among deposits and loans due to an increase in fixed-interest rate loans in a situation where many financial institutions, particularly regional ones, have maintained their focus on housing loans. At the same time, there is great heterogeneity -- as is the case for interest rate risk on yen-denominated bonds -- in the amount of yen interest rate risk on individual financial institutions' balance sheets.

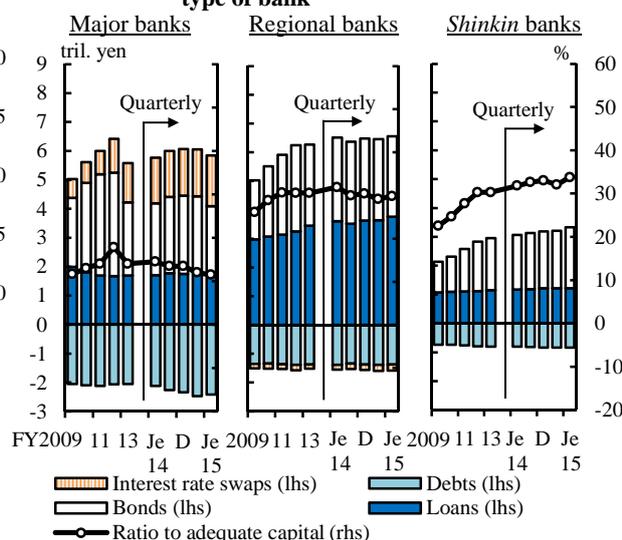
Chart V-2-6: Yen-denominated interest rate risk among financial institutions^{1,2,3}



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

Source: BOJ.

Chart V-2-7: 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.

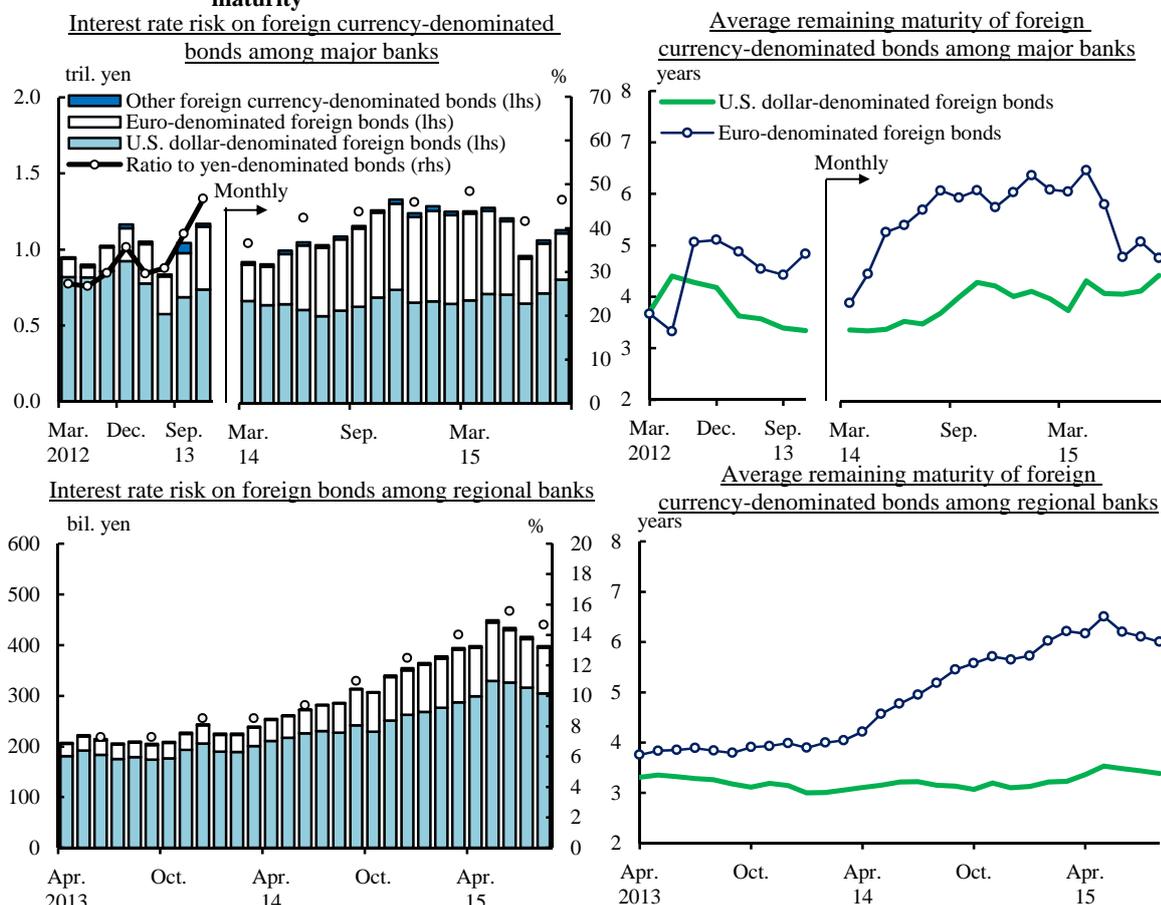
Source: BOJ.

²² The 100 basis point value estimates losses in economic value associated with all assets and liabilities under a parallel shift in the yield curve in which interest rates for all maturities increase by 1 percentage point. When the average remaining maturity of assets is longer than that of liabilities, a widening of maturity mismatch (the difference between the average remaining maturities of assets and liabilities) leads to a greater amount of interest rate risk. Nevertheless, the 100 basis point value is calculated only for the interest rate risk associated with yen-denominated assets (loans and bonds), yen-denominated liabilities, and yen interest rate swaps (only banks are counted). It does not reflect the risk associated with foreign currency-denominated assets and liabilities and off-balance-sheet transactions other than yen interest rate swaps. We set the remaining maturity of demand deposits within 3 months in calculating the 100 basis point value of liabilities and do not take into account core deposits.

2. Foreign currency interest rate risk

The amount of interest rate risk associated with foreign currency-denominated bond investment at financial institutions has increased somewhat since the previous *Report*. The amount of risk for banks (the sum of figures for major banks and regional banks) was up by 3.9 percent, from the end of September 2014 to 1.5 trillion yen at the end of August 2015 (Chart V-2-8).²³ As seen in Chapter IV, while major banks have generally adopted a restraining stance with regard to investment in foreign currency-denominated bonds, regional banks have constantly accumulated such bonds as U.S. government bonds and bonds of foreign financial institutions.

Chart V-2-8: 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-August 2015.

2. Interest rate risk: 100 basis point value in the banking book.

3. Average remaining maturity is estimated by the interest rate risk. Off-balance-sheet transactions of major banks are included. Off-balance sheet transactions of regional banks are excluded.

Source: BOJ.

²³ In order to allow for a decomposition of interest rate risks of the U.S. dollar and the euro as well as for a more timely assessment, the data source for major banks has been switched from information disclosed by relevant sources to those based on the sum of internally managed figures. Accordingly, the amount of interest rate risk on foreign currency-denominated bonds for major banks now refers to "hedged" figures instead of the former "unhedged." Thus, there is no continuity between figures in this *Report* and those in previous issues.

The ratio of the amount of interest rate risk on foreign currency-denominated bonds to that on yen-denominated bonds has reached a level of almost 50 percent at major banks and almost 20 percent at regional banks.

3. Market risk associated with stockholdings

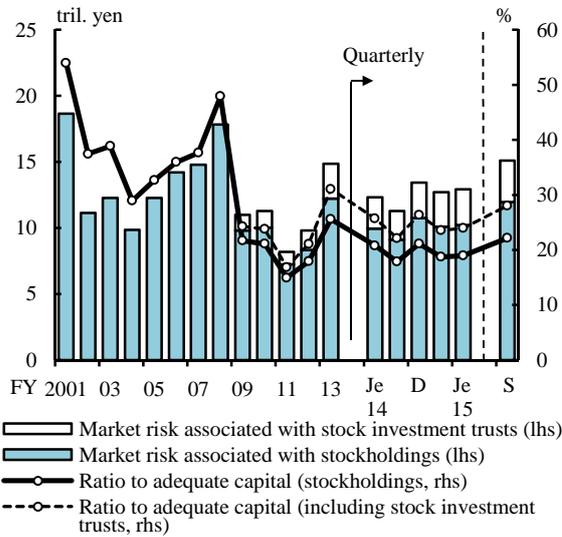
The amount of market risk associated with stockholdings at financial institutions has decreased somewhat since the previous *Report*. The amount of risk was down by 3.9 percent, from 13.4 trillion yen at the end of December 2014 to 12.9 trillion yen at the end of June 2015 (Charts V-2-9 through V-2-11).²⁴ **It should be noted, however, that this decrease is primarily due to the lower stock price volatility as of June 2015 compared with that as of December 2014; market exposure itself has been increasing.** While the amount outstanding 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 diversification in market investment, which has in turn boosted their amounts outstanding of stockholdings, including stock investment trusts.

Since summer 2015, the volatility of stock prices has been rising with a decline in stock prices. **According to an estimate based on developments in stock prices and their volatility through the end of September 2015, the amount of market risk associated with stockholdings at the end of September 2015 stood at 15.1 trillion yen, an increase of 12.4 percent since the previous *Report*.**²⁵ As seen above, fluctuations in the amount of market risk associated with stockholdings depend largely on the market developments. Effects on the financial conditions of financial institutions therefore remain considerable.

²⁴ The market risk associated with stockholdings presented here is estimated using a VaR with a 99 percent confidence level and 1-year holding period. It includes the risk associated with stock investment trusts.

²⁵ From end-June through end-September 2015, stock prices fell by 13.4 percent, while their volatility rose by 35.1 percent. Normally, a decline in the market value of stockholdings reflecting the fall in stock prices causes a decrease in the amount of risk. Because the rate of rise in volatility exceeded the rate of decline in stock prices, however, the amount of market risk associated with stockholdings increased by 16.9 percent.

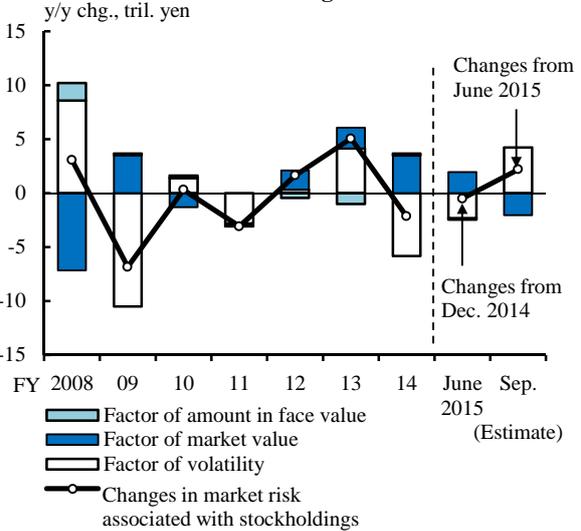
Chart V-2-9: Market risk associated with stockholdings among financial institutions^{1,2,3,4}



Notes: 1. Banks and *shinkin* banks are counted. The latest data are as of end-September 2015.
 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-June 2015 and stock prices as of end-September 2015.

Source: BOJ.

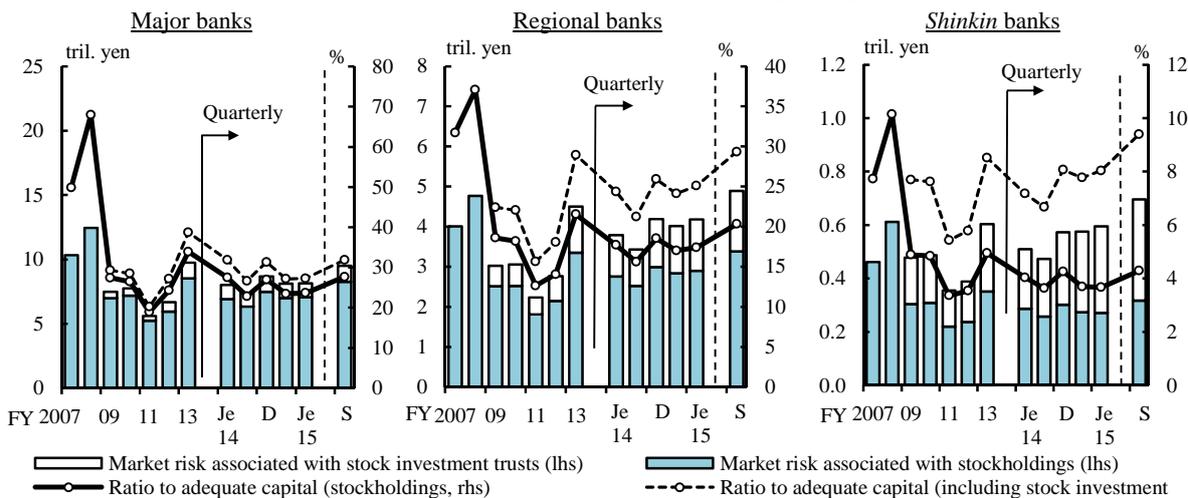
Chart V-2-10: Decompositions of changes in market risk associated with stockholdings^{1,2,3}



Notes: 1. Banks and *shinkin* banks are counted.
 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. Fiscal 2008 data for stock investment trusts are excluded from the figures.

Source: BOJ.

Chart V-2-11: Market risk associated with stockholdings by type of bank^{1,2,3,4}



Notes: 1. The latest data are as of end-September 2015.
 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-June 2015 and stock prices as of end-September 2015.

Source: BOJ.

Changes since the previous Report

As discussed above, **the situation surrounding financial institutions' macro market risks has been largely unchanged from the previous Report.** Specifically, (1) financial institutions as a whole have maintained their trend of proceeding with diverse risk taking through financial products such as investment trusts, while maintaining high levels of yen interest rate risk; (2) heterogeneity in risk-taking stances by type of bank or of individual institutions has been increasing -- with some banks adopting a cautious stance and others increasing their amount of risk -- reflecting varying levels of profit expectations for their market divisions; and (3) although strategic stock investment has been on a moderate declining trend, market risk associated with stockholdings remains large enough to have considerable effects on banks' capital strength and profits. Under these circumstances, volatility in global financial markets, including that in Japan, has been increasing. If this trend is further reinforced, it can affect the amount of risks borne by, and the financial bases of, financial institutions.

Tasks and challenges in market risk management

Given the above, **the following two points can be raised as key tasks and challenges in market risk management for financial institutions.**²⁶

- (1) Financial institutions need to take and manage risks appropriately under clear securities investment and asset-liability management (ALM) strategies, and accurately grasp the profile of diverse risk factors from a cross-sectional and multi-dimensional perspective.
- (2) Financial institutions need to appropriately assess the purpose of strategic stockholdings and thereby continue their efforts to reduce the related risk.

Gaining a cross-sectional understanding of the profile of diverse risk factors is considered crucial, as financial institutions are now taking on more diverse risks in addition to yen interest rate risk, such as risks associated with foreign currency interest rates, stockholdings, real estate, and foreign exchange. In gaining such an understanding it is important to analyze the relevant risks from multiple

²⁶ The two tasks and challenges raised here are largely unchanged from the previous Report in terms of their essence. However, they have been reorganized from a cross-sectional view of risks, as this Report has categorized interest rate risk and market risk associated with stockholdings as market risk, starting with this issue. See also Chapter IV of the April 2015 issue of the Report.

dimensions, for example fluctuations in the market values of assets as well as in the amount of profits. With regard to mark-to-market risk of securities portfolios, it is necessary to set appropriate levels of risk tolerance based on factors such as the amount of risk and mark-to-market -- both realized and unrealized -- gains/losses, and to examine measures in preparation for market fluctuations while enriching the risk analyses in accordance with the diversification of market investment (Box 4 presents a case of risk analysis of securities portfolios, taking regional financial institutions as an example). In addition, with regard to volatility risk of profits from a longer-term perspective, it is necessary to conduct simulations and stress testing on a wide range of profits including loans and deposits businesses, thereby assessing the impact on profitability and capital strength as well as management actions under various scenarios. By establishing clear strategies for securities investment and ALM in such a manner, an orderly response to changes in market conditions becomes possible. It should also be noted that management of yen interest rate risk, which is at a high level when compared with the past, remains important. In yen interest rate risk management, financial institutions should formulate coherent policies on how to recognize their core deposits. It would also be useful to examine the ALM over a longer horizon from a broad perspective, e.g., the outstanding amounts of loans and deposits, their composition and interest rates, and the absorption of funds by financial products other than deposits.

C. Funding liquidity risk

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

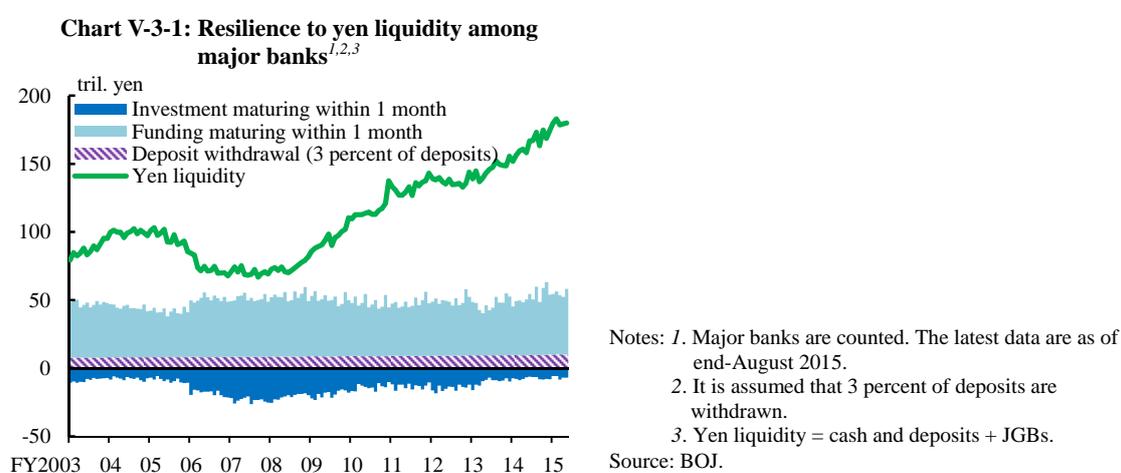
Yen funding liquidity risk

Financial institutions have sufficient funding liquidity in yen funds.

²⁷ The turbulence in global financial markets in and after the summer of 2007 as well as the subsequent financial crisis have left an important lesson that the tightening of liquidity conditions could well shake the foundation for financial institutions' business conditions. The central banks of advanced countries took extraordinary measures to jointly counter the increase in foreign currency liquidity risk when faced with a significant impairment of the functioning of currency and foreign exchange swap markets. Based on these lessons, the Basel III includes new regulations to enhance liquidity risk management by financial institutions in terms of both (1) the stability of the structure of the investment-funding balance (the net stable funding ratio, NSFR) and (2) resilience against a short-term stress situation (the liquidity coverage ratio, LCR). Of these, the LCR has been applied to internationally active banks starting end-March 2015.

With respect to the structure of investment and funding of the yen, stability 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 loan-to-deposit difference is invested in highly liquid securities such as JGBs or current account deposits at the Bank of Japan.

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



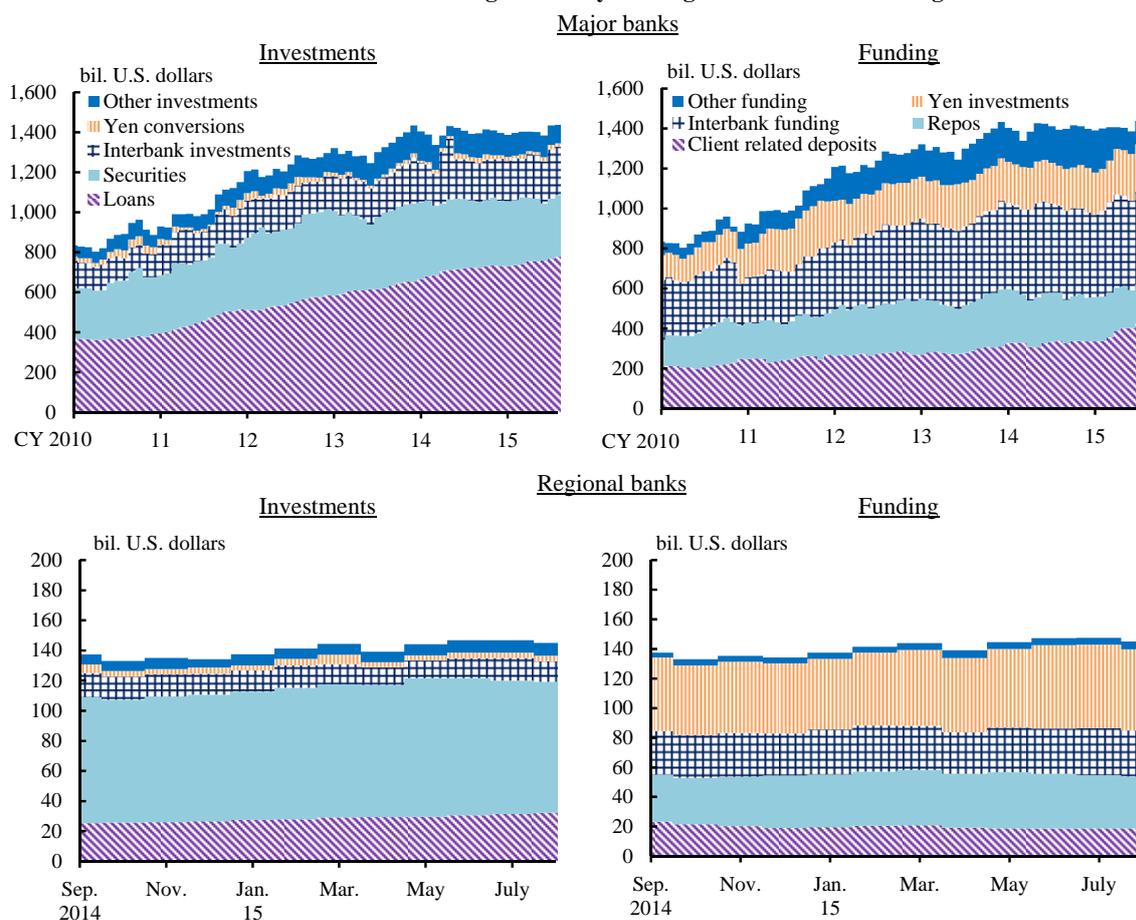
Funding liquidity risk for foreign currencies

Foreign currency-based funding has a funding structure with a large proportion of market funding. Looking at banks as a whole, however, there is a liquidity buffer that can cover funding shortages even if market funding becomes difficult for a certain period.

