

Financial System Report

Summary

October 2019
Bank of Japan



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Features and motivations

- An analysis of potential risks and vulnerabilities associated with the overseas exposure of Japanese banks
- Background behind the recent rise in credit costs
- Medium- to long-term simulation and stress testing taking into account improvement in operating efficiency

This issue newly adds a chapter that comprehensively examines domestic and overseas financial vulnerabilities (Chapter IV) and a section regarding the risks associated with digitalization, which have been becoming increasingly important in recent years (Section F of Chapter V).

Executive summary

Examination of financial cycle and financial vulnerabilities

- The expansion in the financial cycle has continued; however, financial and economic activities as a whole have shown no signs of overheating observed during the bubble period in the late 1980s.
- That said, attention should continue to be paid to the accumulation of vulnerabilities under the continued expansion in the financial cycle. On the domestic front, the *total credit to GDP ratio* has continued to rise. Although the ratio remains lower than in the bubble period, the upward deviation from its trend is getting close to the scale in that period. Meanwhile, loans to low-return borrowers with narrow profit margins have been increasing. Credit costs remain low but have recently started to rise, particularly for regional financial institutions (FIs). The outstanding amount of real estate loans has been increasing and has surpassed the level seen during the bubble period; moreover, the deviation of the *real estate loans to GDP ratio* from its trend has marked a record high for the post-bubble period. With respect to international finance, as the overseas exposures of Japanese banks increase, Japan's financial system, including banks' foreign currency funding condition, is becoming more susceptible to the effects of overseas financial cycles.

Executive summary (cont'd)

Stability of the financial system

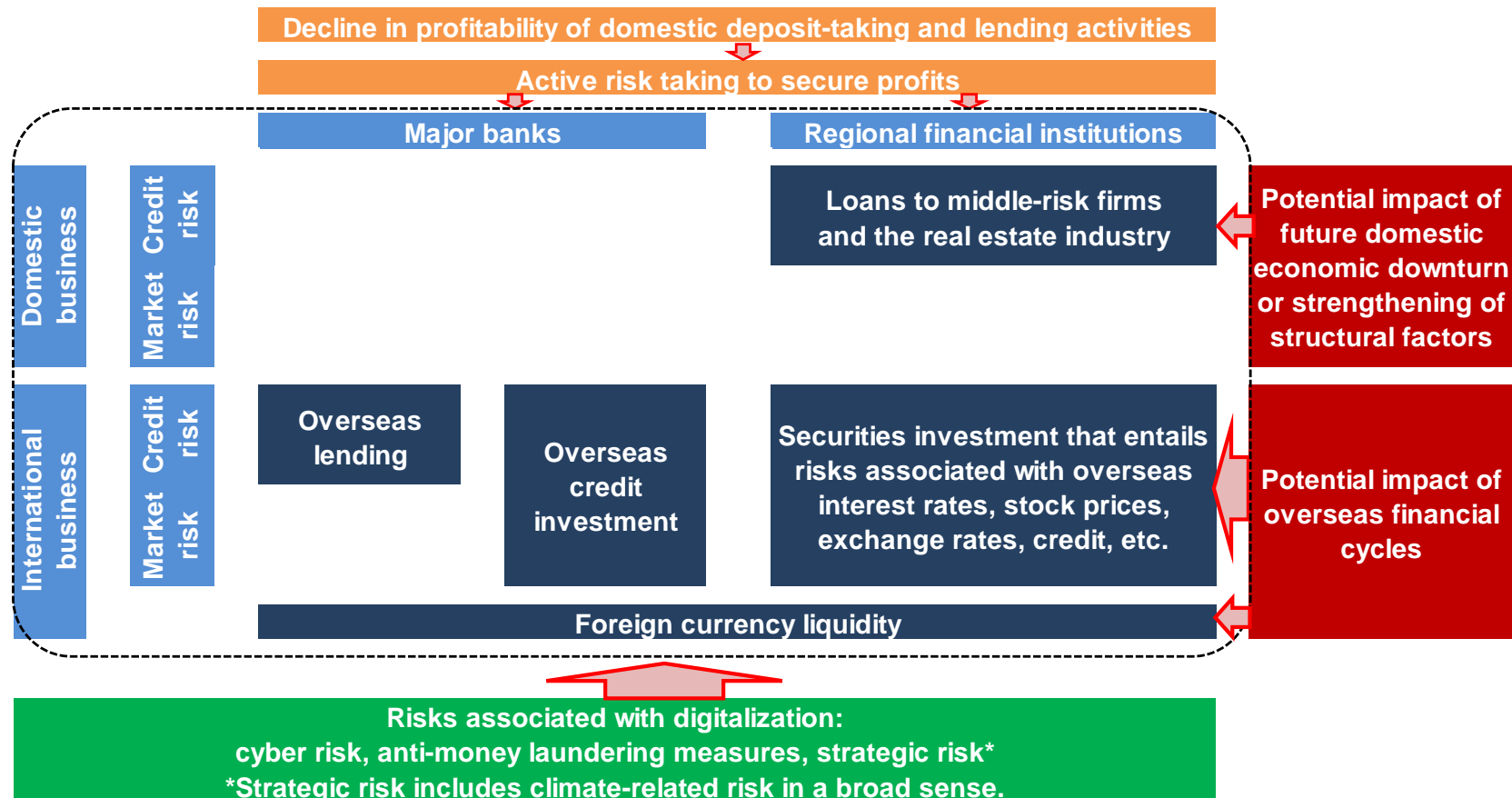
- Japan's financial system has been maintaining stability on the whole. FIs generally have strong resilience in terms of both capital and liquidity with respect to tail events like the onset of the global financial crisis.
- However, FIs' profitability, particularly that of domestic deposit-taking and lending activities, has continued to decline. This seems to be not only due to the prolonged low interest rate environment but also, from a longer-term perspective, due to structural factors such as the secular decline in loan demand associated with the shrinking population and the decline in the potential growth rate. Against this backdrop, major FIs have expanded their global activities and pursued group-wide strategies to provide comprehensive financial services, resulting in an increase in their systemic importance. Regional FIs have been actively taking risks in domestic lending and securities investment. However, as they have not been able to secure adequate returns relative to the risks involved, their capital adequacy ratios have continued to decline moderately. Should this situation persist, loss-absorbing capacity in the event of stress would decrease, and downward pressure on the real economy through a weakening of the financial intermediation function could intensify.

Part I. Examination of financial vulnerabilities

- Summary
- Vulnerabilities on the domestic front
 - Heat map of Financial Activity Indexes
 - Financial gap and risks to economic growth (GaR)
- Vulnerabilities on the international front

Examination of financial vulnerabilities: summary

- Profitability of FI's domestic deposit-taking and lending activities has continued to decline. Against this backdrop, FIs have become more active in risk taking to secure profits.
- The major vulnerabilities of Japan's financial system:
- (International) expansion of overseas exposures and securities investment that entails overseas risks;
- (Domestic) loans to middle-risk firms and the real estate industry.



Decline in profitability of domestic deposit-taking and lending activities

- The decline in profitability of FIs' domestic deposit-taking and lending activities is not only due to the prolonged low interest rate but also, from a longer perspective, due to some structural factors such as the secular decline in loan demand associated with the decline in the potential growth rate reflecting the shrinking population.
- The narrowing of FIs' deposit-lending margins started at the end of the 1990s, when the chronic excess savings in the corporate sector began. This structural change has led to a rise in the share of debt-free firms and therefore a continued slackening of loan demand.
- Against this backdrop, loans to "low-return borrowers," for which through-the-cycle profitability is difficult to guarantee, have been on an increasing trend.

Chart IV-1-1: Deposit-lending margins among domestically licensed banks and excess savings by corporations

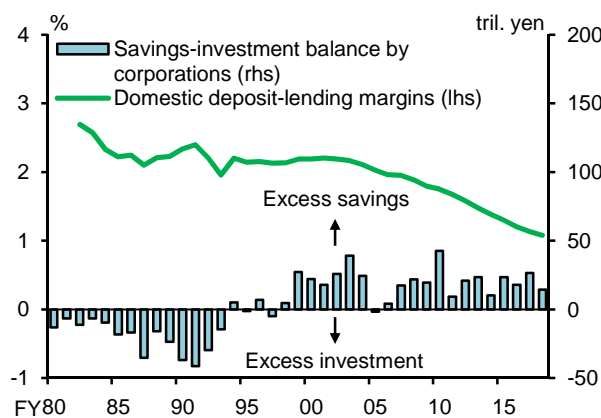
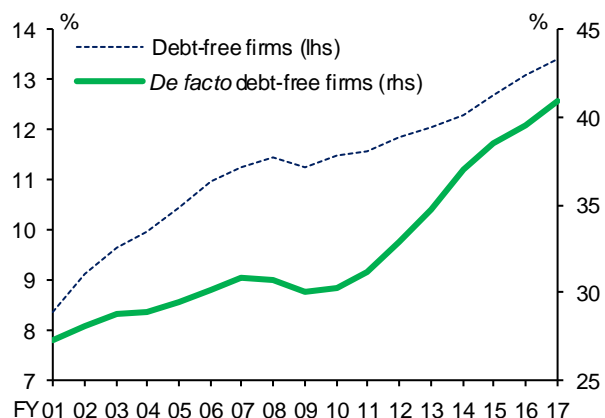
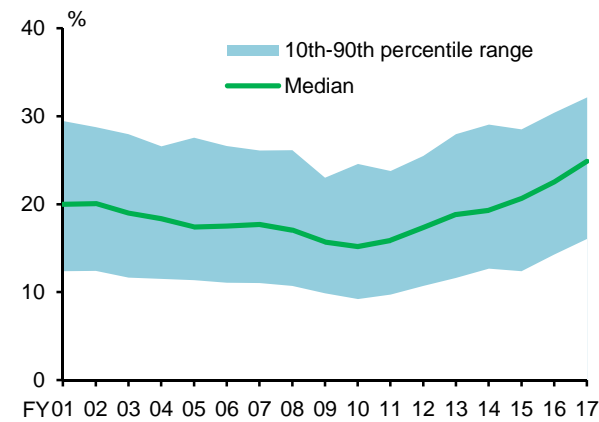


Chart IV-1-2: Share of debt-free firms



Source: Teikoku Databank.

Chart IV-2-9: Loan share of low-return borrowers among financial institutions

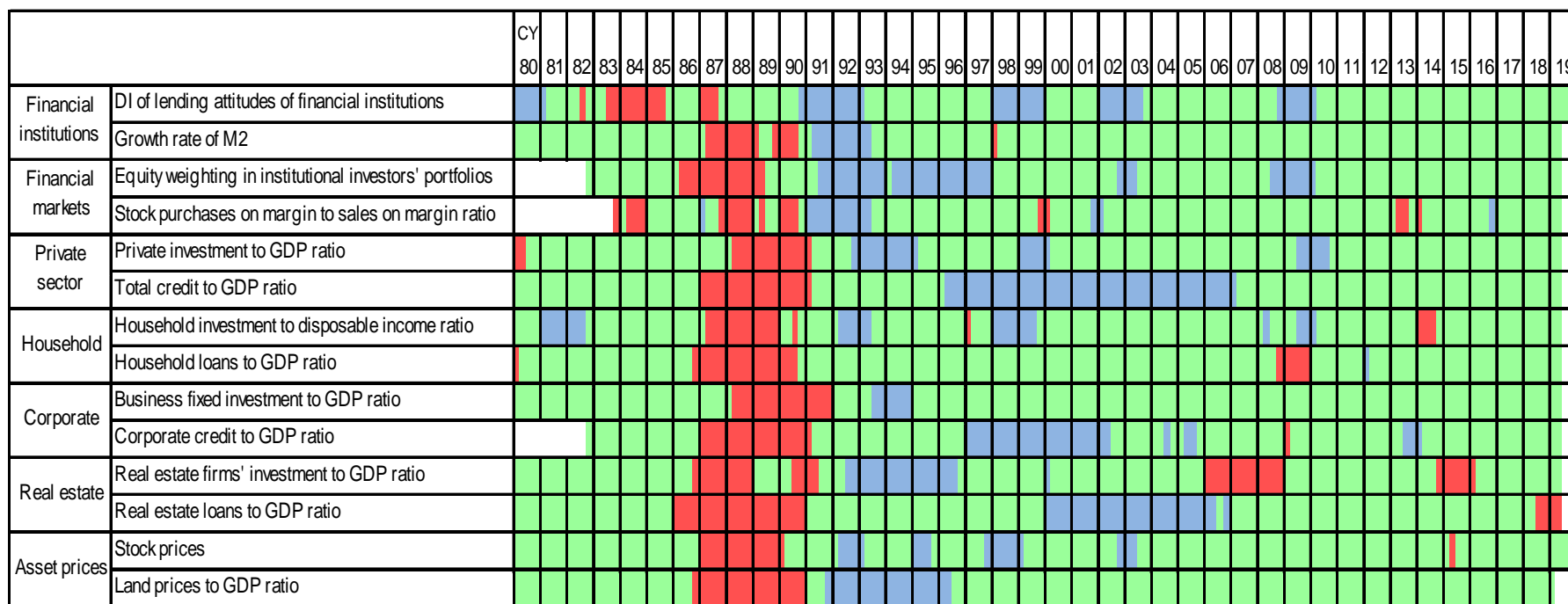


Source: Teikoku Databank.

Vulnerabilities on the domestic front: heat map of Financial Activity Indexes (FAIXs)

- The heat map helps detect signs of overheating or contraction over the financial cycle by showing the degree of the deviation of FAIXs from their trends by different colors.
- 13 out of the 14 FAIXs appear as "green," which signals neither an overheating nor a contraction, implying that financial and economic activities as a whole have not shown excessive movements similar to those seen during the bubble period.
- The *real estate loans to GDP ratio*, which turned "red" in the previous issue, has remained "red."

