Financial System Report

Summary

April 2016

Bank of Japan

April 2016: Comprehensive assessment and Highlights

Comprehensive assessment

- Japan's financial system has been maintaining stability.

  Stability: Unchanged from the previous report

- Financial intermediation has continued to operate smoothly. (April 2016)

  Functioning: "Financial intermediation has operated more smoothly than before." (October 2015)

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

Highlights

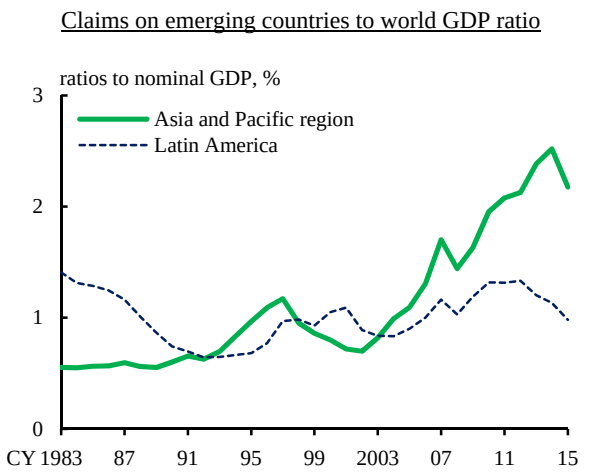
- Effects of QQE with a negative interest rate on the financial system;
- New section in Chapter IV, discussing financial institutions' profitability;
- Underlying factors and effects of the heightened volatility in global financial markets;
- Updated analyses on important risk categories, e.g., foreign currency liquidity, commodity-related exposures, the real estate market, followed by the Bank's view on points of focus in risk management for financial institutions.

Contents

1. External environment

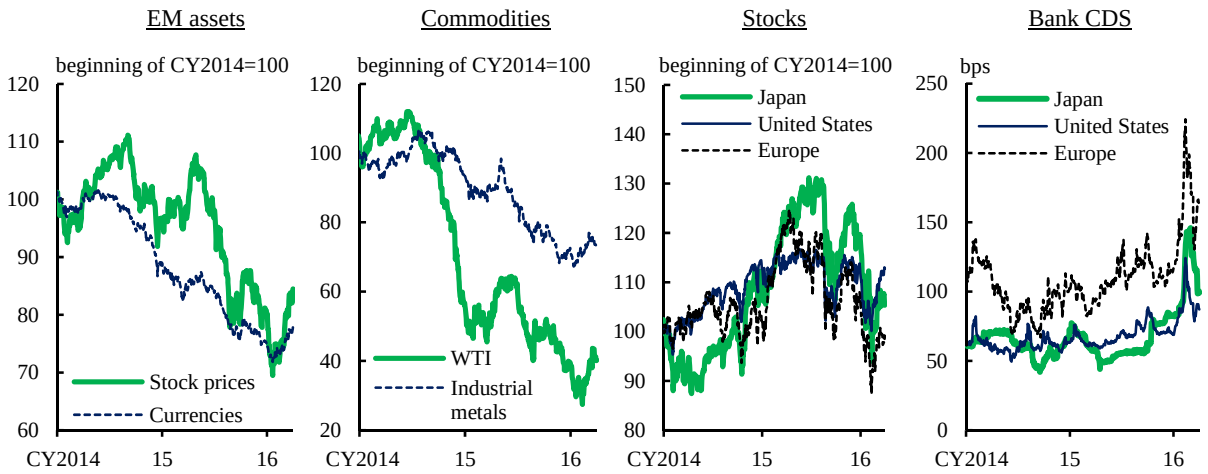
- Since the summer of 2015, investors' risk aversion has increased. There was a significant heightening of financial market volatility through the first quarter of 2016.
- Impulses have been transmitted to Japan mainly in the form of a substantial decline in stock prices, continued yen appreciation and a rise in foreign currency funding costs.
- Nevertheless, interest rates declined further owing to the effects of QQE with a negative interest rate, and the credit market has been stable relative to that of overseas markets. Meanwhile, Japan's economy has continued its moderate recovery trend.

Chart II-2-5: Capital flows into emerging markets



Sources: BIS, "Consolidated banking statistics"; Bloomberg; Haver Analytics; IMF, "World economic outlook."

Chart II-2-2: Risky asset prices



Source: Bloomberg.

2. Assessment of financial system functioning
(1) Financial institutions' domestic loans

- Financial institutions (FIs)' domestic loans have continued to grow at a 2.0-2.5 percent year-on-year rate.
- FIs have continued to adopt a positive stance toward undertaking more risk in their business operations.
- FIs have been active in lending, particularly to small- and medium-sized firms, including borrowers with lower credit ratings, while continuing to support, for example, start-up firms, business revitalization, and firms' business matching.

Chart III-1-1: Domestic loans outstanding among financial institutions

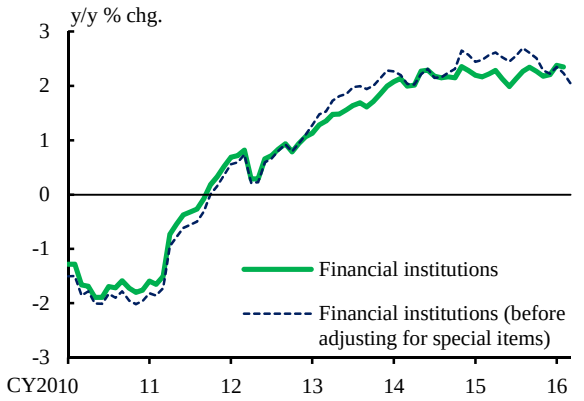


Chart III-1-9: Corporate loans outstanding among financial institutions by industry

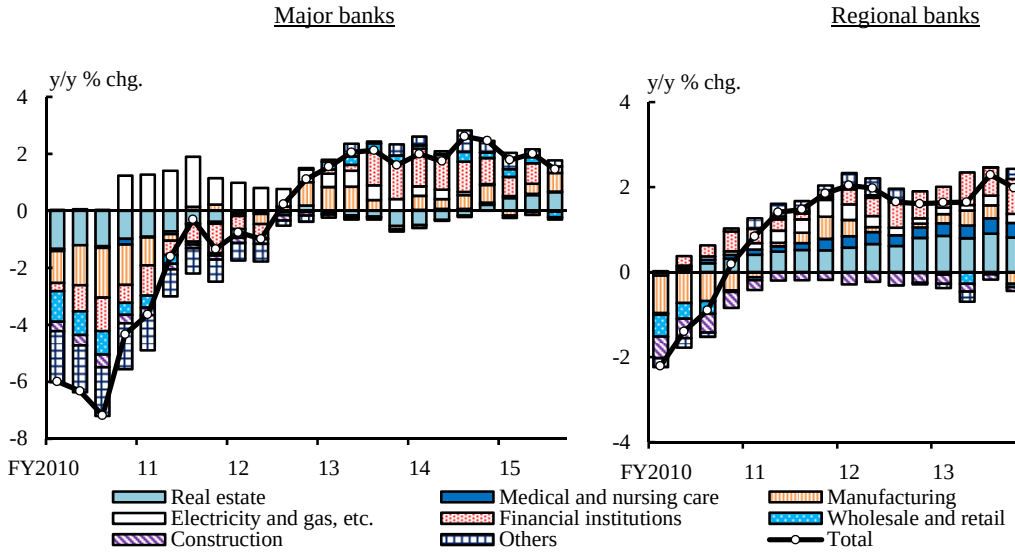
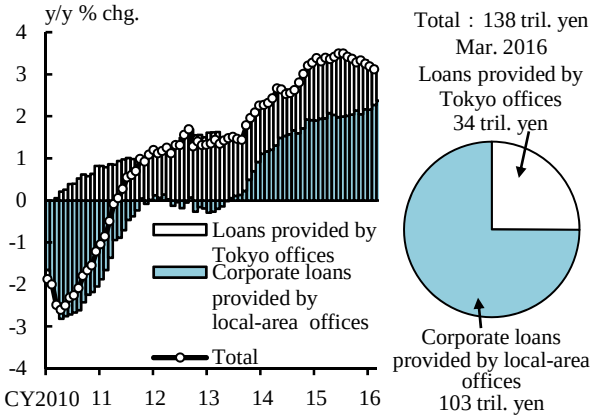


Chart III-1-11: Corporate loans provided by regional banks



2. Assessment of financial system functioning
(2) Financial institutions' overseas loans

- Banks' overseas loans have been growing at a year-on-year rate of around 10 percent.
- Banks have been active in overseas lending, while being mindful of their ability to raise foreign currency funding.

Chart III-1-23: Banks' foreign currency-denominated loans and loans by overseas branches

Loan amounts outstanding (U.S. dollar basis and yen basis)

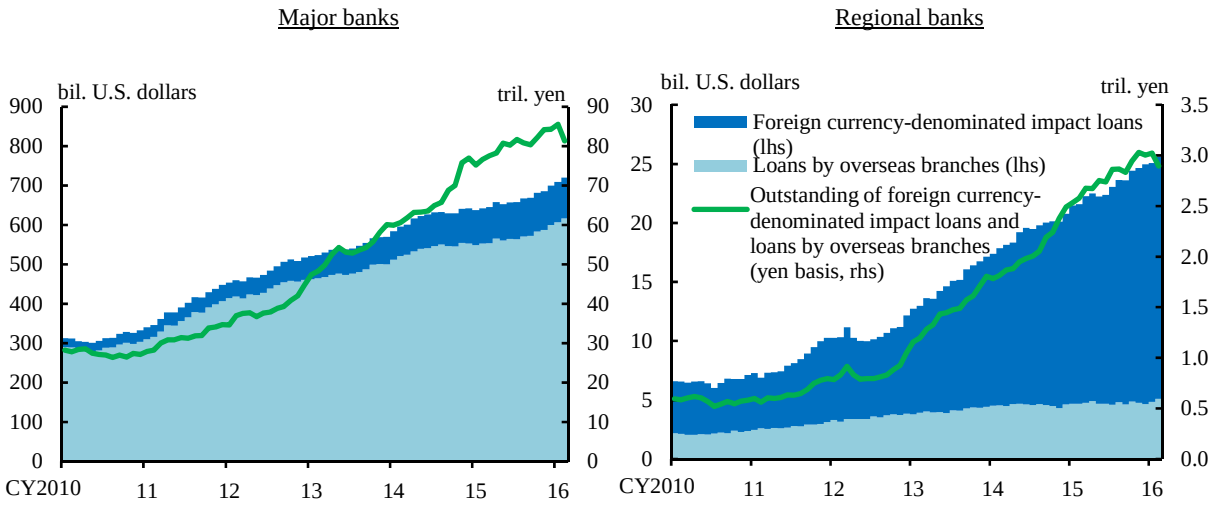
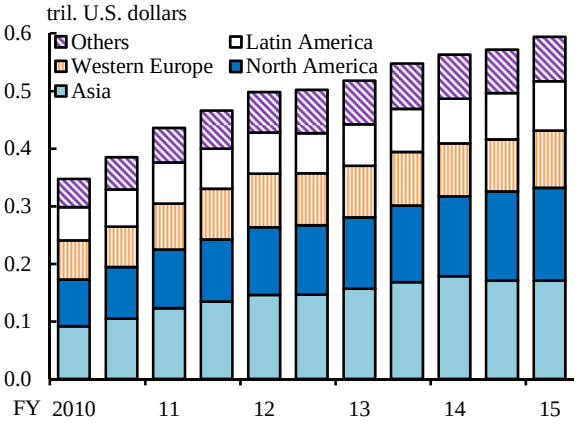


Chart III-1-24: Overseas loans outstanding of three major banks by region



Sources: Published accounts of each bank.

2. Assessment of financial system functioning
(3) Financial institutions' securities investment

- As for securities investment, FIs have been investing further in assets such as foreign bonds and investment trusts, while their outstanding holdings of yen-denominated bonds remain at a high level.
- Recently, however, some FIs have become more cautious regarding the extension of overseas credit, especially to emerging economies, and investment in assets such as stock investment trusts, due in large part to unsettled global financial conditions.

Chart III-1-28: Outstanding amount of yen-denominated bonds among financial institutions

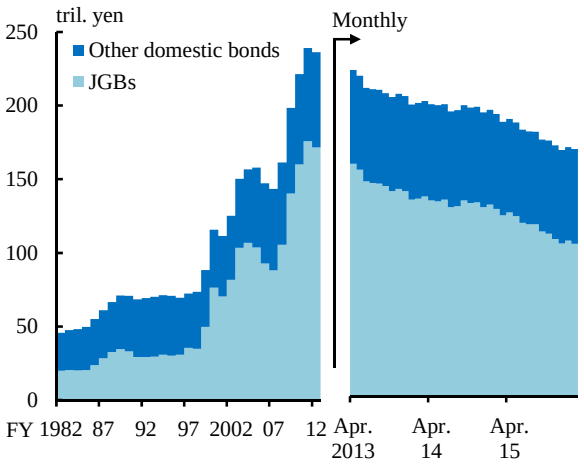


Chart III-1-29: Outstanding amount of foreign bonds among financial institutions

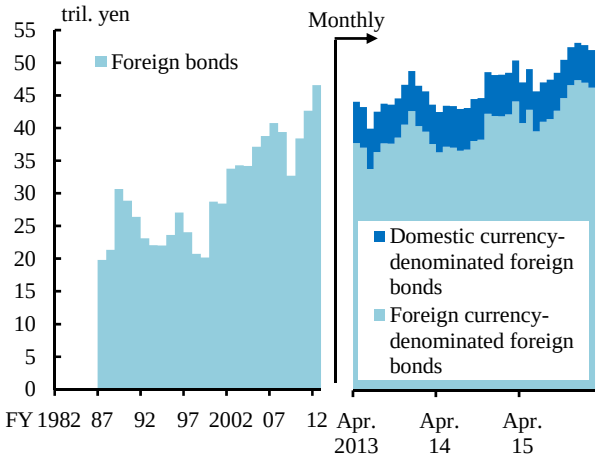
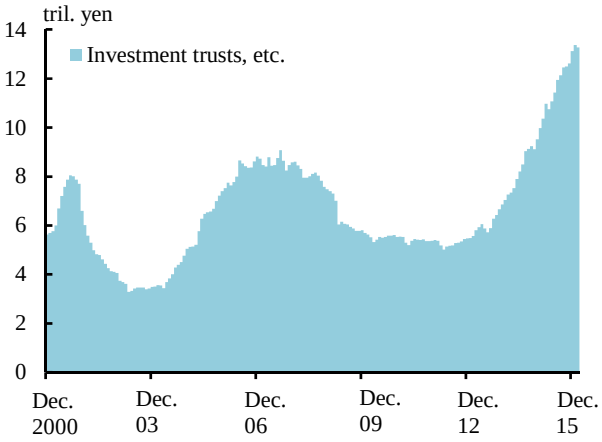


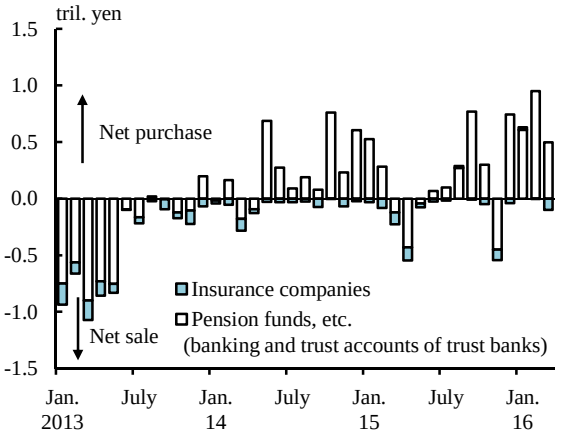
Chart III-1-30: Outstanding amount of investment trusts, etc. among financial institutions



2. Assessment of financial system functioning
(4) Institutional investors

- Institutional investors have continued to reallocate their investments away from domestic bonds toward risky assets, such as foreign bonds, in response to a further decline in domestic interest rates.

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



Source: Tokyo Stock Exchange.