With respect to the structure of investment and funding of foreign currencies, a large proportion of foreign currencies is invested in loans with relatively long maturities and in foreign bonds, and a large share of funding is raised by short-term market funding, such as repos, currency and foreign exchange swaps, and interbank borrowings (Chart V-3-2).

²⁸ In accordance with the concept of the LCR, here we assume 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 used here are assumed, such as the withdrawal of the lines of credit committed to customers, downgrading of credit, and outflow of collateral for margin calls. Thus, it should be noted that the assumption does not match the definition used here.

Chart V-3-2: Structure of foreign currency funding and investments among banks^{1,2}

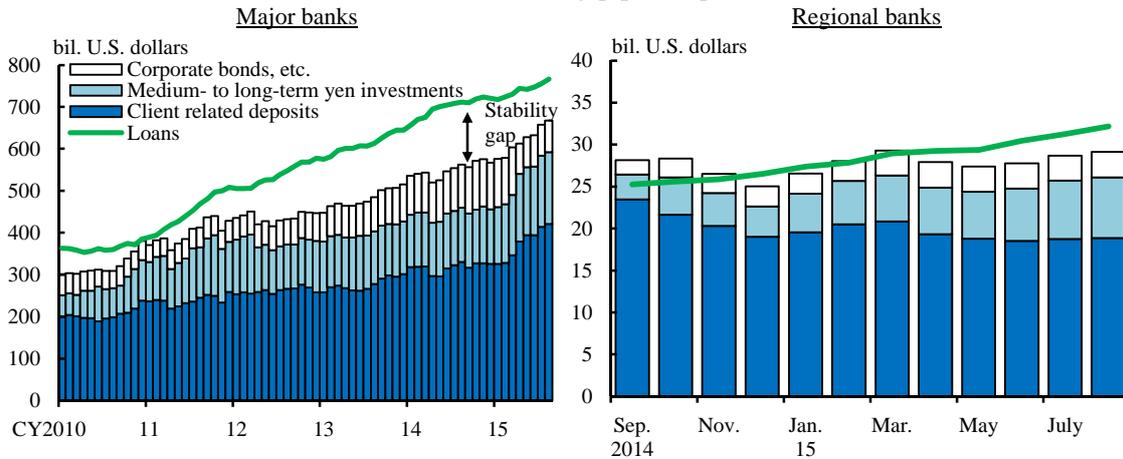


Notes: 1. Major bases of major banks are counted. Total investments and total funding are not equal due to data availability.
 2. The latest data are as of end-August 2015.
 Source: BOJ.

However, the majority of securities are highly liquid assets, such as U.S. government bonds, which can be liquidated through repo borrowings or sales even in the event of market stress. Therefore, in assessing the stability of the investment and funding structure of foreign currencies, it is useful to monitor the gap between the amount (the "stability gap") of illiquid loans and stable funding through, for example, customer deposits, medium- to long-term currency and foreign exchange swaps, and corporate bonds (Chart V-3-3).²⁹

²⁹ Of medium- to long-term currency and foreign exchange swaps, careful attention should be paid to currency and foreign exchange swap arrangements that require adjustments to fluctuations in principal amounts at the time of quarterly interest payments, as additional liquidity becomes necessary on a quarterly basis in the event that the yen depreciates against a foreign currency.

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



Notes: 1. Internationally active banks for major banks are counted. Major bases are counted.

2. The latest data are as of end-August 2015.

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.

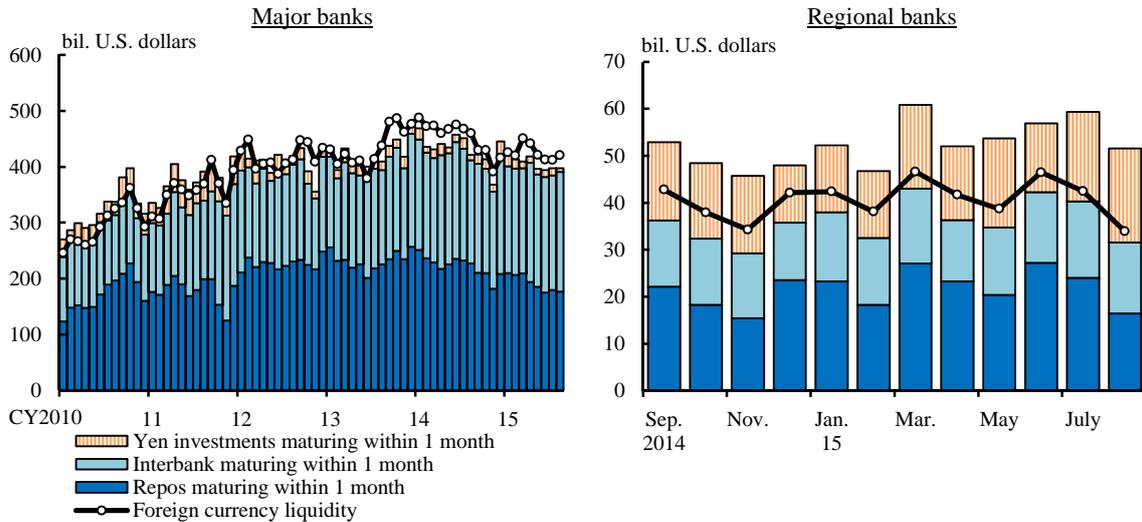
Source: BOJ.

The stability gap had continued to widen among major banks since 2011, but has recently started to narrow. While loans have continued to increase, this narrowing is attributable to banks' efforts to enhance their stable funding sources, particularly through increasing customer deposits and medium- to long-term currency and foreign exchange swap funding. When assessing risks, however, it should be noted that the stability gap still remains considerable in size and that a major portion of the customer deposits are held by large customers and are therefore not necessarily stable. Meanwhile, at regional banks the stability gap has gradually been widening, reflecting an increase in the number of banks working to increase foreign-currency loans, but the gap remains limited in scale so far. Nonetheless, it should be noted that some regional banks, which have been actively accumulating foreign-currency assets, need to work to enhance their stable funding bases.

As for the resilience of foreign currency-based funding against short-term stress, both major banks and regional banks generally hold liquid assets to cover the outflow of funds expected under the stress in which market funding comes to a halt for about 1 month (Chart V-3-4).³⁰

³⁰ We include repo borrowings with remaining maturities of 1 month or less as liquid assets, by assuming that the collateral being 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. Compared with the previous *Report*, more conservative assessments of resilience against stresses have been made by expanding the coverage of funds expected to constitute an outflow of funds to overall interbank borrowing. However, it should be kept in mind that the unused commitment line is not reflected in this result.

Chart V-3-4: Resilience to foreign currency liquidity among banks^{1,2}



Notes: 1. Major bases of major banks are counted. The latest data are as of end-August 2015.
 2. Foreign currency liquidity = cash and deposits + unencumbered U.S. treasuries + repos maturing within 1 month.
 Source: BOJ.

Recent foreign currency-based funding environment

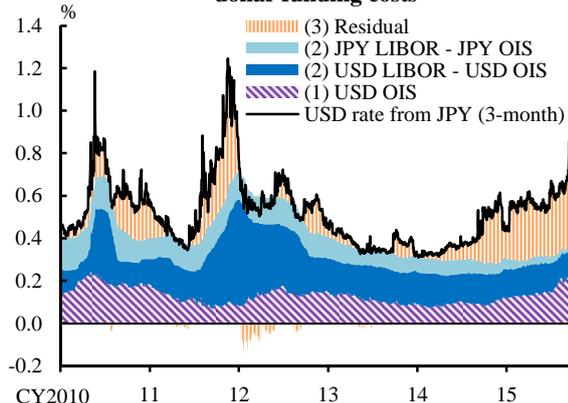
The environment for foreign currency-based market funding through currency and foreign exchange swaps of Japanese banks has generally remained favorable. However, the cost of foreign currency-based funding, particularly the cost of U.S. dollar funding through the currency and foreign exchange swap markets, has continued to rise (Charts V-3-5 and V-3-6).

Chart V-3-5: Trading volumes of FX swaps^{1,2}



Notes: 1. The latest data are as of September 2015.
 2. Tokyo Foreign Exchange Market via brokers.
 Monthly average of daily trading volume.
 Source: BOJ.

Chart V-3-6: Breakdown of the short-term U.S. dollar funding costs^{1,2,3}

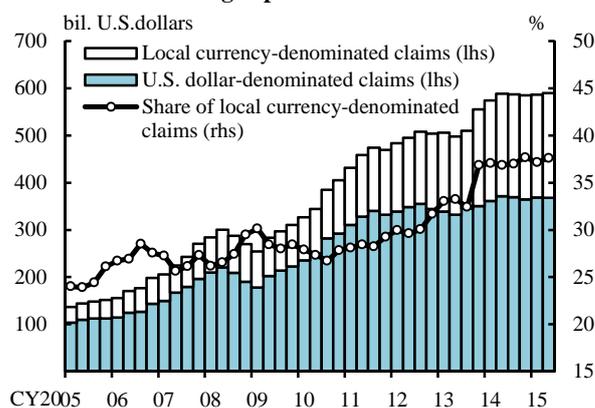


Notes: 1. The latest data are as of September 30, 2015.
 2. (1) USD OIS = a forecast of the U.S. policy rate, (2) USD LIBOR - USD OIS = the dollar funding premium, (2) JPY LIBOR - JPY OIS = the yen funding premium.
 3. For details, see Masatoshi Ando, "Recent Development in U.S. Dollar Funding Costs through FX Swaps," Bank of Japan Review, 12-E-3, April 2012.
 Source: Bloomberg.

Factors behind this trend are thought to be that: (1) foreign-currency funding of Japanese banks has been increasing; and (2) major U.S. and European banks, which are key counterparties of Japanese banks, are reviewing and making substantial changes to their businesses, including the downsizing of their market divisions in response to the implementation of various international financial regulations. When the cost of dollar funding is broken down into three areas, i.e., (1) the OIS regarding future developments in policy interest rates in the United States; (2) the funding premium in inter-bank markets (LIBOR-OIS); and (3) "others", which reflects such factors as supply and demand conditions in the market, it is the third area that contributes most to the recent rise in dollar funding costs. This suggests the possibility that supply and demand conditions might have tightened, due to both an increase in market funding by Japanese banks and to the increasingly cautious lending stance of European and U.S. banks.

At the same time, the situation of local currencies other than the U.S. dollar shows that the weight of local currency-denominated loans has been increasing, particularly in Asia (Chart V-3-7). The funding environment facing Japanese banks varies greatly depending on the country and region: currencies with high loan-to-deposit ratios, such as the Australian dollar and the Hong Kong dollar; and currencies with limited size of currency and foreign exchange swap markets, such as the South Korean won and the New Taiwan dollar (Charts V-3-8 and V-3-9).

Chart V-3-7: Currency-denominated claims for Asia among Japanese banks^{1,2}

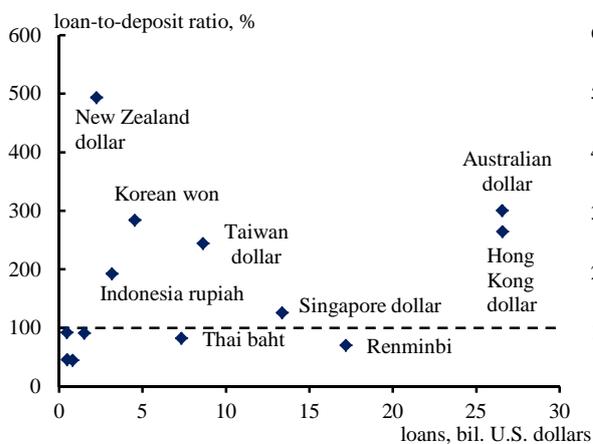


Notes: 1. "U.S. dollar denominated claims" includes not only local currency-denominated cross-border claims but also foreign currency except for U.S. dollar denominated claims.

2. The latest data are as of end-June 2015.

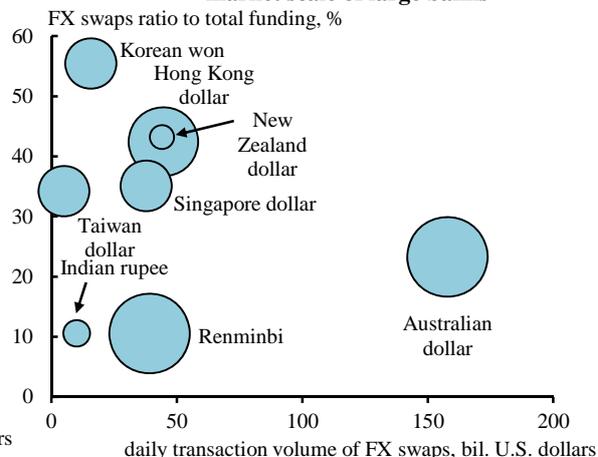
Sources: BIS, "Consolidated banking statistics"; BOJ.

Chart V-3-8: Large banks' loans outstanding and loan-to-deposit ratios by currency¹



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

Chart V-3-9: Dependence on FX swaps and market scale of large banks^{1,2,3,4}



Notes: 1. Five major banks are counted.
2. The size of circles shows the outstanding amount of total investment assets on each currency as of end-March 2015.
3. The outstanding amount of funds through FX swaps and total investment assets are as of end-March 2015.
4. Transaction volume of FX swaps is an average turnover traded by global major financial institutions in April 2013. Daily average.
Sources: BIS, "Triennial Central bank Survey"; BOJ.

Changes since the previous Report

The fact that the stability gap has started to narrow, reflecting efforts by major banks to enhance their stable funding sources, is a relatively significant change with regard to financial institutions' macro foreign currency funding liquidity risk. Nevertheless, the stability gap still remains large. There has been no change to the situation in which foreign currency funding costs keep rising, although the funding environment for foreign currencies has generally remained favorable. Some regional banks are also faced with relatively large stability gaps. Moreover, Japanese banks' local currency-denominated foreign assets have been increasing. Under these circumstances, the volatility of global financial markets has recently increased. If this trend is further reinforced, the effects may spread to the market funding environment of Japanese banks.

Tasks and challenges regarding foreign currency-based funding liquidity risk management

Given the above, the following two points continue to be the key tasks and challenges in terms of management of foreign currency liquidity risk for financial

institutions.³¹

- (1) Financial institutions need to continue with efforts to secure stable foreign currency funding bases and strengthen their ability to respond to potential market stresses.
- (2) Liquidity risk management of local currencies other than the U.S. dollar, such as Asian or European currencies, needs to be enhanced.

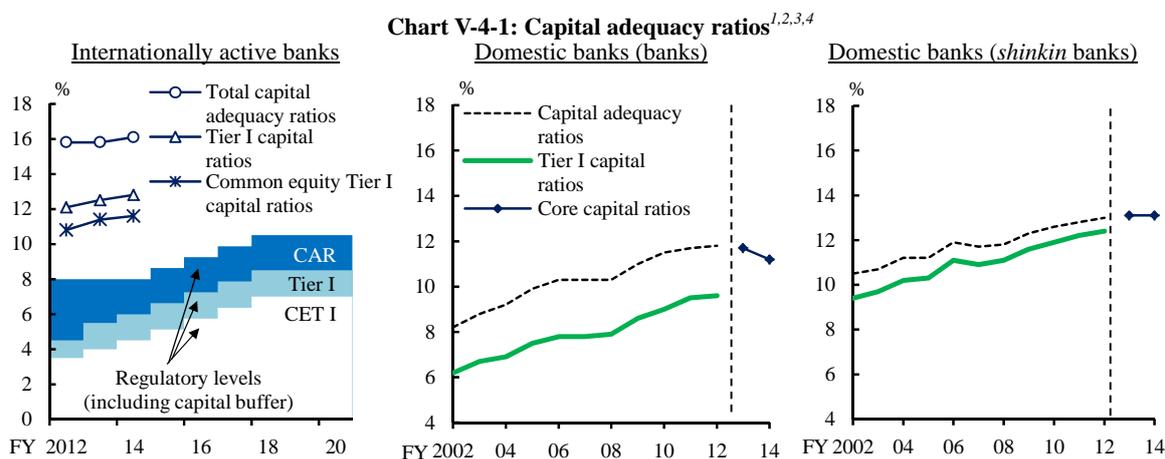
D. Financial institutions' capital adequacy

This section examines whether banks' capital adequacy ratios fulfill regulatory requirements, and further, whether they have secured sufficient capital bases relative to the amount of various risks they bear.

Capital adequacy ratios

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

At internationally active banks, total capital adequacy ratios, Tier I capital ratios, and common equity Tier I capital ratios (CET I capital ratios) as of the end of fiscal 2014 significantly exceeded regulatory levels (Chart V-4-1). The same applies to the core capital ratios of domestic banks.



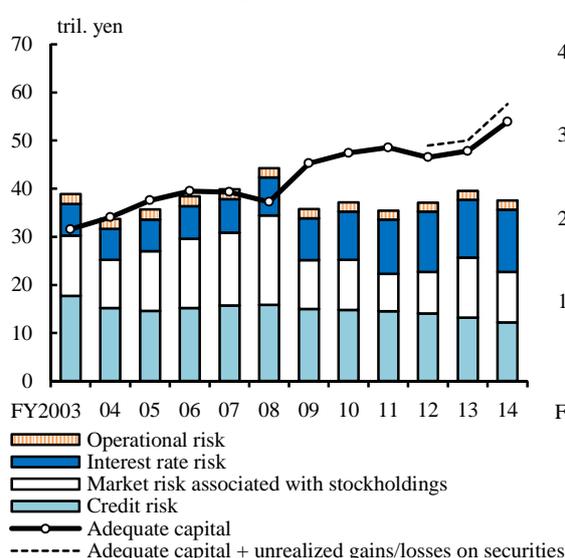
Notes: 1. CAR indicates total capital adequacy ratios.
 2. Internationally active banks and domestic banks are classified as of end-March 2015.
 3. Data for banks are calculated on a consolidated basis.
 4. The data take account of the phase-in arrangements.
 Source: BOJ.

³¹ The two tasks and challenges raised here are basically unchanged from the previous Report. For details, see Chapter IV of the April 2015 issue of the Report.

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

Financial institutions' capital has generally been at an adequate level relative to the amount of risk (Charts V-4-2 and V-4-3).³² Capital held by these institutions has continued to increase, mainly due to the accumulation of retained earnings. At internationally active banks, a substantial increase in unrealized gains on securities, particularly stocks, has contributed to an increase in their capital. At domestic banks, an increase in unrealized gains on securities holdings, which are not counted when calculating capital for these banks, has acted as a considerable buffer against changes in the market value of securities.

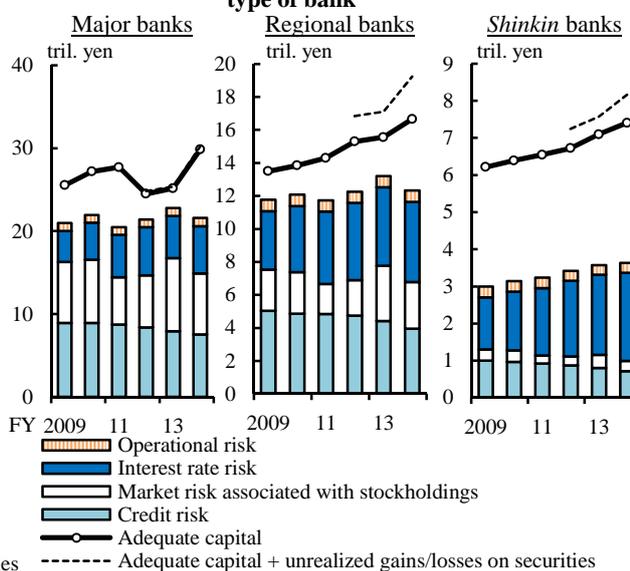
Chart V-4-2: Risks and adequate capital among financial institutions^{1,2,3}



- Notes: 1. Banks and *shinkin* banks are counted.
 2. Market risk associated with equity investment trusts is excluded from that associated with stockholdings. 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.

Source: BOJ.