Chart IV-2-1: Heat map

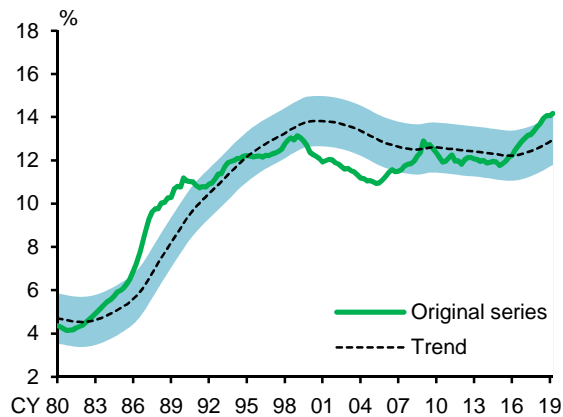


Source: Bloomberg; Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index"; Ministry of Finance, "Financial statements statistics of corporations by industry"; Tokyo Stock Exchange, "Outstanding margin trading, etc."; BOJ, "Flow of funds accounts," "Loans and bills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

Vulnerabilities on the domestic front: real estate market

- The upward deviation of the *real estate loans to GDP ratio* from its trend has marked a record high for the post-bubble period, although regional FIs in particular have become cautious about extending new loans to the real estate industry.
- Based on a wide range of relevant information, including information on land prices, Japan's real estate market cannot, as a whole, be judged as experiencing overheating driven by overly optimistic growth expectations as in the bubble period.
- However, there is the possibility of a build-up of risks that are different from those observed during the bubble period, such as the increase in long-term lending to rental properties amid the declines in population and number of firms.

Chart IV-2-2: Real estate loans to GDP ratio



Source: Cabinet Office, "National accounts"; BOJ, "Loans and bills discounted by sector."

Chart III-1-12: Real estate loans among financial institutions

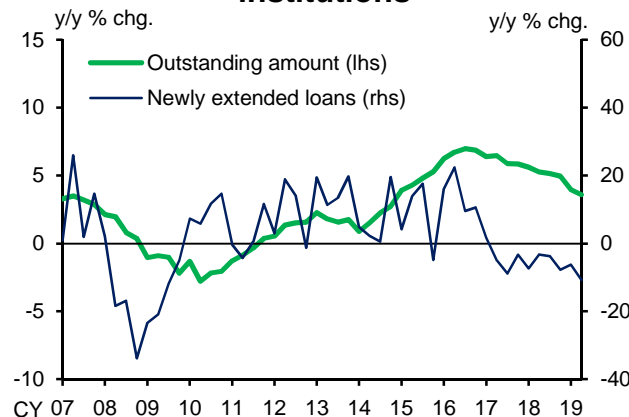
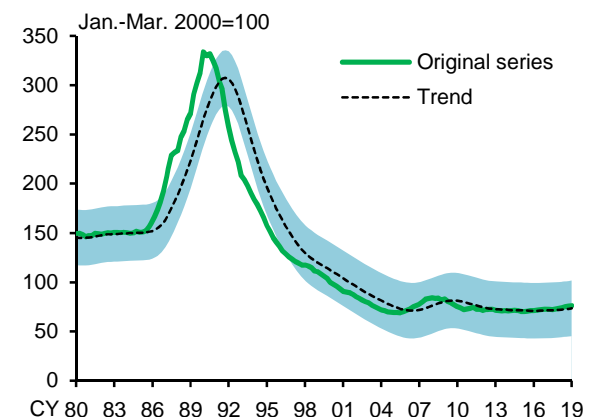


Chart IV-2-5: Land prices to GDP ratio

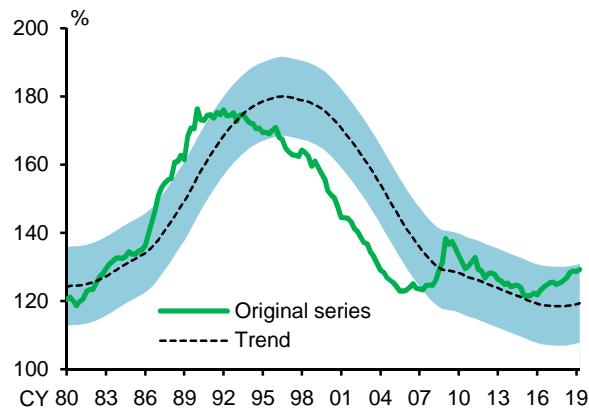


Source: Cabinet Office, "National accounts"; Japan Real Estate Institute, "Urban land price index."

Vulnerabilities on the domestic front: some FAIXs close to "red"

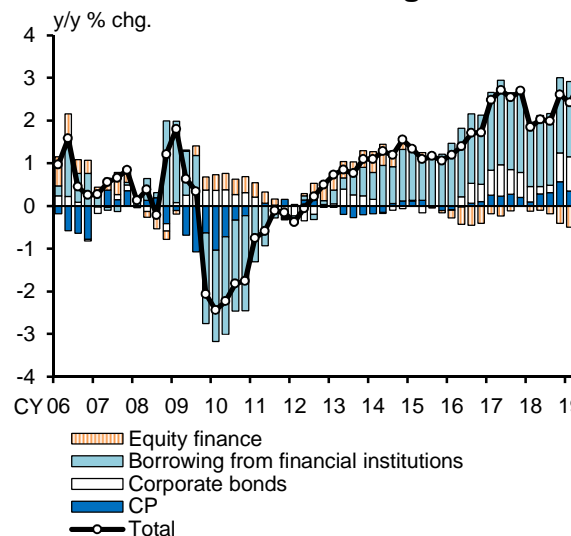
- The *total credit to GDP ratio* has deviated upward from its trend and is getting close to its upper threshold because the outstanding amounts of not only bank loans but also corporate bonds and CP issued have increased against the background of highly accommodative funding conditions.
- Among the other FAIXs that are currently "green," some of them are getting closer to "red" (the *DI of lending attitudes of financial institutions* and the *corporate credit to GDP ratio*).
- It is necessary to carefully examine whether: (1) some shift of FAIXs in the direction of overheating occurs; (2) the total number of FAIXs signaling overheating increases.

Chart IV-2-6: Total credit to GDP ratio



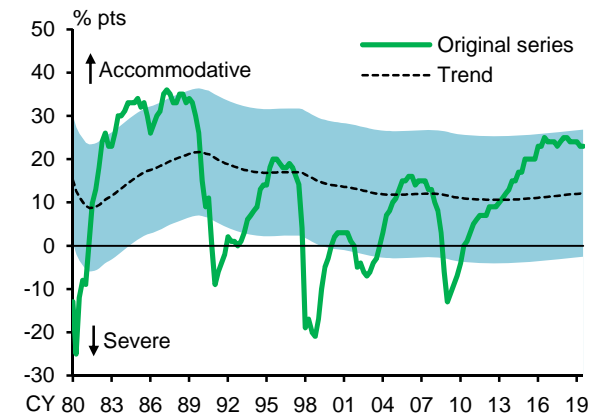
Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Chart III-3-1: Outstanding amount of firms' funding



Source: I-N Information Systems; JASDEC; BOJ.

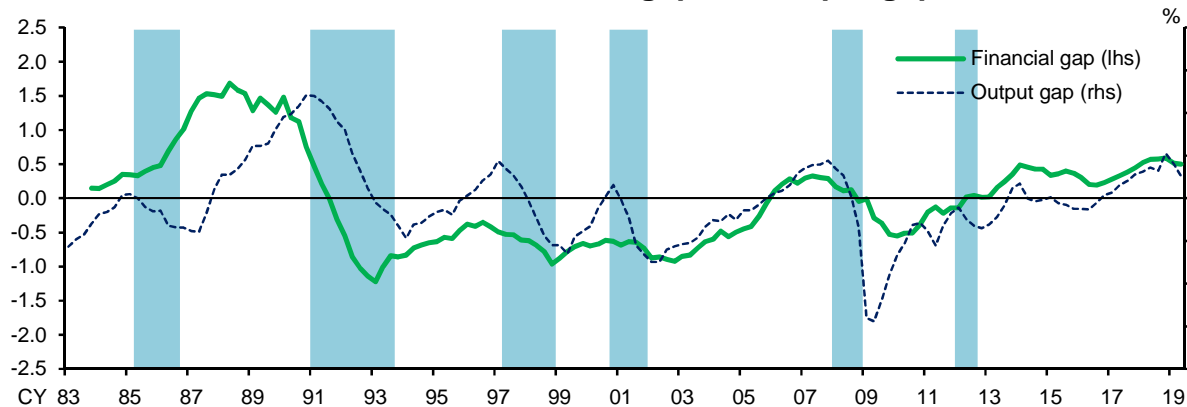
Chart IV-2-8: DI of lending attitudes of financial institutions



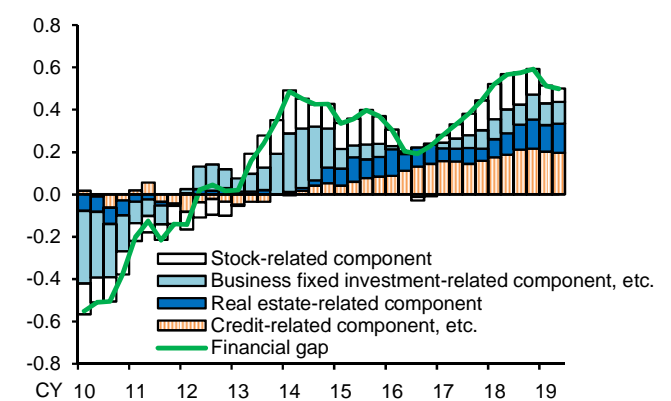
Vulnerabilities on the domestic front: the financial gap

- The "financial gap," the weighted average of the deviation rates of FAIXs from their trends, has fallen somewhat. The fall is mainly attributable to temporary factors such as the stock price decline from the end of 2018 to early 2019.
- The core features of the recent developments have remained unchanged from the previous issue: (1) its level remains near the highest in the post-bubble period; (2) the current phase has marked the longest period of a positive financial gap since the burst of the bubble economy; and (3) a wide range of FAIXs are in positive territory.

Chart IV-2-10: Financial gap and output gap



Decomposition of financial gap



Note: Financial Activity Indexes included in each component are as follows:

Stock-related component: stock prices, equity weighting in institutional investors' portfolios, stock purchases on margin to sales on margin ratio.

Business fixed investment-related component, etc.: private investment to GDP ratio, business fixed investment to GDP ratio, household investment to disposable income ratio.

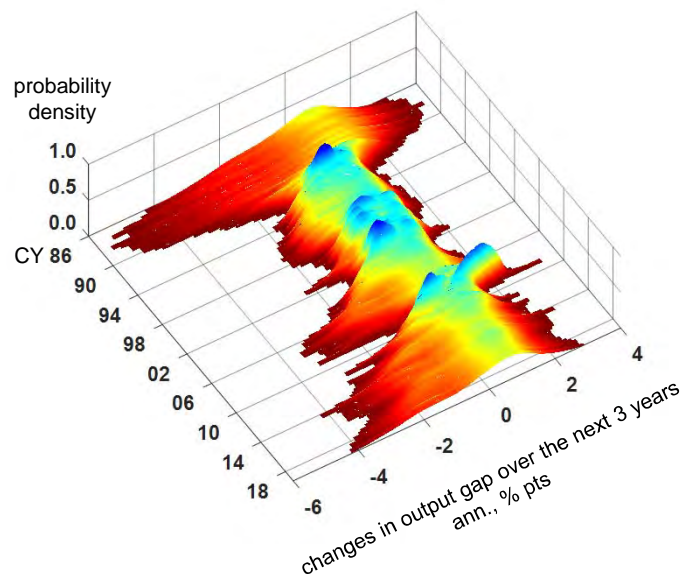
Real estate-related component: real estate loans to GDP ratio, real estate firms' investment to GDP ratio, land prices to GDP ratio.

Credit-related component, etc.: total credit to GDP ratio, corporate credit to GDP ratio, household loans to GDP ratio, DI of lending attitudes of financial institutions, growth rate of M2.

Vulnerabilities on the domestic front: GDP-at-risk (GaR)

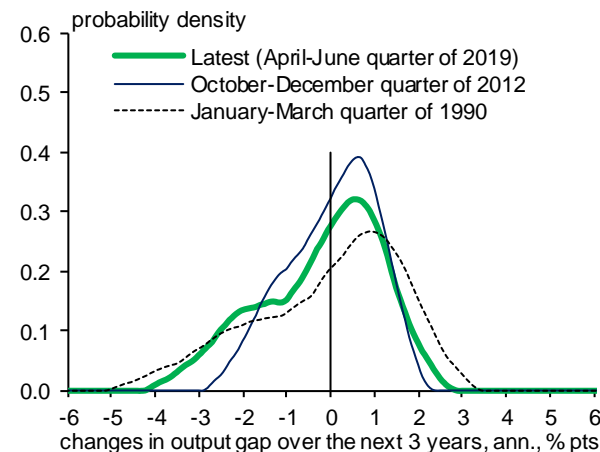
- The extent to which developments in the financial gap may pose a risk to the real economy from a longer-term perspective is examined, using the "GDP-at-risk" approach.
- The estimated probability distribution of GDP growth over the next 3 years has exhibited a fatter tail on the downside in recent years, although this tail is not as fat as during the bubble period.
- The recent expansion in the financial cycle has led to an increase in the downside tail risk to economic growth from a somewhat longer-term perspective by building up pressure on balance sheet adjustments on the back of the cumulative effect of low interest rates.

Chart IV-2-12: Financial vulnerabilities and risks to economic growth over the next 3 years (GaR)



Note: The chart presents the time series of probability distributions of annualized changes in output gap over the next 3 years at each point in time.

Chart IV-2-13: Comparison of risks to economic growth by period



Vulnerabilities on the international front: increase in major banks' overseas lending

- Overseas lending by major banks has been increasing since the global financial crisis. The share of overseas lending in their total lending has reached a historic high.
- The increase in the foreign claims is likely attributable to the fact that, compared to U.S. and European FIs, their risk-taking capacity was not significantly impaired by the global financial crisis.
- The pace of increase has slowed as international competitive pressure has resumed, reflecting the recovery of financial soundness of overseas FIs, particularly the U.S. banks.
- The credit quality of the overall overseas loan portfolio has remained high. Recently, however, some FIs have increased their lending to firms with relatively higher risk.