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

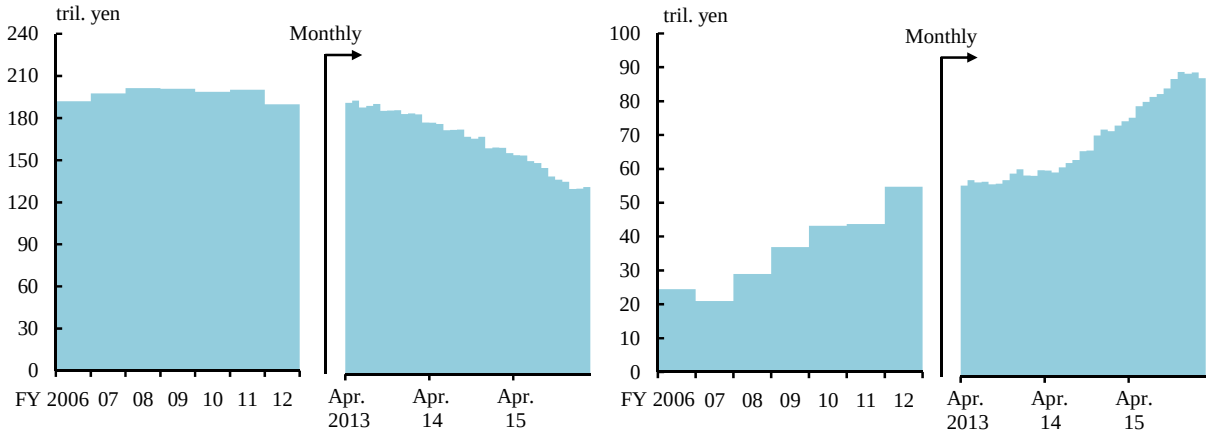
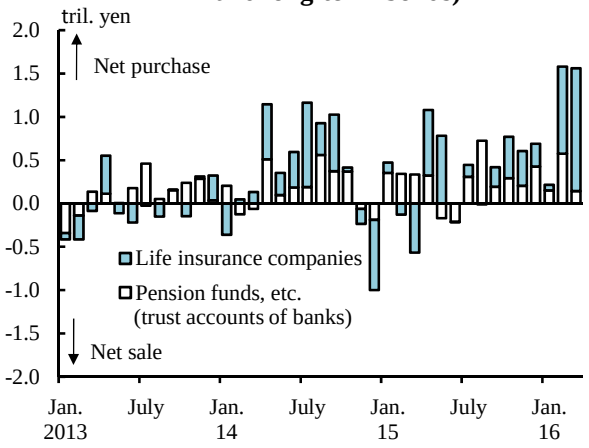


Chart III-2-3: Outward investment among life insurance companies and pension funds, etc. (medium- and long-term bonds)



Source: Ministry of Finance.

2. Assessment of financial system functioning
(5) Households' investment activities

- In terms of households' investment activities, basically there appears to be a continued tendency to increase investments in investment trusts and other risky assets, suggested by the widening use of Nippon Individual Savings Account (NISA) and wrap accounts.
- Recently, however, the trend among households to hold more risky assets has weakened, primarily reflecting unsettled global financial conditions.

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

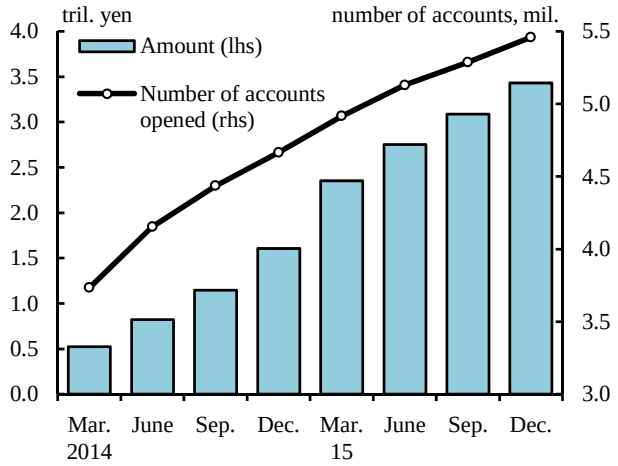


Chart III-5-6: Assets under management in wrap accounts

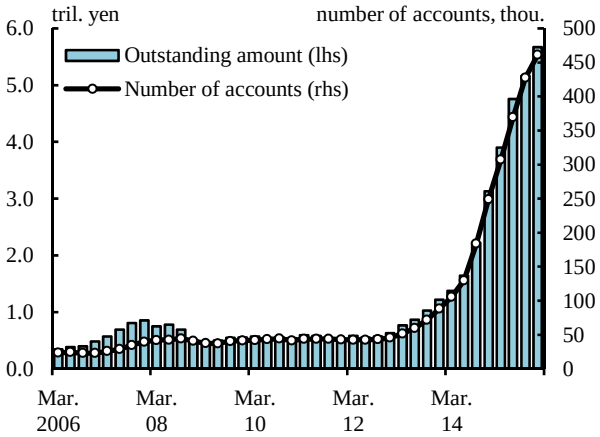
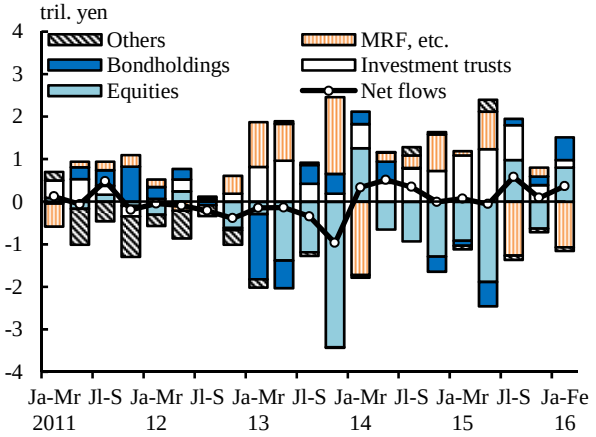


Chart III-5-4: Capital flows by product among major securities companies for retail customers



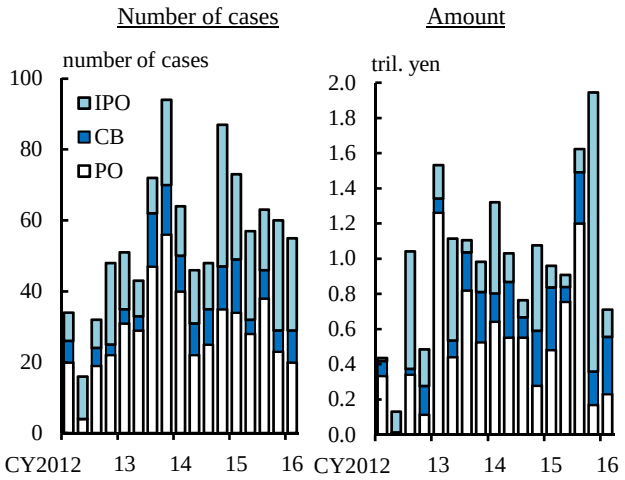
Source: Japan Investment Advisers Association.

2. Assessment of financial system functioning

(6) Financial intermediation through financial markets and financial conditions among firms and households

- Equity financing has decreased recently in response to the decline in stock prices, although firms' proactive financing stance seems to have remained largely unchanged.
- Issuing conditions for CP and corporate bonds have remained favorable alongside a further decline in interest rates.
- Financial conditions among firms and households have become more accommodative.

Chart III-3-1: Equity financing



Source: I-N Information Systems.

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

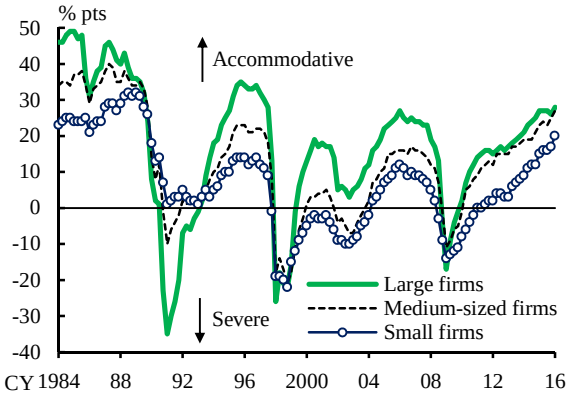


Chart III-4-2: DI of financial positions of firms

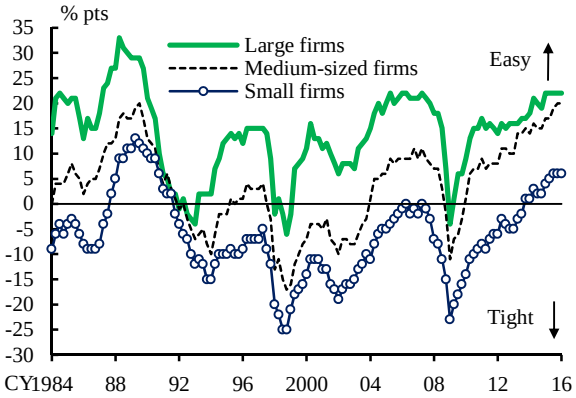
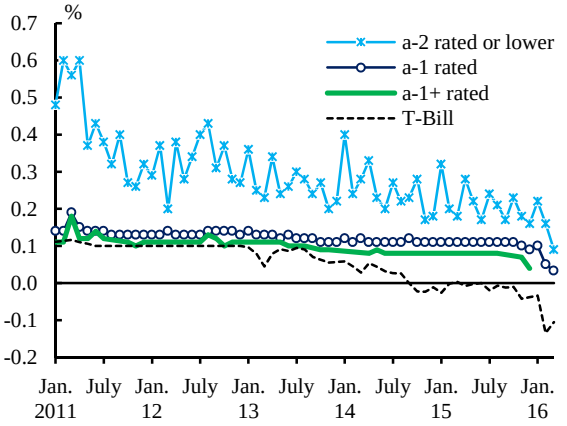


Chart III-3-3: CP issuance rates



Sources: Japan Bond Trading; Japan Securities Depository Center.

3. Assessment of financial system stability

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

- FIs' capital adequacy ratios are sufficiently above regulatory requirements.
- Although the amount of risk borne by FIs has increased, it still remains contained relative to their capital bases.

(1) Taking into account the stock price developments through the end of March 2016, capital level and the amount of risk are estimated.

tril. yen

	Financial institutions		Major banks		
	End-Sep. 2015	End-Mar. 2016 (Estimate)	End-Sep. 2015	End-Mar. 2016 (Estimate)	changes (% chg.)
Adequate capital	53.7	53.7	29.3	29.3	-0.0 (-0.2%)
Amount of risk	38.3	41.0	21.9	23.8	1.8 (8.4%)
Market risk associated with stockholdings	12.8	14.9	9.0	10.4	1.4 (15.9%)
Unrealized gains/losses on securities (tax effects taken into account)	8.5	8.7	4.7	4.7	-0.1 (-1.6%)
Unrealized gains/losses on bondholdings	1.5	2.5	0.3	0.6	0.3 (132.6%)
Unrealized gains/losses on stockholdings	6.4	5.7	4.3	3.8	-0.4 (-10.3%)

(2) See slides 28 to 34 for macro stress testing results.

Chart IV-4-2: Risks borne by financial institutions and amount of adequate capital

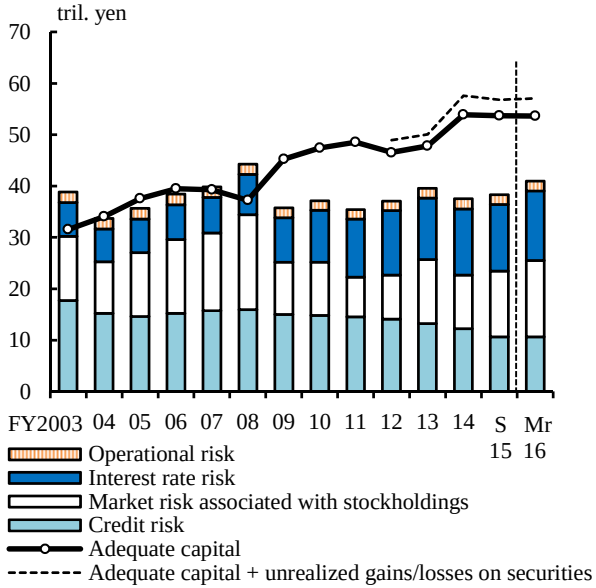
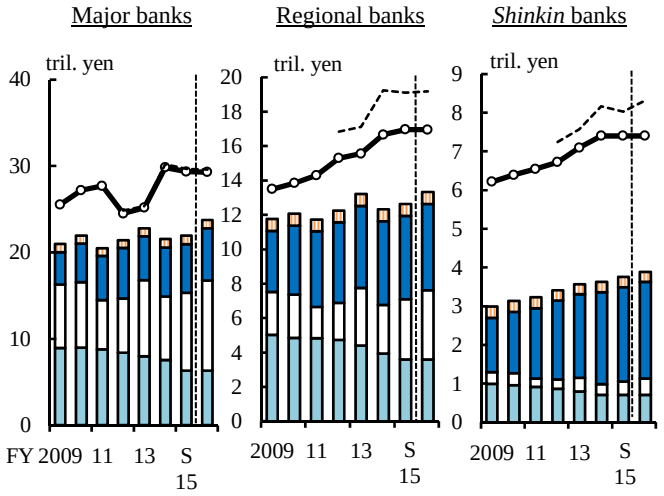


Chart IV-4-3: Risks borne by financial institutions and amount of adequate capital (by type of bank)



Decomposition of risks borne by financial institutions

- Credit risk has decreased due to an improvement in asset quality;
- Yen interest rate risk remains at a high level compared with the past;
- Market risk associated with stockholdings has increased markedly, mainly due to heightened volatility in financial markets.

Chart IV-1-1: Credit risk borne by financial institutions

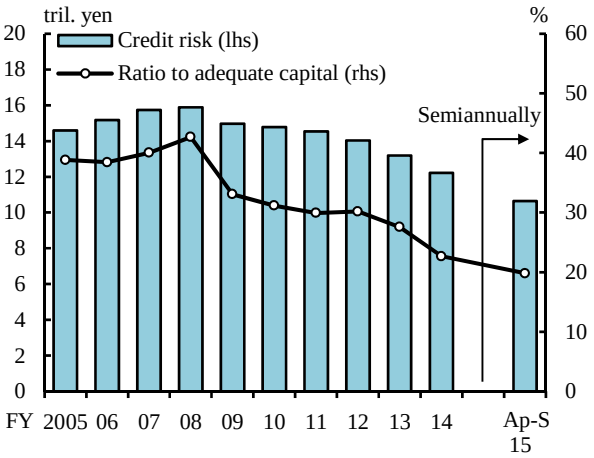


Chart IV-2-1: Interest rate risk associated with yen-denominated bondholdings among financial institutions

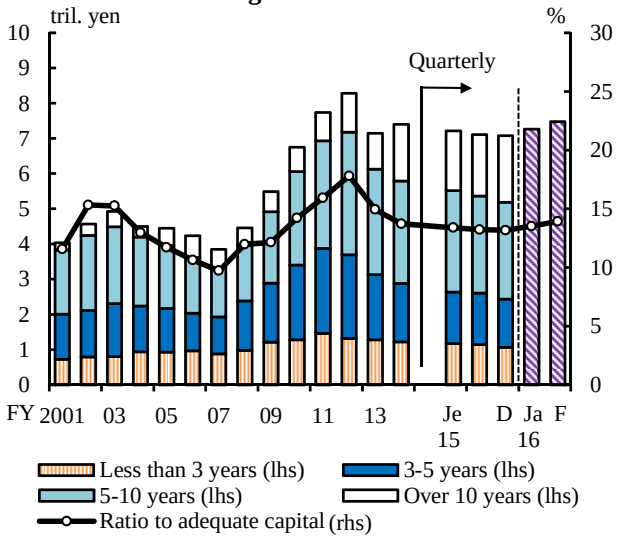


Chart IV-2-8: Market risk associated with stockholdings among financial institutions

