



# Summary

April 2021  
Bank of Japan



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## Features and motivations of the April 2021 issue

- The April 2021 *Report* provides a detailed analysis of two major risks: domestic credit risk and securities investment risk, and then uses a stress testing framework to examine the robustness of Japan's financial system.
- On **the domestic credit risk**, this *Report* presents a simulation of SMEs' financial soundness that incorporates the following features, which are currently observed in Japan's economy: (1) the challenges facing firms are gradually shifting from a liquidity issue to a solvency issue, and (2) the impact of the pandemic significantly varies not only across firm sizes and industries but also among firms in the same industry.
- On **the securities investment risk**, this *Report* examines how the growing presence of non-bank financial intermediaries (NBFIs), e.g., investment funds, in the global financial system changes the risk profiles of Japan's financial institutions (FIs), in light of the experience in March 2020.
- Then, in **the macro stress testing**, the resilience of Japan's financial institutions and the financial system are examined under two downside scenarios that reflect risks revealed from the analysis on the real economy and on the financial markets.

## Executive summary (1/2)

### Current assessment of the stability of Japan's financial system

- Japan's financial system has been maintaining stability on the whole, while COVID-19 continues to have a significant impact on economic and financial activity at home and abroad.
- The Japanese government and the Bank of Japan, in close cooperation with overseas authorities, swiftly implemented large-scale fiscal and monetary policy measures and took flexible regulatory and supervisory actions to support economic activity and maintain the functioning of financial markets. Firms that are significantly affected by the spread of COVID-19 experience funding difficulties. However, underpinned by the financial soundness of FIs on the whole, the policy responses have been effective and the financial intermediation function is being fulfilled smoothly. In financial markets, investors' risk sentiment has improved and inflows of funds to the stock market and emerging market economies have been increasing rapidly.

## Executive summary (2/2)

### Future risks and caveats

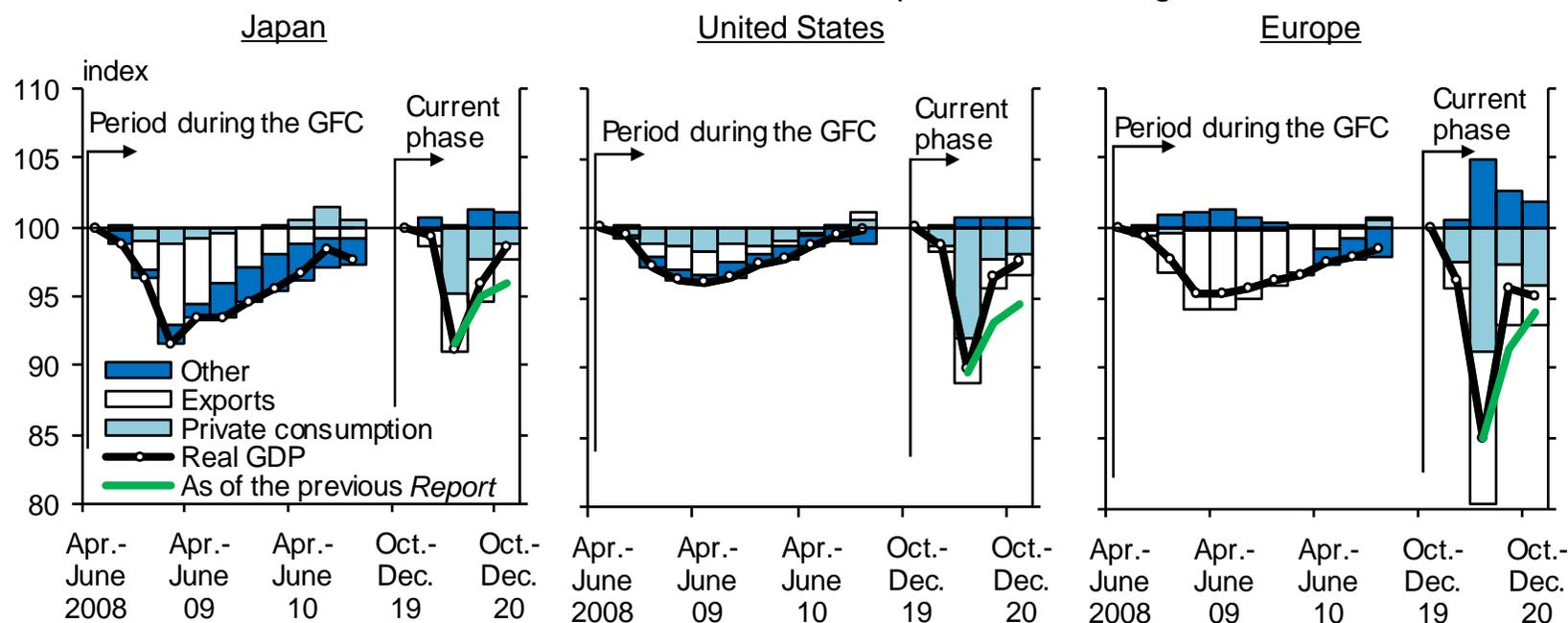
- Even in the case of future resurgence of COVID-19, Japan's financial system is likely to remain highly robust as FIs have improved their financial soundness after the global financial crisis (GFC).
- However, in the event of a substantial and rapid adjustment in global financial markets, a deterioration in FIs' financial soundness and the resultant impairment of the smooth functioning of financial intermediation could pose a risk of further downward pressure on the real economy. In this regard, the following three risks warrant particular attention: (1) an increase in credit costs due to a delay in economic recovery at home and abroad; (2) a deterioration in gains/losses on securities investment due to substantial adjustments in financial markets; and (3) a destabilization of foreign currency funding due to the tightening of foreign currency funding markets, mainly for the U.S. dollar.
- Even after the pandemic subsides, it is likely that the low interest rate environment and structural factors will continue to exert downward pressure on FIs' profits. Against this backdrop, attention should be paid to the risk of a gradual pullback in financial intermediation, or on the contrary, to the possibility that the vulnerability of the financial system increases, mainly as a result of FIs' search for yield behavior.

- 1 . Introduction
- 2 . Domestic credit
- 3 . Overseas credit
- 4 . Securities investment
- 5 . Macro stress testing
- 6 . Challenges for FIs

## Developments in the real economy

- Following the COVID-19 outbreak, domestic and overseas economies declined significantly in the first half of 2020.
- The pace of recovery has been moderate, but it has been faster than the average forecast of professionals and markets at the time of the previous *Report*.

Chart IV-1-1: GDP levels in current phase and during GFC



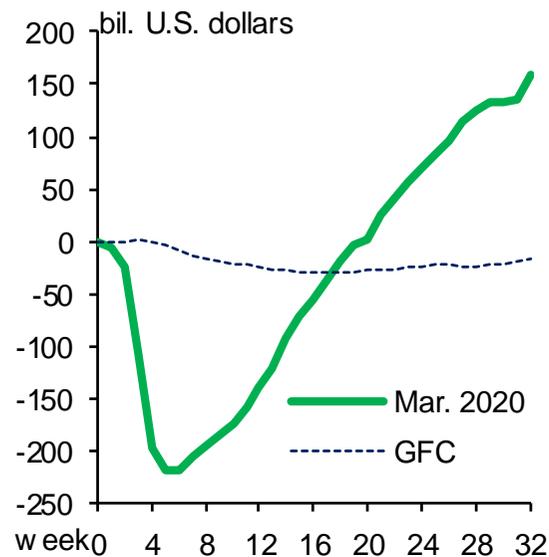
Note: Indexation with the real GDP in the April-June quarter of 2008 is set at 100 for the period during the GFC and that in the October-December quarter of 2019 is set at 100 for the current phase. "As of the previous *Report*" indicates the average forecasts of professionals and markets in August 2020.

Source: BEA; Cabinet Office; ECB; Eurostat; Federal Reserve Bank of Philadelphia; IMF; Japan Center for Economic Research, "ESP forecast."

## Market turmoil in March 2020

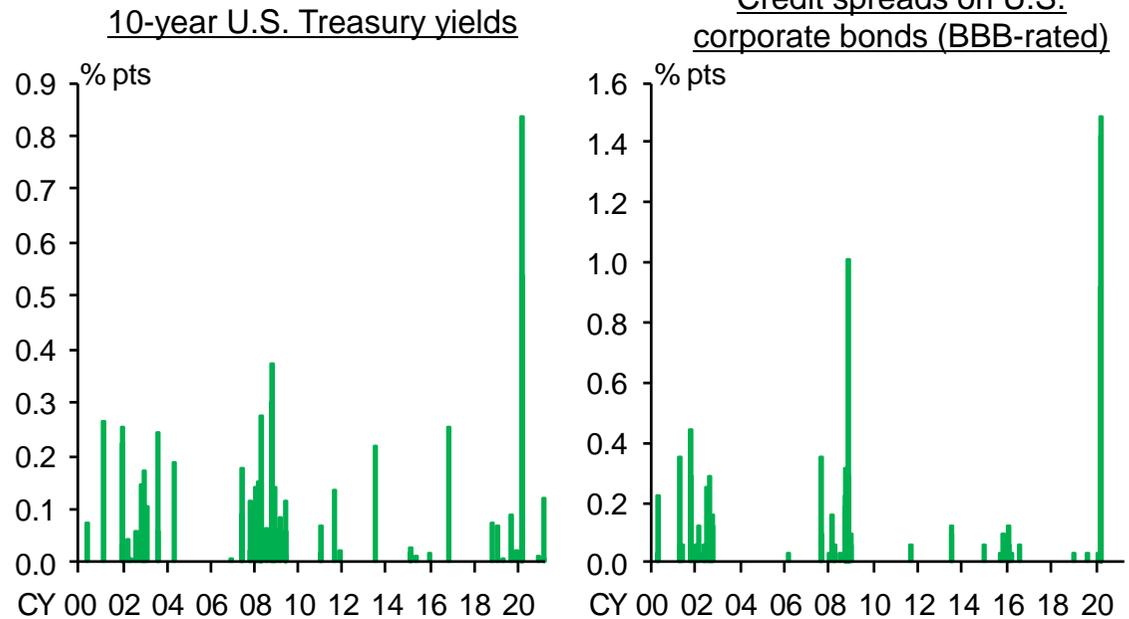
- NBFIs, such as investment funds, of which importance has been growing, faced pressure from rapid outflows of funds and increased margin calls for additional collateral.
- Many FIs including those in Japan breached various risk management limits such as loss limits.