Chart IV-3-4: Overseas loans outstanding of major banks

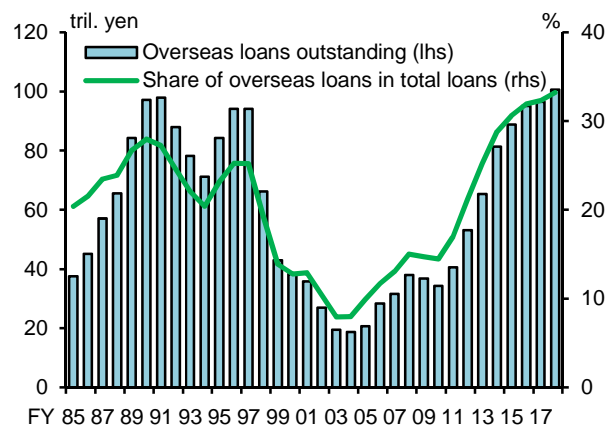
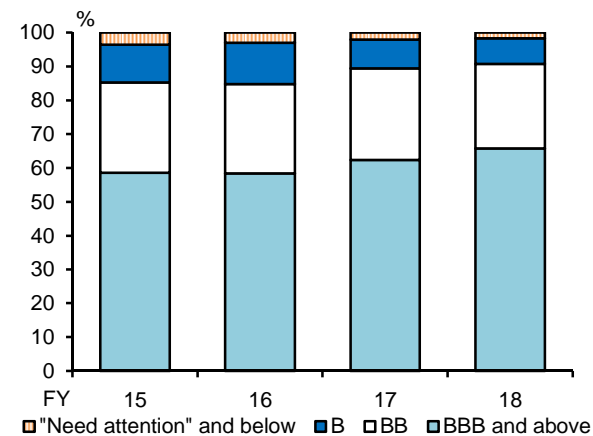


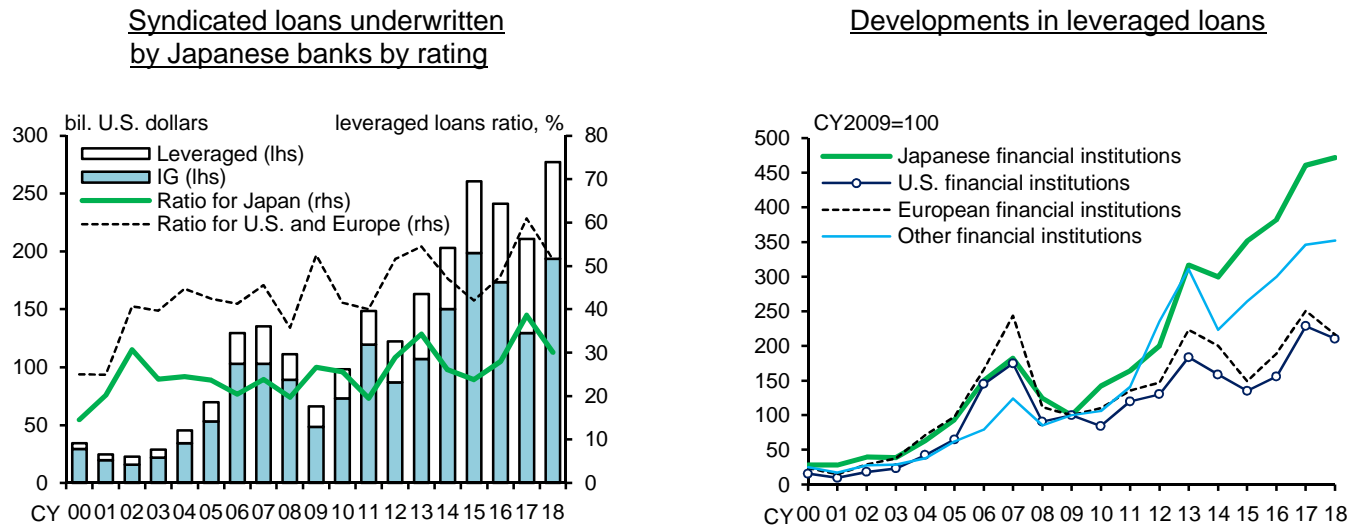
Chart IV-3-5: Composition of major banks' overseas loans by credit rating



Vulnerabilities on the international front: large increase in leveraged loans

- Syndicated loans constitute a major form of lending from Japanese banks to non-Japanese firms in the United States, while the share of such loans in the overall overseas credit portfolios of Japanese banks is presumably not high yet.
- Loans to investment-grade firms make up the largest share in the syndicated loans underwritten by Japanese banks.
- In recent years, however, the rate of increase in underwriting of loans to lower-rated and non-investment-grade firms (i.e., leveraged loans) by Japanese banks has been substantially higher than that by U.S. and European FIs.

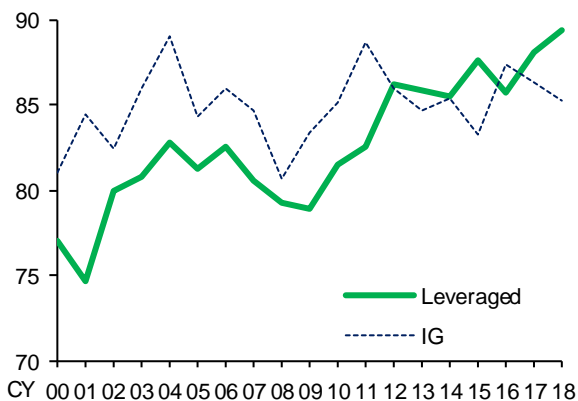
Chart B1-2: Developments in syndicated loans underwritten by Japanese banks



Vulnerabilities on the international front: global connectedness via overseas lending

- An analysis using granular data indicates an increase in the common exposure, i.e., the degree of overlap in borrower categories, between Japanese major banks and overseas FIs in the underwriting market of syndicated loans, particularly for leveraged loans. Such loans entail a higher credit risk and raise concerns about vulnerabilities in a recession.
- Attention needs to be paid to the fact that, as a result of the tighter connectedness with overseas FIs, Japan's major banks and financial system are becoming more susceptible to the effects of overseas financial cycles.

Chart B1-4: Japanese G-SIBs' Interconnectedness Index



Note: 1. "Leveraged" and "IG" indicate syndicated loans rated BB or below and rated above BB, respectively.
 2. The figures in the chart are simple averages of Japanese G-SIBs' Interconnectedness Indexes calculated with respect to other G-SIBs.

Source: Dealogic.

Calculation methodology for the Interconnectedness Index

Step 1. The distance between banks i and j is defined as follows:

The distance between banks i and j (between 0 and 1) =

$$\sqrt{\sum_{\text{categories}} \left\{ \begin{array}{l} \left(\frac{\text{Share of a category in the total}}{\text{outstanding of bank } i\text{'s lending}} \right) \\ - \left(\frac{\text{Share of a category in the total}}{\text{outstanding of bank } j\text{'s lending}} \right) \end{array} \right\}^2}$$

* Categories are classified by country and industry.

Step 2. The Interconnectedness Index for bank i is calculated based on this distance:

Interconnectedness of bank i =

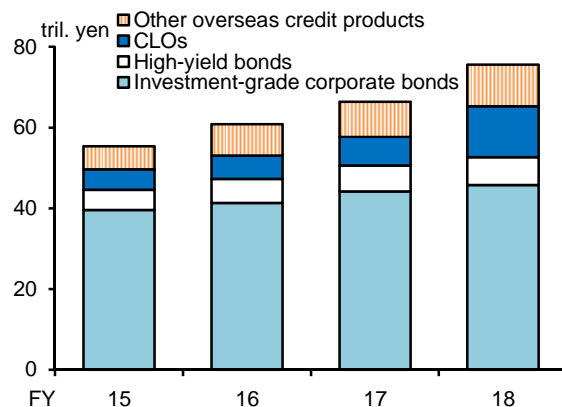
$$\{1 - (\text{weighted average of all the distances from bank } i)\} \times 100$$

* Weights are calculated from the number of common transactions.

Vulnerabilities on the international front: overseas credit investment by major banks

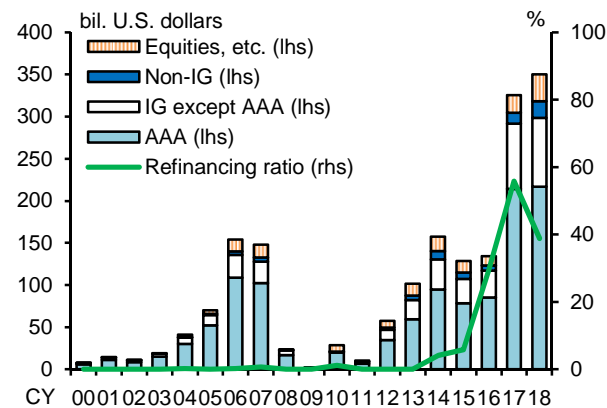
- Investment in overseas credit products by Japan's FIs has mainly focused on investment-grade corporate bonds, but growth in investments in, for example, collateralized loan obligations (CLOs) has been increasing. There are substantial differences across individual FIs in their investment stance regarding these products and the size and composition of their exposure.
- The amount of CLOs arranged in 2018 reached a new record, reflecting the increase in investor demand when market participants were concerned about U.S. policy rate hikes.
- The CLO investment of Japanese banks currently accounts for about 20 percent of their investment in overseas credit products overall. Their share of the total outstanding amount in the global CLO market is also considerable, accounting for approximately 15 percent. Most of this investment is in tranches with the highest AAA credit rating.

Chart III-1-25: Outstanding amount of overseas credit product investment among major banks and other financial institutions



Note: Covers major banks, Japan Post Bank, and a central organization of financial cooperatives.

Chart IV-3-7: Issuance of CLOs

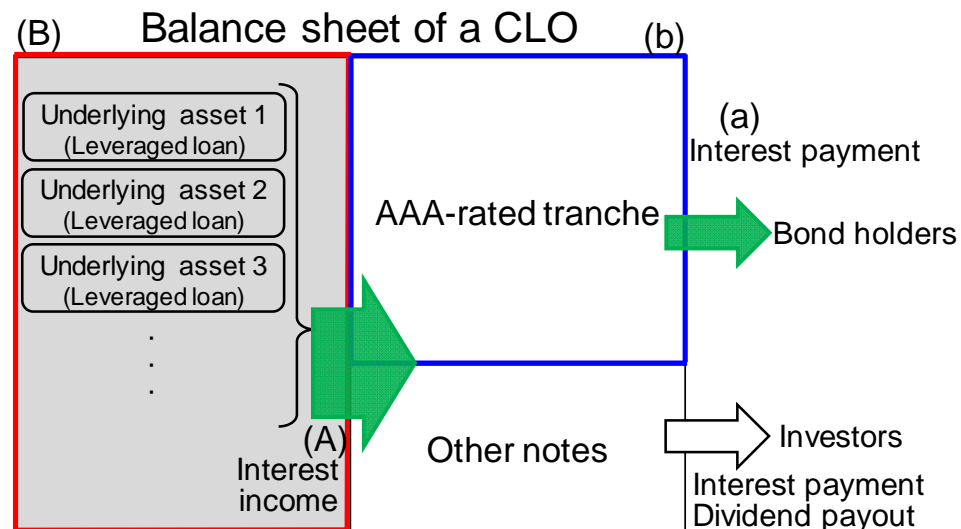


Source: Bloomberg; Creditflux, "CLO-i."

Vulnerabilities on the international front: structure of a CLO

- A CLO is a securitized product with a structure that distributes interest income from the underlying leveraged loans to investors who own AAA-rated tranches and other notes. Repayment of principals and interest payments to the AAA-rated tranches take priority over payments to other notes.
- The soundness of an AAA-rated tranche is monitored by indicators such as (i) interest payment capacity ($A > a$ in the chart), (ii) collateral adequacy ($B > b$), and (iii) quality of underlying assets (i.e., ratings).

Structure and soundness indicators of a CLO

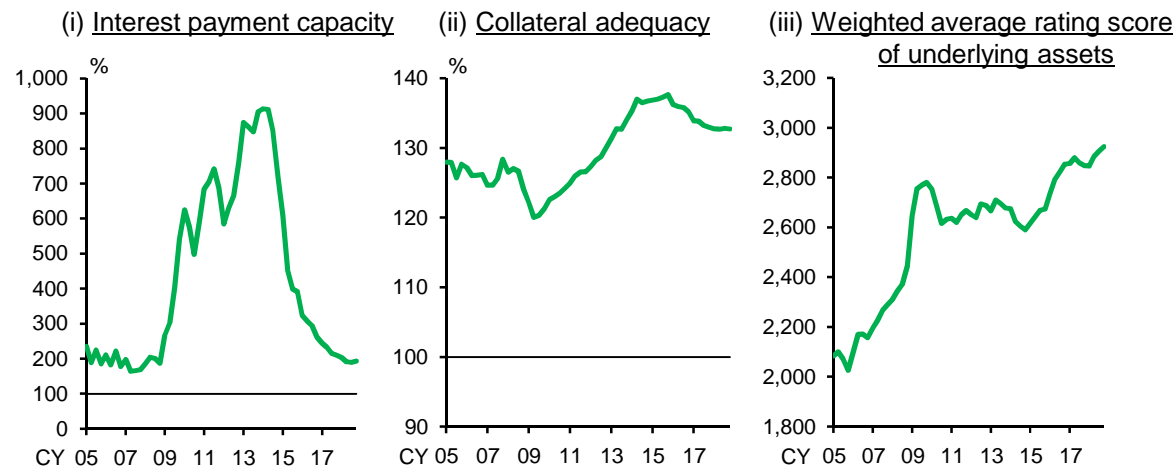


- (i) Interest payment capacity (Interest income (A) / Interest payment (a)
- (ii) Collateral adequacy (Collateral value of underlying assets (B) / Outstanding amount of AAA-rated tranche (b)
- (iii) Quality of underlying assets (ratings)

Vulnerabilities on the international front: soundness of AAA-rated tranches of CLOs

- Various indicators for the soundness of AAA-rated CLO tranches show that (i) the income from the underlying assets is currently sufficient and substantially exceeds the amount of interest payments to AAA-rated tranches.
- (ii) The collateral adequacy ratios, i.e., the collateral value of the underlying asset amount outstanding divided by the AAA-rated tranche amount outstanding, are higher than those before the global financial crisis, implying that the robustness of AAA-rated tranches has risen.
- On the other hand, (iii) the quality of the underlying leveraged loans (i.e., average ratings) has been deteriorating particularly since the beginning of 2015.