Chart V-4-3: Risks and adequate capital by type of bank^{1,2}



- Notes: 1. Market risk associated with equity investment trusts is excluded from that associated with stockholdings. 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.
 2. "Adequate capital + unrealized gains/losses on securities" is the sum of adequate capital and unrealized gains/losses on securities (tax effects taken into account) for domestic banks.

Source: BOJ.

³² Common methods and parameters (such as the confidence level and the holding period) are used in calculating the amount of risk borne by all financial institutions. Thus, the amount of risk calculated here does not necessarily match the internal calculations made by financial institutions as part of their comprehensive risk management. For the calculation methods used for each type of risk, see the Notes in Charts V-1-1, V-2-6, and V-2-9. The amount of operational risk corresponds to 15 percent of gross profits.

Meanwhile, the amount of risk that financial institutions bear has remained more or less unchanged since the end of the first half of fiscal 2014. Taking the above into account, the ability of financial institutions to absorb losses and take on risks generally seems to have remained at high levels for all types of banks.

Looking ahead, the Basel III phase-in arrangements are scheduled to gradually come to an end, and internationally active banks are required to maintain additional capital buffers.³³ Meanwhile, work is underway to review the various methods used for calculating the credit and operational risks as well as the treatment of interest rate risks on the banking book. At the same time, the introduction of a regulation requiring global systemically important banks (G-SIBs) to enhance their default loss-absorbing capacity [i.e., total loss-absorbing capacity (TLAC)] is being discussed. Meanwhile, in Japan disclosure of leverage ratios has started for internationally active banks from the end of March 2015.³⁴ Each financial institution needs to continue responding to changes in regulations and frameworks.

Effects of the slowdown in the Asian economy and of a rise in volatility in financial markets

As has been seen already, **since summer 2015 volatility heightened in domestic and overseas financial markets -- as evidenced by such developments as substantial stock price adjustments -- amid growing concern about a slowdown in emerging economies including Asia. However, effects on the soundness of financial institutions are so far limited.** The most recent data has not shown an apparent rise in their credit costs, while the amount of market risk associated with their stockholdings

³³ For example, the minimum regulatory level of the CET I capital ratio for internationally active banks was raised to 4.5 percent at the end of March 2015. In addition, from 2016 under the Basel III requirements, (1) the capital conservation buffer is scheduled to be raised gradually from 0.625 percent in 2016 to 2.5 percent in 2019; (2) the countercyclical capital buffer is scheduled to be imposed within a range of 0-2.5 percent; and (3) the surcharge for global systemically important banks (G-SIBs) is scheduled to be increased by 1-2.5 percent in accordance with the size and other elements of financial institutions. As for domestic banks, they are currently allowed to include all or a proportion of certain instruments, such as non-convertible preferred stocks and subordinated bonds, as an element of new core capital through the phase-in arrangements, but the percentage of these instruments included will gradually be reduced in the future. In addition, they will be required to gradually deduct certain assets -- such as goodwill -- from core capital based on phase-in arrangements, and these assets will be subject to full deduction by the end of March 2019.

³⁴ As an indicator to supplement the risk-based capital adequacy requirements, this measure requires banks to maintain their capital adequacy ratios above certain levels relative to the sum of the amounts of non-risk-based on- and off-balance sheet exposures. This requirement is scheduled to be implemented as a regulation in 2018.

has increased and unrealized gains on their securities holdings has decreased.

Based on an estimation of stock prices and their volatility observed at the end of September and of financial data as of June 2015, unrealized gains of financial institutions' securities holdings were down by 1.3 trillion yen (or 11.9 percent) from the end of March 2015 to the end of September 2015. Financial institutions' amount of market risk associated with stockholdings was up by 2.0 trillion yen (or 19.0 percent) from the end of March 2015 to the end of September 2015.

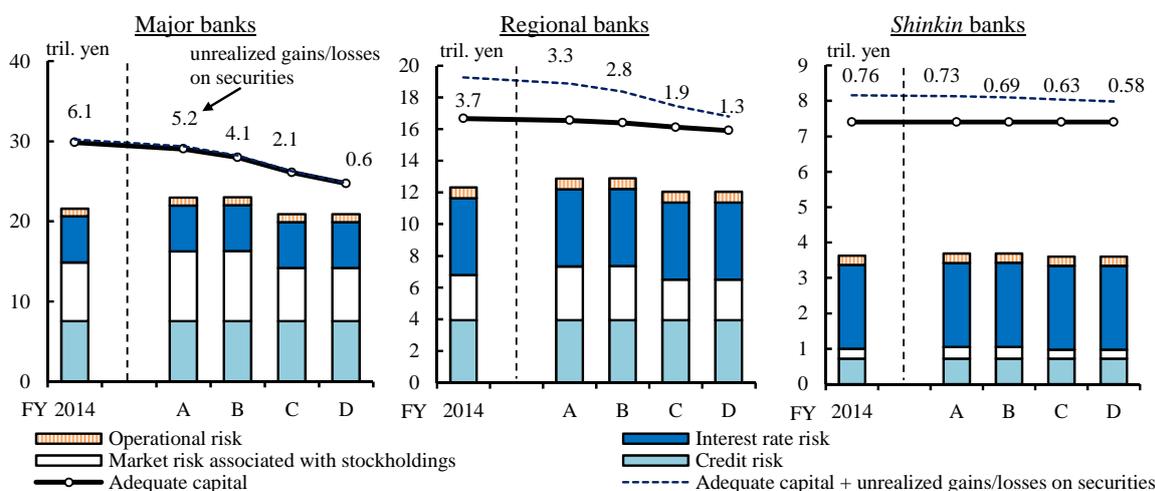
Financial institutions' capital has remained adequate relative to the amount of risk, with the amount of capital at 53.0 trillion yen and 3.4 trillion yen of unrealized gains of securities holdings that are not counted as a part of domestic banks' core capital, relative to the amount of risk at 39.6 trillion yen (Chart V-4-4). **Nevertheless, when the heightening of volatility in stock prices and interest rates at home and abroad is significant, the balance between financial institutions' risks and capital bases may be affected. In the event that the Asian economy and other economies slow further, this could affect the quality of financial institutions' loan portfolios. Careful attention should therefore be paid to developments in financial markets and the Asian economy, and their subsequent effects on the management of financial institutions.**

Chart V-4-4: Effect of stock price changes on adequate capital and risks by type of bank^{1,2,3}

4 scenarios

	Case A <actual value at end-Sep. 2015>	Case B	Case C	Case D
Stock price (change from end-March 2015)	-8.6%	-20%	-40%	-55%
volatility <observation period of 1 year, based on daily data> (change from end-March 2015)	1.3 times	1.5 times	1.5 times	2.0 times

Results of analyses



For case A

tril. yen	Financial institutions		Major banks		Regional banks		Shinkin banks	
	End-Mar. 2015	End-Sep. 2015 (Estimate)	End-Mar. 2015	End-Sep. 2015 (Estimate)	End-Mar. 2015	End-Sep. 2015 (Estimate)	End-Mar. 2015	End-Sep. 2015 (Estimate)
Adequate capital	53.9	53.0	29.8	29.0	16.7	16.5	7.4	7.4
Amount of risk	37.6	39.6	21.6	23.0	12.3	12.9	3.6	3.7
Market risk associated with stockholdings	10.5	12.4	7.3	8.7	2.8	3.4	0.3	0.3
Unrealized gains/losses on securities (tax effects taken into account)	10.5	9.3	6.1	5.2	3.7	3.3	0.8	0.7
Internationally active banks	6.8	5.9	5.7	4.9	1.1	1.0		

Notes: 1. Market risk associated with equity investment trusts is excluded from that associated with stockholdings. Although it makes the estimates different from those in Chapter V.B.3, the difference is not significant enough to affect the overall assessment. 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.
 2. "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.
 3. "Unrealized gains/losses on securities" (tril. yen) on the chart takes tax effects into account.

Source: BOJ.

VI. Macro risk indicators and macro stress testing

This chapter presents an assessment of the stability of the financial system based on two perspectives: "macro risk indicators," which are compilations of indicators that may suggest signs of overheating and instability of the financial system; and "macro stress testing."

A. Macro risk indicators

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

Financial Activity Indexes

The Financial Activity Indexes (FAIXs) are indicators used to gauge overheating in various financial activities. In the *Report*, we identify signs of overheating by selecting as FAIXs 14 indicators that are appropriate in assessing whether financial imbalances similar to those observed during Japan's bubble period have arisen, and by examining the deviation of individual indicators from their trends.³⁵ The FAIXs include the total credit-to-GDP ratio, a representative indicator used worldwide for showing financial imbalances.^{36,37}

According to the FAIXs, there is no overheating in financial intermediation (Chart VI-1-1).³⁸

³⁵ For details on the FAIXs, see Yuichiro Ito, Tomiyuki Kitamura, Koji Nakamura, and Takashi Nakazawa, "New Financial Activity Indexes: Early Warning System for Financial Imbalances in Japan," Bank of Japan Working Paper, No. 14-E-7, April 2014, 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.

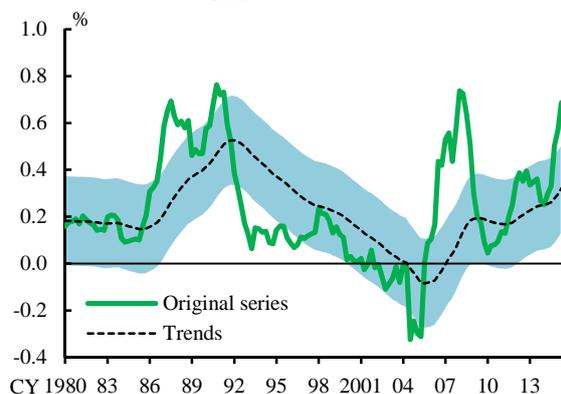
³⁶ The total credit-to-GDP ratio is regarded as one of the key indicators that should be referred to by authorities worldwide in setting the level of the countercyclical capital buffer, which will be introduced under the Basel III requirements.

³⁷ Total credit includes loans extended by financial intermediaries and funding from capital markets such as corporate bonds. Borrowers of funds include households and firms.

³⁸ Whether financial activity is overheating or overcooling is measured based on how far individual indicators deviate from their historical trends. Shaded areas in Chart VI-1-1 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 tilted 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 tilted toward overcooling; (3) areas shaded in green (the most lightly shaded areas) show everything in between; and (4) areas shaded in white show the periods without data.

Compared with the findings presented in the previous *Report*, all 14 indicators have remained unchanged, with the real estate firm investment to GDP ratio remaining "red" and the other 13 indicators "green" (Charts VI-1-4 and VI-1-5).⁴⁰

Chart VI-1-4: Real estate firm 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 April-June quarter of 2015.

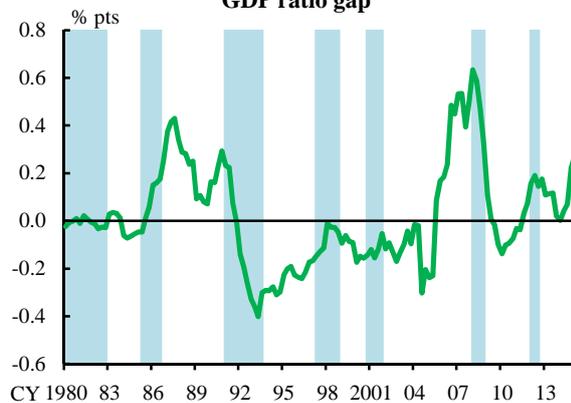
2. Original series = (business fixed investment + land investment + inventory investment) / nominal GDP.

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 VI-1-5: Real estate firm investment to GDP ratio gap^{1,2,3}



Notes: 1. Shaded areas indicate economic recession periods. The latest data are as of the April-June quarter of 2015.

2. The real estate firm investment to GDP ratio gap measures the degree of deviation from real estate firm 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."

The deviation of the real estate firm investment to GDP ratio from its trend widened compared with 6 months ago. This reflects the fact that the investment by major real estate companies is solid, mainly against the backdrop of an improvement in real estate markets particularly in metropolitan areas. However, the real estate loans to GDP ratio, the other FAIX indicator of the real estate industry, remains "green." Developments in real estate-related indicators continue to warrant attention, although a comprehensive look at a wide spectrum 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 (see Box 5 for the situation in the real estate market). Meanwhile, stock prices temporarily shifted to "red" in the April-June quarter of 2015, then returned to "green" in the July-September quarter. As was also discussed in Chapter III, comparing developments in past and present stock markets, in domestic and international stock markets, as well as observing various

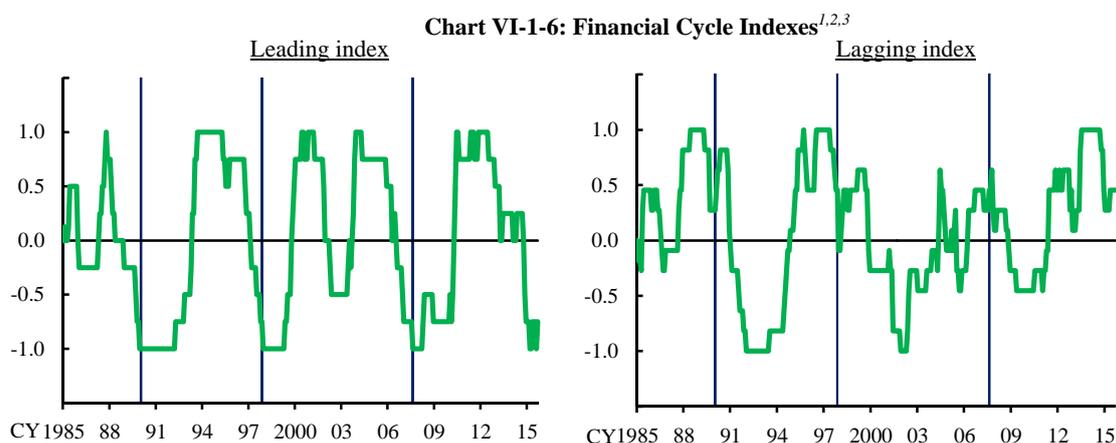
⁴⁰ The FAIXs use as real estate investment data the sums of figures for investments in business equipment, land, and inventories by large firms in the real estate industry as reported in the "Financial Statements Statistics of Corporations by Industry" published by the Ministry of Finance.

valuation indicators, Japan's stock prices are not regarded to be overpriced.

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 Cabinet Office's "Indexes of Business Conditions."⁴¹ A change in the leading index from a positive figure to a negative one indicates that the financial system might become unstable in the near future. The same movement in the lagging index indicates that the financial system may have already become unstable.

Of the Financial Cycle Indexes, although the leading index remains negative, the lagging index remains in a positive range (Chart VI-1-6).



- Notes: 1. The latest data are as of September 2015.
 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. The 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; corporate profits; housing loans; and commodity prices.

Source: BOJ.

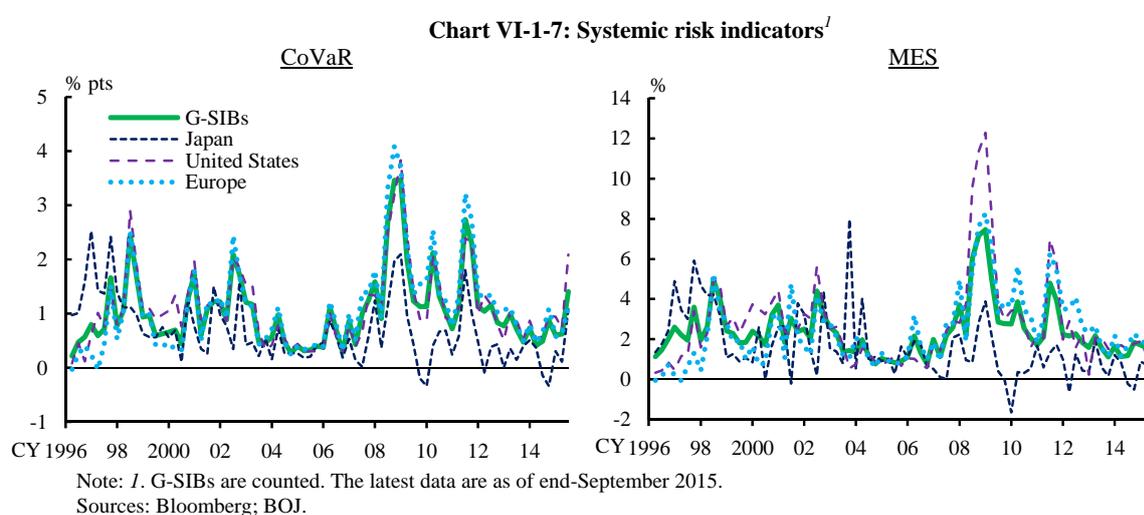
Of the eight component indicators of the leading Financial Cycle Index, seven became negative, the only exception being corporate profits. This is the result of slowing improvements in the long-term trends of seven indicators, other than commodity prices, that are high in levels. Past patterns suggest that simultaneous slowdowns of the

⁴¹ 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 for which priority is placed on detecting cyclical changes of financial system conditions. In contrast, with regard to the FAIXs, priority is placed on detecting instability in the financial system originating from large-scale financial cycles such as an economic bubble, which typically occurs only once every few decades.

long-term trends of the selected indicators have tended to lead to subsequent financial-system instability. Bearing these past tendencies in mind, information from various sources and results of the analyses, including future developments in the Financial Cycle Indexes, need to be carefully examined.

Systemic risk indicators

Systemic risk indicators are used to measure each financial institution's contribution to systemic risk, based on the volatility of the individual stock prices of global major banks and the degree of their comovements. This section examines conditional value-at-risk (CoVaR) and marginal expected shortfall (MES) (Chart VI-1-7).^{42,43}



Systemic risk indicators rose, reflecting the heightening of volatility in global financial markets observed since summer 2015. The rise in the indicators in all three regions reflects the market assessment that recent developments, namely the rise in volatility in the markets and the slowdown in emerging economies including Asia, simultaneously affect the financial soundness of globally active major Japanese, U.S.,

⁴² The CoVaR is an indicator that gauges the amount of systemic risks materializing through two factors: the size of stresses facing individual financial institutions and the degree of comovement among 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," Federal Reserve Bank of New York Staff Reports, No. 348, September 2011.

⁴³ The MES (Marginal Expected Shortfall) is defined as conditional expected losses of individual financial institutions given the stress in the overall financial system. It is another metric of measuring the size of stress for the financial system as a whole and the degree of comovements 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.

and European banks. While having been at a low level relative to major European and U.S. banks, the CoVaR and the MES of the three major financial groups in Japan have recently risen, which may reflect the substantial increase in their exposures in emerging economies including Asia.

Yet the levels of the systemic risk indicators observed since summer 2015 fell short of those observed during the European debt crisis in 2011, even though the volatilities of overall stock markets observed in the two episodes were almost at similar levels. This may reflect the fact that major banks around the world have enhanced their soundness by, for example, the adaptation of post-crisis international financial regulations.

B. Macro stress testing

Macro stress testing models the interrelationship between the financial system and the real economy, and simulates the extent of the impact on financial system stability of negative shocks that hit the economy and financial markets.

Review of the method for developing scenarios

While in past issues of the *Report* different stress scenarios have been developed for every test, starting with this issue, scenarios will be developed based on the following principles.⁴⁴

- (1) Stress scenarios will comprise a "tail event scenario" and a "tailored event scenario."
- (2) The tail event scenario is designed to assess the stability of the financial system through fixed-point observations by applying stress of approximately equal severity for each test. Here, the assumed level of stress is comparable to financial and economic developments at home and abroad at the time of the Lehman shock. Even under an identical scenario, the degree of impact of the stress on the financial system could vary depending on financial institutions' risk profiles and conditions of their financial strength, financial and economic developments, and other factors at the time of the stress testing.

⁴⁴ For details, see "Designing Scenarios in Macro Stress Testing at the Bank of Japan," *Financial System Report Annex Series*, October 2015.

(3) The tailored event scenario is designed to assess the vulnerability of the financial system against a specific event under different scenarios for every test. 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 impact of the stress is transmitted, by utilizing additional data or extending the model as appropriate. The scenario developed in this *Report* is characterized by a substantial slowdown in the Asian economy.

Scenarios involved in this stress testing are hypothetical, developed for the purpose of effectively conducting the above-mentioned examinations. It should be noted that the scenarios do not provide a highly likely outlook for the economy, asset prices, or other such factors. Furthermore, they do not reflect the outlook of the Bank of Japan.

According to the results of macro stress testing, the financial system is considered to have generally strong resilience against various economic and financial shocks at home and abroad. In the following, we look in detail at the model employed and the assumptions for macro stress testing, as well as at the test results.⁴⁵

1. Model and baseline scenario

Model

The Financial Macro-econometric Model (FMM), the model utilized in this stress test, is capable of taking into account the adverse feedback loop between the financial system and the real economy.⁴⁶ The model utilized here, which is based on the former model, has been improved in the following two aspects: (1) the model now takes into account the relationship in which the amount of loans from a financial institution declines in a nonlinear fashion as its capital adequacy ratio falls and approaches regulatory levels; and (2) the accuracy of the estimation of the pass-through to the loan interest rate for *shinkin* banks has been improved (see Box 6 for details).

⁴⁵ The stress testing results outlined in this section should be interpreted with some degree of latitude, as they are calculated based on certain assumptions and omit some elements.

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.