Chart IV-3-7: Cumulative net flows in advanced market bond funds



Note: Week 0 of "Mar. 2020" and "GFC" are the beginning of March 2020 and September 2008, respectively.  
Source: EPFR Global; Haver Analytics.

Chart IV-3-8: Deviation from the historical Value at Risk (VaR)

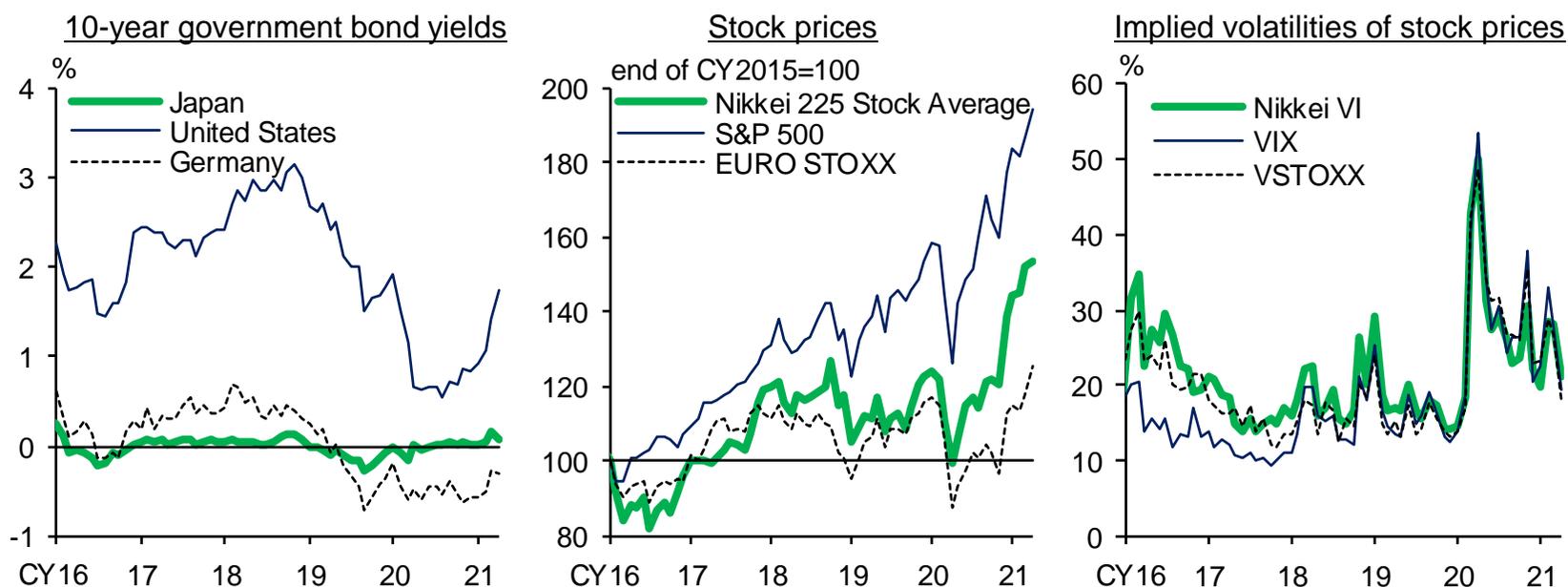


Note: The graph shows the deviation of each index from the historical VaR with a 99 percent confidence level, 10-day holding period, and past 3-year observation period. Latest data as at March 31, 2021.  
Source: Bloomberg.

## Developments in global financial markets

- As aggressive fiscal and monetary policies are maintained in each country and region, investors' risk sentiment has improved, mainly on the back of expectations for the distribution of COVID-19 vaccines. Inflows of funds to the stock market and emerging market economies have been increasing rapidly, and stock prices have risen significantly.
- U.S. long-term interest rates have risen, accompanying an increase in inflation expectations.
- Uncertainty concerning global financial markets remains high.

Chart II-1-1: Developments in global financial markets

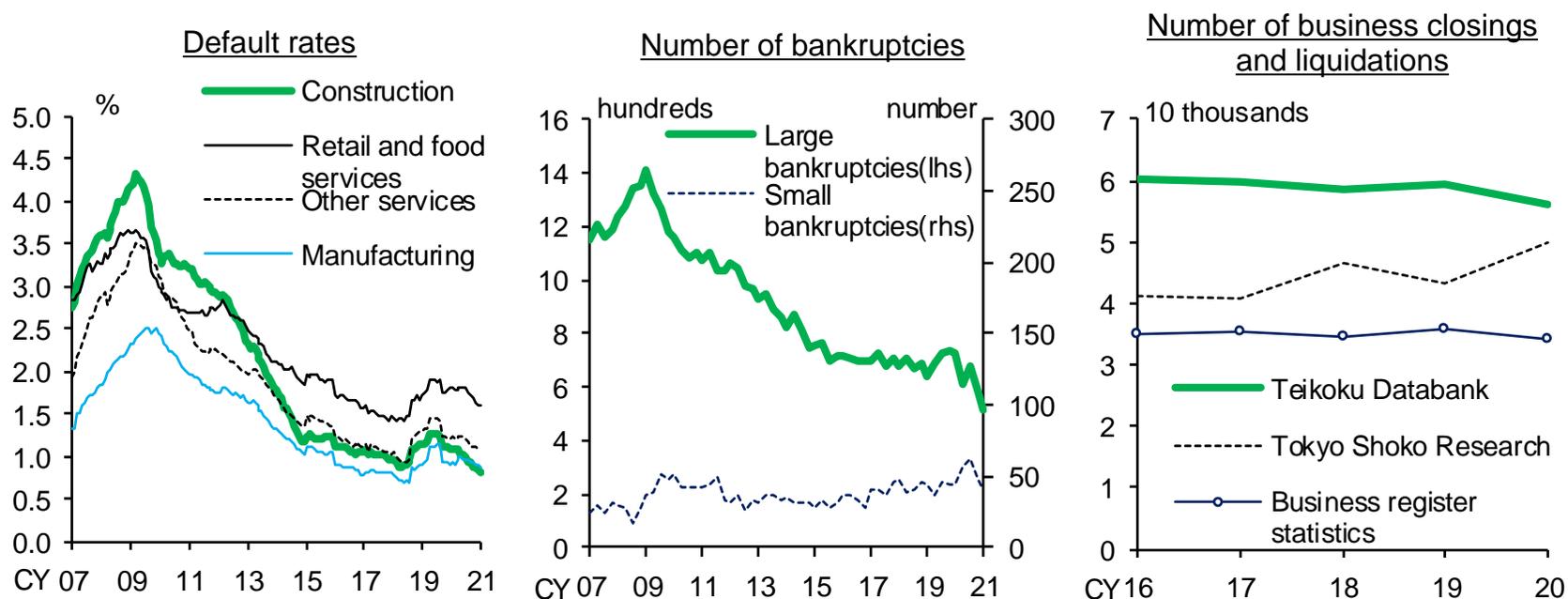


Note: Latest data as at end-March 2021.  
Source: Bloomberg.

## Developments in default rates and bankruptcies

- The financial soundness of FIs and firms is generally maintained and various measures to support corporate financing have been highly effective.
- Default rates and the numbers of bankruptcies of firms have remained at low levels. The numbers of business closings and liquidations so far remain low in general, although results vary depending on the definitions used by survey.

Chart III-1-17: Developments in default rates, bankruptcies, and business closings and liquidations



Note: 1. In the middle chart, "Large bankruptcies" and "Small bankruptcies" indicate above and below 10 million yen of total debt, respectively.  
 2. In the right-hand chart, "Business register statistics" indicates the number of liquidations completed.  
 3. The latest data in the left-hand chart are as at January 2021, and those in the middle chart are as at January-March 2021 (quarterly average).  
 Source: Ministry of Justice; Teikoku Databank; The Risk Data Bank of Japan; Tokyo Shoko Research.

## Heterogeneity in sales forecasts and financial positions

- The sales forecasts of large firms (all industries) for fiscal 2020 were revised slightly upward since the previous *Report*.
- Firms in the face-to-face services as well as transportation and postal services industries have further revised their sales forecasts downward, due to the resurgence of COVID-19. Heterogeneity across firms within these services has increased.
- Corporate financing generally improved slightly, but many firms in the face-to-face services industry regard their financial positions as "tight."

Chart IV-1-5: Year-on-year sales changes by industry (large firms)