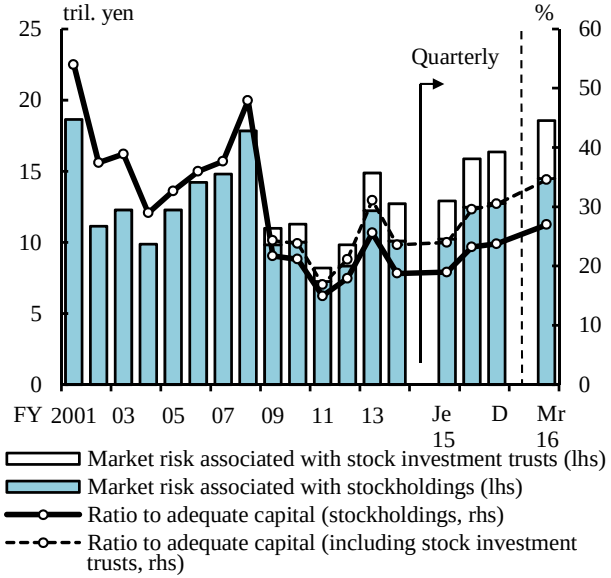


Chart IV-2-3: Effects of a rise in interest rates on capital losses on yen-denominated bondholdings

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	Upward shift by 1 percentage point			Upward shift by 2 percentage points			Upward shift by 3 percentage points		
	End-June 2015	End-Sep. 2015	End-Dec. 2015	End-June 2015	End-Sep. 2015	End-Dec. 2015	End-June 2015	End-Sep. 2015	End-Dec. 2015
Financial institutions	-7.2	-7.1	-7.1	-13.8	-13.6	-13.5	-19.8	-19.5	-19.3
Banks	-5.1	-5.1	-5.0	-9.8	-9.7	-9.6	-14.1	-14.0	-13.8
Major banks	-2.3	-2.4	-2.3	-4.4	-4.5	-4.3	-6.4	-6.5	-6.2
Regional banks	-2.8	-2.7	-2.8	-5.3	-5.2	-5.3	-7.7	-7.4	-7.6
Shinkin banks	-2.1	-2.0	-2.0	-4.0	-3.9	-3.9	-5.7	-5.5	-5.5

3. Assessment of financial system stability
(2) Funding liquidity

- FIs have sufficient yen funding liquidity.
- As for foreign currency funding, FIs have liquidity buffers that can cover possible outflows for a certain period. They have made steady progress in efforts to bolster stable funding sources.
- Nevertheless, foreign currency funding costs are on a rising trend. A broad range of domestic entities will likely continue working toward increasing their demand for foreign currencies.
- Therefore, careful attention should be paid to the liquidity situation in the foreign currency funding market, including the effects of international financial regulations.

Chart B5-8: Undrawn credit commitments among three major Japanese financial groups

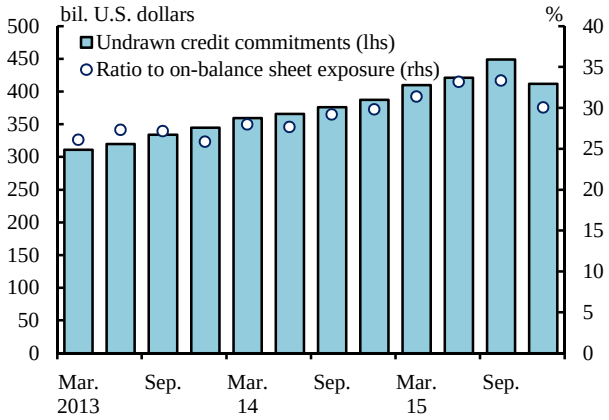


Chart IV-3-4: Resilience to foreign currency liquidity among banks

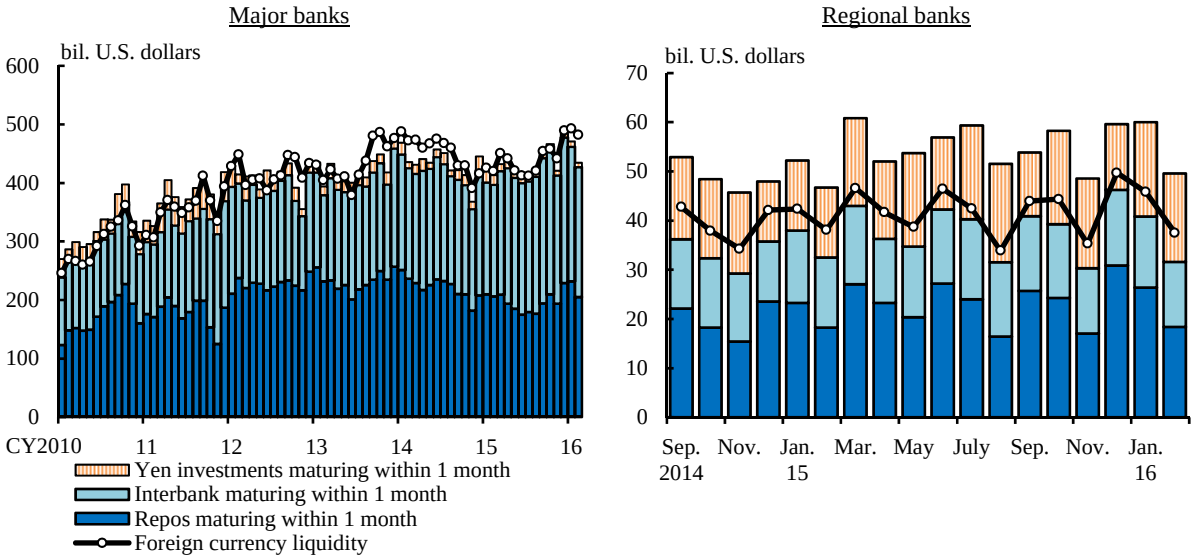
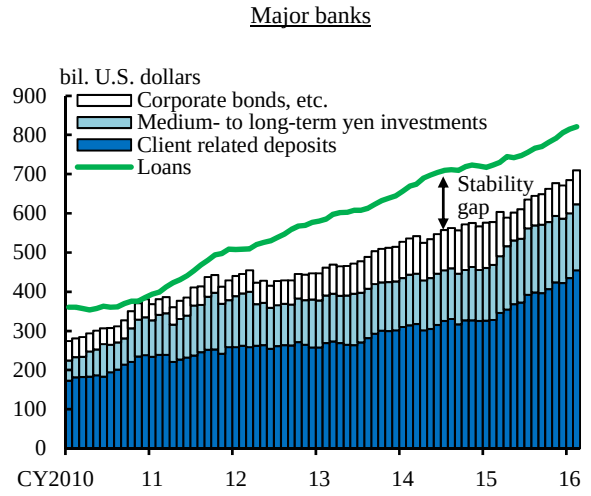


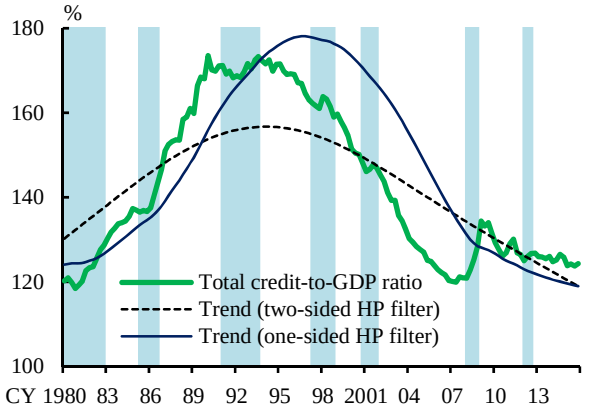
Chart IV-3-3: Stability gap among banks



3. Assessment of financial system stability
(3) Aggregate credit and financial activity indicators

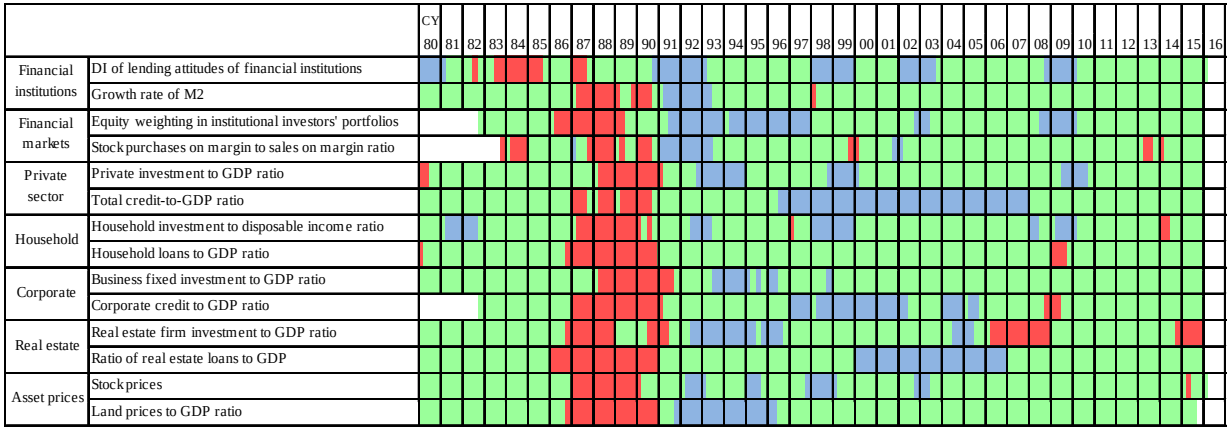
- The total credit-to-GDP ratio has remained unchanged.
- With regard to a wide range of financial activity indicators, no large deviations from their trends have been observed.
- In the real estate market, transaction activity has been buoyant, albeit with regional differences, and the growth rate of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

Chart V-1-2: Total credit-to-GDP ratio



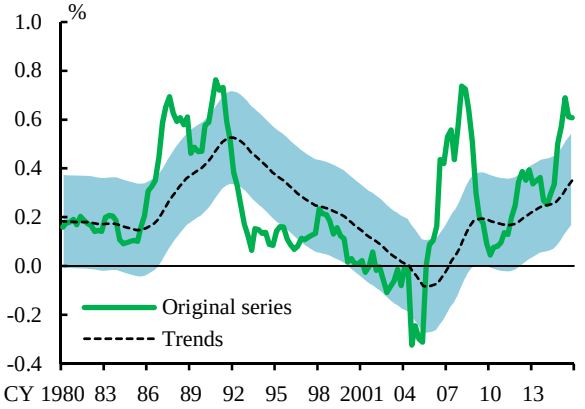
Sources: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

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



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

Chart V-1-5: Real estate firm investment to GDP ratio

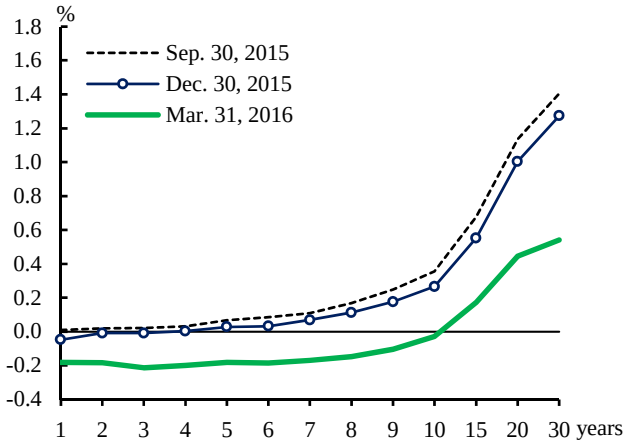


Sources: Cabinet Office, "National accounts"; Ministry of Finance, "Financial statements statistics of corporations by industry."

4. Financial intermediation and QQE with a negative interest rate (1)

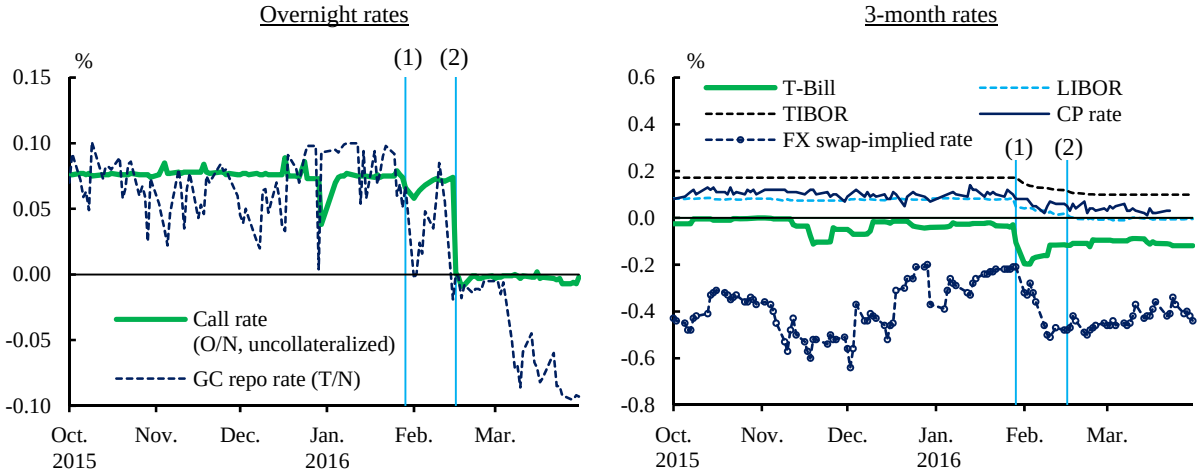
- QQE with a negative interest rate has been contributing to smoother functioning of financial system in the following areas:
- Market interest rates and a wide range of interest rates on deposits and loans have declined further.
- FIs and other entities have been prompted to take portfolio rebalancing a step further, including by taking an increasingly active stance toward lending.

Chart II-3-6: JGB yield curve



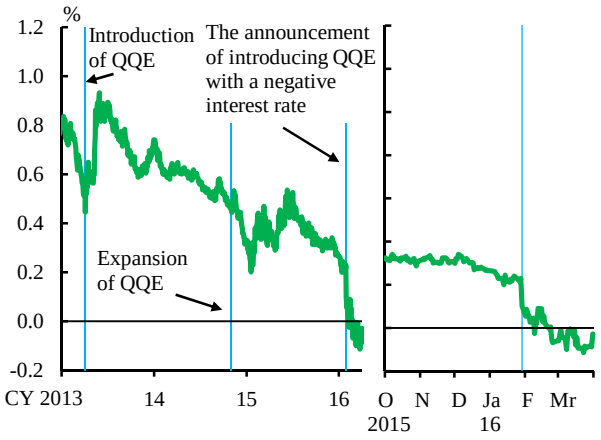
Source: Bloomberg.

Chart II-3-1: Short-term rates



Note: (1) indicates the announcement of introducing QQE with a negative interest rate; (2) indicates the effective start date of the negative interest rate.
Sources: Bloomberg; Japan Bond Trading; JASDEC; JSDA; BOJ.

Chart II-3-5: Long-term JGB yields

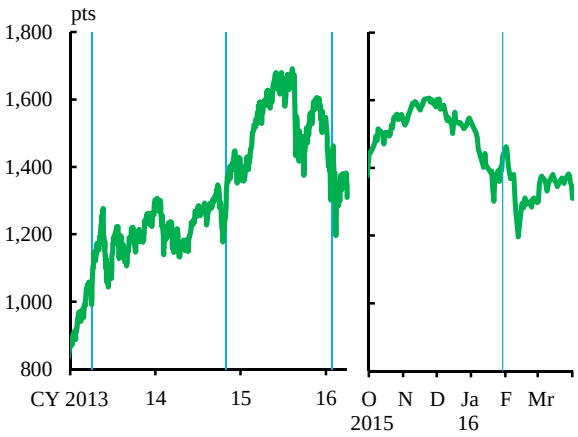


Source: Bloomberg.