Regarding the period of stress, we assume that stresses occur from the October-December quarter of 2015, and changes through the end of fiscal 2017 are estimated.⁴⁷ The subjects of macro stress testing are banks and *shinkin* banks. 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 2013.⁴⁸

Baseline scenario

The baseline scenario is designed to serve as a benchmark in assessing the simulation results under the two stress scenarios to be described later, and does not represent the outlook held by the Bank of Japan.

Under this baseline scenario, overseas economies will see a recovery, in which a recovery in advanced economies spreads to emerging and developing economies with sluggish growth. Under these circumstances, the scenario also assumes Japan's economy to continue its moderate recovery, albeit with fluctuations due to effects from the consumption tax hike.

Specific assumptions made for the baseline scenario are as follows. The overseas real GDP growth rate would rise moderately from 3.4 percent in 2014 to 3.8 percent toward 2017 (the left-hand side of Chart VI-2-1).⁴⁹ Japan's real GDP growth rate would rise from 1.2 percent in fiscal 2015 to 1.7 percent in fiscal 2016, exceeding the country's potential growth rate. However, it would fall to 0.1 percent in fiscal 2017, partly due to the consumption tax hike (the middle of Chart VI-2-1).⁵⁰ With such GDP growth rate and a potential growth rate obtained on the basis of certain assumptions, the output gap would improve from 0.0 percent in fiscal 2014 to 1.6 percent in fiscal 2016, and then narrow to 1.1 percent in fiscal 2017 (the right-hand side of Chart VI-2-1).⁵¹ Stock prices (TOPIX),

⁴⁷ Financial results of banks and *shinkin* banks are available until the end of March 2015. In this analysis, financial results are estimated until the end of September 2015 using the FMM. Macro stress testing starts from the end of September 2015.

⁴⁸ 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. Upon implementation of the new requirements for domestic banks, unrealized gains/losses on securities holdings of domestic banks are not reflected in the estimation of these banks' core capital ratios, and the same applies to this section.

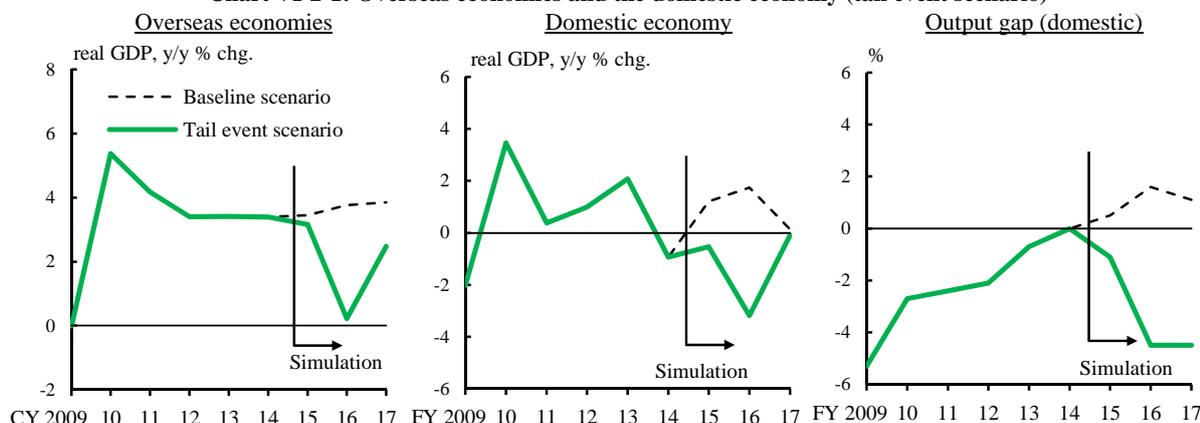
⁴⁹ This assumption is based on long-term forecasts made by the International Monetary Fund (IMF) as of April 2015.

⁵⁰ This assumption is based on ESP forecasts made in August 2015.

⁵¹ The potential growth rate during the estimation period is assumed to remain constant at its average for the period from fiscal 2000 onward.

10-year JGB yields, and the yen's nominal exchange rate against the U.S. dollar are to remain unchanged from levels observed at the end of March 2015.⁵²

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



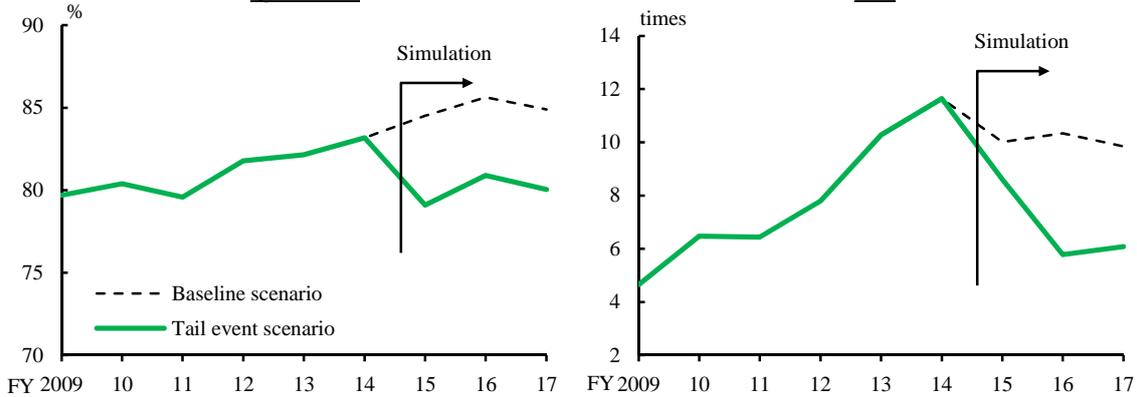
Note: 1. Output gap from fiscal 2009 to fiscal 2014 is estimated by the BOJ. For simulation periods, output gap is estimated by Financial Macro-econometric Model in each scenario and is not the BOJ's forecast.

Sources: Cabinet Office, "National accounts"; IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; BOJ.

Under these assumptions, the simulation results are as follows. Because Japan's economy would continue to exhibit relatively high growth through fiscal 2016, corporate profits would continue to improve, which in turn would keep their quick ratios and interest coverage ratios (ICRs) at high levels throughout the test period (Charts VI-2-2). The year-on-year rate of increase in the amount of loans outstanding would continue to increase at a relatively fast pace at internationally active banks, excluding the effects of foreign exchange conversion, while that at domestic banks would continue to increase moderately (Chart VI-2-3). In this situation, net interest income for both internationally active and domestic banks would continue to increase moderately, while credit costs would remain at low levels (Charts VI-2-4 and VI-2-5). As a result, CET I capital ratios at internationally active banks would rise moderately through fiscal 2017 to reach approximately 14 percent, well above regulatory levels (Chart VI-2-6). On the other hand, partly because the phase-in arrangements being implemented until completion of the shift to the new regulatory requirements are scheduled to gradually come to an end, domestic banks' core capital ratios would decline moderately during the test period. On the whole, however, even in fiscal 2017, they would still stand well above regulatory levels.

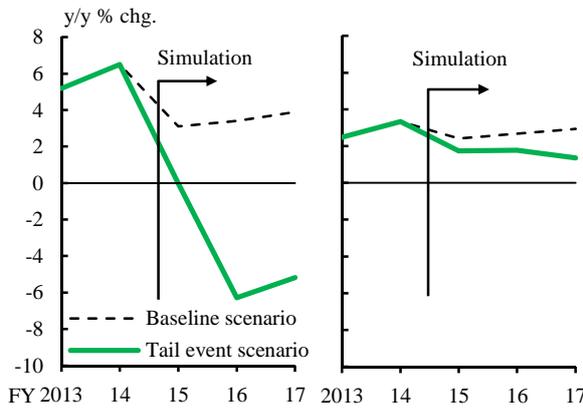
⁵² Specifically, it is assumed that the TOPIX stands at 1,543 points, 10-year JGB yields at 0.405 percent, and the exchange rate (the yen's nominal rate against the U.S. dollar) at 120.21 yen/dollar.

Chart VI-2-2: Firms' financial conditions (tail event scenario)^{1,2}
Quick ratio **ICR**



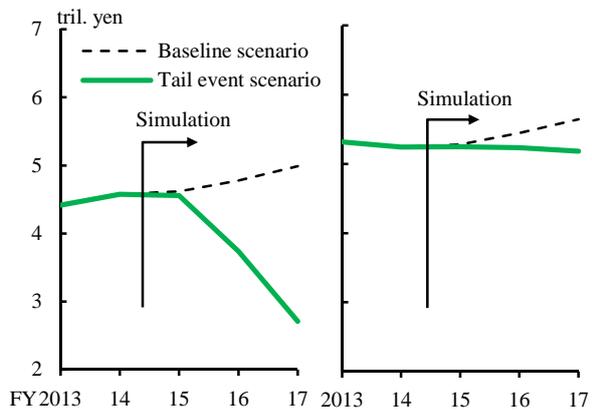
Notes: 1. Quick ratio = (cash and deposits + bills and accounts receivable + securities) / liquid liabilities.
 2. ICR = (operating profits + interest and dividends received, etc.) / interest payments, etc.
 Sources: Ministry of Finance, "Financial statements statistics of corporations by industry";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

Chart VI-2-3: Loans outstanding (tail event scenario)¹
Internationally active banks **Domestic banks**



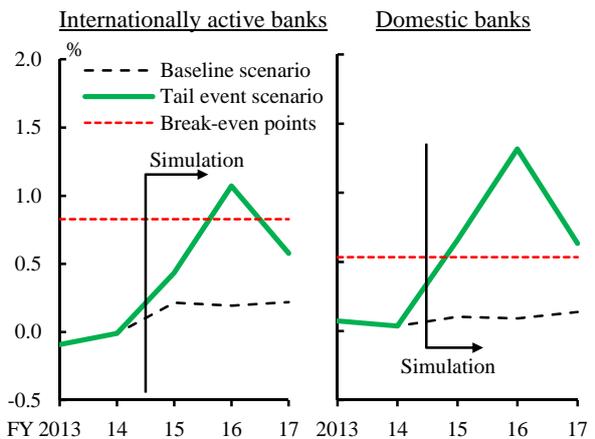
Note: 1. Banks and *shinkin* banks are counted.
 Source: BOJ.

Chart VI-2-4: Net interest income (tail event scenario)¹
Internationally active banks **Domestic banks**



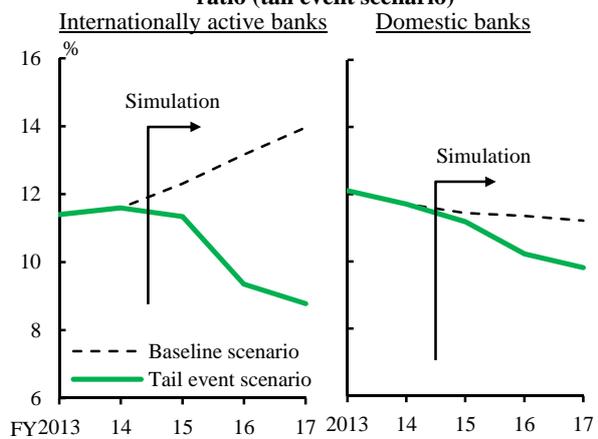
Note: 1. Banks and *shinkin* banks are counted.
 Source: BOJ.

Chart VI-2-5: Credit cost ratio (tail event scenario)¹



Note: 1. Banks and *shinkin* banks are counted. Break-even points are in fiscal 2014.
 Source: BOJ.

Chart VI-2-6: CET I capital ratio and core capital ratio (tail event scenario)^{1,2}



Notes: 1. Banks and *shinkin* banks are counted.
 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 are taking the phase-in arrangements into consideration.
 Source: BOJ.

2. Tail event scenario

The tail event scenario assumes a severe economic downturn -- compared with past periods of deterioration in economic conditions -- due to economic shocks at home and abroad. Specifically, the assumption is that "Japan's output gap would deteriorate to around minus 7 to minus 8 percent" -- corresponding to the level of its bottom in the wake of the Lehman shock -- four quarters after the third quarter of 2015. Other financial and economic indicators are set so that they are generally consistent with such an economic downturn.

More details on the assumptions for the scenario are as follows.⁵³ The growth rate of overseas economies would fall sharply from 3.2 percent in 2015 to 0.2 percent in 2016 (the left-hand side of Chart VI-2-1). Japan's economic growth rate would only be at minus 0.5 percent -- 1.7 percentage points below the baseline scenario level -- in fiscal 2015, and would become substantially negative, reaching minus 3.2 percent in fiscal 2016. Thereafter, the economy would continue to post negative growth in fiscal 2017, the growth rate standing at minus 0.1 percent (the middle of Chart VI-2-1). As a result, Japan's output gap would deteriorate significantly from minus 1.1 percent in fiscal 2015 to minus 4.5 percent in fiscal 2016, and still remain substantially negative at minus 4.5 percent in fiscal 2017 (the right-hand side of Chart VI-2-1).⁵⁴ In financial markets, stock prices (TOPIX) would fall by 55 percent in the 1-year period following the end of September 2015, and then remain unchanged thereafter. 10-year JGB yields would decline by about 0.1 percentage points during the above-mentioned period, and then remain unchanged thereafter. As for the nominal exchange rate, the yen would appreciate against the U.S. dollar by 23 percent and reach 93 yen in fiscal 2016, and then remain unchanged thereafter.

The simulation results based on the above scenario indicate that in the corporate sector financial conditions would deteriorate significantly, with substantial declines in quick ratios and ICRs for example, due to a significant deterioration in economic conditions at home and abroad (Chart VI-2-2). As a result the credit cost ratios of financial institutions in fiscal 2016 would exceed their break-even points, reaching 1.1 percent for internationally active banks and 1.3 percent for domestic banks. They would start to decline in fiscal 2017, but would still be above the break-even credit cost ratio for

⁵³ Variables in this scenario are set so that the rates would be comparable to those in the wake of the Lehman shock, by taking into account financial and economic developments at the time.

⁵⁴ On a quarterly basis, the output gap would deteriorate to approximately minus 7.3 percent in the third quarter of 2016, as assumed in this scenario.

domestic banks (Chart VI-2-5). Moreover, internationally active banks would incur unrealized losses on securities in response to declines in stock prices at home and abroad.

The year-on-year rate of change in loans outstanding at internationally active banks would decline substantially in fiscal 2016 and fiscal 2017, posting negative growth of around minus 5 to minus 6 percent, due to the shrinking of the yen-based value of overseas loans stemming from the yen's appreciation in addition to the decline in demand for funds resulting from the economic downturn at home and abroad (Chart VI-2-3). On the other hand, at domestic banks, the year-on-year rate of increase in their loans outstanding would remain positive through fiscal 2017, although the pace of growth would slow. Consequently, while net interest income in fiscal 2017 would decline substantially at internationally active banks to approximately 2.7 trillion yen, a level half that of the baseline scenario, the decline at domestic banks would be relatively limited in comparison (Chart VI-2-4).

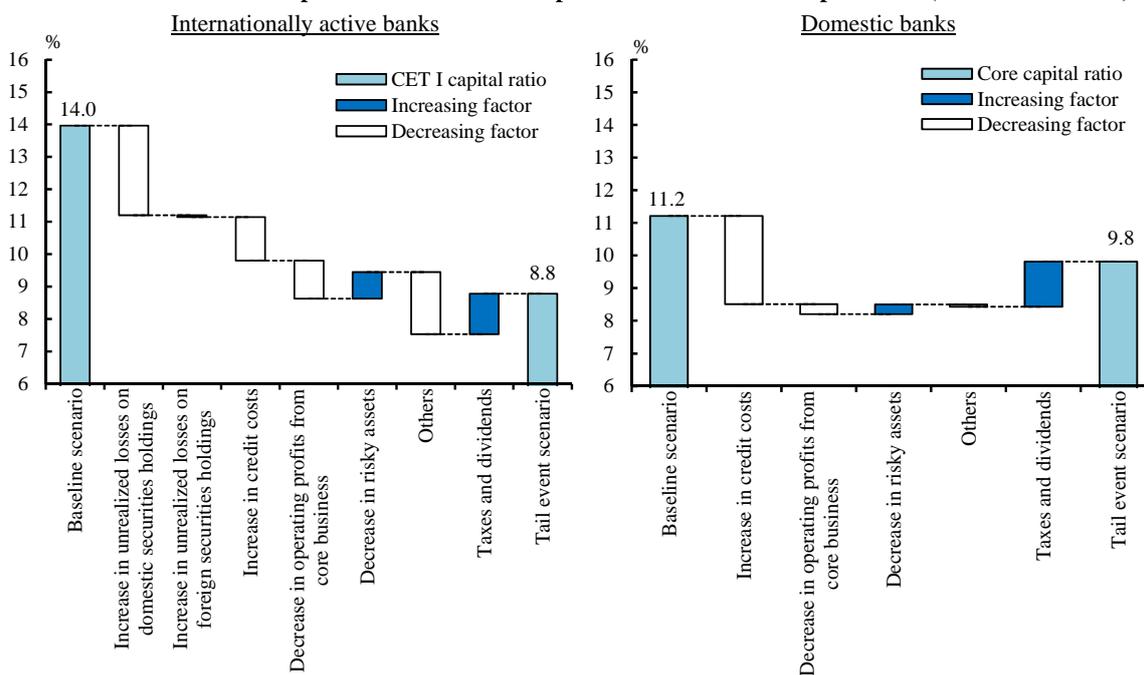
Under these circumstances, in terms of banks' capital adequacy ratios the CET I capital ratio for internationally active banks would decline to 8.8 percent in fiscal 2017, down by 5.2 percentage points from the baseline scenario. However, on average it would still remain above regulatory levels (Chart VI-2-6). The decline in capital adequacy ratios is mostly attributable to unrealized losses on domestic securities holdings resulting from declines in Japan's stock prices (minus 2.8 percentage points) (the left-hand side of Chart VI-2-7).⁵⁵ The occurrences of credit costs, as well as the decline in operating profits from core business due to the decrease in net interest income, also play a considerable part in the decline in the capital adequacy ratios, depressing them by 1.3 percentage points and 1.2 percentage points respectively. In addition, as deferred tax assets increase, the portion of such assets exceeding the upper limit for inclusion in the calculation of CET I capital plays a part in the downward pressure exerted by "others."

On the other hand, the core capital ratio for domestic banks would fall to 9.8 percent at the end of fiscal 2017, falling by 1.4 percentage points from the baseline scenario of 11.2 percent; on average, however, it would still be sufficiently above regulatory levels

⁵⁵ In calculating unrealized gains and losses on domestic securities, starting with this *Report* those on stock investment trusts are included. Under this model, based on the Basel III requirements, unrealized gains and losses on securities are counted as an element 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 gains and losses.

(the right-hand side of Chart VI-2-7). The decline in the core capital ratio for these banks would be mainly caused by the occurrence of credit costs (minus 2.7 percentage points) due to the deterioration in corporate financing conditions. It should be noted that the extent of the decline in the core capital ratios for domestic banks would be smaller than that for internationally active banks, partly because unrealized gains and losses on securities holdings are not counted in calculating domestic banks' capital adequacy ratios.

Chart VI-2-7: Decompositions of the CET I capital ratio and the core capital ratio (tail event scenario)^{1,2}



Notes: 1. Banks and *shinkin* 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 2018.

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 are taking the phase-in arrangements into consideration.

Source: BOJ.

The above findings of the tail event scenario indicate that, **even if financial and economic conditions at home and abroad would deteriorate to a level comparable to that of the conditions observed at the time of the Lehman shock, financial institutions' capital adequacy ratios on average would be maintained above regulatory levels.**⁵⁶

⁵⁶ A comparison of these results with the simulation results of the stress scenario presented in the October 2014 issue of this *Report* -- the latter of which assumed stresses equivalent to the Lehman shock -- shows that under this tail event scenario the capital adequacy ratios of internationally active banks are depressed further (i.e., minus 5.2 percentage points in this issue as opposed to minus 3.3 percentage points in the October 2014 issue). This is mainly due to the fact that "unrealized losses on domestic securities" and "others" contribute to a greater extent in reducing the capital adequacy ratios. This development can be attributed to the following in particular: (1) an increase in market risk

3. Tailored event scenario

The tailored event scenario -- assuming "a slowdown in the Asian economy" -- focuses on the effect of the materialization of credit risks in overseas lending by Japanese banks on Japan's financial system. This focus is motivated by the following developments: (1) overseas loans, particularly those to Asia, have been increasing rapidly in recent years, especially among major banks; and (2) the economic slowdown has become evident in emerging economies, including Asia. In examining the occurrence of credit costs in overseas loans it is necessary to take into account loan portfolios by region, as patterns of occurrence of credit costs differ depending on the region. However, the FMM, based on which the Bank of Japan conducts its macro stress testing, is not designed to analyze loan portfolios separately by country or region. Accordingly, in the analysis under the tailored event scenario in this *Report*, the data and the model are extended so that the occurrence of credit costs can be analyzed separately by country or region.⁵⁷ Given the characteristics of the scenario, the analysis focuses on the effect only on internationally active banks.