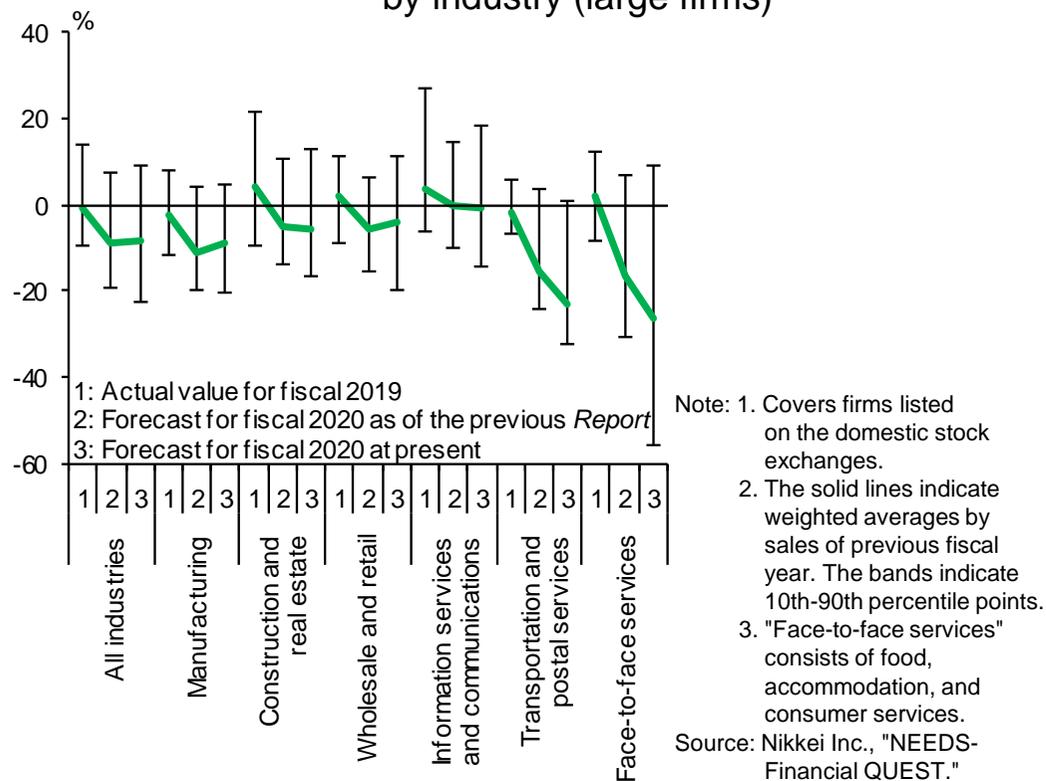
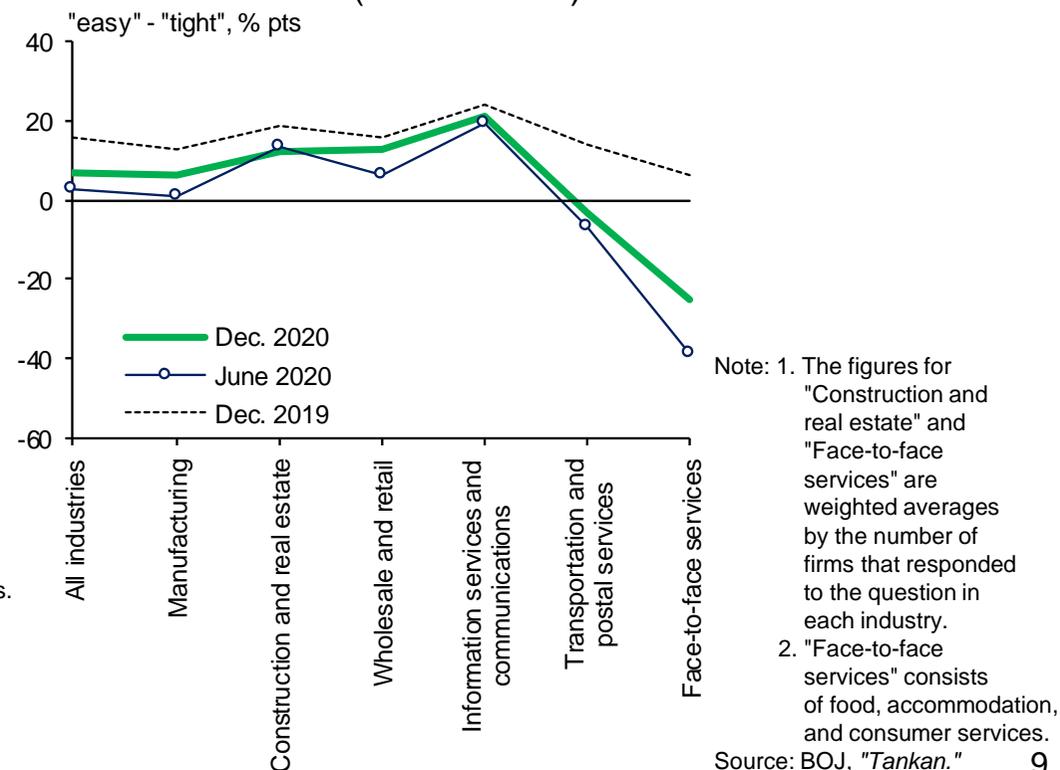


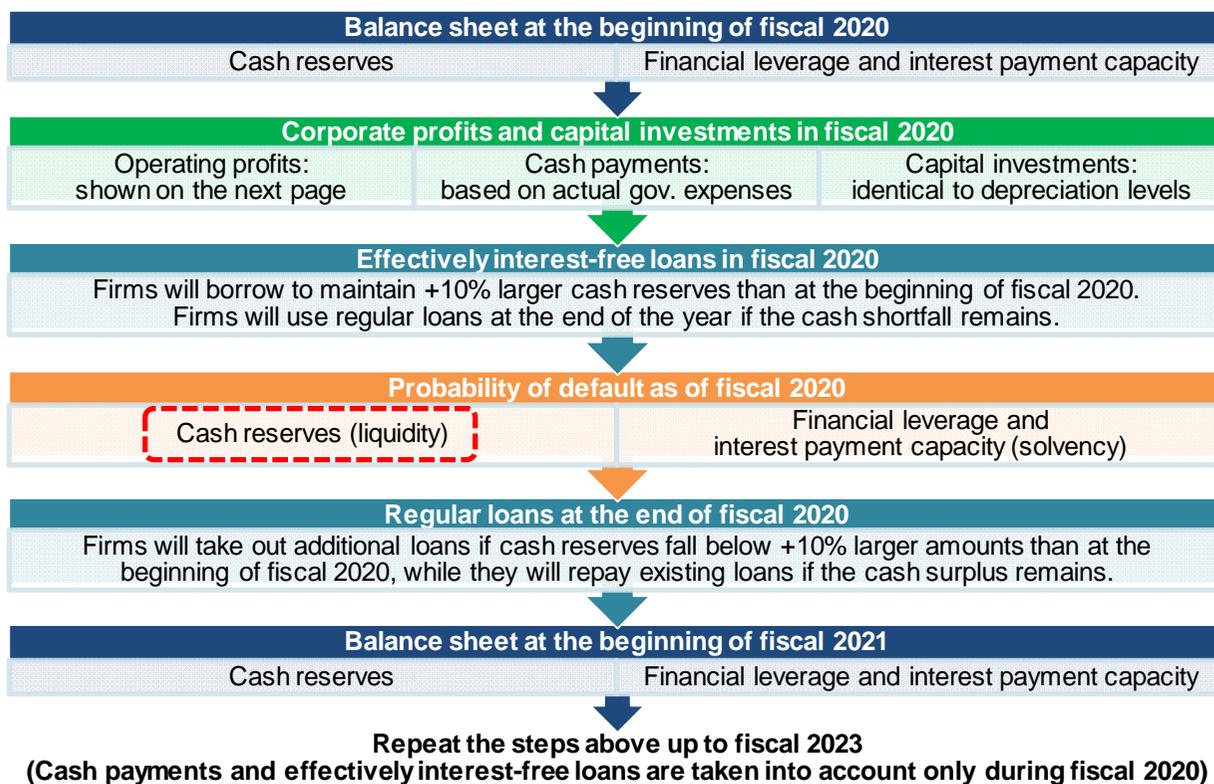
Chart IV-1-4: DI of financial positions by industry (all firm sizes)



## Medium-term simulation on financial soundness and the PD of SMEs

- As firms' challenge will shift gradually from securing funds to repaying debts, this *Report* expands the one-year simulation based on firm-level data in the previous *Report* to cover years until fiscal 2023. Taking into account the assumption about the increased heterogeneity of individual firms' profits within the same industry, the impact of a change in debt repayment capacity (solvency), as well as in cash reserves (liquidity) on the probability of default (PD) is examined.

### Steps and assumptions for medium-term simulation



### Trade-off between liquidity and solvency

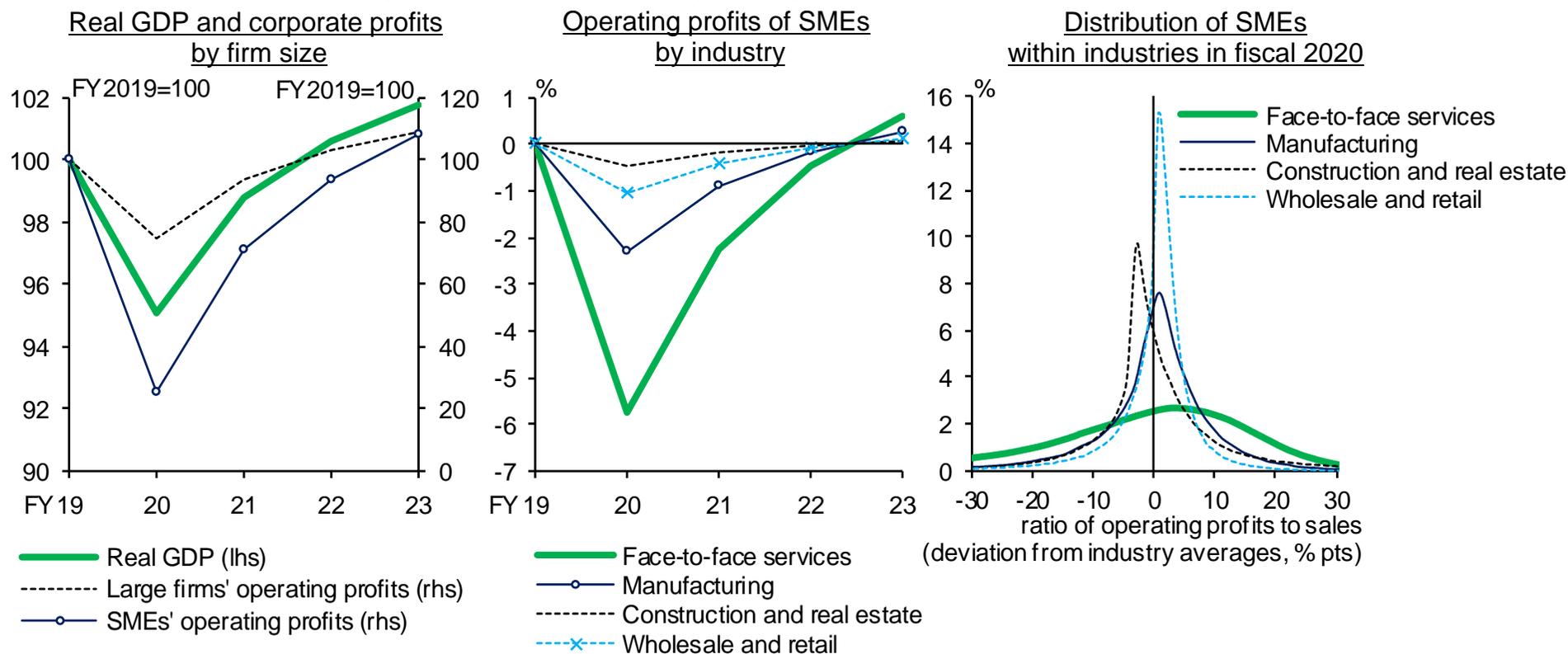
	Regular loans	Effectively interest-free loans	Cash payments
Cash reserves	↑	↑	↑
Debt repayment capacity	↓	Short term ↘ Medium term ↓	↑
<b>Trade-off between liquidity and solvency</b>			
	Yes	Short term Slightly Medium term Yes	No

↑: improve    ↓: worsen    ↘: somewhat worsen

## Assumptions on corporate profits

- Based on private forecasters' forecasts of GDP growth, overall corporate profits of firms are estimated up to fiscal 2023. Assumptions in line with these forecasts are made with regard to the profits of large firms and SMEs and in different industries, reflecting differences in the impact of COVID-19.
- The increased heterogeneity among SMEs within the same industry is taken into account.

