Financial System Report

Preface

Objective of the Financial System Report

The Bank of Japan publishes the *Financial System Report* semiannually, with the objective of comprehensively analyzing and assessing the stability of Japan's financial system and facilitating communication with concerned parties in order to ensure such stability. The Bank uses the results of the analysis set out in the *Report* in planning measures to ensure stability in the financial system and for providing guidance and advice to individual financial institutions through on-site examinations and off-site monitoring. Moreover, the Bank makes use of the results in international regulatory and supervisory discussions. In relation to monetary policy, the macro assessment of financial system stability is also an important input for the Bank in assessing risks in economic and price developments from a medium- to long-term perspective.

The *Report* assesses the stability of Japan's financial system from a macroprudential perspective. The macroprudential framework is used to devise institutional designs and policy measures based on analyses and assessments of risks in the financial system, together with the interconnectedness of the real economy, financial markets, and financial institutions' behavior, to ensure the stability of the overall financial system.

Specifically, this *Report* analyzes and assesses the following points. First, it analyzes the external environment surrounding Japan's financial system. Second, it analyzes financial intermediation in Japan such as financial conditions among firms and households and developments in financial markets and financial intermediary investment. Third, it analyzes risks observed in financial markets. Fourth, it analyzes risks borne by financial intermediaries such as banks, *shinkin* banks, and insurance companies. And fifth, it assesses risk in the financial system from a macroeconomic perspective by examining macro financial risk indicators and assessing the resilience of the financial system using macro stress testing.

Features of this Report

In this issue, in addition to the regular examination of the financial system, the contents have been enhanced in the following areas: (1) refinement of macro stress testing by incorporating the relationship between credit costs and an interest rate rise; (2) revision of the Financial Activity Indexes (FAIXs), which are macro risk indicators; and (3) analysis of profitability among regional financial institutions. In the analysis of financial intermediation and associated risks, a detailed examination has been conducted not only of the aggregate or average values of various indicators, but also of the distribution of

these indicators among individual financial institutions.

The Bank will continue to enhance the *Report* to contribute further to ensuring financial system stability.

Contents

I. Comprehensive assessment of the financial system and overview

A. Comprehensive assessment of the financial system

Japan's financial system as a whole has been maintaining stability.

Judging from developments in financial markets and financial institutions' behavior, there is no indication warning of financial imbalances such as excessively bullish expectations. The volatility of stock prices temporarily increased from the beginning of 2014, but volatility has generally been low in the Japanese government bond (JGB) and foreign exchange markets.

Capital bases of financial institutions such as banks and *shinkin* banks have been adequate on the whole, and these institutions have sufficient funding liquidity. Thus, they generally have strong resilience against various economic and financial shocks, as they would maintain their capital adequacy ratios above regulatory levels even under stresses arising in scenarios involving a significant economic downturn and a substantial rise in interest rates. However, attention should be paid to the possibility that the impacts of an economic downturn and an interest rate rise spread to the financial system, depending on the speed and extent of the economic downturn and the rise in interest rates, as well as the factors behind them. Some financial institutions have relatively weak capital bases, and are behind the curve in improving asset quality following the Lehman shock. These institutions need to steadily strengthen their capital.

Financial intermediation has operated more smoothly than it did at the time of the previous *Report*.

Financial institutions have adopted more proactive lending attitudes at home and abroad, and some of them have increasingly taken on risks associated with securities investment, albeit to a small extent. Financial intermediation through financial markets has become prevalent. In these circumstances, financial conditions among firms and households have become more accommodative. Financial institutions' loans have grown at a faster pace, particularly those to small and medium-sized firms, and these institutions have extended loans to a wider range of industries and regions.

The recent economic recovery has had positive effects on the profits of financial institutions. The positive effects include an increase in profits related to stock investment, an increase in sales of stock investment trusts, and a decrease in credit costs. However, the core profitability of domestic business operations relating to deposits and loans has remained on a downtrend, mainly due to the continued narrowing of interest rate spreads on loans. Business conditions among regional financial institutions are

particularly severe. The decline in core profitability does not immediately affect the stability or functioning of the overall financial system. Nonetheless, the declining trend in core profitability is a challenge that should be resolved because it may constrain financial institutions' ability to absorb losses and take on risks in the medium to long term.

B. Overview (summary of Chapters II to VI)

Chapter II: Examination of the external environment

Overseas economies -- mainly advanced economies -- are starting to recover, although a lackluster performance is still seen in part. In this situation, while concerns over the European debt problem have abated further, global financial markets have remained susceptible to developments in U.S. monetary policy and emerging economies. After the turn of the year, some developments indicating nervousness were temporarily observed in global financial markets as concerns mounted over prospects in some emerging countries with structural problems, such as current account deficits, and risk-taking by investors was reduced.

Japan's economy has continued to recover moderately as a trend, albeit with some fluctuations due to the consumption tax hike, and financial conditions among firms and the employment and income situation in the household sector have generally improved. The ratio of risky assets including investment trusts has risen among households. As for the fiscal balance, fiscal deficits have persisted, but the national and local governments' primary deficit to GDP ratio is expected to improve, partly due to the consumption tax hikes.

Chapter III: Examination of financial intermediation

Financial conditions among firms and households have become more accommodative under quantitative and qualitative monetary easing (QQE) compared with those at the time of the previous *Report*. Funding conditions have improved not only for large and medium-sized firms, but also for small firms, and interest rates on housing loans have declined.

Financial intermediation through financial markets has become prevalent, particularly in equity financing. As the Bank of Japan's JGB purchases under QQE have expanded, financial institutions such as banks and *shinkin* banks have increased their holdings of

risky assets, including loans. Financial institutions' domestic loans have grown at a faster pace, particularly those to small and medium-sized firms, and these institutions have extended loans to a wider range of industries and regions. Overseas loans have continued to show relatively high growth. Regarding securities investment, investment in instruments such as foreign securities and stock investment trusts has increased, albeit slightly. Meanwhile, no major changes have been seen in investment by investors other than financial institutions, such as insurance companies.

Chapter IV: Risks observed in financial markets

In Japan's financial markets, the volatility of stock prices temporarily increased from the beginning of 2014. This is because investors became increasingly risk averse given nervousness in some emerging markets and a decline in stock prices globally. JGB yields have been stable due to factors such as the continued tightening of supply and demand conditions in the JGB market prompted by the Bank's large-scale JGB purchases. The volatility of foreign exchange rates has shown a decreasing trend.

Chapter V: Risks borne by financial intermediaries

At financial institutions such as banks and *shinkin* banks, capital adequacy ratios as a whole have been rising recently, and these institutions have ratios well above regulatory levels. Interest rate risk and credit risk declined, while market risk associated with stockholdings increased, reflecting a rise in the market value of stocks held. As a result, the amount of risk borne by financial institutions has increased on the whole, but its pace of increase has been almost consistent with the rate of capital growth, and financial institutions' capital bases have generally been adequate. Financial institutions have also secured sufficient funding liquidity. Nevertheless, there are still some financial institutions with low levels of bank capital adequacy relative to the amount of risk they bear, and these institutions need to steadily strengthen their capital.

The recent economic recovery has had positive effects on the profits of financial institutions. The positive effects include an increase in profits related to stock investment, an increase in sales of stock investment trusts, and a decrease in credit costs. However, the core profitability of domestic business operations relating to deposits and loans has remained on a downtrend, mainly due to the continued narrowing of interest rate spreads on loans. Business conditions among regional financial institutions are particularly severe. The decline in core profitability does not immediately affect the

stability or functioning of the overall financial system. Nonetheless, the declining trend in core profitability is a challenge that should be resolved, because it may constrain financial institutions' ability to absorb losses and take on risks in the medium to long term.

Chapter VI: Risk assessment of the financial system from a macroeconomic perspective

Judging from developments in financial markets and financial institutions' behavior, the financial risk indicators show no warning of financial imbalances such as excessively bullish expectations at present. The results of macro stress testing indicate that financial institutions on the whole would be able to maintain the levels of capital adequacy ratios above regulatory levels even if a significant economic downturn similar to the Lehman shock occurred or long-term interest rates rose by about 2 percentage points with an economic downturn. Nevertheless, an economic downturn and a rise in interest rates may cause a stronger adverse feedback loop between the real economy and financial activity via an increase in the burden of firms' interest payments, depending on the speed and extent of the economic downturn and the rise in interest rates, as well as the factors behind them. This may have impacts on financial institutions' profits and capital, and ultimately on the financial system. Furthermore, it should be noted that if significant economic and financial shocks occurred, capital adequacy ratios may plunge at financial institutions with weak capital bases relative to the amount of risk they bear. On the funding liquidity side, financial institutions have sufficient liquid assets to see themselves through stress events such as deposit outflows continuing for a certain period and a decline in the functioning of financial markets.

II. Examination of the external environment

This chapter examines the external environment surrounding Japan's financial system. It summarizes developments in global financial markets, overseas economies, Japan's economy, financial conditions among firms and households, and fiscal conditions in Japan.

A. Developments in global financial markets and overseas economies

While concerns over the European debt problem have abated further, global financial markets have remained susceptible to developments in U.S. monetary policy and emerging economies. Although U.S. long-term interest rates rose around the end of 2013 owing to speculation about U.S. monetary policy, they were generally stable after when the U.S. Federal Reserve decided to begin reducing the pace of its asset purchases, and stock prices remained firm in advanced countries (Chart II-1-1). After the turn of the year, however, concerns mounted over prospects in some emerging countries with structural problems, such as current account deficits, and this reduced risk taking by investors. As a result, stock prices and exchange rates temporarily weakened in financial markets in these emerging countries, and some developments indicating nervousness were temporarily observed in advanced countries' financial markets as evidenced by declining long-term interest rates and stock prices (Chart II-1-2).

Chart II-1-1: Government bond yields and stock prices in advanced countries[1,2]

Government bond yields

Stock prices
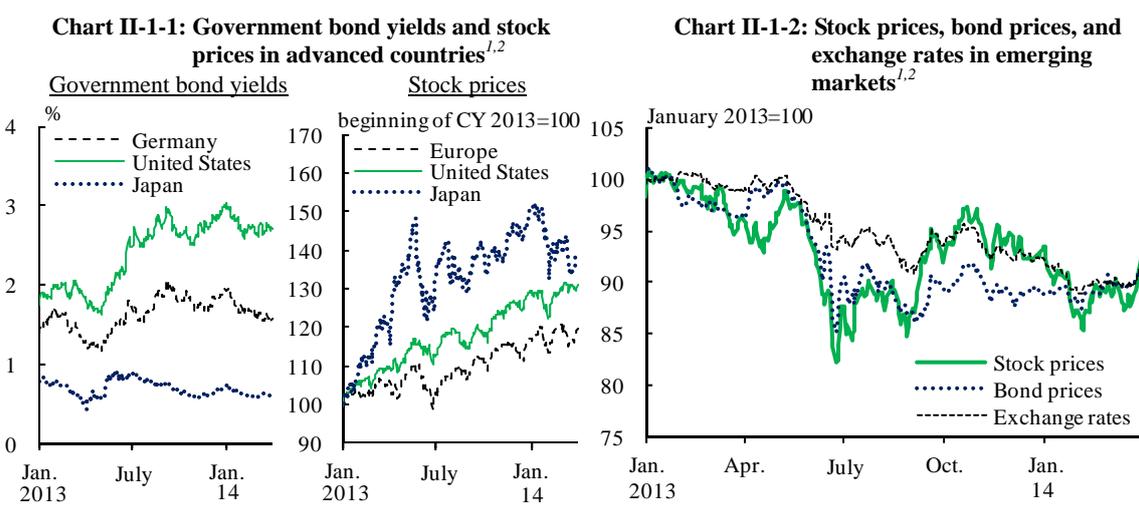
Notes: 1. The latest data are as of March 31, 2014.
2. The left-hand chart shows 10-year government bond yields. In the right-hand chart, the S&P 500 is used for the United States, the STOXX Europe 600 for Europe, and the TOPIX for Japan.
Source: Bloomberg.

Chart II-1-2: Stock prices, bond prices, and exchange rates in emerging markets[1,2]

Notes: 1. The latest data are as of March 31, 2014. The MSCI Emerging Markets Index is used for stock prices, and price indexes of emerging markets calculated by J.P. Morgan are used for bond prices and exchange rates.
2. Higher exchange rates indicate appreciation of emerging economies' currencies.
Source: Bloomberg.

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Overseas economies -- mainly advanced economies -- are starting to recover, although a lackluster performance is still seen in part (Chart II-1-3).

The U.S. economy has been on a moderate recovery, mainly in private demand. In Europe, progress has been made in establishing a banking union, and concerns have eased further over the tail risks associated with the European debt problem. However, the European debt problem has not yet been resolved fundamentally, and levels of debt in both the private and public sectors have remained high (Chart II-1-4).

Chart II-1-3: OECD composite leading indicators[1]
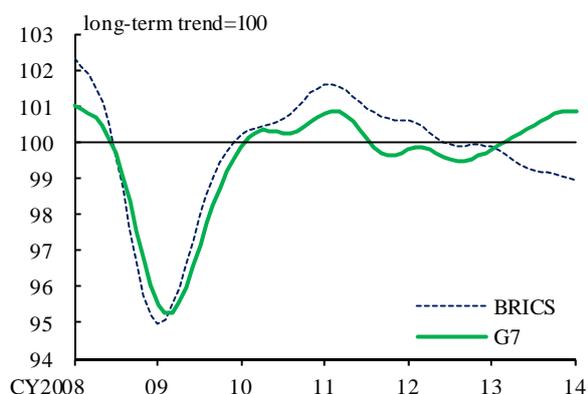
Note: *1*. The latest data are as of January 2014. BRICS calculations are simple averages of Brazil, Russia, India, China, and South Africa.
Source: OECD.

Chart II-1-4: Debt outstanding by sector in the euro area[1]
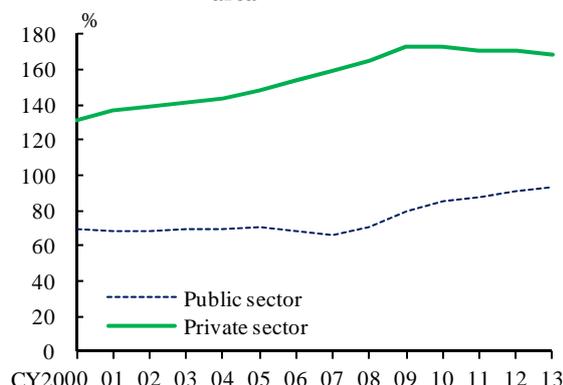
Note: *1*. The latest data are as of the July-September quarter of 2013. The private sector consists of households and nonfinancial corporations. The debt outstanding figures are ratios to nominal GDP.
Sources: ECB; Eurostat.

Economic activity in some emerging countries has continued to be affected by a tightening of financial conditions and cautious sentiment among economic entities, and the growth momentum, particularly in domestic demand, has weakened. In these circumstances, there has been an outflow of overseas funds from financial markets in emerging countries, particularly those with structural problems such as current account deficits, and the exchange rates of these countries have depreciated sharply (Charts II-1-5 and II-1-6). Some of these countries have raised their policy interest rates to avoid sharp fluctuations in the value of their currencies, and this has further depressed domestic demand.

The Chinese economy has continued to be stable, with somewhat lower growth compared to a while ago. The pace of increase in overall credit has been restrained, partly owing to various policy measures taken by the authorities. Nevertheless, triggered by the fact that the repayment of some trust products was not conducted as scheduled and interest payments on corporate bonds were not made, concerns have intensified somewhat over developments in the Chinese financial system and their impact on the

real economy (Chart II-1-7).

Chart II-1-5: Capital flows into bond funds[1]
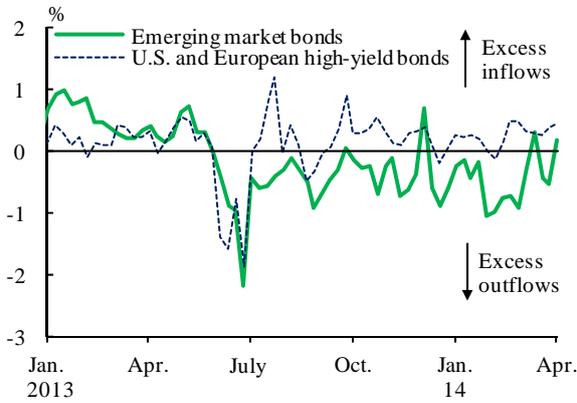
Note: *1*. The latest data are from March 27 to April 2, 2014.
Capital flows are ratios to total assets.
Source: EPFR Global.

Chart II-1-6: Exchange rates and current account balances in emerging countries and regions[1,2]
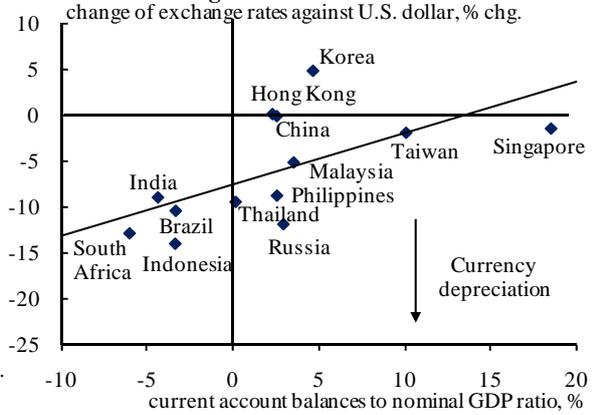
Notes: *1*. The ratio of current account balances to nominal GDP is the outlook for 2013 by the IMF.
2. The exchange rates are changes from April 1, 2013 to March 31, 2014.
Sources: Bloomberg; IMF, "Wold economic outlook."

Chart II-1-7: Total amount of social financing in China[1]
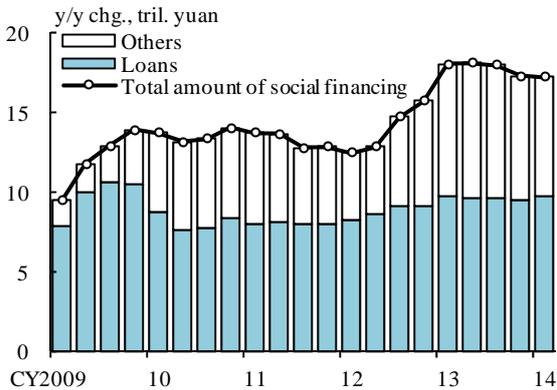
Note: *1*. The latest data are as of February 2014.
Source: CEIC.

B. Domestic economy, financial conditions among firms and households, and fiscal conditions

Japan's economy has continued to recover moderately as a trend, albeit with some fluctuations due to the consumption tax hike. In the corporate sector, business sentiment and profits have improved in a wide range of firms -- not only among large and medium-sized firms, but also among small firms (Charts II-2-1 and II-2-2). In these circumstances, the financial conditions of firms have generally improved, with their interest payment capacity and on-hand liquidity remaining at high levels (Charts II-2-3

and II-2-4).

Chart II-2-1: DI of business conditions[1]

Note: 1. The latest data are as of March 2014.
Source: BOJ, "*Tankan*."

Chart II-2-2: Current profits of firms[1,2]
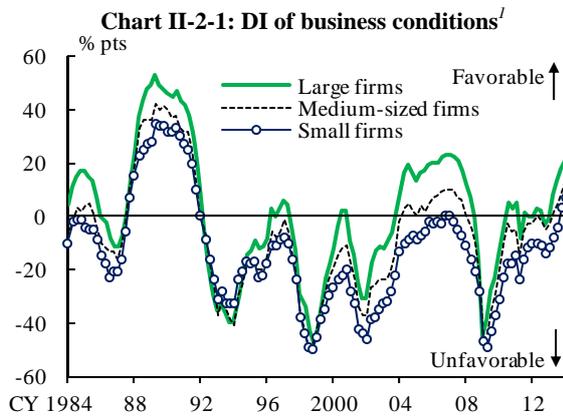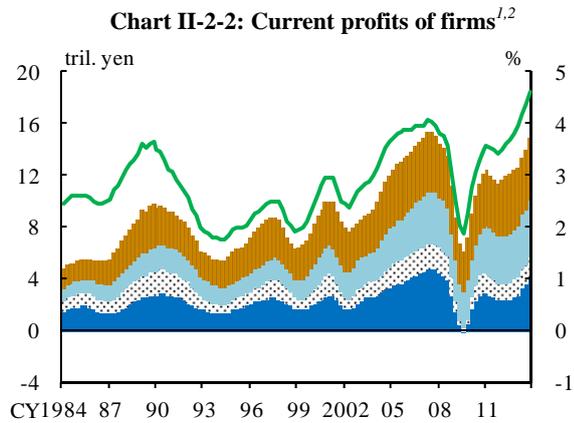
■ Medium-sized and small nonmanufacturing firms (lhs)
▨ Large nonmanufacturing firms (lhs)
▨ Medium-sized and small manufacturing firms (lhs)
■ Large manufacturing firms (lhs)
— Ratio of current profits to sales (rhs)

Notes: 1. The latest data are as of the
October-December quarter of 2013;
4-quarter moving averages.
2. Large firms: capital of 1 billion yen or more.
Medium-sized and small firms: capital of 10
million yen to less than 1 billion yen.
Source: Ministry of Finance, "Financial statements
statistics of corporations by industry."

Chart II-2-3: Interest coverage ratios (ICRs)[1,2,3]
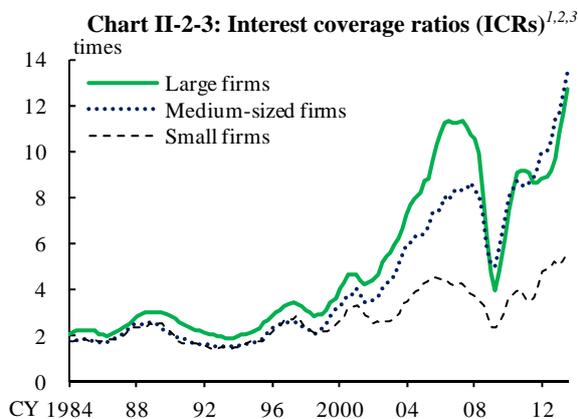
Notes: 1. The latest data are as of the October-December
quarter of 2013; 4-quarter moving averages.
2. Large firms: capital of 1 billion yen or more.
Medium-sized firms: capital of 100 million yen
to less than 1 billion yen. Small firms: capital of
10 million yen to less than 100 million yen.
3. ICR = (operating profits + interest and dividends
received, etc.) / interest payments, etc.
Source: Ministry of Finance, "Financial statements
statistics of corporations by industry."

Chart II-2-4: Ratio of cash and deposits to sales of firms[1,2]
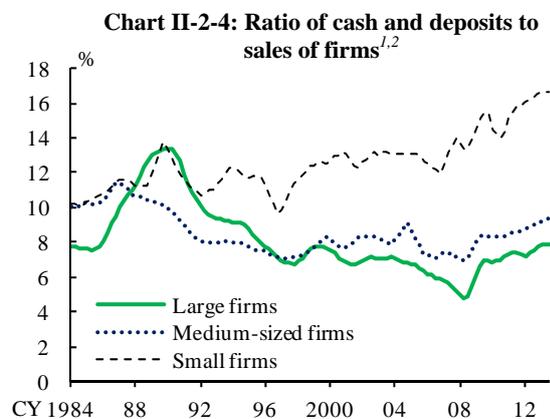
Notes: 1. The latest data are as of the October-December
quarter of 2013; 4-quarter moving averages.
2. For details on the size of firms, see Note 2 in
Chart II-2-3.
Source: Ministry of Finance, "Financial statements
statistics of corporations by industry."

The employment and income situation in the household sector has continued to show some improvement. On the household assets side, against the backdrop of improved consumer sentiment and the rise in stock prices, the ratio of cash and deposits to total

financial assets has continued to decline and the ratio of risky assets including stocks and investment trusts has risen (Chart II-2-5). Developments in the flow of funds related to stocks and stock investment trusts showed that there was a significant net outflow of funds around the end of 2013 prior to the expiration of the preferential tax treatment of securities investment income. However, there has been a large net inflow of funds at the beginning of 2014, due in part to the introduction of Nippon Individual Savings Accounts (NISAs) -- investment accounts that are tax-free up to a certain amount (Chart II-2-6).

Chart II-2-5: Ratios of "cash and deposits" and "equities and investment trusts, etc." among households[1,2,3]
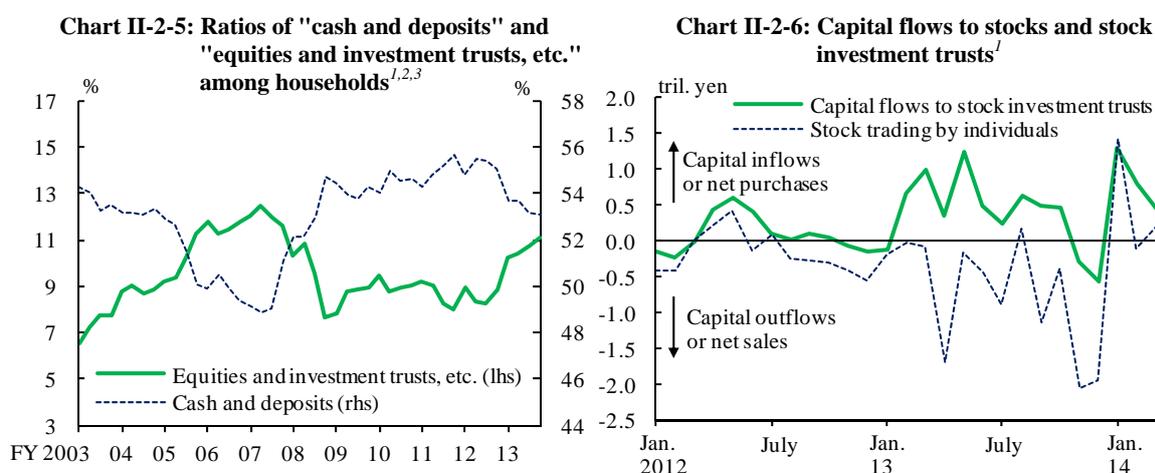
Notes: *1*. The latest data are as of end-December 2013.
2. The data for "equities and investment trusts, etc." are the sum of equities, investment trusts, outward investments in securities, and foreign currency deposits. Figures indicate the ratio to total financial assets of households.
3. Changes in the outstanding amount of financial assets are partly attributable to movements in market value.
Source: BOJ, "Flow of funds accounts."

Chart II-2-6: Capital flows to stocks and stock investment trusts[1]

Note: *1*. The latest data are as of March 2014.
Sources: Investment Trusts Association, Japan; Tokyo Stock Exchange.

Regarding fiscal conditions, government debt has continued to increase, and the government debt to GDP ratio remains high by international standards (Chart II-2-7). As for the fiscal balance, according to a statement on economic and fiscal projections for medium- to long-term analysis presented by the government in January 2014, although fiscal deficits are expected to persist for a certain period, mainly because of increasing social security expenditure against the backdrop of factors such as the aging population, the national and local governments' primary deficit to GDP ratio is expected to be reduced by about half by fiscal 2015, partly due to the consumption tax hikes (Chart II-2-8).[1]

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

Chart II-2-7: International comparison of general government gross debt[1]
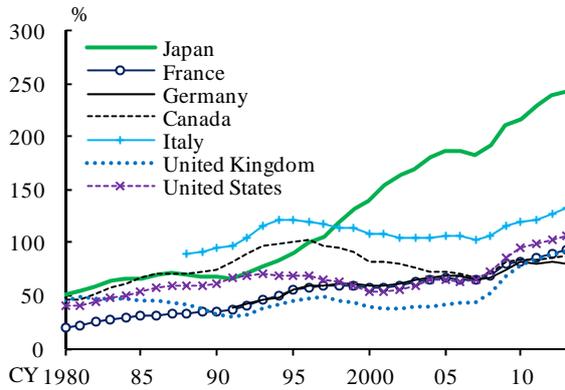
Note: *1*. The latest data are as of 2013. The general government gross debt figures are ratios to nominal GDP.

Source: IMF, "World economic outlook."

Chart II-2-8: Primary balance[1,2,3]
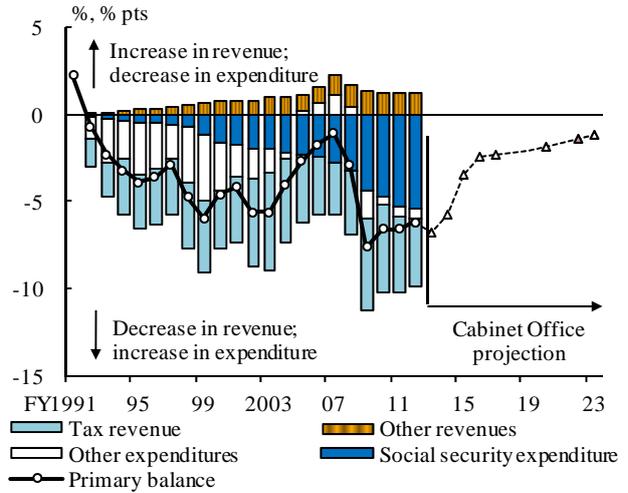
Notes: *1*. The primary balance figures are ratios to nominal GDP. Breakdown figures show cumulative changes from fiscal 1991. The data are for the central and local governments.
   2. "Social security expenditure" comprise the following items: social benefits other than social transfers in kind; social transfers in kind; and current transfers from the central and local governments to social security funds.
   3. The primary balances from fiscal 2013 to fiscal 2023 are Cabinet Office estimates. Breakdown figures are the Bank of Japan's estimates.

Sources: Cabinet Office, "Economic and fiscal projections for medium to long term analysis," "National accounts"; BOJ.

III. Examination of financial intermediation

This chapter examines the functioning of the financial system, mainly based on financial information for the second half of fiscal 2013. First, we check the funding environment among firms and households, and outline developments in financial intermediation among financial markets, financial institutions such as banks and *shinkin* banks, and institutional investors. We then analyze in detail developments in loans and securities investment by financial institutions, which constitute a large part of financial intermediation.

A. Financial conditions among firms and households

Financial conditions among firms and households have become more accommodative under QQE compared with those at the time of the previous *Report*. Funding conditions have improved not only for large and medium-sized firms, but also for small firms. Funding conditions for households have become more accommodative, as seen in a decline in interest rates on housing loans.

Since the second half of fiscal 2013, lending attitudes of financial institutions as perceived by firms have become more accommodative. In this situation, financial positions have remained favorable at large and medium-sized firms, and those for small firms have clearly improved recently (Charts III-1-1 and III-1-2). Firms' funding costs have continued to decline, and the outstanding amount of firms' funding has increased at a faster pace, particularly for bank borrowing (Charts III-1-3 and III-1-4). With the decline in interest rates on housing loans, housing loans have continued to increase, partly due to the effects of a front-loaded increase in demand prior to the consumption tax hike (Charts III-1-5 and III-1-6).
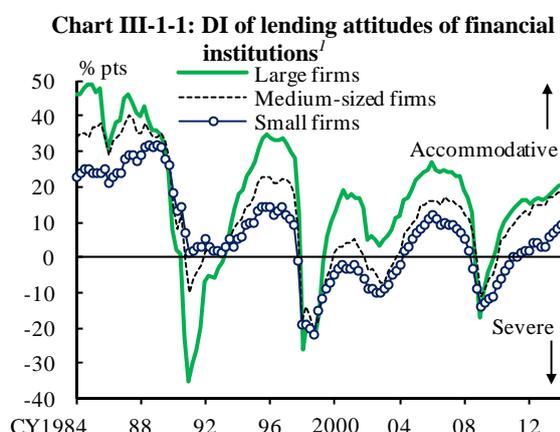
Chart III-1-1: DI of lending attitudes of financial institutions[1]

Note: *1*. The latest data are as of March 2014.
Source: BOJ, "*Tankan*."

Chart III-1-2: DI of financial positions[1]
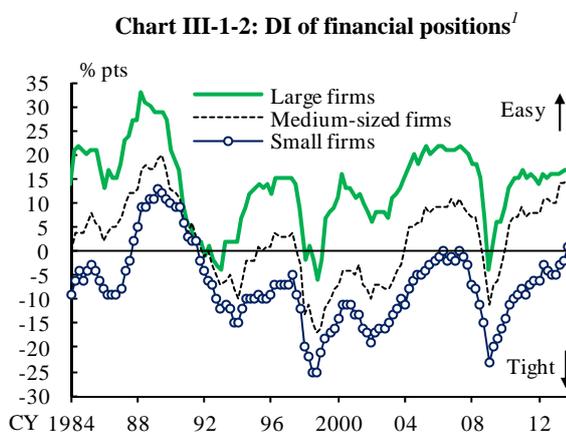
Note: *1*. The latest data are as of March 2014.
Source: BOJ, "*Tankan*."

Chart III-1-3: Average contract interest rates on new loans and discounts[1]
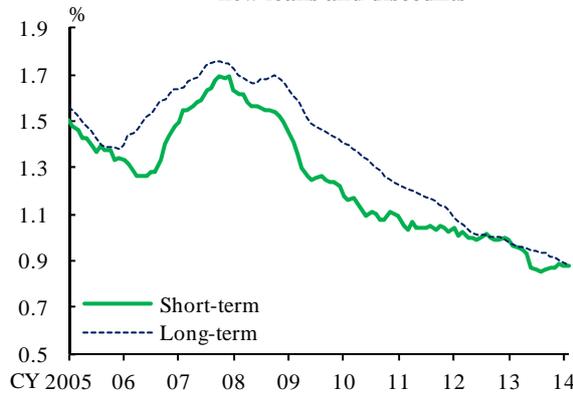
Note: 1. Domestically licensed banks are counted. The latest data are as of February 2014; 6-month moving averages.

Source: BOJ, "Average contract interest rates on loans and discounts."

Chart III-1-4: Outstanding amount of firm funding[1,2]
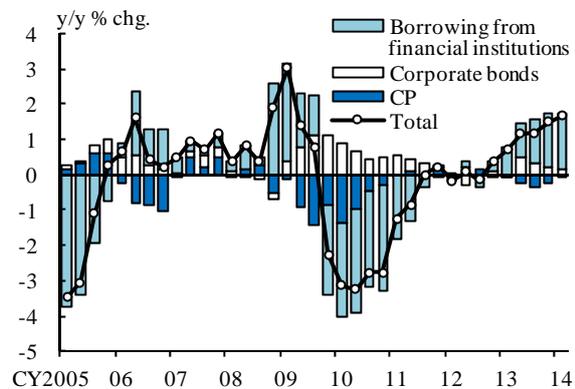
Notes: 1. The latest data are as of end-February 2014.
2. CP issued by banks is excluded. Corporate bonds issued by banks and those issued in overseas markets are included. The latest data of "borrowing from financial institutions" include borrowing from banks, financial institutions for cooperative organizations, and insurance companies.

Sources: I-N Information Systems; Japan Securities Dealers Association; Japan Securities Depository Center; BOJ, "Deposits, vault cash, and loans and bills discounted," "Loans and bills discounted by sector."

Chart III-1-5: Housing loan rates[1,2]
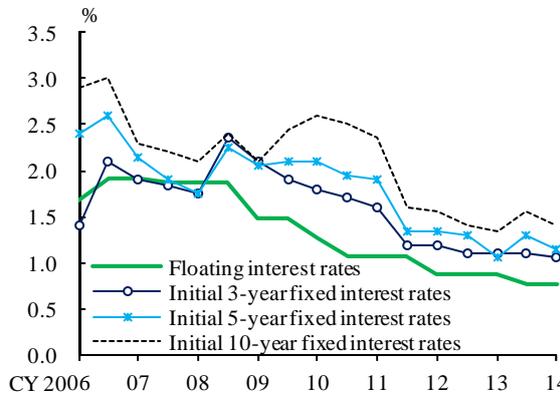
Notes: 1. Mizuho Bank, The Bank of Tokyo-Mitsubishi UFJ, Sumitomo Mitsui Banking Corporation, Resona Bank, and Saitama Resona Bank are counted. The data are as of April and October of each year. The latest data are as of April 2014.
2. Housing loan rates are preferential rates. Median.

Sources: Japan Financial News, "Nikkin report"; Published accounts of each bank.

Chart III-1-6: Housing loans and housing starts[1,2]
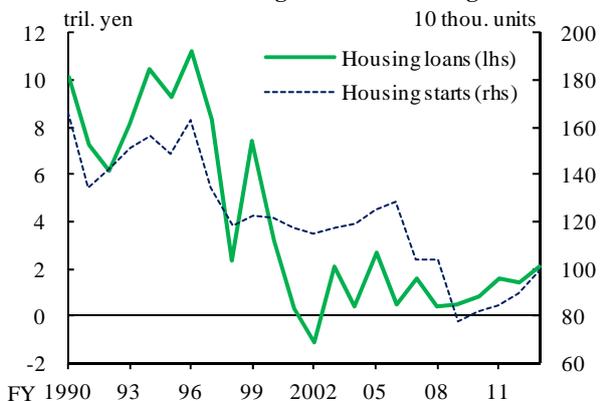
Notes: 1. Housing loans extended to households from both private and public financial institutions are included on a flow basis.
2. The figure on housing loans for fiscal 2013 is calculated using the average year-on-year rate of change in the period from April 2013 to December 2013. The figure on housing starts for fiscal 2013 is calculated using the average year-on-year rate of change in the period from April 2013 to February 2014.

Sources: Ministry of Land, Infrastructure, Transport and Tourism, "Statistics on building construction starts"; BOJ, "Flow of funds accounts."

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B. Financial intermediation through financial markets

This section summarizes developments in firms' funding through financial markets.

1. CP and corporate bond markets

Issuance rates on CP and those on corporate bonds have been stable at low levels, and issuing conditions appear to remain favorable.

By type of product, the year-on-year rate of change in the outstanding amount of CP has been negative (Chart III-2-1). This seems to be due to a reduction in interest-bearing debt by some business companies (excluding electric power and gas companies and other financial companies). Issuance rates on CP have been stable at low levels (Chart III-2-2).

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

Chart III-2-2: CP issuance rates[1,2]
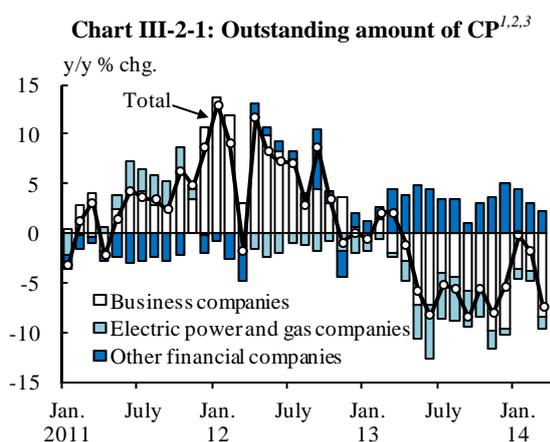
Notes: 1. "Business companies" excludes electric power and gas companies and other financial companies.
2. "Other financial companies" includes leasing companies, credit card companies, consumer finance companies, and securities finance companies.
3. The latest data are as of end-March 2014.
Source: Japan Securities Depository Center.
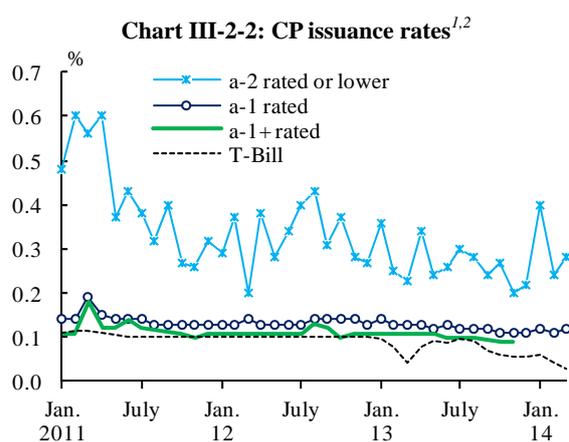
Notes: 1. Monthly average 3-month rates weighted by issuance volume.
2. The latest data are as of March 2014.
Sources: Bloomberg; Japan Bond Trading; Japan Securities Depository Center.

The outstanding amount of corporate bonds has been somewhat above the year-ago level (Charts III-1-4 and III-2-3). Yield spreads between AA-rated corporate bonds and JGBs have been narrowing very moderately on the whole amid continued solid demand for corporate bonds from investors (Chart III-2-4).

Chart III-2-3: Amount of corporate bonds issued[1,2]
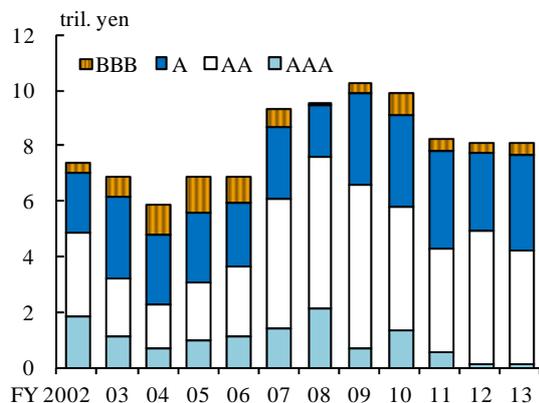
Notes: 1. Based on the launch date.
2. Classified by the highest rating among JCR, Moody's, R&I, and S&P.
Sources: Capital Eye; I-N Information Systems.

Chart III-2-4: Yield spreads between corporate bonds and JGBs[1,2,3]
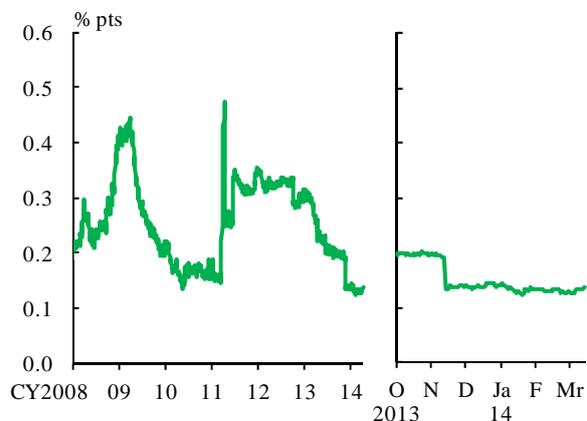
Notes: 1. Rated AA by R&I.
2. Average yield spreads of bonds with a residual maturity of 3 years or more but less than 7 years.
3. The latest data are as of March 31, 2014.
Source: Japan Securities Dealers Association.