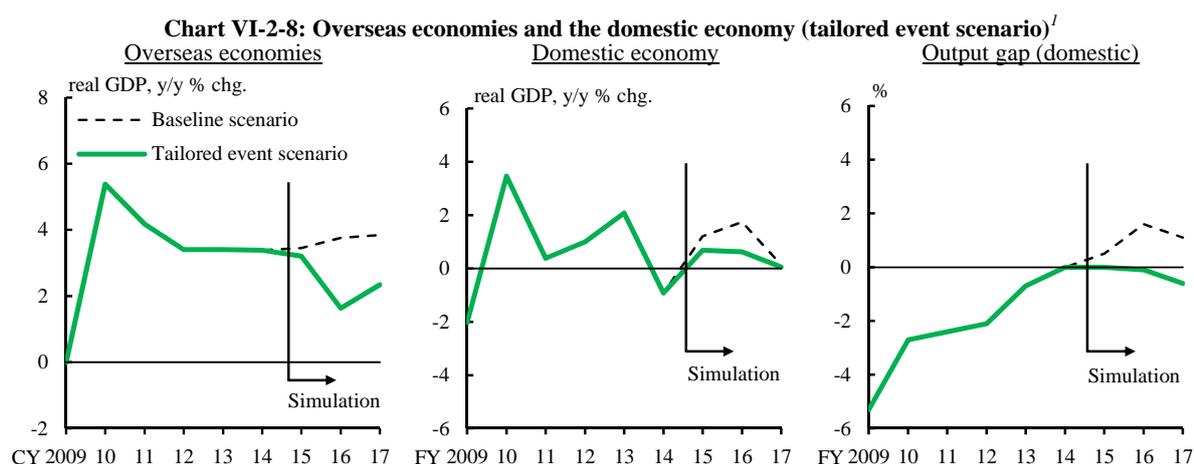
The details of the scenario are as follows.⁵⁸ The growth rate of the economies in the Asian region would decline substantially, from 6.8 percent in 2014 to 6.2 percent in 2015 and to 3.0 percent in 2016. The growth rate in 2016 is approximately equivalent to that of the Asian economy at the time of the Asian currency crisis. Such significant slowdown in the Asian economy would be transmitted to other countries via

associated with stockholdings due to a subsequent rise in the market value of stockholdings; (2) the inclusion of stock investment trusts as part of the focus of analysis, starting with this issue; (3) the scheduled increase in the share of unrealized gains and losses on securities to be counted as CET I capital, from 80 percent in end-March 2017 to 100 percent in end-March 2018 (the October 2014 issue covers the period up until end-March 2017); and (4) the number of internationally active banks whose amount of deferred tax assets resulting from unrealized losses on securities exceeded the upper limit for inclusion into CET I capital was greater in the simulation results under this scenario than in the October 2014 issue.

⁵⁷ Specifically, amid a deceleration in overseas economies, changes in the borrower classification transition matrix resulting from the increase in corporate default probability in Asia, North America, Europe, and other regions have been calculated. The results show that during the estimation period, the probability of downgrading would increase by about 0.6 percentage points at most. For details, see "Designing Scenarios in Macro Stress Testing at the Bank of Japan," *Financial System Report Annex Series*, October 2015.

⁵⁸ The tail event scenario assumes a severe stress situation equivalent to that at the time of the Lehman shock, as well as a situation in which a direct negative shock is applied to not only overseas economies but also the domestic economy, for example in the form of a decline in confidence in the private sector. On the other hand, the tailored event scenario assumes a situation that does not take into account a direct shock applied to the domestic economy, but rather one in which the domestic economy is exposed to only the negative impact originating from the deceleration in overseas economies and endogenous to the model.

international trade linkages and declines in commodity prices, which would lower the growth rate of overseas economies to 3.2 percent in 2015 and to 1.6 percent in 2016 (the left-hand side of Chart VI-2-8). As a result, a decrease in exports would put downward pressure on Japan's economy, with the rate of real GDP growth declining from 0.7 percent in fiscal 2015 to 0.6 percent in fiscal 2016 and to 0.1 percent in fiscal 2017 (the middle of Chart VI-2-8). The slowdown of the world economy would affect international capital flows. Specifically, capital that has been flowing into Japan's stock and real estate markets from foreign investors would flow out. Reflecting such an outflow of capital, stock prices would fall by 23 percent over a 1-year period following the end of September 2015, while the year-on-year rate of change in land prices in fiscal 2017 would decline to minus 2.8 percent, approximately 2.0 percentage points below the baseline.⁵⁹ As for the yen's nominal exchange rate, the yen would appreciate against the U.S. dollar, reaching 104 yen over the 1-year period following the end of September 2015, and then remain unchanged thereafter.



Note: 1. Output gap from fiscal 2009 to fiscal 2014 is estimated by the BOJ. For simulation periods, output gap is estimated by 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.

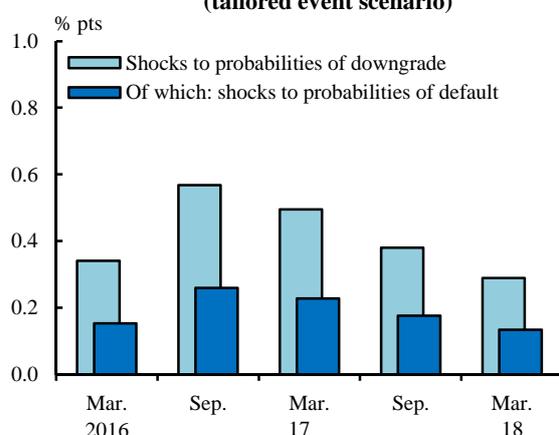
The simulation results based on this scenario indicate that a sharp slowdown in the world economy -- particularly Asia -- would cause a deterioration in financial conditions of overseas firms, which would lead to an increase in the number of downgrades of borrower classification in terms of overseas loans (Chart VI-2-9). By region, credit ratings of Asian borrowers would be considerably downgraded as the real GDP growth rate of the Asian economy would decline at a fast pace (Chart VI-2-10).⁶⁰ As a result,

⁵⁹ The rate of decline in stock prices and the pace of year-on-year decline from the baseline level for land prices are set taking into account the growth rate of domestic and overseas economies.

⁶⁰ The greater shock to the borrower classification transition matrix felt in Asia compared to other

the credit cost ratio would rise to approximately 50 basis points in fiscal 2016, mainly due to an increase in credit costs for loans to overseas, particularly to Asia (Chart VI-2-11).⁶¹ On average, credit cost ratios would remain sufficiently below the break-even credit cost ratio. However, credit costs, particularly of major banks with a large share of overseas loans, would largely exceed the average. Moreover, financial institutions would incur unrealized losses on securities holdings due to the decline in stock prices at home and abroad. Funding costs, including those for foreign currencies, would also increase.

**Chart VI-2-9: Shocks to transition probabilities
(tailored event scenario)¹**

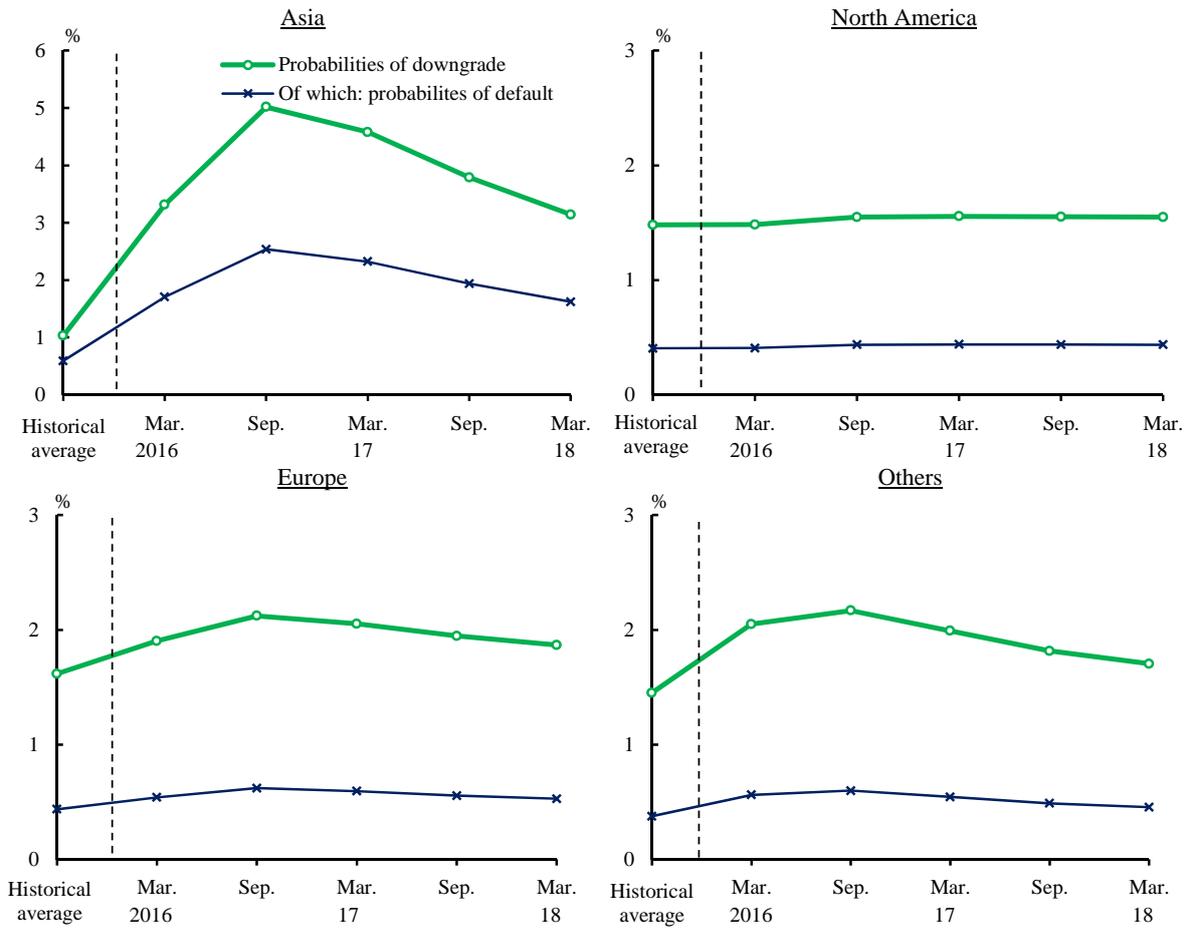


Note: 1. The vertical axis shows the GDP growth elasticity of transition probabilities multiplied by the deviation of the GDP growth under stresses.
Sources: Moody's; BOJ.

regions can be attributed to the large margin of decline in the region's real GDP growth rate, as well as to the higher sensitivity of its borrower classification transition matrix to the real GDP growth rate.

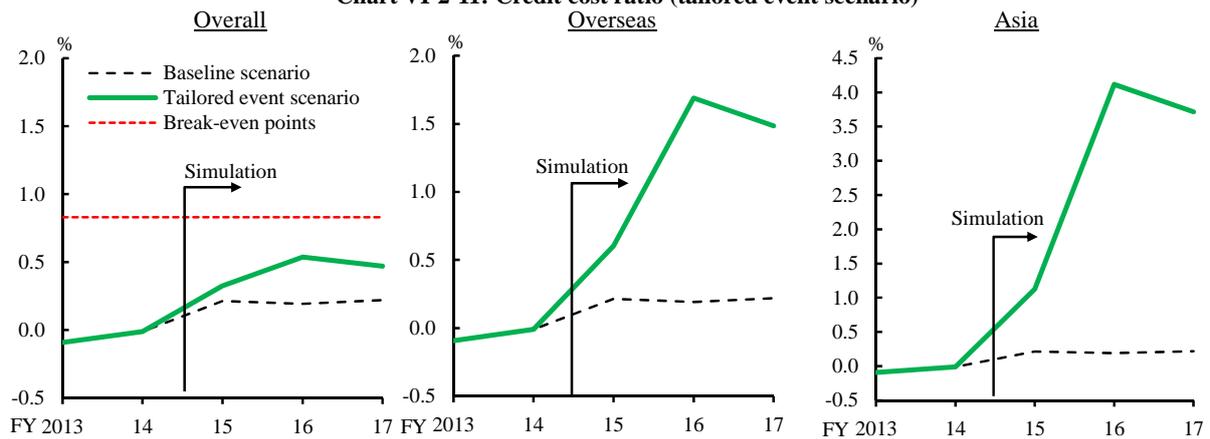
⁶¹ Similarly, with regard to loans in the domestic sector, firms' financial conditions would deteriorate due to economic deceleration, mainly reflecting a decline in exports, thereby playing a part in the increase in credit costs.

Chart VI-2-10: Transition probabilities by region (tailored event scenario)



Sources: Moody's; BOJ.

Chart VI-2-11: Credit cost ratio (tailored event scenario)^{1,2,3}



Notes: 1. Internationally active banks are counted. Break-even points are in fiscal 2014.

2. Overseas and Asian credit costs under the baseline scenario are estimated with loan volume share of each region.

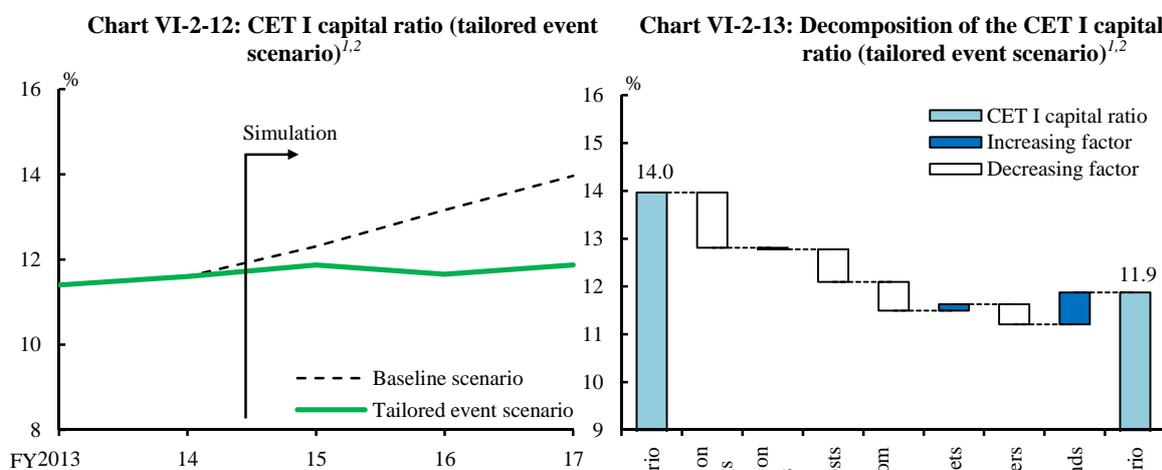
3. Credit costs under the tailored event scenario are calculated with estimated baseline credit costs and credit costs due to stresses to transition probabilities of each region.

Source: BOJ.

The year-on-year rate of change in loans outstanding would be negative at around minus 2.2 percent in fiscal 2016, due to a decrease in the yen-based value of foreign

currency-denominated loans -- resulting from an appreciation of the yen -- in addition to a decrease in demand for funds reflecting economic deterioration at home and abroad. Consequently, net interest income would plunge to around 3.8 trillion yen -- a decrease of 1.2 trillion yen from the baseline -- for fiscal 2017.

Under these circumstances, the capital adequacy ratio (the CET I capital ratio) would decline to 11.9 percent in fiscal 2017 but would still stand well above regulatory levels (Chart VI-2-12). The decline is largely attributable to the increase in unrealized losses on domestic securities holdings, the occurrence of credit costs, and to a decline in operating profits from core business (Chart VI-2-13).



Notes: 1. Internationally active banks are counted.
 2. The CET I capital ratio is taking the phase-in arrangements into consideration.
 Source: BOJ.

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 2018.
 2. The CET I capital ratio is taking the phase-in arrangements into consideration.
 Source: BOJ.

The simulation exercises under the tailored event scenario specifically analyze the effects of a slowdown in Asian economies on Japan's financial institutions and financial system. Assuming that a slowdown in Asian economies would have an effect on the overall world economy mainly through the channel of real economic activity such as trade, the slowdown in the world economy would be milder than what is assumed under the tail event scenario. Under such assumptions, **the risk that a slowdown in Asian economies would threaten the stability of Japan's financial system is considered to**

be limited. Nevertheless, the credit cost ratio in the Asian region would rise substantially to around the average of those in overseas economies during past financial crises (Chart V-1-16). When these effects spread to not only Japanese banks but also Asian, U.S., and European financial institutions active in the Asian region, it is possible that the adverse financial effects on the Asian economy would be greater than those assumed by this test.

4. Issues in interpreting the results of macro stress testing

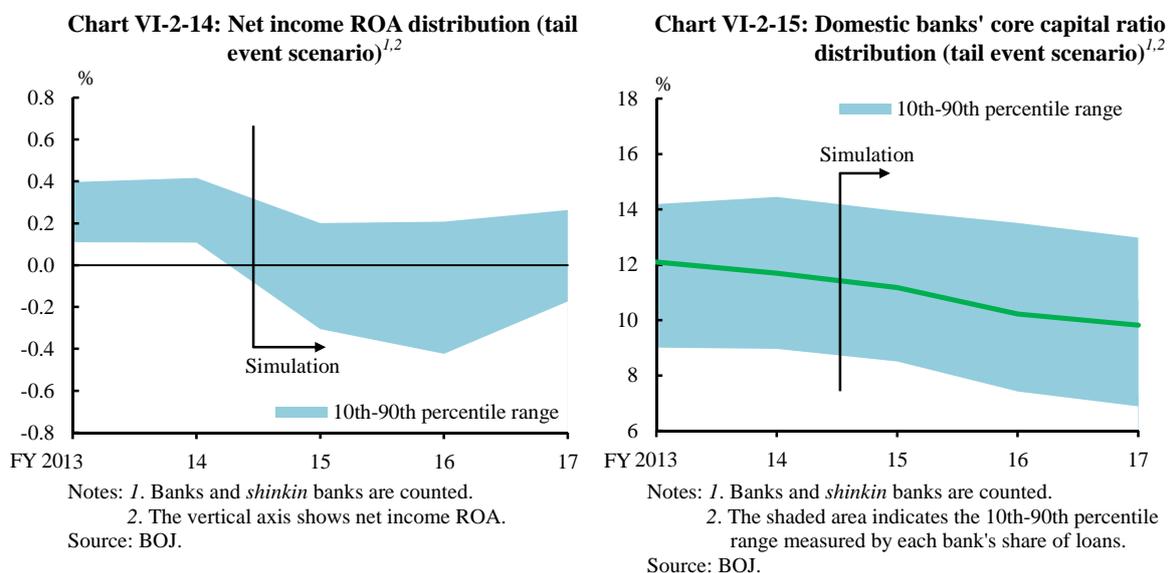
The above results suggest that Japan's financial system has generally strong resilience against various stresses. However, in interpreting the test results the following three issues should be noted.

First, it is possible that economic or financial shocks affect the stability of the financial system, depending on their speed and extent, as well as the factors behind them.⁶² Second, it is possible that the negative effects would be greater than those indicated by this test in the event of such developments as a dramatic decline in market liquidity, the concentration of an unwinding of risks, or credit contraction among financial institutions. For example, this analysis does not assume a mechanism in which many financial institutions are forced to reduce their assets by funding constraints due to a decline in market functioning and other such factors. On the contrary, if market participants including institutional investors behave differently from banks and *shinkin* banks in their risk taking, it is possible that their behavior would mitigate the negative effects described above and contribute to stabilizing the financial system. Third, even if financial institutions' capital adequacy ratios are above regulatory levels, as stresses occur it is possible for financial institutions' risk-taking stance to weaken or for the financial intermediation function to decline, when banks record net losses in their financial statements or financial institutions incur unrealized losses on securities.⁶³ In addition, even if the financial system as a whole maintains sufficient levels of capital, the impact on individual financial institutions' capital would be more significant for some compared with others. The results of this tail event scenario indicate that financial

⁶² If fluctuations in interest rates and volatility in stock prices, or the size of an economic downturn, are greater than that assumed under the stress scenario, or if these conditions are prolonged, or further, if multiple shocks occur in a complex manner, the negative effects would become more pronounced than those reflected in the findings of this *Report*.

⁶³ The refinement to the FMM in this issue (i.e., the introduction of the mechanism in which financial institutions adopt a more cautious lending stance once their capital adequacy ratios fall below a certain threshold, even if such ratios originally stand above regulatory levels) has been designed to address these issues.

institutions recording net losses have reached a considerably large number, and that there is significant heterogeneity with regard to their capital adequacy ratios (Charts VI-2-14 and VI-2-15).



Stress testing in financial institutions and the Bank of Japan's actions

Recently, financial institutions, especially major institutions, are emphasizing stress testing as a tool to capture and analyze various and complex risks.⁶⁴ Stress testing plays an important role in a framework that comprehensively disciplines risk taking and risk management, such as a risk appetite framework, based on the business strategies of financial institutions.

In stress testing of financial institutions, it is critical to develop an appropriate scenario that puts severe stress corresponding to their risk profile. In developing scenarios, how to select macro-economic and financial variables and their own financial variables, and how to specify their interrelationship appropriately, become important.

Against this backdrop, the Bank of Japan is enhancing its disclosures on scenario

⁶⁴ Integrated risk management is an alternative tool that can be used to capture risks in an integrated way for management purposes. This compares a financial institution's capital with the aggregate of each risk measured by compatible tools such as VaR. Stress testing is superior to integrated risk management in the following points: (1) it assesses developments in profits as well as capital strength; (2) it incorporates a financial institution's own behavioral changes; and (3) it sets variables flexibly based on likelihood and judgments. Stress testing generally works as an effective tool to assess risk profiles and vulnerability, as it captures common risk factors and transmission channel in business and asset portfolios that are seemingly diversified, or risks that are masked under favorable business conditions (e.g. liquidity risk). On the other hand, there are some challenges to ensure the effectiveness of stress testing, such as avoidance of heavily subjective tests.

development, methodologies, and data of macro stress testing so that these can be referred to by individual financial institutions when they conduct stress testing. The Bank will release the *Financial System Report Annex Series* as a supplementary volume on the narrative and logic behind the setting of scenarios. In addition, the main variables in each scenario can be downloaded from the Bank of Japan's web site. To enhance the effectiveness of macro stress testing, the Bank of Japan will continue to strengthen communication with financial institutions.