Chart IV-1-7: Assumptions on GDP and corporate profits for medium-term simulation

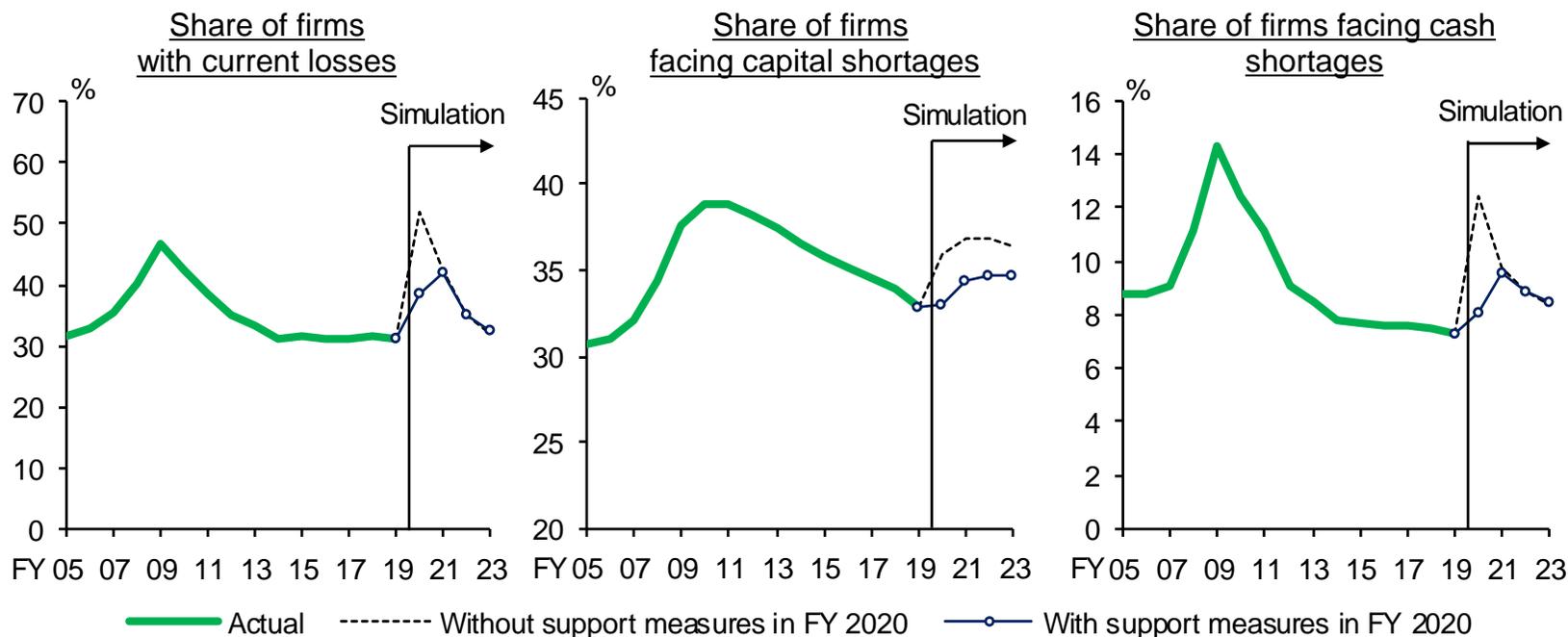


Note: The figures in the middle chart indicate changes in operating profits from fiscal 2019 as a percentage of sales in fiscal 2019.  
 Source: Japan Center for Economic Research, "ESP forecast."

## Simulation results: SMEs' financial conditions

- If not for the support measures, half of SMEs would be making losses in fiscal 2020. With the support measures, the share of SMEs making losses is contained to about 7 percentage points higher than in fiscal 2019. However, in fiscal 2021, the share increases by another 3 percentage points, partly because of the moderate pace of economic recovery.
- Reflecting the assumptions about the existence of some SMEs that will take time to recover their profits, the share of SMEs for which financial conditions will stay fragile in terms of liquidity and creditworthiness remains high.

Chart IV-1-10: Simulation results



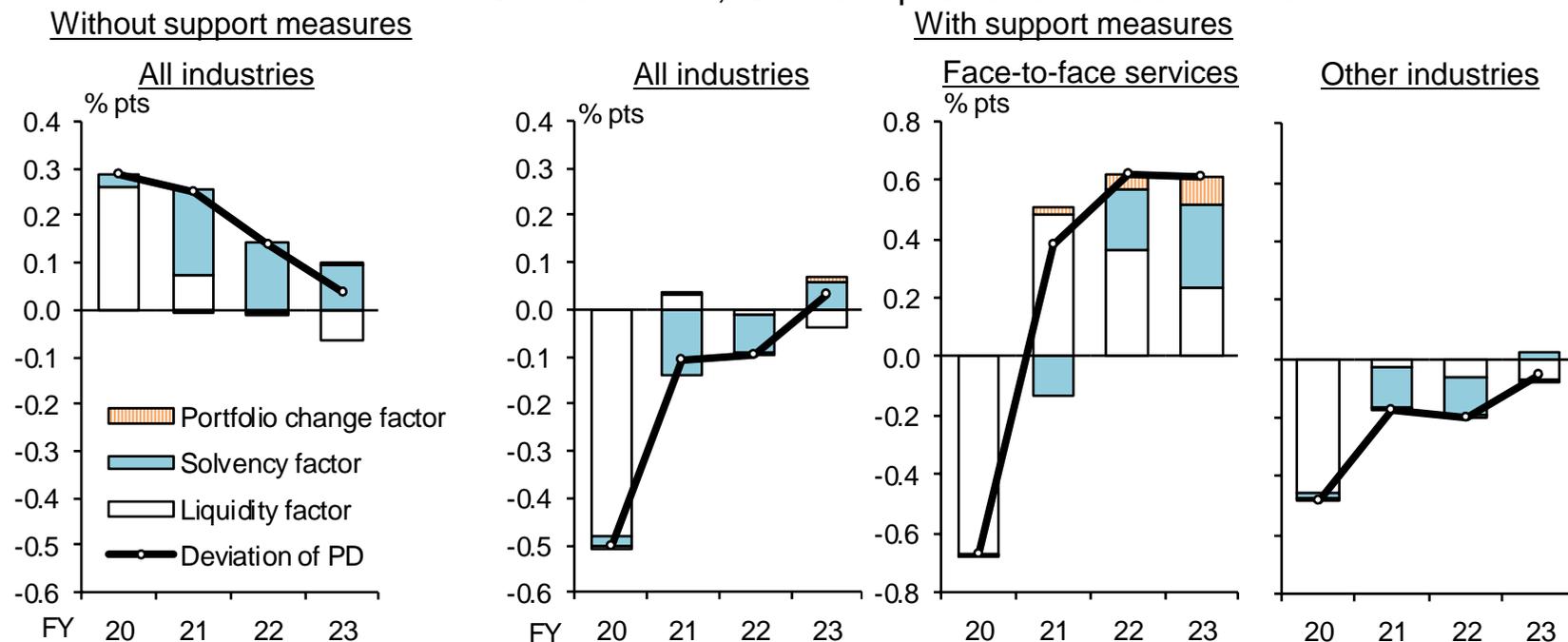
Note: Firms facing cash shortages are defined as firms whose net operating cash outflow during the year exceeds their cash reserves at the beginning of the fiscal year.

Source: CRD Association.

## Simulation results: SMEs' PD

- If not for the support measures, the PD would increase by about 30 bps in fiscal 2020, mainly due to a decrease in firms' cash reserves. The impact on the PD remains in fiscal 2021 and beyond because of the deterioration in firms' debt repayment capacity, led by the increase in borrowing in fiscal 2020.
- With the support measures, the PD falls substantially in fiscal 2020 due to the increase in cash reserves. The PD hardly increases in fiscal 2021 and 2022, with lower necessity for additional borrowing. In fiscal 2023, when interest subsidies for effectively interest-free loans end, the PD increases slightly caused by the increase in interest payments.
- The PD of face-to-face services is pushed up from fiscal 2021. Depending on future developments in the recovery of profits, the heterogeneity in SMEs' PD across industries and firms may become more pronounced going forward.

Charts IV-1-12,13: Decomposition of the deviation of PD



Note: The charts indicate the deviation of PD from the simulation without the COVID-19 outbreak (firms' profits are unchanged and precautionary loans are not obtained, etc.).