2. Stock and real estate investment trust markets

Both the amount and number of equity financing through the stock market have been larger than in the previous year (Chart III-2-5).

Chart III-2-5: Equity financing[1]
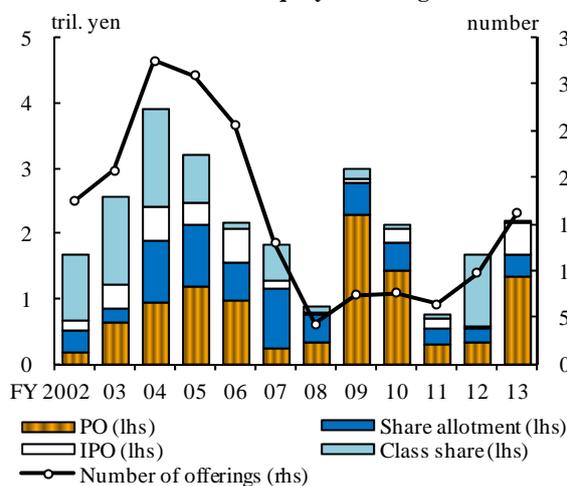
Note: 1. Based on the issuance or effective date.
Source: I-N Information Systems.

Chart III-2-6: REIT index[1]
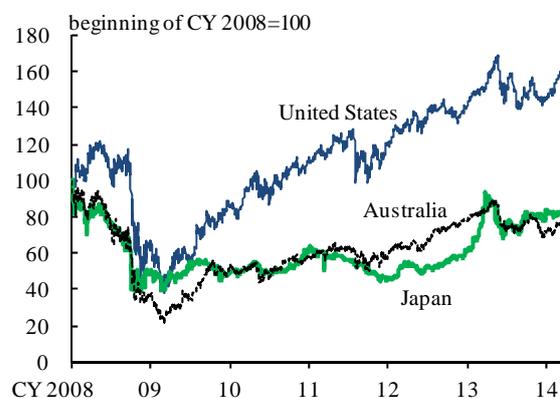
Note: 1. The latest data are as of March 31, 2014.
Source: Bloomberg.

Investment unit prices for Japan real estate investment trusts (J-REITs) rose toward the end of 2013, partly reflecting expectations of improvement in the real estate market and attractiveness based on yield spreads. Since the beginning of 2014, they have remained solid compared with the stock market, although a temporary decline was seen amid

weak stock prices (Chart III-2-6). New listings and public offerings (POs) by J-REITs have been more actively undertaken, and these amounts in fiscal 2013 slightly exceeded the historical high set in fiscal 2005 and marked a new record high (Chart III-2-7). Meanwhile, the outstanding amount of securitized products has been decreasing (Chart III-2-8).

Chart III-2-7: Financing through POs and IPOs by J-REITs[1]
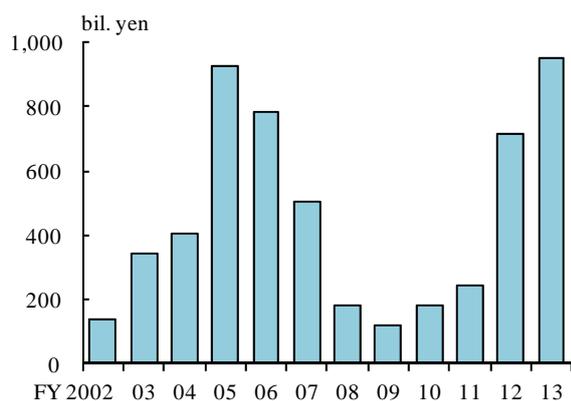
Note: *1*. Based on the issuance or effective date.
Source: I-N Information Systems.

Chart III-2-8: Outstanding amount of securitized products[1,2]
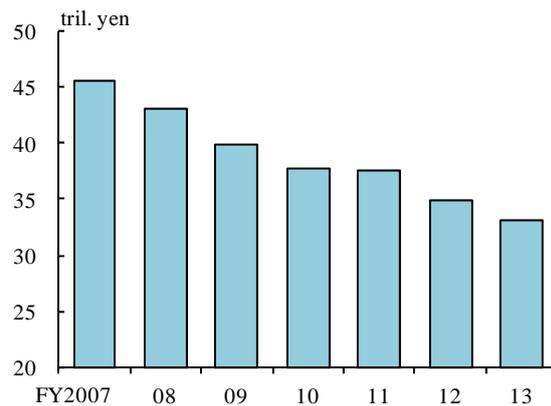
Notes: *1*. Securitized products in the form of securities.
    2. The data for fiscal 2013 are as of end-December 2013.
Source: BOJ, "Flow of funds accounts."

C. Developments in investment by financial intermediaries

This section outlines developments in investment of a wide range of financial intermediaries, including not only financial institutions but also institutional investors.

At financial institutions such as banks and *shinkin* banks, the outstanding amount of investment has exhibited higher growth as a whole, albeit with some fluctuations (Chart III-3-1). [2] Financial institutions have reduced their holdings of domestic bonds, especially JGBs, and have increased cash and deposits, particularly in current accounts held at the Bank, as the Bank continued to conduct large-scale JGB purchases. However, these institutions have not only shifted from domestic bonds to cash and deposits, but have also increased relatively high-risk assets, as evidenced by faster growth in domestic loans and a continued rise in overseas assets. Looking in detail at these developments by type of bank, domestic bondholdings started to decline substantially at

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[2] In Chart III-3-1, changes in overseas assets converted into yen include the effects of fluctuations in foreign exchange rates. The recent slight slowdown in overseas assets shown in this chart partly reflects the fact that the yen has recently stopped depreciating in terms of the year-on-year rate of change in foreign exchange rates.

major banks in the first half of fiscal 2013, bondholdings started to decline at regional banks in the October-December quarter of 2013 on a year-on-year basis, and the pace of increase in domestic bondholdings slowed significantly at *shinkin* banks (Chart III-3-2). Cash and deposits have increased at all types of bank. On the other hand, domestic loans have continued to increase at major banks and their growth has accelerated at regional and *shinkin* banks. Overseas assets have also continued to increase at major and regional banks.

Chart III-3-1: Asset investment outstanding among banks and *shinkin* banks[1,2,3]
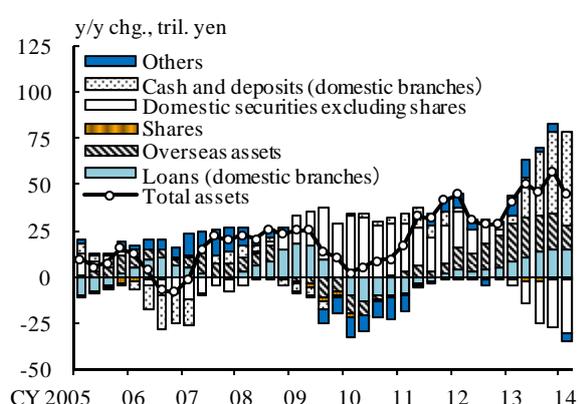
Notes: *1.* The data are the sum of domestic and overseas branches. The data for domestic branches are based on the average amount outstanding. The data for overseas branches are based on the amount outstanding at month-end.
  2. The chart shows changes from the quarterly average of the previous year. The latest data represent changes from January-February 2013 to January-February 2014.
  3. Overseas assets are the sum of foreign securities and loans of overseas branches.
Source: BOJ.

Chart III-3-2: Asset investment outstanding by type of bank[1]
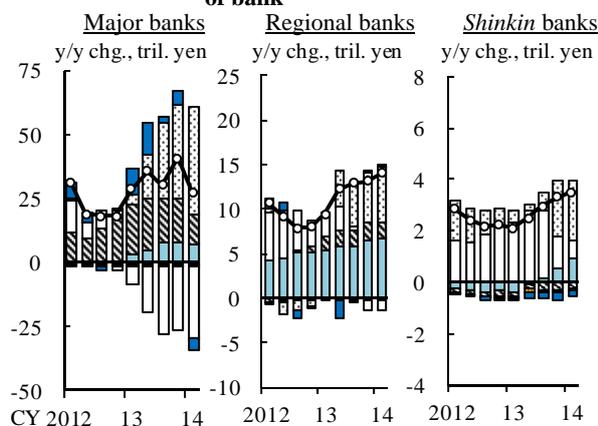
Note: *1.* See Notes in Chart III-3-1.
Source: BOJ.

As described above, financial institutions have reduced their investment in domestic bonds, especially JGBs, while increasing investment in relatively high-risk assets such as loans. The changes in which financial institutions have gradually become active in taking on risks can be confirmed by developments in individual financial institutions. Looking at changes in the outstanding amount of investment from the end of March 2013 by individual financial institution, the number of financial institutions that have increased their holdings of risky assets (loans and securities other than JGBs and municipal bonds) has gradually increased (Chart III-3-3). Financial institutions with greater holdings of risky assets have relatively low nonperforming loan (NPL) ratios (Chart III-3-4). It seems that financial institutions with sound balance sheets and high risk-taking capacity have been increasing their holdings of risky assets.

Chart III-3-3: Percentage of banks and *shinkin* banks that increased risky assets[1,2,3]
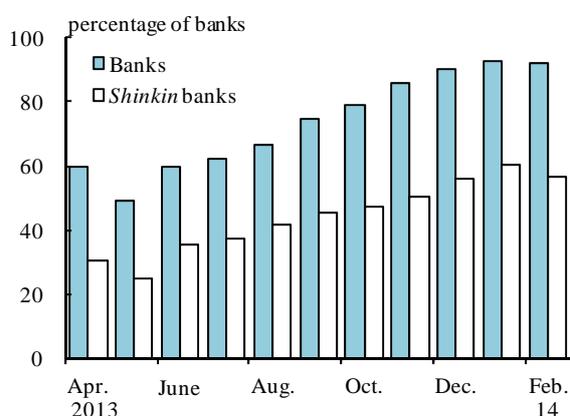
percentage of banks

Notes: 1. The data are the sum 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.
2. The chart shows the percentage of banks that increased their risky assets compared to March 2013.
3. The data for risky assets are the sum of loans and securities other than JGBs and municipal bonds.

Source: BOJ.

Chart III-3-4: Changes in risky assets and NPL ratio[1,2,3,4]

changes in risky assets / total assets as of end-March 2013, %
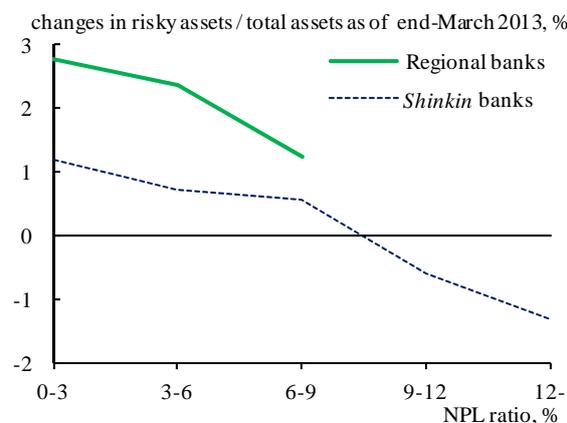
Notes: 1. Figures represent changes from March 2013 to February 2014.
2. The data for risky assets are the sum of loans and securities other than JGBs and municipal bonds.
3. The vertical axis shows the median of banks with each NPL ratio.
4. The NPL ratios are as of end-March 2013.

Source: BOJ.

Meanwhile, no major changes have been observed in investment by financial intermediaries other than financial institutions, such as institutional investors, compared with the period prior to the introduction of QQE. Life insurance companies have continued to reduce their stockholdings in view of a possible tightening of regulations, while they have increased their investment in super-long-term JGBs to reduce the duration mismatch between their assets and liabilities (Chart III-3-5).[3] Pension funds have continued to reduce their investment in overseas assets and stocks, while increasing their domestic bondholdings (Chart III-3-6).

As mentioned above, developments in insurance companies and pension funds are based on the Bank's "Flow of funds accounts" available as of December 2013, but the trend in these developments has since remained more or less unchanged. Looking at recent developments based on available monthly statistics, JGB purchases have continued to outpace bond sales at insurance companies and trust banks entrusted with pension assets (Chart III-3-7). At present, no major changes are being observed in the trading of stocks and overseas assets by these financial intermediaries (Charts III-3-8

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[3] In recent years, in view of progress made in deliberations on tightening various financial regulations, insurance companies have been working to reduce their holdings of stocks, the risks of which tend to be estimated larger than those of other assets, taking account of a possible tightening of regulations in Japan.

and III-3-9).

Chart III-3-5: Asset investment outstanding among life insurance companies[1,2]
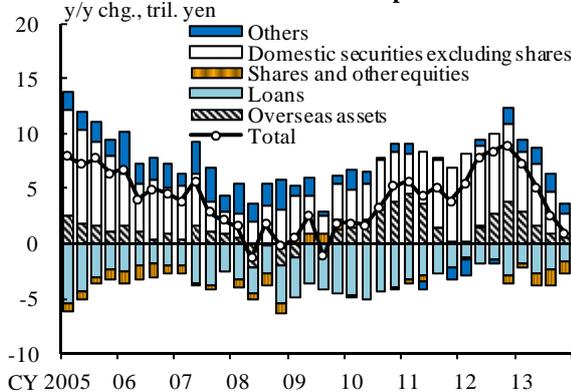
Notes: 1. The latest data are as of December 2013. The chart shows the sum of financial transactions in the last 4 quarters.
2. "Others" include cash and deposits. "Loans" exclude repurchase agreements and securities lending transactions.
Source: BOJ, "Flow of funds accounts."

Chart III-3-6: Asset investment outstanding among pension funds[1,2]
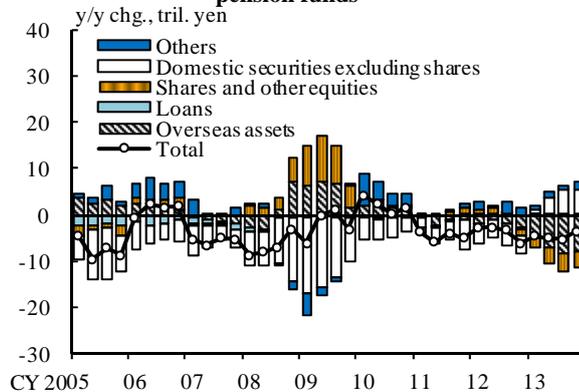
Notes: 1. The latest data are as of December 2013. The chart shows the sum of financial transactions in the last 4 quarters.
2. "Others" include cash and deposits. "Loans" exclude repurchase agreements and securities lending transactions.
Source: BOJ, "Flow of funds accounts."

Chart III-3-7: Trading volume of government bonds by type of investor[1]
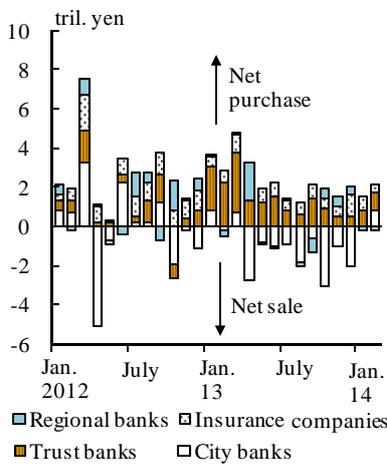
Note: 1. The latest data are as of February 2014. Short-term securities are excluded.
Source: Japan Securities Dealers Association.

Chart III-3-8: Trading volume of Japanese stocks by type of investor[1]
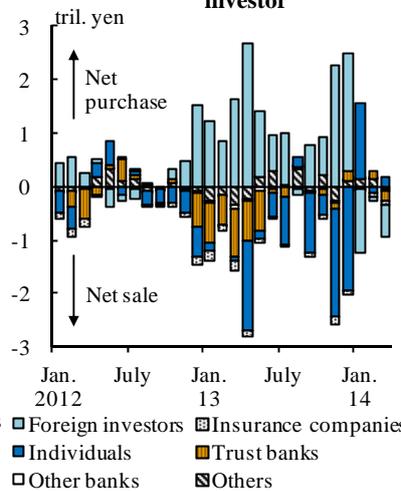
Note: 1. The latest data are as of March 2014.
Source: Tokyo Stock Exchange.

Chart III-3-9: Outward portfolio investment by type of investor[1]
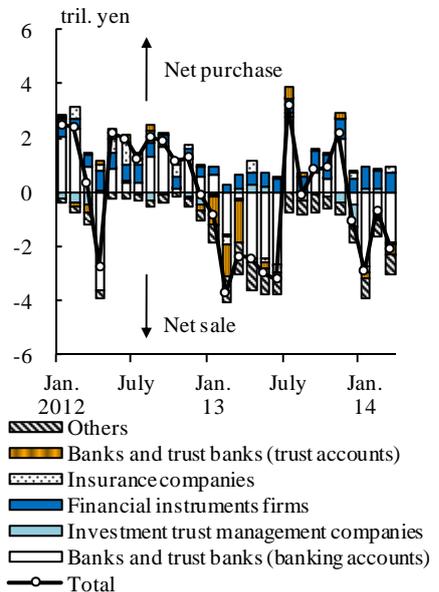
Note: 1. The latest data are as of March 2014.
Source: Ministry of Finance, "International transactions in securities (monthly; based on reports from designated major investors)."

D. Financial institution loans and securities investment

As discussed above, financial institutions have reduced their investment in yen-denominated bonds such as JGBs while actively extending loans at home and abroad, and some of them have increased investment in foreign securities, investment trusts, and other assets. In this section, we look into detailed developments in financial intermediation through financial institution loans and securities investment.

1. Domestic loans

The amount of financial institutions' domestic loans outstanding has continued to grow at a faster pace (Chart III-4-1). By type of bank, the year-on-year rate of increase in loans outstanding has remained positive at major banks, although the pace of growth has recently slowed somewhat. That for regional and *shinkin* banks has accelerated since autumn 2013.[4] The breakdown by borrower shows that growth in loans to large firms has slowed slightly, whereas that in loans to small and medium-sized firms has risen recently (Chart III-4-2). Meanwhile, growth in loans to individuals, such as housing loans, has also remained relatively high.

Chart III-4-1: Domestic loans outstanding among financial institutions[1]

Note: *1*. The latest data are as of March 2014.
Source: BOJ, "Principal figures of financial institutions."

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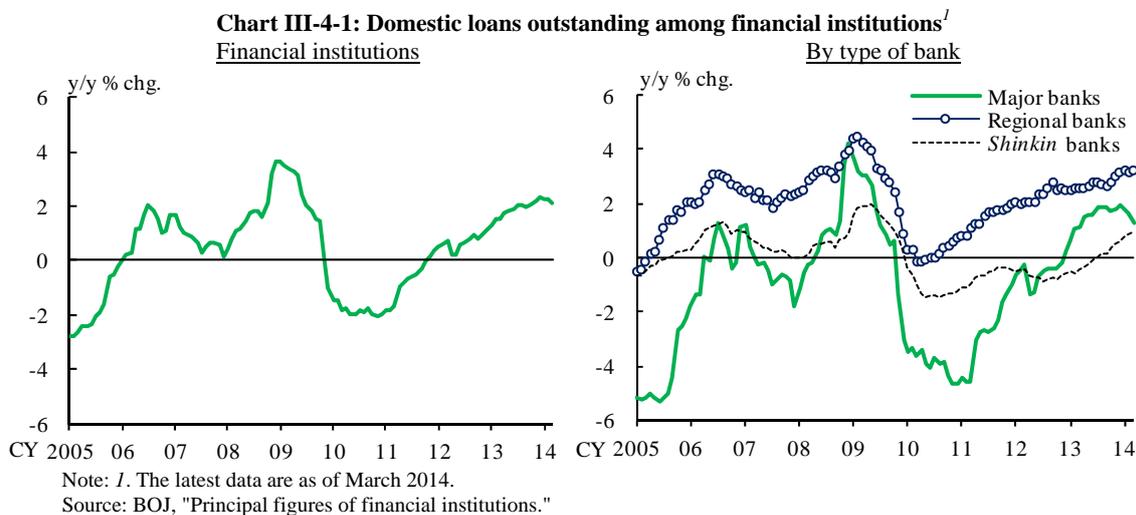
[4] Financial institutions' domestic loans include foreign currency-denominated loans. The slight slowdown in the growth rate of loans extended by major banks from the beginning of 2014 mainly reflects the fact that, as mentioned in Footnote 2, the amount of foreign currency-denominated loans has been depressed by the pause in yen depreciation in terms of the year-on-year rate of change in foreign exchange rates.

Chart III-4-2: Loans outstanding among financial institutions by sector[1]
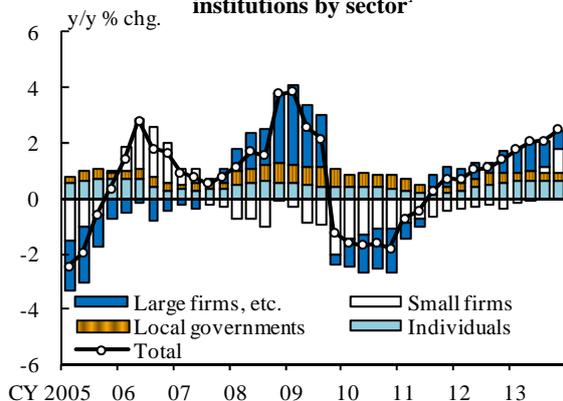
Note: 1. Banks and *shinkin* banks are counted. The latest data are as of end-December 2013. Figures include loans to the finance and insurance industries.
Source: BOJ.

Chart III-4-3: Financial institutions' loans in economic recovery phases[1]
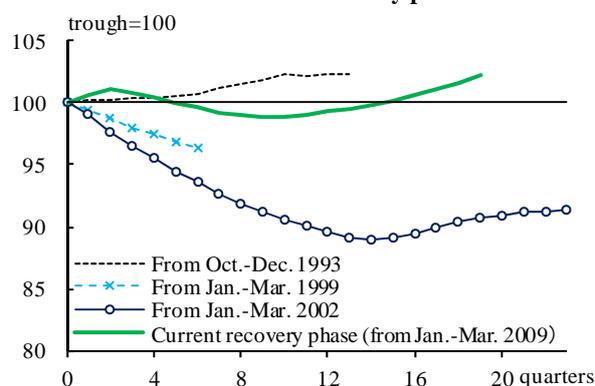
Note: 1. Banks and *shinkin* banks are counted. The figures are 4-quarter moving averages.
Source: BOJ.

We compare recent developments in financial institutions' loans with those observed during the economic recovery phases seen since the 1990s. At the end of the 1990s and during the early 2000s, loans outstanding continued to decline despite the economic recovery, due to the NPL problem among financial institutions and firms' balance-sheet adjustments. In the current recovery phase, growth in loans outstanding is somewhat higher than it was in the two most recent recovery phases, as financial institutions' soundness has been maintained (Chart III-4-3). The ratio of loans to nominal GDP is relatively high compared with the ratio observed during the previous recovery phase (Chart III-4-4). Nevertheless, loan growth has recently been restrained in comparison with the growth observed during the bubble economy, when it substantially exceeded growth in nominal GDP.

From a longer-term perspective, developments in loan growth and the nominal GDP growth rate have generally been consistent (Chart III-4-5). In the previous economic recovery phase that started in 2002, firms acquired funds mainly by using retained earnings and increasing their capital to limit the debt ratio, which in turn restrained the growth of loans outstanding relative to that of nominal GDP. In the current recovery phase, firms have increased their borrowing at a pace consistent with nominal GDP growth against the backdrop of a low debt ratio (Chart III-4-6).

20

Chart III-4-4: Financial institutions' loans to nominal GDP ratio in economic recovery phases[1]
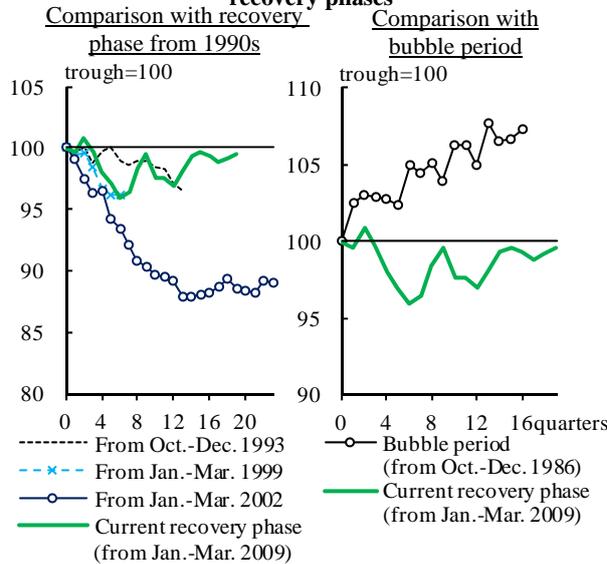
Comparison with recovery phase from 1990s
trough=100

Comparison with bubble period
trough=100

----- From Oct.-Dec. 1993
--x-- From Jan.-Mar. 1999
--o-- From Jan.-Mar. 2002
—— Current recovery phase
(from Jan.-Mar. 2009)

--o-- Bubble period
(from Oct.-Dec. 1986)
—— Current recovery phase
(from Jan.-Mar. 2009)

Note: 1. Banks and *shinkin* banks are counted. The figures are 4-quarter moving averages.
Sources: Cabinet Office, "National accounts"; BOJ.

Chart III-4-5: Growth rates of nominal GDP and loans outstanding[1]

y/y % chg.

----- Nominal GDP
—— Loans outstanding
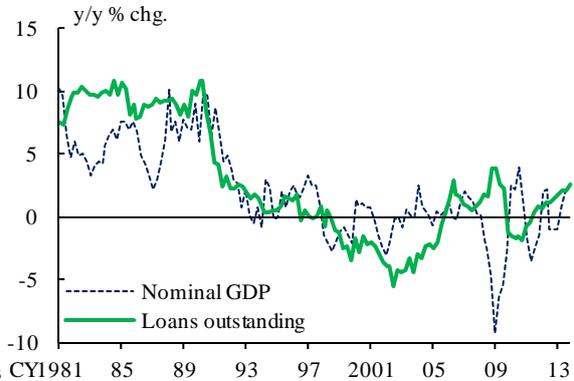
Note: 1. Banks and *shinkin* banks are counted. The latest data for nominal GDP are as of the October-December quarter of 2013. The latest data for loans outstanding are as of end-December 2013.
Sources: Cabinet Office, "National accounts"; BOJ.

Chart III-4-6: Debt to total asset ratios of firms[1,2]
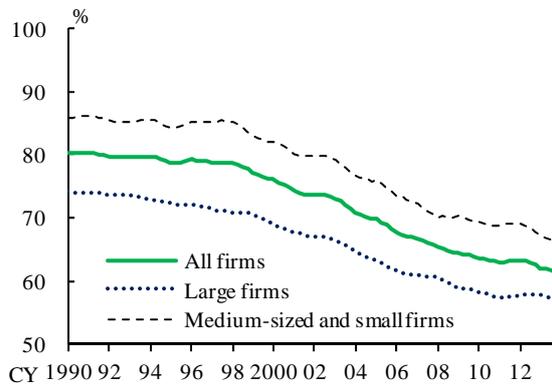
%

—— All firms
······ Large firms
----- Medium-sized and small firms

Notes: 1. The latest data are as of the October-December quarter of 2013; 4-quarter moving averages.
2. Large firms: capital of 1 billion yen or more. Medium-sized and small firms: capital of 10 million yen to less than 1 billion yen.
Source: Ministry of Finance, "Financial statements statistics of corporations by industry."

Corporate loans

The increase in growth of corporate loans has been observed in a wider range of industries compared with the situation at the time of the previous *Report*. Loans to electric power companies and real estate companies have continued to increase, and loans to nonmanufacturing industries such as the medical care and welfare, and wholesale and retail industries have also increased (Charts III-4-7 and III-4-8).[5] The breakdown by region also shows that loan growth has risen in a wide range of regions (Chart III-4-9).
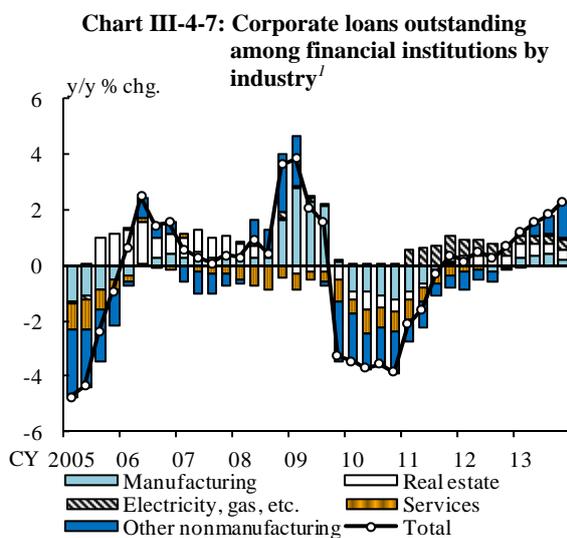
Chart III-4-7: Corporate loans outstanding among financial institutions by industry[1]

Legend:
- Manufacturing
- Real estate
- Electricity, gas, etc.
- Services
- Other nonmanufacturing
- Total

Note: *1.* Banks and *shinkin* banks are counted. The latest data are as of end-December 2013. Figures include loans to the finance and insurance industries.

Source: BOJ.

Chart III-4-8: Percentage of industries with positive year-on-year loan growth[1,2]
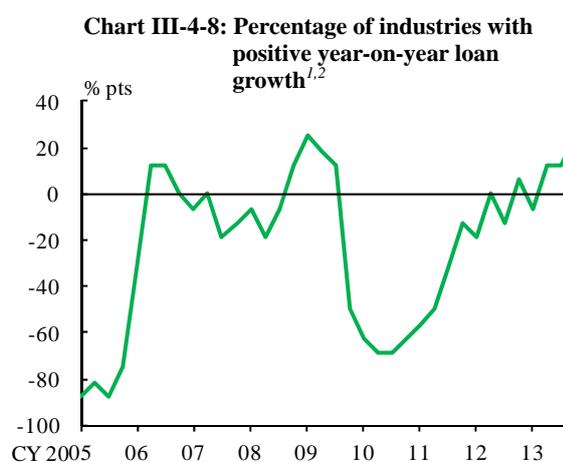
Notes: *1.* Domestically licensed banks are counted. The latest data are as of end-December 2013.
2. Net percentage of industries calculated by subtracting industries with negative year-on-year loan growth from those with positive year-on-year loan growth. Industries that do not continuously exist from January 2005 are excluded, and 32 industries are counted.

Source: BOJ, "Loans and bills discounted by sector."

Looking at the background to the increase in corporate loans in terms of demand for funds and the supply of funds, demand for funds has increased at a wide range of firms, and has recently risen at a faster pace, particularly among small and medium-sized firms. The loan survey of financial institutions showed that the figure calculated by deducting the number of institutions observing substantially weaker and moderately weaker demand for funds over the past three months from the number of institutions observing substantially stronger and moderately stronger demand declined somewhat, but is still positive among large firms, while it increased among small firms (Chart III-4-10).

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[5] The recent acceleration in loan growth seems to be partly due to an increase in loans related to mergers and acquisitions of firms.

Chart III-4-9: Loans outstanding by region[1]

- Hokkaido
- Tohoku
- Northern Kanto
- Southern Kanto
- Koshinetsu and Hokuriku
- Tokai
- Kinki
- Chugoku
- Shikoku
- Kyushu

☐ End-June 2013
☑ End-December 2013

-1 0 1 2 3 4 5
y/y % chg.
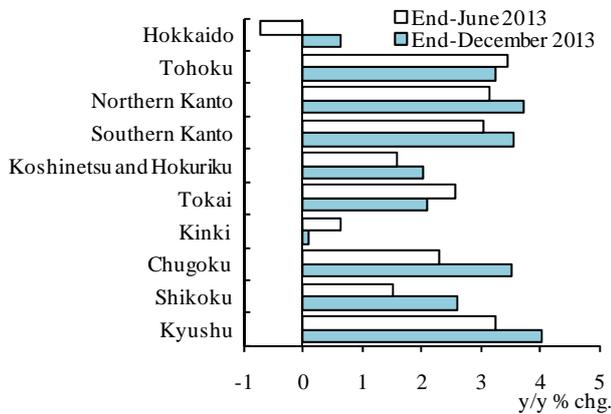
Note: *1*. Domestically licensed banks are counted.
Source: BOJ, "Deposits, vault cash, and loans and bills
discounted by prefecture (domestically
licensed banks)."

Chart III-4-10: DI of firms' demand for loans[1,2]

% pts

Stronger ↑

Weaker ↓

—— Small firms
----- Large firms

FY 2005 06 07 08 09 10 11 12 13
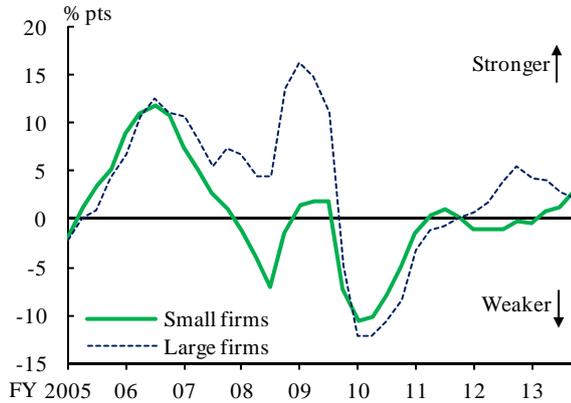
Notes: *1*. The latest data are as of January 2014; 4-quarter
moving averages.
2. DI of firms' demand for loans = (percentage of
respondents selecting "substantially stronger" +
percentage of respondents selecting "moderately
stronger" * 0.5) - (percentage of respondents selecting
"substantially weaker" + percentage of respondents
selecting "moderately weaker" * 0.5).
Source: BOJ, "Senior loan officer opinion survey on bank
lending practices at large Japanese banks."

On the other hand, financial institutions' lending attitudes have become more accommodative. These institutions have become more active in extending corporate loans because of the better economic outlook and improved business conditions among firms (Charts III-1-1 and III-4-11). Since the second half of fiscal 2013, a greater number of financial institutions have focused on expanding their loan volumes by, for example, establishing funds for increasing the amount of loans and supporting firms' business fixed investment, expanding their business networks with firms to include firms with lower creditworthiness, and giving branch managers greater decision-making authority.

Chart III-4-11: DI of credit standards[1,2]
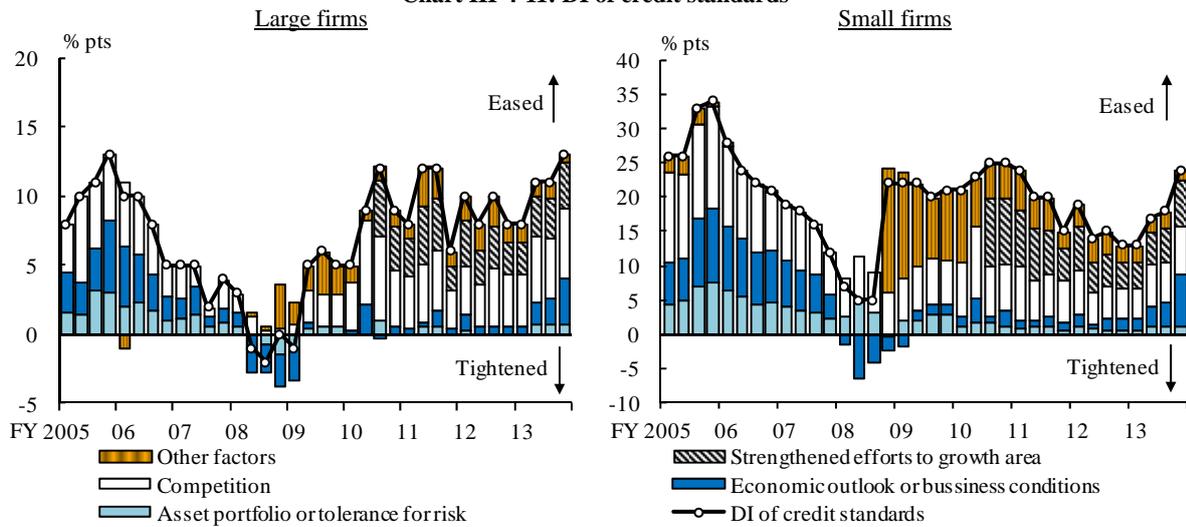
Notes: *1*. The latest data are as of January 2014.

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."

As described above, the recent increase in corporate loans has been caused by the uptrend on both the supply and demand sides. Nevertheless, the situation remains unchanged in that the pressure exerted by the supply of loans is somewhat stronger, and competition for the extension of loans has remained intense among financial institutions. Therefore, the diminishing trend in interest rate spreads on loans has not yet come to a halt (Chart III-4-12).

Chart III-4-12: Interest rate spreads on loans in the domestic business sector[1]
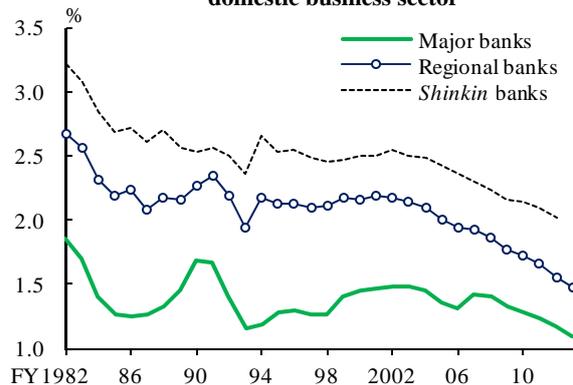
Note: *1*. The latest data for major banks and regional banks are as of the first half of fiscal 2013 (annualized), and those for *shinkin* banks are as of fiscal 2012.

Source: BOJ.

Real estate-related loans

The rate of growth in real estate-related loans extended by financial institutions remains generally the same as that observed in overall corporate loans (Chart III-4-13). Current conditions in the real estate market are different from those observed from the early 2000s to around 2008, when business sentiment and the growth rate of loans in the real estate industry continued to significantly exceed those of all industries throughout Japan (Chart III-4-14). Commercial land prices in Tokyo have started to rise, but the rate of growth has not reached the level seen from around 2007 to 2008, and there is no evidence of marked rises in office rents in central Tokyo (Chart III-4-15). Nonetheless, the prices of properties acquired by real estate funds for the purpose of earning future rental income have risen despite the recent sluggish growth in rental income. Reflecting this, the J-REIT capitalization rate -- which is calculated by dividing net operating profits such as rental income by the total market value of J-REITs -- has been at a relatively low level (Chart III-4-16). Meanwhile, the default rate in the real estate industry has been low (Chart III-4-17).

Chart III-4-13: Loans outstanding to the real estate industry[1]

Note: *1*. Banks and *shinkin* banks are counted. The latest data are as of end-December 2013.
Source: BOJ.

Chart III-4-14: DI of business conditions for real estate[1]

Note: *1*. The latest data are as of March 2014.
Source: BOJ, "*Tankan.*"
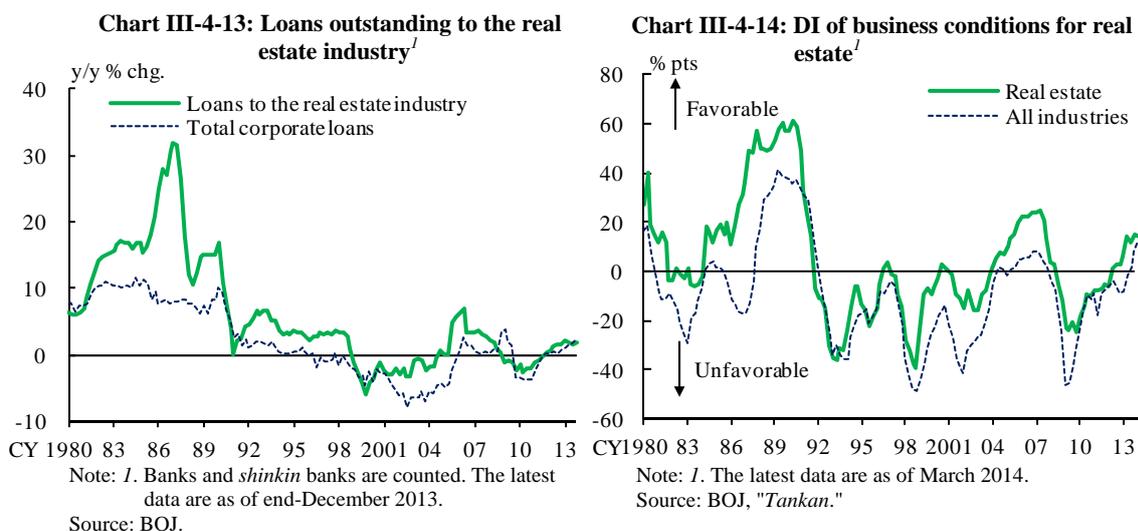
Chart III-4-15: Land prices and office rents[1,2]

Land prices

y/y % chg.

Office rents

y/y % chg.

Chart III-4-16: Capitalization rate of J-REITs[1]

%

Average
Office
Retail
Residential

Commercial land in
Tokyo area

Average (nationwide)

Notes: *1*. In the right-hand chart, the data are as of
December of each year, and for 2014, the data are
as of February 2014.

2. In the right-hand chart, offices in the Tokyo
business district (Chiyoda-City, Chuo-City,
Minato-City, Shinjuku-City, and Shibuya-City in
Tokyo) are counted.

Sources: Miki Shoji Co., Ltd; Ministry of Land,
Infrastructure, Transport and Tourism, "Public
notice of land prices."

Note: *1*. The latest data are as of end-March 2014. The
ratio is net operating income divided by the sum
of market capitalization, net interest-bearing
debt, and deposits from tenants.

Source: Sumitomo Mitsui Trust Research Institute.

Chart III-4-17: Default rate among real estate companies[1]

%
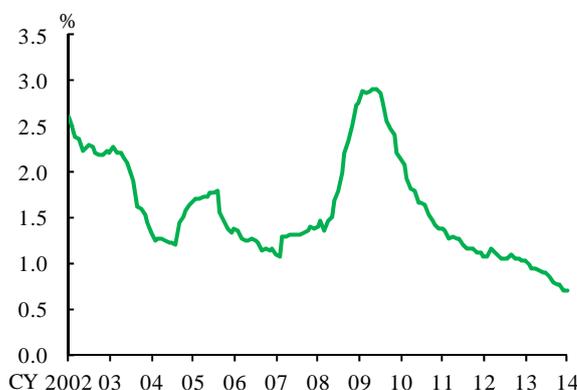
Note: *1*. The latest data are as of January 2014.
Source: Risk Data Bank of Japan, Ltd., "RDB enterprise
default ratio."