4. Financial intermediation and QQE with a negative interest rate (2)

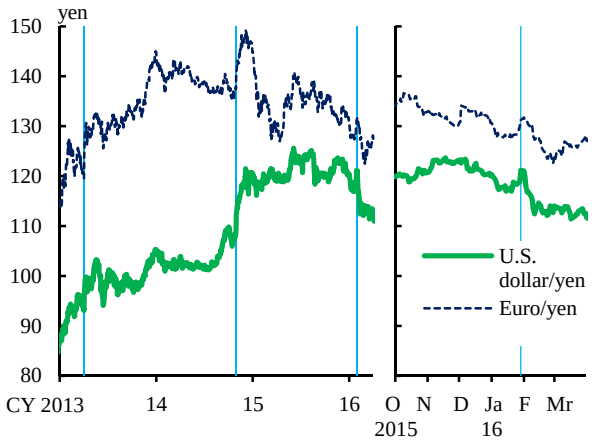
- Nevertheless, the transmission of the above effects is constrained by several factors:
- The need to review and adapt investment strategies and operational arrangements, including IT systems, to the new environment of negative interest rates.
- The heightened volatility in global financial markets has led to a decline in stock prices, yen appreciation, and an increase in the cost of foreign currency funding, which have worked to restrain risk taking somewhat.

Chart II-3-17: Stock prices (TOPIX)



Source: Bloomberg.

Chart II-3-22: Foreign exchange rates



Source: Bloomberg.

Operational arrangements in response to the negative interest rate

Various entities such as financial institutions, investors, and firms have been addressing operational issues regarding negative interest rates. These include:

(1) legal and contractual treatment of interest rates applied to market interest rate-based lending in the case where a related formula calculates a negative interest rate (the Financial Law Board published the relevant document on February 19, 2016);

(2) treatment of hedging accounting in the case where borrowers engage in interest rate swaps to fix original variable interest rate payments (the Accounting Standard Board of Japan, ASBJ, published interim guidance on March 24, 2016);

(3) treatment of discount rates applied to retirement benefit accounting (ASBJ published interim guidance on March 10, 2016); and

(4) treatment of fees for money trusts that are subject to negative interest rates

The Bank of Japan will continue to support these efforts as necessary.

4. Financial intermediation and QQE with a negative interest rate (3)

- Furthermore, signs of a holdup in the flow of funds have been observed:

(1) a large sum of funds have remained within trust banks and major banks;

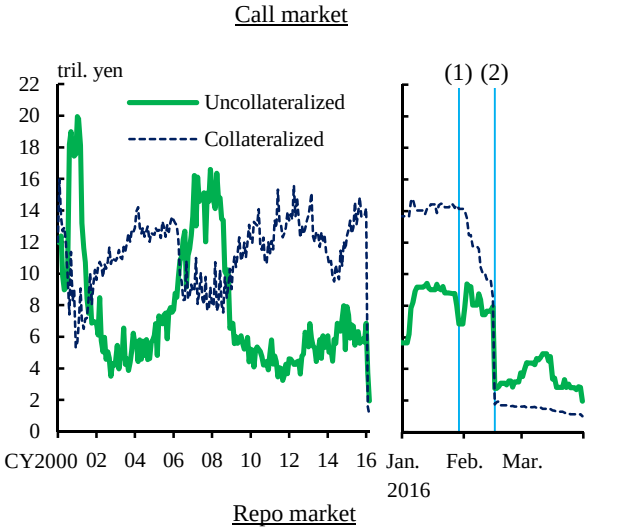
(2) the suspension of subscriptions and the early redemption of some investment trusts and insurance products;

(3) postponed transactions due to operational constraints and necessary arrangements, including IT-related issues;

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

- The effects of QQE with a negative interest rate are expected to propagate further as these issues are resolved.

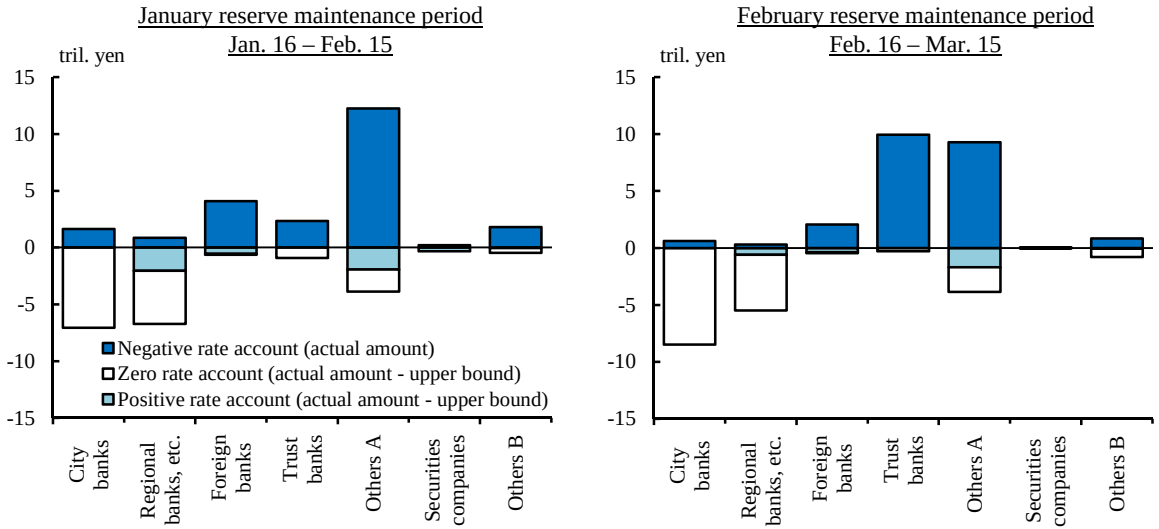
Chart II-3-2: Amount outstanding in money markets



Note: (1) indicates the announcement of introducing QQE with a negative interest rate; (2) indicates the effective start date of the negative interest rate.

Sources: Association of Call Loan and Discount Companies; JSDA.

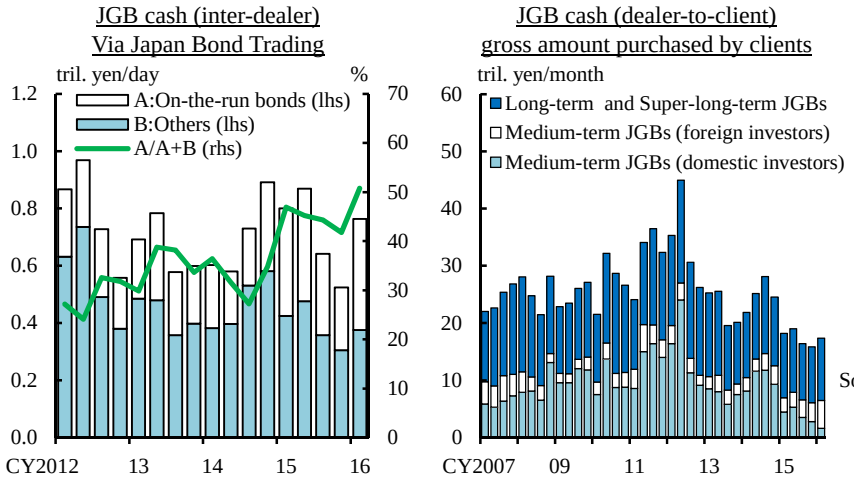
Chart II-3-4: BOJ current account balances by sector



Liquidity in the JGB market

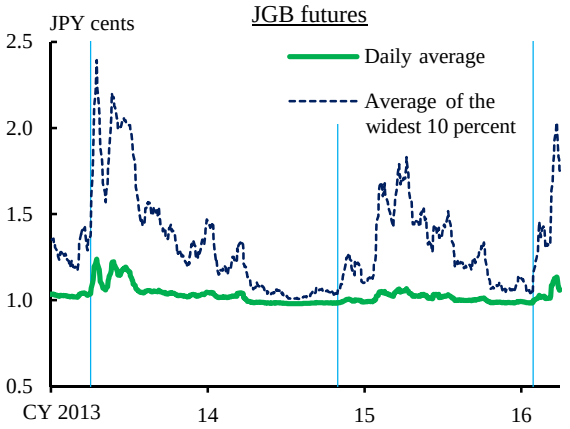
- Since the introduction of QQE with a negative interest rate was announced, many liquidity indicators suggest that liquidity in the JGB market has deteriorated.
- It is necessary to continue careful monitoring of whether the robustness of the JGB market toward stress is maintained.

Chart II-3-9: Transaction volume in the JGB market



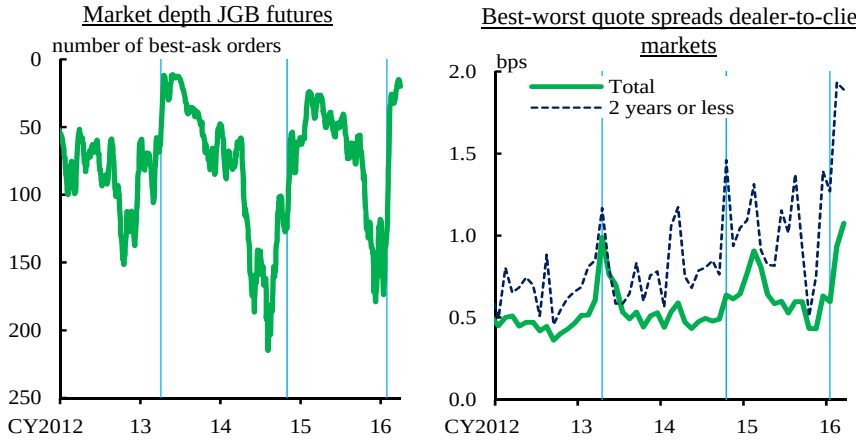
Sources: Bloomberg; JSDA; QUICK.

Chart II-3-10: Bid-ask spreads in the JGB market



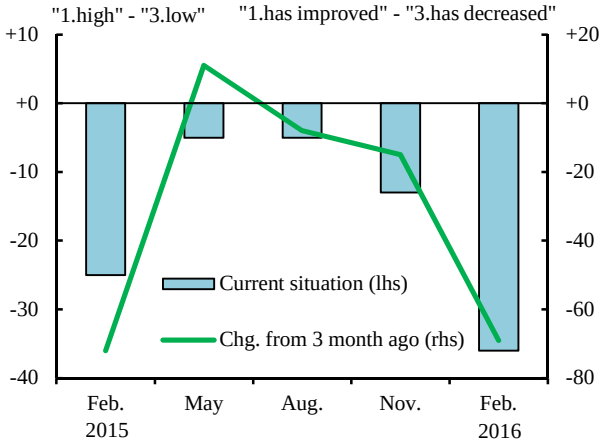
Sources: Nikkei Inc., "NEEDS"; Thomson Reuters Markets; BOJ.

Chart II-3-11: Market depth and resiliency in the JGB market



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

Chart II-3-12: Bond market survey



5. Financial institutions' profitability, financial stability, and QQE with a negative interest rate (1)

- QQE with a negative interest rate will exert further downward pressure on financial institutions' profits for the time being.
- Despite a continued decline in profits from domestic loans, FIs have maintained overall profits at a high level largely due to: (1) a decline in credit costs; (2) an increase in securities-related profits, alongside a rise in stock prices; and (3) an increase in international operating profits.
- There is an increasing possibility that a decline in core profitability may become more apparent primarily due to: (1) the slowdown in the pace of decline in credit costs; and (2) heightened volatility in global financial markets, which has weighed on securities-related profits.

Chart IV-5-3: Interest margin on loans by type of bank

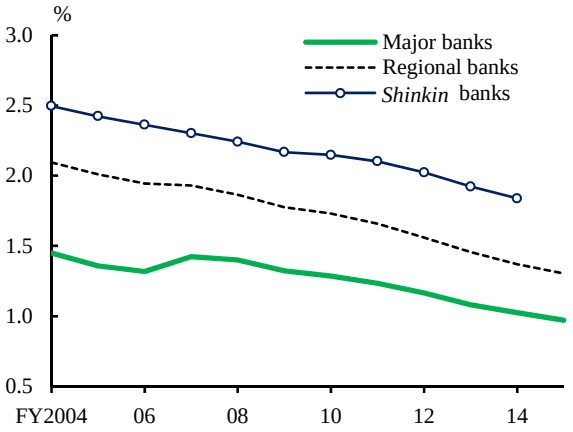


Chart IV-5-1: Net income by type of bank

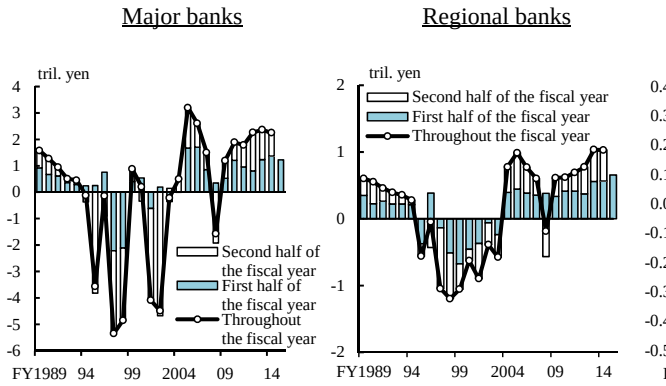
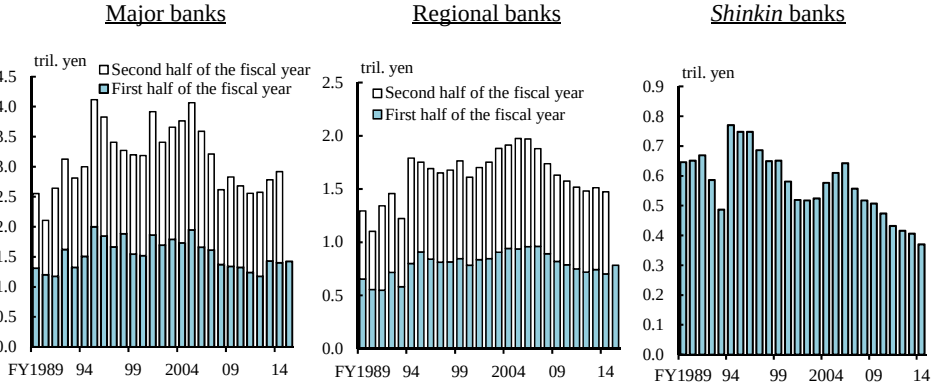


Chart IV-5-2: Profits from core business by type of bank



5. Financial institutions' profitability, financial stability, and QQE with a negative interest rate (2)

- FIs have generally secured sufficient capital bases that will allow them to continue with proactive credit intermediation, even though profitability will come under downward pressure for the time being.
- If FIs' portfolio rebalancing activities lead to an improvement in economic and price developments, this is in turn likely to bring about a recovery in core profitability.
- However, if the recent trend of declining profits persisted, it could eventually lead to a weakening in their credit intermediation function.
- With regard to the impact of QQE with a negative interest rate on financial stability, it is necessary to examine both the risk of overheating – excessive accumulation of macro risks and exuberant asset prices -- and the risk of a gradual pullback in financial intermediation due to a persistent decline in profits.