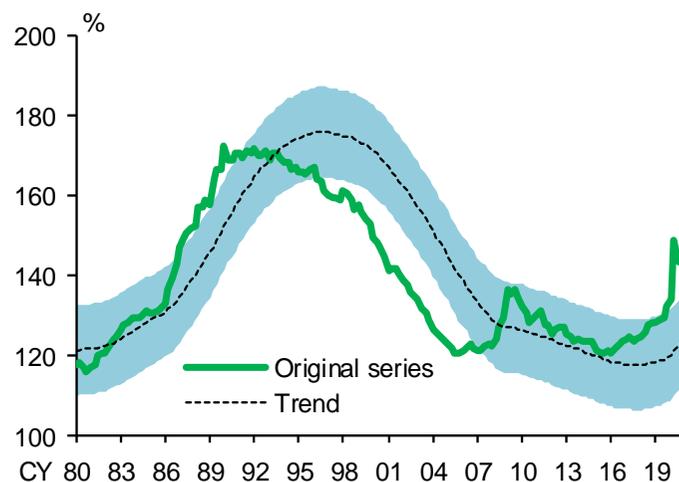




## Duration of total credit to GDP ratio's "red" signaling and probability of crisis.

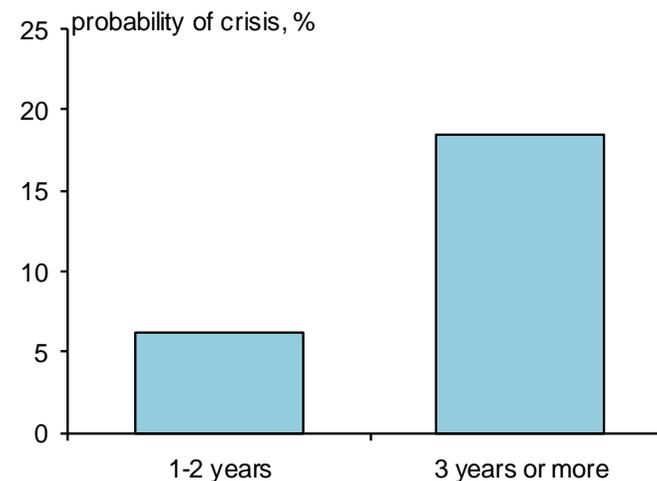
- The longer the *total credit to GDP ratio* -- which shows a high predictive power and which can be regarded as capturing the credit activities of the private sector as a whole -- signals "red," the higher the probability of a banking crisis.
- The past experience of various banking crises suggests the need for greater vigilance against the risk of financial imbalances building up under the situation where the indicator signals "red" for a protracted period.

Chart III-3-3: Total credit to GDP ratio



Note: 1. "Trend" is calculated using the one-sided HP filter. The shaded area indicates the root mean square of the deviation from the trend.  
 2. 4-quarter backward moving averages. Latest data as at the October-December quarter of 2020.  
 Source: Cabinet Office, "National accounts"; BOJ, "Flow of funds accounts."

Chart B1-3: Duration of total credit to GDP ratio's "red" signaling and probability of crisis

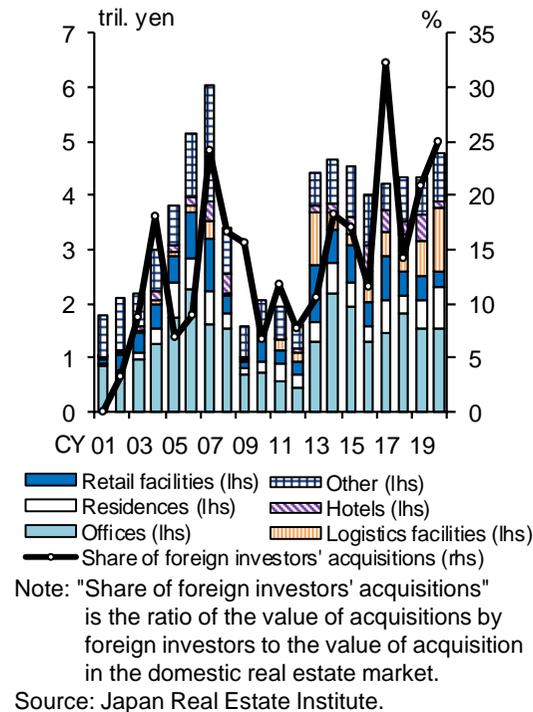


Note: The chart indicates probability of crisis over the subsequent year.

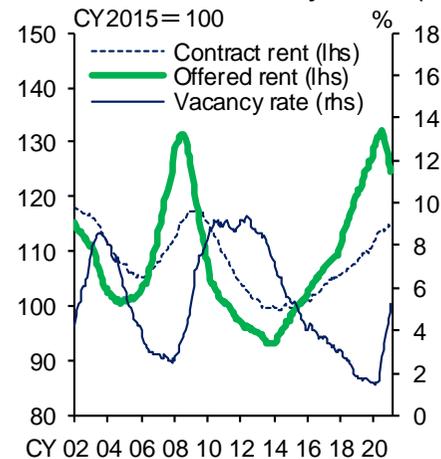
## Signs of change in the real estate market

- The total value of transactions has remained at a high level. Transactions in logistics facilities and residences have increased, while those in retail facilities and hotels have shrunk considerably.
- Unlike the GFC period, transactions by foreign investors remain brisk, supported by the continued accommodative lending stance of Japan's FIs.
- After the COVID-19 outbreak, vacancy rates for office buildings have begun to rise, and the uptrend in land prices seen before the outbreak shows signs of reversing.

Chart B2-1: Real estate transaction value

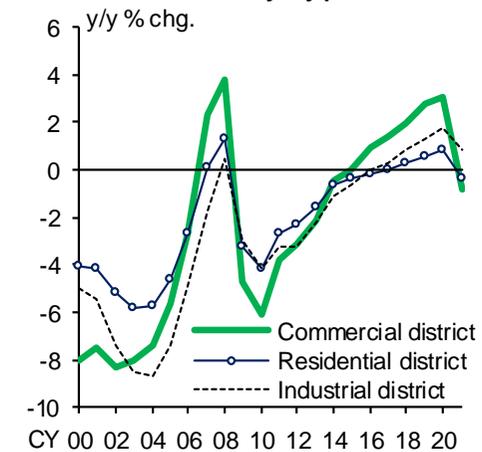


Charts B2-4,8: Office rents and vacancy rate (Tokyo)



Note: 1. "Contract rent" is quality-adjusted rent income in the Tokyo area. "Offered rent" is the newly offered rent per unit area in the 5 central wards of Tokyo.  
 2. Latest data as at February 2021.  
 Source: Miki Shoji Co., Ltd.; BOJ, "Services Producer Price Index."

Chart B2-10: Land prices by type of use

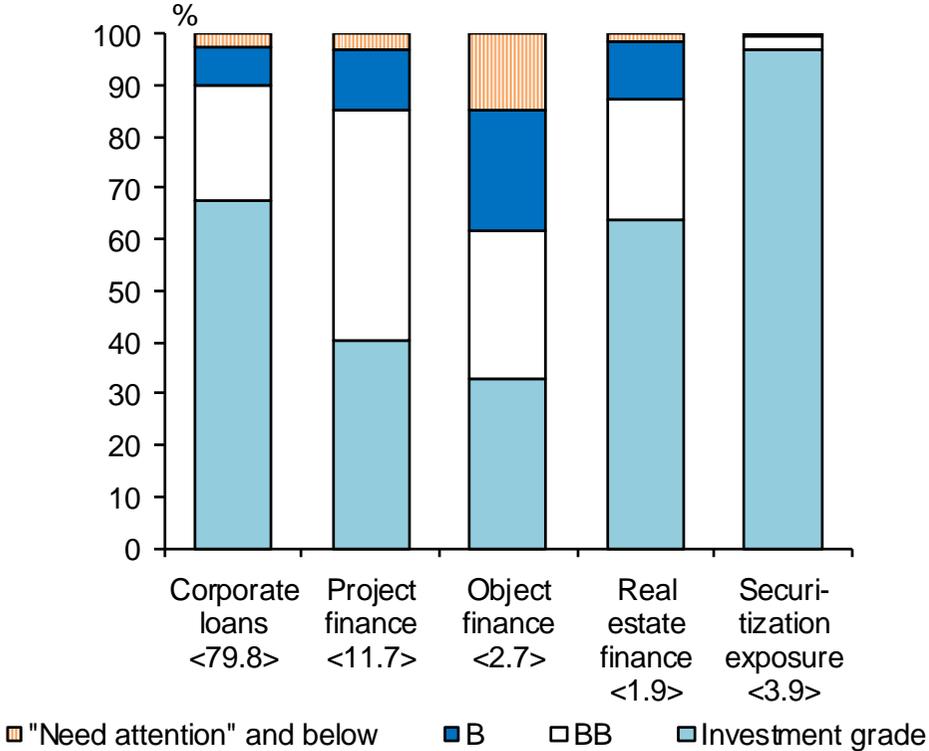


Note: 1. The nationwide averages.  
 2. The data are based on figures at the beginning of January for each year. The latest data are as at the beginning of January 2021.  
 Source: Ministry of Land, Infrastructure, Transport and Tourism, "Land Market Value Publication."

## Quality of overseas loan portfolios

- In corporate loans, which account for 80 percent of Japanese banks' overseas lending, investment-grade loans have a majority share. The quality of overseas corporate lending has remained high on the whole.
- However, the share of non-investment-grade firms is relatively high in natural resource- and energy-related project finance loans and in object finance loans for the acquisition of aircraft, and the number of loan downgrades increased.

Chart III-1-23: Composition of overseas loans by type of product and credit rating among large financial institutions (end-September 2020)



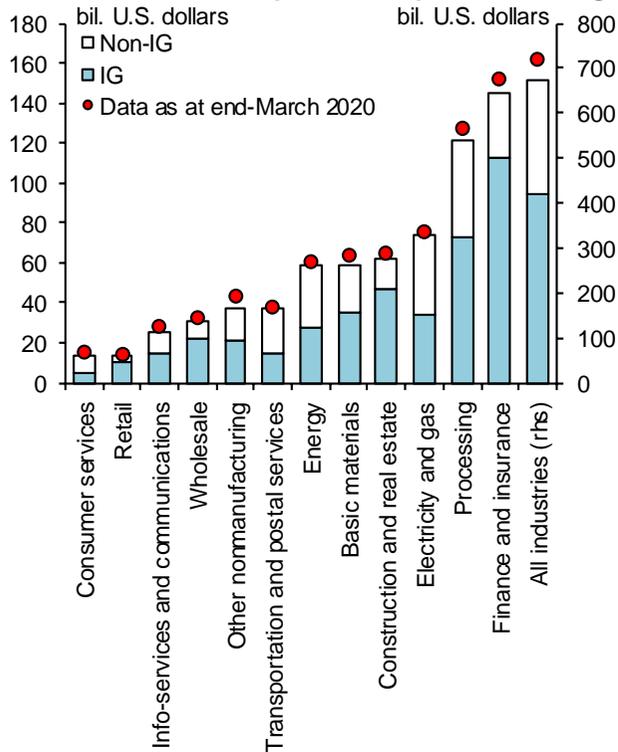
Note: "Large financial institutions" includes major banks, Japan Post Bank, and a central organization of financial cooperatives. The figures in brackets indicate the share of the respective product types.