It is notable that the recent growth in real estate-related loans has varied among types of
bank and regions, and that these loans have been growing at a faster pace among
regional banks and in nonmetropolitan areas. By type of bank, the growth in real
estate-related loans has been relatively sluggish among major banks, while the
momentum of growth has become stronger among regional banks (Chart III-4-18). By
borrower, regional banks' loans to house and room leasing business by households have

continued to increase, and those to small and medium-sized real estate companies have increased at a faster pace. The breakdown of loans by region shows that real estate-related loans have recently exhibited relatively high growth in nonmetropolitan regions, including some regions with a relatively rapid rate of population decline (Charts III-4-19 to III-4-21).

Chart III-4-18: Real estate-related loans outstanding by type of bank[1]

Major banks

Regional banks

House and room leasing business by households
Large firms
Real estate-related local public corporations

Small and medium-sized firms
Special purpose companies for real estate
Real estate-related loans

Note: 1. The latest data are as of end-December 2013.
Source: BOJ.
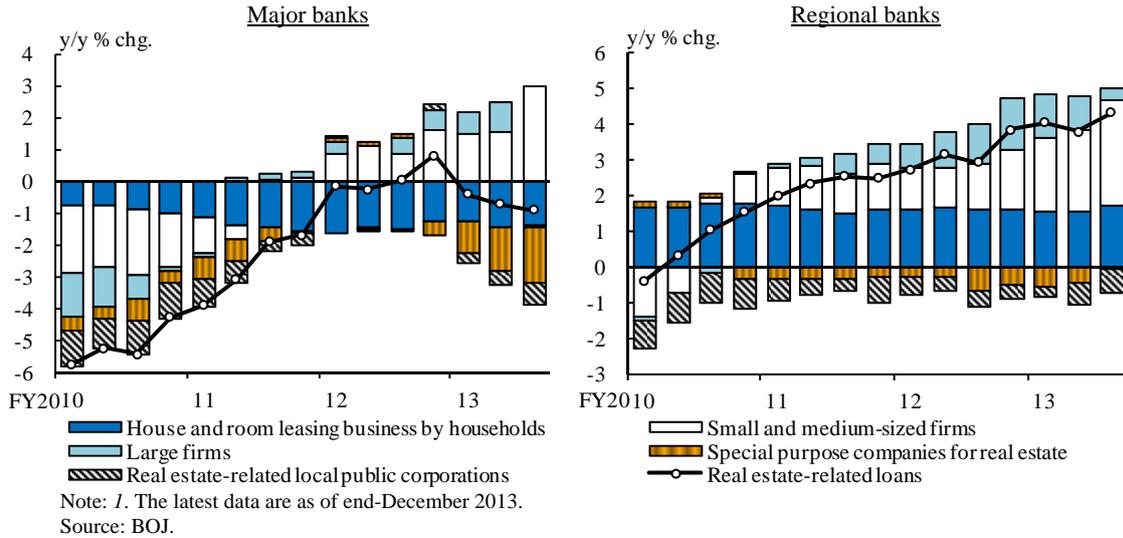
Chart III-4-19: Real estate-related loans in metropolitan and nonmetropolitan areas[1,2]

Nonmetropolitan areas
Metropolitan areas

Notes: 1. Regional banks are counted. The latest data are as of end-December 2013.
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.
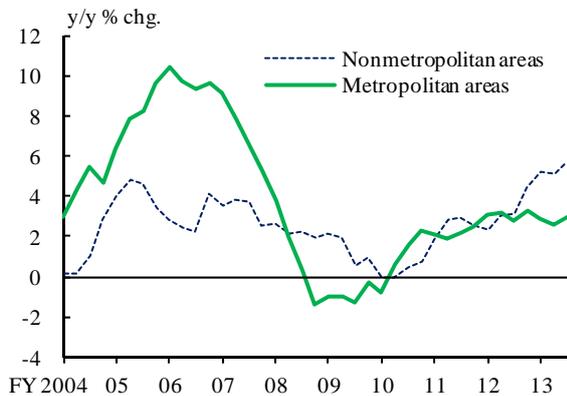
Chart III-4-20: Real estate-related loans by region[1,2]

Metropolitan areas

Nonmetropolitan areas

Southern Kanto
Kinki
Tokai

Hokkaido
Tohoku
Northern Kanto
Koshinetsu and Hokuriku
Chugoku
Shikoku
Kyushu

Notes: 1. Regional banks are counted. The latest data are as of end-December 2013.
2. Banks are grouped based on the prefectures where their head offices are located.
Source: BOJ.
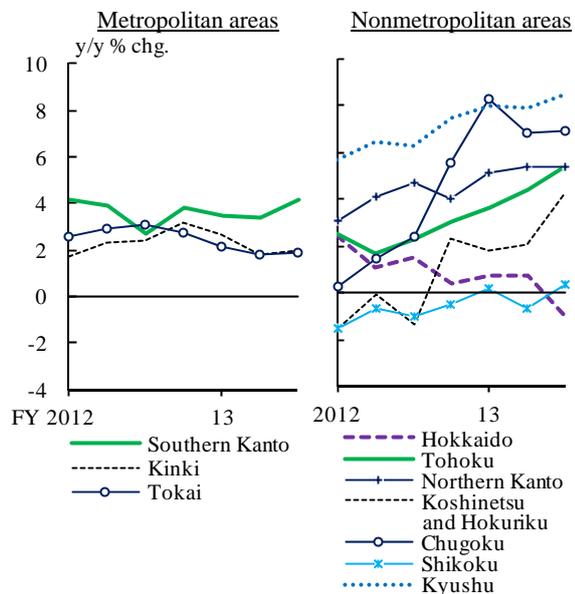
Chart III-4-21: Relationship between real estate-related loans and population growth[1,2]
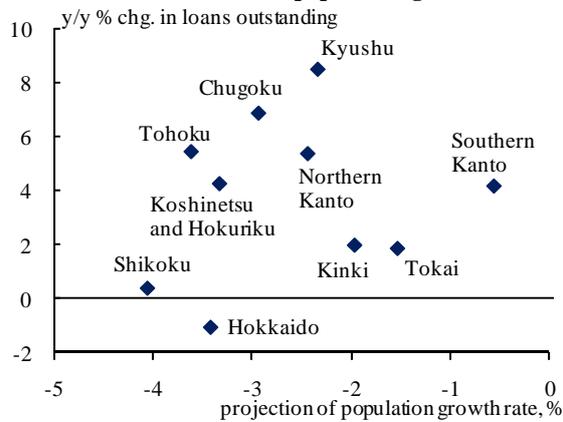
Notes: 1. Regional banks are counted for changes in real estate-related loans outstanding. Banks are grouped based on the prefectures where their head offices are located.
2. The vertical axis indicates year-on-year rates of change from end-December 2012 to end-December 2013. The horizontal axis indicates a projection of the growth rates from 2015 to 2020.

Sources: National Institute of Population and Social Security Research, "Population projection for Japan"; BOJ.

Housing loans

Housing loans extended by financial institutions have remained on an uptrend (Chart III-1-6). This is because housing investment has expanded, partly due to a front-loaded increase in demand prior to the consumption tax hike, and financial institutions have adopted more proactive lending attitudes, as seen in the decline in interest rates on housing loans (Chart III-4-22). Various banks have expanded preferred discounts to increase their amount of housing loans (Chart III-4-23). In addition, financial institutions have focused on expanding their loan volumes in recent years by actively extending housing loans to low-income households through, for example, reducing housing loan down-payment ratios (Chart III-4-24).

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Chart III-4-22: DI of demand for housing loans[1,2]

Other factors
Interest rates
Income
Household consumption
Housing investment
DI of demand for housing loans
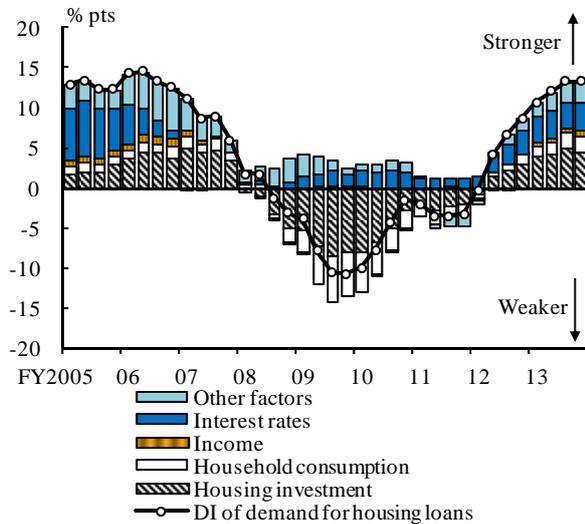
Notes: *1*. The latest data are as of January 2014;
4-quarter moving averages.
2. DI of demand for housing loans = (percentage
of respondents selecting "substantially
stronger" + percentage of respondents selecting
"moderately stronger" * 0.5) - (percentage of
respondents selecting "substantially weaker" +
percentage of respondents selecting
"moderately weaker" * 0.5).
Source: BOJ, "Senior loan officer opinion survey on bank
lending practices at large Japanese banks."

Chart III-4-23: Preferred discounts on housing loan rates[1,2]

Floating interest rates   Initial 10-year fixed interest rates

10th-90th percentile range   25th-75th percentile range
Median
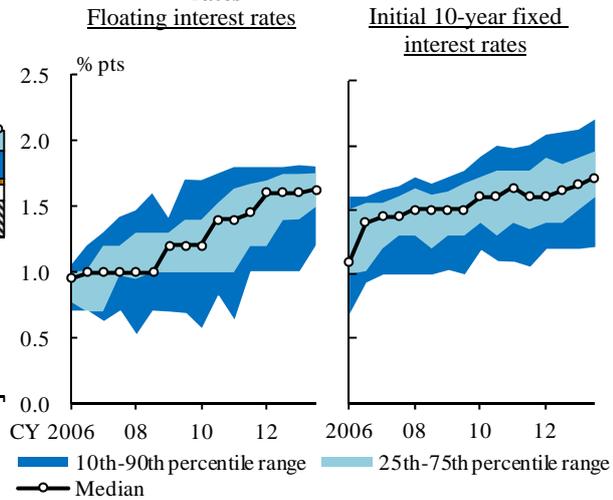
Notes: *1*. Major banks and regional banks are counted. The
latest data are as of October 2013.
2. Preferred discounts on housing loan rates are
calculated by subtracting preferential rates from
offered rates.
Source: Japan Financial News, "Nikkin report."

Chart III-4-24: Customers targeted by financial institutions for housing loans

Yearly income of households around 4 million yen
Yearly income of households around 6 million yen
Yearly income of households around 8 million yen
Yearly income of households around 10 million yen
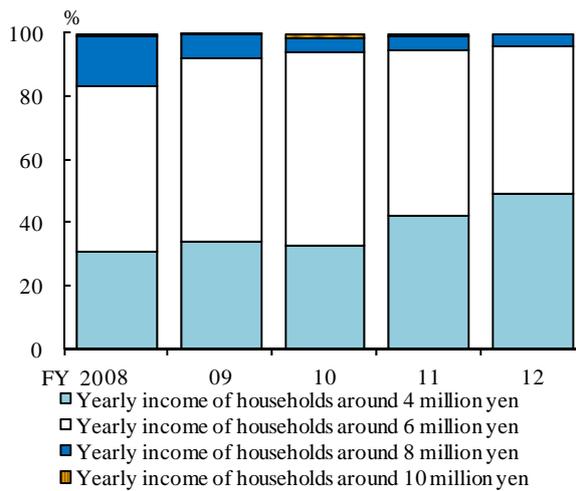
Source: Japan Housing Finance Agency.

Chart III-4-25: Profitability of housing loans[1,2]

Floating interest rates   Initial 10-year fixed interest rates

Funding costs, etc.
Preferential rates
Profitability
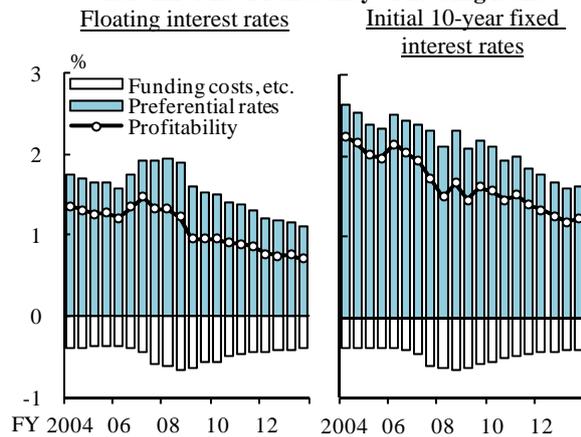
Notes: *1*. Major banks and regional banks are counted. The
latest data are as of October 2013. Profitability at
the time of extension.
2. "Funding costs, etc." are the sum of the funding rate
and the group credit life insurance premium
(assumed to be 0.3 percent).
Sources: Japan Financial News, "Nikkin report"; BOJ.

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In these circumstances, the profitability of housing loans has been on a downtrend (Chart III-4-25).[6] Furthermore, the debt burden on young people with housing loans has been growing (Chart III-4-26). Meanwhile, as for interest rate preferences on housing loans, the proportion of housing loans with fixed interest rates temporarily increased around the middle of 2013 because of expectations of higher interest rates, but that of housing loans with low floating interest rates has increased again as long-term interest rates have declined (Chart III-4-27).

Chart III-4-26: Liabilities to savings ratio by age[1]
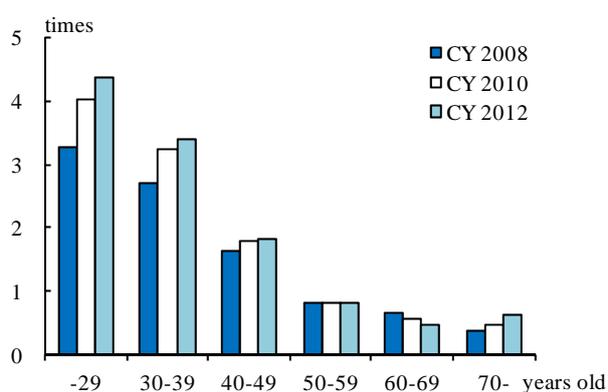
Note: *1*. Worker households among two-or-more-person households with liabilities are counted.
Source: Ministry of Internal Affairs and Communications, "Family income and expenditure survey."

Chart III-4-27: Share of newly extended housing loans by type of interest rate[1]
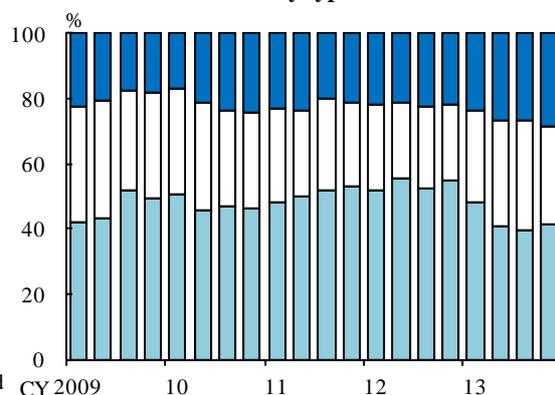
Note: *1*. The latest data are as of December 2013. Individuals with newly extended housing loans are counted based on the number of housing loans contracted.
Source: Japan Housing Finance Agency.

Developments in loans extended by public financial institutions

Looking at developments in public financial institutions' loans in recent years, loans extended by public financial institutions as a proportion of the outstanding amount of loans to small and medium-sized firms had been on a downtrend since the middle of the 2000s. However, the proportion started to rise in the wake of the economic recession following the Lehman shock in 2008. It has since gradually peaked out following the Great East Japan Earthquake in 2011 (Chart III-4-28). Various emergency measures taken since the Lehman shock have served to underpin corporate activity, especially among small and medium-sized firms, but the decline in the proportion of public

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[6] The profitability of housing loans discussed here is calculated by deducting funding interest rates and group credit insurance premiums from interest rates on housing loans. The ratio of general and administrative expenses to deposits and the credit cost ratio are not deducted from interest rates on housing loans.

financial institutions' loans reflects the fact that the significance of these measures has gradually begun to decline as Japan's economy has recovered.

Chart III-4-28: Ratio of public loans in the total loans to small and medium-sized firms[1,2]
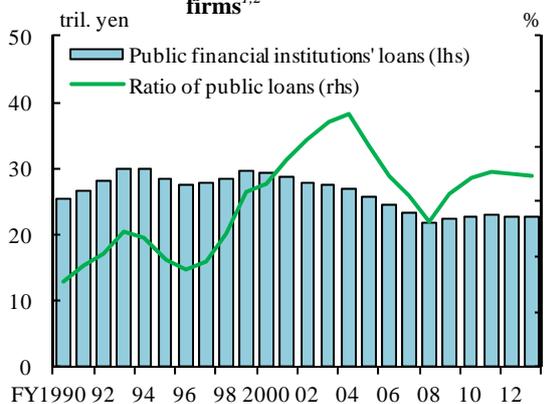
Notes: 1. Public financial institutions' loans are defined as the sum of those made by Japan Finance Corporation and Shoko Chukin Bank. The latest data are as of the first half of fiscal 2013.
2. The ratio of public loans is defined as the sum of loans made by public financial institutions' in the total amount lent to small and medium-sized firms.

Sources: Published accounts of each institution; BOJ, "Loans and bills discounted by sector."

Chart III-4-29: Lending rates and average lending terms[1,2]
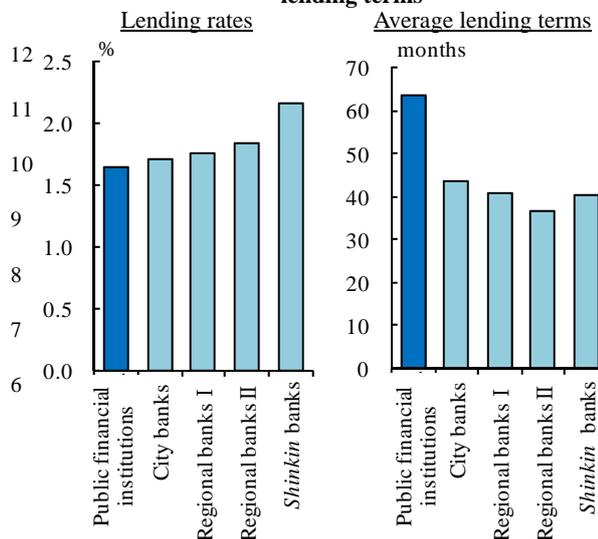
Notes: 1. Averages for 2013.
2. Public financial institutions include Japan Finance Corporation, Japan Housing Finance Agency, and Shoko Chukin Bank, etc.

Source: Japan Finance Corporation.

In comparison with private financial institutions, public financial institutions have extended loans at low interest rates and with long maturities (Chart III-4-29). By industry, public financial institutions account for a relatively large share of loans to some industries such as the agriculture, forestry, fisheries, mining, and medical care and welfare industries (Chart III-4-30). In addition, interest rates on borrowings in these industries have also been low compared with those in other industries. Meanwhile, the average credit score of firms borrowing from public financial institutions is not necessarily low relative to that of firms borrowing from regional banks, although this finding should be interpreted with some latitude given the differences in credit scores among financial institutions (Chart III-4-31).[7] As described above, private financial institutions have recently adopted more proactive lending attitudes, and private and public financial institutions are expected to cooperate and collaborate with each other in an appropriate manner and proceed with role-sharing in order to further enhance the vigor of the corporate sector.

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[7] The credit scores discussed in this section are based on the "SPECIA" of the Teikoku Databank, and the scores show individual firms' creditworthiness assessed by the Teikoku Databank.

Chart III-4-30: Interest rates among firms and public loan ratios[1,2]

interest rates, %

$$y = -0.01x + 2.01$$
$$R^2 = 0.28$$

- Information and communications and transportation
- Construction
- Services
- Real estate
- Electricity, gas, and water and sewage
- Manufacturing
- Wholesale and retail
- Medical and nursing care
- Agriculture, forestry, and fishery and mining

public loan ratios, %

Notes: 1. For public financial institutions, Development Bank of Japan, Japan Finance Corporation, Shoko Chukin Bank, and Welfare and Medical Service Agency are counted.
2. Public loan ratios are defined as the ratio of public institutions' loans outstanding by sector to total loans outstanding by sector. Interest rates are averages from fiscal 2009 to fiscal 2012, and public loan ratios are as of fiscal 2012.

Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; Published accounts of each institution; BOJ.

Chart III-4-31: Credit ratings of borrowing firms[1]

credit ratings

- Major banks
- Regional banks
- *Shinkin* banks
- Public financial institutions

FY 2008 · 10 · 12
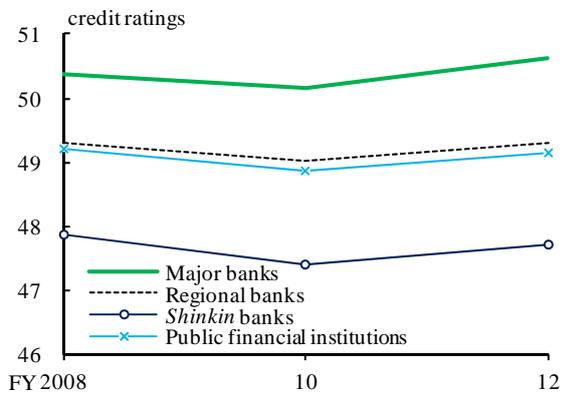
Note: 1. For public financial institutions, Development Bank of Japan, Japan Bank for International Cooperation, Japan Finance Corporation, Japan Housing Finance Agency, Okinawa Development Finance Corporation, Shoko Chukin Bank, and Welfare and Medical Service Agency are counted.

Source: Teikoku Databank, "SPECIA."

2. Overseas loans

Financial institutions' overseas loans have continued to show relatively high growth, particularly among major banks. The growth rate is lower than that observed around 2011 and 2012, when U.S. and European financial institutions significantly reduced their assets following the Lehman shock and Japan's banks did the opposite by increasing their loans, but overseas loans (converted into U.S. dollars) have continued to exhibit over 10 percent growth compared with the previous year (Chart III-4-32). By region, the situation remains the same, in that growth in loans to Asia is higher than in other regions (Charts III-4-33 to III-4-35).

Competition for overseas loans has recently been intensifying gradually, partly due to the slowdown in loans to Asia, steady funding conditions among overseas firms through corporate bond issuance, and the waning of asset reduction programs among overseas financial institutions.

Chart III-4-32: Overseas loans of major banks[1]

bil. U.S. dollars   y/y % chg.

Loans outstanding (lhs)
Year-on-year changes (rhs)

CY2001 02 03 04 05 06 07 08 09 10 11 12 13 14
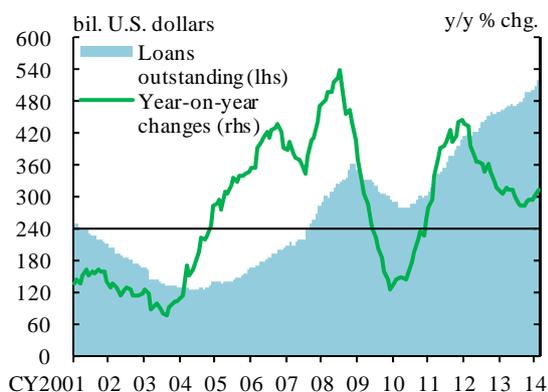
Note: 1. The latest data are as of end-February 2014. The loans outstanding of overseas branches of major banks, which are converted into U.S. dollars at each month-end.

Source: BOJ.

Chart III-4-33: Overseas loans outstanding of major banks by region[1,2]

Loans outstanding   Growth rates

tril. U.S. dollars   %

FY 2010 11 12 13

Asia   Latin America
North America   Western Europe
Others

Asia, North America, Western Europe, Latin America
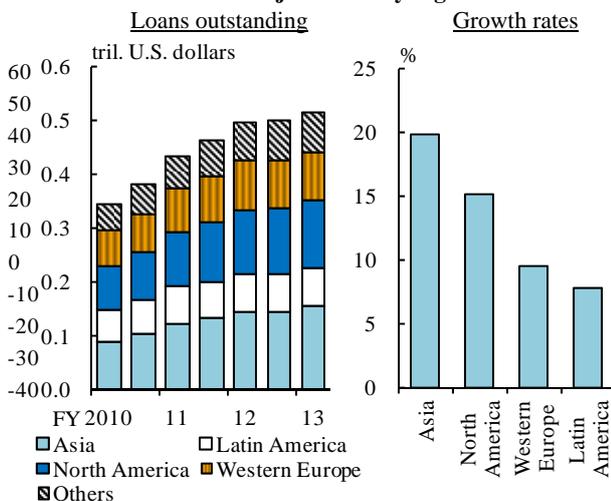
Notes: 1. Banks in the three major financial groups are counted on a non-consolidated basis.
2. The right-hand chart shows annualized growth rates from end-September 2010 to end-September 2013.

Source: BOJ.

Chart III-4-34: Real GDP growth rate of Asia and claims on Asia and Pacific region[1,2]

y/y % chg.   y/y % chg.

CY2006 07 08 09 10 11 12 13

Claims on Asia and Pacific region (lhs)
Real GDP growth rate of Asia (rhs)
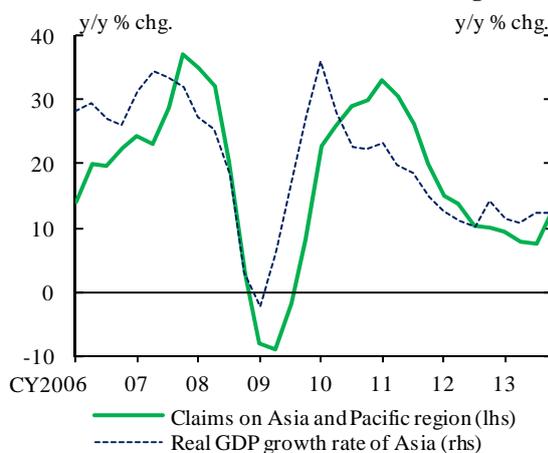
Notes: 1. The real GDP growth rate of Asia is the average of China, India, Indonesia, Korea, Malaysia, Taiwan, and Thailand, weighted by each country's nominal GDP. The latest data are as of the October-December quarter of 2013.
2. Figures for claims are the sum of cross-border claims and local currency positions of foreign affiliates with local residents. The latest data are as of end-December 2013, and statistical discontinuities due to M&A are adjusted.

Sources: CEIC; BOJ, "The results of BIS international consolidated banking statistics in Japan."

Chart III-4-35: Claims on Asia by country and region[1]
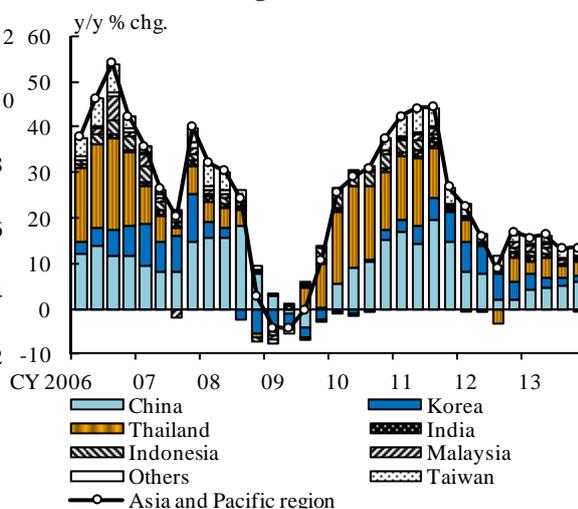
y/y % chg.

CY 2006 07 08 09 10 11 12 13

China   Korea
Thailand   India
Indonesia   Malaysia
Others   Taiwan
Asia and Pacific region

Note: 1. The latest data are as of end-December 2013. The figures represent local currency positions of foreign affiliates with local residents. The latest data of statistical discontinuities due to M&A are adjusted.

Source: BOJ, "The results of BIS international consolidated banking statistics in Japan."

3. Securities investment

Turning to overall securities investment among financial institutions, a greater number of financial institutions have adopted a prudent stance on accumulating more risk associated with yen interest rates, while gradually increasing investment in securities other than yen-denominated bonds.

First, with regard to financial institutions' investment in yen-denominated bonds, as they became more concerned about an upward shift in yen interest rates after the Bank introduced QQE through around autumn 2013, major banks significantly reduced their outstanding investment, and outstanding amounts invested started to decline slightly among regional and *shinkin* banks after showing an uptrend (the upper part of Chart III-4-36). Since then, against a backdrop of ongoing stability in long-term interest rates, some restored outstanding amounts invested in yen-denominated bonds to previous levels in order to secure security interest income, whereas others continued to reduce their outstanding yen-denominated bondholdings. In these circumstances, outstanding yen-denominated bondholdings have declined at a slightly slower pace at major banks, while those at regional and *shinkin* banks have been more or less unchanged.

On the other hand, the outstanding amount invested in foreign securities and investment trusts converted into yen rose, especially among major and regional banks, around the end of 2013 (the lower part of Chart III-4-36).[8] As described in Chapter II, financial institutions' stance toward investment in foreign securities and investment trusts has become somewhat cautious from the beginning of 2014, reflecting slightly increased uncertainty over global financial markets. Nonetheless, more financial institutions plan to increase their investment in risky assets other than yen interest rate instruments compared with the situation in the first half of 2013.

Looking in detail at developments in foreign securities investment, some major banks reduced their outstanding amounts invested around the middle of 2013 on the back of rises in U.S. and European long-term interest rates and heightened volatility. Toward the end of 2013, however, their outstanding amounts of investment recovered as concerns over rises in U.S. and European long-term interest rates abated somewhat. Regional banks also increasingly invested in foreign securities at a gradual pace, seeking higher yields at a time of ongoing low domestic interest rates. Meanwhile, the outstanding amount invested in foreign securities by *shinkin* banks was more or less

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[8] The lower part of Chart III-4-36 shows the outstanding amount of foreign securities converted into yen and includes the effects of fluctuations in foreign exchange rates.

unchanged.

As for developments in investment in investment trusts and other assets, some major banks have increased their investment in stock investment trusts, reflecting the steady performance of Japanese stock prices around the end of 2013. In addition, outstanding holdings in investment trusts and other assets among regional and *shinkin* banks have increased slightly.

Chart III-4-36: Outstanding amount of securities[1]

Outstanding amount of domestic bonds

Outstanding amount of foreign securities, investment trusts, etc.
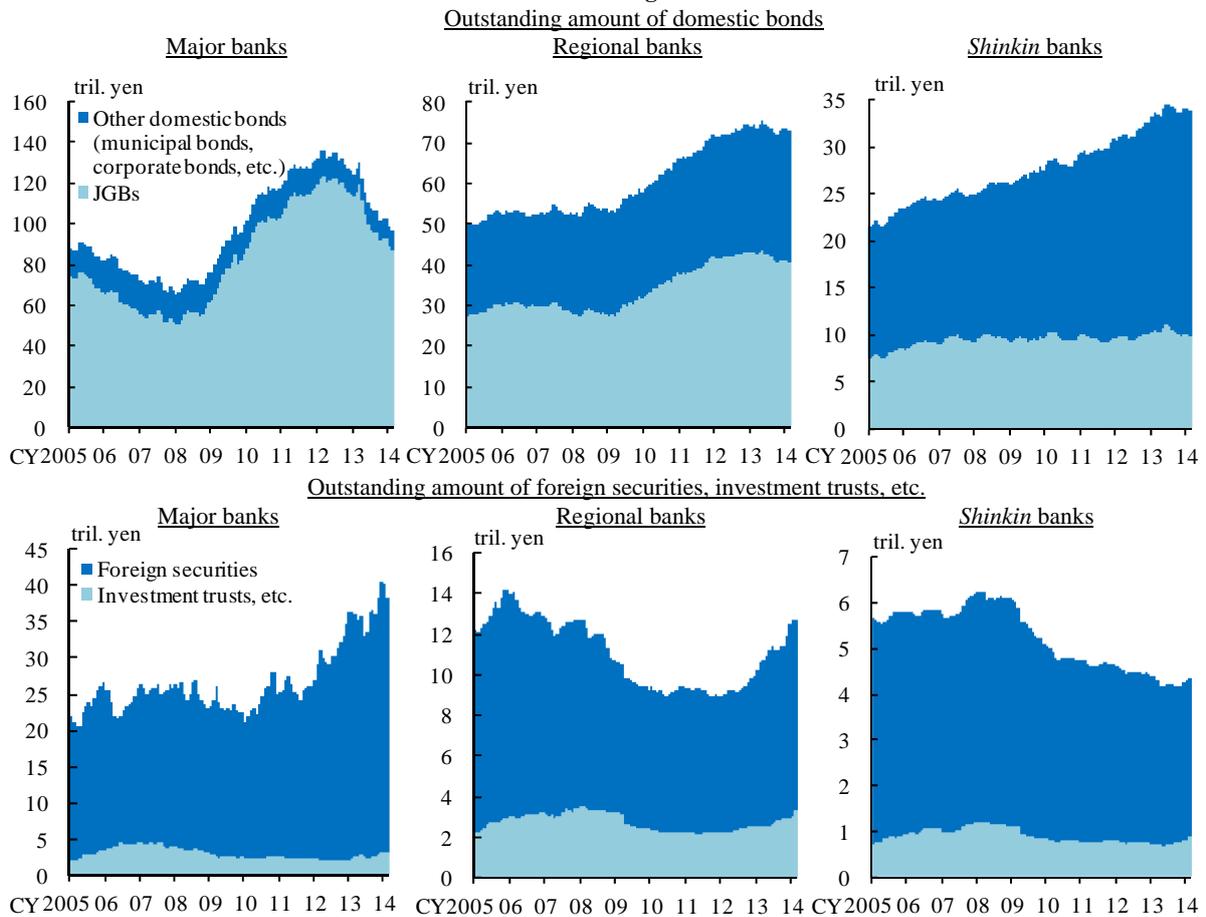
Note: *1*. The latest data are as of February 2014. The data are based on the average amount outstanding.
Source: BOJ.

IV. Risks observed in financial markets

This chapter examines the risks observed in the government bond, stock, and foreign exchange markets, mainly during the second half of fiscal 2013.

A. Risks implied in government bond markets

In the JGB market, long-term yields have been stable at low levels.

Yields on 10-year JGBs increased slightly at the end of 2013 when U.S. long-term yields and Japanese stock prices rose, but have decreased moderately since the beginning of 2014 as stock prices have been weak. Overall, JGB yields have been stable within a narrow range (Chart IV-1-1).[9] Looking at changes in yields by maturity, yields across the curve have declined (Chart IV-1-2).

Chart IV-1-1: Long-term JGB yields[1]

Note: *1*. The latest data are as of March 31, 2014.
Source: Bloomberg.

Chart IV-1-2: Changes in the JGB yield curve[1]

Note: *1*. Changes are from September 30, 2013 to March 31, 2014.
Source: Bloomberg.
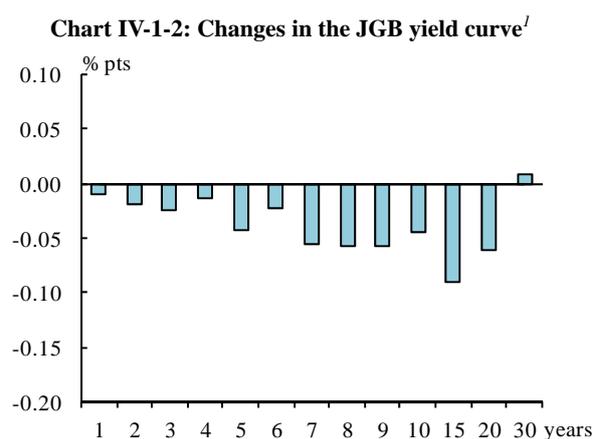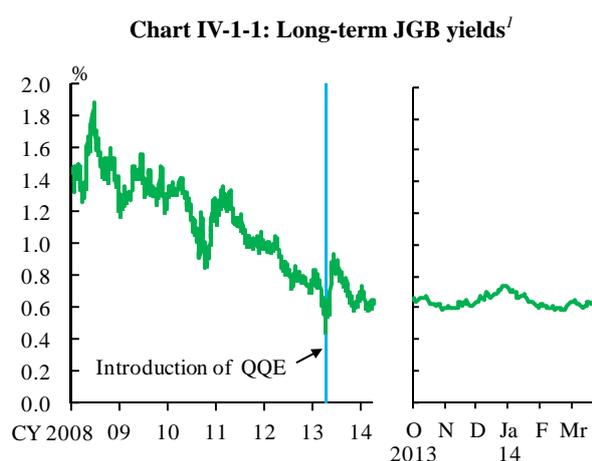
After increasing in spring 2013, the volatility (model-free implied volatility [MFIV]) of JGB prices followed a moderate declining trend, and it has recently almost returned to the level recorded before the introduction of QQE (Chart IV-1-3).[10]

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[9] In this chapter, the vertical lines in the charts indicate the introduction of QQE.

[10] MFIVs of government bond prices are calculated by using price information from futures options markets. The results correspond to options market participants' expected change in government bond prices for the next 3 months. Unlike standard implied volatility, MFIVs capture the recognition of tail risks.

Chart IV-1-3: MFIVs of government bond prices[1,2]
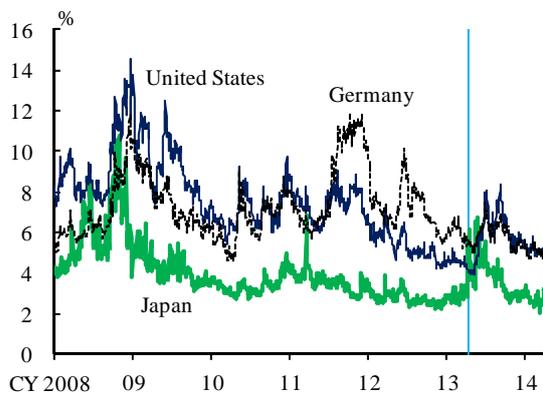
Factors affecting long-term JGB yields

Regarding market participants' inflation expectations, both survey results and the
break-even inflation (BEI) rate -- calculated as the yield spread between fixed-rate
coupon-bearing bonds and inflation-indexed bonds -- show that inflation expectations
appear to be rising on the whole (Charts IV-1-4 and IV-1-5).[11]

Chart IV-1-4: Market participants' expectations of long-term price changes[1,2]
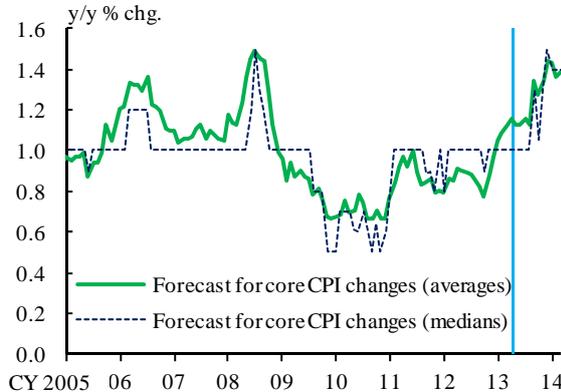
Chart IV-1-5: BEI for inflation-indexed JGBs[1,2]

As mentioned earlier, long-term JGB yields have been stable at low levels, although

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[11] Some deals in inflation-indexed bonds have been carried out since the beginning of 2014, but
changes in the BEI rate should be interpreted with some latitude given that the market liquidity of
inflation-indexed bonds is lower than that of fixed-rate coupon-bearing bonds.

inflation expectations appear to be rising on the whole and overseas yields have moved up since spring 2013. To determine the background to this, we decompose developments in long-term JGB yields using principal component analysis. It is implied that long-term JGB yields have generally remained stable since spring 2013 as "other factors" have offset the upward pressure exerted by the "global factor," which is common to Japan, the United States, Germany, and the United Kingdom. Although it is difficult to identify "other factors," they seem to be explained by factors such as tight JGB supply and demand conditions caused by the Bank's large-scale JGB purchases (Chart IV-1-6). Meanwhile, Japanese sovereign credit default swap (CDS) premiums have not shown any noticeable changes recently (Chart IV-1-7).

Chart IV-1-6: Decomposition of long-term JGB yields[1,2,3]

Chart IV-1-7: Sovereign CDS premiums[1,2]
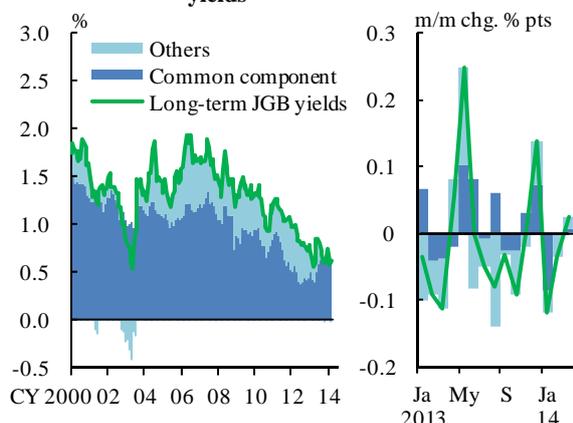
Notes: 1. "Common component" is extracted from a principal component analysis and is defined as the first principal component of U.S., German, U.K., and Japanese government bond yields (the contribution ratio is 0.89).
2. "Others" is the sum of the constant term and residuals from regression of JGB yields on "common component" and the constant term.
3. The estimation uses month-end data from January 2000 to March 2014.
Sources: Bloomberg; BOJ.

Notes: 1. 5-year CDSs.
2. The latest data are as of March 31, 2014.
Source: Bloomberg.

Looking at trading by type of investor, sales of JGBs by city banks were notable after the introduction of QQE, but they seem to have paused since the beginning of 2014. Meanwhile, insurance companies and pension funds (through trust banks entrusted with pension assets) have continued to make net purchases (Chart III-3-7).

As for the outlook, the results of the survey of market participants indicate that "overseas interest rates" are considered a factor causing upward pressure on JGB yields. As a factor causing downward pressure on JGB yields, market participants continue to indicate "JGB supply and demand conditions" and pay somewhat greater attention to "short-term interest rates and monetary policy" (Chart IV-1-8). Risk reversals (the

difference in implied volatilities between call and put options) -- which indicate the skew of investors' recognition of future risks -- show that investors have relaxed their vigilance against a possible rise in JGB yields, but risk reversals remain somewhat high relative to past levels (Chart IV-1-9).