VII. Conclusion

Japan's financial system has been maintaining stability. In order to ensure the stability in the future, (1) continued efforts are necessary to keep the fine balance between macro risks to which financial institutions are exposed and their financial bases, while (2) steadily responding to structural changes in the financial system that might become a source of future fragility.

Financial institutions' macro risks have generally been restrained, even in a situation where these institutions have been geared toward taking more risks in their business operations in domestic and overseas lending as well as in securities investment. It should be noted, however, that this is largely attributable to the fact that benign financial conditions, i.e., low and stable credit costs and low market volatility, have been maintained in recent years. Meanwhile, exposure has continued to increase in various areas, such as credit, market, and funding liquidity. Taking the above into account, it is necessary for financial institutions to continue making efforts to strengthen their ability to respond to risks in areas in which they are actively enhancing their risk-taking stance, such as overseas operations and market investment. Financial institutions' overseas loans have continued to show relatively high growth. Some types of domestic loans that are exposed to overseas credit risk have been increasing, for example loans for Japanese firms' overseas business expansion, loans for merger and acquisition activities, and resource development-related loans. In response to these developments it is necessary to strengthen credit management. For foreign currency funding, which supports expansion of overseas operations, some progress has been made in increasing customer deposits and medium- to long-term funding, yet financial institutions need to continue with their efforts to enhance their stable foreign-currency funding base. For market investment, while maintaining high levels of yen interest rate risk, financial institutions have been taking more risks by investing their funds to more diversified asset classes, for example investment trusts. Gaining a cross-sectional and multi-dimensional understanding of the profile of risks, which allows for an appropriate response to such developments in investment patterns, is considered crucial.

Meanwhile, from summer 2015 volatility rose in global financial markets amid growing concern about a slowdown in emerging economies, including Asia. Effects on the financial bases of Japan's financial institutions and on the stability of Japan's financial system have been limited. Nonetheless, it is important for financial institutions to evaluate their resilience against stresses and their potential sources of fragility, in case of a further strengthening of the above-mentioned trend, so that they can reflect this

evaluation in their business operations and risk management.

The increased systemic importance of large financial institutions and the decline in core profitability among regional financial institutions, structural issues that were discussed in previous *Reports* and the recent *Annex*, have been unchanged.⁶⁵

The Bank of Japan will continue to tackle the above issues toward ensuring stability of the financial system, particularly through its off-site monitoring and on-site examinations.⁶⁶ Recent efforts in the Bank's off-site monitoring and on-site examinations are as follows.

Regarding issues on financial institutions' overseas credit risk, the Bank looks into developments in portfolios and large exposures, in particular loans for non-Japanese firms, loans for merger and acquisition activities, and resource development-related loans in which financial institutions have been actively engaged. The Bank also exchanges views with financial institutions on the effects of developments of overseas economies on the quality of their credit portfolios.

Regarding issues on foreign-currency funding, the Bank enhances its surveillance on financial institutions' foreign-currency liquidity risks under their international business strategies, not only for the U.S. dollar but also for other local currencies. The Bank encourages institutions to enhance their risk management by, for example, preparing a variety of countermeasures in times of stress. As for risks of investment in markets, given the growing importance of a cross-sectional and multi-dimensional analysis of the profile of diverse risk factors as financial institutions are now investing to risky assets further, the Bank gains a deeper understanding of financial institutions' risk management frameworks and their planned responses in the event of market fluctuations. It also encourages the strengthening of risk management, consistent with the levels of their risk appetite.

⁶⁵ For developments concerning these structural changes, see "Financial Results for Japan's Banks and *Shinkin* Banks for Fiscal 2014," *Financial System Report Annex Series*, July 2015 (available in Japanese only).

⁶⁶ The previous *Report* -- issued in the beginning of fiscal 2015 -- raised the following as points which the Bank aimed to strengthen its grasp of, and as areas on which to exchange views with financial institutions, through its off-site monitoring and on-site examinations: (1) financial institutions' international operations; (2) financial institutions' ALM and investment in markets; (3) large financial institutions' systemic-risk characteristics and their business management; (4) regional financial institutions' profitability; (5) financial institutions' efforts to increase industrial strength and efforts toward enhancing the vitality of their client firms; and (6) market-related businesses conducted by financial institutions and securities firms and developments in sales of financial products. This policy remains unchanged for the second half of fiscal 2015.

Regarding the systemic importance of major banks, the Bank has been encouraging major banks in multiple occasions including on-site examinations to enhance their ability to comprehend their complex and global risks, by for example implementing a more effective stress testing framework and to strengthen their ability to respond to crises.⁶⁷ In addition, regarding the profitability of regional financial institutions, the Bank has been analyzing the profitability of individual regional financial institutions taking into account the effects from demographic factors, and has continued its dialogue with these institutions.⁶⁸

⁶⁷ "Designing Scenarios in Macro Stress Testing at the Bank of Japan," *Financial System Report Annex Series*, October 2015, forms part of the Bank's efforts in this area.

⁶⁸ In relation to the management tasks and challenges as well as the profitability of regional financial institutions, the Bank released a number of papers (available in Japanese only) in the first half of fiscal 2015, as follows: "Efforts by Regional Finance in the Face of a Population Decline," *Financial System Report Annex Series*, May 2015; "Financial Results for Japan's Banks and *Shinkin* Banks for Fiscal 2014," *Financial System Report Annex Series*, July 2015; and "Recent Developments in Loan-Loss Provision Calculation by Regional Financial Institutions," *Financial System Report Annex Series*, August 2015. During this period, the Bank also held seminars with a view to backing up financial institutions' support for regions and industries in their efforts to enhance their vitality: specifically, a large-scale seminar on support for start-up businesses and a regional seminar on the financing of PPPs. In the second half of fiscal 2015, the Bank plans to continue with these regional seminars while holding a large-scale seminar on agri-finance.

Box 1: Overseas M&A-related loans by major banks and credit management

As Japanese businesses have become increasingly active in mergers and acquisitions (M&As), M&A-related loans have represented a substantial part of the recent increase in lending by Japan's major banks (Chart IV-1-8). Overseas M&A deals can involve large non-interest revenues (e.g., M&A advisory fees and underwriting fees as an agent bank) and can also offer business opportunities following the acquisition. Hence, major banks have been active in overseas M&A deals and have strengthened their ties with the securities companies within their own corporate groups.

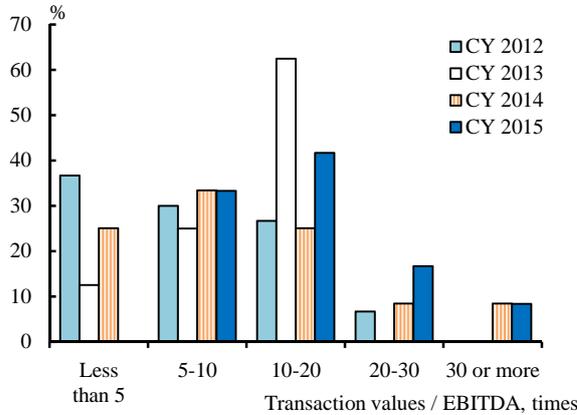
There are two types of M&A-related loans: (1) leveraged buy-out (LBO) loans, which are to be repaid exclusively from the future cash flows of the acquired company; and (2) corporate loans, which are to be repaid from the combined cash flows of the acquired and acquiring companies. While some M&A deals in Japan are financed by LBO loans, most overseas M&A deals by Japanese firms are financed by corporate loans. The following should be noted in terms of managing credit risks pertaining to overseas M&A-related loans, mainly corporate loans.

First, M&A-related loans require examination for credit extension in a relatively short period of time. In the competitive environment of overseas M&A deals, banks often need to complete the necessary due diligence within one or two months. Under these circumstances, banks need to make their decision on large bridge loans jointly with a few other banks. After bridge loans are extended, these loans are normally refinanced by the issuance of corporate bonds or by the extension of a syndicated loan. Before making a bridge loan, banks must conduct appropriate examinations, including the feasibility of such refinancing of the obligation.

Second, risk characteristics of overseas businesses are complex. For overseas businesses, the examination should take into account the differences in business practices and legal frameworks. Consideration should also be given to the economic situations in the countries in which the parties to the M&As are located, as well as to foreign exchange rate levels.

Third, large-scale M&A deals could have considerable effects on the future of the acquiring company. Some of the overseas M&A deals made by Japanese corporations since 2014, including large deals, have involved transaction values in excess of 20 times the EBITDA (earnings before interest, taxes, depreciation, and amortization) for the term, which has been perceived by some as a sign of overheating (Chart B1-1). Also, in some cases the amounts posted as goodwill in acquisition accounting are fairly large relative to the firm's net assets.

Chart B1-1: Distribution of transaction values / EBITDA ratio of overseas M&A deals made by Japanese corporations^{1,2}



Notes: 1. Figures for CY 2015 are as of the January-September period 2015.
 2. Transaction values are the sums of figures for net liabilities of the target and purchasing prices for the target.
 Source: Bloomberg.

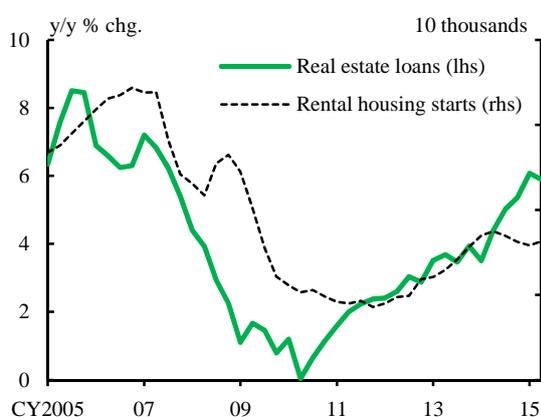
In addition to their normal analysis of financial data, major banks have been engaged in the following efforts: conducting due diligence for deals with relatively high risk profiles through their overseas branches or affiliates, as well as through local consulting firms; and having management meetings with the target firm. In addition, with the aim of ensuring the financial soundness of the acquiring company, in some cases banks have imposed more restrictive covenants than those for syndicated loans for domestic transactions.

So far there has been no record of large credit costs in overseas M&A-related loans. Given their considerable potential effects, however, the following should be implemented in dealing with M&A-related loans: (1) examination and development of a framework for the risk assessment of overseas business; (2) enhancement of stress testing, which incorporates trends and developments in foreign exchange and overseas economies; and (3) reinforcement of the monitoring of developments in post-merger integration.

Box 2: Loans and credit management for the housing rental business

In recent years, loans for real estate rental business to individuals or to asset management companies established by individuals (hereinafter referred to as "loans for the housing rental business") have increased, particularly among regional financial institutions. This reflects the increase in rental housing starts in many regions, stemming from the growing needs for more effective asset management, or from tax saving by land owners or high net-worth individuals (Charts B2-1 and B2-2).

Chart B2-1: Developments in real estate loans and rental housing starts^{1,2,3}



Notes: 1. The latest data are as of end-June 2015; quarterly basis.
 2. Regional banks and *shinkin* banks are counted.
 3. Rental housing starts are on a nationwide basis; 4-quarter backward moving totals.
 Sources: Ministry of Infrastructure, Transport and Tourism, "Statistics on building construction starts"; BOJ.

Chart B2-2: Correlation coefficient between real estate loans and rental housing starts by prefecture^{1,2,3,4}

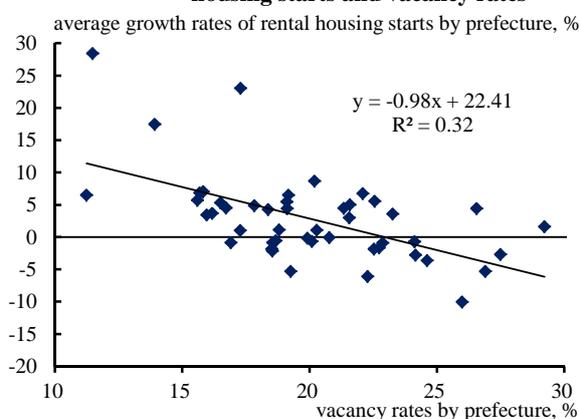


Notes: 1. The latest data are as of end-June 2015; quarterly basis.
 2. Regional banks and *shinkin* banks are counted.
 3. This chart shows a correlation coefficient between real estate loans on a year-on-year basis and rental housing starts (4-quarter backward moving totals) by prefecture.
 4. Rental housing starts are indexed with the stock of rented houses as of October 2003 = 100 by prefecture.
 Sources: Ministry of Internal Affairs and Communications, "Housing and land survey"; Ministry of Infrastructure, Transport and Tourism, "Statistics on building construction starts"; BOJ.

While Japan's total population has started to decline, it has been pointed out that demand for rental property has been steadily increasing for the following reasons: (1) the number of households is increasing, along with an increase in single-person households, against the background of the rapid aging of the population and the fact that people are now getting married much later in life; and (2) there is social migration to urban areas or, in provincial regions, closer to city centers from outlying areas. In fact, recent rental housing starts are increasing faster in prefectures where vacancy rates are low. In addition, a strong correlation between the increases in rental housing starts and the increase in the number of households is observed (Charts B2-3 and B2-4). That said, it should be noted that assets to which loans to the housing rental sector are extended

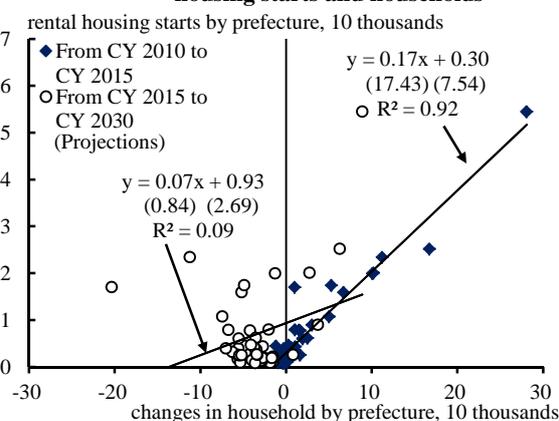
have a long economic life and the maturity of loans usually exceeds 10 years, or even in some cases 20 years, which requires banks to have a long-term perspective. From that perspective, looking at supply and demand conditions of rental property in the longer term, at the prefecture level the correlation between the present level of rental housing starts and the forecast for the future number of households is not necessarily very high. Although prefecture-level data may not be sufficiently granular for the purpose of the above analysis, when actually extending credit banks need to base their decisions on the actual conditions, as well as on the forecast of future supply and demand conditions based on the location of each property.

Chart B2-3: Relationship between rental housing starts and vacancy rates^{1,2}



Notes: 1. Rental housing starts are averages from 2010 to 2014.
2. Vacancy rates by prefecture are as of 2013.
Sources: Ministry of Infrastructure, Transport and Tourism, "Statistics on building construction starts"; Ministry of Internal Affairs and Communications, "Housing and land survey."

Chart B2-4: Relationship between rental housing starts and households^{1,2,3}



Notes: 1. Rental housing starts are averages from 2010 to 2014.
2. Figures for the number of households are projections made by the respective prefecture.
3. Figures in parentheses are t-values.
Sources: Ministry of Infrastructure, Transport and Tourism, "Statistics on building construction starts"; National Institute of Population and Social Security Research, "Household projection for Japan."

Given the long maturities and other characteristics peculiar to this sector, both initial screening and interim management during the life of the loan are essential for the management of credit risks of the housing rental business.

The initial screening for loan applications should examine whether the revenue and expenditure plans prepared by the business-owner or the house-builder is appropriate, and then verify whether non-rental incomes or the quality of collateral is appropriate. In verifying the revenue and expenditure plan, the location of the property, rent-pricing in the neighborhood, vacancy ratios, etc. should be closely scrutinized. In addition, simulations should be conducted by putting future rents (i.e., the occupancy ratio x the average level of rent for the property) and interest rates on loans under certain stresses, taking into consideration future expenditure for maintenance and repairs. In this regard,

challenges -- such as the appropriateness of the stress being unexamined or the periods in consideration being too short -- are in fact being identified, especially through on-site examinations.

Once loans are made, banks need to put the actual vacancy ratios as well as revenue and expenditure against their plans at regular intervals. Necessary measures should be taken, including support for business owners to improve their revenue relative to expenditure and adjustments in the conditions for the initial screening, if there are systematic divergences between the plans and the outcomes. It would also be useful to analyze and manage each portfolio, along with the development and utilization of data regarding, for example, delinquency and default rate by area, property age, or borrower classification. Although credit costs for this sector are not increasing at the moment, interim management throughout the loan period is essential.

Box 3: Changes in loan portfolios and sophistication of credit risk analysis

Since the adoption of the Basel II requirements, many financial institutions in Japan have been measuring the amount of credit risks using the so-called "internal ratings-based approach." The amount of credit risks obtained by this approach has the advantage of being able to be measured analytically, and also of bearing a relatively small calculation load. On the other hand, there are limitations such as (1) some elements, such as the concentration risks of loans, are left out from the assessment; and (2) being based on past experience, the assessments tend to be backward looking. Therefore, from the viewpoint of gaining timely and appropriate insight on credit risks, it is recommended that changes in portfolio attributes be taken into account and that banks conduct (1) measurement of concentration risks coming from the increasingly large size of loans and (2) stress testing under the business environment that could be expected in the future.

As examined in the main text, size of individual loans among major banks has grown moderately over the last few years (Chart V-1-15). This merits particular attention because the amount of risk obtained by the "internal ratings-based approach" leaves out the concentration risks resulting from the increasingly large size of loans.⁶⁹ In fact, the divergence between the amount of credit risks measured by taking into account the factors in the growing size of loans and those obtained by the "internal ratings-based approach" has been growing gradually, suggesting the importance of appropriately capturing the concentration risks (Chart B3-1).

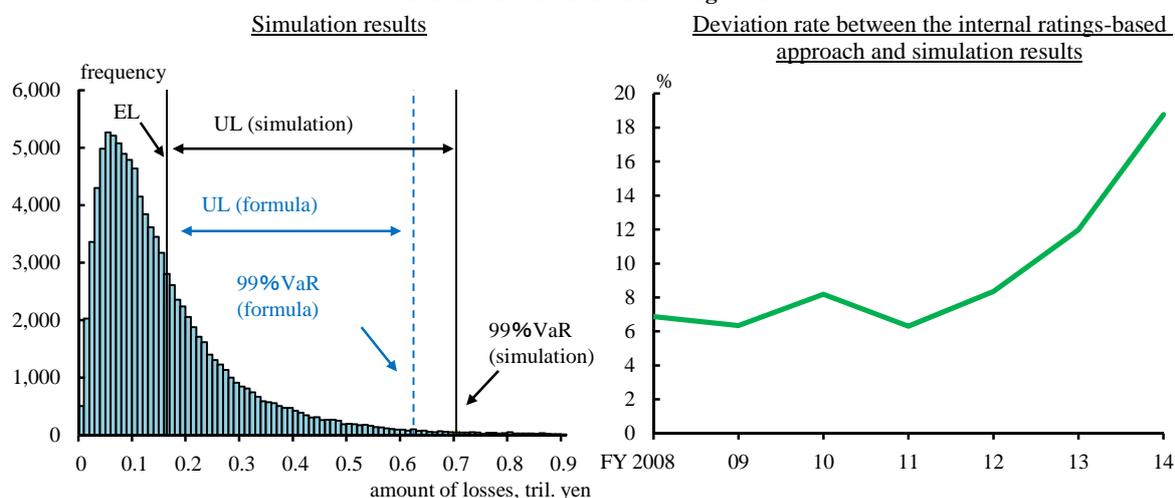
An example of an analysis of the possibility of utilizing stress testing under assumed changes in the business environment is presented below. In measuring the amount of credit risks, estimating the maximum amount of losses through stress testing based on an assumption of specific and severe financial and economic conditions has become an increasingly popular tool in risk management, in addition to an estimation of the maximum amount of losses based on the VaR.

A rough description of the differences between these two approaches is that while (1) the VaR, based on the assumption that the distribution of probabilities of the amounts of possible future losses can be estimated from the distributions of the amounts of losses observed in the past, estimates the maximum amount of losses that could be incurred within a certain period, (2) stress testing regards the amount of conditional, expected

⁶⁹ For this reason, under the Basel requirements, increase in the risk borne by a bank as a result of growing size of loans is covered not by their minimum capital requirements (the first pillar) but by "corporate governance and oversight (supervisory review process)" (the second pillar).

losses obtained under a stressful scenario which assumes specific, severe financial and economic conditions to be the maximum amount of losses (Chart B3-2).

Chart B3-1: Credit risk for large borrowers^{1,2}



Notes: 1. The left-hand chart shows the results of a Monte Carlo simulation based on the Merton model, using the credit data of approximately 2,000 firms. Major banks are counted. The data are as of end-March 2015.
 2. Deviation rate = credit risk estimated by the simulation / credit risk estimated by the internal ratings-based approach - 1.