Source: BOJ.

## Overseas corporate loans

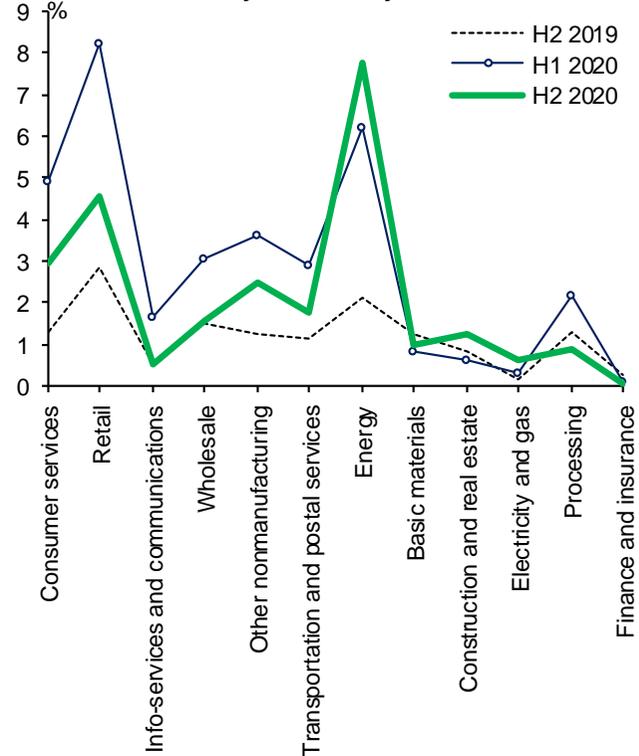
- The industry composition of Japanese banks' overseas corporate loans was more or less unchanged, with relatively large amount of loans outstanding in the electricity and gas, processing manufacturing, and finance and insurance industries. The default rates of these industries have not increased significantly since the COVID-19 outbreak.
- The default rates in the second half of 2020 have declined in many industries, including the face-to-face services and retail services industries, which have been heavily impacted by pandemic, with the exception of the energy industry.

Chart IV-2-1: Overseas corporate loans outstanding by industry and rating



Note: 1. Covers the three major banks' lending. Latest data as at end-September 2020.  
 2. Energy covers oil and natural gas development.  
 Source: BOJ.

Chart IV-2-2: Default rates of corporate bonds by industry

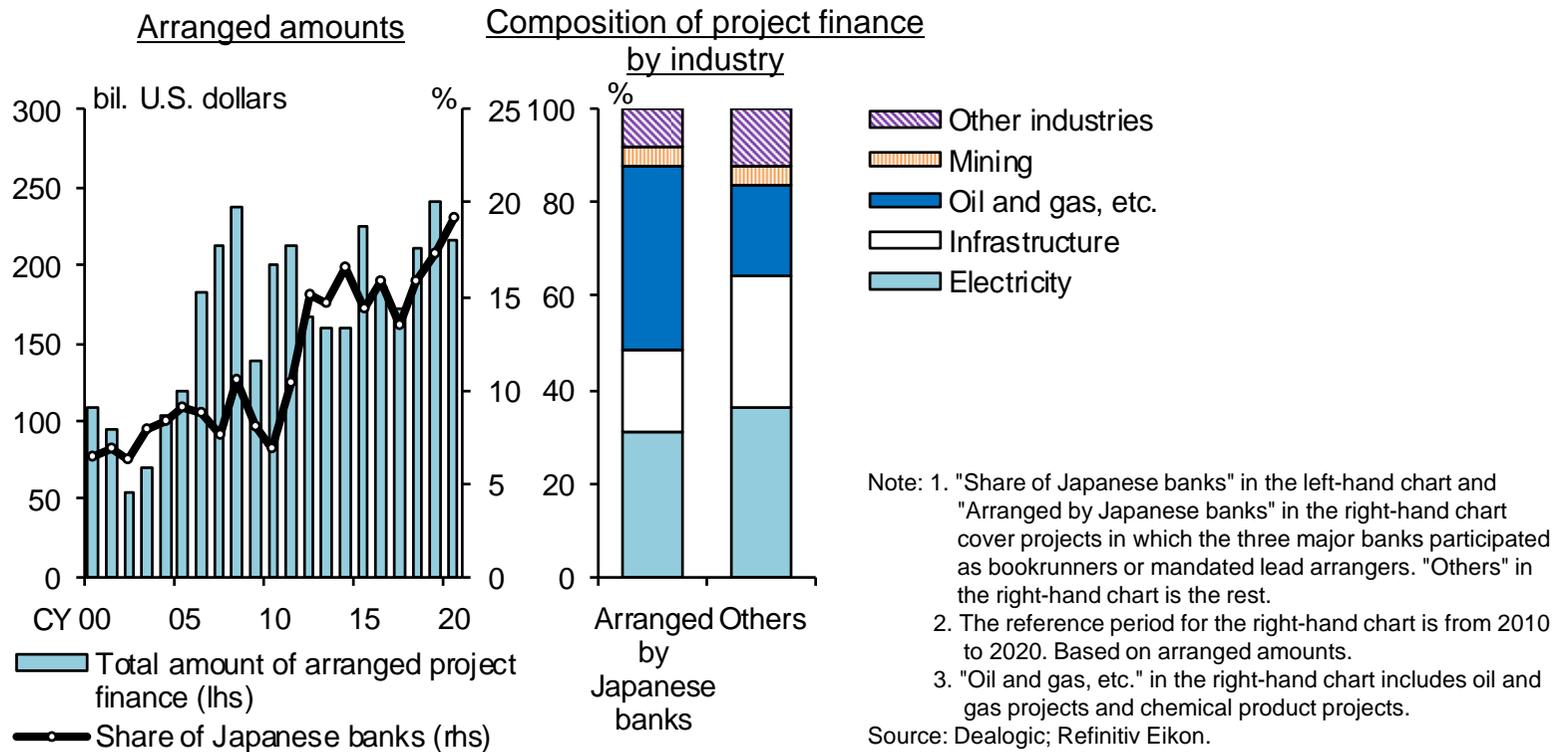


Note: Energy covers oil and natural gas development.  
 Source: Moody's.

## Project finance loans

- Since the GFC, Japanese banks have been expanding their project finance loans, while FIs in Europe and the United States have shrunk their project finance business.
- Looking at the industry composition of project finance loans arranged by Japanese banks, "oil and gas, etc." accounts for a relatively large share.

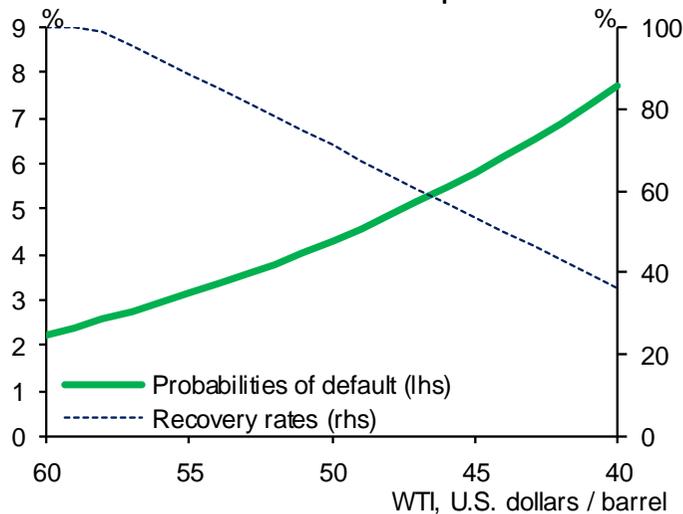
Chart IV-2-4: Arranged amounts of project finance



## Transition risk of oil and gas project finance loans

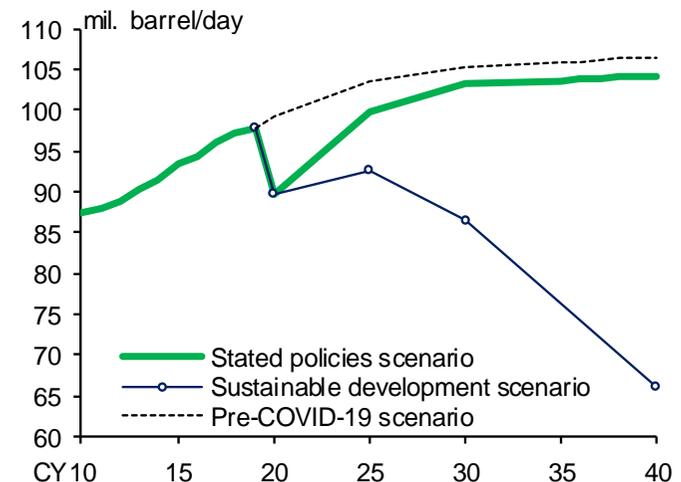
- A simulation using project-level data shows that both default and recovery rates of oil and gas project finance loans deteriorates as the price of crude oil declines.
- It is necessary to keep in mind the possibility of a significant decline in future crude oil demand, due to the fact that countries are prompting a shift toward a low carbon economy.

Chart IV-2-9: Probabilities of default and recovery rates in times of low crude oil prices



Note: The figures are estimates for oil and gas projects. In estimating "Probabilities of default," the deviation of the actual WTI from the forecast during the project period is used as an explanatory variable. In the graph, the horizontal axis for probabilities of default represents the sum of the WTI forecast (the average of the latest five years) and this deviation.

Chart IV-2-8: Long-term outlook for crude oil demand



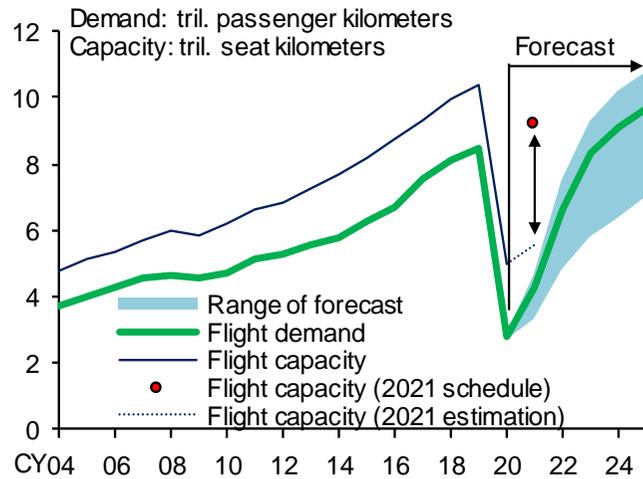
Note: 1. The values from 2020 onward are outlooks.  
 2. "Stated policies scenario" is a scenario that reflects all of today's announced policy intentions and targets. "Sustainable development scenario" is the scenario that is expected to be followed to achieve sustainable energy objectives, including the Paris Agreement. Assumptions for the economic environments other than energy policies are the same as those of "Stated policies scenario." "Pre-COVID-19 scenario" indicates "Stated policies scenario" as of 2019.