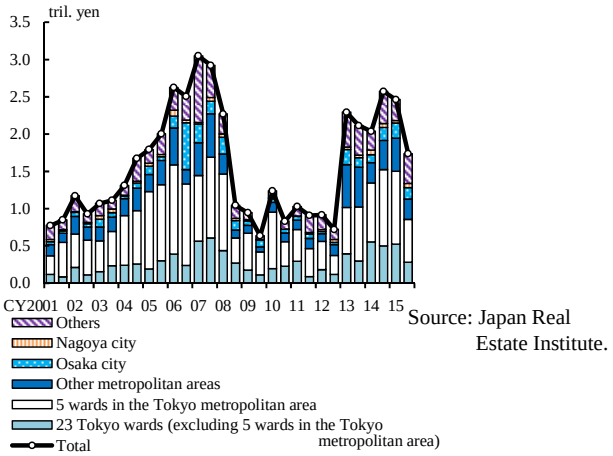
6. Toward ensuring future financial stability

Risks and challenges from a macroprudential perspective	Actions by the Bank of Japan
Accumulation of macro risks (1) Japan's financial system is increasingly exposed to developments in overseas economies, as well as the vagaries of financial markets at home and abroad. **Structural changes** (2) Increasing systemic importance of large financial institutions. (3) Decline in profitability associated with domestic deposit-taking and lending activities. **QQE with a negative interest rate can be considered to exert significant effects on all three risks.** **Longer-term issues** (4) Sustainability of the shifts “from saving to investment.” (5) Proliferation of IT utilization, e.g., FinTech and cyber security protection.	➢ off-site monitoring and on-site examinations ✓ Encourage refinement of financial institutions’ management practices that facilitate the adoption of a positive approach toward risk taking and global business expansion. ✓ **The Bank will focus on:** **(1) FIs’ international operations incl. foreign currency funding;** **(2) FIs’ ALM and investments in markets;** **(3) systemic-risk characteristics of large FIs;** **(4) regional FIs’ profitability;** **(5) other areas incl. the roles of foreign FIs’ Japanese branches within their group.** ➢ seminars and other events ➢ coordination with overseas central banks, other organizations and authorities, particularly the JFSA ➢ international financial regulations ➢ measures related to transaction activities

Real estate market (1)

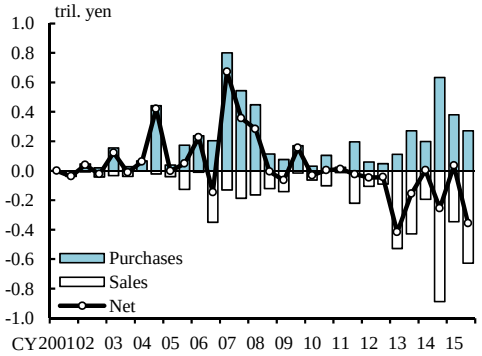
- The total value of real estate transactions has decreased slightly.
- The fall in real estate prices across the nation has begun to dissipate.
- The distribution of the growth rates of commercial land prices (appraisal values) as monitored at the same locations has been skewed moderately to the right.
- Large falls in vacancy rates for office properties in central Tokyo have been observed. Expected yields are hitting record lows in an increasing number of areas, although actual rental price hikes remain moderate for now.

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



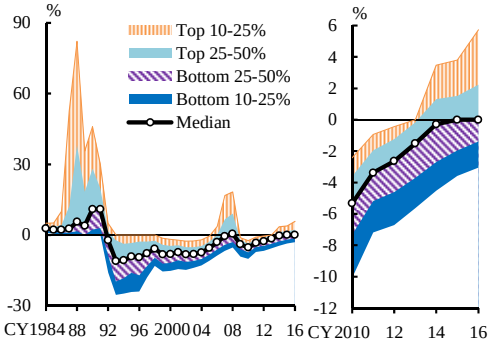
Source: Japan Real Estate Institute.

Chart B4-8: Real estate transactions by foreign investors



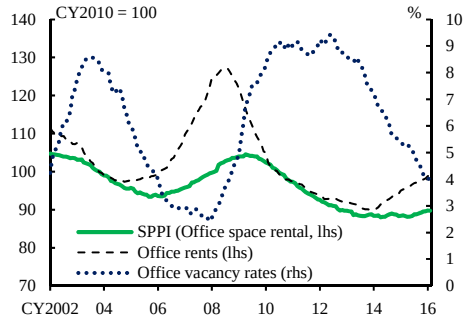
Source: Japan Real Estate Institute.

Chart B4-1: Distribution of year-on-year rates of change in commercial land prices



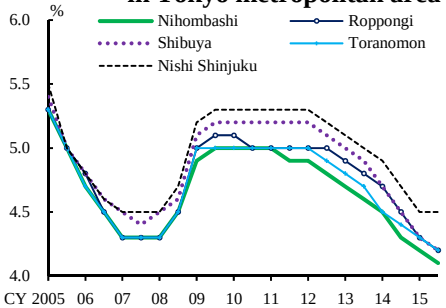
Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land market value publication."

Chart B4-3: Office rents and vacancy rates in the Tokyo area



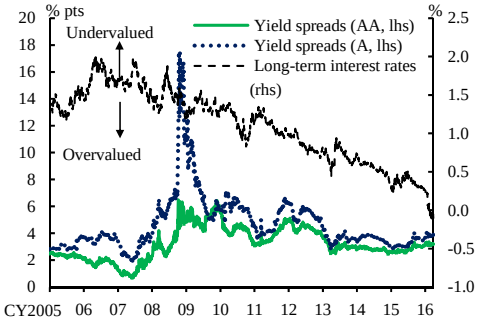
Sources: Miki Shoji Co., Ltd.; BOJ, "Services Producer Price Index."

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



Source: Japan Real Estate Institute, "The Japanese real estate investor survey. "

Chart B4-5: Yield spreads of J-REITs

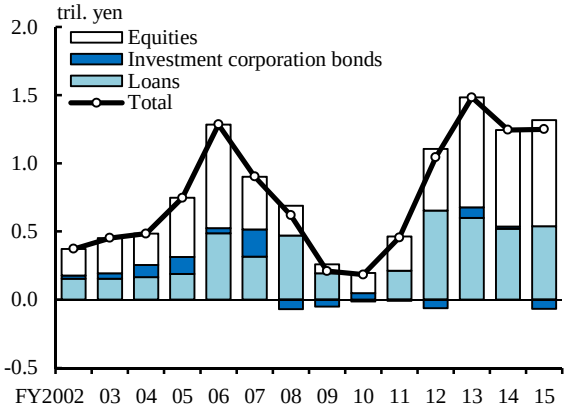


Sources: Bloomberg; Japan Bond Trading; QUICK.

Real estate market (2)

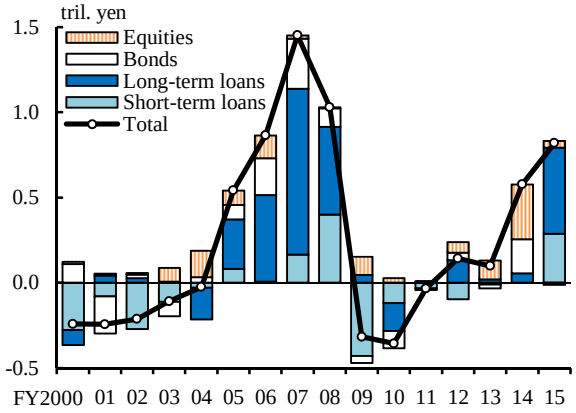
- J-REITs have continued to raise funding at high levels, but leverage has not increased.
- Listed real estate companies (mainly large corporations) other than J-REITs have significantly increased their debt financing recently.
- The distribution of the year-on-year changes in the outstanding amounts of interest-bearing debts of small- and medium-sized real estate companies with low credit ratings continued on an upward trend.

Chart B4-11: Financing by J-REITs



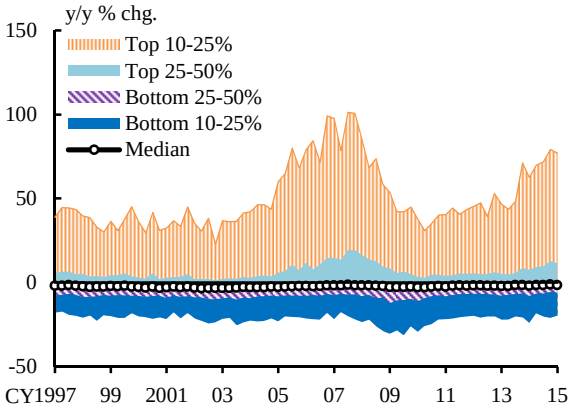
Source: Nikkei Needs.

Chart B4-12: Financing by listed real estate companies other than J-REITs



Source: Nikkei Needs.

Chart B4-13: Debt financing by real estate companies with lower creditworthiness



Source: CRD.

Real estate market (3)

- Real estate loans have been growing rapidly, continuing to increase at a pace exceeding that of loans to firms in all industries.
- The increase in loans by major banks is mainly attributable to J-REITs.
- Among regional financial institutions, loans to small firms in the housing rental business have been growing at a faster pace.

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

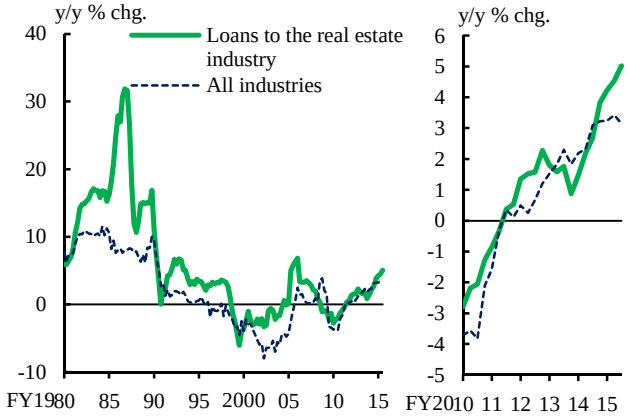
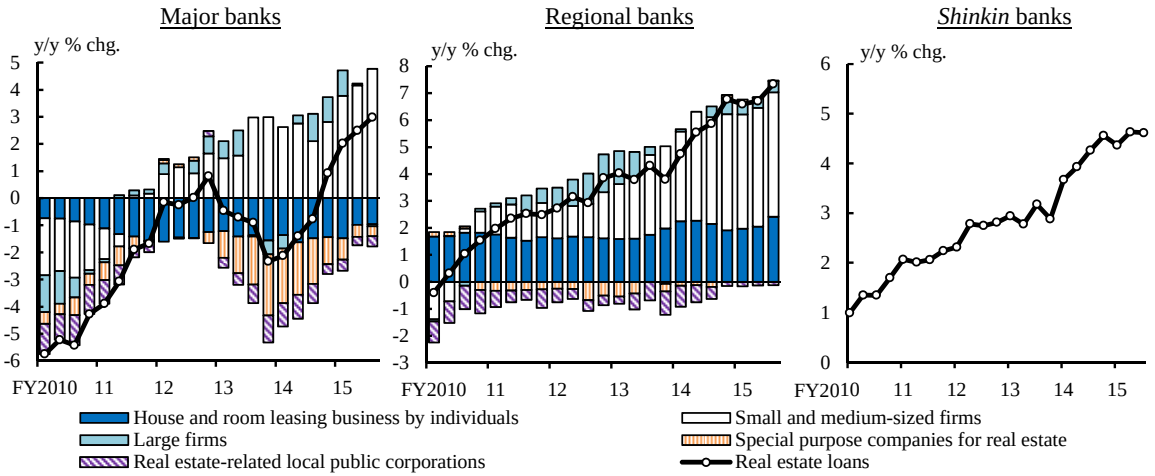


Chart III-1-15: Real estate loans by type of bank

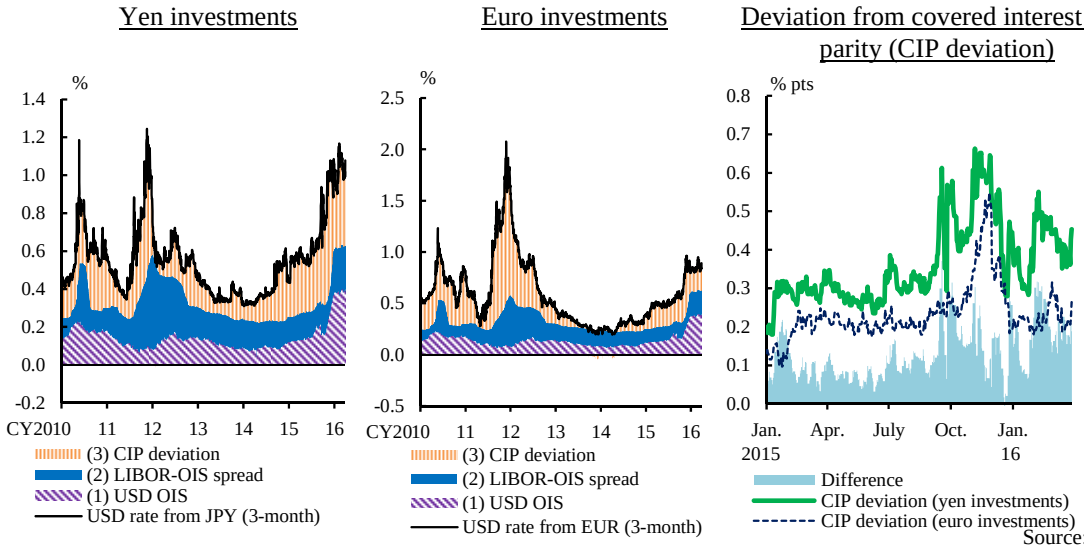


- In summary, the real estate market as a whole is not in an overheating state.
- However, signs of a gradual vitalization continue to be observed.
- The situation in the real estate market, including the potential upcoming impact of the negative interest rate environment, warrants careful vigilance.

Foreign currency funding liquidity (1)

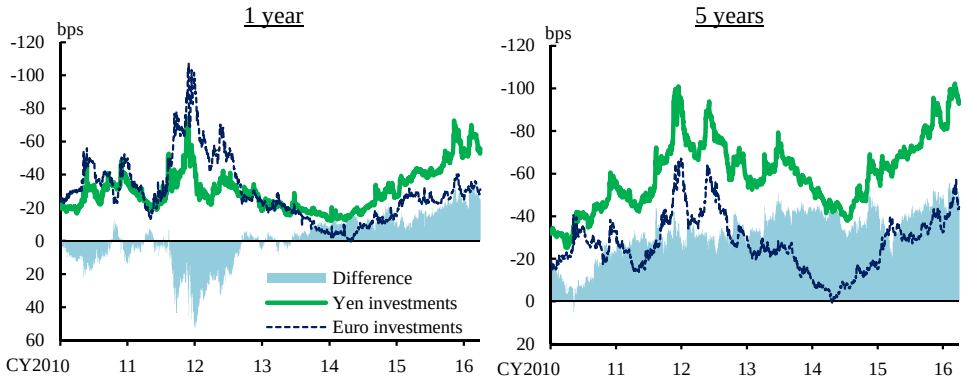
- The funding premium in the foreign currency funding markets has widened, particularly in the foreign exchange and currency swap markets.
- Although constraints on the availability of funds have not been observed, there is a possibility that foreign currency funding conditions continue to tighten.

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



Source: Bloomberg.

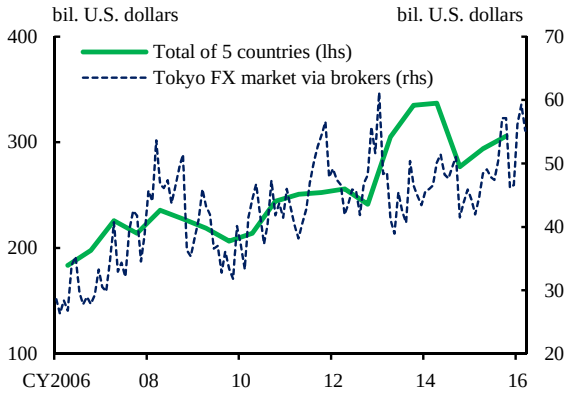
Chart IV-3-6: Medium- to long-term U.S. dollar funding premiums (cross-currency swaps)



Source: Bloomberg.

Chart II-2-14: Liquidity indicators for the FX swap market

Transaction volume in the U.S dollar/yen market



Sources: Foreign Exchange Committee of each country; BOJ.

Foreign currency funding liquidity (2)

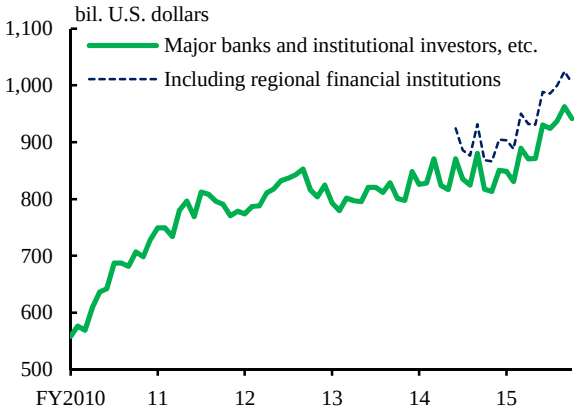
➢ The bid-ask spread has widened in currency swap markets. Factors include:

(1) strengthened demand for U.S. dollars against the background of the divergence of U.S. monetary policy from other advanced economies;

(2) restraints on the supply of U.S. dollars by emerging economies' foreign reserve managers and sovereign wealth funds;

(3) regulatory reforms, which have reduced FI's appetite for arbitrage trading and thus limited U.S. dollar supply.