Chart IV-3-9: Soundness indicators of AAA-rated tranches of CLOs

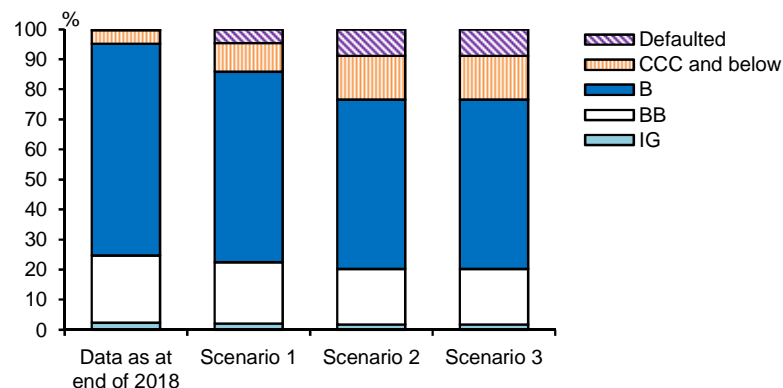


Note: 1. "Interest payment capacity" (median) indicates interest income from underlying loans divided by interest payment to AAA-rated tranches.
2. "Collateral adequacy" (median) indicates the ratios of the outstanding of underlying assets to that of AAA-rated tranches.
3. An increase in "weighted average rating score of underlying assets" (median) indicates a downgrading of underlying assets.
Source: Creditflux, "CLO-i."

Vulnerabilities on the international front: credit risk of AAA-rated tranches

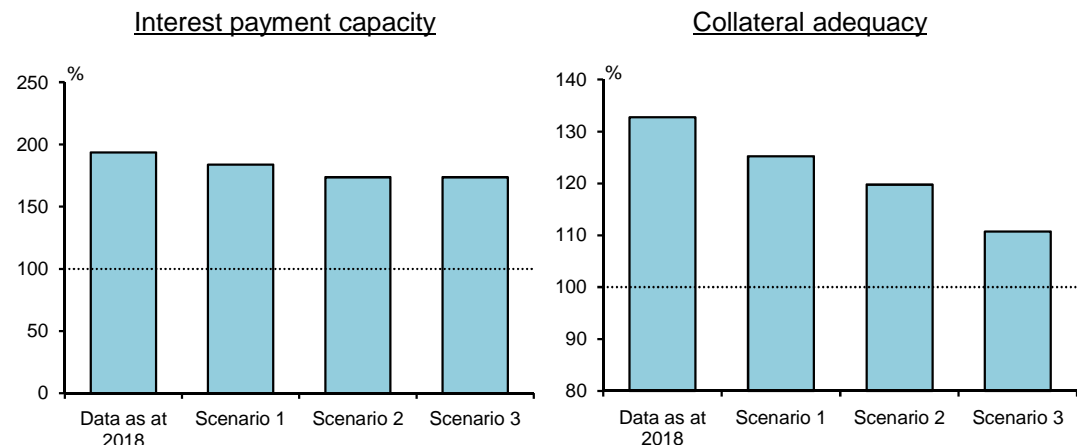
- Using granular data, the credit stress simulations examine changes in the robustness of AAA-rated tranches based on changes in the ratings of underlying assets during the global financial crisis.
- Scenario 1 assumes a downgrading by only half as much as during that period; Scenario 2 assumes a downgrading of the same extent as during that period; Scenario 3 imposes an additional severe assumption that the recovery rate of defaulted underlying assets is only half that observed during the global financial crisis.
- In all scenarios, the income from the underlying assets continues to exceed the amount of interest payments, and the collateral value of the underlying assets remains higher than the outstanding amount of AAA-rated tranches.

Chart B2-1: Changes in the composition of the rating of underlying assets by scenario



Source: Creditflux, "CLO-i."

Chart B2-2: Stress simulation of credit risk for AAA-rated tranches of CLOs



Note: 1. In the left-hand chart, interest income from loans with a rating of CC or below is assumed to be zero.

The value for "Data as at 2018" is the median.

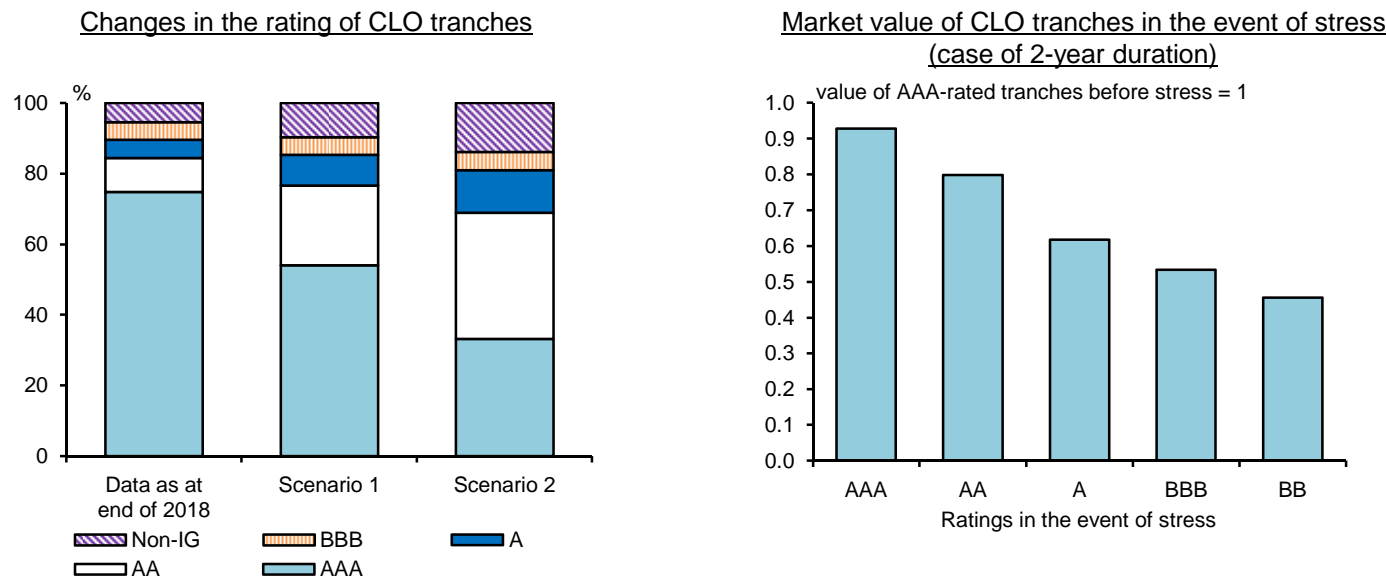
2. In the right-hand chart, the value of loans with a rating of B or above is calculated by book value, while the value of loans with a rating below B is calculated by market value. The market value used here is estimated using the median of transaction prices for each rating in 2009. In Scenario 3, the value of loans with a rating of below B is calculated at half the price of the market value. The value for "Data as at 2018" is the median.

Source: Creditflux, "CLO-i."

Vulnerabilities on the international front: market risk of AAA-rated tranches

- The market stress simulations examine the impact on the price of CLOs by assuming that the market spread for the tranches of each rating increases to the maximum level observed during the global financial crisis, based on the fact that: (1) a substantial number of AAA-rated tranches were downgraded to AA or below; (2) the spreads of tranches rated AA or below, in particular, increased substantially.
- The results indicate that even AAA-rated tranches would experience a price drop of about 10 percent due to the increase in spreads. If AAA-rated tranches were downgraded to AA or A, their prices would drop by 20 to 30 percent. In addition, there exists the possibility that, in the event of market stress, an amplification of price drops due to an increase in durations could be observed.

Chart B2-3: Stress simulation of market risk for AAA-rated tranches of CLOs



Note: In the right-hand chart, changes in the market values are calculated based on the maximum increase in spreads for each rating during the global financial crisis. The price changes are simulated as changes in the present values caused by the increase in discount rates, which are assumed to increase by the same amounts as the spreads. The market values shown here are scaled by AAA-rated tranches before stress, which are normalized to 1.

Source: Bloomberg; Creditflux, "CLO-i."

Vulnerabilities on the international front: market risk of AAA-rated tranches (cont'd)

- These simulation results suggest that AAA-rated tranches of CLOs are reasonably robust in terms of credit risk, i.e., protected against a loss of principal or a suspension of interest payments in the event of stress. However, attention should be paid to, among other things, the risk of a decline in market prices, due to a downgrading of ratings in the event of a sudden change in economic and market conditions.

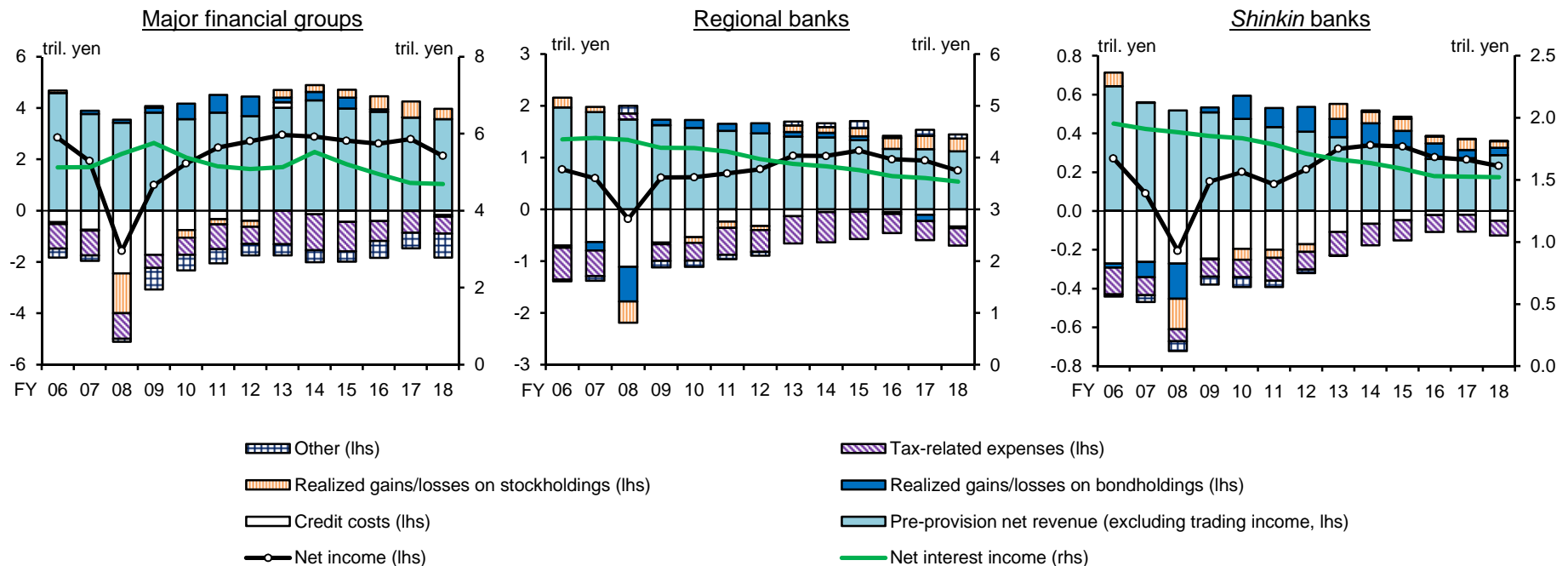
Part II. FIs' financial bases and risk profiles

- FIs' profitability
- Background behind the rise in credit costs
- FIs' capital adequacy

FIs' profitability

- FIs' net income in fiscal 2018 remained high from a historical perspective. However, it showed a somewhat large decline.
- Pre-provision net revenue (PPNR) excluding trading income continued to follow a decreasing trend, reflecting the persistent downward trend in domestic net interest income.
- Gains from securities trading were sluggish due in part to market developments such as the rise in U.S. interest rates and the decline in stock prices. Credit costs remained low but showed some increase. Financial results for fiscal 2018 highlight that the offsetting effects that have supported the FIs' declining core profitability have become less powerful.

Chart V-1-1: Developments in and decomposition of net income



Source: Published accounts of each bank; BOJ.

Background behind the rise in credit costs

- Credit cost ratios (i.e., credit costs divided by total loans outstanding) have remained low but started to rise, particularly for regional FIs. Firms' default rate has risen slightly.
- Two major points behind the recent rise in credit costs: first, some low-performing firms with a long-standing business relationship with their FIs have been facing a delay in business restructuring; and second, there is some slackening of loan screening and credit risk management amid FIs' efforts to increase lending.
- Against this backdrop, an increasing number of FIs have raised loan-loss provisions. FIs need to become even more aware of the possible effects on credit costs associated with the materialization of downside risks to the economy.

Chart V-1-3: Credit cost ratios by type of bank

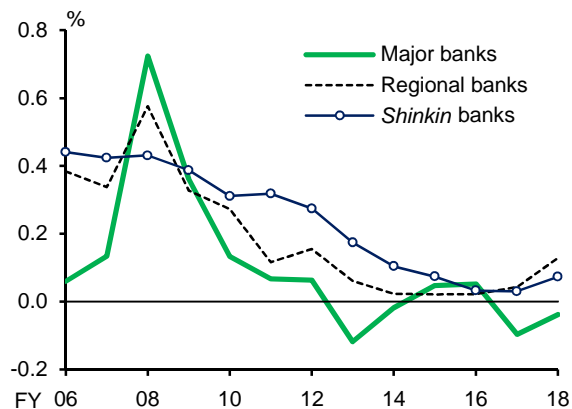
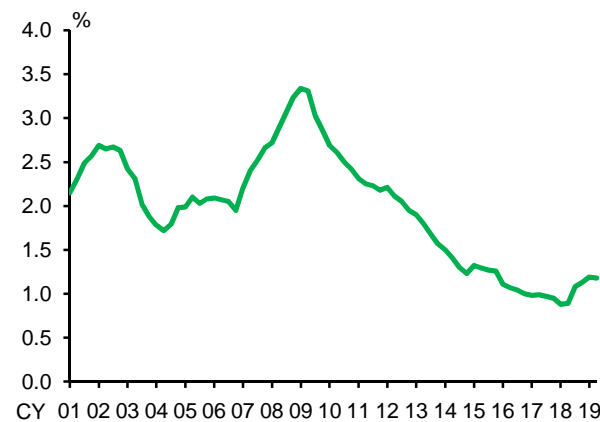
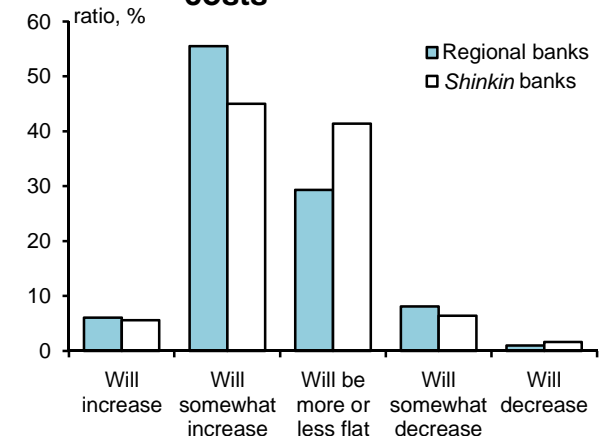


Chart V-1-6: Firms' default rate



Source: The Risk Data Bank of Japan.