Source: IEA, "World Energy Outlook 2020."

## Aircraft-related object finance loans

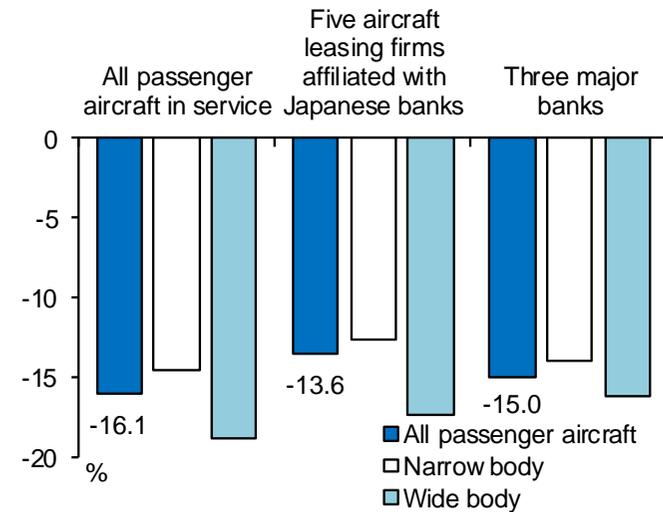
- Due to the spread of COVID-19, global air passenger demand experienced a significant decrease, and the price of used aircraft fell sharply.
- If the prices of used passenger aircraft decline further, attention should be paid to the possibility that the recovery rate of non-recourse loans for aircraft financing may fall below 100% in the event of default.

Chart IV-2-10: Trends and outlook of demand and capacity for air transportation



Note: 1. The value of "Flight capacity (2021 schedule)" is annualized data from April to December 2021 as of January 2021.  
2. The value of "Flight capacity (2021 estimation)" is calculated by the BOJ in consideration of the relationship between "Flight demand" and "Flight capacity" from 2004 to 2019.  
Source: Cirium "SRS Analyser"; IATA/Tourism Economics, "Air Passenger Forecasts."

Chart IV-2-11: Price declines of used passenger aircraft



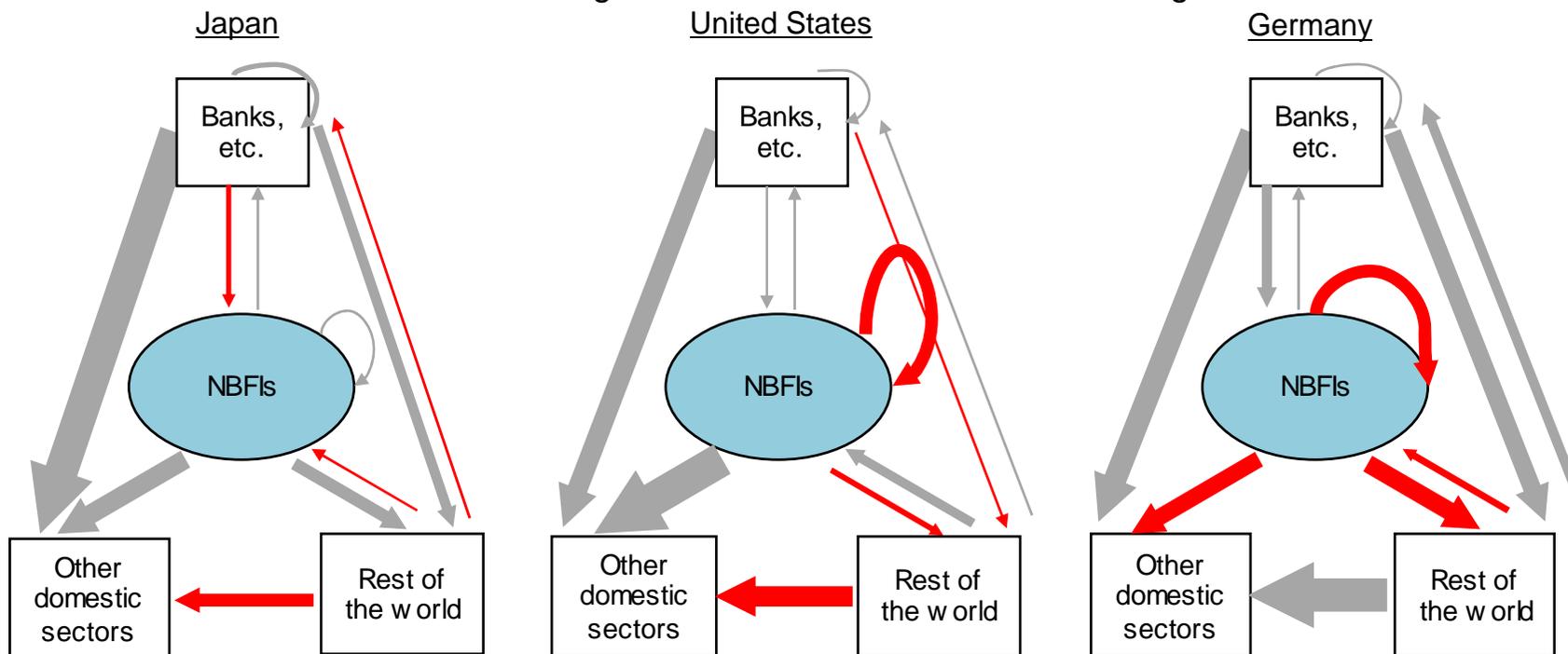
Note: Change in price is calculated on the half-life market value basis for the period from January 2020 to January 2021 in consideration of an individual aircraft's age.  
Source: Cirium, "Fleets Analyzer," "Value Time Series."

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## Structural changes in interconnectedness surrounding non-banks

- In Japan, the cash flow from "banks, etc." to "NBFIs" has increased in recent years, reflecting the increase in investment trust holdings by banks. The relative volume of cash flow from "NBFIs" to "other domestic sectors," which includes the nonfinancial sector, is smaller compared to the United States and Germany.
- The link between "rest of the world," i.e., foreign entities, and domestic sectors has grown in all countries.

Chart B5-1: Structural changes in interconnectedness surrounding non-banks

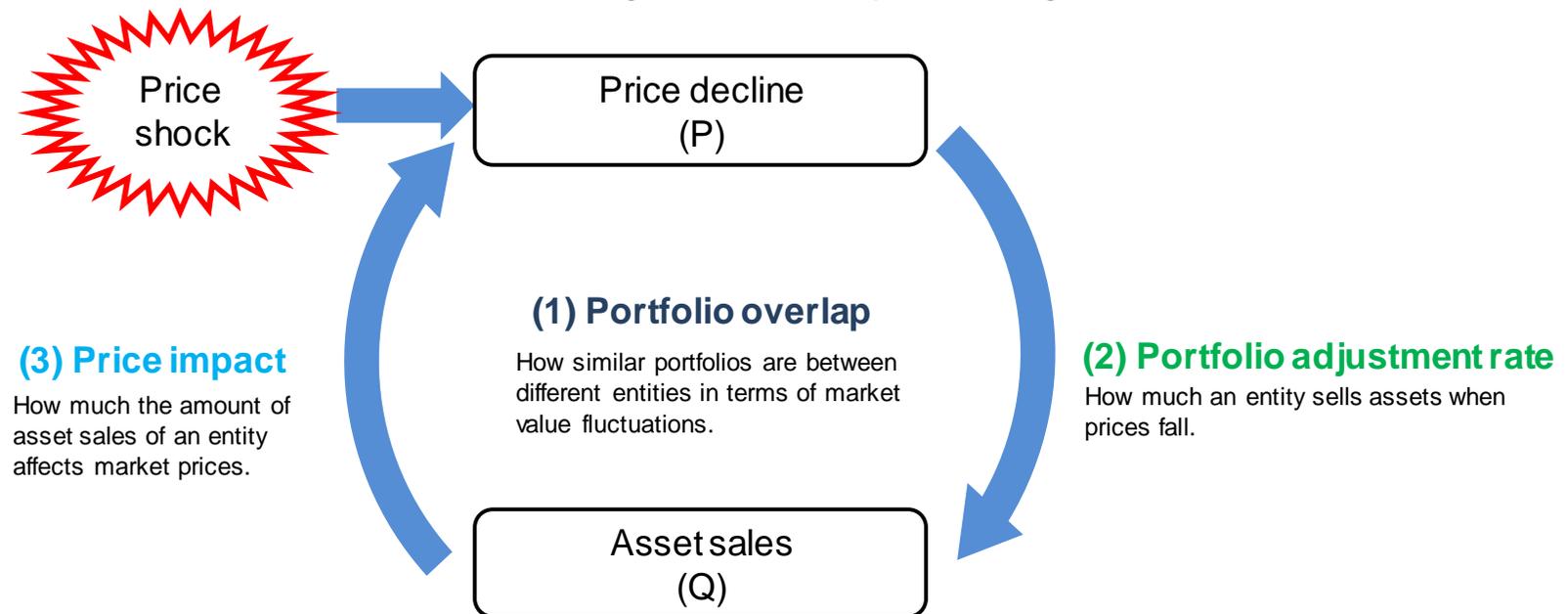


Note: 1. Covers loans, debt securities, equities, and investment trust beneficiary certificates (fund shares). Estimates by the BOJ.  
 2. The thickness of the arrows indicates the relative amount within each country as of 2020.  
 3. Red arrows indicate the top four links with the highest percentage increase compared to 2010 within each country.

## Market risk faced by Japanese FIs

- The importance of foreign NBFIs has increased, and Japanese FIs have been actively investing in overseas credit products and investment trusts.
- The effect of an external shock to asset prices amplified and transmitted through transactions among each entity in the financial network (the "interlinkage effect") is examined by a time-series model. The degree of interlinkage effect consists mainly of (1) the degree of portfolio overlap, (2) the portfolio adjustment rate, and (3) the degree of price impact.