Chart IV-3-7: Yen investments by Japanese financial entities

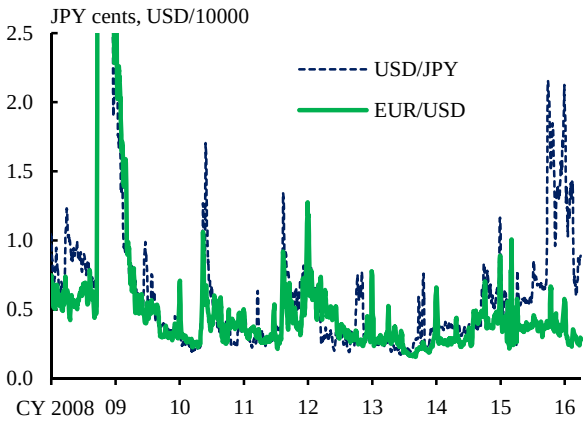


Major banks and institutional investors, etc. include major banks, Japan Post Bank, The Norinchukin Bank, Shinkin Central Bank (from end-September 2014) and life insurance companies.

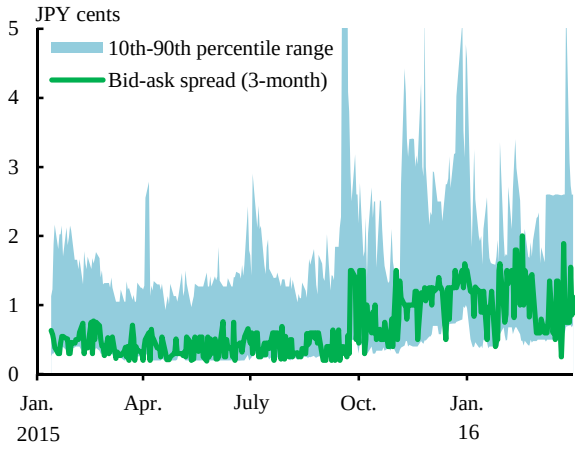
Sources: The Life Insurance Association of Japan; Published accounts of each company; BOJ.

Chart II-2-14: Liquidity indicators for the FX swap market

Bid-ask spreads (3-month)



Distribution of bid-ask spreads (U.S. dollar/yen)



Sources: Bloomberg; Thomson Reuters Markets.

Systemic importance of large financial institutions (1)

- The average G-SIB score of the three major financial groups is lower than the G-SIB average across the five categories, except for the "size" category.
- In particular, their scores are not so high compared with all other G-SIBs with regard to indicators such as "complexity" and "interconnectedness."
- However, Japanese G-SIBs (the three major financial groups) are growing and becoming more complex.

Chart B5-1: Breakdown of loans among three major Japanese financial groups

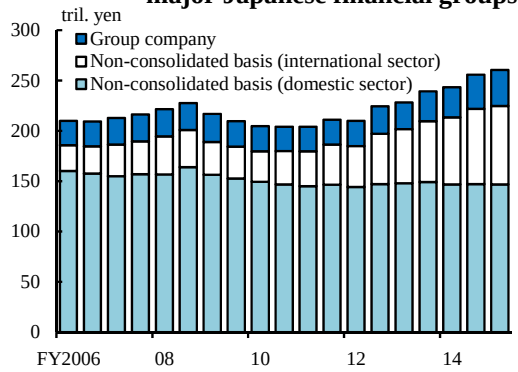


Chart B5-2: Gross profits among three major Japanese financial groups and group company's share

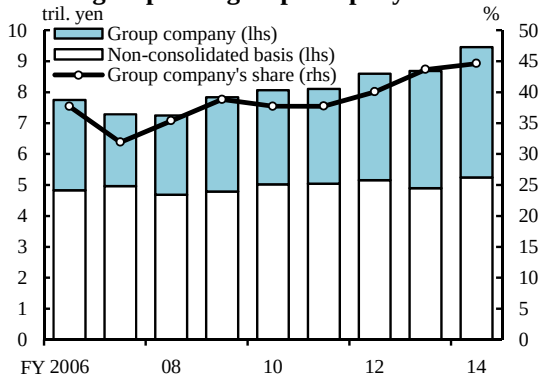
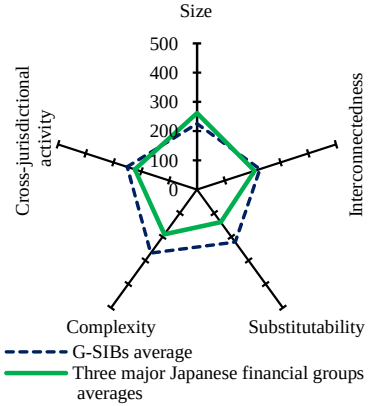
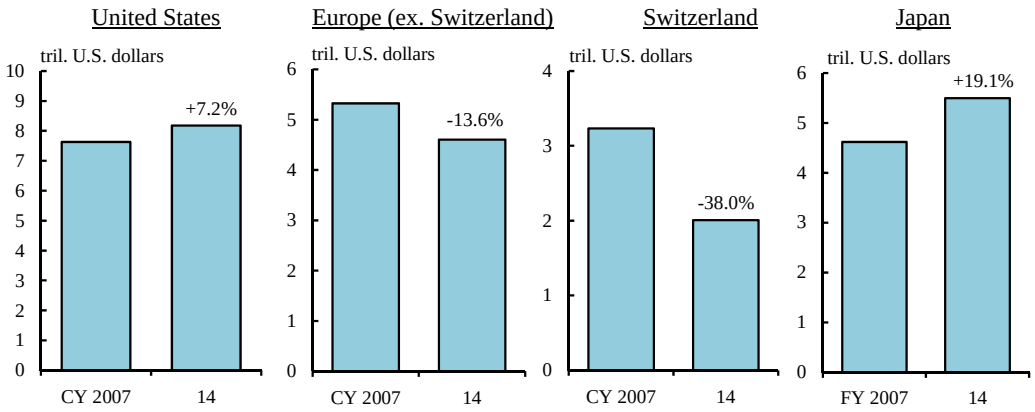


Chart B5-3: G-SIB scores



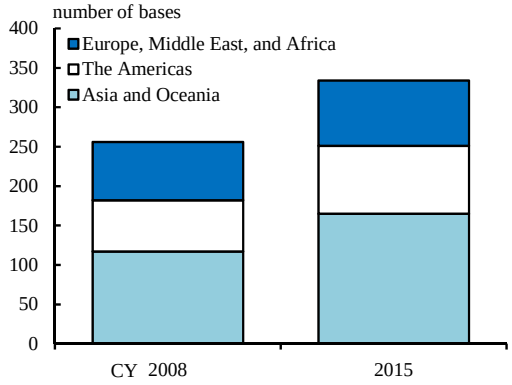
Source: S&P Global Market Intelligence.

Chart B5-4: Total assets among G-SIBs



Sources: Published accounts of each bank.

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



Sources: Published accounts of each group.

Systemic importance of large financial institutions (2)

- Certain aspects of the risk profiles of Japanese G-SIBs are not necessarily captured by the G-SIB score:

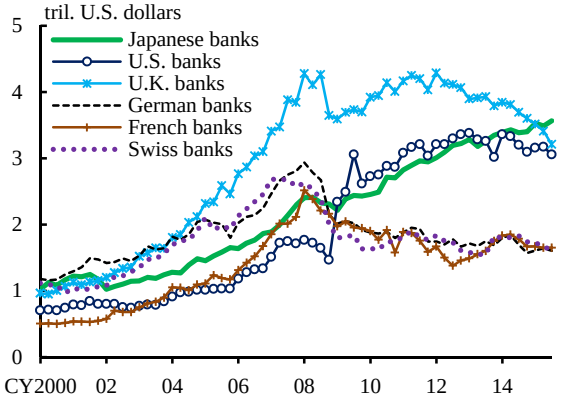
(1) a large proportion of cross-border claims is foreign currency-denominated and highly dependent on market funding;

(2) stockholdings are large both in absolute terms and relative to the amount of capital;

(3) the share of concentrated exposures to non-financial corporations has been high and has exhibited an increasing trend in recent years. In addition, off-balance-sheet overseas claims, such as credit commitments are on an increasing trend.

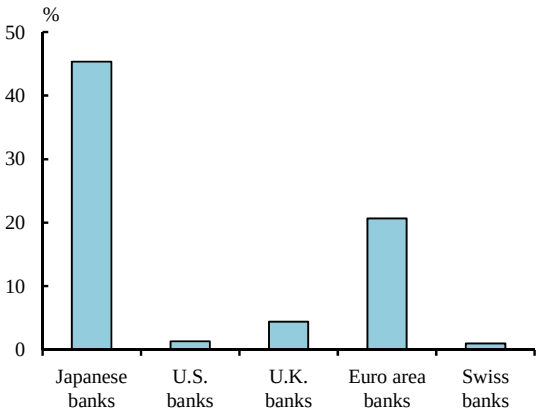
- There is a need to establish governance frameworks and information systems, as well as to enhance their risk management frameworks, in tune with their new business environment.

Chart B5-5: International claims by bank nationality



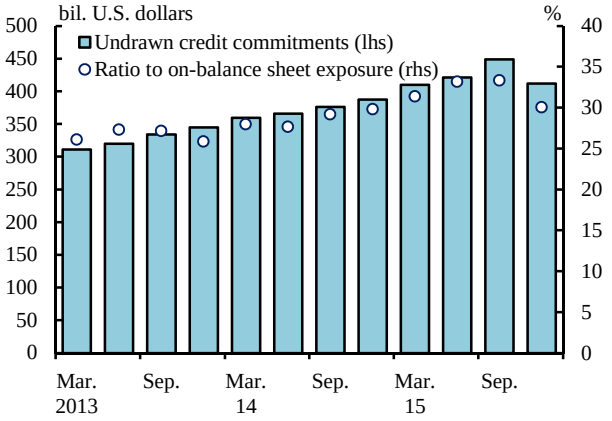
Source: BIS, "Consolidated banking statistics."

Chart B5-6: Outstanding amount of stockholdings to Tier I ratios among G-SIBs



Sources: Published accounts of each bank.

Chart B5-8: Undrawn credit commitments among three major Japanese financial groups

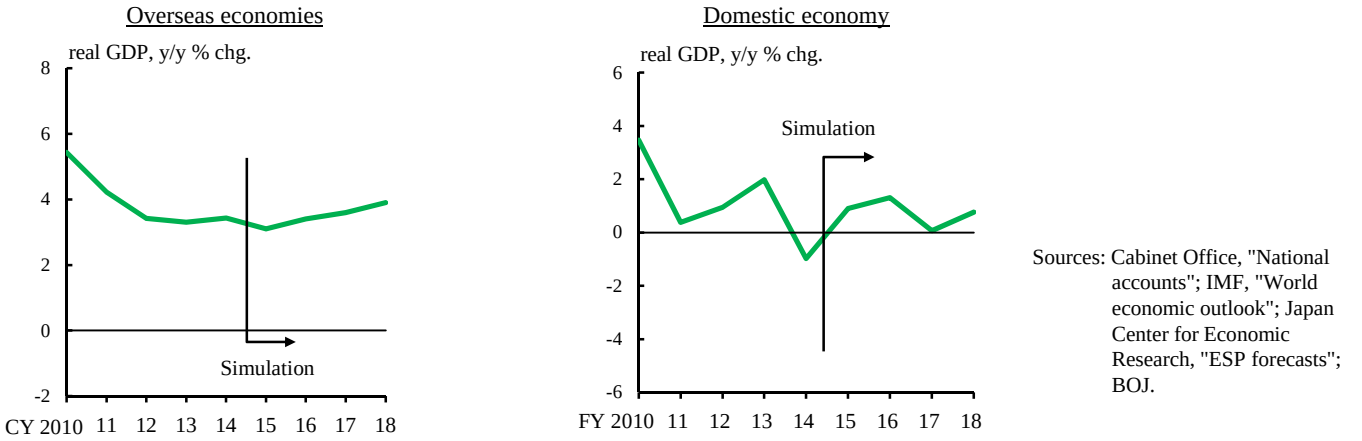


Macro stress testing (1) Baseline

(Baseline scenario) The economic environment at home and abroad improves moderately.

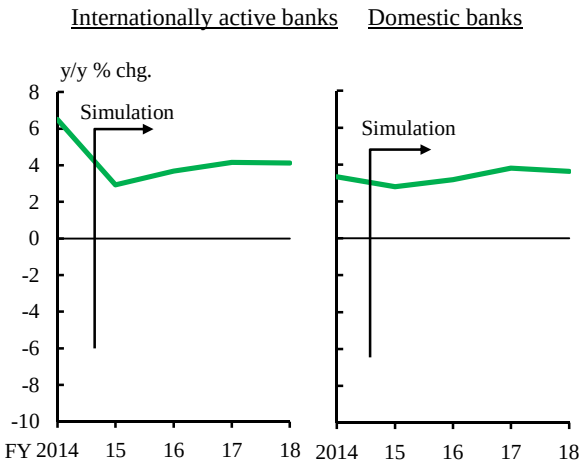
- The year-on-year growth rate of loans outstanding increases moderately partly due to declining loan interest rates, following the introduction of a negative interest rate. Although net interest income decreases somewhat due to the narrowing of lending spreads, the effects wane gradually.

Overseas economies and the domestic economy

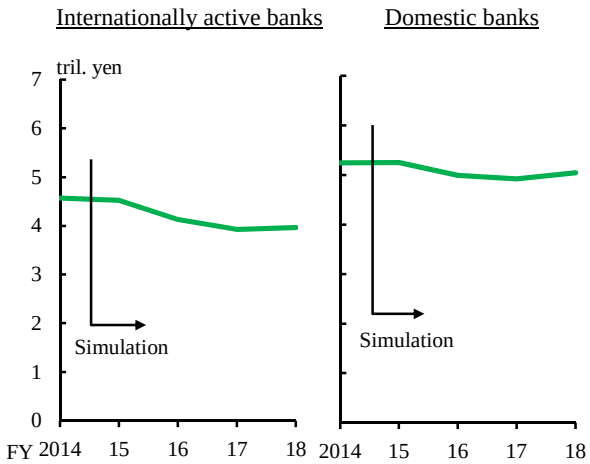


Sources: Cabinet Office, "National accounts"; IMF, "World economic outlook"; Japan Center for Economic Research, "ESP forecasts"; BOJ.

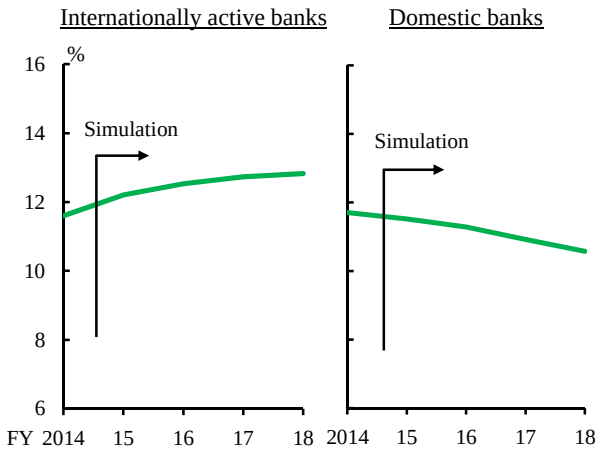
Loans outstanding



Net interest income



CET I capital ratio and core capital ratio

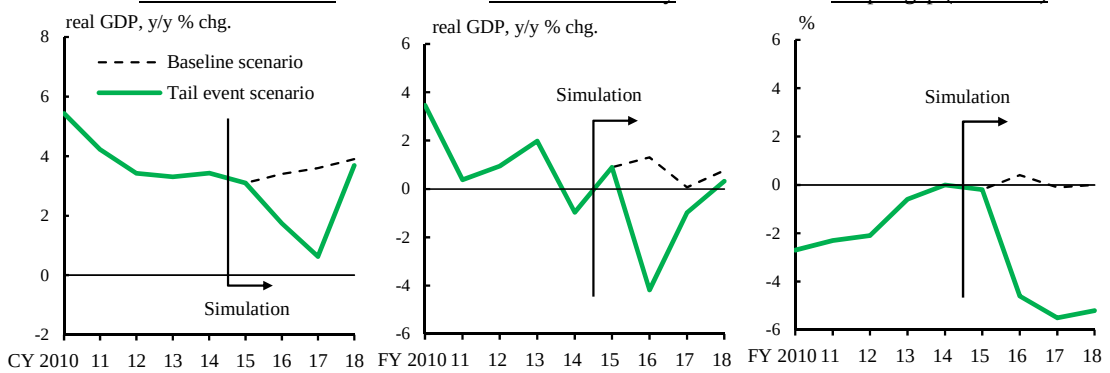


Macro stress testing (2) Tail event

(Tail event scenario) Economic and financial developments at home and abroad deteriorate to an extent consistent with that seen during the Lehman shock.