Chart V-1-5: Financial institutions' view on developments in credit costs



Note: View on future credit costs.

FIs' capital adequacy

- Capital adequacy ratios have been sufficiently above the regulatory levels for all types.
- However, those of domestic banks have continued to gradually decline in recent years. This decline mainly reflects the fact that retained earnings are growing at a slower pace than risk-weighted assets, partly due to the increase in loans to low-return borrowers.

Chart V-5-1: Financial institutions' capital adequacy ratios

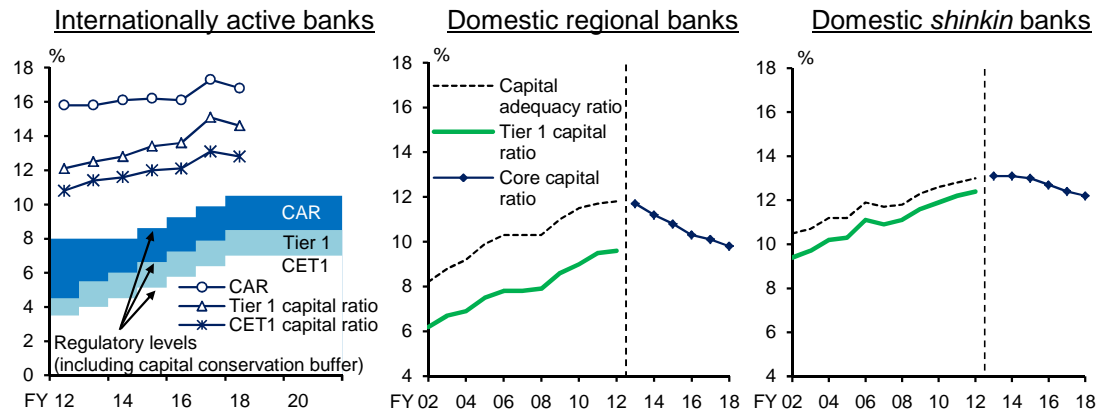
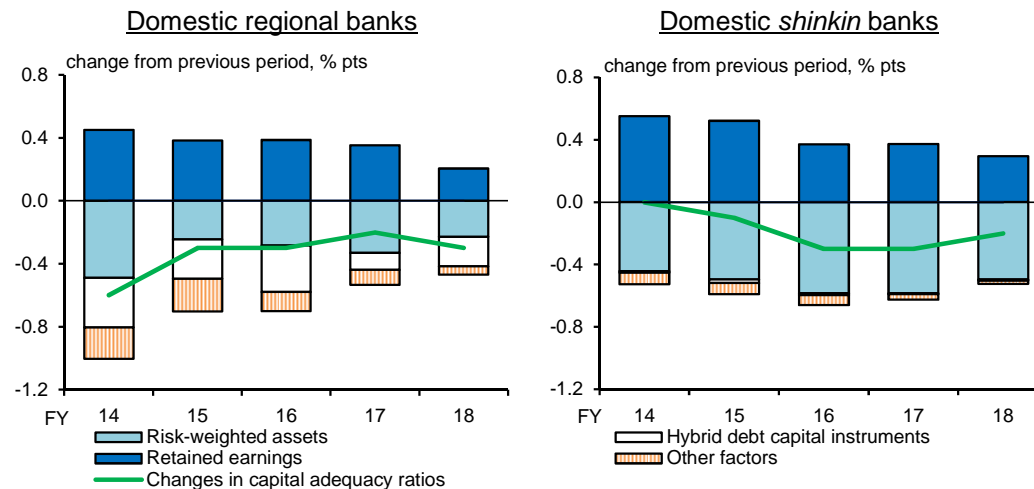


Chart V-5-2: Factors of changes in capital adequacy ratios



Estimation of capital adequacy ratios that FIs use as a yardstick

- Changes in FIs' capital adequacy ratios could affect their risk-taking behavior such as lending.
- The estimation results for the capital adequacy ratio that domestic banks use as a yardstick of their business stability (the "target ratio") show that average actual capital adequacy ratios are recently falling below the target ratio. Regional banks may be somewhat raising their target ratios partly due to declines in unrealized gains that they have used as a *de facto* buffer.
- Attention needs to be paid to the possibility that FIs' lending attitudes might become more cautious given that the capital adequacy ratio at regional FIs started to decrease.

Chart V-5-5: Target and actual capital adequacy ratios

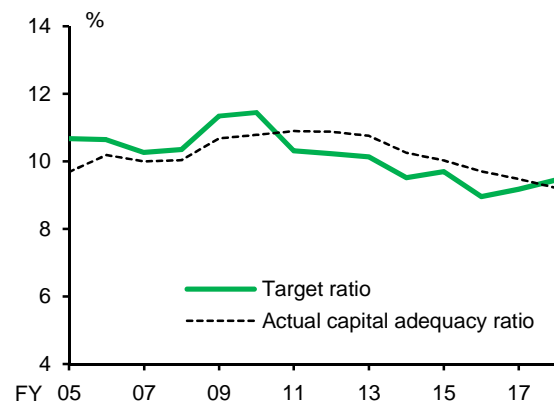
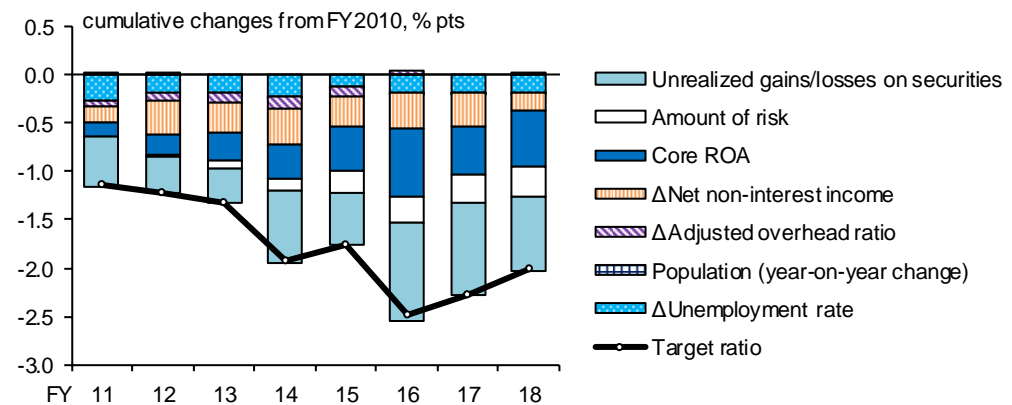


Chart B3-2: Decomposition of target ratio



Results of the survey on shareholder governance

- A recent survey of regional banks shows that among around 60 regional banks that used or referred to the cost of equity, nearly 80 percent indicated that their own sustainable earnings "underperform" (or "underperform strongly") their cost of equity.
- Many respondents cited "increase in non-interest income" and "cost reduction" as their counter-measures to meet shareholder requests.
- Regional banks are aware that their profitability falls below the level requested by shareholders and try to ensure various income sources and improve operating efficiency.

Chart V-5-10: Comparison between earnings and the cost of equity

Survey question: "How are your bank's sustainable earnings compared to the cost of equity?"

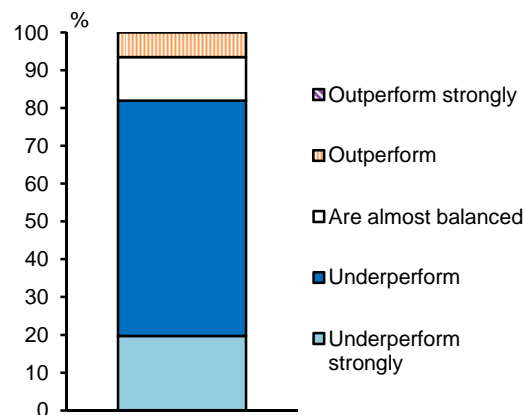
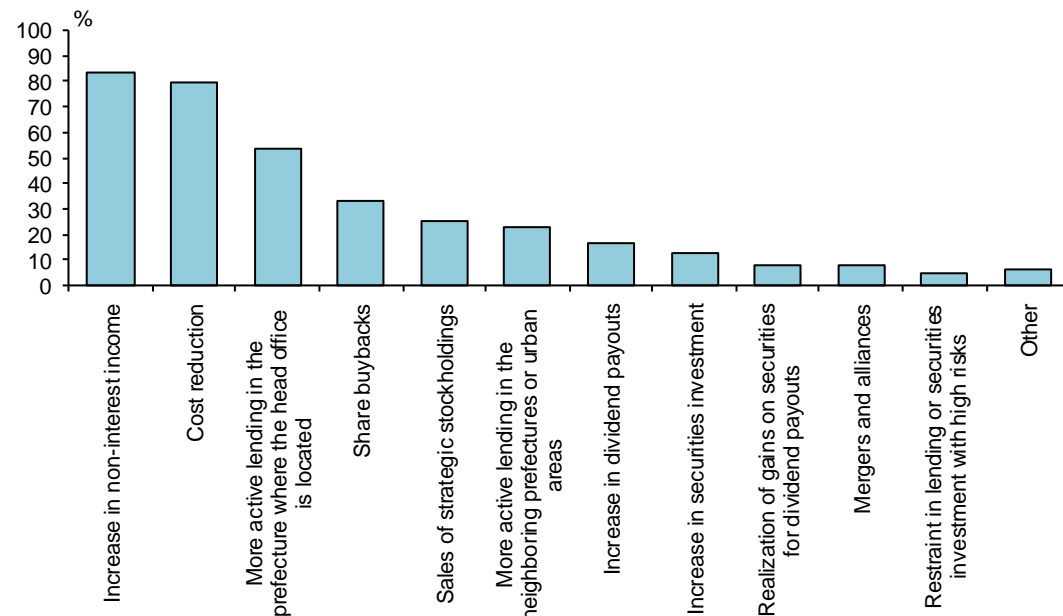


Chart V-5-11: Counter-measures to meet shareholder requests

Survey question: "What counter-measures has your bank taken to achieve the business target that your shareholders focus on?" (up to five options could be selected)



Note: Results of the survey on business management and shareholder governance conducted in fiscal 2019. The survey covers listed regional banks (for those affiliated with financial holding companies, only banks with the largest total assets are covered).

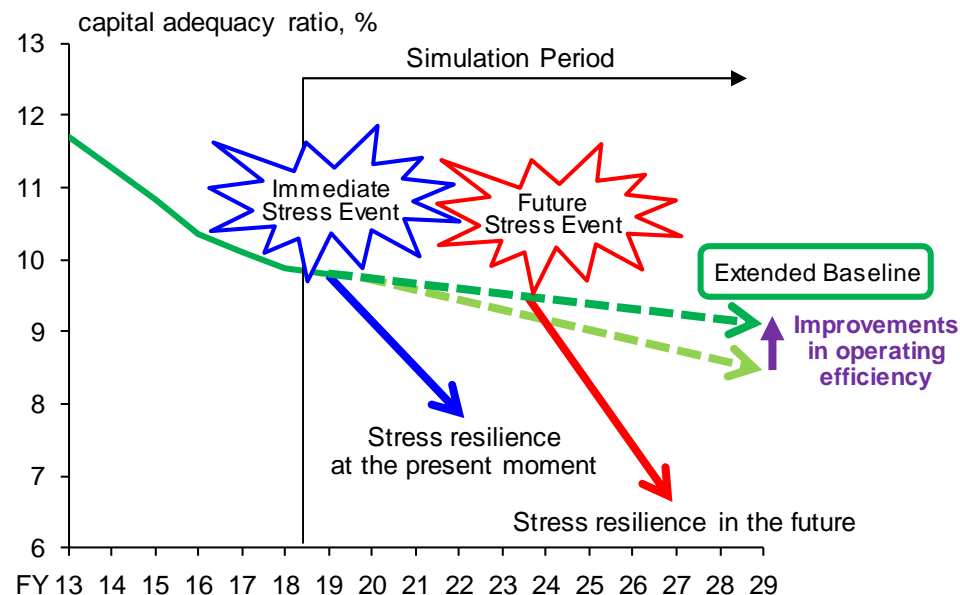
Part III. FIs' resilience to tail risk

- Regular macro stress testing
- Medium- to long-term simulation and stress testing incorporating improvements in operating efficiency

Overview of the macro stress testing (MST)

- (1) A regular MST that assumes the immediate realization of risk; and (2) a medium- to long-term MST that assumes that a stress event occurs in 5 years' time are presented.
- The second MST was conducted in the previous issue to examine the implication of a possible prolonged decline in Japan's FIs' profitability for the future financial stability.
- This issue also estimates how regional FIs' efforts to improve operating efficiency, such as overhead cost savings and increases in net non-interest income, will affect the future profits and financial soundness of regional FIs, and incorporates those effects into the medium- to long-term baseline scenario.
- The aim of the second MST is to show, with a certain degree of practicality, the possibility that changes in FIs' activities improve their profitability and stress resilience.