Chart IV-1-8: Factors affecting JGB yields[1,2]
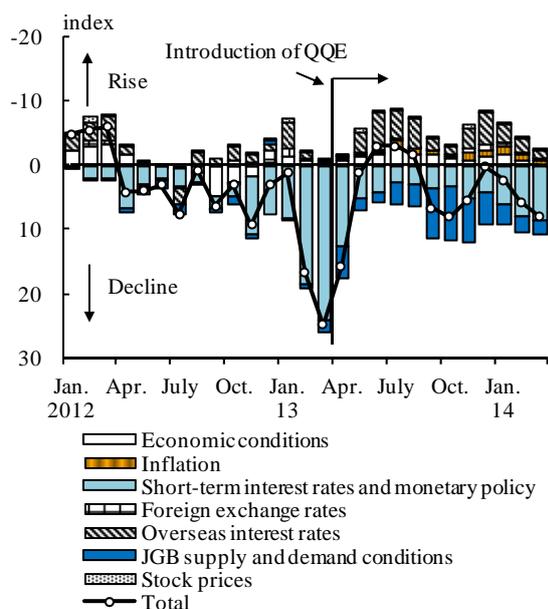
Economic conditions
Inflation
Short-term interest rates and monetary policy
Foreign exchange rates
Overseas interest rates
JGB supply and demand conditions
Stock prices
Total

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 and then subtracting 50).
2. The latest survey was conducted from March 25-27, 2014.
Sources: QUICK, "QUICK Report (Bond)"; BOJ.

Chart IV-1-9: Risk reversals of government bond prices[1,2]
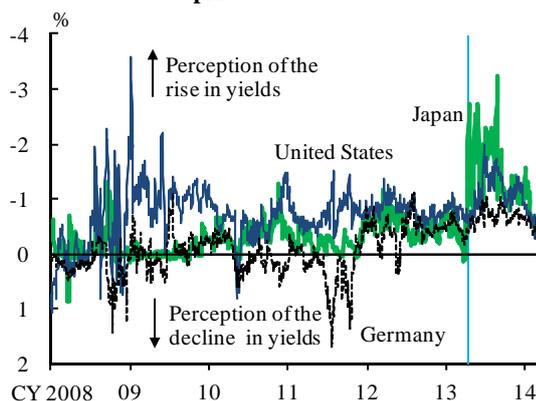
Notes: *1*. See Note 1 in Chart IV-1-3.
2. The latest data are as of March 31, 2014.
Sources: Bloomberg; BOJ.

Liquidity in the JGB market

To gather clues for assessing liquidity in the JGB market, we discuss transaction volume, bid-ask spreads, and the daily price range to transaction volume ratio (Chart IV-1-10).[12] First, transaction volume in the JGB futures and newly issued 10-year JGB markets has generally remained within the average range of the past, albeit with some fluctuations. Bid-ask spreads for JGB futures contracts continue to show no noticeable changes.

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[12] Bid-ask spreads are the difference between the price quoted by buyers and that quoted by sellers. The daily price range to transaction volume ratio is calculated as the daily price range divided by transaction volume.

Those for newly issued 10-year JGBs widened somewhat after the introduction of QQE, but tightened toward the end of 2013. The daily price range to transaction volume ratio in both the JGB futures and newly issued 10-year JGB markets temporarily rose after the introduction of QQE, but it has since been declining moderately, recently almost returning to the level recorded before the introduction of QQE. The earlier discussions suggest that some indicators related to liquidity in the JGB market deteriorated after the introduction of QQE in April 2013, but these indicators have recently generally been within their average range of the past.

Chart IV-1-10: Indicators of liquidity in the JGB market[1,2]

Transaction volume

Bid-ask spreads

Daily price range to transaction volume ratio

Notes: 1. 10-day backward moving average.
2. The latest data are as of March 31, 2014.
Sources: Bloomberg; QUICK; Thomson Reuters.
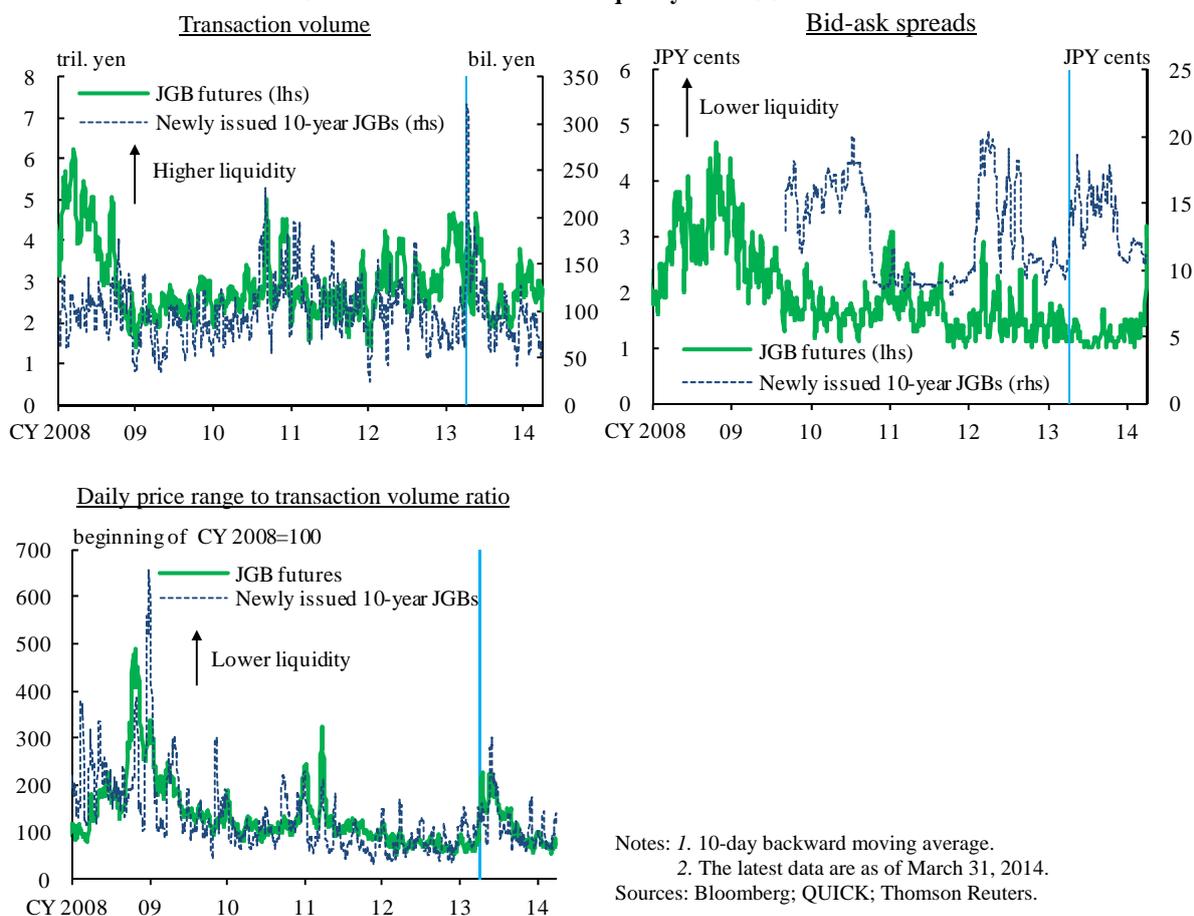
B. Risks implied in stock markets

In stock markets, a temporary increase was seen in the volatility of stock prices, as investors became increasingly risk averse from the beginning of 2014. The volatility of stock prices in Japan has remained at a somewhat high level relative to volatility in overseas markets.

Japanese stock prices rose toward the end of 2013 with the depreciation of the yen on the back of the rise in U.S. stock prices. From the beginning of 2014, stock prices were weak as investors became increasingly risk averse given nervousness in financial markets in some emerging countries with structural vulnerabilities and a decline in stock prices globally (Chart IV-2-1). They have since fluctuated mainly in response to the situation in Ukraine.

Chart IV-2-1: Stock price index[1,2]
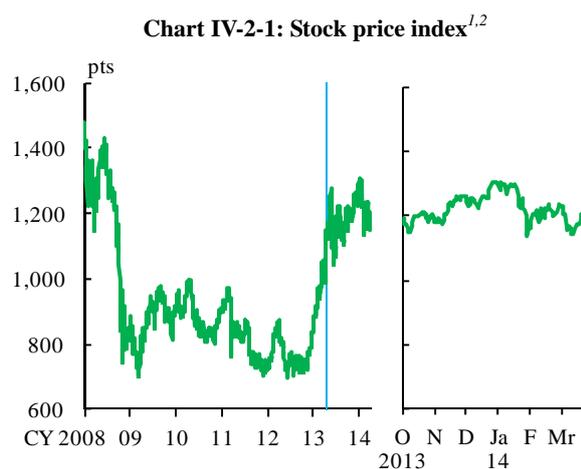
Notes: *1*. TOPIX.
     2. The latest data are as of March 31, 2014.
Source: Bloomberg.

Chart IV-2-2: MFIVs of stock prices[1]
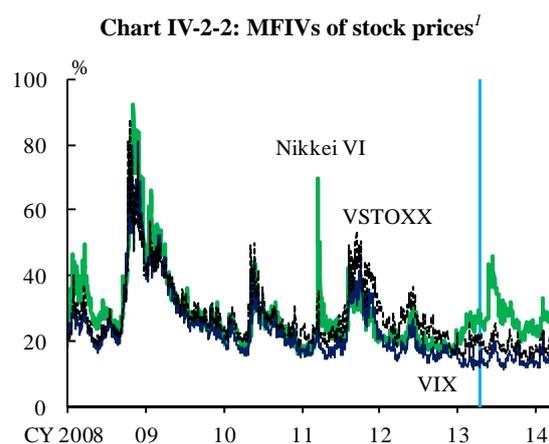
Note: *1*. The latest data are as of March 31, 2014.
Source: Bloomberg.

After increasing in the middle of 2013, the volatility (MFIV) of Japanese stock prices followed a moderate decreasing trend toward the end of 2013.[13] It temporarily increased somewhat due to a decline in stock prices from the beginning of 2014 (Chart IV-2-2). Volatility has remained at a somewhat high level relative to volatility in overseas markets. Risk reversals show that vigilance against a risk of declining prices has increased somewhat recently as stock prices have fallen (Chart IV-2-3).

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[13] 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 calculated by using price information on S&P 500 options, EURO STOXX 50 options, and Nikkei 225 options, respectively. They correspond to options market participants' expected rate of change in stock prices for the next month.

Chart IV-2-3: Risk reversals of stock prices[1,2]
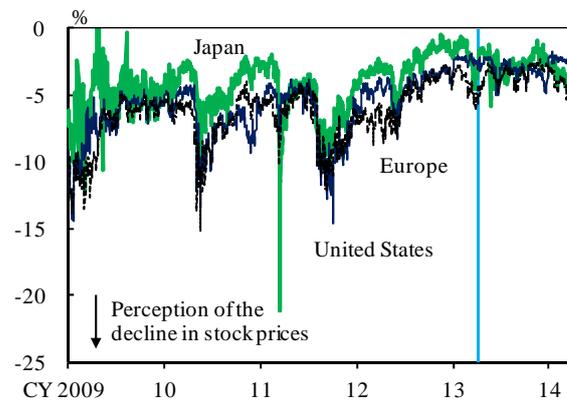
Notes: 1. Nikkei 225 options for Japan; S&P 500 options for
the United States; EURO STOXX 50 options for
Europe.
2. The latest data are as of March 31, 2014.
Sources: Bloomberg; BOJ.

Looking at trading by type of investor, individuals have made net purchases since the beginning of 2014, partly reflecting (1) buybacks of profit-taking sales conducted before the preferential tax treatment of securities investment income terminated at the end of 2013 and (2) purchases stimulated by the launch of NISAs. Meanwhile, foreign investors, who were large net buyers when stock prices rose from autumn 2012, have become net sellers since the beginning of 2014 (Chart III-3-8). This is because, since the beginning of 2014, some foreign investors who conduct short-term trading seem to have to some degree unwound their positions -- long positions in stocks including stock price index futures combined with short positions in the yen -- which were accumulated as Japanese stock prices rose in tandem with depreciation of the yen (Charts IV-2-4 and IV-2-5). However, net positions in Nikkei 225 futures on the Chicago Mercantile Exchange (CME) -- which are seen as likely to reflect speculators' positions -- show that market participants rapidly increased their long positions from autumn 2012, and have continued to hold these positions at a high level (Chart IV-2-6). Such fluctuations in positions in the futures market affect the spot market through arbitrage transactions. In fact, an across-the-board increase or fall is increasingly being observed in the spot market, and comovements in individual stock prices, as well as the correlation between industries, have been rising. In such situations where the correlations between individual stocks and between industries are increasing, attention should be paid to the higher likelihood of heightening volatility in the overall stock markets if some shocks occur (Charts IV-2-7 and IV-2-8).

Chart IV-2-4: Foreign investors' share of stock futures trading value[1,2]
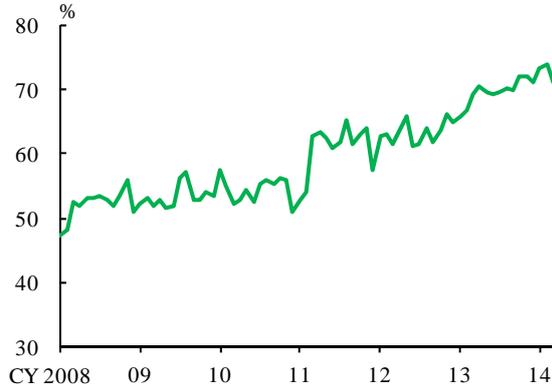
Notes: *1.* Foreign investors' share of trading value (sum of sales and purchases) for Nikkei 225 Futures and Nikkei 225 mini.
　　　2. The latest data are as of March 2014.
Source: Osaka Securities Exchange.

Chart IV-2-5: Correlation between Japanese stock prices and foreign exchange rates[1,2,3]
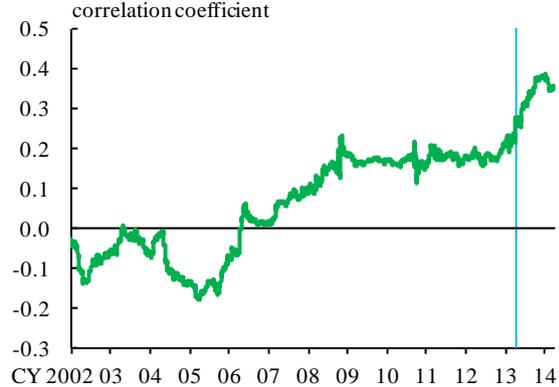
Notes: *1.* 500-day rolling correlation of daily rate of price change.
　　　2. TOPIX for stock prices; U.S. dollar/yen for foreign exchange rates.
　　　3. The latest data are as of March 31, 2014.
Sources: Bloomberg; BOJ.

Chart IV-2-6: CME Nikkei 225 futures net positions[1,2]
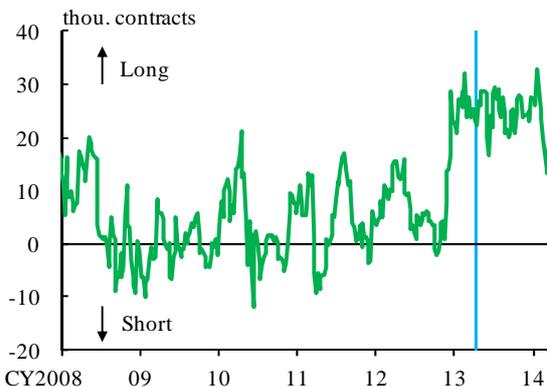
Notes: *1.* Non-commercial trades.
　　　2. The latest data are as of March 25, 2014.
Source: Bloomberg.

Chart IV-2-7: Index of an across-the-board increase or fall[1,2,3,4]
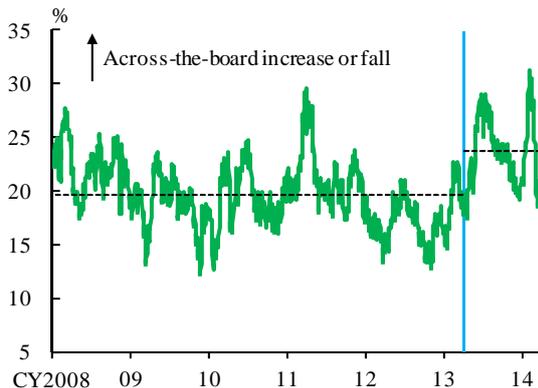
Notes: *1.* Index of an across-the-board increase or fall = (|number of stocks for which prices have increased – those for which prices have fallen|) / total number of stocks.
　　　2. Stocks listed on the First Section of the Tokyo Stock Exchange are counted.
　　　3. 30-day backward moving average. The dashed line indicates the average from January 4, 2008 to April 3, 2013 and from April 4, 2013 onward.
　　　4. The latest data are as of March 31, 2014.
Sources: Bloomberg; BOJ.

Chart IV-2-8: Correlation between industries in TOPIX[1]
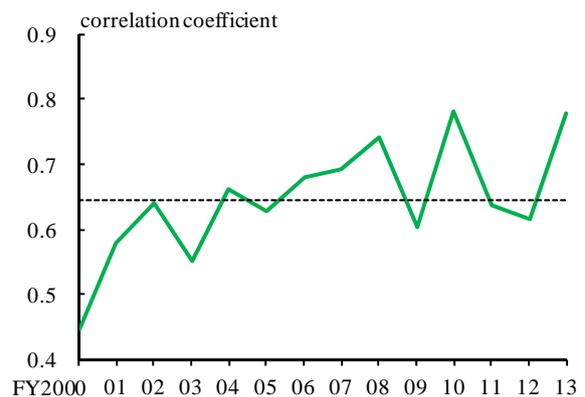
Note: *1.* The correlation coefficient for each fiscal year is calculated by taking a simple average of correlation coefficients based on daily price changes for all pairwise combinations of 17 industries in TOPIX (136 in total). The dashed line indicates the average for the whole sample period.
Sources: Bloomberg; BOJ.

C. Risks implied in foreign exchange markets

In foreign exchange markets, the volatility of the yen's exchange rates has generally declined moderately.

In foreign exchange markets, the yen depreciated to the 105-106 yen level against the U.S. dollar toward the end of 2013, coupled with the rise in Japanese stock prices in a situation where expectations for a recovery in the U.S. economy were rising. Since the beginning of 2014, the yen has appreciated somewhat as investors have become increasingly risk averse given nervousness in some emerging markets and a decline in stock prices (Chart IV-3-1). The yen also depreciated to the 145-146 yen level against the euro toward the end of 2013, but has appreciated somewhat since the beginning of 2014.

Meanwhile, volatility (MFIV) in the U.S. dollar/yen and euro/yen rates has generally declined moderately since the middle of 2013, although it temporarily rose slightly, reflecting the aforementioned developments in spot rates before and after the New Year (Chart IV-3-2).[14]

Chart IV-3-1: Foreign exchange rates[1]
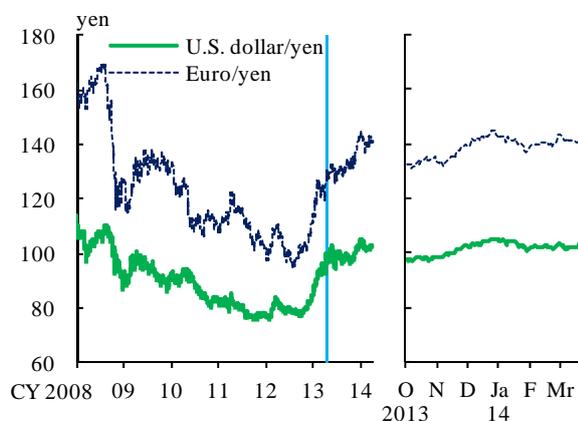
Note: *1*. The latest data are as of March 31, 2014.
Source: Bloomberg.

Chart IV-3-2: MFIVs of U.S. dollar/yen and euro/yen rates[1,2]
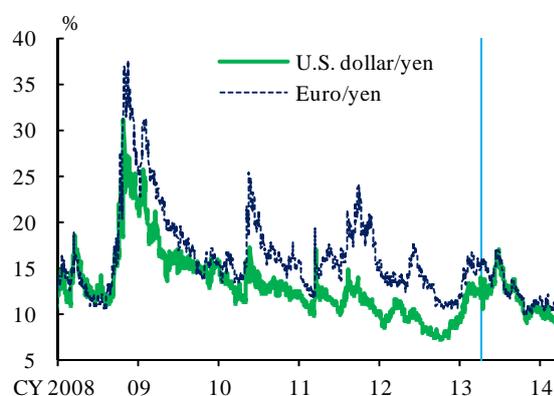
Notes: *1*. MFIVs are calculated by using data on 3-month over-the-counter option prices.
  2. The latest data are as of March 31, 2014.
Sources: Bloomberg; BOJ.

International Monetary Market (IMM) futures net positions on the CME, which are seen as likely to reflect speculators' positions, showed that market participants had increased their long positions in the U.S. dollar against the yen since autumn 2012, when the yen depreciated in tandem with a rise in stock prices. As the yen depreciated further toward

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[14] MFIVs for the U.S. dollar/yen rate and the euro/yen rate are calculated by using data on 3-month over-the-counter option prices. The results correspond to options market participants' expected change in foreign exchange rates for the next 3 months.

the end of 2013, they further increased their long positions in the dollar against the yen. After the beginning of 2014, market participants reduced such positions somewhat, but have still continued to take large long positions in the dollar against the yen (Chart IV-3-3).

Chart IV-3-3: IMM futures net positions[1]

Note: *1*. The latest data are as of March 25, 2014.
Source: Bloomberg.
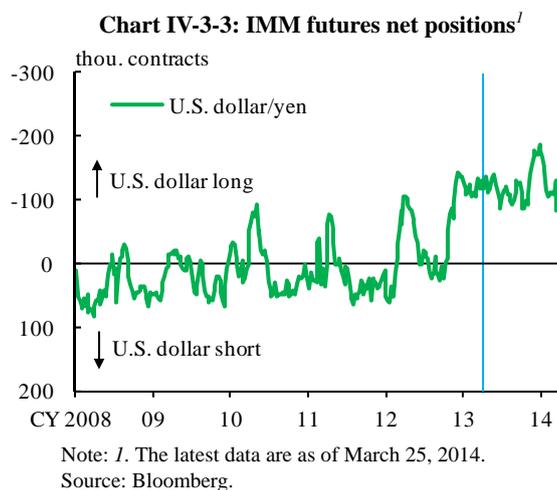
Regarding factors affecting foreign exchange rates, market participants continue to pay close attention to "interest rates and monetary policy" as a factor causing yen depreciation (Chart IV-3-4). Regarding U.S. dollar/yen and euro/yen risk reversals, in response to depreciation of the yen in the spot market, the skew favoring dollar puts and euro puts diminished somewhat toward the end of 2013, implying that concerns over yen appreciation against the dollar and euro eased somewhat. Since the beginning of 2014, however, risk reversals have remained more or less unchanged (Chart IV-3-5).

Chart IV-3-4: Factors affecting foreign exchange rates[1,2]
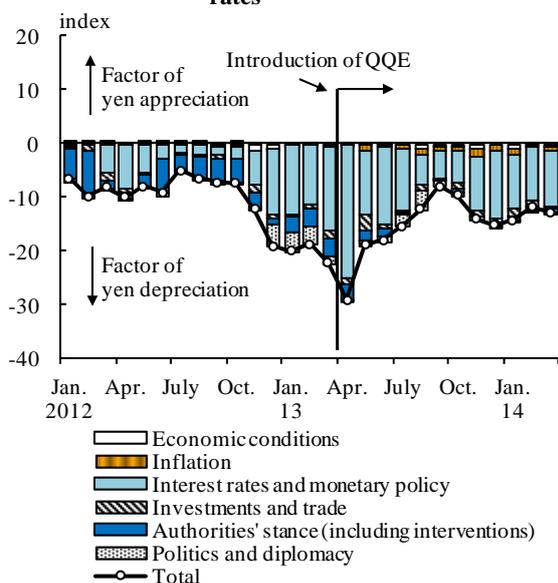
Economic conditions
Inflation
Interest rates and monetary policy
Investments and trade
Authorities' stance (including interventions)
Politics and diplomacy
Total

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
foreign exchange fluctuations is multiplied by the impact
of the factor on foreign exchange fluctuations (indexed
with strong upward pressure [yen appreciation] = 100,
upward pressure = 75, neutral = 50, downward pressure
[yen depreciation] = 25, strong downward pressure = 0
and then subtracting 50).

2. The latest survey was conducted from March 10-13,
2014.

Sources: QUICK, "QUICK Report (Foreign Exchange)"; BOJ.

Chart IV-3-5: Risk reversals of U.S. dollar/yen and euro/yen rates[1,2]
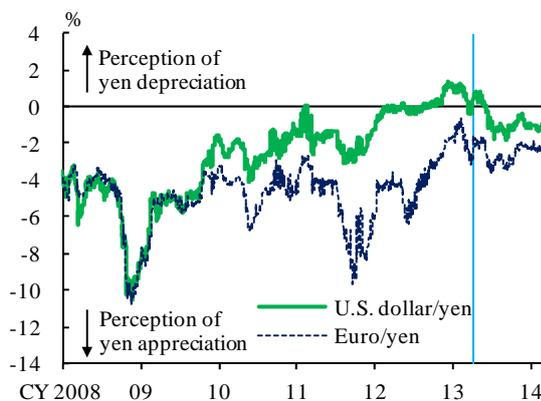
Notes: *1*. 1-year risk reversals.
2. The latest data are as of March 31, 2014.
Source: Bloomberg.

V. Risks borne by financial intermediaries

In this chapter, we examine in detail the stability of business conditions among financial institutions such as banks and *shinkin* banks based on various risks borne by these institutions, their capital base adequacy, and profitability. We then outline the stability of business conditions among other financial intermediaries including insurance companies and securities companies. It should be noted that most data used in our analysis are as of the end of September 2013, but regarding market risk, data for the second half of fiscal 2013 are used where possible.

A. Banks and *shinkin* banks

1. Credit risk

Actual financial results for the first half of fiscal 2013 showed that credit risk (unexpected losses) at financial institutions such as banks and *shinkin* banks declined as a whole relative to Tier I capital (Chart V-1-1).[15] The distribution of credit risk relative to Tier I capital also showed the same trend at individual financial institutions (Chart V-1-2). As mentioned earlier, financial institutions have actively extended loans, and loans outstanding have grown both at home and abroad. Nevertheless, the overall amount of credit risk has declined since factors such as improvement in the quality of assets reflecting the economic recovery have worked to restrain the amount of risk financial institutions bear.

Credit costs and the quality of loans

By type of bank, the credit cost ratio (the ratio of costs incurred by credit extension to loans outstanding) turned negative at major banks, owing to an increase in reversals of provisions for loan losses (Chart V-1-3). Regional banks also saw a decline in the credit cost ratio due to improved business performance among borrowing firms.

Chart V-1-4 decomposes the recent change in credit cost ratios into the following six contributing factors: (1) downgrading of firms from a higher borrower classification to a lower classification; (2) upgrading of firms from a lower borrower classification to a

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[15] Unexpected losses are estimated by deducting the average amount of losses from the maximum amount of losses with a 99 percent probability of occurrence. 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.

higher classification; (3) changes in the loan-loss provision ratio; (4) changes in the uncovered loan ratio; (5) recoveries of write-offs; and (6) other factors. As shown in Chart V-1-4, the decrease in the effects of the downgrading factor was basically the primary contributor to the decline in credit cost ratios observed since the Lehman shock.[16]

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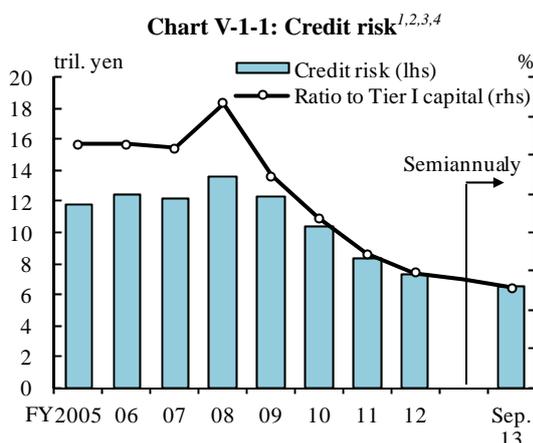
Notes: *1*. Banks and *shinkin* banks are counted.
     2. Credit risk is unexpected losses with a 99 percent confidence level.
     3. Credit risk includes foreign currency-denominated assets.
     4. For *shinkin* banks, figures for Tier I capital and credit risk in the first half of fiscal 2013 are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

Chart V-1-2: Credit risk to Tier I capital ratio[1]
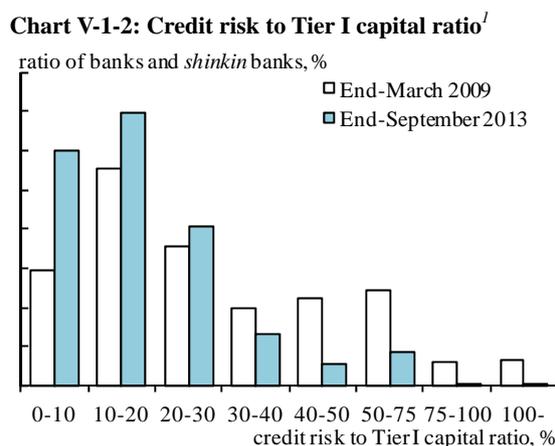
Note: *1*. See Notes in Chart V-1-1.
Source: BOJ.
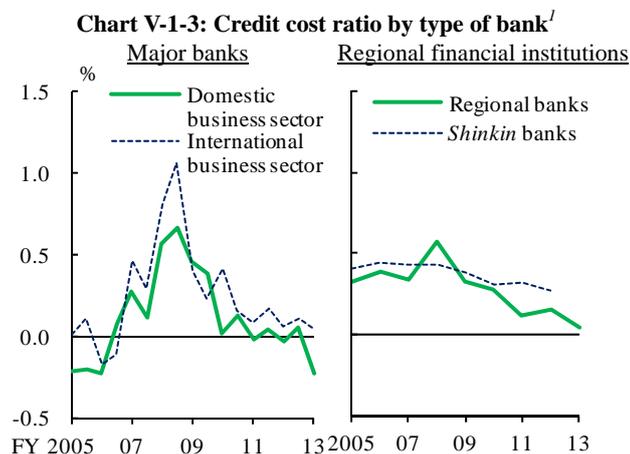
Chart V-1-3: Credit cost ratio by type of bank[1]

Note: *1*. The latest data for major banks and regional banks are as of the first half of fiscal 2013 (annualized), and those for *shinkin* banks are as of fiscal 2012.
Source: BOJ.

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[16] This is an analysis based on a set of assumptions, and quantitative results should be interpreted with some latitude.

Chart V-1-4: Determinants of credit cost ratio

Major banks

Regional banks

Upgrade of borrower classification
Changes in the loan-loss provision ratio
Recoveries of write-offs
Credit cost ratio

Downgrade of borrower classification
Changes in the uncovered loan ratio
Others
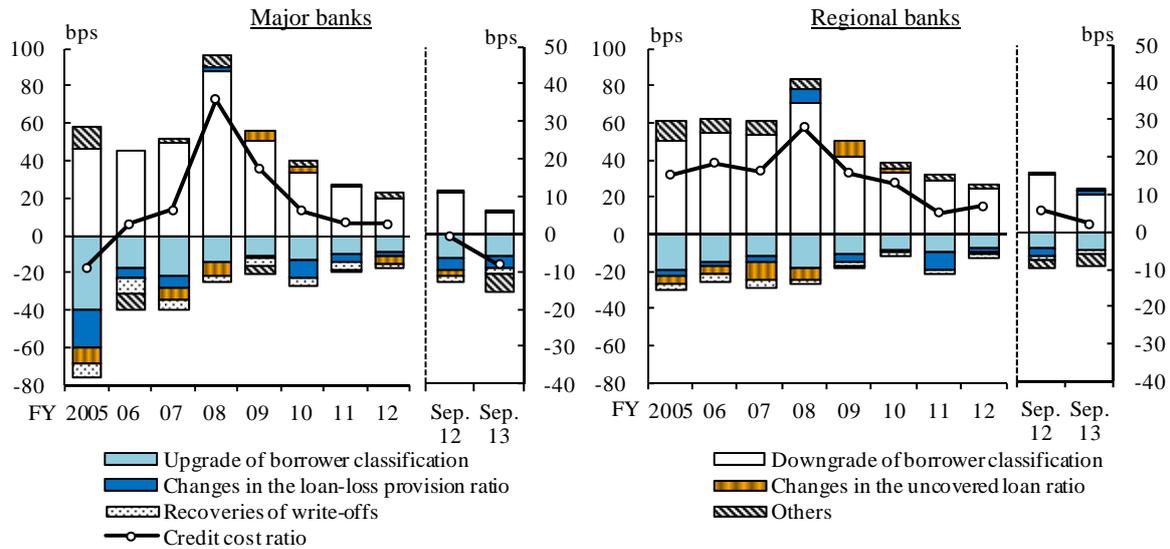
Source: BOJ.

The NPL ratio of major banks had been more or less unchanged for a period, but has recently begun to decline, reflecting the downtrend in corporate bankruptcies, and the NPL ratio has continued to decline at regional banks (Charts V-1-5 and V-1-6). The borrower classification shows that the quality of loans has continued to improve recently, particularly among major and regional banks (Chart V-1-7). Nonetheless, at *shinkin* banks, both the NPL ratio and the proportion of firms classified as needing special attention or below in their total loans have increased, albeit very gradually.

Chart V-1-5: Corporate bankruptcies

number of cases, thou.
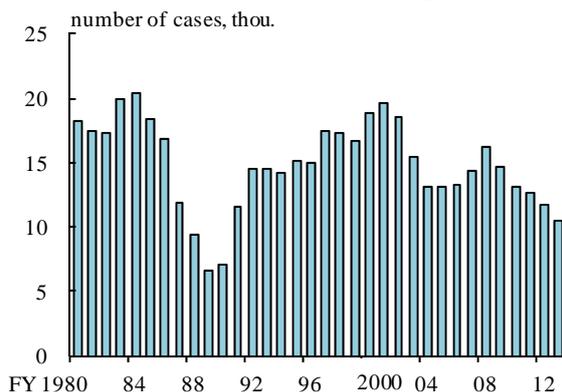
Source: Tokyo Shoko Research Ltd.

Chart V-1-6: NPL ratios[1]
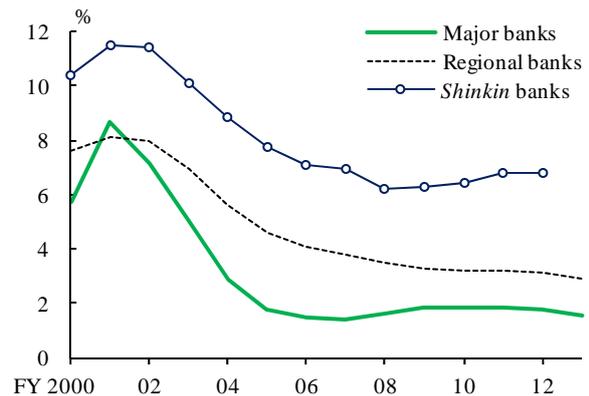
Major banks
Regional banks
Shinkin banks

Note: *1*. The latest data for major banks and regional banks are as of end-September 2013, and those for *shinkin* banks are as of end-March 2013.
Source: BOJ.

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Chart V-1-7: Loans outstanding by borrower classification[1,2]

Major banks   Regional banks   *Shinkin* banks
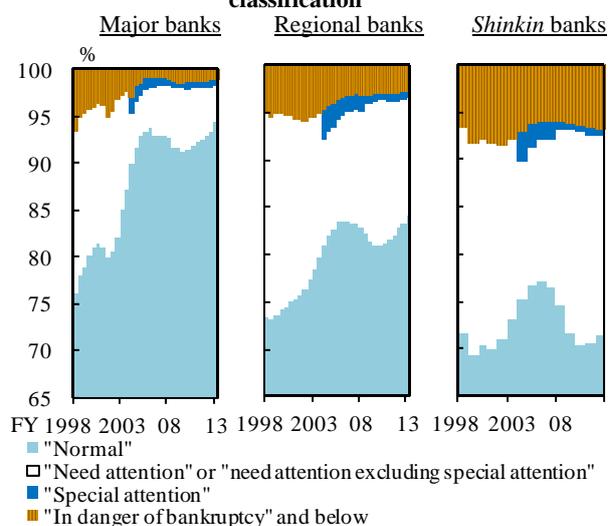
Notes: 1. The latest data for major banks and regional banks are as of end-September 2013, and those for *shinkin* banks are as of end-March 2013.
2. "Need attention" or "need attention excluding special attention" indicates "need attention" until fiscal 2003 and "need attention excluding special attention" from fiscal 2004.

Source: BOJ.

- "Normal"
- "Need attention" or "need attention excluding special attention"
- "Special attention"
- "In danger of bankruptcy" and below

Firms' business conditions under the SME Financing Facilitation Act

The improvement in the asset quality among financial institutions and the decline in credit costs seem to basically reflect the economic recovery. Another factor behind the upturn is the assistance extended by financial institutions to firms in distress, including the support provided after the Act Concerning Temporary Measures to Facilitate Financing for Small and Medium-Sized Enterprises (SMEs), etc. (the SME Financing Facilitation Act) was implemented in December 2009.[17]

In order to check developments in business performance under the SME Financing Facilitation Act, we picked firms that were likely to have benefited from the SME Financing Facilitation Act based on the data on credit scores of individual small and medium-sized firms, and examined movements in credit scores.[18] It should be noted, however, that this analysis covers only a limited number of firms to which the SME Financing Facilitation Act was applied.

Looking at changes in the credit scores of selected firms from fiscal 2010, among the firms to which the SME Financing Facilitation Act was applied, some firms' credit scores improved and credit scores of other firms deteriorated. Compared to the total

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[17] Although the SME Financing Facilitation Act lapsed at the end of March 2013, the government has continued to maintain its stance of facilitating the extension of loans to small and medium-sized firms. According to a number of surveys conducted among these firms, such as the survey conducted by Tokyo Guarantee, the proportion of firms facing funding difficulties after the SME Financing Facilitation Act lapsed is limited.

[18] Specifically, we picked firms listed in the "SPECIA" of the Teikoku Databank with data including the term "SME Financing Facilitation Act."

number of small and medium-sized firms included in the database, the proportions of firms whose credit scores improved and deteriorated were larger among firms to which the SME Financing Facilitation Act was applied than were those of firms to which it was not applied (Chart V-1-8).

Chart V-1-8: Credit rating changes for firms to which the SME Financing Facilitation Act applies[1]

Chart V-1-9: Credit ratings for groups of deteriorating and improving firms[1]

Note: *1*. Firms with capital less than 100 million yen are counted.
Source: Teikoku Databank, "SPECIA."

Note: *1*. Firms to which the SME Financing Facilitation Act appear to have been applied in fiscal 2010 and for which data are consecutively available from fiscal 2002 to fiscal 2011 are counted.
Source: Teikoku Databank, "SPECIA."

In order to analyze the background factors, we divided these firms into two groups: (1) firms whose credit scores improved; and (2) firms whose credit scores deteriorated. We then traced the average credit scores of each group and obtained the following results (Chart V-1-9). First, the group of firms whose credit scores improved had relatively high credit scores before the Lehman shock. These firms saw their scores drop sharply following the Lehman shock and swiftly recovered their scores under the SME Financing Facilitation Act. Second, the group of firms whose credit scores worsened had relatively low scores prior to the Lehman shock, and their scores were following a moderate downtrend. This trend could not be stemmed even by application of the SME Financing Facilitation Act. As for the first group, the SME Financing Facilitation Act has fulfilled, to a certain extent, the role of providing emergency support to ailing firms that were hit by the rapid economic deterioration following the Lehman shock. On the other hand, the latter group mainly consists of firms that had structural problems even before the Lehman shock, and the SME Financing Facilitation Act did not necessarily lead to fundamental improvement in their creditworthiness, or took time to do so. It will be worth observing whether the effects of the upturn in the economic and price situation

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spread to the business conditions of firms in the latter group, and whether these firms can enhance their corporate value by proceeding with financial and business restructuring under continued support from financial institutions.[19]

Credit risk associated with overseas loans

Financial institutions' overseas loans have continued to exhibit high growth, but credit risk associated with overseas loans has generally been restrained, as seen in the fact that NPL ratios have remained stable at low levels in each region (Chart V-1-10). On the other hand, since the profitability of overseas loans has continued to be higher than that of domestic loans, overseas loans have contributed to underpinning bank profitability (Chart V-1-11). However, in Asian regions with high growth potential, interest rate spreads on loans are relatively low for Japan's banks relative to those of U.S. and European financial institutions or local financial institutions (Chart V-1-12). This seems to be because Japan's banks conduct a certain volume of transactions with Japanese-affiliated firms, and they have been somewhat prudent in extending loans to foreign firms in Asia by selecting borrowing firms with relatively high creditworthiness. At present, Japan's banks account for around 10 percent of overall credit extended to this area (Chart V-1-13).

Chart V-1-10: NPL ratio of major banks by region[1]
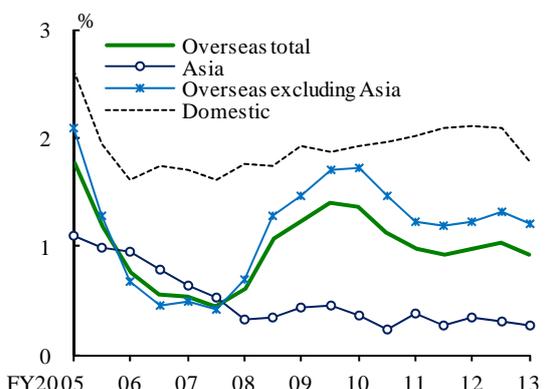
Note: *1*. The three major financial groups are counted on a non-consolidated basis. The latest data are as of end-September 2013.
Sources: Published accounts of each group.

Chart V-1-11: ROA of major banks[1]
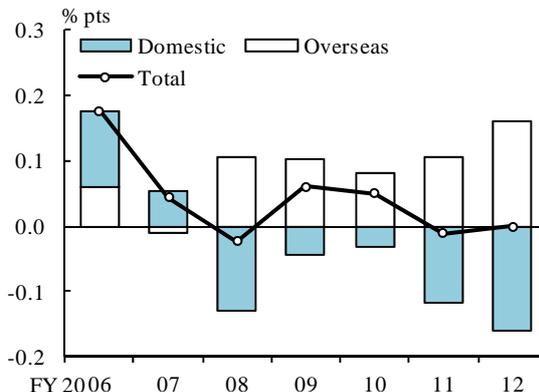
Note: *1*. The figures represent cumulative changes in gross operating profit ROA from fiscal 2005. The three major financial groups are counted on a consolidated basis.
Sources: Published accounts of each group.