- The year-on-year growth rate of overseas loans outstanding declines substantially, while the growth rate of domestic loans outstanding remains positive, partly due to the decline in lending interest rates.
- Firms' financial conditions deteriorate and the credit cost ratios of financial institutions exceed their break-even points, due to a significant deterioration in economic conditions both at home and abroad.

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



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

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

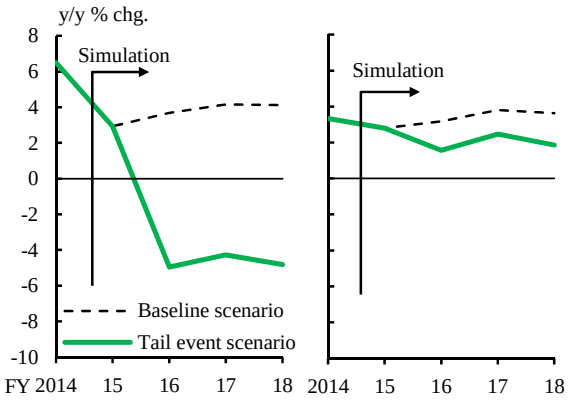


Chart V-2-3: Net interest income (tail event scenario)

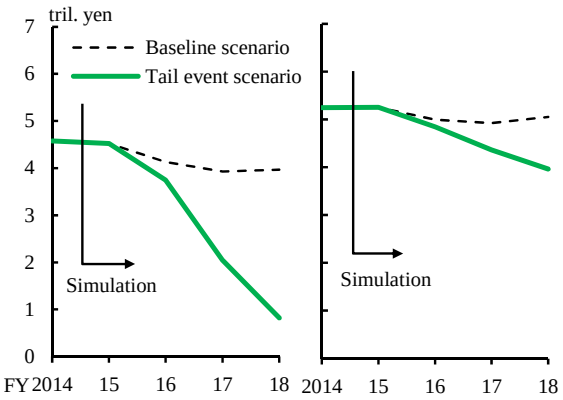
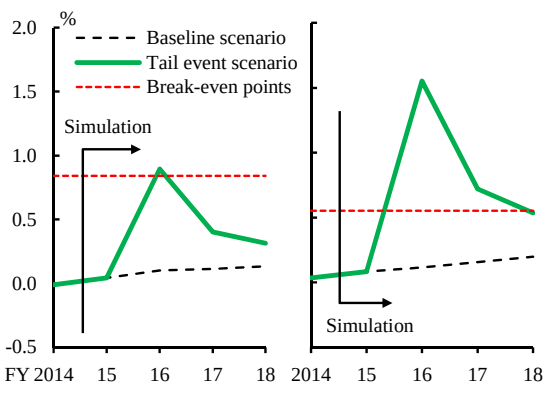


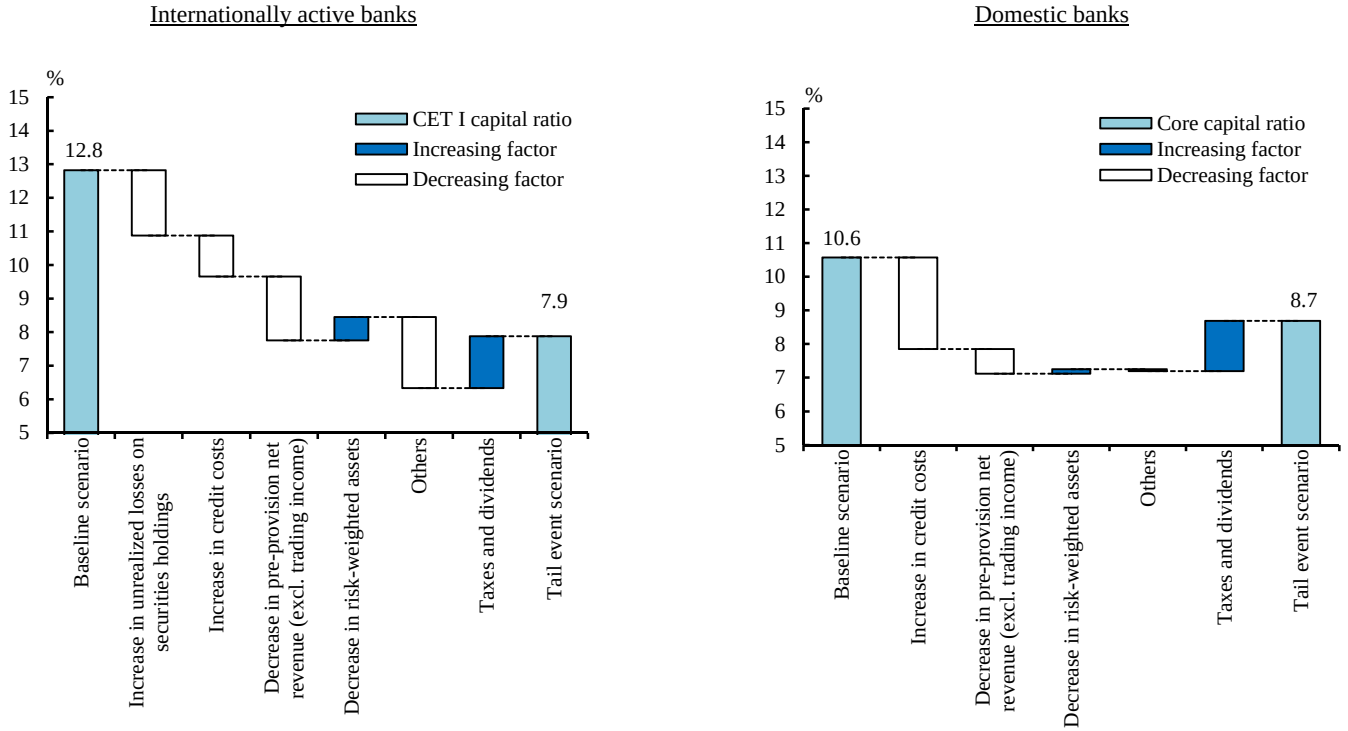
Chart V-2-5: Credit cost ratio (tail event scenario)



Macro stress testing (3) Tail event

- The capital adequacy ratio (CET I ratio) at internationally active banks falls by 5.0%pts compared to the baseline scenario, due to a decrease in pre-provision net revenue (excl. trading income) and an increase in unrealized losses on securities holdings, in addition to increase in credit costs.
- On average, the capital adequacy ratio still remains above regulatory requirements.
- The core capital ratios for domestic banks decline by 1.9%pts, mainly due to an increase in credit costs, but remain well above regulatory requirements on average.

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



Note: As of end-March 2019

Macro stress testing (4) Tail event

- Under the tail event scenario, more than 80 percent of FIs temporarily (fiscal 2016) record net losses, resulting significant heterogeneity with regard to their capital adequacy ratios.

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

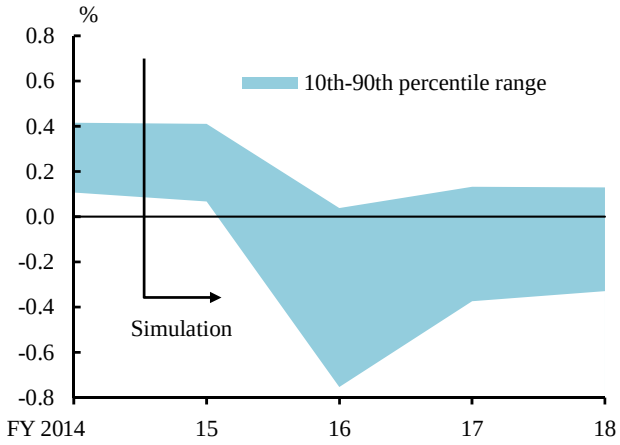
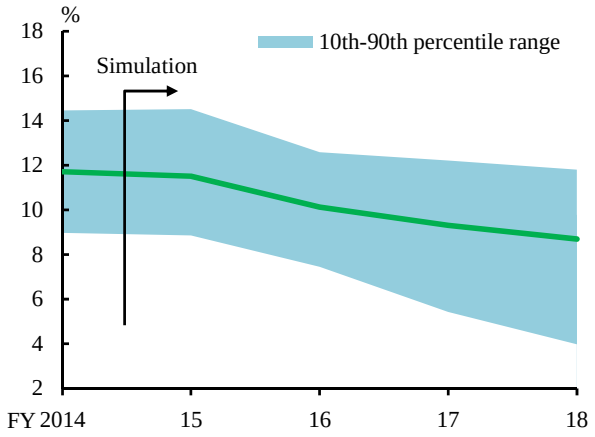


Chart V-2-16: Domestic banks' core capital ratio distribution (tail event scenario)

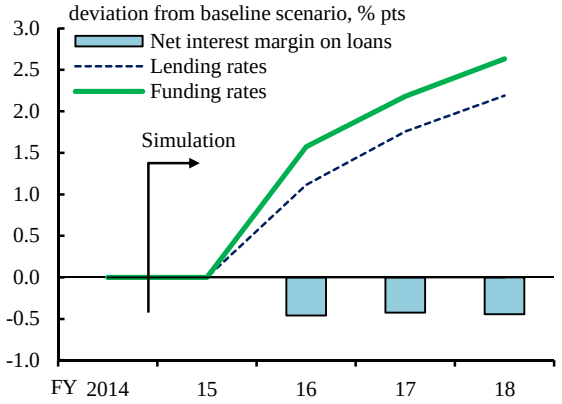


Macro stress testing (5) Tailored event for internationally active banks

(Background) A substantial increase in loans to overseas and foreign bond holdings, as well as an increase in demand for foreign currency funding.

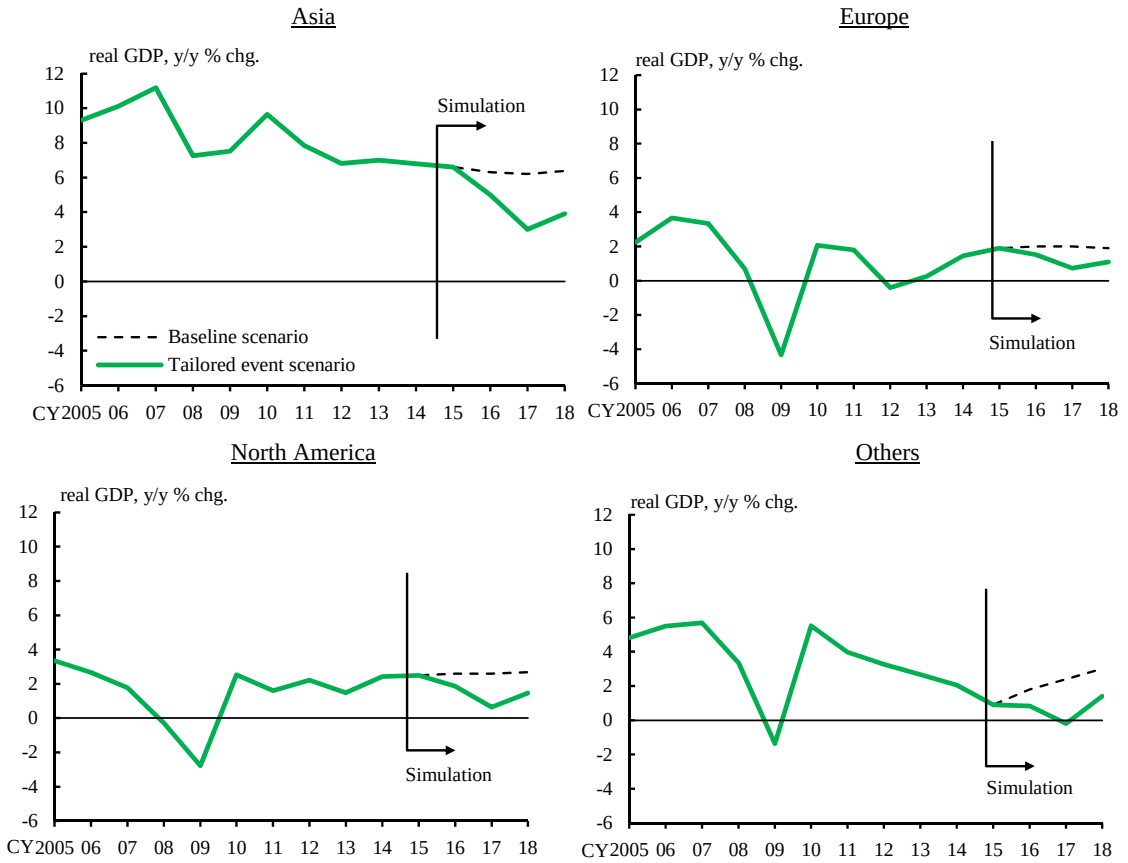
(Tailored event scenario) A rise in Japanese banks' foreign currency funding costs. I.e., term premiums for U.S. long-term interest rates widen by 200 basis points and U.S. dollar funding premiums, particularly in currency and FX swap markets, by 50 basis points.

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



Note: Five major banks with a considerable share of overseas loans are counted.

Annex series Chart 4-6: Overseas economies



Sources: IMF, "World economic outlook"; BOJ.

Macro stress testing (6) Tailored event for internationally active banks

- Net interest income decreases, mainly due to the narrowing of lending spreads on overseas loans.
- The credit cost ratio for overseas loans rises considerably.