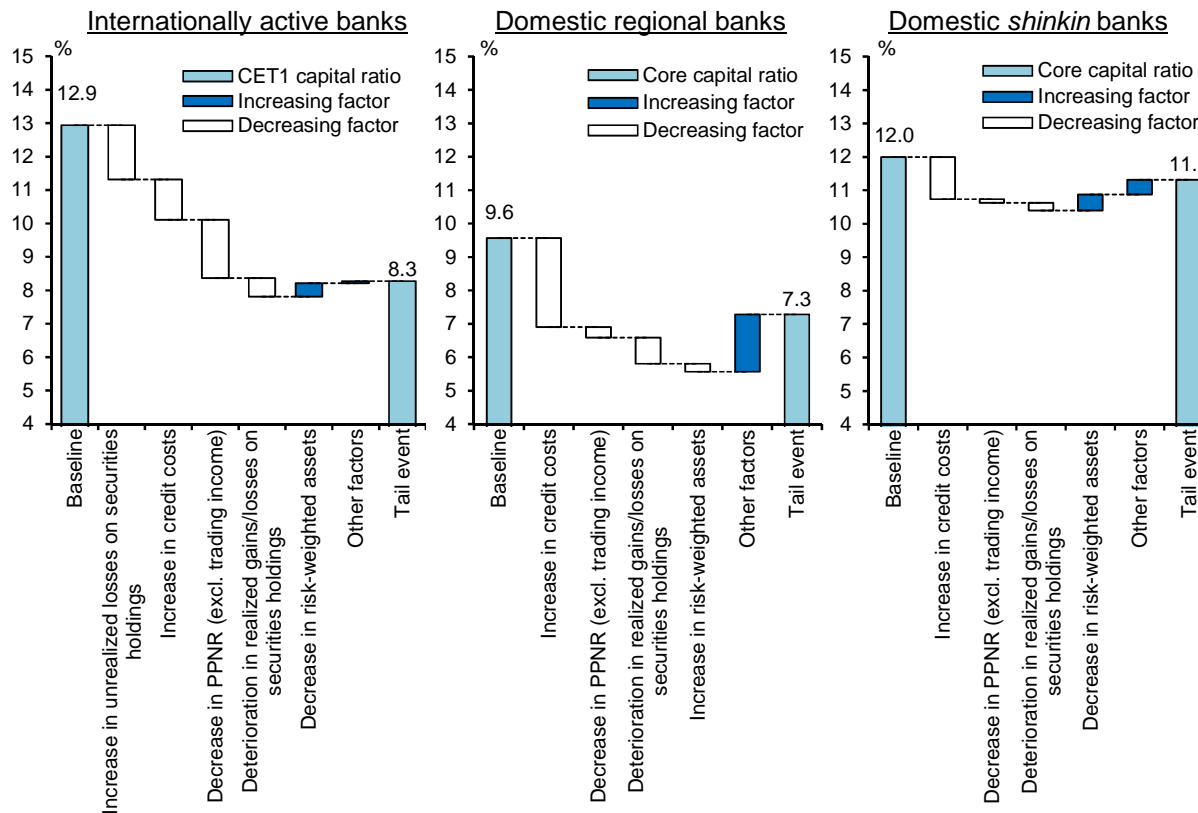
Macro stress testing in this issue of the Report



Results of the regular MST

- The results of the regular MST assuming a realization of an immediate tail event comparable to the global financial crisis indicate that net income substantially declines due to an increase in credit costs and securities-related realized losses, as well as a decline in PPNR excluding trading income.
- Capital adequacy ratios decrease correspondingly but exceed regulatory requirements on average for all types of banks.

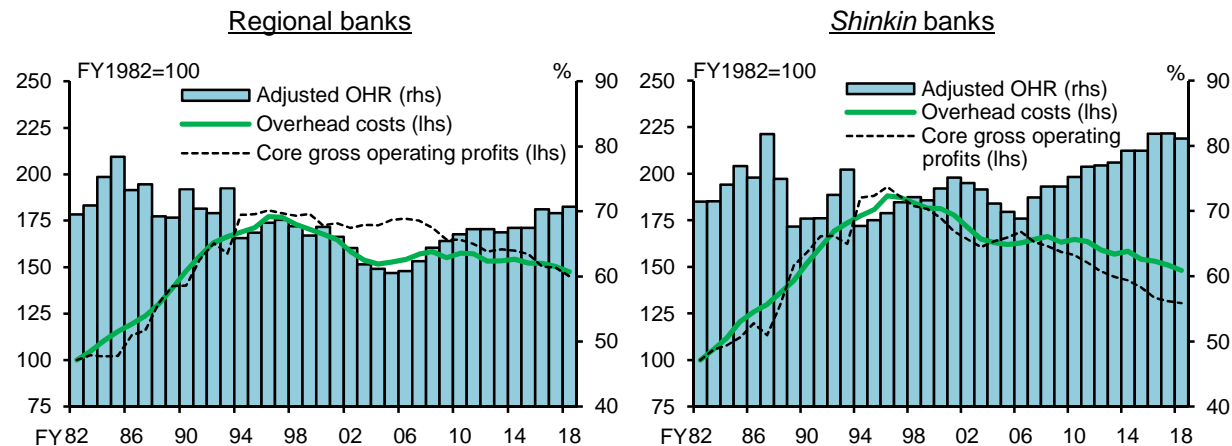
Chart VI-1-7: Decomposition of the CET1 capital ratio and the core capital ratio (fiscal 2022)



Regional FIs' operating efficiency (adjusted overhead ratios)

- The medium- to long-term simulation uses the adjusted overhead ratio (OHR), the ratio of overhead costs to core gross operating profits, as an indicator for measuring operating efficiency. A lower value of the adjusted OHR means that an FI's operating efficiency is higher.
- The adjusted OHRs of regional FIs have been on an upward trend since the mid-2000s (i.e., operating efficiency has been on a downward trend) as the decline in core gross operating profits has outpaced the decline in overhead costs.
- Currently, the average adjusted OHR for regional banks is around 70 percent, while that for *shinkin* banks is around 80 percent.

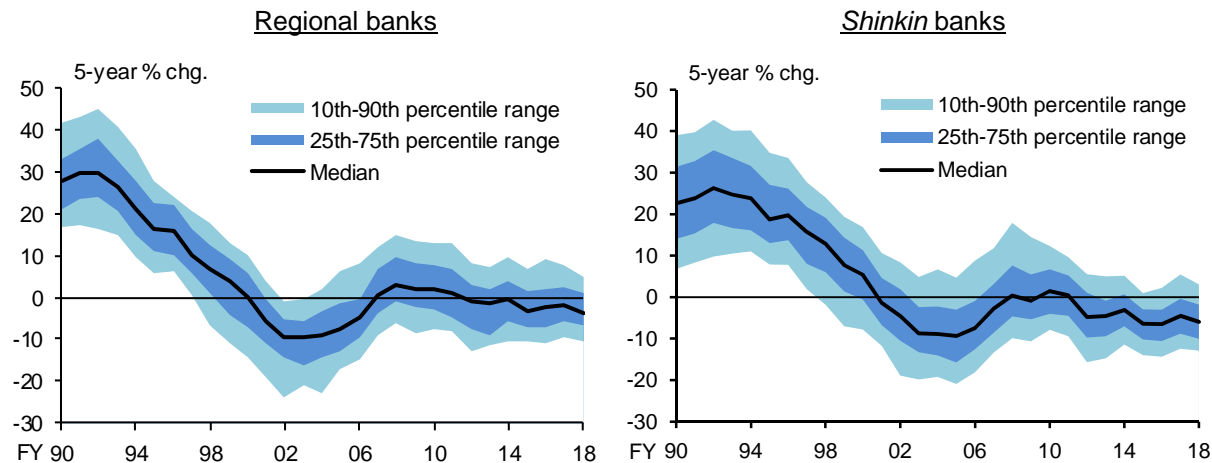
Chart VI-2-1: Adjusted OHR of regional financial institutions



Regional FIs' overhead cost savings

- About 80 percent of regional FIs have reduced their overhead costs over the last 5 years, with about half of them saving on overhead costs at an average annual rate of greater than 1 percent.
- Regional FIs in recent years have been accelerating their efforts to streamline operations while paying attention to making IT investments and securing the human resources necessary for strategic business evolution.

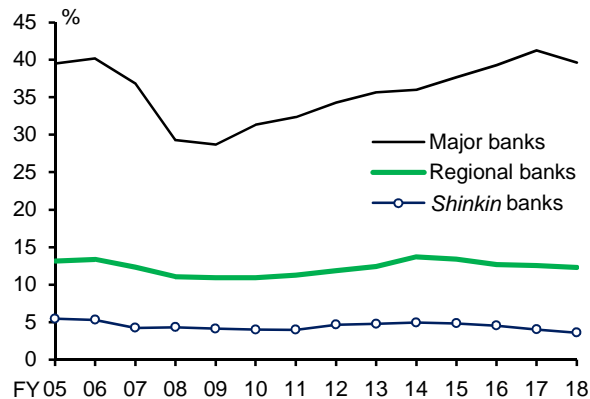
Chart VI-2-4: Overhead costs of regional financial institutions



Regional FIs' net non-interest income ratio

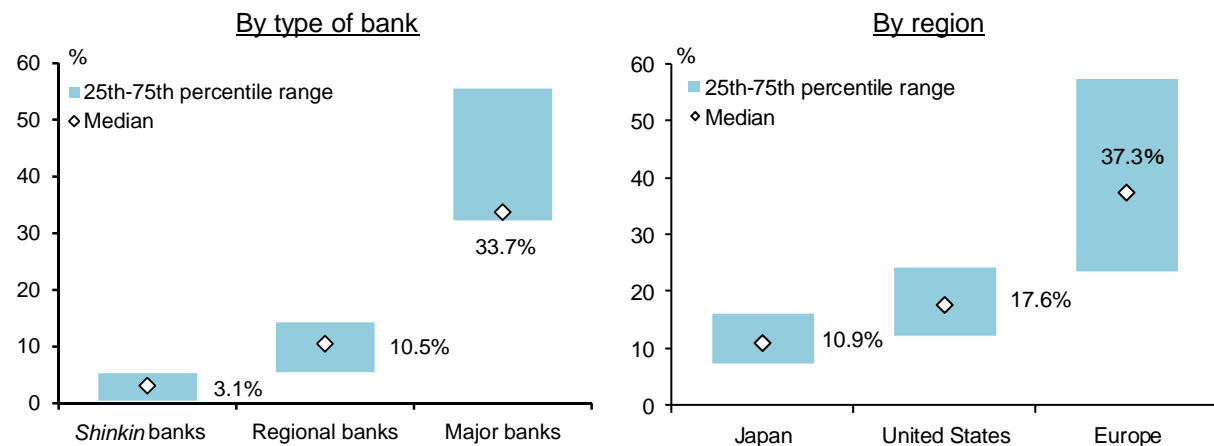
- Net non-interest income ratios for regional banks and *shinkin* banks have remained largely unchanged in recent years, and their levels have been below those of major banks in Japan and their regional FI peers abroad.

Chart VI-2-5: Developments in net non-interest income ratio



Note: Net non-interest income ratio = net non-interest income / core gross operating profits

Chart VI-2-6: Comparison of net non-interest income ratio by type of bank and by region



Note: 1. In the left-hand chart, net non-interest income ratio is defined in the same way as in Chart VI-2-5. Data as at fiscal 2018.

2. In the right-hand chart, net non-interest income ratio is calculated as (gross operating profits - net interest income) / gross operating profits. Gross operating profits here include realized gains/losses on securities holdings. For Japan, data cover regional financial institutions. For the United States and Europe, financial institutions whose gross operating profits are larger than the maximum of Japan's regional financial institutions are excluded. Data are averages over fiscal 2015-2017.

Source: OECD; S&P Global Market Intelligence; BOJ.

Simulation assumption (1): assumed improvements in operating efficiency

- The medium- to long-term simulation incorporates improvements in operating efficiency, such as (1) overhead cost savings, and (2) increases in net non-interest income such as fees and commissions, both of which are the focus of regional FIs in recent years, into the baseline scenario.
- Hereafter, this case is referred to as the "increasing efficiency case" and compared to the "constant efficiency case," which assumes no such improvements in operating efficiency.
- The "increasing efficiency case" assumes that the adjusted OHR improves by around 5 percentage points. This size of improvement is calculated assuming net interest income fixed at the current level. If this improvement were achieved immediately, the adjusted OHR would be around 65 percent and 75 percent for regional banks and *shinkin* banks.
- For regional banks, this improvement can be achieved by increasing their net non-interest income by about 10 percent over the next 10 years and saving by about 1 percent per year on their overhead costs, which is the observed average pace in recent years (See the table below).

Chart VI-2-9: Combination of overhead cost savings and increases in net non-interest income

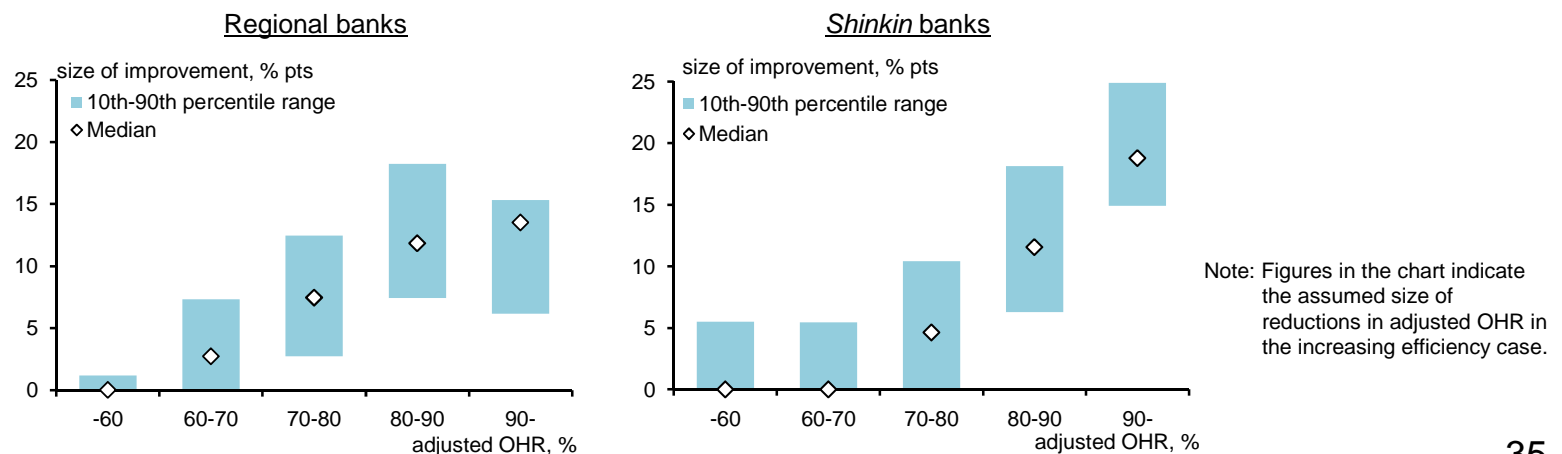
Top value: bil. yen; middle and bottom values: %

	Actual values of FY2018		Top value: assumed amount of increase in net non-interest income Middle value: assumed rate of increase in net non-interest income Bottom value: assumed net non-interest income ratio		
	Core gross operating profits	Net non-interest income	Three cases of overhead cost savings over the next 10 years		
			-5%	-10%	-15%
Regional banks	4,141.0	510.3 <12.3>	+151.8 [+29.7] <15.4>	+45.5 [+8.9] <13.3>	+7.0 [+1.4] <12.5>
<i>Shinkin</i> banks	1,594.7	57.2 <3.6>	+89.7 [+156.7] <8.7>	+34.2 [+59.7] <5.6>	+10.2 [+17.8] <4.2>

Simulation assumption (1): assumed improvements in operating efficiency (cont'd)

- From individual FIs' perspective, the above assumption is consistent with assuming an improvement in operating efficiency to the level achieved by the top 10 percent of FIs having similar characteristics such as size and belonging to the same bank type.
- The size of improvements in operating efficiency for each FI is estimated by a quantitative method called "stochastic frontier analysis."
- Since there is a considerable dispersion of adjusted OHRs among individual FIs, the difficulty of achieving the assumed level is not the same across these institutions.
- The aim of assuming improvement in operating efficiency in the medium- to long-term simulation is not to uniquely present the scenario most likely to be realized or the level of operating efficiency that FIs should aim for, but to understand the severity of FIs' future profit environment and the importance of various efforts to respond to it by showing several hypothetical scenarios and the simulation results under those scenarios.