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[19] The Center for Advanced Financial Technology, which is part of the Financial System and Bank Examination Department of the Bank of Japan, hosted a seminar on challenges in and measures for the revitalization of small and medium-sized firms in December 2012.

Chart V-1-12: Interest rate spreads on loans and NPL ratios in Asia[1]

interest rate spreads on loans, %

Japanese banks
European banks
Other foreign banks
Local banks
U.S. banks

NPL ratios, %
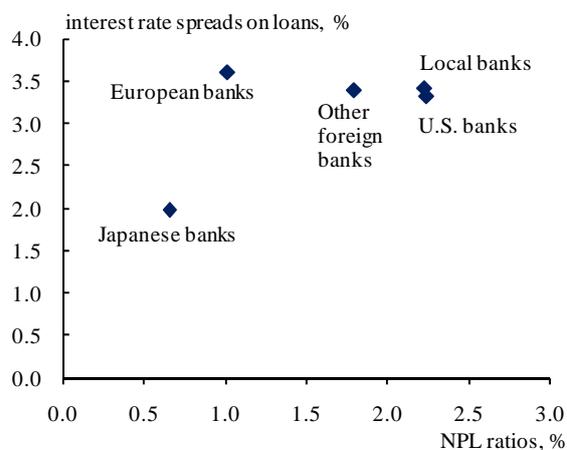
Note: *1*. Overseas subsidiaries and branches in China, Indonesia, Malaysia, and Thailand for which financial information is available are counted. Figures are averages from fiscal 2010 to fiscal 2012.
Source: Bureau Van Dijk, "Bankscope."

Chart V-1-13: Japanese banks' share of local claims on Asia and Pacific region[1]

%

CY2005 06 07 08 09 10 11 12 13
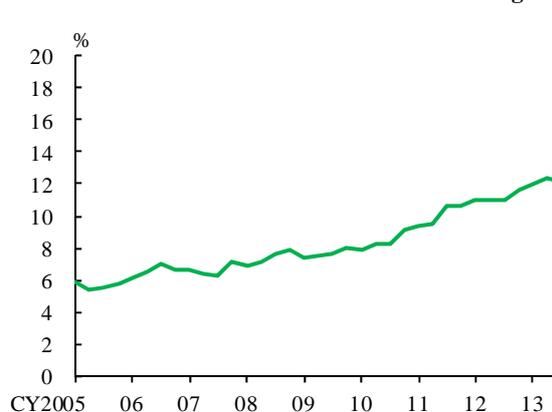
Note: *1*. The latest data are as of end-September 2013. The figures represent local currency positions of foreign affiliates with local residents.
Sources: BIS, "Consolidated banking statistics"; BOJ, "The results of BIS international consolidated banking statistics in Japan."

2. Interest rate risk

Amount of interest rate risk (100 basis point value)

The amount of interest rate risk (100 basis point value) associated with all assets and liabilities, including bond investment and deposits and loans, continued to decline toward the end of September 2013, but increased somewhat toward the end of December 2013. By type of bank, the amount of interest rate risk was more or less unchanged at major banks. Meanwhile, at regional and *shinkin* banks, interest rate risk decreased toward the end of September 2013 and increased, albeit slightly, toward the end of December 2013 (Charts V-1-14 and V-1-15).[20]

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[20] 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. Yen interest rate swaps are covered only for banks from this issue of the *Report* onward. We set the remaining maturity of demand deposits within 3 months in calculating the 100 basis point value of liabilities.

Chart V-1-14: Interest rate risk among financial institutions[1,2,3,4]
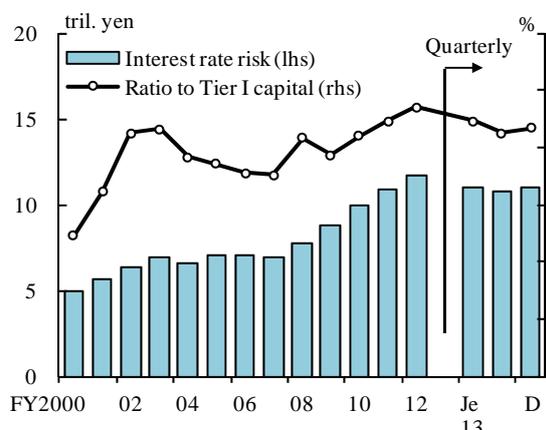
Notes: 1. Banks and *shinkin* banks are counted.
2. Interest rate risk: 100 basis point value in the banking book. For banks, off-balance-sheet transactions (interest rate swaps) are included.
3. Interest rate risk excludes risk associated with foreign currency-denominated assets and liabilities.
4. For banks, figures for Tier I capital as of end-June 2013 and end-December 2013 are assumed to be unchanged from end-March 2013 and end-September 2013, respectively. For *shinkin* banks, figures for Tier I capital in fiscal 2013 are assumed to be unchanged from end-March 2013.
Source: BOJ.

Chart V-1-15: Interest rate risk by type of bank[1]

Note: 1. See Notes 2, 3, and 4 in Chart V-1-14.
Source: BOJ.
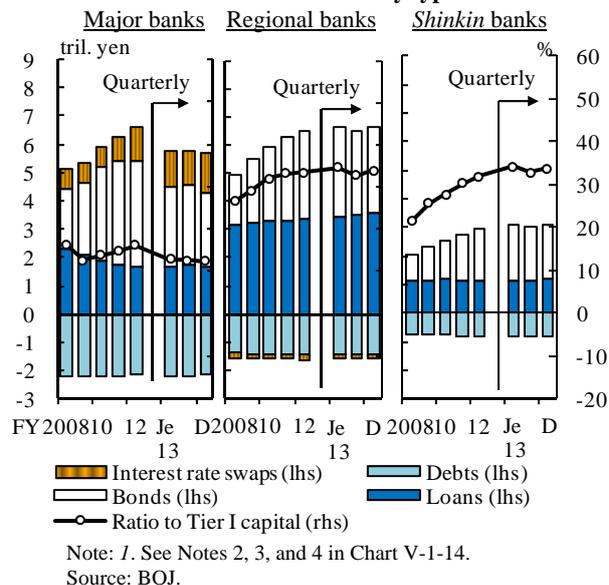
Looking at developments in detail, as described above, financial institutions, particularly major banks, further reduced investment in yen-denominated bonds and shortened the average remaining maturities of bonds toward around autumn 2013 as they became increasingly aware of the risk of an upward shift in yen interest rates after the Bank's introduction of QQE (Charts V-1-16 and V-1-17). This was reflected in the reduced amount of interest rate risk observed toward the end of September 2013. Thereafter, the amount of risk associated with bond investment continued to decline moderately as financial institutions remained concerned about the effect of an upward shift in interest rates on their investment. However, the overall amount of interest rate risk increased slightly, as the amount of risk associated with instruments other than bond investments increased, reflecting an increase in some banks' positions in interest rate swaps with fixed receipts and higher growth in loans with long maturities and fixed interest rates. As for the average remaining maturities of assets and liabilities, average remaining maturities for bonds have shortened somewhat, while those for loans have been more or less unchanged and those for interest rate swaps have lengthened only marginally.

Chart V-1-16: Average remaining maturity of assets and liabilities among financial institutions[1,2,3]
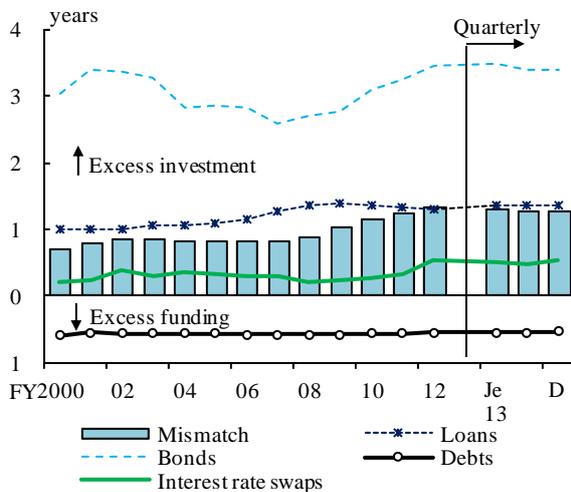
Notes: 1. Banks and *shinkin* banks are counted.
2. The mismatch is the difference between the average remaining maturity of assets and that of liabilities. The average remaining maturity of assets is the weighted average of loans, bonds, and interest rate swaps with interest receipts. The average remaining 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 that of those with interest payments.
3. The data exclude foreign currency-denominated assets and liabilities.

Source: BOJ.

Chart V-1-17: Average remaining maturity of assets and liabilities by type of bank[1]
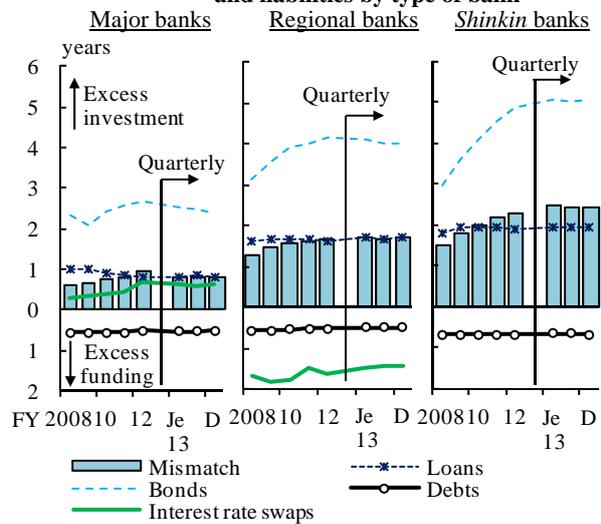
Note: 1. See Notes 2 and 3 in Chart V-1-16.
Source: BOJ.

Financial institutions have generally remained cautious about taking on additional interest rate risk since the beginning of spring 2013. Nonetheless, some institutions have continued to focus on taking on risks associated with interest rates to secure income from interest rate spreads. Looking at the relationship between the amount of interest rate risk and core profitability (the ratio of operating profits from core business to total assets), interest rate risk tends to increase when financial institutions' core profitability is low (Chart V-1-18). Financial institutions need to appropriately conduct risk management in accordance with their capital strength, comprehensively taking account of other risks such as credit risk and market risk associated with stockholdings.

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Chart V-1-18: Operating profit ROA from core business and interest rate risk among financial institutions[1,2]

Banks	*Shinkin* banks

ratio of interest rate risk on all assets and liabilities to Tier I capital, %

operating profit ROA from core business, percentile
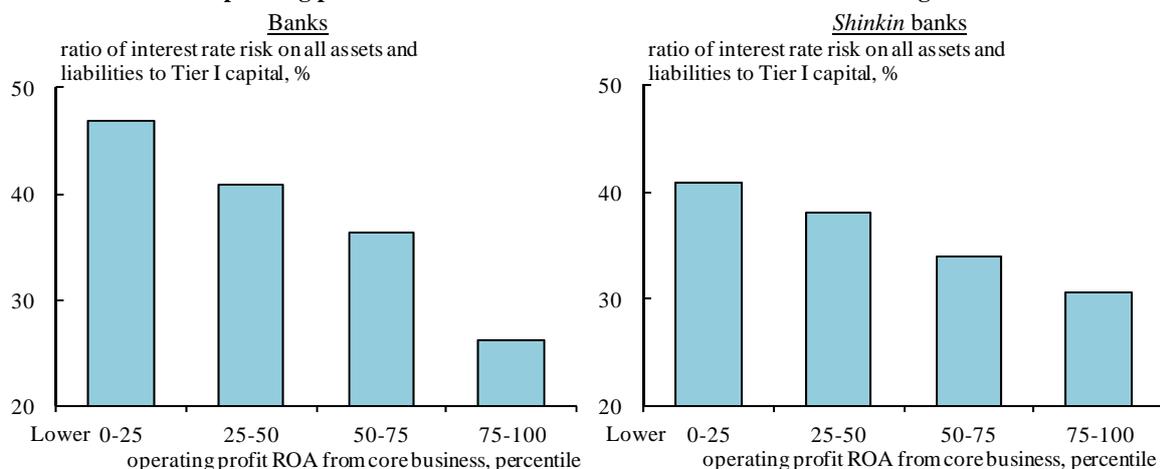
Notes: *1*. The data for interest rate risk are as of end-December 2013. Those for Tier I capital of banks are as of end-September 2013, and those for *shinkin* banks are as of end-March 2013. Operating profit ROA from core business is the average for the past 5 years.
   2. For details on interest rate risk, see Notes 2 and 3 in Chart V-1-14.
Source: BOJ.

Amount of interest rate risk associated with bond investment (100 basis point value)

As mentioned earlier, a wide range of financial institutions' assets and liabilities bear interest rate risk. Unrealized capital losses on bondholdings affect the disclosure of information on financial results, the calculation of the amount of distributable profits, and the calculation of capital adequacy ratios (in the case of internationally active banks).[21] Taking these factors into account, the amount of interest rate risk associated with bondholdings at financial institutions as a whole has continued to decrease. Under a parallel shift in the yield curve in which interest rates for all maturities increase by 1 percentage point, the amount of unrealized capital losses on bondholdings as of the end of December 2013 was 7.5 trillion yen for financial institutions as a whole: 2.6 trillion yen for major banks, 3.0 trillion yen for regional banks, and 1.9 trillion yen for *shinkin* banks (see the parallel shift scenario in Charts V-1-19 and V-1-20).[22] Under a steepening scenario in which long-term interest rates (10-year rates) rise by 1 percentage point and short-term interest rates do not rise significantly, the amount was 4.7 trillion yen for financial institutions as a whole: 1.3 trillion yen for major banks, 2.0 trillion yen for regional banks, and 1.4 trillion yen for *shinkin* banks (see the steepening scenario in Charts V-1-19 and V-1-20).

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[21] For details on the accounting standards for financial institutions' bondholdings, see Box 9 in the October 2012 issue of the *Report*.

[22] In Chart V-1-19, we did not take account of the effects of off-balance-sheet transactions in estimating changes in the market value of bond prices.

Chart V-1-19: Effects of a rise in interest rates on capital losses on bondholdings[1]

tril. yen

		Upward shift					
		End-June 2013			End-December 2013		
		1 % pt	2 % pts	3 % pts	1 % pt	2 % pts	3 % pts
Financial institutions	Steepening scenario	-4.9	-8.3	-11.9	-4.7	-8.0	-11.4
	Parallel shift scenario	-7.9	-13.9	-19.9	-7.5	-13.2	-19.0
Banks	Steepening scenario	-3.5	-5.9	-8.5	-3.3	-5.6	-8.1
	Parallel shift scenario	-6.0	-10.6	-15.3	-5.6	-10.0	-14.4
Major banks	Steepening scenario	-1.4	-2.4	-3.5	-1.3	-2.3	-3.3
	Parallel shift scenario	-2.9	-5.2	-7.5	-2.6	-4.7	-6.8
Regional banks	Steepening scenario	-2.1	-3.5	-5.0	-2.0	-3.3	-4.8
	Parallel shift scenario	-3.2	-5.5	-7.8	-3.0	-5.3	-7.7
Shinkin banks	Steepening scenario	-1.5	-2.4	-3.4	-1.4	-2.3	-3.3
	Parallel shift scenario	-1.9	-3.2	-4.6	-1.9	-3.2	-4.6

Note: *1*. The data exclude foreign currency-denominated bondholdings.

Source: BOJ.

Chart V-1-20: Assumptions for yield curve of rises in interest rates[1]
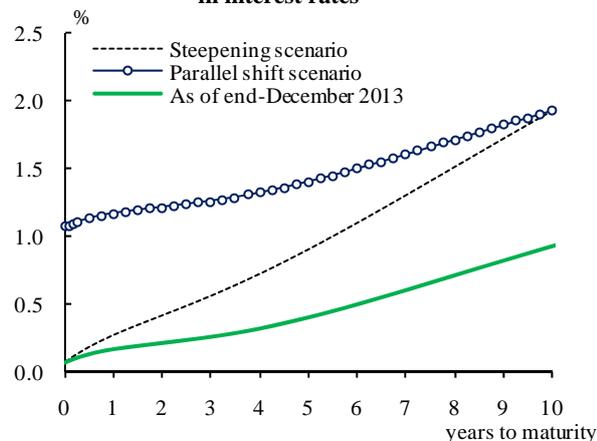
Note: *1*. A parallel shift scenario represents the situation in which yields on all maturities shift upward from the baseline by 1 percentage point. A steepening scenario represents the situation in which the 10-year interest rate shifts upward from the baseline by 1 percentage point.

Sources: Bloomberg; BOJ.

The amount of interest rate risk associated with bondholdings at financial institutions as a whole peaked at the end of fiscal 2012 and has been decreasing since the beginning of fiscal 2013 (Chart V-1-21).[23] By maturity, the risk amount has been more or less unchanged in the short-term maturity zone of 3 years or less, while it has clearly decreased in the medium- to long-term maturity zones of 3 years or more. The breakdown by type of bank shows that major banks have significantly reduced their bondholdings in the medium-term maturity zone of 3 to 5 years (Chart V-1-22). Regional and *shinkin* banks reduced their holdings of yen-denominated bonds with maturities of 5 to 10 years toward the end of September 2013, but their holdings recovered somewhat toward the end of December 2013, mainly for the purpose of acquiring security interest income.

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[23] The interest rate risk (the grid point sensitivity [GPS]) in Charts V-1-21 and V-1-22 indicates capital losses on bondholdings when interest rates of all maturities rise individually by 1 percentage point. The aggregate of GPS matches with 100 basis point value. The effects of off-balance-sheet transactions are not taken into account in the estimation of GPS.

Chart V-1-21: Interest rate risk associated with bondholdings among financial institutions[1,2]
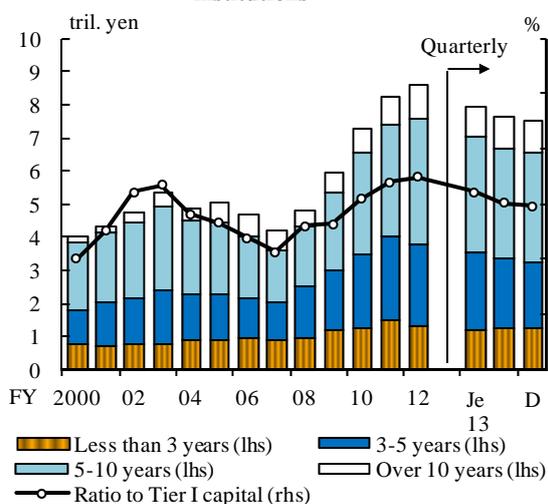
Notes: 1. Banks and *shinkin* banks are counted. Interest rate risk excludes risk associated with foreign currency-denominated bondholdings.
2. For details on the ratio to Tier I capital, see Note 4 in Chart V-1-14.
Source: BOJ.

Chart V-1-22: Interest rate risk associated with bondholdings by type of bank[1,2]
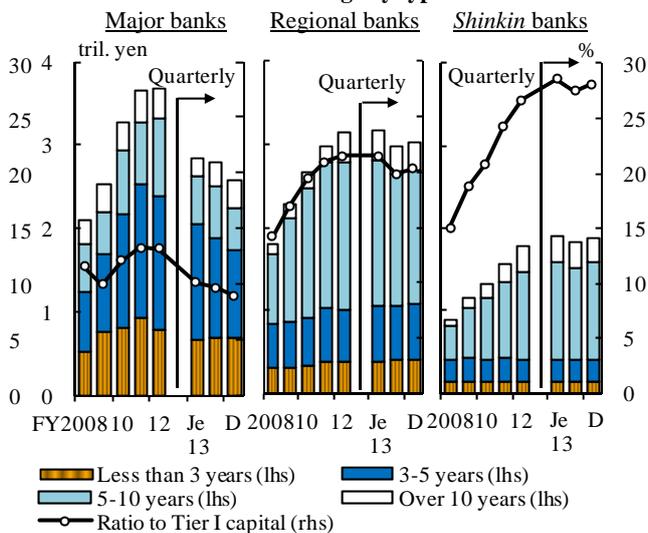
Notes: 1. Interest rate risk excludes risk associated with foreign currency-denominated bondholdings.
2. For details on the ratio to Tier I capital, see Note 4 in Chart V-1-14.
Source: BOJ.

3. Market risk associated with stockholdings

The amount of market risk associated with stockholdings (including stock investment trusts) increased between the end of June 2013 and the end of December 2013 (Chart V-1-23). This was mainly because the market value of total stocks held increased along with the rise in stock prices. The fact that a wider range of financial institutions have increased, albeit slightly, their investment in stock investment trusts for the purpose of earning investment gains also led to the increase in the amount of risk (Chart V-1-24). However, as financial institutions continued to reduce their stockholdings with the aim of maintaining business ties with firms (strategic stockholdings), their outstanding amount of stockholdings has remained more or less unchanged on a book value basis.

Chart V-1-23: Market risk associated with stockholdings among financial institutions[1,2,3,4]
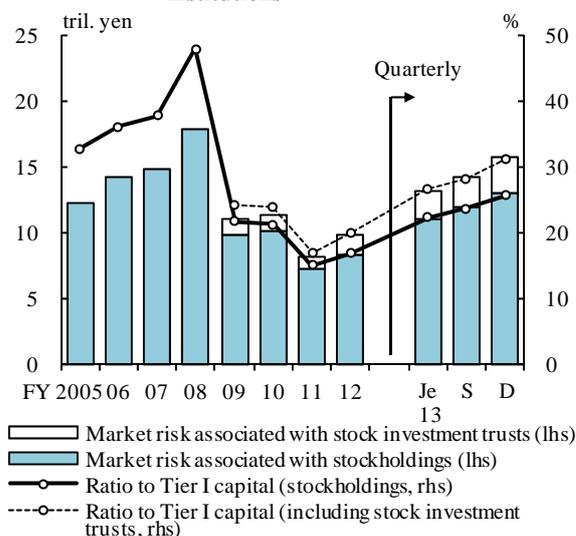
Notes: 1. Banks and *shinkin* banks are counted.
2. Market risk associated with stockholdings and stock investment trusts: value-at-risk with a 99 percent confidence level and 1-year holding period.
3. Market risk associated with stockholdings and stock investment trusts excludes risk associated with foreign currency-denominated stockholdings and stock investment trusts. The data for stock investment trusts before fiscal 2008 are excluded from the figures.
4. For details on the ratio to Tier I capital, see Note 4 in Chart V-1-14.
Source: BOJ.

Chart V-1-24: Outstanding holdings of stocks and stock investment trusts among financial institutions[1,2,3]
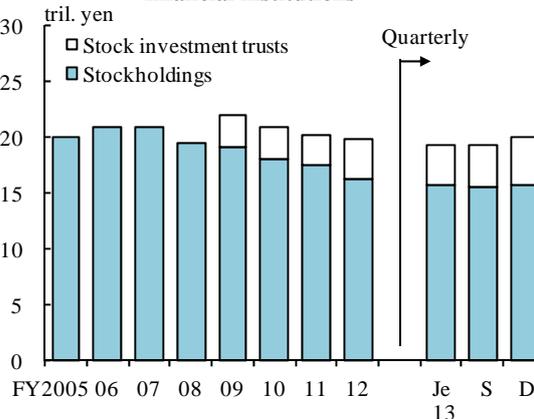
Notes: 1. Banks and *shinkin* banks are counted.
2. This chart is based on book value.
3. The data exclude foreign currency-denominated stockholdings and stock investment trusts. The data for stock investment trusts before fiscal 2008 are excluded from the figures.
Source: BOJ.

4. Bank capital

Bank capital adequacy ratios

Financial institutions' capital adequacy ratios as a whole have been rising recently, and both internationally active banks and domestic banks have ratios well 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) under the Basel III requirements rose in the first half of fiscal 2013 compared with the situation at the end of fiscal 2012, mainly due to a rise in retained earnings, and have continued to significantly exceed the regulatory levels (Chart V-1-25). At domestic banks, capital adequacy ratios and Tier I capital ratios have been increasing as a whole. By individual bank, capital adequacy ratios have improved at both regional and *shinkin* banks compared with the levels observed immediately after the Lehman shock (Chart V-1-26). The new regulatory requirements for domestic banks' capital adequacy ratios were

introduced at the end of March 2014, and sufficiently high capital adequacy ratios in light of regulatory requirements seem to be currently maintained at these banks. However, the phase-in arrangements being implemented until the shift to the new regulatory requirements is completed are scheduled to be gradually ended, and internationally active banks will be required to hold additional capital buffers.[24] In view of such scheduled events, each financial institution needs to appropriately manage its capital level through, for example, accumulating retained earnings.

Chart V-1-25: Capital adequacy ratios[1,2,3]
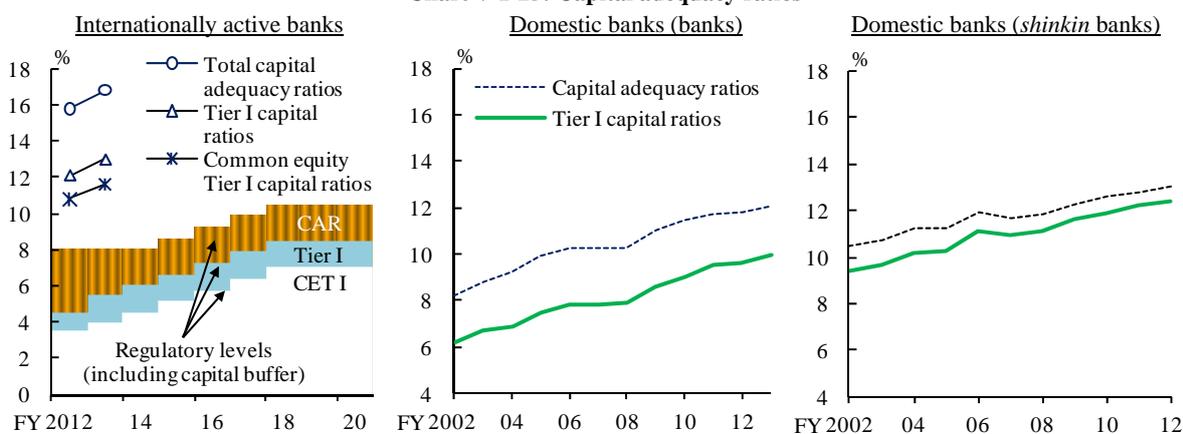
Notes: *1.* CAR indicates total capital adequacy ratios. The latest data for banks are as of end-September 2013, and those for *shinkin* banks are as of end-March 2013.
    2. Figures for internationally active banks and domestic banks are based on the Basel III requirements and the Basel II requirements, respectively. Data for banks are calculated on a consolidated basis.
    3. The data for internationally active banks take account of the phase-in arrangements.
Source: BOJ.

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[24] For example, the minimum regulatory level of the CET I capital ratio for internationally active banks was 4.0 percent as of the end of March 2014, but is scheduled to be raised to 4.5 percent by 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 100 percent of certain instruments, such as non-convertible preferred stocks and subordinated bonds, as an element of new core capital by 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 from core capital, and these assets will be subject to full deduction from the end of March 2019.

Chart V-1-26: Distribution of capital adequacy ratios of regional financial institutions

Regional banks (domestic banks)

Shinkin banks
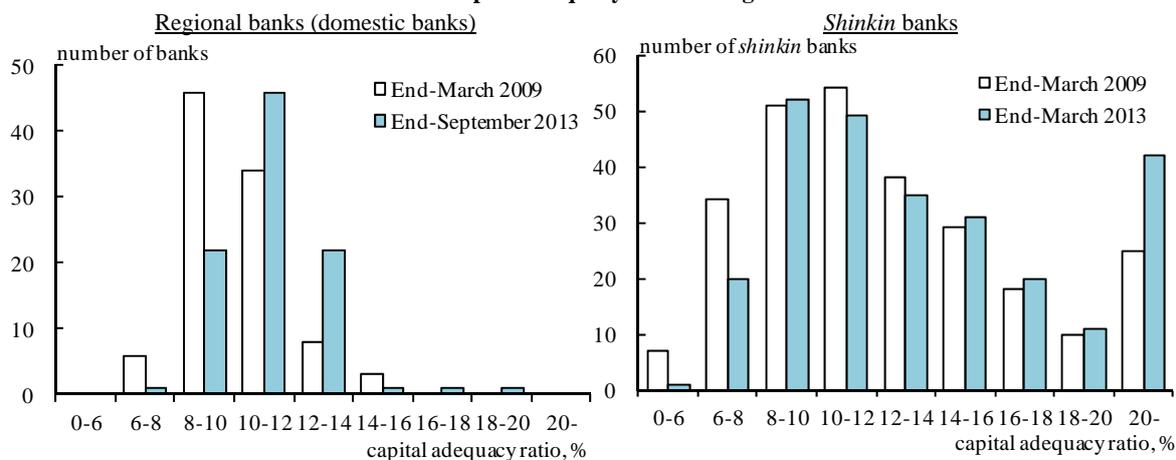
Source: BOJ.

Bank 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 risk amounts discussed in Sections 1 to 3. As mentioned earlier, capital held by these institutions has increased mainly due to the accumulation of retained earnings. While the amount of risk borne by financial institutions increased on the whole between the end of March 2013 and the end of September 2013, mainly reflecting the increase in market risk associated with stockholdings, its pace of increase has been almost consistent with the rate of capital growth (Charts V-1-27 and V-1-28).[25] Therefore, the ability of financial institutions to absorb losses and take on risks seems to remain high compared to the past.

Looking at bank capital adequacy relative to the amount of risk borne by individual financial institutions as of the end of September 2013, no major changes have been observed since the end of March 2013 (Chart V-1-29). Many banks have improved their levels of capital relative to the amount of risk they bear compared to those seen immediately after the Lehman shock, although no major changes have been observed in capital levels among *shinkin* banks. The ability to take on risks seems to have increased at individual financial institutions compared to several years ago. Nevertheless, there are still some financial institutions with low levels of bank capital adequacy relative to the amount of risk they bear, and these institutions need to steadily strengthen their

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[25] In Charts V-1-27 and V-1-28, we took account of some foreign currency-denominated assets and liabilities in calculating the amount of risk borne by major banks. Common methods and parameters (such as the confidence level and the holding period) were 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.

capital.

Chart V-1-27: Risks and Tier I capital among financial institutions[1,2,3,4]

tril. yen

Credit risk
Market risk associated with stockholdings
Interest rate risk
Operational risk
Tier I capital
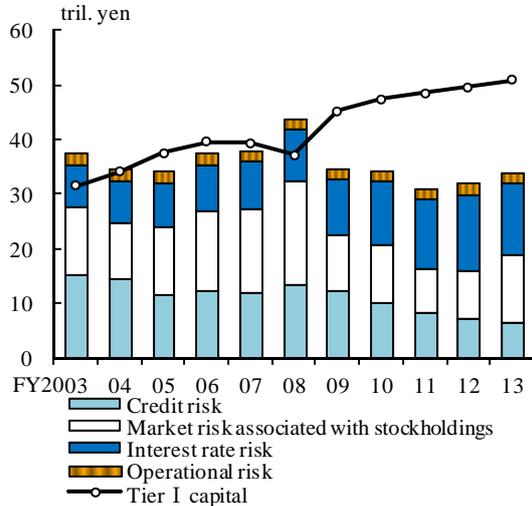
Chart V-1-28: Risks and Tier I capital by type of bank[1,2,3,4]

Major banks   Regional banks   *Shinkin* banks
tril. yen   tril. yen   tril. yen

Credit risk
Market risk associated with stockholdings
Interest rate risk
Operational risk
Tier I capital
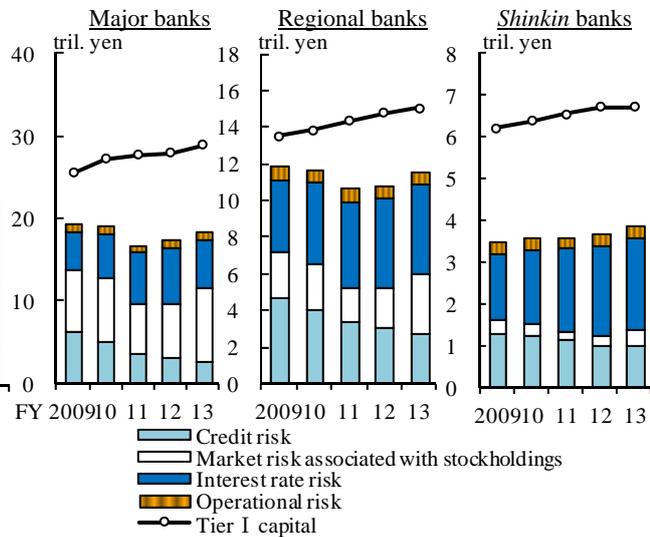
Notes: *1*. Banks and *shinkin* banks are counted in Chart V-1-27. The latest data are as of end-September 2013.
  2. Credit risk: unexpected losses with a 99 percent confidence level. Market risk associated with stockholdings: value-at-risk with a 99 percent confidence level and 1-year holding period. Interest rate risk: 100 basis point value. Operational risk: 15 percent of gross profits. For banks, off-balance-sheet transactions (interest rate swaps) are included.
  3. For *shinkin* banks, figures for Tier I capital and credit risk in fiscal 2013 are assumed to be unchanged from the levels of end-March 2013, and figures for gross profits in fiscal 2013 are assumed to be unchanged from fiscal 2012.
  4. Market risk associated with stock investment trusts is excluded from that associated with stockholdings. Credit risk includes risk associated with foreign currency-denominated assets. Market risk associated with stockholdings and interest rate risk (on-balance-sheet transactions) at major banks include risk associated with foreign currency-denominated assets.
Source: BOJ.

Chart V-1-29: Distribution of risks to Tier I capital among financial institutions[1,2,3,4]

Banks   *Shinkin* banks

ratio of banks, %

End-March 2009
End-March 2013
End-September 2013

Higher risks

ratio to Tier I capital, %

ratio of *shinkin* banks, %

Higher risks

ratio to Tier I capital, %
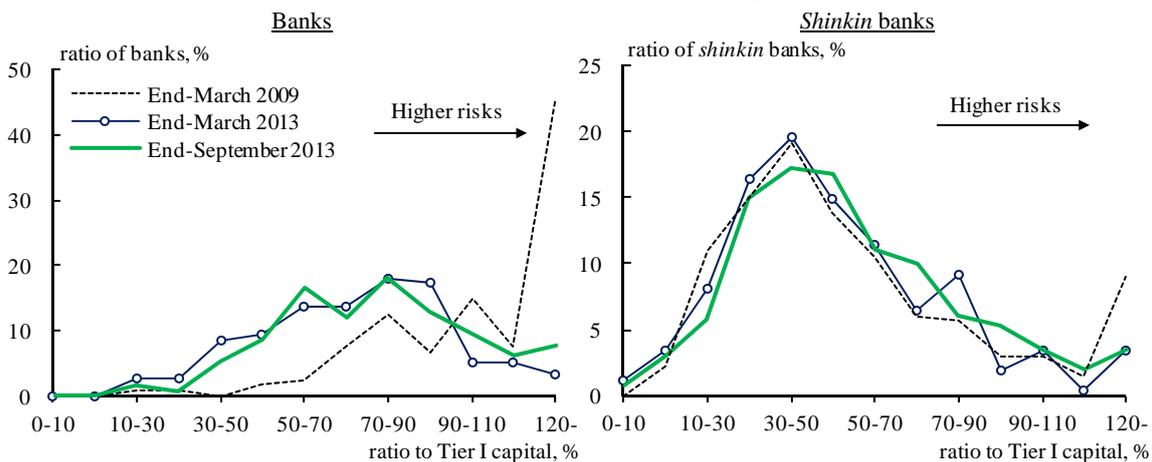
Notes: *1*. Credit risk: unexpected losses with a 99 percent confidence level. Market risk associated with stockholdings: value-at-risk with a 99 percent confidence level and 1-year holding period. Interest rate risk: 100 basis point value. For banks, off-balance-sheet transactions (interest rate swaps) are included.
  2. For *shinkin* banks, figures for Tier I capital and credit risk in the first half of fiscal 2013 are assumed to be unchanged from the levels of end-March 2013.
  3. Market risk associated with stock investment trusts is included in that associated with stockholdings. Credit risk includes risk associated with foreign currency-denominated assets. Market risk associated with stockholdings and interest risk exclude risk associated with foreign currency-denominated assets and liabilities.
  4. The horizontal axes indicate the ratio of the sum of credit risk, interest rate risk, and market risk associated with stockholdings to Tier I capital.
Source: BOJ.

5. Profitability

Developments in bank profitability

The recent economic recovery and active financial intermediation have had positive effects on the profits of financial institutions. Financial institutions' profits (net income) increased in the first half of fiscal 2013 at major and regional banks, mainly due to an increase in gains on stockholdings, an increase in fees and commissions from sales of investment trusts, and a reduction in costs related to credit extension (or an increase in reversals of provisions for loan losses) (Chart V-1-30). However, core profitability (the ratio of operating profits from core business to total assets) has remained on a downtrend against the backdrop of ongoing narrowing of interest rate spreads on domestic loans and expansion of the deposit surplus (Charts III-4-12, V-1-31, and V-1-32). Business conditions among regional financial institutions, whose business operations relating to deposits and loans are conducted mainly in Japan, are particularly severe. Operating profits from core business include gains on the redemption of stock investment trusts, which are essentially stock investment profits, and attention should be paid to the fact that operating profits from core business have been boosted by the inclusion of gains on the redemption of stock investment trusts.[26]
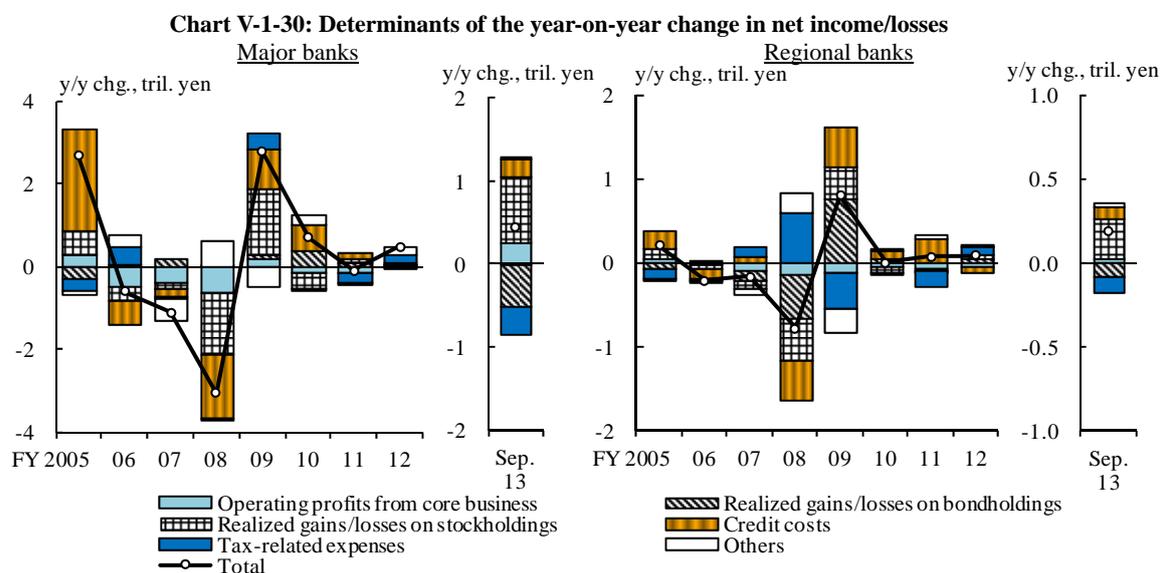
Chart V-1-30: Determinants of the year-on-year change in net income/losses

Source: BOJ.

A decline in core profitability does not immediately affect the stability or functioning of the overall financial system. Nonetheless, it may constrain financial institutions' ability to absorb losses and take on risks in the medium to long term, in that institutions may

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[26] Regarding determinants in Chart V-1-32, gains on the redemption of stock investment trusts are included in "interest and dividends from securities."

record losses due to bankruptcies of large-lot borrowing firms and realized losses on securities holdings. Thus, financial institutions are expected to increase and ensure their profitability.

Chart V-1-31: Operating profit ROA from core business[1]
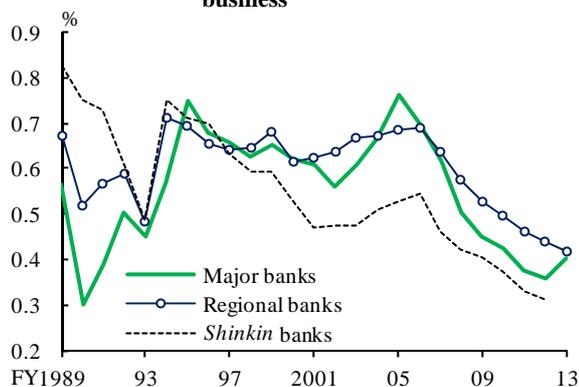
Note: 1. The latest data for major banks and regional banks are as of the first half of fiscal 2013 (annualized), and those for *shinkin* banks are as of fiscal 2012. Domestic business sector.
Source: BOJ.