Source: BOJ.

It is not possible to say which of these two approaches is better because the advantages and the disadvantages of each of these approaches are like the two sides of a coin. The "VaR" method has the advantage in that the probability of the incidence of the maximum amount of losses obtained here is backed by past data, which are thought to be "objective evidence." However, this very fact makes it difficult for the VaR method to estimate the maximum amount of losses to be incurred by risk scenarios that have not materialized. On the other hand, stress testing allows analyses of the extent of the effects under scenarios for which risks have not materialized, or under scenarios of a different nature, to assess the degree of vulnerability of individual loans or portfolios. At the same time, the risk assessment here depends heavily on the choice of the scenario, which is a "subjective factor."

In order to assist in concretely visualizing differences between the two approaches, the amount of credit risks of each major bank's portfolio of large-lot loans has been estimated by the VaR method and by two different stress testing -- one under Scenario 1 and one under Scenario 2. The results are that the relationship in magnitude among the three estimated amounts of credit risks obtained for each portfolio varies significantly from bank to bank (Chart B3-3).

Chart B3-2: Conceptual diagram of credit risk

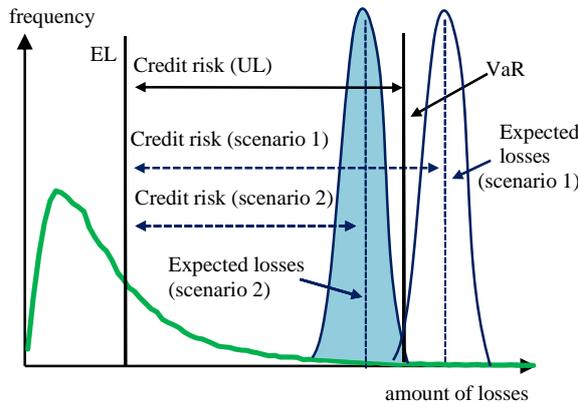
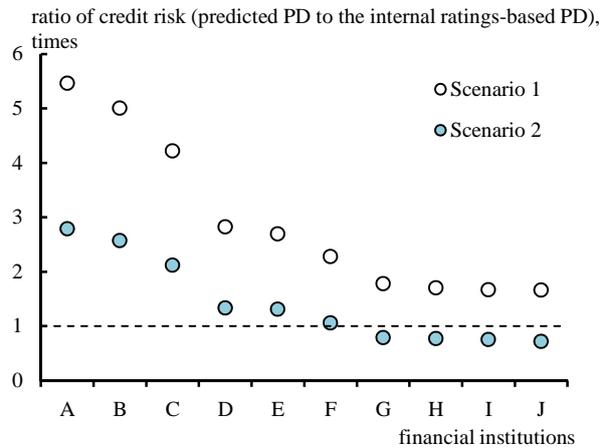


Chart B3-3: Comparison of credit risk¹



Note: 1. The vertical axis indicates the ratio of credit risk calculated using predicted PDs under stress scenarios ((predicted PD under stresses - internal ratings-based PD) × EAD) to credit risk calculated using the internal ratings-based PDs based on the VaR. In scenarios 1 and 2, Japan's real GDP and stock prices (TOPIX) are assumed to change based on "the tail event (scenario 1)" and "the tailored event (scenario 2)" (see Chapter VI.2 for details).

Sources: Moody's; BOJ.

These results suggest that the amount of credit risks obtained could vary significantly depending on (1) how the differences in the attributes of each bank's credit portfolio would be represented in the model and on what kind of data the model was based on and on (2) the nature of the scenario under which the analysis was made. Each of the above analyses was made on the basis of individual credit extension (loan) data. As stress testing has become increasingly popular in the analysis of the amount of credit risks since the financial crisis, the importance of utilizing "fine-grained" data and also the importance of the selection of scenarios has been felt with growing intensity. It is important that analyses be enhanced further, including the development and utilization of these data as well as the improvement of each bank's capability for setting scenarios.

Box 4: Risk analysis of securities portfolios of regional financial institutions

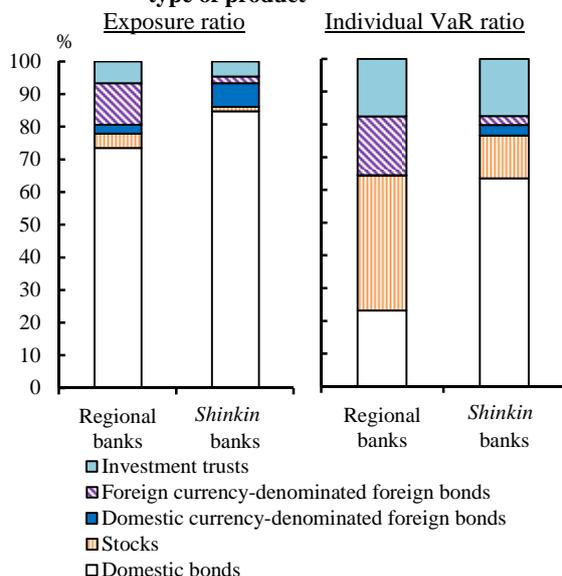
(The magnitude of the risk associated with foreign securities, investment trusts, and other assets)

As examined in Chapter IV, while regional financial institutions have maintained high levels of yen-denominated bonds outstanding in terms of a long-term perspective, their holdings of investment trusts and foreign securities have risen above the levels seen before the Lehman shock, reflecting their growing willingness to take on diverse risks.

An examination of the weight of the amount outstanding of risky assets, comprising investment trusts (e.g., domestic and foreign stock investment trusts, real-estate investment trusts and bond-ladder funds) and foreign securities and stocks, in the total securities portfolios shows that such weight now stands at over 20 percent for regional banks and over 10 percent for *shinkin* banks. Thus, domestic bonds still account for an overwhelming share of their portfolios. However, in terms of the value-at-risk (i.e., the arithmetic sum of the VaRs obtained for each type of assets, hereinafter referred to as "individual VaR"), risky assets can be considered comparable to domestic bonds, as they account for approximately 80 percent at regional banks and approximately 40 percent at *shinkin* banks (Chart B4-1).⁷⁰ Therefore, as mentioned earlier in the main text it is very important to enhance risk analyses of these risky assets in response to the trend of increasing diversity of investment. The following examines the effects of the correlation among risk factors and the changes in volatility, as they are critical issues in the risk analyses of the risky assets.

⁷⁰ When the relationship between the VaR for a 20-day holding period and unrealized gains/losses by type of asset is examined, partly due to the low book value resulting from the past impairment unrealized gains on stocks far exceed the amount of the VaR. By contrast, since other risky assets have in recent years been acquired in a rising phase of their prices, their book value is generally high. Since VaRs and unrealized gains/losses are at about the same levels, these risky assets are more susceptible to the possibility of turning into unrealized losses (Chart B4-2).

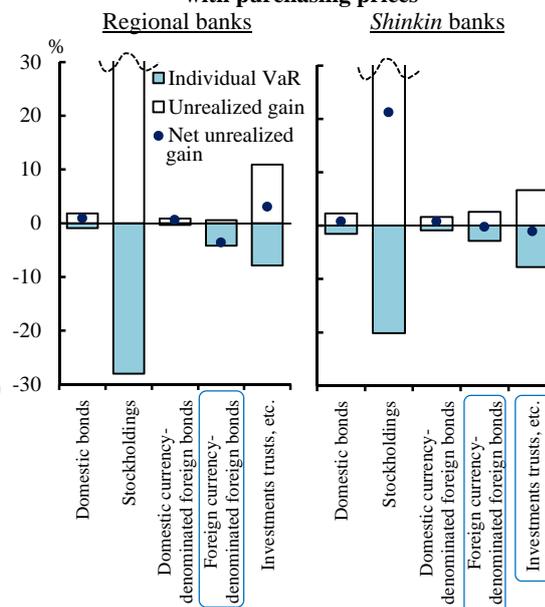
Chart B4-1: Exposure and individual VaR ratio by type of product^{1,2,3}



Notes: 1. Exposure is based on the book value as of end-June 2015. Individual VaR is based on the market value as of end-June 2015.
 2. Individual VaR for each product is calculated based on Variance Covariance method considering corresponding risk factors. Interest rates in yen, USD, and euro (German Bunds) are used for interest rate risks. TOPIX and the MSCI World Index are used for risks associated with stock holdings, dollar/yen and euro/yen rates are used for risks associated with foreign exchange rates, J-REIT index and the HFRX are used for other risks. Domestic bonds are divided into eight zones and sensitivity for each zone is calculated by the maturity ladder. For sensitivity of stocks, the beta calculated by unrealized profit is used. Sensitivity of foreign bonds and investment trusts, etc. is calculated by the data collected from each bank.
 3. Individual VaR is calculated for a holding period of 20 days, with a 99.9 percent confidence level, and with an observation period of 1 year from end-August 2015.

Source: BOJ.

Chart B4-2: Net unrealized gain ratio compared with purchasing prices^{1,2}



Notes: 1. The data are as of end-June 2015. The definition of individual VaR is referred to Note 2 in Chart B4-1.
 2. The in this chart indicates assets whose market prices are below purchasing prices if subtracted from individual VaR (with a 99 percent confidence level and a 20-day holding period).

Source: BOJ.

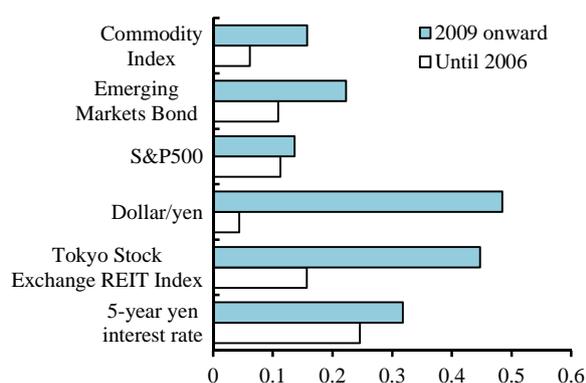
(Correlation among risk factors)

In general, holding more diverse assets curbs the risk of the total portfolio through the effect of risk diversification. In managing risks, however, proper consideration should be given to the effects of changes in the correlation between risk factors, which is the basis of the premise for such diversification effects.

First, in stressed market conditions the correlation among risk factors could change dramatically from the value observed in a normal market environment. For example, the abrupt unwinding of risks by a broad range of investors (i.e., making "risk-off" decisions) could sharply strengthen the correlation among risky assets, such as domestic and foreign stock prices, or change the relationship between bond and stock prices

which normally show a negative correlation by turning the relationship into a positive correlation. Thus, it would be beneficial to see from past stressed situations for example, the extent to which the correlation could change and how it could affect the risk profile of the institution's own portfolios. Second, even in normal times, the correlation between risk factors could be subject to a structural change depending on the market environment. A case in point is that since the Lehman shock, the correlation between risk factors has become stronger secularly.⁷¹ This can be mainly attributed to the behavior of investors, as they have increasingly and globally broadened the scope of the instruments of their investment in search for higher yields, under the prolonged low interest rate environment of major countries. In fact, the rolling correlations among the TOPIX and other major risk factors after 2009 is much greater than the value up to 2006 (Chart B4-3). Higher correlations among risk factors of this kind partially offset the diversification effects of holding diverse investment, thus increasing the amount of portfolio risk as a whole. For example, the comparison between the VaRs of risky portfolio assets (hereinafter, "total VaR") of regional financial institutions based on the market data during two different sample periods (2006 and 2015) shows that the VaRs based on 2015 data are greater for both regional banks and *shinkin* banks (Chart B4-4). Needless to say, however, this trend is not fixed and could change depending on the market environment. These points should be taken into account in risk analyses.

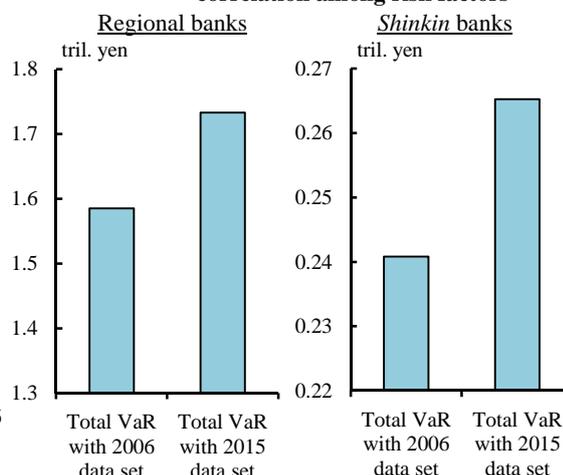
Chart B4-3: Correlation changes in TOPIX returns and major risk factors^{1,2}



Notes: 1. Commodity Index is the S&P GSCI Commodity Index. Emerging Markets Bond is the MSCI Emerging Markets Index.
2. The data are the medians of rolling correlation between each index and TOPIX returns; 1-year backward period.

Source: Bloomberg.

Chart B4-4: Difference in amount of risk due to correlation among risk factors^{1,2}



Notes: 1. Total VaR is calculated based on Variance Covariance method considering corresponding risk factors. See Note 2 in Chart B4-1 for details.
2. Total VaR with 2006 data set is based on "risk factor data in 2006." Total VaR with 2015 data set is based on "risk factor data from September 2014 to August 2015."

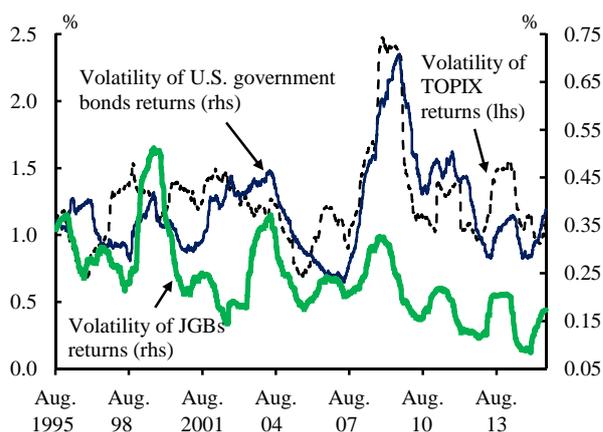
Source: BOJ.

⁷¹ The IMF's *Global Financial Stability Report (GFSR)* released in April 2015 also points out the structural increase in correlation among risk factors.

(Changes in volatility)

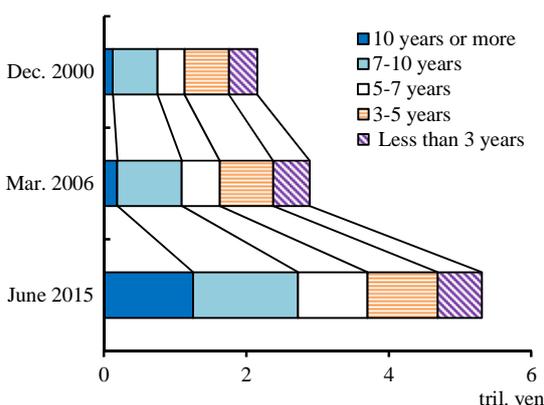
Regional financial institutions have been increasing their investment in risky assets while maintaining high levels of yen bonds outstanding. This is partly supported by secular decline in the volatility of the yen interest rates, holding down the amount of risks in terms of the VaR.

Chart B4-5: Developments of JGB price volatility^{1,2}



Notes: 1. The latest data are as of end-August. Daily volatility (1-year holding period).
2. Volatility of bond price return is calculated based on the 7-10yr bond price return indices.
Sources: Bloomberg; BOJ.

Chart B4-6: Changes in grid point sensitivity of domestic bonds¹



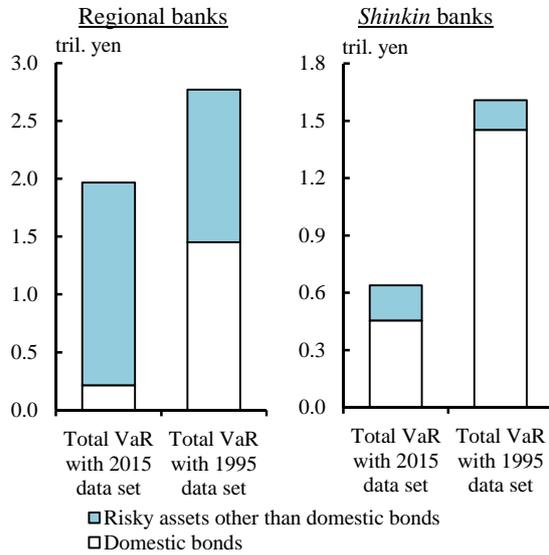
Note: 1. The amount of change in the present value of domestic bonds in case each of maturity shifts upward by 1 percentage point. Regional banks and *shinkin* banks are counted.
Source: BOJ.

A bird's eye view of changes in the volatility of yen interest rates since the turn of the century shows that it has trended downward, albeit with some fluctuations, to levels which are very low from a long-term perspective (Chart B4-5). This is in striking contrast to the fact that the volatility of stock prices (TOPIX) and overseas interest rates (U.S. long-term interest rates) have generally remained unchanged despite some large swings. The volatility of yen interest rates in terms of daily rate of changes in bond prices was about 0.1 percent, about one-third of that in U.S. interest rates (about 0.3 percent) and approximately one-tenth that in stock prices (about 1.0 percent). During this period, regional financial institutions have expanded their exposure in long- and super-long-term bonds (Chart B4-6). An estimation of the VaR of the regional financial institutions' present securities portfolios is made by applying their current volatility and that as of 1995, and shows that the amount of risk for the latter (based on 1995 data) is almost 1.5 times the current figure for regional banks, and almost 2.5 times the current figure for *shinkin* banks (Chart B4-7).⁷² Thus, the effects of changes in volatility need

⁷² The estimation in this Box does not take interest rate swaps and other off-balance sheets transactions into account. Since the volumes of regional financial institutions' off-balance sheets transactions are generally small, it is assumed that including such transactions would not produce results significantly different from those shown above.

to be taken into account in risk management.

Chart B4-7: Difference in amount of risk due to volatility of risk factors^{1,2}



Notes: 1. Total VaR for the whole securities portfolio is calculated based on Variance Covariance method considering corresponding risk factors. See Note 2 in Chart B4-1 for details. Yet, for the 1995 data set, exposure for the euro is replaced with that for USD, real estate index is replaced with TOPIX, and hedge fund index is replaced with MSCI World Index due to data constraint. The decomposition of total VaR into domestic bonds and other risky assets is based on marginal VaR calculation.

2. Total VaR with 2015 data set is based on "risk factor data from September 2014 to August 2015." Total VaR with 1995 data set is based on "risk factor data in 1995."

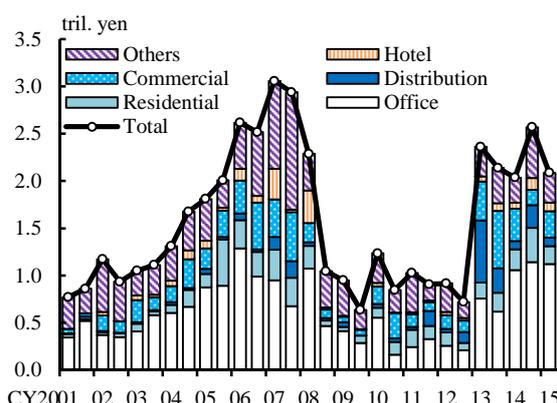
Source: BOJ.

Box 5: The situation in the real estate market

The latest financial activity indexes show that the "real estate firm investment to GDP ratio" has deviated more widely from its trend and has continued to signal "red". This section will examine the recent situation in the real estate market from a broad perspective, including the transaction and price trends as well as developments in the financial aspects.⁷³

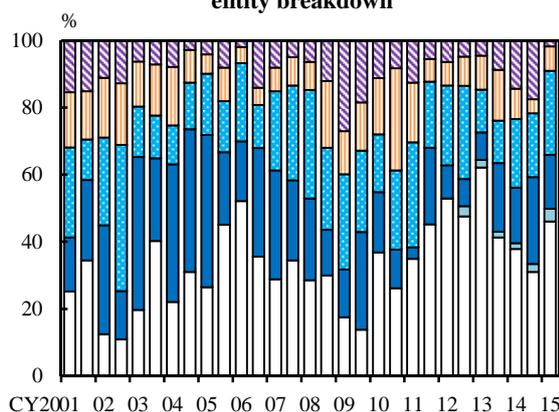
The value of real estate transactions is still below the level which prevailed in or around 2007, yet it has remained at a high level (Chart B5-1). By type of property, transactions for offices have remained brisk. By type of investor, Japan real estate investment trusts (J-REITs) have recently regained their share in total transactions (Chart B5-2).⁷⁴ Among overseas investors, unloading of the investment properties acquired before the Lehman shock and purchases of new properties have existed side by side, resulting in the amount of net purchases generally hovering at around zero (Chart B5-3).