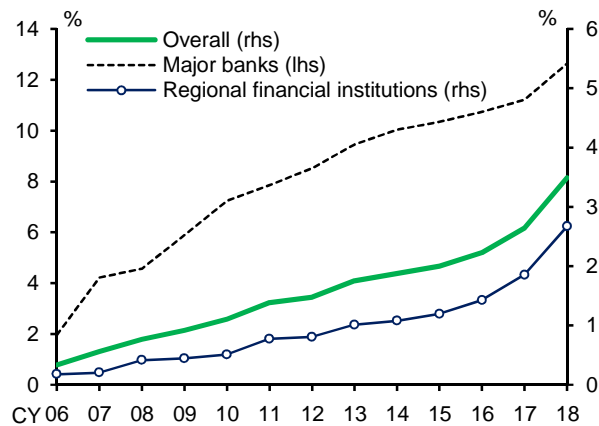
Chart VI-2-10: Assumed improvement in operating efficiency



Simulation assumption (2): supply-demand balance in the loan market

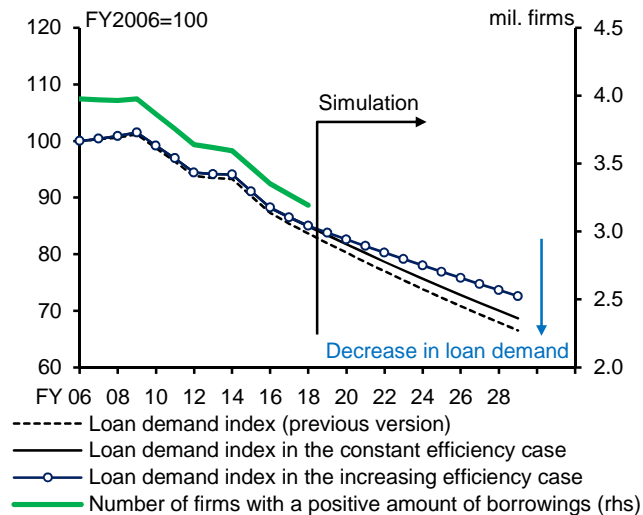
- A mechanism in which the secular decline in loan demand leads to a fall in lending margins through a loosening of the supply-demand balance in the loan market is the same as the one assumed in the previous issue. The "loan demand index," calculated as the number of borrowing firms per bank branch, was used as a proxy variable.
- As in the previous issue, it is assumed that, in tandem with the continued decline in the loan demand index, the share of loans to low-return borrowers continues to rise.

Chart VI-2-11: Share of "branch-in-branch" among all branches



Source: The Japan Financial News Co., Ltd.

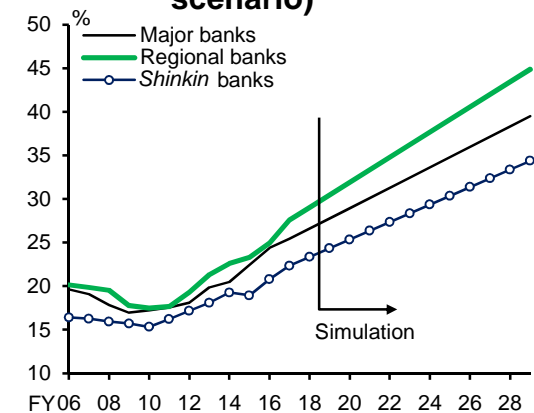
Chart VI-2-12: Loan demand index (medium- to long-term baseline scenario)



Note: "Loan demand index in the constant efficiency case" takes into consideration the effect of the *de facto* decreases in the number of branches by using "branch-in-branch" consolidation. "Loan demand index in the increasing efficiency case" additionally supposes that overhead cost saving efforts induce streamlining of branches, etc.

Source: Ministry of Internal Affairs and Communications; Teikoku Databank; The Japan Financial News Co., Ltd.

Chart VI-2-13: Share of loans to low-return borrowers (medium- to long-term baseline scenario)

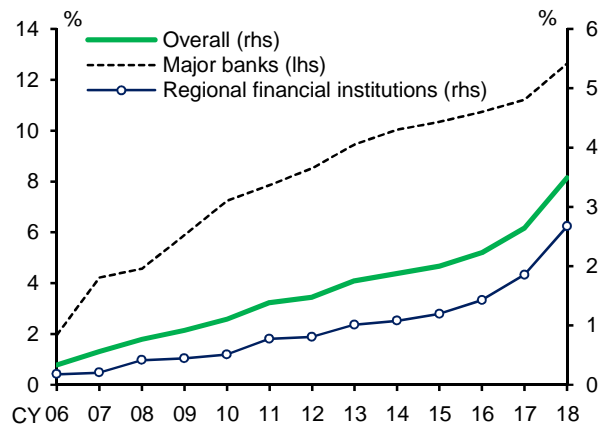


Source: Teikoku Databank.

Simulation assumption (2): supply-demand balance in the loan market (cont'd)

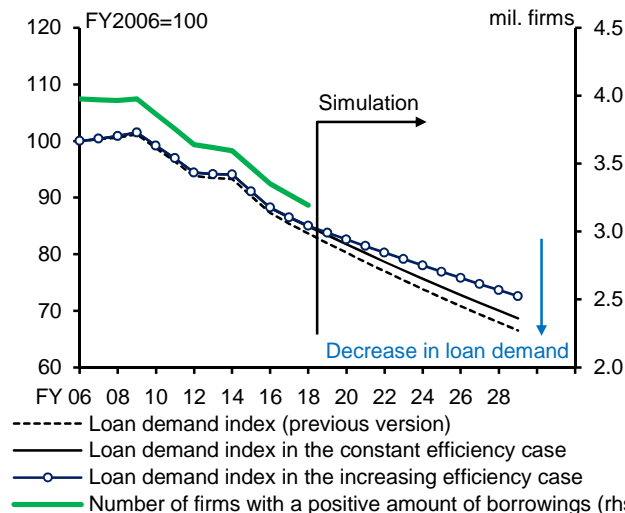
- FIs have recently been introducing so-called "branch-in-branch" consolidation and joint branches, as well as "lightweight" branches. The simulation attempts to refine the loan demand index, taking into account the effects of changes in the branch operations on the supply-demand conditions in the loan market.
- Namely, (1) the *de facto* decline in the number of branches due to the increased use of "branch-in-branch" consolidation, and (2) streamlining of branch operations as part of overhead cost savings assumed in the "increasing efficiency case," both of which will moderate the downward trend in the loan demand index somewhat going forward.

Chart VI-2-11: Share of "branch-in-branch" among all branches



Source: The Japan Financial News Co., Ltd.

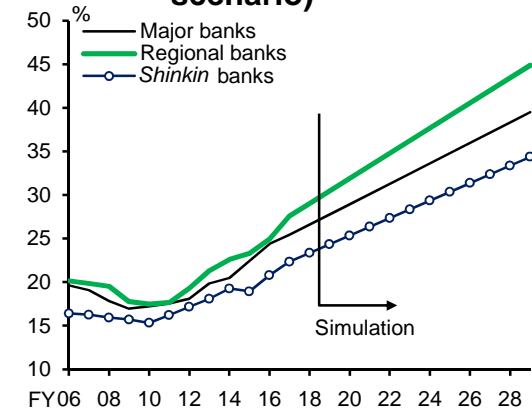
Chart VI-2-12: Loan demand index (medium- to long-term baseline scenario)



Note: "Loan demand index in the constant efficiency case" takes into consideration the effect of the *de facto* decreases in the number of branches by using "branch-in-branch" consolidation. "Loan demand index in the increasing efficiency case" additionally supposes that overhead cost saving efforts induce streamlining of branches, etc.

Source: Ministry of Internal Affairs and Communications; Teikoku Databank; The Japan Financial News Co., Ltd.

Chart VI-2-13: Share of loans to low-return borrowers (medium- to long-term baseline scenario)



Source: Teikoku Databank.

Simulation assumption (3): macroeconomic variables

- The way to set paths for the macroeconomic variables is identical to the previous issue.
- Regarding the output gap, the first 3 years of the scenario are identical to the baseline scenario in the regular macro stress testing. For the subsequent 7 years, the scenario is based on the assumption that the output gap gradually converges to zero, i.e., its long-run equilibrium level. Population continues to decline moderately in line with the medium-fertility and medium-mortality case. The potential growth rate evolves in the range of 0.5-1.0 percent, which is close to the current level.
- Government bond yields evolve in line with the forward rates implied by the yield curve. Stock prices and foreign exchange rates are assumed to be constant over the simulation period.

Chart VI-2-7: Output gap (medium- to long-term baseline scenario)

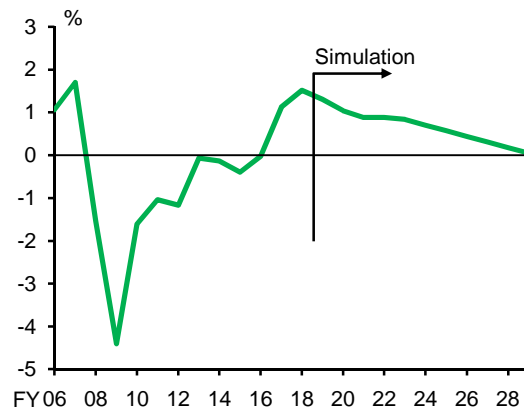
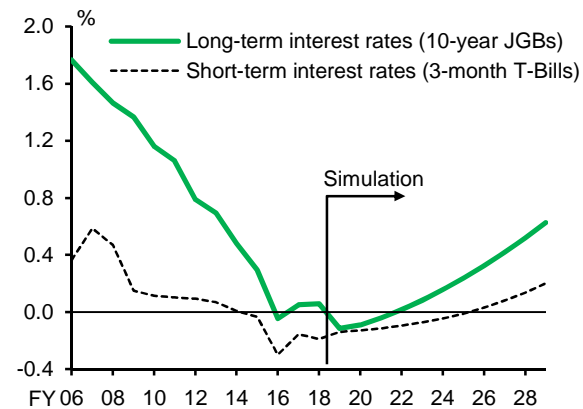


Chart VI-2-8: Nominal interest rates (medium- to long-term baseline scenario)

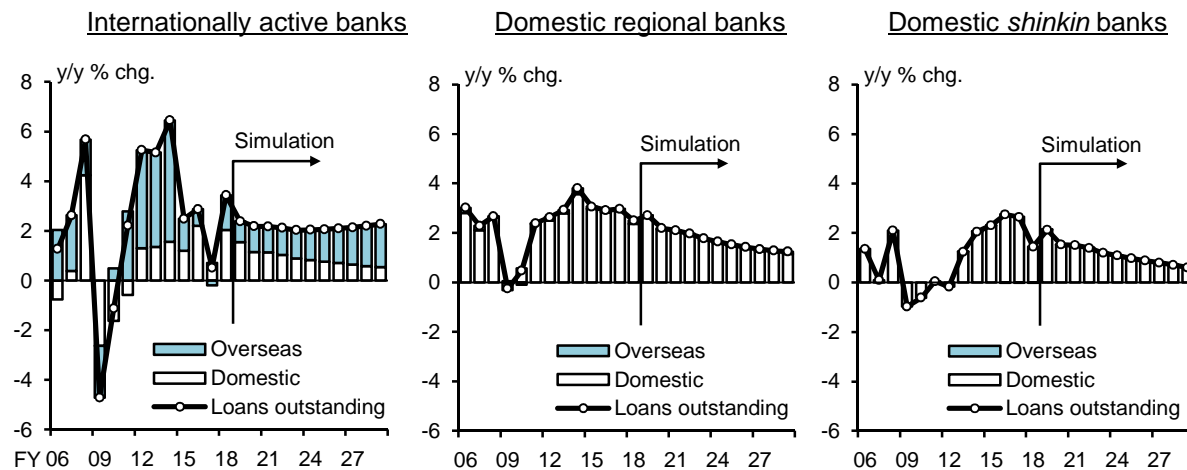


Source: Bloomberg; Ministry of Finance.

Simulation result (1): loans outstanding

- In the baseline scenario, growth in loans outstanding of domestic banks gradually slows, reflecting the decline in Japan's population and the shrinking of the positive output gap. Loans outstanding of internationally active banks maintain a largely constant growth rate, with the decline in domestic lending -- as observed in domestic banks -- being offset by the growth in overseas lending.