Chart V-1-32: Determinants of operating profit ROA from core business[1]

Major banks   Regional banks   *Shinkin* banks

Loan interest rate spread factor | Loan-deposit gap factor | Interest and dividends from securities
Other net interest income | Personnel expenses | Non-personnel expenses
Net non-interest income | Operating profit ROA from core business
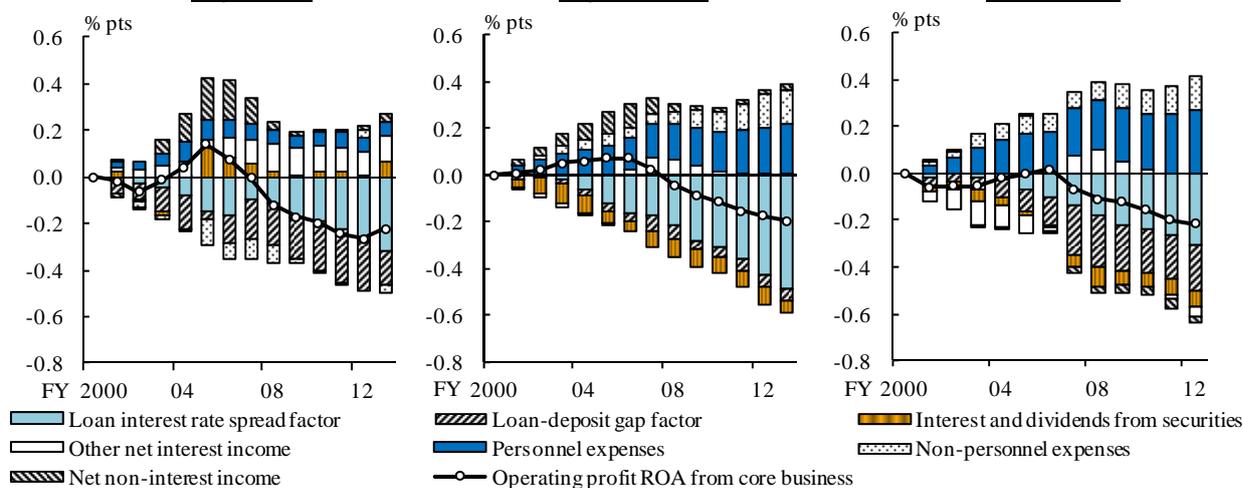
Note: 1. The figures represent cumulative changes from fiscal 2000. The latest data for major banks and regional banks are as of the first half of fiscal 2013 (annualized), and those for *shinkin* banks are as of fiscal 2012. Domestic business sector.
Source: BOJ.

Profitability of regional banks

We have raised the decline in the overall profitability of financial institutions as one of the challenges facing Japan's financial system in past issues of the *Report*. However, some institutions have achieved relatively high profitability in spite of recent financial conditions. In this section, we summarize the differences observed in profitability

among regional banks and factors behind these differences. Specifically, we use regional banks' ratio of operating profits from core business to total assets in fiscal 2012 as a measure of their profitability. We define institutions in the top 10 percent as the "high profit group" and those in the lowest 10 percent as the "low profit group," and compare developments in the profitability of these two groups.

In terms of the ratio of operating profits from core business to total assets, the gap between the high profit group and the low profit group has continued to expand since around 1997 (Chart V-1-33). Several factors have contributed to the widening gap between these two groups. Factor decomposition shows that differences in interest rate spreads on loans, gains on securities holdings, and net non-interest income were contributing factors from the early 2000s, but the difference in interest rate spreads on loans has become particularly pronounced since around 2007 (Chart V-1-34).

Chart V-1-33: Operating profit ROA from core business of regional banks[1,2,3]
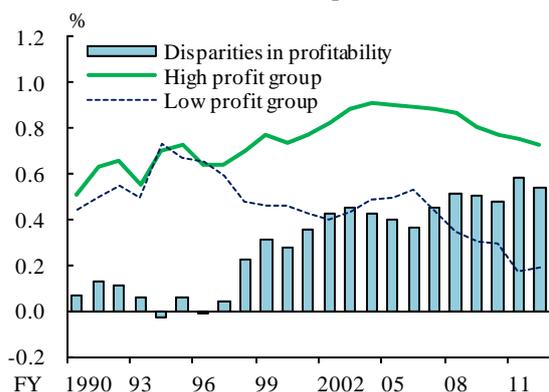
Notes: 1. Regional banks that have not merged with other banks are counted.
2. High profit group and low profit group are composed of regional banks with operating profit ROA from core business in the top 10th percentile range and the bottom 10th percentile range among regional banks in fiscal 2012, respectively.
3. Disparities in profitability represent the difference between operating profit ROA from core business among high profit group and that among low profit group.
Source: BOJ.

Chart V-1-34: Determinants of disparities in operating profit ROA from core business[1,2]
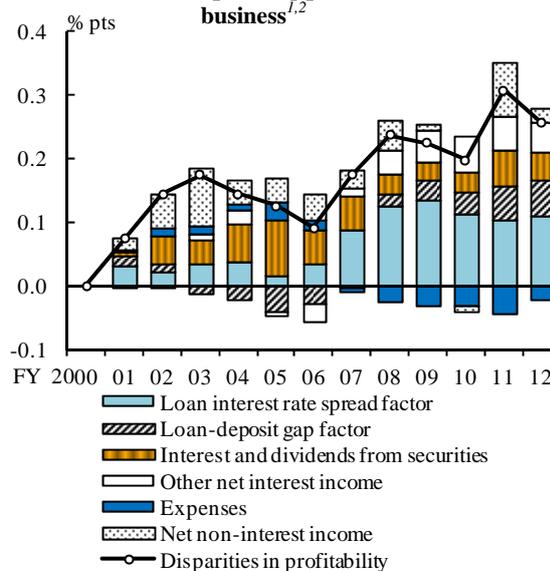
Notes: 1. Regional banks that have not merged with other banks are counted.
2. The figures represent cumulative changes from fiscal 2000. For details on the disparities in profitability, see Notes 2 and 3 in Chart V-1-33.
Source: BOJ.

Looking at developments in loans by borrowing firm, as for the high profit group, the increase in loans to small and medium-sized firms has significantly contributed to the increase in total loans since the middle of the 2000s, and loans to individuals have also continued to grow (Chart V-1-35). Regarding the low profit group, loans to small and medium-sized firms have been sluggish, and loans to individuals have been restrained

since the middle of the 2000s. It is also notable that loans extended to local governments by financial institutions in the low profit group have shown significant growth. Moreover, the breakdown of corporate loans by industry shows that while the high profit group experienced relatively high growth in loans to a wide range of industries around the middle of the 2000s, the growth of loans, especially to the real estate industry, among the high profit group has exceeded that among the low profit group in recent years (Chart V-1-36).

Chart V-1-35: Loans outstanding by sector[1]
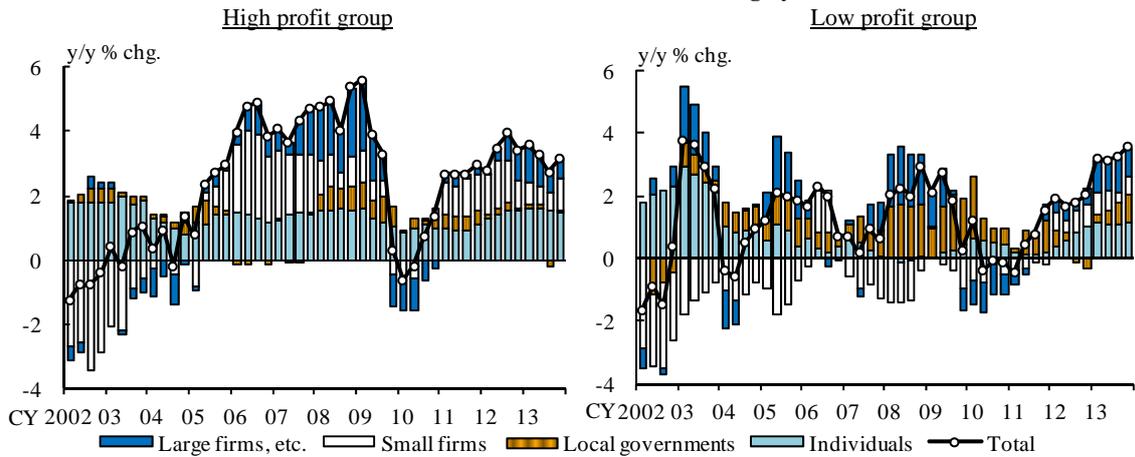
Note: 1. The latest data are as of end-December 2013. See Notes 1 and 2 in Chart V-1-33. Figures include loans to the finance and insurance industries.
Source: BOJ.

Chart V-1-36: Corporate loans outstanding by industry[1]
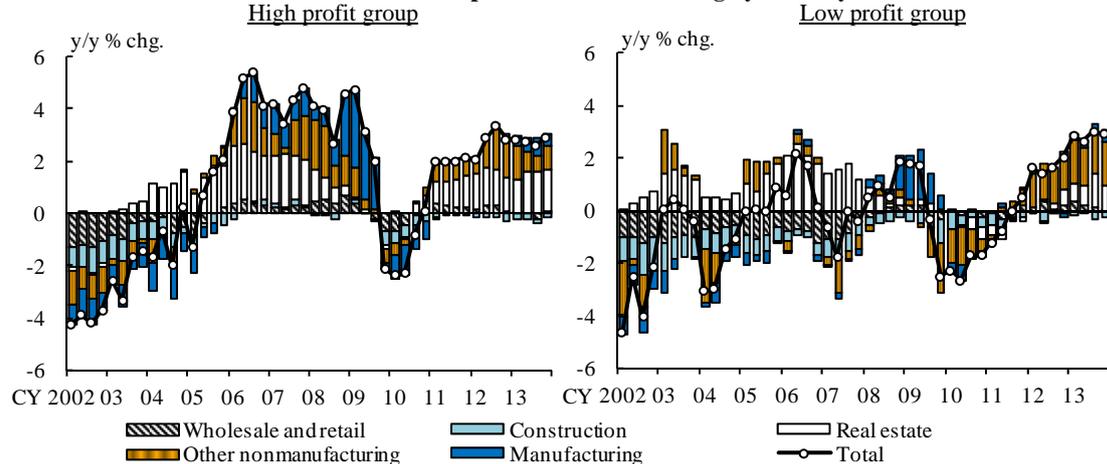
Note: 1. The latest data are as of end-December 2013. See Notes 1 and 2 in Chart V-1-33. Figures include loans to the finance and insurance industries.
Source: BOJ.

Looking at the financial conditions of the two groups, capital adequacy ratios in the high profit group are higher than those in the low profit group, and the gap has widened in the past few years (Chart V-1-37). As for credit cost ratios, no major differences have

recently been observed between the two groups, although a gap sometimes existed in the past (Chart V-1-38). The above evidence suggests that some regional banks have maintained relatively high levels of profitability by appropriately managing risks and increasing loans based on adequate financial bases.

Chart V-1-37: Capital adequacy ratio of regional banks[1]
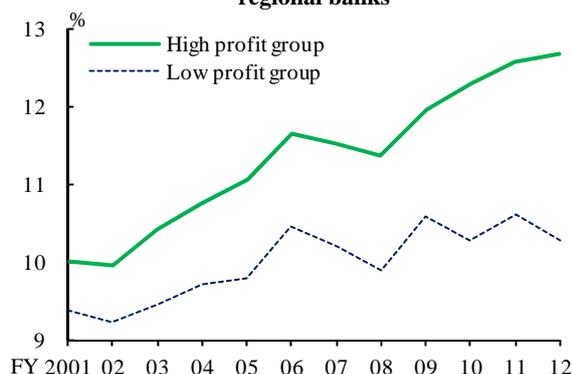
Chart V-1-38: Credit cost ratio of regional banks[1]

Note: *1*. See Notes 1 and 2 in Chart V-1-33.
Source: BOJ.
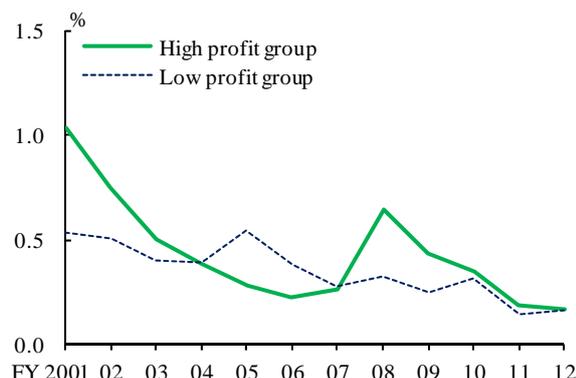
Note: *1*. See Notes 1 and 2 in Chart V-1-33.
Source: BOJ.

Effects of an increase in regional banks' loans outside their home regions

Next, we analyze the impact of regional banks' accumulation of loans outside their home regions on their profitability and quality of assets, as well as its effects on other financial institutions.[27] In recent years, as many regional banks have faced severe business conditions in their home regions and have seen a large deposit surplus, they have proceeded to increase loans outside their home regions to expand and ensure their lending volumes (Chart V-1-39). In fact, the share of loans extended by incoming banks from other regions has increased in many parts of Japan, especially in metropolitan areas (Chart V-1-40).

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[27] Loans outside financial institutions' home regions refer to loans extended outside the prefectures where their head offices are located.

Chart V-1-39: Share of regional banks' loans outside their home regions[1]
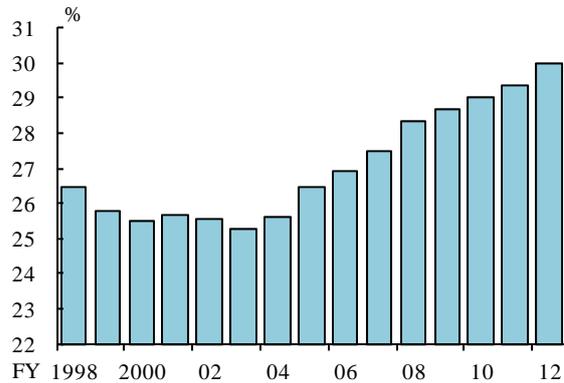
Note: *1*. The figures represent banks' loans outside the prefectures where their head offices are located as a share of their total loans.
Source: BOJ.

Chart V-1-40: Changes in the share of regional banks' loans outside their home regions by region[1,2,3]
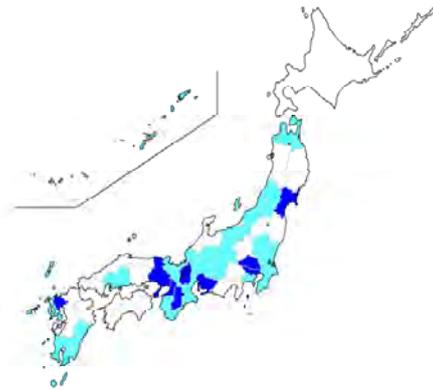
Notes: *1*. Regional banks are counted.
2. The darkest shaded areas indicate where the share of regional banks' loans outside their home regions increased by more than 2 percentage points. The lighter shaded areas indicate where the share increased by 0-2 percentage points. The areas in white indicate where the share decreased. For details on the ratio of loans outside home regions, see Note in Chart V-1-39.
3. The data represent changes from fiscal 2007 to fiscal 2012.
Source: BOJ.

There are two major points to note here. First, an increase in loans outside financial institutions' home regions has not necessarily led to improvement in their profitability on the whole in terms of the ratio of operating profits from core business to total assets. Looking at the relationship between the ratio of loans outside financial institutions' home regions (loans extended outside financial institutions' home regions as a proportion of their total loans) and the ratio of operating profits from core business to total assets using micro data on individual financial institutions, these ratios do not have a statistically significant correlation (Chart V-1-41). This is because interest rates on regional banks' loans offered outside their home regions are lower than those offered at home (Chart V-1-42). This suggests that financial institutions that extend loans outside their home regions are offering low interest rates to expand their customer bases. In addition, interest rate spreads on loans also seem to be constrained by the fact that these institutions have a strong tendency to extend most of such loans to firms with relatively high creditworthiness when increasing their loans outside their home regions (Chart V-1-43).

Chart V-1-41: Relationship between ratio of loans outside home regions and profitability[1,2,3]

change in operating profit ROA from core business, % pts

y = 0.003x - 0.18
(0.52)
R² = 0.00

change in share of loans outside home regions, % pts
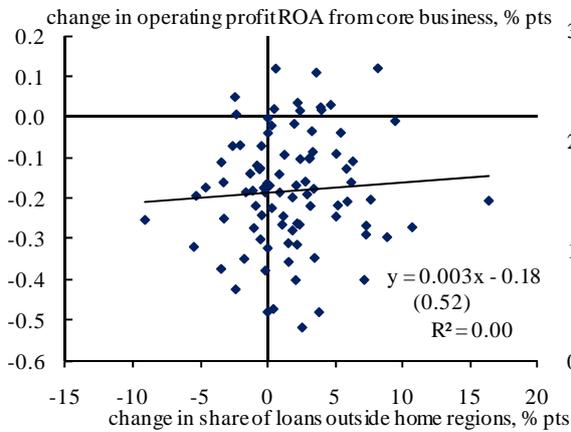
Notes: 1. Regional banks that have not merged with other banks are counted. Domestic business sector.
2. The data represent changes from fiscal 2007 to fiscal 2012.
3. The figure in parentheses is a p-value.
Sources: Kinyu Journal, "Kinyu map"; BOJ.

Chart V-1-42: Regional banks' loan interest rates inside and outside their home regions[1]
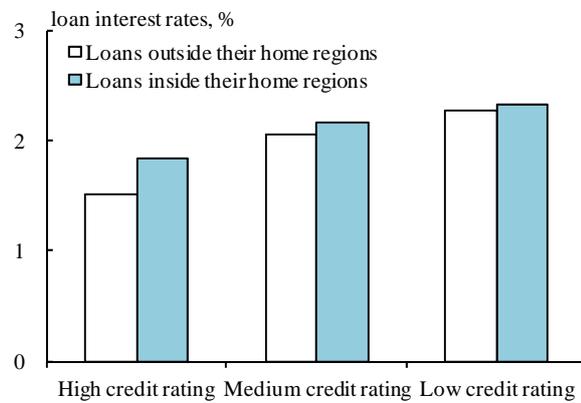
loan interest rates, %

☐ Loans outside their home regions
☐ Loans inside their home regions

High credit rating   Medium credit rating   Low credit rating

Note: 1. The data are as of fiscal 2012. The top 15 regional banks that increased branches outside their home regions as a share of their total number of branches from fiscal 2004 to fiscal 2011 are counted. Banks that have merged with other banks are excluded.
Source: Teikoku Databank, "SPECIA."

Second, financial institutions that need to compete with incoming banks from other regions may see a decline in their share of good borrowing firms, resulting in increased credit risk. In fact, data such as the ratio of normal loans to total loans show that *shinkin* banks that need to compete with incoming banks have fallen behind other types of bank in improving their loan asset quality (Charts V-1-44 and V-1-7).

Chart V-1-43: Loans outside home regions and credit ratings for borrowing firms[1]
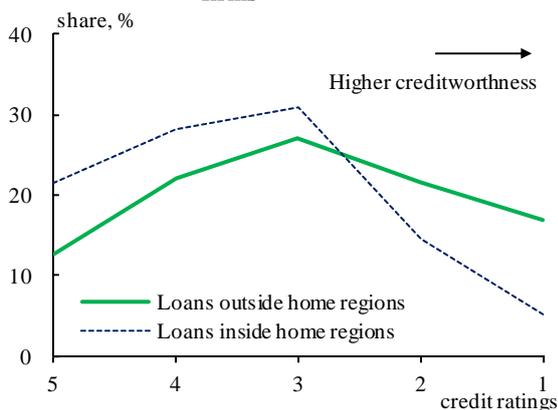
share, %

Higher creditworthiness

—— Loans outside home regions
- - - Loans inside home regions

credit ratings

Note: 1. The data are as of fiscal 2012. The top 15 regional banks that increased branches outside their home regions as a share of their total number of branches from fiscal 2004 to fiscal 2011 are counted. Banks that have merged with other banks are excluded.
Source: Teikoku Databank, "SPECIA."

Chart V-1-44: Ratio of "normal" loans outstanding among *shinkin* banks[1,2]

Metropolitan areas   Local areas

%

☐ 10th-90th percentile range
—○— Median

FY 2005 07 09 11   2005 07 09 11
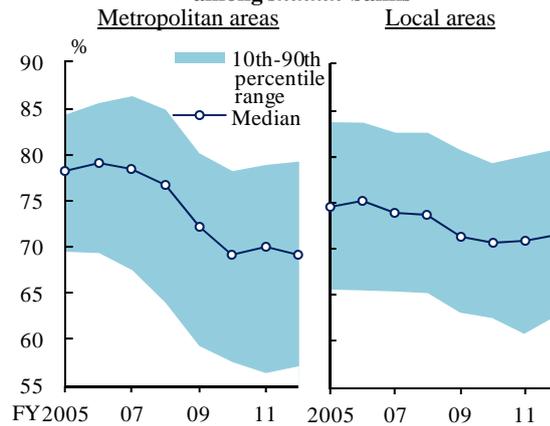
Notes: 1. "Metropolitan areas" comprise Tokyo, Osaka and Aichi prefecture. "Local areas" comprise other prefectures. Banks are grouped based on the prefectures where their head offices are located.
2. The latest data are as of end-March 2013.
Source: BOJ.

The increase in regional banks' loans outside their home regions makes borrowing firms' funding conditions more accommodative, but it might also lead to intensification of competition in extending loans. In these circumstances, it is necessary for both financial institutions that extend loans outside their home regions and that need to compete with incoming banks to conduct their business operations by taking full account of the balance between interest rate spreads on loans and the amount of credit risk, and at the same time, appropriately assess their asset quality and profitability.

6. Funding liquidity

Financial institutions have sufficient funding liquidity in yen funds. This is because deposits have continued to grow at a faster pace than that of loans, and financial institutions have mainly invested in highly liquid securities. The recent funding environment indicates that yen deposits continue to be on a rising trend, and market funding conditions -- in terms of banks' corporate bonds and CP -- have remained favorable (see Box 1 for the effects of future demographic changes on household deposits constituting an element of financial institutions' yen deposits).

Foreign-currency funding depends to a large extent on market funding instruments such as repos, certificates of deposit (CDs), and foreign exchange swaps and currency swaps, while foreign-currency investment is concentrated in investment in foreign bonds with longer maturities and overseas loans (Chart V-1-45). Thus, gauging market funding conditions is vital in assessing funding liquidity risk. Foreign-currency funding conditions for Japan's banks have generally been stable, as their credit ratings have remained high on the whole relative to those of foreign financial institutions. Major banks have expanded their funding sources and lengthened the maturities of foreign-currency funding instruments, mainly in the foreign exchange swap and currency swap markets, and the amount of foreign currency-denominated corporate bonds issued has increased steadily over the past few years, reflecting the active stance of major banks in such issuance (Chart V-1-46). Such efforts financial institutions have made to lengthen the maturities of foreign-currency funding instruments have also enhanced the stability in funding of foreign currencies. However, Japan's banks are still susceptible to market funding conditions as they have expanded their overseas loans and investment in foreign securities, and they need to continue to ensure that they retain stable funding sources.

Chart V-1-45: Foreign currency funding and investment among banks[1]
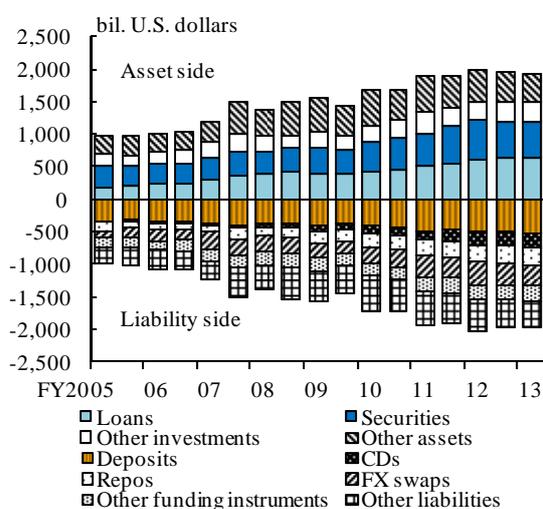
Note: 1. Major banks and regional banks are counted. The latest data are as of end-September 2013.
Source: BOJ.

Chart V-1-46: Issuance of foreign currency-denominated corporate bonds by major banks[1]
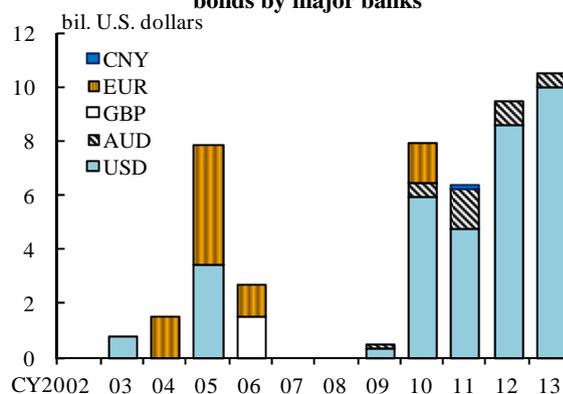
Note: 1. The chart shows the sum of straight bonds denominated in foreign currency and convertible bonds denominated in foreign currency. Issuance amounts are converted into dollar amounts using the exchange rate on the issuance date.
Source: I-N Information Systems.

Box 1: Demographic changes and household deposits

The growth rate in the amount of yen deposits has recently increased due to continued fund inflows into yen deposits in all types of bank (Chart B1-1). However, from a medium- to long-term perspective, household deposits -- which account for a large proportion of yen deposits -- are expected to be depressed by demographic changes.

In this box, we evaluate the impacts of demographic changes on household deposits by categorizing such changes into the following three factors: (1) changes in the number of households; (2) changes in the household size (e.g., a rise in the ratio of one-person households to total households); and (3) changes in the age structure of household heads (e.g., a rise in the ratio of elderly household heads to total household heads). We then estimate the effects of these factors on household deposits. We analyze household deposits based on the number of households rather than based on population data because the "National survey of family income and expenditure," which provides deposit data by attribute such as age group, uses households as the data unit. Looking at the data by attribute, the amount of deposits per household, for example, is smaller for one-person households than for multi-person households across all age groups, with the gap remaining small until the household heads are in their 40s, but the gap gradually widens when the household heads are over 50 years of age (Chart B1-2). The amount of deposits increases as the household heads become older, regardless of whether it is a one-person household or a multi-person household. However, when the household

heads are over 60 years of age, growth in the amount of deposits levels off. As the amount of deposits varies significantly with household attributes, the overall amount of household deposits outstanding is affected not only by changes in the number of households (the first factor described above), but also by changes in household attribute composition ratios such as the one-person households to total households ratio and the elderly household heads to total household heads ratio (the second and third factors described above).

Chart B1-1: Outstanding amount of deposits by type of bank[1,2]
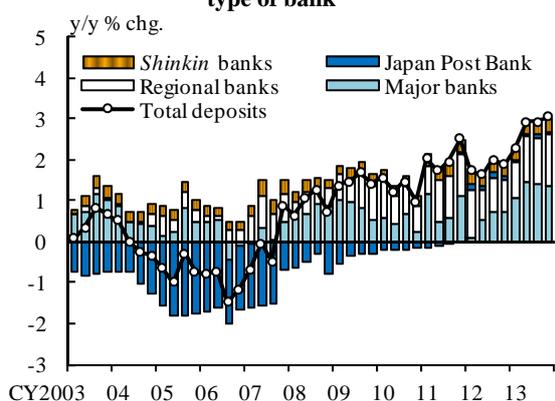
Notes: *1*. The latest data are as of end-December 2013.
     2. Transfer deposits are excluded from "Japan Post Bank" figures until September 2007.
Sources: Japan Post Bank; Japan Post Holdings; BOJ.

Chart B1-2: Amount of household deposits by age group of household heads[1]
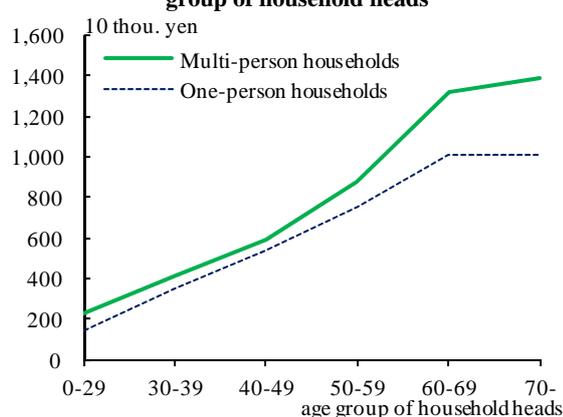
Note: *1*. The data used for this chart are calculated based on the "National survey of family income and expenditure" of 2009 and the "Population census" of 2010.
Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure," "Population census."

Looking at developments in household deposits by explicitly taking account of the impacts of demographic changes to date, a decline in the household size has reduced the amount of household deposits, while an increase in the number of households and a rise in the ratio of elderly household heads to total household heads have boosted household deposits (Chart B1-3).[28] As a result, demographic changes including these three factors

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[28] The determinants in Chart B1-3 are calculated based on the left-hand column in the table shown below. Each term in the equation corresponds to factors shown in the right-hand column of the table ([1] number of households factor; [2] household size factor; [3] age structure of household head factor; and [4] per capita deposits factor). $\sum$ indicates the sum of household heads in age group *i*.

have contributed to an increase in household deposits as a whole.

Based on certain assumptions, our estimation process indicates that the number of households will start declining from the beginning of the 2020s, and that the pace of decline will accelerate thereafter. As a result, demographic changes will cause overall household deposits to decline during the late 2020s (Charts B1-4 and B1-3).[29,30]

The impacts of demographic changes on household deposits differ substantially among regions. In nonmetropolitan areas, because the ratio of elderly household heads to total household heads has already reached a relatively high level compared with the ratio in metropolitan areas, changes in the age structure of household heads are unlikely to exert additional upward pressure on household deposits. Moreover, the number of households in nonmetropolitan areas will start to decline at an earlier stage than in metropolitan areas, and the pace of decline will accelerate over time. Thus, while the impacts of demographic changes are not expected to exert any downward pressure on household

Total amount of deposits = number of households	: (1)
*∑{number of one-person households / total number of households	: (2)
* number of one-person households with household heads in age group *i* / total number of one-person households	: (3)
* amount of deposits per one-person household with the household head in age group *i*	: (4)
+ (1 - number of one-person households / total number of households)	: (2)
* number of multi-person households with household heads in age group *i* / total number of multi-person households	: (3)
* average household size in multi-person households with household heads in age group *i*	: (2)
* per capita deposits in multi-person households with household heads in age group *i*}	: (4)

[29] In Charts B1-3 and B1-5, we assume that the amount of deposits per one-person household and per capita deposits in multi-person households remain the same in all age groups from 2010. The estimation shows that the "number of households factor" will reduce household deposits through a decline in the number of households. However, if the number of households declines with the death of household heads and Japanese residents inherit part of these household heads' deposits, it is assumed that the effects of the "per capita deposits factor" will increase and partly offset the downward pressure exerted by the "number of households factor." In contrast, if further aging population increases the number of households with elderly household heads who spend their savings, the decline in the "per capita deposits factor" will reduce the amount of household deposits. Therefore, a decline in the number of households or the further aging population might affect the amount of household deposits through the effects of factors other than the three described above. In addition, the "per capita deposits factor" might affect household deposits depending on macroeconomic developments and the financial environment. Thus, the estimation results should be interpreted with some latitude.

[30] As shown in Chart B1-4, although the population has already started declining in Japan, the number of households is expected to continue increasing until the 2010s because the number of one-person households will increase, particularly among the elderly.

deposits in metropolitan areas for the time being, they are expected to gradually exert downward pressure on such deposits in nonmetropolitan areas (Chart B1-5).[31]

Chart B1-3: Determinants of household deposits[1,2,3,4]
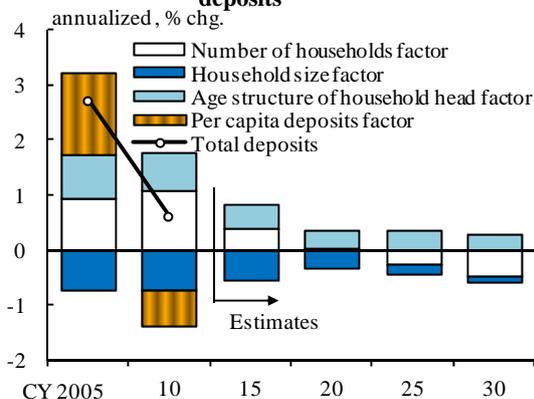
Notes: 1. The vertical axis shows annualized growth for the 5 years.
2. For details of the determinants, see Footnote 28.
3. The household size of multi-person households in the estimation period is estimated by the BOJ.
4. The amount of deposits per one-person household and per capita deposits in multi-person households in 2005 and 2010 are calculated using "National survey of family income and expenditure" of 2004 and 2009, respectively. Those figure after 2010 are assumed to be unchanged in all age groups.

Sources: Ministry of Internal Affairs and Communications, "National survey of family income and expenditure," "Population census"; National Institute of Population and Social Security Research, "Household projection for Japan"; BOJ.

Chart B1-4: Number of households
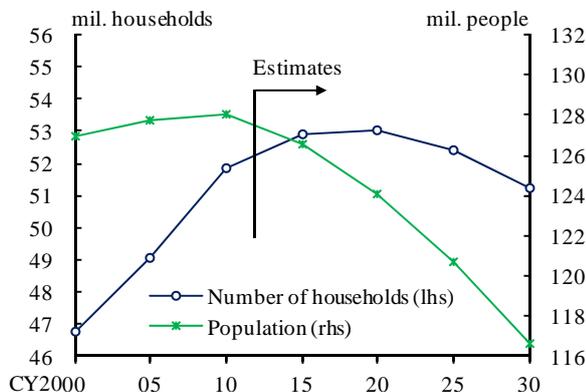
Sources: Ministry of Internal Affairs and Communications, "Population census," "Population estimates"; National Institute of Population and Social Security Research, "Household projection for Japan," "Population projection for Japan."

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[31] In nonmetropolitan areas, if the number of households declines with the death of household heads, and residents in these areas inherit the deposits of such household heads, the effects of the "per capita deposits factor" will increase and partly offset the downward pressure exerted by the "number of households factor." Nonetheless, if such deposits are inherited by residents living outside these areas, such inheritance will neither amplify the effects of the "per capita deposits factor" nor offset the downward pressure exerted by the "number of households factor." Therefore, if an increasing number of residents living outside nonmetropolitan areas inherit deposits against the backdrop of young people moving from nonmetropolitan to metropolitan areas, the effects of the "number of households factor" will not be offset, and might lead to a more marked decrease in the amount of household deposits.

**Chart B1-5: Demographic factors of
household deposits by area**[1,2]

Metropolitan areas   Nonmetropolitan areas

annualized, % chg.

☐ Number of households factor
■ Household size factor
■ Age structure of household head factor
─○─ Demographic factor
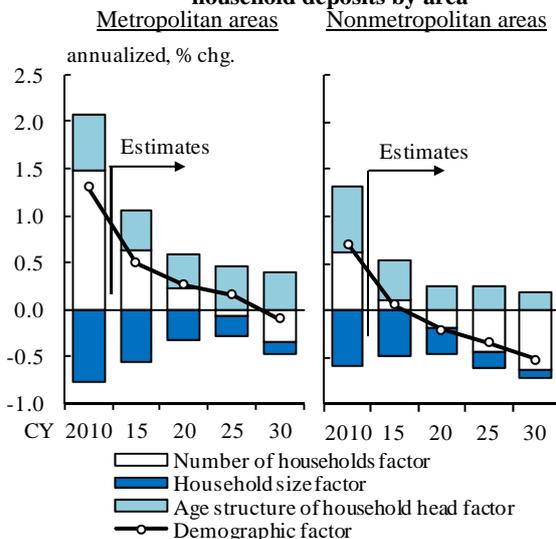
Notes: *1*. The data used for these charts are calculated in the
same manner as are those in Chart B1-3 using
metropolitan and nonmetropolitan area data.
"Demographic factor" consists of "number of
households factor," "age structure of household
head factor," and "household size factor." The
amount of deposits per one-person household and
the household size by age group for multi-person
households are assumed to be the same as for the
national data in Chart B1-3. The per capita
deposits in multi-person households in 2010 are
calculated using "National survey of family
income and expenditure" of 2009, and after 2010
are assumed to be unchanged in all age groups.
    2. Metropolitan areas consist of the Southern Kanto
region, the Tokai region, and the Kinki region.
Nonmetropolitan areas are those other than
metropolitan areas.

Sources: Ministry of Internal Affairs and Communications,
"National survey of family income and
expenditure," "Population census"; National
Institute of Population and Social Security Research,
"Household projection for Japan"; BOJ.

B. Financial intermediaries other than banks and *shinkin* banks

Business conditions among insurance companies and securities companies seem to have become more stable in terms of profitability and adequacy of capital bases. Insurance companies have enhanced their profitability with an improved income balance for insurance products, and have increased their solvency margin ratios. Securities companies have also improved their profits owing to robust sales of financial products, and have increased their capital adequacy ratios.

1. Insurance companies

The financial results of major life insurance companies for the first half of fiscal 2013 showed that solvency margin ratios rose further, as these companies increased their net income due mainly to an increase in interest and dividends on foreign currency-denominated assets, reflecting depreciation of the yen (Chart V-2-1). In addition, as the average yield guaranteed to insurance policyholders declined -- mainly because of a reduction in insurance product yields for new contracts and the accumulation of policy reserves -- negative spreads were resolved based on the aggregated data of nine major life insurance companies, although some still faced negative spreads (Chart V-2-2). Life insurance companies have continued to increase their investment in super-long-term JGBs in order to resolve the duration mismatch -- the extent to which the duration of liabilities exceeds that of assets (Charts V-2-3 and

V-2-4).

Chart V-2-1: Solvency margin ratio of life insurance companies[1]
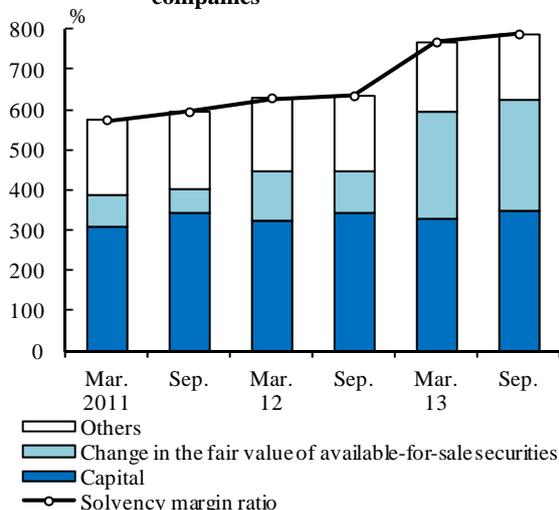
Note: 1. Data for the nine major life insurance companies are counted.
Sources: Published accounts of each life insurance company.

Chart V-2-2: Negative rate spread for life insurance companies[1]
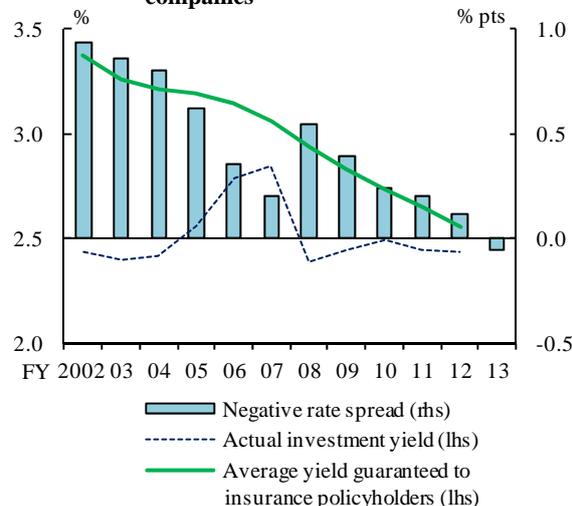
Note: 1. Data for the nine major life insurance companies are counted. The latest data are as of the first half of fiscal 2013 (annualized). Figures are weighted averages by their total asset size. The negative rate spread is the gap between the yield guaranteed to insurance policyholders and the actual investment yield.
Sources: Published accounts of each life insurance company.

Chart V-2-3: Duration mismatch at life insurance companies[1]
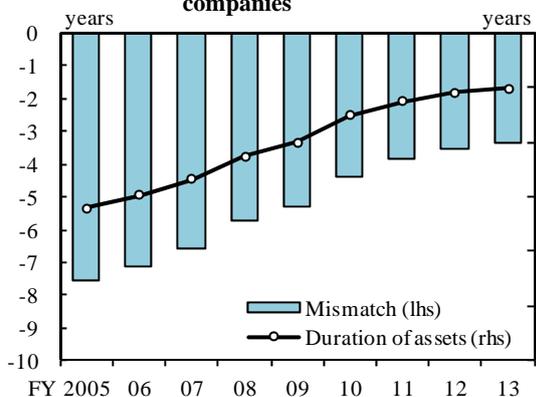
Note: 1. Data for the nine major life insurance companies are counted. The latest data are as of end-September 2013.
Sources: Japan Institute of Life Insurance, "Life insurance survey"; Ministry of Internal Affairs and Communications, "Population census"; National Institute of Population and Social Security Research, "Population projection for Japan"; Published accounts of each life insurance company; BOJ.

Chart V-2-4: JGB holdings of life insurance companies[1]

Note: 1. Data for the nine major life insurance companies are counted. The latest data are as of end-September 2013.
Sources: Published accounts of each life insurance company.

The financial results of major nonlife insurance companies for the first half of fiscal 2013 showed that solvency margin ratios rose, as these companies increased their net income mainly due to increased income from overseas subsidiaries and the improved

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income balance, reflecting the revision of premium rates for auto insurance. The combined ratio (the sum of the ratios of insurance payments to insurance premiums and operating expenses to insurance premiums), which indicates the profitability of nonlife insurance business, has also declined recently, indicating that business conditions among these companies have improved (Chart V-2-5). Nonlife insurance companies have proceeded to expand their overseas business operations, as overseas markets are expected to continue to exhibit high growth (Chart V-2-6).

Chart V-2-5: Combined ratio in nonlife insurance companies[1]
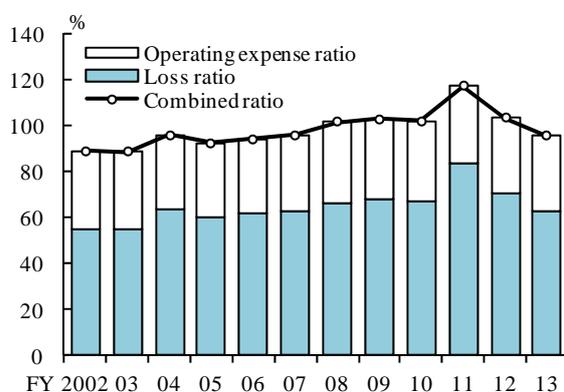
Note: *1*. The latest data are as of the first half of fiscal 2013. The "loss ratio" is the ratio of insurance losses to insurance premiums. The "operating expense ratio" is the ratio of operating expenses to insurance premiums.

Source: General Insurance Association of Japan.