Chart B5-1: Value of real estate transactions¹



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

Chart B5-2: Real estate transactions by type of entity breakdown¹



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

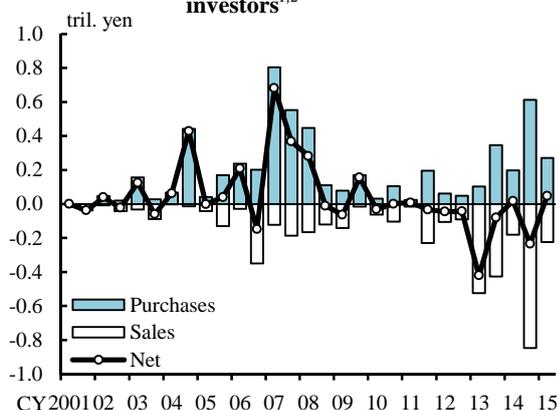
Real estate prices have begun to cease falling across the nation. The land prices to GDP ratio has remained in line with the past trend, while the distribution of the rates of increases in commercial land prices (appraisal values) as monitored at the same spots

⁷³ For details on the data used in this analysis, see Yuichiro Ito, Ichiro Muto and Yasutaka Takizuka, "Data Analysis for Monitoring Japan's Real Estate Market," Bank of Japan Review, No. 15-E-2, March 27, 2015.

⁷⁴ "Special purpose companies (SPCs)" and "asset management (AM)" in the chart denote mainly privately-placed funds.

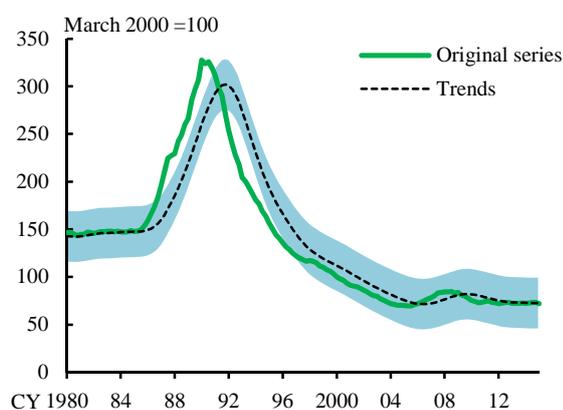
has not shown signs of spreading upward, as was seen during the past two real-estate booms (Charts B5-4 and B5-5). The distribution of transaction prices for commercial real estate properties within the special-ward area of Tokyo Metropolis shows a similar pattern (Chart B5-6). The yield spread of the J-REITs has not shown signs of contraction (Chart B5-7). Nevertheless, in central Tokyo, where the vacancy ratios of office buildings have fallen, there have been sporadic transactions in highly priced properties, reflecting investors' strong appetite for the properties in anticipation of a full recovery in office rents. In some areas in central Tokyo, the expected yields for investors have been renewing record lows (Charts B5-8 and B5-9). It should be noted, however, that similar developments have not taken place in the provincial regions except for some limited areas.

Chart B5-3: Real estate transactions by foreign investors^{1,2}



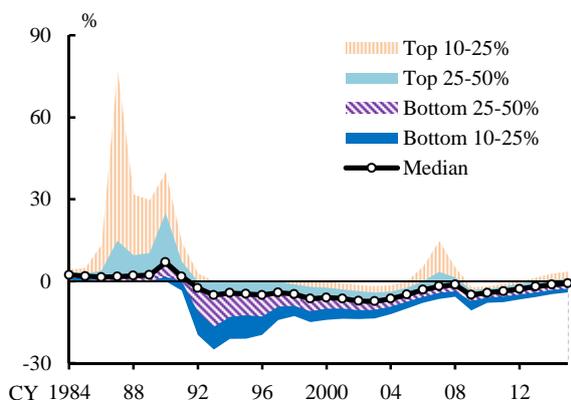
Notes: 1. The latest data are as of the first half of 2015.
 2. The definition of foreign investors is based on the criteria of Japan Real Estate Institute.
 Source: Japan Real Estate Institute.

Chart B5-4: Land prices to GDP ratio^{1,2,3,4}



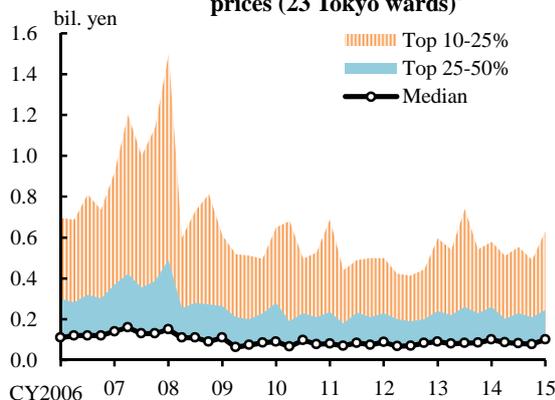
Notes: 1. The latest data are as of the January-March quarter of 2015.
 2. Original series = the land price of six major cities (all use categories average) / nominal GDP.
 3. Trends are calculated using the 3-year moving averages.
 4. Shaded areas indicate the root mean square of deviation from trends.
 Sources: Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index."

Chart B5-5: Distribution of year-on-year rates of change in commercial land prices^{1,2}



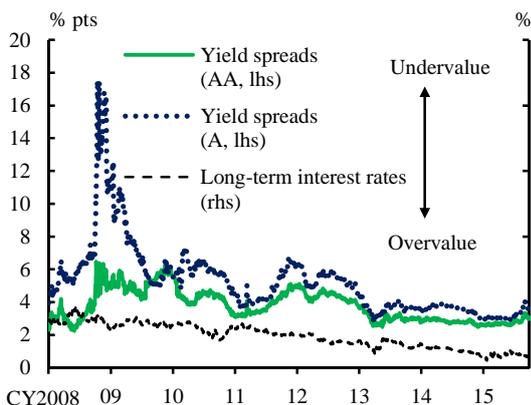
Notes: 1. The data are based on figures at the beginning of July for each year. The latest data are as of the beginning of July 2015.
2. Year-on-year rates of change in individual land prices in commercial areas.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Publication of market values of standard sites by prefectural government."

Chart B5-6: Distribution of individual commercial property transaction prices (23 Tokyo wards)¹



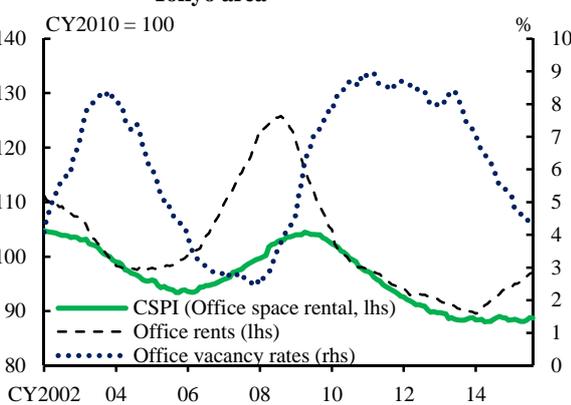
Note: 1. The latest data are as of the January-March quarter of 2015.
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Real estate transaction-price information."

Chart B5-7: Yield spreads of J-REITs^{1,2}



Notes: 1. The latest data are as of September 30, 2015.
2. Yield spreads = dividend yields of J-REITs - long-term interest rates (10-year JGBs).
Sources: Bloomberg; Japan Bond Trading; QUICK.

Chart B5-8: Office rents and vacancy rates in the Tokyo area^{1,2,3}

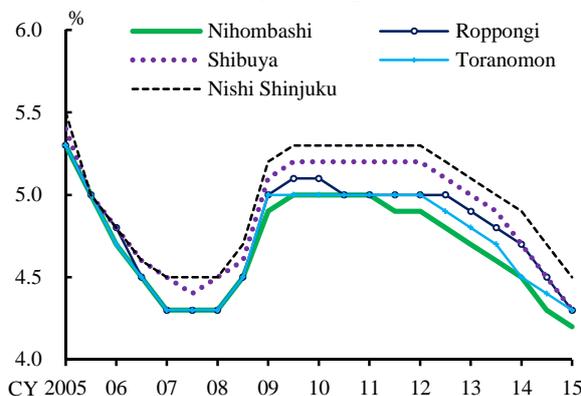


Notes: 1. The latest data are as of August 2015.
2. Rents and vacancy rates are averages of existing offices in the Tokyo business district (Chiyoda-city, Chuo-city, Minato-city, Shinjuku-city, and Shibuya-city in Tokyo).
3. The effect of the consumption tax hike on CSPI is excluded.
Sources: Miki Shoji Co., Ltd.; BOJ, "Services Producer Price Index."

From a financial aspect, J-REITs have continued high levels of fund raising, but there has been no increase in leverages (Chart B5-10). Banks' investment in and funding for real estate funds by type of bank show that while major banks have somewhat increased their lending, regional banks have increased equity investment (Chart B5-11). Listed real estate companies (i.e., large corporations) other than J-REITs have also increased their fund raising, but it is still at a low level and borrowing is limited compared with

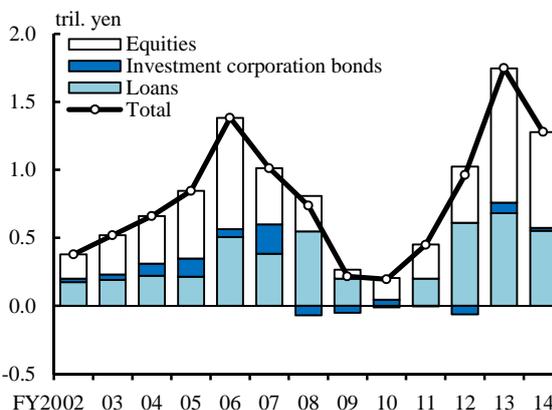
the real-estate boom in or around 2007 (Chart B5-12). Investment by listed real estate companies that mainly drives up the "real estate firm investment to GDP ratio" has been financed mainly with internal funds or from new capital raised.

Chart B5-9: Capitalization rate of office buildings in Tokyo metropolitan area¹



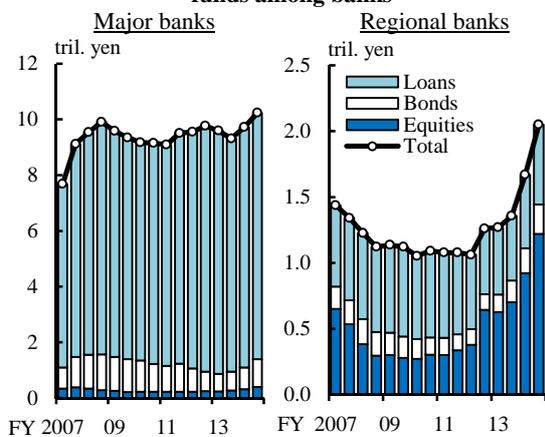
Note: 1. The latest data are as of April 2015
Source: Japan Real Estate Institute, "The Japanese real estate investor survey."

Chart B5-10: Financing by J-REITs¹



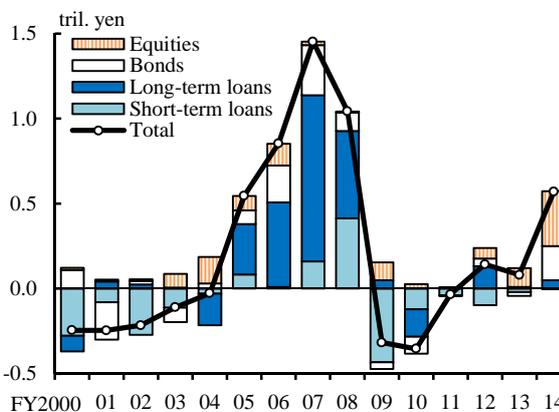
Note: 1. The amount of financing for each firm is aggregated for the month during which its account is published. This chart indicates the total volume of funds raised by firms on an annual basis.
Source: Nikkei Needs.

Chart B5-11: Investments and loans for real estate funds among banks^{1,2}



Notes: 1. The latest data are as of fiscal 2014.
2. Yen-denominated recourse loans are excluded.
Source: BOJ.

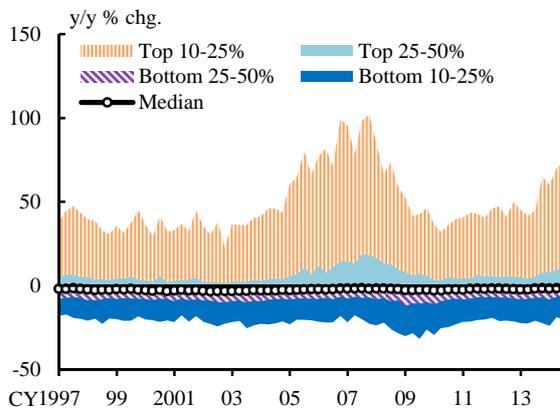
Chart B5-12: Financing by listed real estate companies other than J-REITs¹



Note: 1. 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.

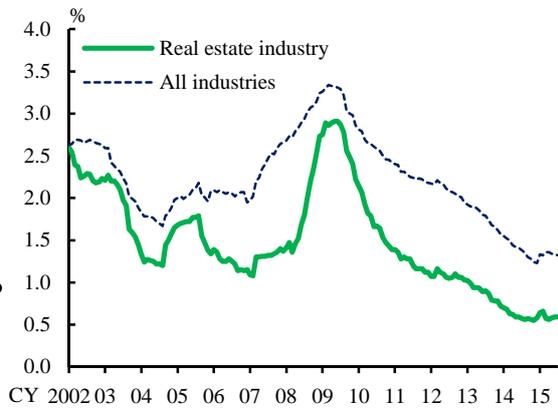
By contrast, the distribution of the year-on-year changes in the outstanding amounts of interest-bearing debts of small and medium-sized real-estate companies with low credit ratings has been spreading upward. However, the degree of the spread toward the right of the distribution is not as stark as that observed in the mid-2000s, when a sharp rise in the default rate in the real-estate industry followed (Charts B5-13 and B5-14).

Chart B5-13: Debt financing by real estate companies with lower creditworthiness^{1,2}



Notes: 1. The latest data are as of the July-September quarter of 2014.
 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 B5-14: Default rate among real estate companies¹



Note: 1. The latest data are as of July 2015.
 Source: Risk Data Bank of Japan, Ltd., "RDB enterprise default ratio."

As shown above, many indicators are still below the levels which prevailed during the real-estate boom prior to the Lehman shock, indicating that the real estate market as a whole is not in an overheated condition. Nevertheless, J-REITs and overseas investors have been stepping up their property purchases on top of an increase in investment by large real-estate companies, resulting in transactions in some high-value properties in central Tokyo.

In addition, banks are becoming more aggressive in investment and financing in the real estate and related sectors, and there have been signs of increased borrowing by small and medium-sized real estate companies with low credit ratings. Under these circumstances, the situation in the real estate market warrants vigilant attention.

Box 6: Improvement of the Financial Macro-econometric Model

Since the FMM was developed in 2011, efforts have been made to meet new analytical needs or regulatory changes and to improve its accuracy. In this *Report* the following improvements have been made: (1) the introduction of nonlinearity to the relationship between loans and banks' capital adequacy ratio, and (2) enhancement of the accuracy in estimating the pass-through rate to *shinkin* banks' loan interest rates.

(1) The introduction of nonlinearity to the lending function

It is frequently observed that when financial institutions have ample capital, they do not reduce their loans by a substantial amount even when faced with a decrease in their capital. On the contrary, if their capital decreases when they have barely sufficient capital, they tend to become more conscious of their capital constraints and drastically reduce their loans. This suggests a nonlinear relationship between loans and banks' capital adequacy ratio. However, former specifications in the FMM did not fully incorporate such nonlinearity.

Accordingly, in this issue the specification of financial institutions' behavior in lending to domestic corporations has been refined so that it incorporates the nonlinear relationship into the FMM. Specifically, the refined specification captures the tendency that, even if the capital adequacy ratio does not fall below the regulatory level, when the capital adequacy ratio gap (i.e. the financial institution's capital adequacy ratio minus the regulatory level) falls below a certain threshold, this financial institution becomes increasingly attentive to the regulatory level and sharply reduces their lending.⁷⁵

Chart B6-1: Effects of non-linear model on corporate loan volume^{1,2}

%, % pts	Internationally active banks		Domestic banks	
		Capital adequacy ratio gap below thresholds		Capital adequacy ratio gap below thresholds
Changes in loans outstanding with non-linear effects (a)	1.4	1.8	4.2	5.4
Changes in loans outstanding without non-linear effects (b)	1.5	2.4	4.8	6.3
Non-linear effects (a-b)	-0.1	-0.6	-0.5	-0.9

Notes: 1. Major banks and regional banks are counted. Changes in loans outstanding are percent changes of domestic corporate loan volume from end-March 2015 to end-March 2018.

2. For internationally active banks, capital adequacy ratio gap is the deviation of total capital adequacy ratio from the regulatory level. For domestic banks, capital adequacy ratio gap is the deviation of core capital ratio from the regulatory level.

Source: BOJ.

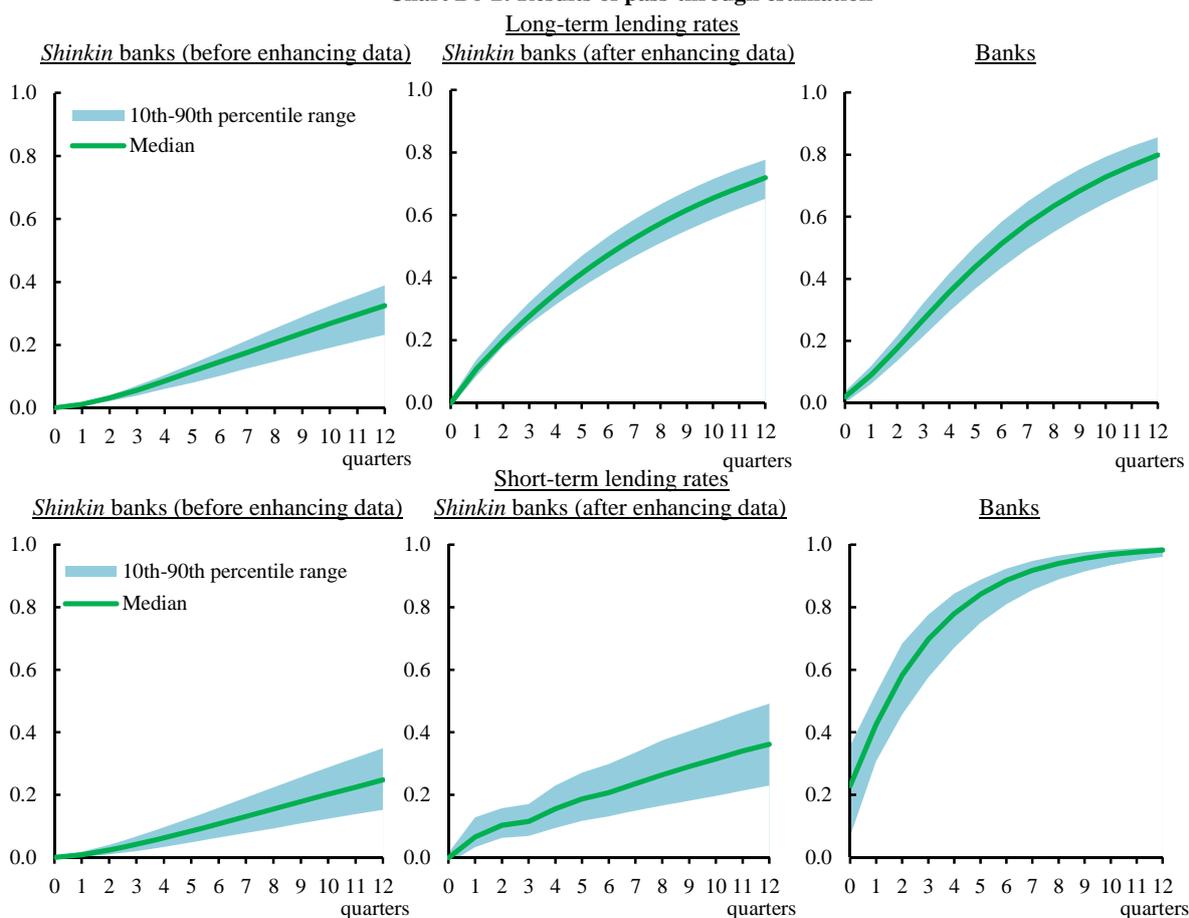
⁷⁵ Thresholds are set for individual financial institutions based on their time-series data.

This refinement has the following effects: under the tail event scenario the growth rates of loans to domestic corporations from the end of fiscal 2014 through the end of fiscal 2017 are lowered by 0.1 percentage points for internationally active banks and by 0.5 percentage points for domestic banks. For banks whose capital adequacy ratio gaps have fallen below the thresholds, the refined specification indicates a stronger effect in that the growth rates are lowered by 0.6 percentage points and 0.9 percentage points, respectively (Chart B6-1).

(2) Estimation of the market interest rate pass-through to *shinkin* banks' loan interest rates

In former estimations of the market interest rate pass-through to the loan interest rate for *shinkin* banks, annual data for loan interest rates were used. In this *Report*, however, we have refined the estimation method using quarterly data, which has become newly available.

Chart B6-2: Results of pass-through estimation^{1,2}



Notes: 1. The vertical axis indicates the pass-through of lending rates.

2. For banks, major banks and regional banks are counted.

Source: BOJ.

The results show that the pass-through to *shinkin* banks' long-term lending rate in 3 years reaches around 0.3 using annual data and around 0.6 using quarterly data which is close to that of banks (Chart B6-2).

It can be interpreted that the use of quarterly data captures lending rate fluctuations more accurately. A similar trend can be identified with regard to the pass-through for short-term lending rates, but the pass-through in this case is significantly lower than that of banks. This reflects the differences in transaction practice relating to loan interest rates between banks and *shinkin* banks, such as the fact that the share of lending whose interest rates move on with market interest rates is higher in banks than in *shinkin* banks.

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 = 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.