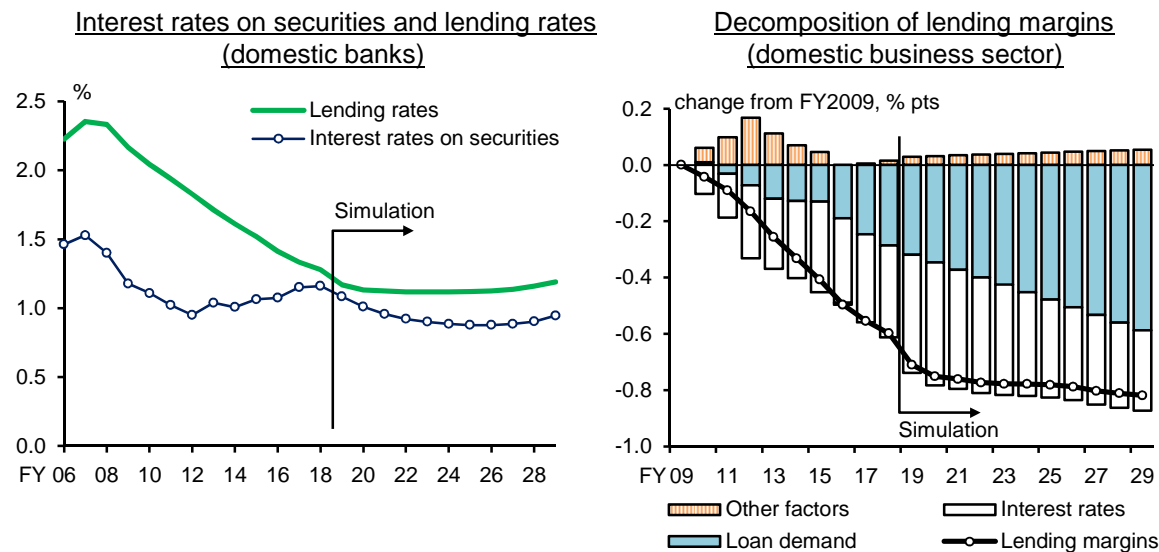
**Chart VI-2-14: Loans outstanding in the increasing efficiency case
(medium- to long-term baseline scenario)**



Simulation result (2): interest rates on securities and lending rates

- Even with market interest rates turning upward, lending rates remain more or less unchanged except for at the very end of the simulation period, due to the continuing structural downward pressure reflecting the decline in loan demand. Yields on securities will decline even from a somewhat longer-term perspective, reflecting the fact that yield curves both at home and abroad are currently flattening.
- As the "increasing efficiency case" incorporates the effects which somewhat moderate the downward trend in loan demand, downward pressure on lending margins is alleviated compared to the "constant efficiency case."

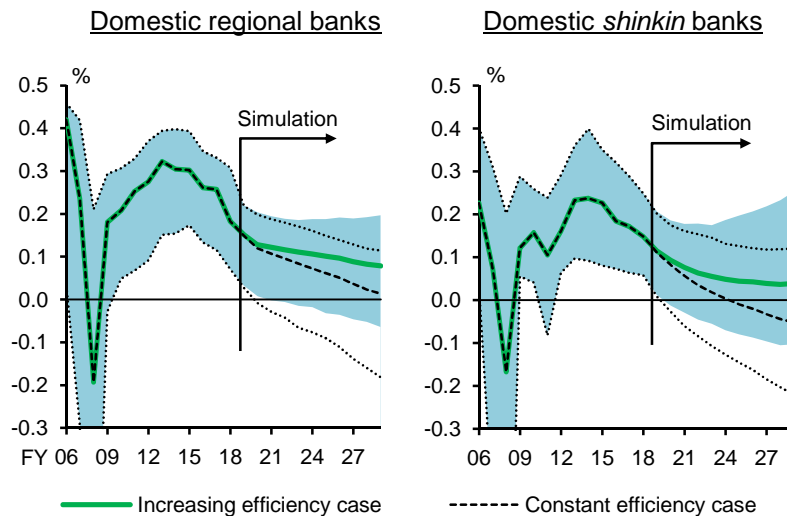
Chart VI-2-15: Interest rates on securities and lending rates in the increasing efficiency case (medium- to long-term baseline scenario)



Simulation result (3): net income

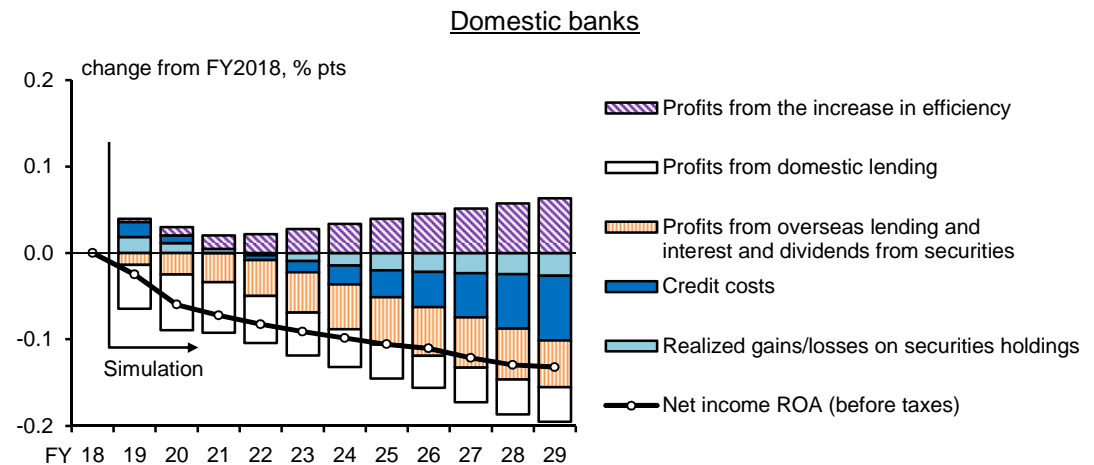
- As a result, net income of domestic banks follows a downward trend throughout the simulation period. However, average net income ROA of domestic banks in the "increasing efficiency case" significantly shifts upward compared to the "constant efficiency case," which does not assume any improvements in operating efficiency, as does the entire cross-sectional distribution of net income ROA.
- While the improvement in operating efficiency in the "increasing efficiency case" cannot fully compensate for the downward pressure on profits in domestic deposit-taking and lending activities and in securities investment and the upward pressure on credit costs, it does make a substantial positive contribution to profits.

Chart VI-2-16: Net income ROA (medium- to long-term baseline scenario)



Note: The shaded areas indicate the 10th-90th percentile range in the increasing efficiency case, and the thin dotted lines indicate the 10th-90th percentile range in the constant efficiency case.

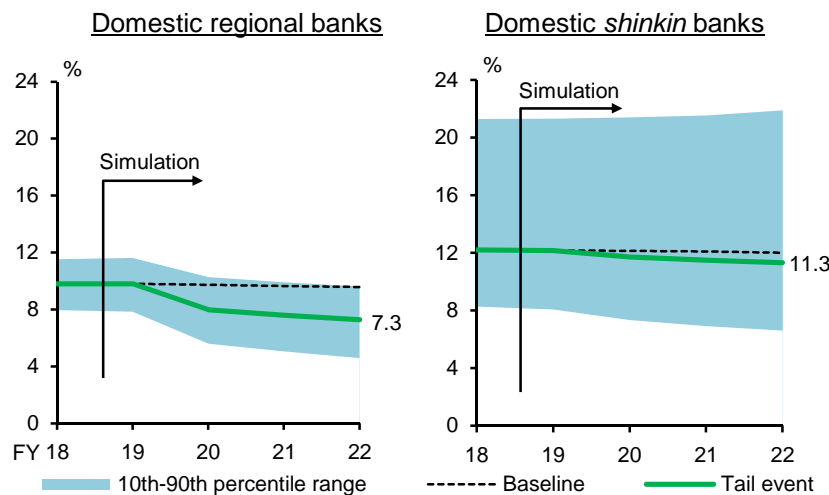
Chart VI-2-17: Decomposition of net income ROA in the increasing efficiency case (medium- to long-term baseline scenario)



Results of stress testing: an immediate tail event and a tail event in 5 years' time

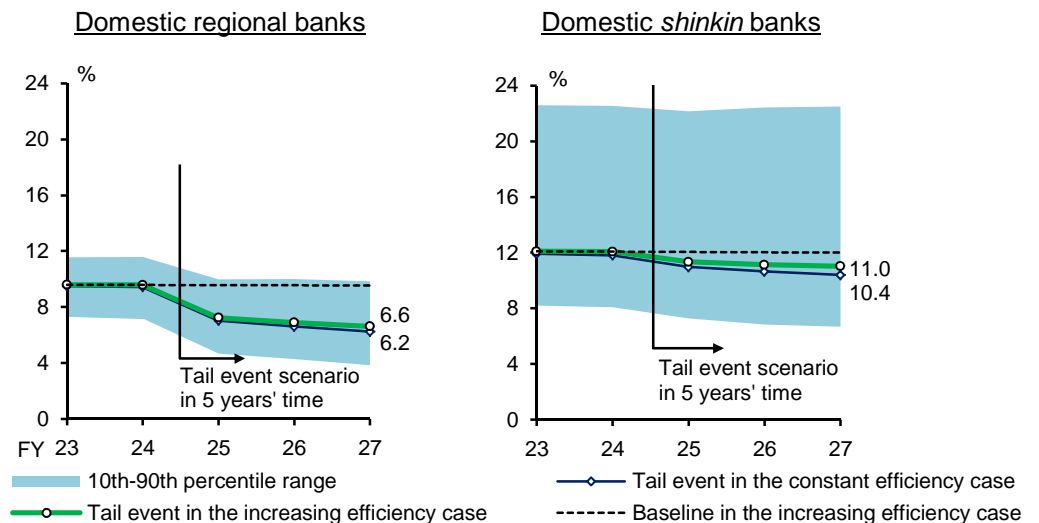
- Comparing the immediate tail event and that in 5 years' time for domestic banks, the results of the latter are more severe because, over the next 5 years, (1) the share of loans to low-return borrowers is assumed to increase, leading to more credit costs in the event of stress; and (2) locking in gains on securities and the decline in unrealized gains are assumed to continue, leading to larger impairment losses.
- The capital adequacy ratios are higher in the "increasing efficiency case" than those in the "constant efficiency case" by around 0.5 percentage points. Although these results are subject to a large margin of error, they suggest that wide-ranging efforts by FIs to improve operating efficiency will significantly enhance their future financial soundness and stress resilience.

Chart VI-1-6: CET1 capital ratios and core capital ratios (immediate tail event scenario)



Note: "10th-90th percentile range" is for the tail event.

Chart VI-2-20: CET1 capital ratios and core capital ratios (tail event scenario in 5 years' time)



Note: "10th-90th percentile range" is for the tail event in the increasing efficiency case.

Toward ensuring financial stability in the future

- Japan's financial system has been maintaining stability on the whole. However, FIs' profitability, particularly that of domestic deposit-taking and lending activities, has continued to decline.
- A recovery in the profitability of FIs is important for ensuring stability of the financial system into the future. To achieve this, it is essential to raise the potential growth rate of Japan's economy and revitalize regional economies. For this to be achieved, various entities need to make their efforts: firms to increase their productivity; and the government to reform regulations and institutions, and stimulate innovation. FIs can also play an important role by providing solution-related services for firms regarding business succession and restructuring, as well as financial services supporting wealth accumulation by households in response to the rise in longevity. FIs have already been intensifying such efforts, but they need to further accelerate efforts to improve operating efficiency, including those indicated in this *Report*.
- Against this backdrop, in order for the financial system to maintain stability into the future and carry out its financial intermediation functions effectively even in the event of stress, FIs need to address the following four business challenges.

First, FIs should strengthen efforts to raise their core profitability. Specifically, they need to accelerate efforts to (1) enhance their capacity to provide more attractive financial services such as solution-related services for firms and services supporting households' wealth accumulation, (2) keep their loan interest rates commensurate with the risks involved and increase their non-interest income based on the provision of enhanced services, and (3) review business processes and expense structures. To strongly promote the improvement in operating efficiency, effective options include mergers or collaboration with other FIs, as well as alliances with firms in other business areas.

Toward ensuring financial stability in the future (cont'd)

Second, FIs should enhance their risk management in areas where they have actively increased their risk taking. In terms of credit risk, FIs need to strengthen their risk management for lending to middle-risk firms and the real estate industry and for overseas lending. It is also important for FIs to take into account characteristics of their loan portfolios and future prospects when managing loans and setting loan-loss provisions. In terms of market risk, FIs need to improve their risk management in response to the wide-ranging and complex risks associated with credit investment and investment trusts. In terms of liquidity risk, FIs need to secure stable foreign currency funding bases. Moreover, major FIs with systemic importance need to ensure a solid financial base, strengthen their governance on a global and group-wide basis, and prepare to deal with a stress event in an orderly manner.

Third, FIs should adapt to digitalization. While advances in digitalization can possibly erode the profit opportunities of existing FIs, they can also provide FIs with tools for expanding the frontiers of services that FIs can provide and fundamentally increasing their operating efficiency. In terms of strategic risk as to whether FIs are able to develop appropriate business strategies in response to changes in the business environment, adaptation to digitalization is one of the most important topics recently. Therefore, FIs need to develop strategies to exploit the potential gains offered by digital technology and establish frameworks for cybersecurity management and anti-money laundering controls.

Toward ensuring financial stability in the future (cont'd)

Finally, FIs should implement appropriate capital policies. Given that both investors and firms have been more closely scrutinizing capital efficiency and payouts to shareholders in recent years, striking the right balance between appropriate payouts and enhancement of capital is particularly important for regional banks whose profitability has continued to decline. FIs need to develop business plans that appropriately take capital costs into account according to their governance structure, which differs between corporations and cooperative institutions. At the same time, they need to clarify capital policies, including those pertaining to sufficient capital levels, dividend payout plans, and the effective use of unrealized gains on securities, and they also need to improve communication with shareholders and a wide range of other stakeholders.

- In order to ensure the stability of the financial system, the Bank of Japan, through on-site examinations, off-site monitoring, and other activities such as holding seminars, will continue to provide support to FIs in their efforts to address the challenges listed above.
- In conducting on-site examinations and off-site monitoring, the Bank will continue to focus on grasping FIs' future profitability and financial soundness and sharing its views with these institutions. In doing so, the Bank will concentrate on examining FIs' resilience to downside risks and actively engage in dialogue with FIs about which the Bank has concerns regarding their future profitability and financial soundness. Such dialogue will cover the capital levels necessary for these institutions to perform their financial intermediation functions in a stable manner into the future as well as management policies that can secure such capital levels.
- As FIs grapple with structural problems, it is important to develop an institutional framework for the financial system that adapts to structural changes such as digital technology innovations and to consider how government FIs should function. The Bank of Japan will hold discussions with the parties concerned, taking these issues into account.