Chart V-2-6: Ratio of overseas subsidiaries' premiums to total premiums in nonlife insurance companies[1]
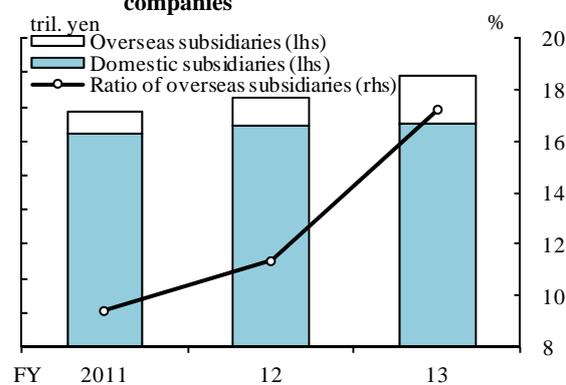
Note: *1*. Data for the three major nonlife insurance company groups are counted. The latest data are annualized figures of April to December 2013.

Sources: Published accounts of each nonlife insurance group.

2. Securities companies

The financial results of major securities companies for the October-December quarter of 2013 showed that they increased their net income on a quarter-on-quarter basis, mainly because fees and commissions for sales of investment trusts and securities brokerage expanded, reflecting trading increases in investment trusts and stocks following the rise in stock prices (Chart V-2-7). As profits have been on an uptrend, the capital adequacy ratios of major securities companies have risen since 2012, and their business conditions have become more stable (Chart V-2-8). However, developments in global financial regulations show that the introduction of new capital and liquidity regulations is under discussion, and securities companies that conduct business operations globally need to deal appropriately with changes in the business environment, taking account of the possible tightening of such regulations.

The large part of profits among Japanese securities companies is correlated to the flow

of fund volumes in areas such as sales and cancellations of investment trusts and securities brokerage. Thus, they are more susceptible to market developments than are overseas securities companies (Chart V-2-9). To make their profits more stable, they are expected to improve their profit structures by expanding their customer bases to include a wide range of individuals through actively utilizing NISAs -- which were introduced in January 2014 -- thereby increasing their outstanding assets in custody and the corresponding income from fees and commissions.

Chart V-2-7: Profits of securities companies[1]

tril. yen

Others
Personnel expenses
Net trading income
Other fees received
Commissions for underwriting, secondary distribution, etc.
Commissions for sales of investment trusts and securities brokerage
Net income
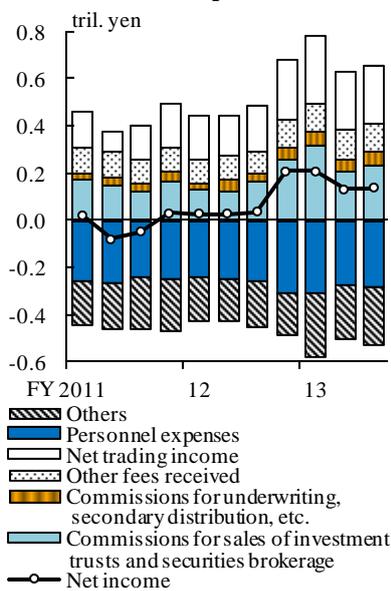
Note: 1. Data for the five major securities company groups are counted. The latest data are as of the October-December quarter of 2013.

Sources: Published accounts of each securities company.

Chart V-2-8: Capital to risk ratio of securities companies[1]

%

Note: 1. Data for the five major securities companies are counted. The latest data are as of December 2013.

Source: BOJ.

Chart V-2-9: Commissions of securities companies[1,2]

ratio to commissions, %

Others
Underwriting, secondary distribution, etc.
Sales of investment trusts
Securities brokerage
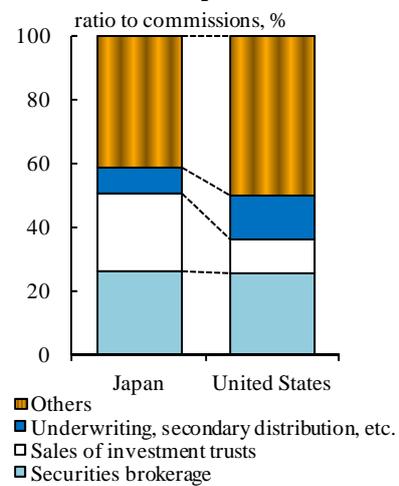
Notes: 1. Figures for "Japan" are calculated based on general trading participants in the Tokyo Stock Exchange. Figures for "United States" are calculated based on firms that are members of the Financial Industry Regulatory Authority. The data are as of fiscal 2010 for Japan and as of 2010 for the United States.
2. "Others" for the United States represent the sum of other revenues related to securities business and asset management fees.

Sources: SIFMA; Tokyo Stock Exchange.

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VI. Risk assessment of the financial system from a macroeconomic perspective

This chapter outlines an assessment of macro risk factors associated with the financial system by using "macro risk indicators" and "macro stress testing." Macro risk indicators show overheating or instability in financial activity. In this chapter, we assess macro risk factors by examining several macro risk indicators. 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. For example, to a certain extent, we can quantitatively assess a feedback loop between the financial system and the real economy in which a deterioration in economic conditions reduces financial institutions' capital adequacy ratios through a decline in stock prices, further dampening economic activity.[32]

It should be noted that the scenarios assumed in the macro stress testing described in this chapter are not used to present the most likely projection for Japan's economy and asset prices. Rather, it seeks to clarify the characteristics of risks financial institutions face and assess the resilience of the financial system. The stress testing results outlined in this chapter should be interpreted with some degree of latitude, as they are calculated based on certain assumptions and omit some elements.

A. Macro risk indicators

Total credit-to-GDP ratio

One representative indicator used for examining any overheating in financial activity is the total credit-to-GDP ratio.[33] Japan's total credit-to-GDP ratio has been more or less unchanged (Chart VI-1-1).[34] This is because, as described in Chapter III, banks and *shinkin* banks have recently become more active in lending, but the rate of increase in the outstanding amount of credit to firms and households has generally been compatible

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[32] In general, macro stress testing is conducted under "exceptional but plausible" scenarios in order to assess the resilience of the financial system.

[33] 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.

[34] Total credit includes, on the supply side, loans extended by financial intermediaries such as banks and *shinkin* banks and funding from capital markets such as corporate bond issuance. On the demand side, it includes funding by households and firms.

with the pace of recovery in the real economy. The total credit-to-GDP ratio is currently hovering around its long-term trend, and the gap between this ratio and its long-term trend (the total credit-to-GDP gap) has not expanded (Chart VI-1-2).[35] At present, credit extension by financial intermediaries does not show any signs of overheating.

Chart VI-1-1: Total credit-to-GDP ratio[1,2]
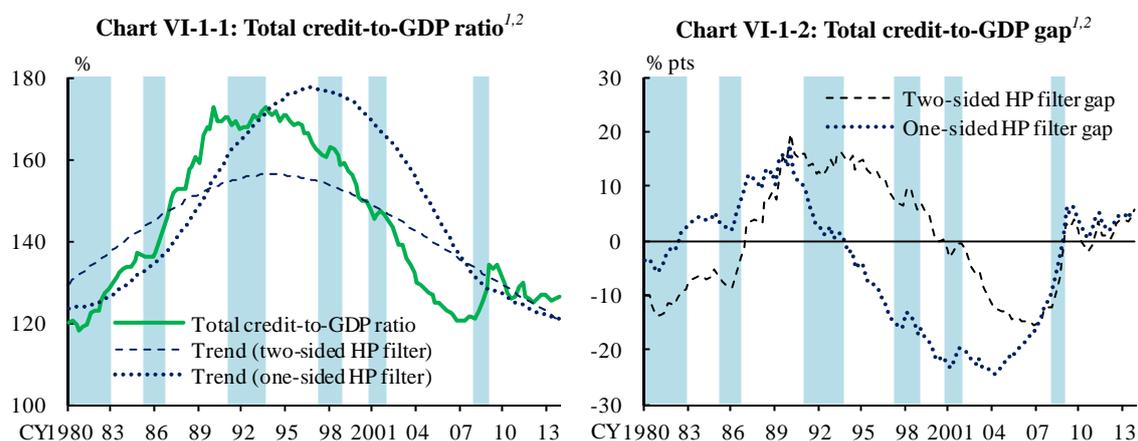
Notes: *1*. Shaded areas indicate economic recession periods. The latest data are as of the October-December quarter of 2013.
2. The two-sided HP filter is a method for extracting a trend from all available data using the Hodrick Prescott filter. The one-sided HP filter is a method for extracting a trend from the data available for a time period using the Hodrick Prescott filter.
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

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

Notes: *1*. See Notes in Chart VI-1-1.
2. The total credit-to-GDP gap is the deviation from each trend of the total credit-to-GDP ratio.
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Financial Activity Indexes

The Financial Activity Indexes (FAIXs), which include the total credit-to-GDP ratio mentioned above, are indicators used to gauge overheating in various financial activities. FAIXs identify signs of overheating by examining the deviation of individual indicators from their trends. It is difficult to predict in which area of financial activities financial imbalances and overheating will actually arise. Therefore, it is necessary to regularly examine a wide range of indicators. In the *Report*, we select a number of indicators as FAIXs that are appropriate in assessing whether financial imbalances similar to those

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[35] When gauging overheating or overcooling of total credit, it is necessary to examine how far the actual total credit-to-GDP ratio deviates from its long-term trend. Nevertheless, because there are various issues regarding methods used for estimating the long-term trend, the estimation results should be interpreted with some latitude regardless of which method is used. In this section, we use two methods commonly employed for estimating the trend: (1) the "two-sided HP filter," in which the Hodrick-Prescott (HP) filter is applied to data for the whole period; and (2) the "one-sided HP filter," in which the HP filter is applied to each period. We then show deviation of the actual figure from the long-term trend estimated by these two methods. In both estimation methods, we set the smoothing parameter of the HP filter (i.e., λ) at 400,000.

observed during Japan's Heisei bubble period, which occurred around the late 1980s, have arisen. For this issue of the *Report*, we have revised the FAIXs and increased their number from 10 to 14 (see Box 2 for the revision of the FAIXs).[36] Among the 14 FAIXs, most indexes do not show any signs of overheating (Chart VI-1-3).[37]

Chart VI-1-3: Heat map of Financial Activity Indexes[1]

		CY 80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
Financial institutions	DI of lending attitudes of financial institutions																																			
	Growth rate of M2																																			
Financial markets	Equity weighting in institutional investors' portfolios																																			
	Stock purchases on margin to sales on margin ratio																																			
Private sector	Private investment to GDP ratio																																			
	Total credit-to-GDP ratio																																			
Household	Household investment to disposable income ratio																																			
	Household loans to GDP ratio																																			
Corporate	Business fixed investment to GDP raito																																			
	Corporate credit to GDP ratio																																			
Real estate	Real estate firm investment to GDP ratio																																			
	Ratio of real estate loans to GDP																																			
Asset prices	Stock prices																																			
	Land prices to GDP ratio																																			

Note: *1*. The latest data for the DI of lending attitudes of financial institutions, the stock purchases on margin to sales on margin ratio, and stock prices are as of the January-March quarter of 2014. Those for growth rate of M2 are as of January-February of 2014, and those for the land prices to GDP ratio are as of the July-September quarter of 2013. Those for other indicators are as of the October-December quarter of 2013.

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

Financial Cycle Indexes and systemic risk indicators

The financial system can become unstable not only due to the emergence of large-scale financial imbalances such as those observed during the Heisei bubble period, but also because of the emergence of concerns about the soundness of financial institutions and a plunge in real economic activity. The indexes that gauge such instability in the financial system in advance are the Financial Cycle Indexes.[38] Both the leading and lagging

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

[37] The FAIXs consist of 14 financial indicators and measure whether financial activity is overheating or overcooling, based on how far individual indicators deviate from their historical trends. Shaded areas in Chart VI-1-3 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 in white show the periods without data.

[38] The Financial Cycle Indexes are diffusion indexes used to identify signs of future 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." A change in the leading index from a positive figure to a negative one indicates that the financial system may become unstable in the near future. The same movement in the lagging index indicates that the financial system might have already become unstable.

Financial Cycle Indexes have been in a positive range, albeit with some fluctuations (Chart VI-1-4).[39]

Chart VI-1-4: Financial Cycle Indexes[1]
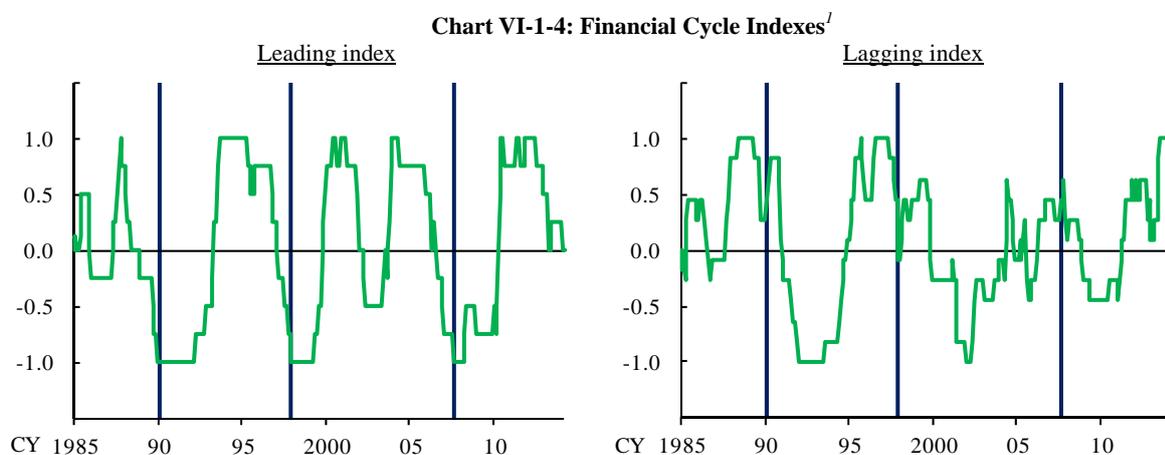
Note: *1*. The latest data are as of March 2014. The left-hand, middle, and right-hand vertical lines indicate the collapse of Japan's asset price bubble, the default of Sanyo Securities, and the outbreak of the U.S. subprime problem, respectively.
Source: BOJ.

The correlation between stock prices of individual financial institutions and aggregate financial stock prices does not show any signs of an increase in systemic risk in the financial sector (Chart VI-1-5). Conditional value-at-risk (CoVaR), which measures the degree to which stresses occurring at individual financial institutions propagate through the entire financial sector, has been at an extremely low level for Japan's banks relative to U.S. and European banks.[40] The marginal expected shortfall (MES), which measures the extent to which stresses in the entire financial sector have adverse effects on the corporate value of individual financial institutions, has been low, and it seems that the degree to which stresses occurring at overseas financial institutions propagate through Japan's banks is limited.[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. 2011-E-1, April 2011.

[39] Leading indexes have recently declined to zero. This partly reflects the fact that the pace of improvement in some indexes constituting the leading indexes, such as housing loans, has moderated. Nevertheless, these indicators remain on an improving trend.

[40] As CoVaR increases, the propagation of stresses occurring at individual financial institutions to the entire financial sector becomes stronger. CoVaR is estimated based on the VaR of stocks of 29 major banks around the world (i.e., G-SIBs as of November 2013). For details, see Tobias Adrian and Markus K. Brunnermeier, "CoVaR," Federal Reserve Bank of New York Staff Report, No. 348, September 2011.

[41] The MES shows expected losses at an individual financial institution if the VaR of aggregate financial stocks exceeds a certain threshold. Specifically, an individual financial institution's MES is the rate of change in the market value of stocks on the day the market value of aggregate financial

No solid evidence of instability in the financial system is observed in these indicators.

Chart VI-1-5: Systemic risk indicators[1]

CoVaR   MES

Note: *1*. G-SIBs are counted. The latest data are as of end-March 2014.
Sources: Bloomberg; BOJ.

Box 2: Revision of the Financial Activity Indexes

The Financial Activity Indexes (FAIXs) are used to assess whether financial activities are overheating or overcooling by examining the deviation of multiple indicators from their historical trends. The aim is to assess macro risk factors associated with the financial system. The previous FAIXs, which were used in past issues of the *Report*, consisted of ten financial indicators (Chart B2-1). These indicators were selected in 2012, referring to existing studies on early warning indicators.

Chart B2-1: Heat map of the previous Financial Activity Indexes[1]

Note: *1*. The latest data for the DI of lending attitudes of financial institutions, stock prices, and the spread between expected equity yields and government bond yields are as of the January-March quarter of 2014. Those for the money multiplier (ratio of M2 to the monetary base) are as of January-February of 2014, and those for the gross rent multiplier (ratio of land prices to rent) are as of the July-September quarter of 2013. Those for other indicators are as of the October-December quarter of 2013.

Sources: Bloomberg; Cabinet Office, "National accounts"; Japan Post Holdings, "The former Japan Post statistical data"; Japan Real Estate Institute, "Urban land price index"; Ministry of Finance, "Financial statements statistics of corporations by industry"; Ministry of Internal Affairs and Communications, "Consumer price index"; Ministry of Posts and Telecommunications, "Annual statistical report of postal services," "Annual statistical report of postal service administrations"; Thomson Reuters; BOJ, "Flow of funds accounts," "Monetary base," "Money stock," "*Tankan*."

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stocks falls below the value with the lowest 5 percent probability of occurrence. The sample includes 29 major banks around the world (G-SIBs as of November 2013). 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.

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Considering that progress has been made in studies on and practical applications of early warning indicators in other countries, we decided to revise the FAIXs in preparing this issue of the *Report*.[42] The indicators comprising the new FAIXs were selected through the following process.

(1) Collection of candidate indicators

Candidate indicators were chosen from the indicators deemed useful in existing studies, including the most recent ones, on early warning indicators. We collected as many such indicators as possible, and as a result, the number of candidate indicators was 159.[43]

(2) Categorization of candidate indicators

The candidate indicators were categorized by economic sector and by type of activity captured. Specifically, we set six economic sectors: the financial institution sector, the financial market sector, the private sector, the household sector, the corporate sector, and the real estate sector. For each sector, we set two categories: "investment activities on the asset side" and "financing activities on the liability side." In brief, two activity categories were set for each of the six sectors, and twelve categories were thus set. In addition, as for asset prices, we set two categories: stock prices and real estate prices. As a result, there are 14 categories in total. The 159 candidate indicators were then sorted into these 14 categories.

(3) Selection of the best indicator in each category

The usefulness of indicators in each category was examined from two perspectives: (a) whether the indicator can detect the overheating of financial activities in Japan's Heisei bubble period, which occurred around the late 1980s and had a major impact on Japan's economy and financial activities; and (b) whether the indicator successfully minimizes various statistical errors involved in forecasting future events. In the examination, multiple possibilities were explored with respect to methods used for extracting trends from indicators and thresholds employed for assessing that the deviation of an indicator from its trend constitutes overheating.

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[42] Under the Basel III requirements, the countercyclical capital buffer will be introduced, and the buffer requirement will be adjusted according to the state of the financial system. Many studies conducted in recent years in other countries have made progress in developing reference indicators for assessing the state of the financial system to determine whether the buffer should be increased or decreased.

[43] In the development of the previous FAIXs in 2012, the number of candidate indicators was 97.

Chart B2-2: Comparison between the new FAIXs and the previous FAIXs[1,2,3]

	New indicators		Previous indicators	
	Investment Activity	Funding Activity	Investment Activity	Funding Activity
Financial institutions	* DI of lending attitudes of financial institutions < **past averages**, 1σ >	• **Growth rate of M2** < **one-sided HP filter**, 1σ >	DI of lending attitudes of financial institutions < 3-year moving averages, 1σ >	Money multiplier < 3-year moving averages, 1σ >
Financial markets	‡ Equity weighting in institutional investors' portfolios < 3-year moving averages, 1σ >	† **Stock purchases on margin to sales on margin ratio** < 3-year moving averages, 1σ >	Equity weighting in institutional investors' portfolios < 3-year moving averages, 1σ >	
Private sector	† **Private investment to GDP ratio** < 3-year moving averages, 1σ >	* Total credit-to-GDP ratio < **one-sided HP filter**, 1σ >		Total credit-to-GDP ratio < 3-year moving averages, 1σ >
Household	† **Household investment to disposable income ratio** < 3-year moving averages, 1σ >	• **Household loans to GDP ratio** < 3-year moving averages, **1.25σ** >		Households' debt-to-cash ratio < 3-year moving averages, 1σ >
Corporate	• **Business fixed investment to GDP ratio** < **one-sided HP filter**, 1σ >	† **Corporate credit to GDP ratio** < 3-year moving averages, 1σ >	Ratio of business investment to operating profits < 3-year moving averages, 1σ >	Ratio of firms' CP outstanding to their liabilities < 3-year moving averages, 1σ >
Real estate	† **Real estate firm investment to GDP ratio** < **one-sided HP filter**, 1σ >	† **Ratio of real estate loans to GDP** < **one-sided HP filter**, 1σ >		

	New indicators		Previous indicators	
	Stock prices	Land prices	Stock prices	Land prices
Asset prices	* Stock prices < **one-sided HP filter, 1.5σ** >	• **Land prices to GDP ratio** < 3-year moving averages, 1σ >	Stock prices < 3-year moving averages, 1σ > Spread between expected equity yields and government bond yields < 3-year moving averages, 1σ >	Gross rent multiplier < 3-year moving averages, 1σ >

Notes: *1.* The underlined items show the points of modification. Trends and thresholds for each indicator are in parentheses.
2. The symbol represent the following; ‡: unmodified, *: methods for extracting trends and thresholds modified, •: data processing methods modified, †: newly adopted.
3. σ is a unit that represents the root mean square of deviation between actual and trend values.

As a result of the revision, two of the ten financial indicators comprising the previous FAIXs were abandoned, one was retained, three were revised in terms of extraction methods, and four were revised in terms of data processing methods (Chart B2-2). The 14 indicators, including these eight and six newly selected, now constitute the new FAIXs (Chart VI-1-3).

The assessment of the present state of financial activities does not change even if it is based on the previous FAIXs: most indicators in the previous FAIXs do not show any signs of overheating, as in the assessment based on the new FAIXs (Chart B2-1).

B. Macro stress testing

1. Assumptions for macro stress testing

As in the previous *Report*, a baseline scenario and two stress scenarios are set as assumptions for macro stress testing. One stress scenario assumes that severe stresses equivalent to the Lehman shock in 2008 occur in overseas economies and financial markets (an economic downturn scenario), and the other stress scenario assumes that the yield curve steepens with a rise of about 2 percentage points in long-term interest rates in Japan (an upward interest rate shift scenario). The magnitude of stresses under each

scenario is assessed by comparing them with the baseline scenario.

The test takes account of the adverse feedback loop between the financial system and the real economy using the Financial Macro-econometric Model (FMM).[44] In this issue of the *Report*, we improve the FMM by changing the mechanism used for determining financial institutions' credit costs. It is notable that, as a result, the impact of changes in the real economy or interest rates on financial institutions' credit costs has become more significant compared with the previous version of the FMM (see Box 3 for the refinement of the FMM).

We assume that stresses occur from the April-June quarter of 2014, and changes through the end of fiscal 2016 are estimated.[45] The subjects of macro stress testing are banks and *shinkin* banks. The capital adequacy ratios are calculated based on the Basel III requirements for internationally active banks and on the Basel II requirements for domestic banks including *shinkin* banks.[46] However, under the new capital adequacy ratio requirements which have been applied to domestic banks since the end of March 2014, the flexible treatment of capital adequacy requirements regarding the capital calculation method -- which was in effect as an exceptional measure -- has become permanent. Accordingly, unrealized gains/losses on securities holdings are not included in capital in the estimates for domestic banks' capital adequacy ratio presented in this chapter.

Box 3: Refinement of the Financial Macro-econometric Model

A rise in market interest rates reduces the market value of bonds held by financial institutions. At the same time, it affects the net interest income of financial institutions through various factors including their lending and funding rates and loan volume. In this *Report*, the effects of such fluctuations in the market value of bonds and net interest income on financial institutions are quantitatively assessed in macro stress testing conducted under upward interest rate shift scenarios assuming rising domestic market interest rates.

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[44] A paper is scheduled to be released regarding the framework for macro stress testing, including the FMM.

[45] Financial results of banks and *shinkin* banks are available until the end of September 2013 and the end of March 2013, respectively. In this analysis, financial results are estimated until the end of March 2014 using the FMM. Macro stress testing is conducted starting from the end of March 2014.

[46] 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.

However, a rise in market interest rates can increase the burden of debt repayments on firms by causing a rise in borrowing rates, and in turn, this can lead to an increase in firms' defaults and financial institutions' credit costs. In fact, as for corporate loans, it has been observed that default rates are related to interest coverage ratios (ICRs; defined as [operating profits + interest and dividends received, etc.] / interest payments, etc.), which indicate a firm's interest payment burden. Specifically, default rates start to increase rapidly as ICRs fall below a certain threshold (Chart B3-1).[47]

The macro stress testing framework employed in past issues of the *Report* did not necessarily fully capture such a mechanism, in which an increase in borrowers' interest payment burden caused by higher borrowing rates raises default rates and financial institutions' credit costs.[48] In preparing this issue of the *Report*, in order to better incorporate this mechanism into the framework, we refined the credit cost-related equations, which are the core element of the FMM used in testing. This refinement made it possible for our testing framework to capture the impacts of a rise in interest rates in a more comprehensive manner. Specifically, the refinements made involved the following two aspects.

First, we refined the credit cost-related equations so that default rates among borrowing firms are affected not only by changes in the macroeconomic environment (i.e., nominal GDP), but also more directly by changes in firms' financial positions.[49] As a result, the aforementioned mechanism -- in which an increase in borrowers' interest payment burden caused by higher borrowing rates raises default rates via a deterioration in borrowers' financial positions -- works more clearly in the refined framework than it did

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[47] In Chart B3-1, due to the limited data available, the relationship between borrowing firms' ICRs and default rates is not shown for overall corporate loans, but is shown only for loans to small and medium-sized firms.

[48] We raised this issue in the October 2013 issue of the *Report*.

[49] In the FMM, default rates of borrowing firms are expressed in terms of the probability of a transition between credit rating categories. Among the transition probabilities, default rates correspond to the probabilities of a downgrade from "normal" or "need attention excluding special attention" to other lower credit rating categories. If a transition between credit rating categories occurs, including such a downgrade, additions to or reversals of provisions for loan losses are recorded, reflecting differences in loan loss provision ratios between the categories, and this causes credit costs to fluctuate. In this model, the transition probabilities are functions of the macroeconomic environment (nominal GDP) and firms' financial positions (e.g., ICRs). However, because the previous version of these functions did not fit the data well, the effects of changes in firms' financial positions on the transition probabilities were limited in the previous framework. In this refinement, we changed the specification of these functions in order to fit them better to the data. As a result, the effects of changes in firms' financial positions on the transition probabilities have become larger than they were in the previous framework.

in the previous one, even though the macroeconomic environment remained the same. In addition, due to this refinement, more credit rating category transition patterns are now explained by changes in the macroeconomic environment or firms' financial positions. As a result, transitions between credit rating categories and credit cost fluctuations caused by such transitions have generally become more responsive to changes in the macroeconomic environment and firms' financial positions.[50]

Second, we modified the equation used for determining the level of firms' financial position indicator so that changes in firms' interest payment burden are directly reflected in changes in the indicator.[51] Specifically, we modified the equation employed for determining interest payments, etc. -- the ICR denominator -- so that interest payments, etc. directly respond to changes in the level of interest rates.

As a result of the refinement, the estimated magnitude of increases in credit cost ratios under upward interest rate shift scenarios has become larger than it was in the previous framework (Chart B3-2).

Chart B3-1: ICR and default rate of small and medium-sized firms[1,2]

default rate, %

Higher burden of debt repayments

ICR, times
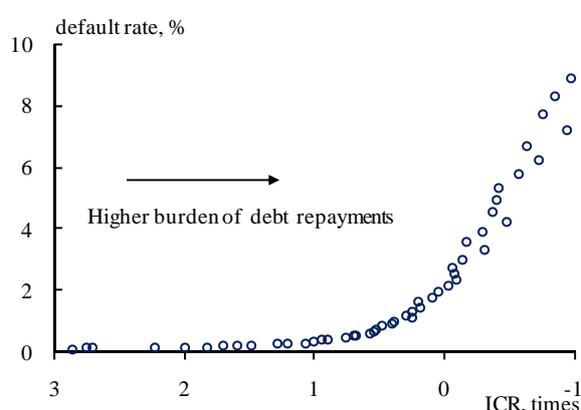
Notes: *1*. The data are as of 2012. Defaults are defined as loans delinquent for 3 months or more, downgraded to de facto bankrupt or bankrupt, or subrogated by credit guarantee corporations.
  2. ICR = (operating profits + interest and dividends received, etc.) / interest payments, etc.
Source: CRD.

Chart B3-2: Effects of an upward interest rate shift on credit cost ratio[1,2]

Internationally active banks   Domestic banks

deviations of credit cost ratio, % pts

☐ Previous model
☐ Refined model

1   2   3   1   2   3   years
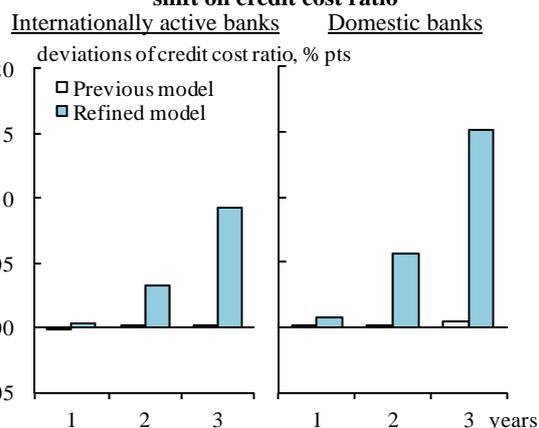
Notes: *1*. Banks and *shinkin* banks are counted.
  2. A 2 percentage point steepening in interest rates for the first year is assumed. The vertical axes show deviations from the baseline scenario.
Source: BOJ.

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[50] In the previous framework, for some credit rating category transition patterns, the transition probability functions could not be estimated because they fit the data poorly. For such patterns, we had to assume that the transition probabilities would remain constant at the most recent observations throughout the simulation period in macro stress testing.

[51] In the previous framework, firms' financial indicators changed in accordance with changes in nominal GDP, and these indicators were not directly affected by changes in the level of interest rates.

2. Baseline scenario

Assumptions made for the baseline scenario are as follows. The overseas real GDP growth rate would rise moderately from 2.5-3.0 percent in 2013 to about 4.0 percent through 2016 (the left-hand side of Chart VI-2-1).[52] Stock prices (TOPIX) and 10-year JGB yields would remain unchanged from the levels observed at the end of September 2013.[53] The domestic nominal GDP growth rate would rise from minus 0.2 percent in fiscal 2012 to 2.3 percent in fiscal 2013 and hover at 2.0-2.5 percent through fiscal 2016 (the right-hand side of Chart VI-2-1).[54]

Chart VI-2-1: Overseas economies and the domestic economy

Sources: Cabinet Office, "National accounts"; IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; BOJ.
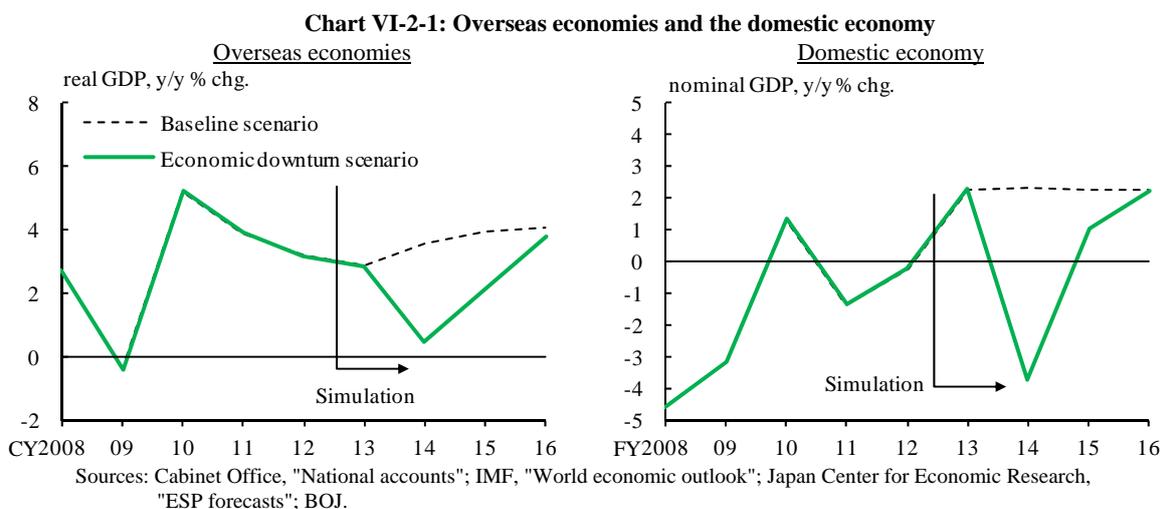
Under these assumptions, the simulation results are as follows. Since Japan's economy would continue to exhibit relatively high growth from the beginning of the estimation period, firms' financial conditions would continue to improve, which in turn would keep their quick ratios and ICRs at levels slightly above those in fiscal 2012 (Charts VI-2-2 and VI-2-3).[55] As a result, credit cost ratios would remain at low levels, while CET I capital ratios and Tier I capital ratios would rise moderately through fiscal 2016 (Charts VI-2-4 and VI-2-5).[56]

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[52] This assumption is based on the long-term forecasts made by the International Monetary Fund (IMF) as of October 2013.

[53] Specifically, it is assumed that the TOPIX stands at 1,194 points and 10-year JGB yields at 0.69 percent.

[54] This assumption is based on private-sector forecasts made in February 2014.

[55] Quick ratios are the ratios of quick assets (cash and deposits, bills and accounts receivable, and securities) to liquid liabilities.

[56] From fiscal 2013, the credit cost ratios of internationally active banks are estimated to become slightly negative, and those of domestic banks are estimated to be around 0 percent. As mentioned in Chapter V.A, financial institutions' credit cost ratios have recently been low. This is because (1)

Chart VI-2-2: Quick ratio[1]
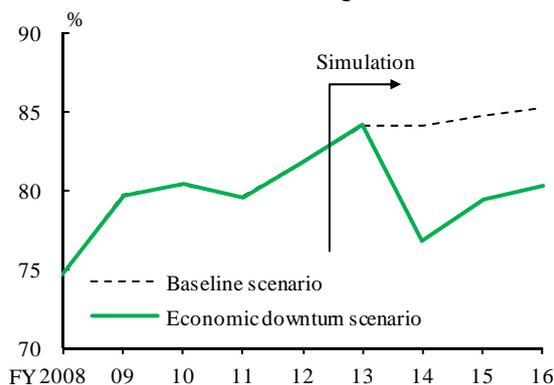
Note: 1. Quick ratio = (cash and deposits + bills and accounts receivable + securities) / liquid liabilities.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ.

Chart VI-2-3: ICR[1]
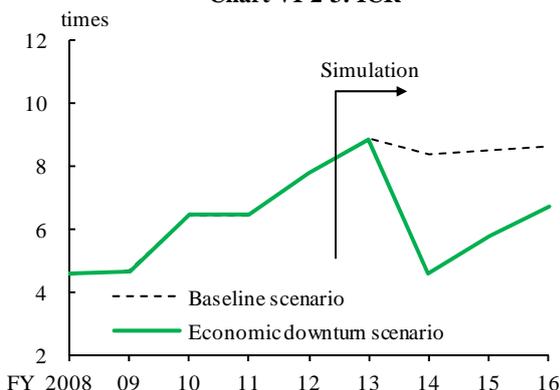
Note: 1. ICR = (operating profits + interest and dividends received, etc.) / interest payments, etc.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ.

Chart VI-2-4: Credit cost ratio[1]
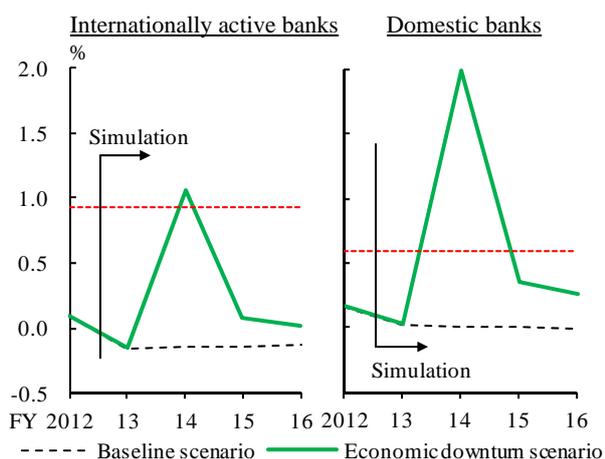
Note: 1. Banks and *shinkin* banks are counted. The horizontal dashed lines indicate the break-even points in the first half of fiscal 2013. For *shinkin* banks, the break-even points in the first half of fiscal 2013 are assumed to be unchanged from fiscal 2012.
Source: BOJ.

Chart VI-2-5: CET I capital ratio and Tier I capital ratio[1,2,3]
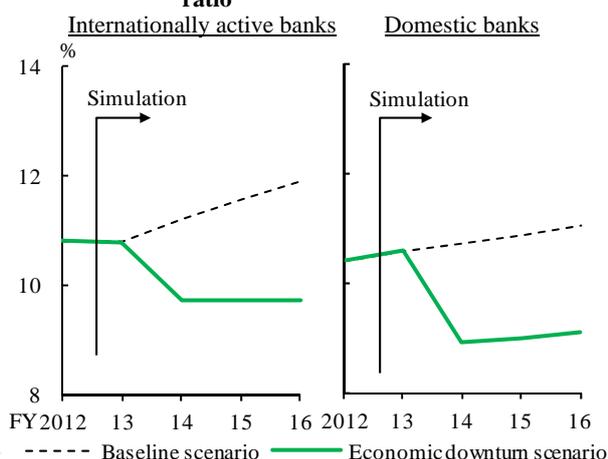
Notes: 1. Banks and *shinkin* banks are counted.
2. The left-hand chart shows the CET I capital ratio of internationally active banks. The right-hand chart shows the Tier I capital ratio of domestic banks.
3. The CET I capital ratio of internationally active banks is based on the Basel III requirements (taking the phase-in arrangements into consideration).
Source: BOJ.

financial institutions' asset quality continued to improve; and (2) financial institutions' support for firms with sluggish business performance restrained the occurrence of default. We assume in the baseline scenario that this trend would continue in future. Specifically, a large number of borrowing firms' credit ratings would be upgraded because the domestic economic growth rate would remain high during the beginning of the estimation period. On the other hand, based on the assumption that financial institutions' support for firms with sluggish business performance continues, the number of downgraded borrowing firms would be limited. As a result, from fiscal 2013, banks' credit cost ratios would remain at low levels and the ratios of internationally active banks would be negative, as reversals of provisions for loan losses were recorded.

3. Economic downturn scenario

Assumptions made for the economic downturn scenario are as follows. The stress equivalent to the Lehman shock in 2008 would arise in overseas economies and global financial markets in the first half of fiscal 2014. The overseas economic growth rate would plunge to 0.5 percent in 2014 from 2.5-3.0 percent in 2013 and return to around the baseline scenario level in 2016 (the left-hand side of Chart VI-2-1). Stock prices (TOPIX) would fall by 55 percent between the end of March 2014 and the end of March 2015, and 10-year JGB yields would decline by about 0.3 percentage point during the same period. Thereafter, stock prices and 10-year JGB yields would remain more or less unchanged. Under these assumptions, the domestic economic growth rate would drop to minus 3.5-4.0 percent in fiscal 2014, and would then return to around the baseline scenario level in fiscal 2016 (the right-hand side of Chart VI-2-1).[57]

The simulation results of financial institutions' balance sheets and profits are as follows. Financial institutions would incur unrealized losses on stockholdings due to the decline in stock prices. As corporate profits declined significantly owing to the economic downturn, firms' financial indicators such as quick ratios and ICRs would deteriorate in fiscal 2014 (Charts VI-2-2 and VI-2-3). Thereafter, although firms' profits would pick up and firms' financial indicators would improve in line with the recovery in the domestic economic growth rate, firms' profits and financial indicators would deviate downward from the baseline scenario levels throughout the estimation period. As a result, credit cost ratios would increase considerably in fiscal 2014. Despite a subsequent decline, credit cost ratios would continue to deviate upward from the baseline scenario level throughout the estimation period (Chart VI-2-4).

Consequently, although capital adequacy ratios would fall significantly from the baseline scenario from fiscal 2014, these ratios would on average continue to exceed regulatory levels (Chart VI-2-5). The CET I capital ratio for internationally active banks would be 9.7 percent in fiscal 2016, falling by 2.2 percentage points from the baseline scenario of 11.9 percent. The CET I capital ratio at internationally active banks would be under downward pressure caused by unrealized losses on securities holdings resulting from falling stock prices and increased credit costs due to an economic downturn (the left-hand side of Chart VI-2-6). On the other hand, the Tier I capital ratio for domestic banks would be 9.1 percent at the end of fiscal 2016, falling by 2.0 percentage points from the

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[57] Such developments in the domestic economic growth rate reflect external shocks including a downturn in overseas economies and the simulation results of the effects of an adverse feedback loop between the financial system and the real economy.

baseline scenario of 11.1 percent. The decline in the Tier I capital ratio for domestic banks would be mainly caused by the occurrence of credit costs due to an economic downturn (the right-hand side of Chart VI-2-6).[58]

Chart VI-2-6: Determinants of the CET I capital ratio and the Tier I capital ratio (economic downturn scenario)[1,2,3]
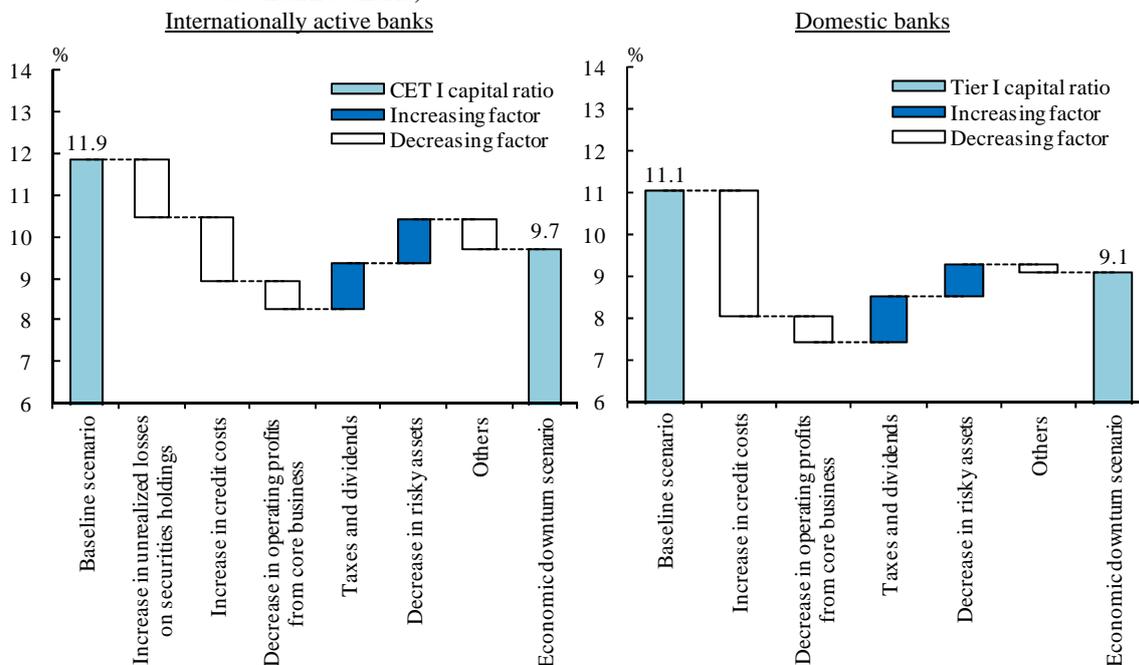
Internationally active banks | Domestic banks

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 2017.
　　　 2. The left-hand chart shows the CET I capital ratio of internationally active banks. The right-hand chart shows the Tier I capital ratio of domestic banks.
　　　 3. The CET I capital ratio of internationally active banks is based on the Basel III requirements (taking the phase-in arrangements into consideration).
Source: BOJ.