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

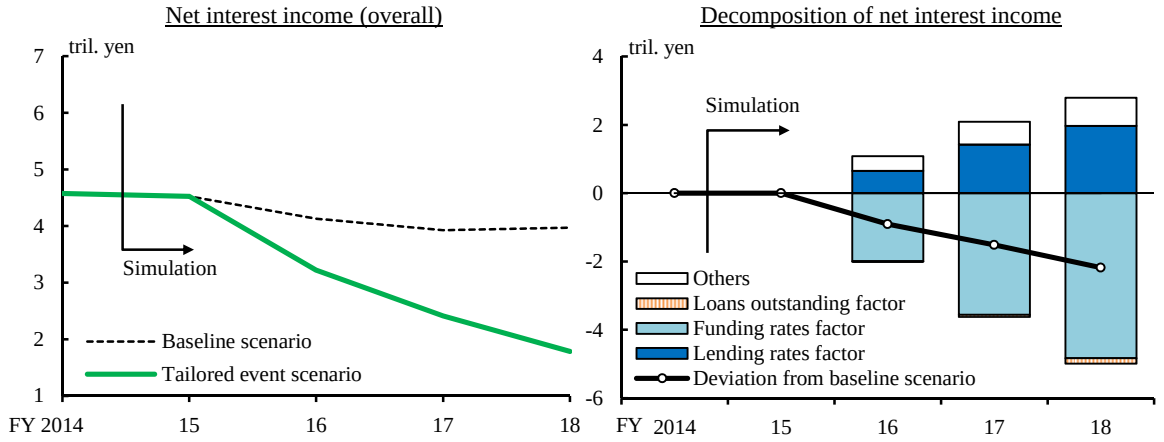
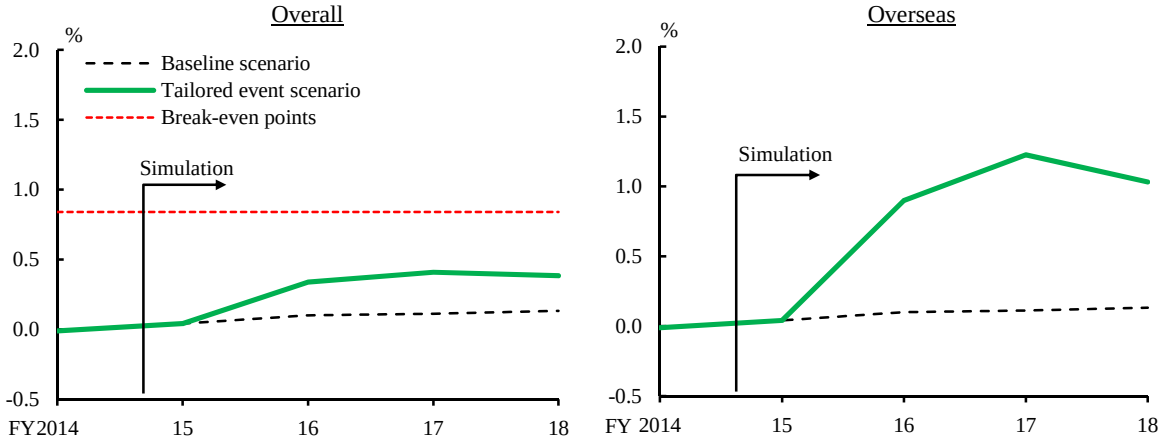


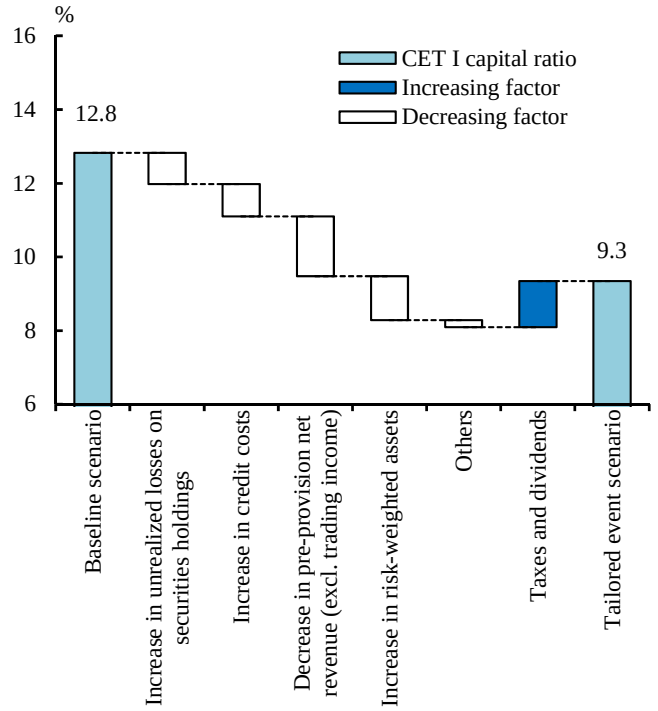
Chart V-2-12: Credit cost ratio: overall loans and overseas loans (tailored event scenario)



Macro stress testing (7) Tailored event for internationally active banks

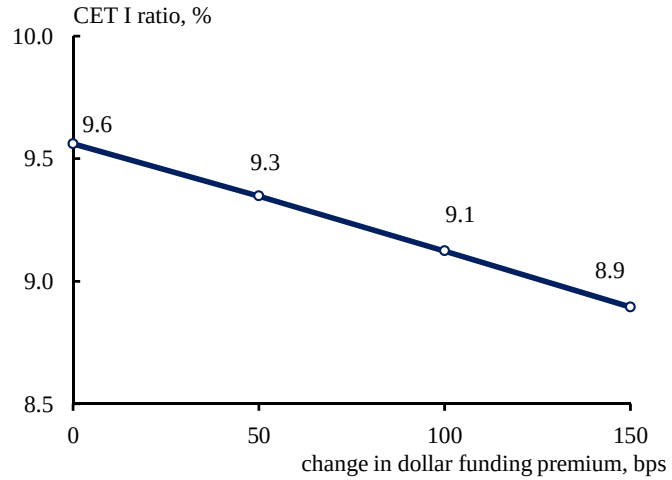
- The capital adequacy ratio (CET I capital ratio) declines by around 3.5%pts compared to the baseline scenario, but is maintained above regulatory requirements.
- As funding premiums widen, the magnitude of the decline in capital adequacy ratios become larger correspondingly.

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



Note: Internationally active banks are counted. As of end-March 2019.

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



Note: Internationally active banks are counted.

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

- The shrinking population and customer base -- in addition to the low interest rate environment -- is exacerbating the problem of low profitability of regional banking.
- Estimation results from a sample of *shinkin* banks throughout Japan, show that the impact of population changes on total assets, deposits and loans are statistically and quantitatively significant.
- It is useful to utilize more granular data, such as municipal-level data, to evaluate changes in banks' business footprint and incorporate such effects into long-term management plans.

$$\underline{<\text{Estimation}>}\ \text{Rate of change of deposits in } \textit{shinkin} \text{ bank}_{i,t}$$
$$= \text{Constant} + \beta\left(\text{Rate of change of population of sales area of } \textit{shinkin} \text{ bank}_{i,t-1}\right)$$
$$+ \gamma\left(\text{Rate of change of control variable of } \textit{shinkin} \text{ bank}_{i,t}\right) + \text{Residual}_{i,t}$$

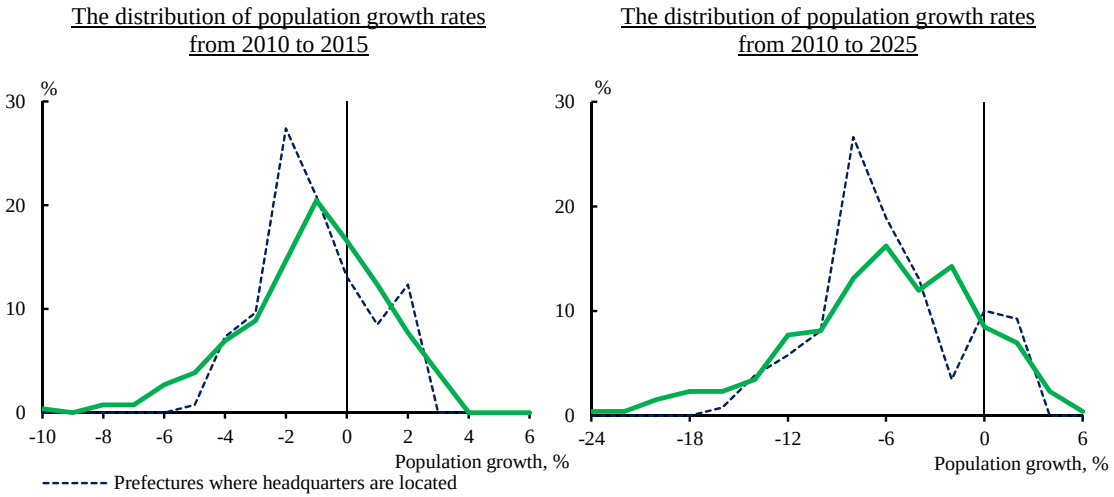
Chart B7-1: Effects of population growth on *shinkin* banks (estimation results)

%

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

Sources: Ministry of Economy, Trade and Industry, "Census of Manufacture," "Yearbook of the Current Survey of Commerce"; Ministry of Internal Affairs and Communications, "Population Estimates"; BOJ.

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

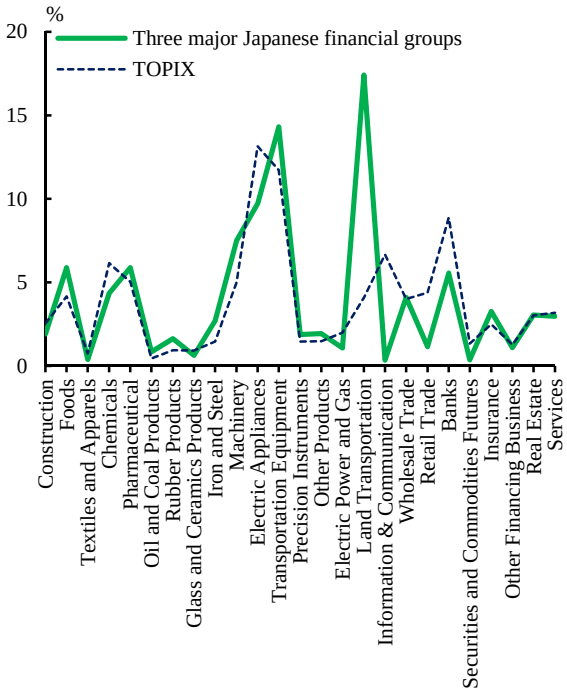


Sources: National Institute of Population and Social Security Research, "Population and Household Projection"; The Japan Financial News Co., Ltd.; BOJ.

Impact of financial institutions' strategic stockholdings on their funding costs

- For the first time in the FSR, the impact of financial institutions' strategic stockholdings on their shareholder capital costs is analyzed empirically.
- The results show that banks with a higher ratio of strategic stockholdings tend to have higher shareholder capital costs.
- Estimates suggest that when the ratio of strategic stockholdings to total capital is lowered from 16.2% (i.e., the average among the 13 internationally active banks) to 10.0%, the shareholder capital cost is lowered by 1%pt from 11.0% to 10.0%.

Chart B3-1: Stock portfolio by industry



Sources: Bloomberg; published accounts of each group.

CAPM

$$E(r_i) = r_f + \beta_{im}[E(r_m) - r_f]$$

$E(r_i)$	Excess return of each bank (= capital cost)
$E(r_m)$	Expected return of the market portfolio
r_f	Risk free rate
β_{im}	Elasticity of the firm's expected return to the expected return of the market portfolio

Chart B3-2: Estimation results

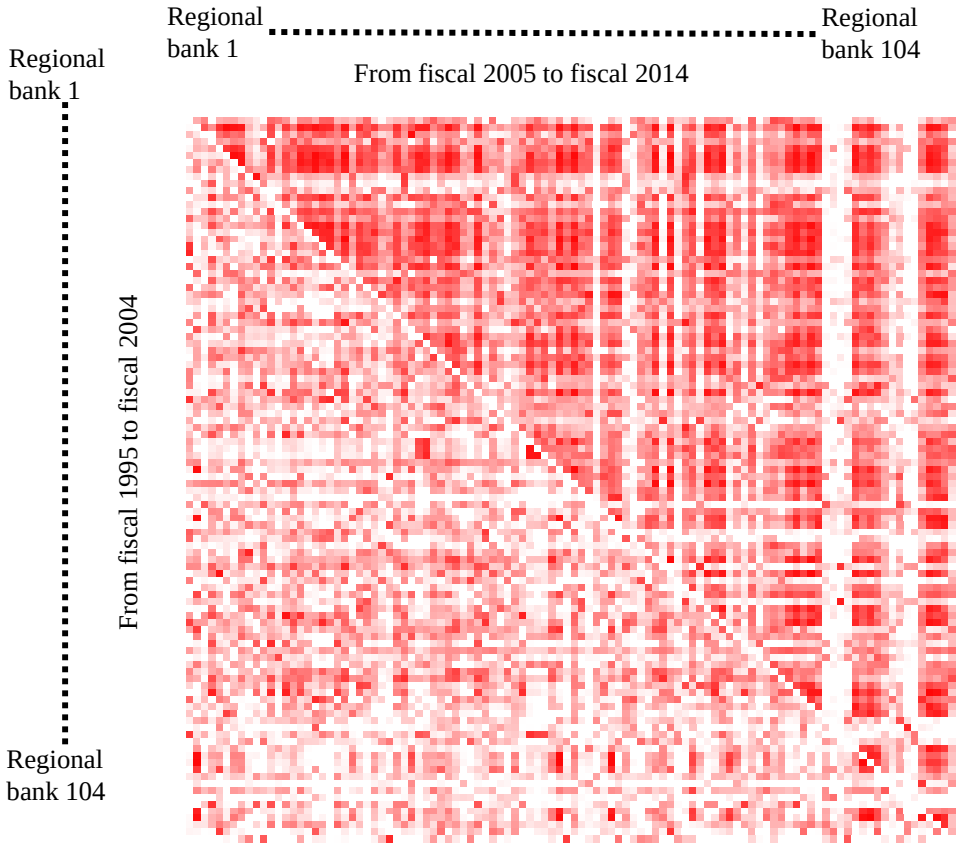
	Estimate 1	Estimate 2
Constant	-5.710	-3.176
Capital ratio (%)	-0.000	0.022
Total assets (Log)	0.381	0.217
Stockholdings / Capital (%)	0.013 *	0.017 *
Number of banks	13	13
Observations	461	461
R^2	0.706	0.811
Fixed effect	yes	yes
Time effect	no	yes

Sources: Bloomberg; QUICK; BOJ.

The increased degree of comovement in profits and stock prices among regional banks (1)

- Regional banks are more actively involved in securities investment nowadays, and are seeking ways of increasing their non-interest income.
- At the same time, the degree of comovement in their profits has increased since these actions render their profits more sensitive to market fluctuations, which is a risk factor common to regional banks.

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

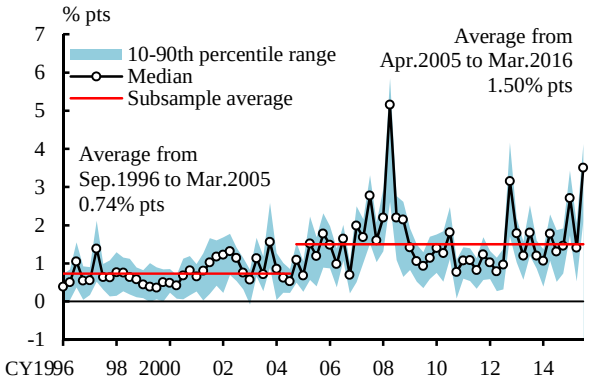


Note: Darker color indicates higher correlation.

The increased degree of comovement in profits and stock prices among regional banks (2)

- The CoVaR, an indicator that captures the systemic importance of individual banks based on their stock prices, reveals that an increase in the degree of comovement between the risk of individual banks and regional banks as a whole.
- Panel data estimates support the view that the profits as well as the stock prices of regional banks that engage in more securities investment or depend more heavily on non-interest income tend to comove more closely.
- This suggests that the Bank of Japan needs to monitor FIs from a macroprudential perspective.

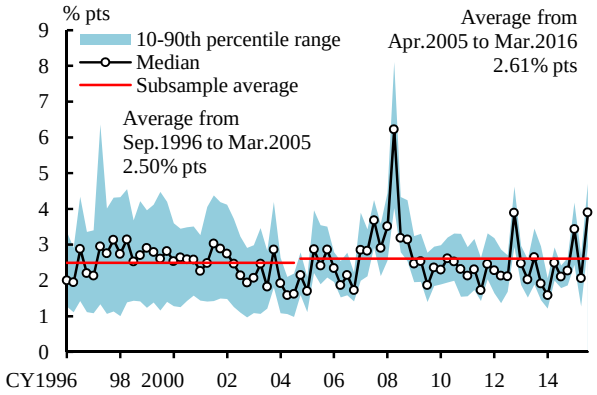
Chart B6-3: Regional banks' CoVaR (=β×VaR)



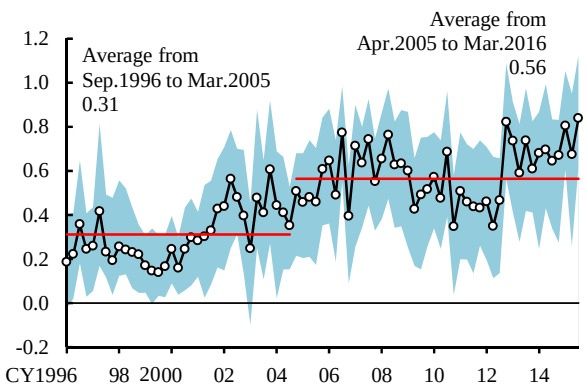
Sources: Bloomberg; BOJ.

Chart B6-4: Regional banks' VaR and β

Risk of an individual bank's share (VaR)



Comovement parameter β



Sources: Bloomberg; BOJ.

Chart B6-5: Panel analysis on comovement parameter β

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

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