The distribution of individual bank Tier I capital ratios shows that some domestic banks' rates of decline in Tier I capital ratios are relatively large (Chart VI-2-7). This indicates that the extent of the impact on capital of an increase in credit costs due to an economic downturn differs among individual banks. Particular attention should be paid to the fact that the rates of decline in Tier I capital ratios would be substantial for financial institutions with low loan quality (Chart VI-2-8).

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[58] In calculating capital adequacy ratios, domestic banks' capital does not reflect unrealized losses on securities holdings. Thus, unlike in the case of internationally active banks, unrealized losses on securities holdings caused by a decline in stock prices do not reduce domestic banks' capital.

Chart VI-2-7: Domestic banks' Tier I capital ratio distribution (economic downturn scenario)[1,2]
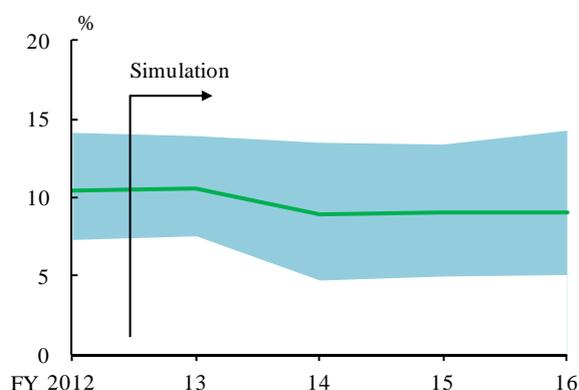
Chart VI-2-8: Changes in the Tier I capital ratio and shares of loans to domestic bank borrowers classified "Special attention" or below (economic downturn scenario)[1,2]

Notes: *1.* Banks and *shinkin* banks are counted.
    2. The shaded area indicates the 10th-90th percentile range measured by each bank's share of loans.
Source: BOJ.
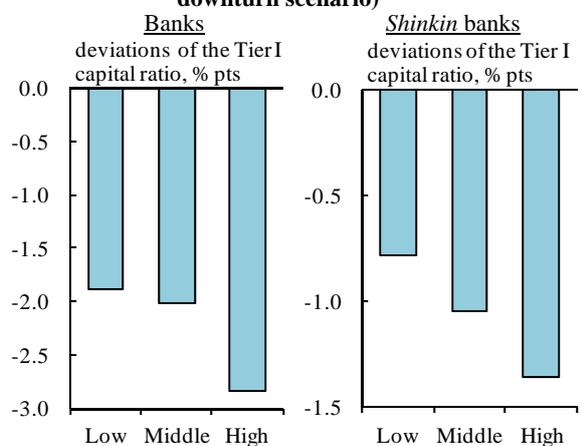
Notes: *1.* The horizontal axes show "special attention" or below loans as a share of the total amount of loans outstanding as of end-March 2014. In the left-hand chart, "low" is less than 2.8 percent, "middle" is 2.8-3.8 percent and "high" is 3.8 percent or more. In the right-hand chart, "low" is less than 5.15 percent, "middle" is 5.15-7.75 percent and "high" is 7.75 percent or more.
    2. The vertical axes show the average Tier I capital ratio deviation for each bank from the baseline scenario as of end-March 2015.
Source: BOJ.

4. Upward interest rate shift scenarios

Macro stress testing assumes the following two rising interest rate cases: a case in which interest rates rise in line with economic improvement; and a case in which interest rates rise with an economic downturn. Both cases assume a steepening scenario under which market interest rates for instruments with longer maturities would rise by 2 percentage points, while those for instruments with shorter maturities would not rise significantly. We set the same assumptions for overseas economies as in the baseline scenario.

A rise in interest rates in line with economic improvement

The first case assumes that the yield curve would steepen gradually, as demand for funds increased in line with economic improvement and a rise in stock prices. The assumptions in more detail are as follows. Market interest rates for instruments with a 10-year maturity would deviate upward from the baseline scenario by 2.0 percentage

points for 1 year from the end of March 2014 and remain unchanged through the end of fiscal 2016. Interest rates for instruments with shorter maturities would remain more or less unchanged. The nominal GDP growth rate would deviate upward from the baseline scenario by about 2 percentage points in fiscal 2014 and would then return to around the baseline scenario level in fiscal 2016 (Chart VI-2-9).[59] Stock prices would rise gradually in line with economic improvement, deviating upward from the baseline scenario by about 25 percent in fiscal 2016.[60]

Chart VI-2-9: Domestic economy (upward interest rate shift scenarios)

nominal GDP, y/y % chg.

----- Baseline scenario
—— Upward shift of interest rates with economic improvement
—○— Upward shift of interest rates with economic downturn
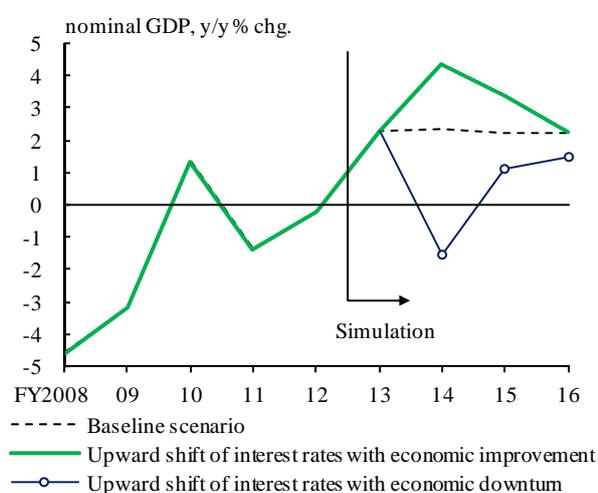
Sources: Cabinet Office, "National accounts"; Japan Center for Economic Research, "ESP forecasts"; BOJ.

Chart VI-2-10: Loans outstanding (upward interest rate shift scenarios)[1]

Internationally active banks   Domestic banks
y/y % chg.

----- Baseline scenario
—— Upward shift of interest rates with economic improvement
—○— Upward shift of interest rates with economic downturn
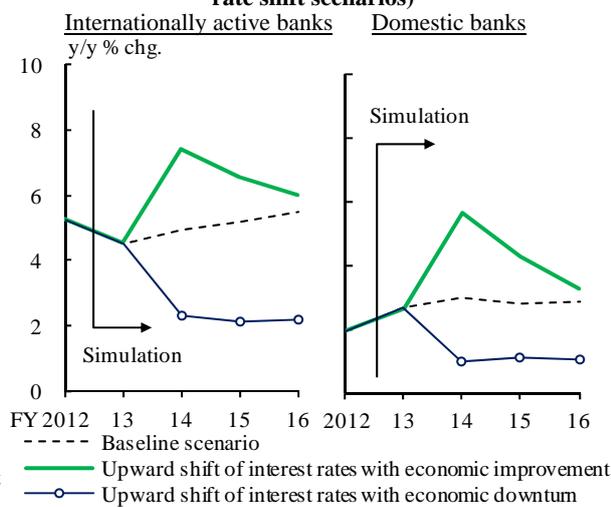
Note: *1*. Banks and *shinkin* banks are counted.
Source: BOJ.

The simulation results of financial institutions' balance sheets and profits are as follows. Financial institutions would incur unrealized capital losses on bondholdings as market interest rates rose. However, they would also face unrealized gains on stockholdings due to the rise in stock prices. As economic activity deviated upward from the baseline scenario, the outstanding amount of loans would deviate upward from the baseline scenario and interest rate spreads on loans would improve (Chart VI-2-10). Therefore,

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[59] The rate of upward deviation in the nominal GDP growth rate for fiscal 2014 from the baseline scenario is calculated using the elasticity between the year-on-year rate of change in long-term interest rates and the nominal GDP growth rate in the period when there was a maximum correlation after the collapse of the Heisei bubble. Similar to the economic downturn scenario results, developments in the domestic economic growth rate reflect the simulation results of the effects of an adverse feedback loop between the financial system and the real economy.

[60] In the October 2013 issue of the *Report*, we assumed in the first case that stock prices would rise by 80 percent from the baseline scenario. In this issue of the *Report*, we assume a lower rate of increase in stock prices since the level of stock prices in the baseline scenario became higher than that in the previous issue of this *Report*.

core profits (operating profits from core business) would also exceed the baseline scenario. Firms' quick ratios would also deviate upward from the baseline scenario owing to the improvement in business conditions, while their ICRs would remain at around the baseline scenario level despite the downward pressure from increased interest payments caused by the rise in interest rates (Charts VI-2-11 and VI-2-12). As a result, credit cost ratios would deviate slightly downward from the baseline scenario (Chart VI-2-13).

Chart VI-2-11: Quick ratio (upward interest rate shift scenarios)[1]
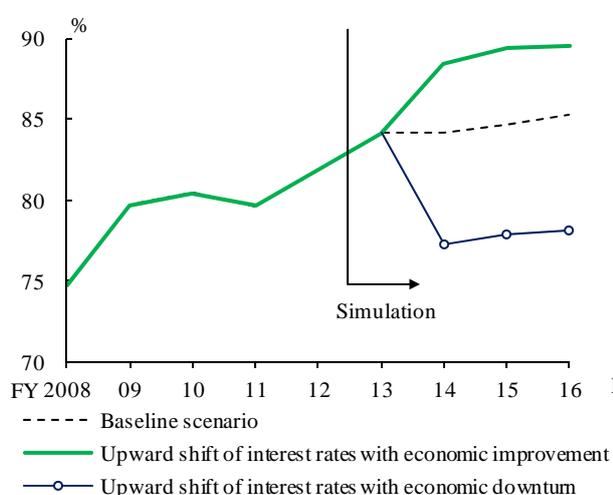
Note: *1*. Quick ratio = (cash and deposits + bills and accounts receivable + securities) / liquid liabilities.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ.

Chart VI-2-12: ICR (upward interest rate shift scenarios)[1]
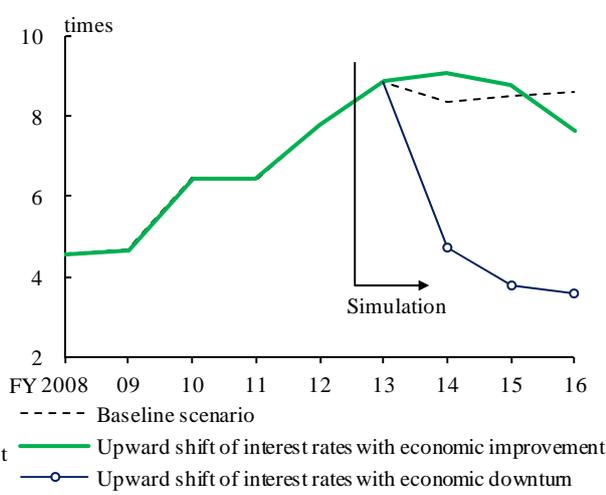
Note: *1*. ICR = (operating profits + interest and dividends received, etc.) / interest payments, etc.
Sources: Ministry of Finance, "Financial statements statistics of corporations by industry"; BOJ.

In these circumstances, the CET I capital ratio would exceed the baseline scenario level at internationally active banks (Chart VI-2-14). This is because increases in core profits and unrealized gains on stockholdings would exceed the increase in unrealized capital losses on bondholdings due to the rise in interest rates (the left-hand side of Chart VI-2-15). At domestic banks, whose unrealized gains/losses on securities holdings are not taken into account in calculating the Tier I capital ratio, this ratio would remain at around the baseline scenario level through fiscal 2015 because the sharp increase in lending would raise the amount of their risky assets, despite improvement in core profits (Chart VI-2-14). However, interest rate spreads on loans would improve over time, and operating profits from core business would accumulate further. As a result, domestic banks' Tier I capital ratio would also deviate slightly upward from the baseline scenario in fiscal 2016 (the right-hand side of Chart VI-2-15).

Chart VI-2-13: Credit cost ratio (upward interest rate shift scenarios)[1]
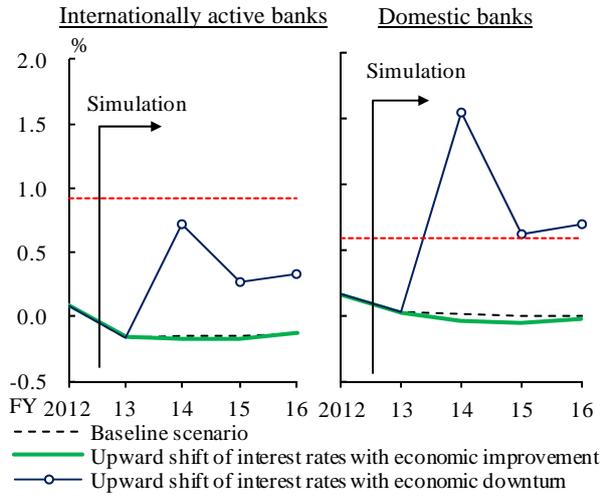
Internationally active banks   Domestic banks

- - - - Baseline scenario
—— Upward shift of interest rates with economic improvement
—○— Upward shift of interest rates with economic downturn

Note: 1. Banks and *shinkin* banks are counted. The horizontal dashed lines indicate the break-even points in the first half of fiscal 2013. For *shinkin* banks, the break-even points in the first half of fiscal 2013 are assumed to be unchanged from fiscal 2012.

Source: BOJ.

Chart VI-2-14: CET I capital ratio and Tier I capital ratio (upward interest rate shift scenarios)[1,2,3]
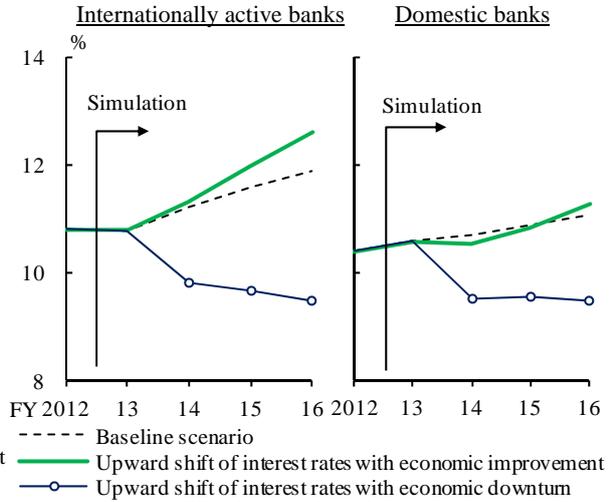
Internationally active banks   Domestic banks

- - - - Baseline scenario
—— Upward shift of interest rates with economic improvement
—○— Upward shift of interest rates with economic downturn

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 Tier I capital ratio of domestic banks.
3. The CET I capital ratio of internationally active banks is based on the Basel III requirements (taking the phase-in arrangements into consideration).

Source: BOJ.

Chart VI-2-15: Determinants of the CET I capital ratio and the Tier I capital ratio (upward shift of interest rates with economic improvement)[1,2,3]

Internationally active banks   Domestic banks
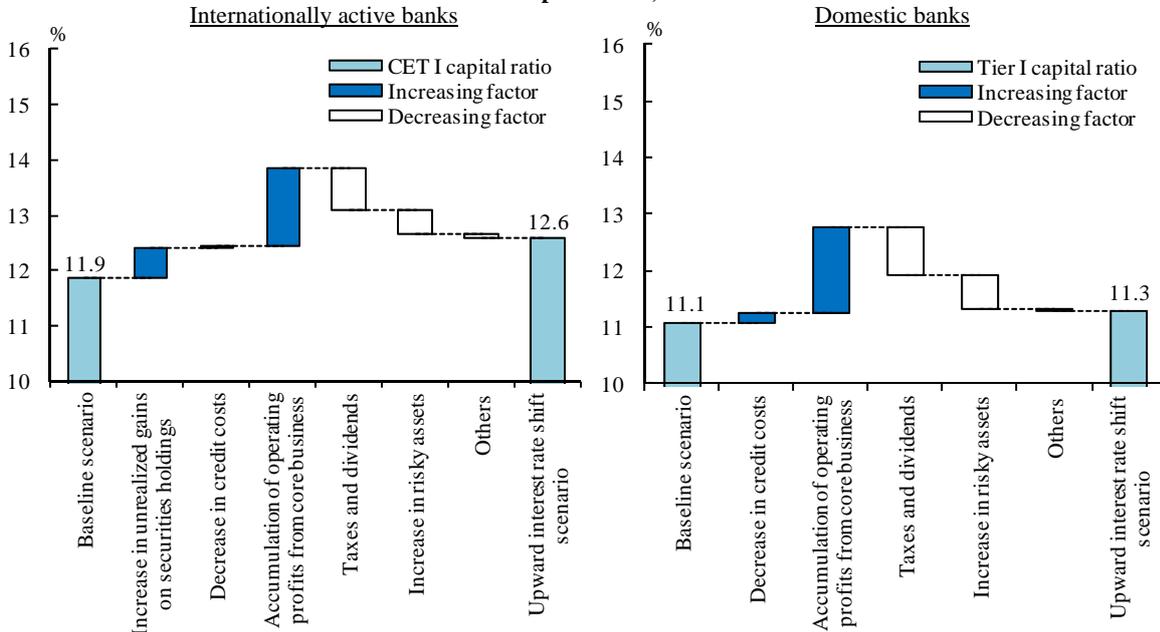
Notes: 1. Banks and *shinkin* banks are counted. "Increase in unrealized gains on securities holdings" is calculated by taking account of tax effects. The data are as of end-March 2017.
2. The left-hand chart shows the CET I capital ratio of internationally active banks. The right-hand chart shows the Tier I capital ratio of domestic banks.
3. The CET I capital ratio of internationally active banks is based on the Basel III requirements (taking the phase-in arrangements into consideration).

Source: BOJ.

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As mentioned above, a rise in interest rates in line with the economic improvement would generally have a positive effect on financial institutions' capital because the upward deviation of core profits and the moderate downward deviation of credit costs from the baseline scenario would offset unrealized capital losses on bondholdings.

A rise in interest rates with an economic downturn

The second case assumes that a decline in stock prices and an economic downturn in tandem with a sharp rise in interest rates would hinder improvement in financial institutions' interest rate spreads on loans. The assumptions in more detail are as follows. The interest rate yield curve would steepen immediately after the start of the estimation period. Specifically, 10-year rates would rise by 2 percentage points from the baseline scenario at the beginning of the April-June quarter of 2014 and remain at the same level through the end of fiscal 2016. Stock prices would fall by 34 percent during the quarter with a simultaneous rise in interest rates.[61] After declining for 1 year along with the economic downturn, stock prices would remain unchanged from fiscal 2015, staying 45 percent below the baseline scenario. With respect to the economy, the nominal GDP growth rate would deviate downward from the baseline scenario immediately after the start of the estimation period, recording around minus 1.5 percent in fiscal 2014. Nominal GDP growth would recover moderately thereafter, but would remain about 1 percentage point lower than the baseline scenario in fiscal 2016 (Chart VI-2-9).[62] Furthermore, we assume a situation in which the deterioration in economic conditions would make it difficult for financial institutions to raise their loan interest rates as compared with normal times amid weakening demand for funds. We also assume that as market interest rates rose, the correlation between financial institutions' deposit interest rates and market interest rates would become stronger than at a time when interest rates are stable at low levels.[63]

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[61] The rate of decline in stock prices has been calculated using the elasticity of stock prices to JGB yields observed from April to October 1991, when the negative correlation between stock prices and JGB yields was the strongest since 1990.

[62] Similar to the economic downturn scenario results, developments in the domestic economic growth rate reflect the simulation results of the effects of an adverse feedback loop between the financial system and the real economy.

[63] Specifically, for both internationally active banks and domestic banks, we assume that the pass-through of loan interest rates (the extent to which loan interest rates would rise in response to a rise in market interest rates) would be smaller, while the pass-through of funding interest rates would be larger, than the estimation results based on past data. The extent of downward and upward deviations is calculated by adjusting the estimated coefficients of each pass-through rate by about two

The simulation results of financial institutions' balance sheets and profits are as follows. A rise in market interest rates combined with a simultaneous decline in stock prices would cause unrealized losses on both bondholdings and stockholdings at financial institutions. At the same time, the rise in loan interest rates -- reflecting higher market interest rates -- and the economic downturn would make growth in loans outstanding deviate sharply downward from the baseline scenario (Chart VI-2-10). In a situation in which interest rate spreads on loans do not improve at the same pace as in normal times, the downward deviation of loans outstanding from the baseline scenario would cause downward pressure on financial institutions' core profits. Moreover, a sharp deterioration in profits and an increase in interest payments among borrowing firms would worsen firms' financial conditions (measured by quick ratios and ICRs). As a result, credit cost ratios would rise to a level substantially above the baseline scenario (Charts VI-2-11 to VI-2-13).

In these circumstances, the CET I capital ratio for internationally active banks would deviate significantly downward from the baseline scenario because of the emergence of unrealized losses on securities holdings and credit costs. The ratio would stand at 9.5 percent at the end of fiscal 2016, falling by 2.4 percentage points from the baseline scenario of 11.9 percent (Chart VI-2-14 and the left-hand side of Chart VI-2-16). The Tier I capital ratio for domestic banks would deviate significantly downward from the baseline scenario level due to the emergence of credit costs, although their capital does not reflect unrealized losses on securities holdings. The ratio would stand at 9.5 percent at the end of fiscal 2016, falling by 1.6 percentage points from the baseline scenario of 11.1 percent (Chart VI-2-14 and the right-hand side of Chart VI-2-16).

standard deviations.

Chart VI-2-16: Determinants of the CET I capital ratio and the Tier I capital ratio (upward shift of interest rates with economic downturn)[1,2,3]
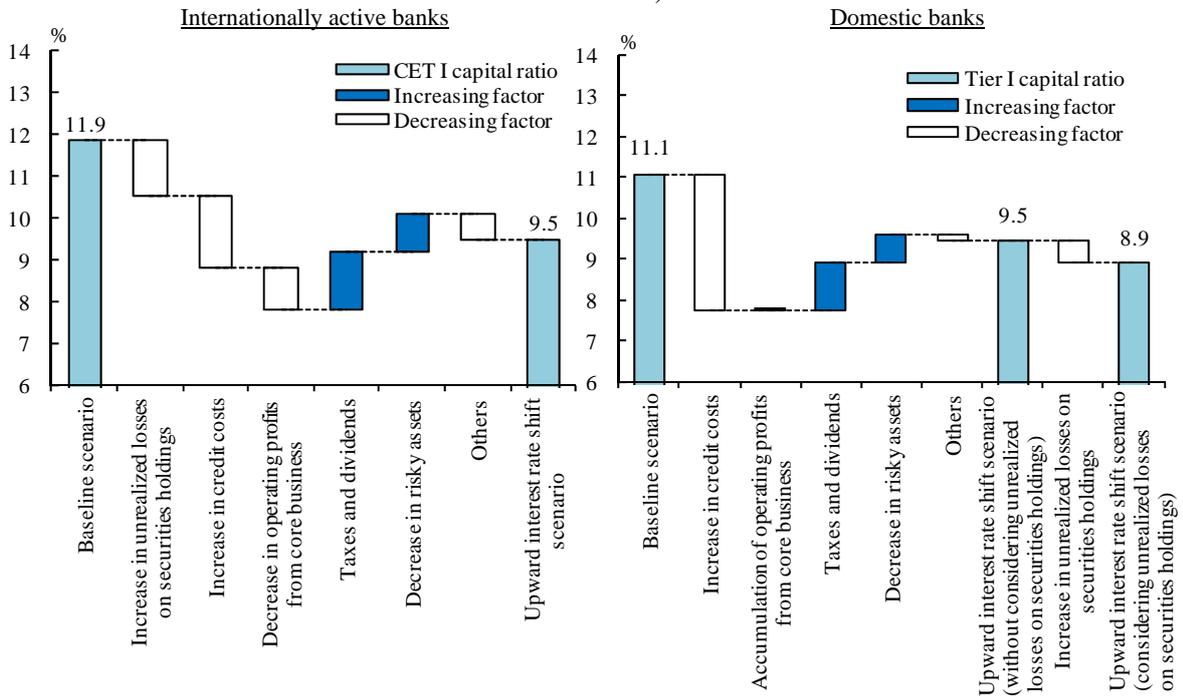

Notes: *1*. Banks and *shinkin* banks are counted. "Increase in unrealized losses on securities holdings" is calculated by taking account of tax effects. The data are as of end-March 2017.
  2. The left-hand chart shows the CET I capital ratio of internationally active banks. The right-hand chart shows the Tier I capital ratio of domestic banks.
  3. The CET I capital ratio of internationally active banks is based on the Basel III requirements (taking the phase-in arrangements into consideration).
Source: BOJ.

As described above, a rise in interest rates combined with an economic downturn has a major impact on financial institutions' capital because it causes the emergence of unrealized losses on bondholdings and stockholdings, as well as credit costs and a decline in core profits. Nevertheless, CET I capital ratios and Tier I capital ratios would remain above the regulatory levels on average. Assuming that unrealized losses on securities holdings would become realized losses due to sales of bonds and stocks, the Tier I capital ratio for domestic banks would be 8.9 percent, deviating more significantly downward from the baseline scenario of 11.1 percent (the right-hand side of Chart VI-2-16 and Chart VI-2-17). The extent of the impact of a rise in interest rates on credit costs differs among individual financial institutions as in the economic downturn scenario. The impact of such a rise on core profits (net interest income) also differs among individual institutions due to differences in the balance sheet structure and interest rate setting behavior (see Box 4 for differences in the effects of a rise in interest rates on net interest income among individual financial institutions). The distribution of Tier I capital ratios by individual financial institution shows that some

banks face relatively high rates of decline in their Tier I capital ratios, and this warrants attention (Chart VI-2-18).

Chart VI-2-17: Tier I capital ratio of domestic banks (considering unrealized losses on securities holdings)[1,2]
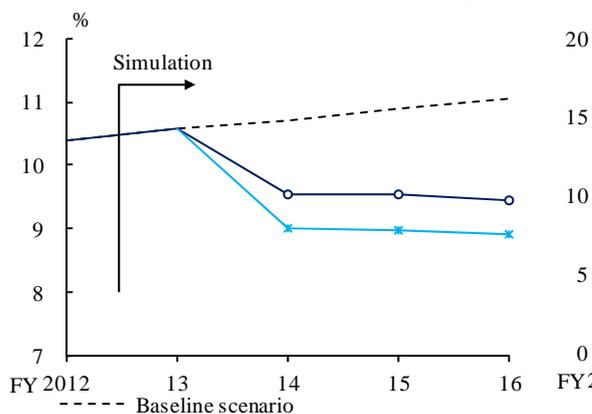
Notes: *1.* Banks and *shinkin* banks are counted.
2. The stress scenario is an upward interest rate shift with an economic downturn.
Source: BOJ.

Chart VI-2-18: Domestic banks' Tier I capital ratio distribution (considering unrealized losses on securities holdings)[1,2,3]
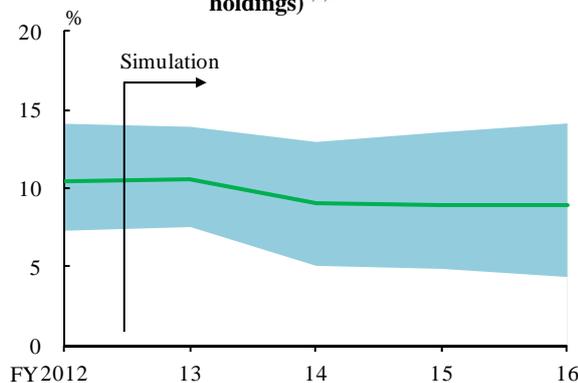
Notes: *1.* Banks and *shinkin* banks are counted.
2. The shaded area indicates the 10th-90th percentile range measured by each bank's share of loans.
3. The stress scenario is an upward interest rate shift with an economic downturn.
Source: BOJ.

Box 4: Differences in the effects of a rise in interest rates on net interest income among individual financial institutions

As mentioned in the main text, a rise in market interest rates affects net interest income, one of the fundamental categories of income among financial institutions, by inducing such institutions to renew their lending and funding rates. However, the pattern of net interest income fluctuations after a rise in interest rates varies across institutions.

First, the pattern of net interest income fluctuations depends on the individual institution's specific investment-funding balance. For example, after a rise in interest rates, net interest income is more likely to increase at a bank with a higher loan-to-deposit ratio or with a higher ratio of ordinary deposits outstanding to total deposits outstanding (Chart B4-1).[64]

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[64] First, in many cases, lending rates tend to rise faster than the average rate of return on a bond portfolio after a rise in interest rates because the average remaining maturity of loans tends to be shorter than that of bonds. At a bank with a high loan-to-deposit ratio, loans account for a relatively large proportion of its investment assets. Therefore, at such a bank, the rate of return on its overall investment assets rises relatively quickly after a rise in interest rates, which implies that net interest income is more likely to increase than it is at other banks. Second, the pass-through rates -- the

Chart B4-1: Banks' balance-sheet structure and net interest income[1,2,3,4]

Loan-to-deposit ratio	Ratio of ordinary deposits to total deposits
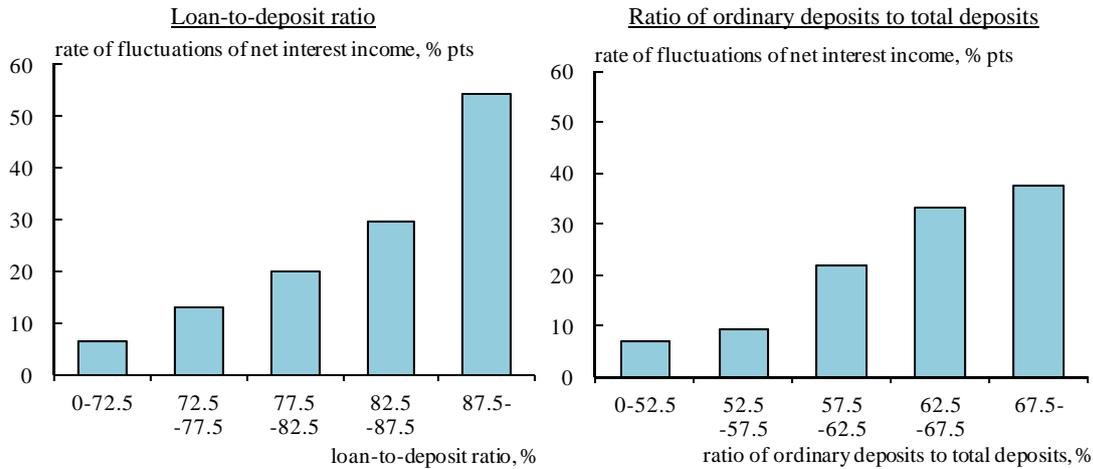
Notes: 1. Major banks and regional banks are counted.
       2. A 2 percentage point parallel shift in interest rates is assumed.
       3. The vertical axes indicate the ratio of annual net interest income, calculated as the deviation from the baseline scenario 2 years after the upward shift in interest rates, to net interest income for fiscal 2012. The figures show the median for financial institutions grouped into each category on the horizontal axis.
       4. The horizontal axis ratios are as of end-September 2013.
Source: BOJ.

Second, the pattern of net interest income fluctuations also depends on the pass-through rates of lending and funding rates at individual institutions. Net interest income is more likely to increase if the pass-through rates of lending rates are higher than those of funding rates because, in that case, the spread between lending and funding rates improves after a rise in market interest rates. The pass-through rates of lending and funding rates differ among financial institutions, depending on various factors, including the business environment they face and the structures of their assets and liabilities. In fact, the pass-through rates estimated for each institution utilizing its own interest rates and balance sheets vary to a large degree across institutions (Chart B4-2).[65]

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extent to which deposit rates rise in response to a rise in market interest rates -- of ordinary deposit rates are lower than those of time deposit rates. In the estimation results, which are discussed below, the pass-through rates of ordinary deposit rates 1 year after the market interest rate rise are about 20 percent, while those of time deposit rates are about 70 percent. Therefore, at a bank with a high ratio of ordinary deposits outstanding to total deposits outstanding, funds can be financed at relatively low costs for a long period even after a rise in market interest rates, and net interest income is more likely to increase than it is at other banks.

[65] We estimate the pass-through rate for each institution by employing the dynamic panel model. The sample period begins from 2003. The dependent variable is long-term/short-term loan interest rates or interest rates on deposits by maturity. The independent variables are as follows: (1) the features of individual banks' asset and liability composition (the size of total assets, the liquidity asset ratio, the capital adequacy ratio, the ratio of loans to medium-sized firms and small firms to total loans, and the ratio of deposits to total funding); (2) market interest rates (the London interbank offered rate [Libor] and the swap interest rate); and (3) macroeconomic variables (the GDP growth rate, market volatility, etc.). In the case of estimating the pass-through rates of ordinary deposit rates,

Chart B4-2: Distribution of pass-through of loan interest rates and funding rates[1,2,3]

Loan interest rates

Funding rates
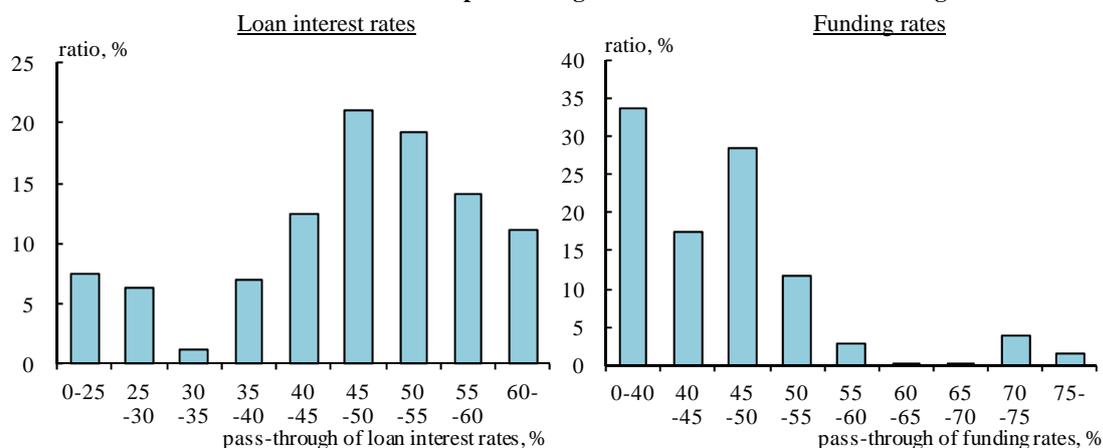
Notes: 1. Banks and *shinkin* banks are counted.
     2. The vertical axes show the share of loans outstanding and funding outstanding corresponding to the horizontal axis category. The data are as of end-September 2013.
     3. The horizontal axes indicate pass-through of loan interest rates and funding rates (a year after the market rate rise).
Source: BOJ.

The variations in the Tier I capital ratio among financial institutions under the upward interest rate shift scenarios partly reflect such differences in the pattern of net interest income fluctuations.

C. Resilience against funding liquidity risk

This section examines whether Japanese financial institutions hold sufficient liquidity buffers under scenarios in which the yen funding market and foreign currency funding markets come under stress.

Regarding funding in yen, under an assumption in which market funding in yen comes to a complete stop for 3 months, many banks would have sufficient liquid assets to satisfy their short-term funding needs, i.e., their liquid asset ratios would be greater than 1 with the amounts of assets and liabilities set at the levels prevailing at the end of September 2013 (the left-hand side of Chart VI-3-1). Furthermore, even if we assume a more severe shock in which 10 percent of deposits with a term until renewal of the deposit rate of 3 months or less are withdrawn, many banks would have sufficient liquid assets to meet their funding needs (the right-hand side of Chart VI-3-1). In this regard, financial

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we use sector averages of the rates as the dependent variable, only (2) and (3) in the above list as the independent variables, and the ordinary least squares method for the estimation method. The formulation of this estimation was based on the study of Leonardo Gambacorta, "How Do Banks Set Interest Rates?," European Economic Review, 52, pp. 792-819, 2008.

institutions' resilience against liquidity risk associated with funding in yen seems to be very strong.


Chart VI-3-1: Stress testing against yen liquidity shock[1,2,3]

Liquid asset ratio | Liquid asset ratio under deposit withdrawal

liquid asset ratio, times

— Median
— Bottom 30th percentile range
---- Bottom 10th percentile range
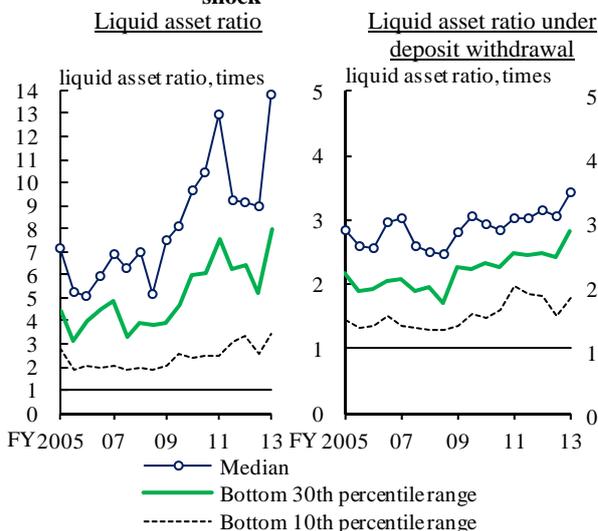
Notes: *1*. Major banks and regional banks are counted. Banks whose market investment exceeds their market funding are excluded. The latest data are as of end-September 2013.
2. Liquid asset ratio = (current accounts held at the Bank of Japan + cash + government bonds) / (net market funding maturing within 3 months + expected withdrawal of deposits with a term until renewal of the deposit rate of 3 months or less).
3. In the left-hand chart, it is assumed that 0 percent of deposits are withdrawn. In the right-hand chart, it is assumed that 10 percent of deposits with a term until renewal of the deposit rate of 3 months or less are withdrawn.
Source: BOJ.

Chart VI-3-2: Stress testing against foreign currency liquidity shock[1,2]

liquidity buffer / funding shortages, times

☐ End-September 2012
☐ End-March 2013
■ End-September 2013

FX swaps | Repos | CDs and CP | Simultaneous shock
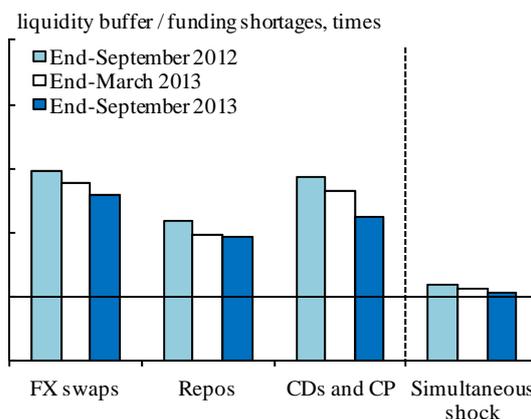
Notes: *1*. Major banks and regional banks are counted.
2. The duration of funding shortages in each market is 1 month.
Sources: Published accounts of U.S. MMFs; BOJ.

As for foreign currency funding markets, we assume a scenario under which one of the major sources of foreign currency funding for financial institutions -- the foreign exchange swap market, the repo market, and the CD and CP markets -- becomes unavailable for 1 month with the amounts of assets and liabilities set at the levels prevailing at the end of September 2013. Under this assumption, Japan's banks would still have adequate foreign currency liquidity buffers against stresses that may occur in any of the markets, i.e., their foreign currency liquidity to funding shortage ratios would be greater than 1, although these ratios declined somewhat recently (Chart VI-3-2).[66]

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[66] Funding shortages due to the disruption of each market comprise the amount of debt due within a month. Foreign currency liquidity buffers include foreign currency-denominated securities (excluding held-to-maturity securities and securities used as collateral in repo transactions) and foreign currency deposits. The estimate is based on the amounts of foreign currency-denominated assets and liabilities

Even under an extremely severe stress scenario in which all of the aforementioned markets become unavailable for 1 month, banks' current foreign currency liquidity buffers would cover their funding shortages. In this regard, financial institutions' resilience against liquidity risk associated with funding in foreign currencies also seems to be strong.

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at the end of September 2013. Funding shortages are calculated based on the maturity structure estimated as follows: the amount of foreign exchange swaps, CDs, and CP to be redeemed within a month is estimated based on transaction balance data, while all repo transactions are presumed to be redeemed within a month. If the foreign exchange swap market and the CD and CP markets are put under stress, banks are assumed to retain foreign currencies by using their foreign currency deposits and selling foreign currency-denominated securities or financing against the collateral provided by such securities. On the other hand, if the repo market is put under stress, banks are assumed to retain foreign currencies by using their foreign currency deposits and selling their securities. In each scenario, we do not consider securities borrowed in repo transactions as liquidity buffers.

Annex: 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 based on the Basel III requirements

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 based on the Basel II requirements

Tier I capital ratio = Tier I capital / risky assets

   Tier I capital is the key element of capital including common equities and retained earnings.

   Risky assets are financial institutions' risk-weighted assets.