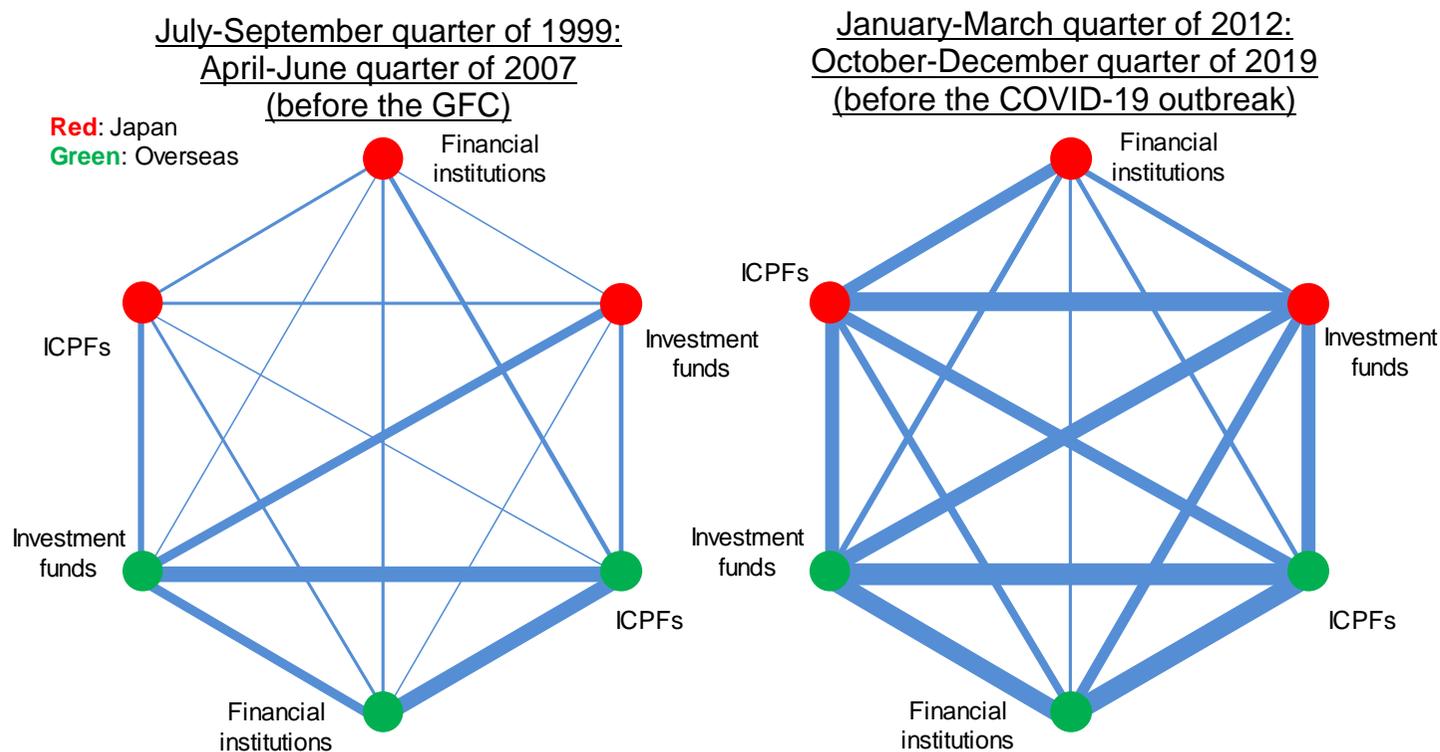
Chart B5-2: Interlinkage effect of the price changes



## Portfolio overlap among entities

- Before the GFC, the degree of portfolio overlap between Japanese FIs and other entities was generally low. Since then, the portfolio overlap of Japanese FIs has increased with foreign investment funds in addition to domestic insurance companies and pension funds (ICPFs).
- In general, the portfolio overlaps among all entities have increased.

Chart B5-3: Portfolio overlap



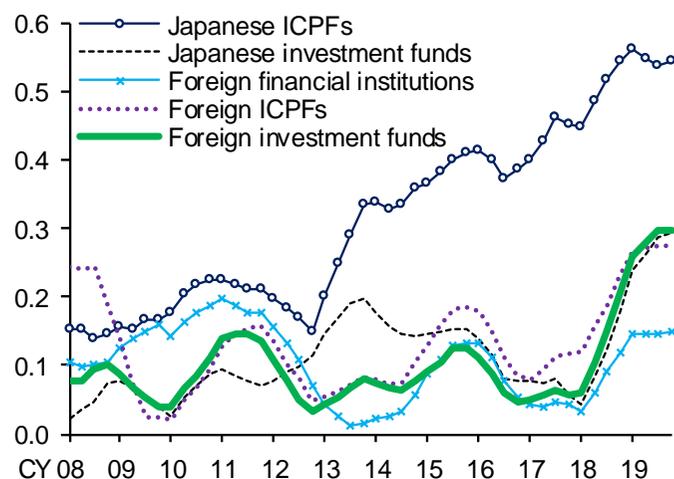
Note: The thickness of a line shows the degree of portfolio overlap between two entities.

## Portfolio overlap between Japanese FIs and other entities

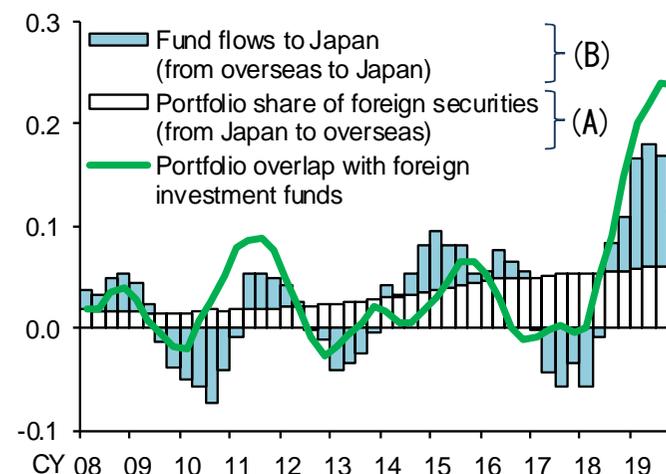
- The degree of overlap between Japanese FIs and domestic ICPFs has clearly increased since around 2013, when both entities rebalanced their portfolios by reducing the weight of JGBs and increasing that of assets with more risks.
- The degree of overlap with foreign investment funds has also increased due to (A) the trend factor of the increase in Japanese FIs' investment in overseas securities, and (B) the cyclical factor of foreign investment funds' investment in Japan with fluctuations according to market conditions.

Chart B5-4: Portfolio overlap between Japanese financial institutions and other entities

Linkage between Japanese financial institutions and other entities



Decomposition of linkage with foreign investment funds



Note: 1. Portfolio overlap is 4-quarter backward moving averages. Latest data as at the October-December quarter of 2019.

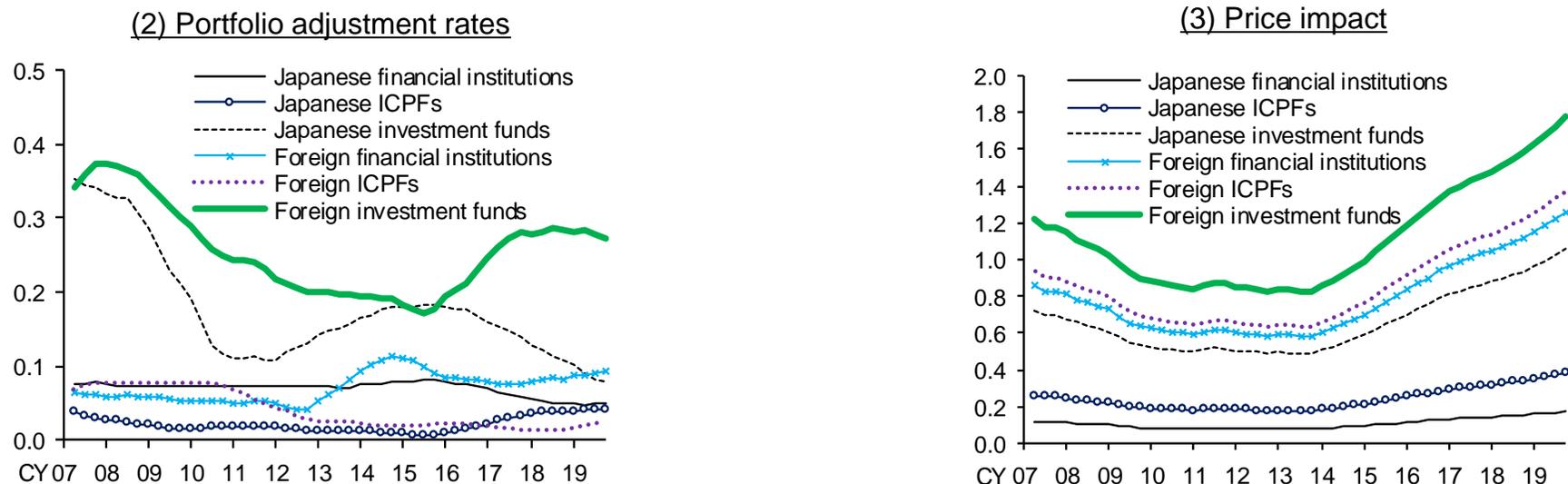
2. The right-hand chart shows the decomposition of portfolio overlap between Japanese financial institutions and foreign investment funds into domestic and overseas factors by linear regression. As independent variables, the portfolio share of foreign securities of Japanese financial institutions and net fund flows to Japan are used.

Source: EPFR Global; Haver Analytics; BOJ.

## Portfolio adjustment rates and price impact

- Studies have shown that an investment fund, holding more illiquid assets, tends to face more pressure for redemption when the market price fluctuates, and that the degree of price impact by such a fund tends to be more significant.
- Both the portfolio adjustment rate and the degree of price impact of foreign investment funds have been rising in recent years, consistent with the fact that foreign investment funds are increasing their holdings of relatively illiquid assets.

Chart B5-5: Portfolio adjustment rates and price impact



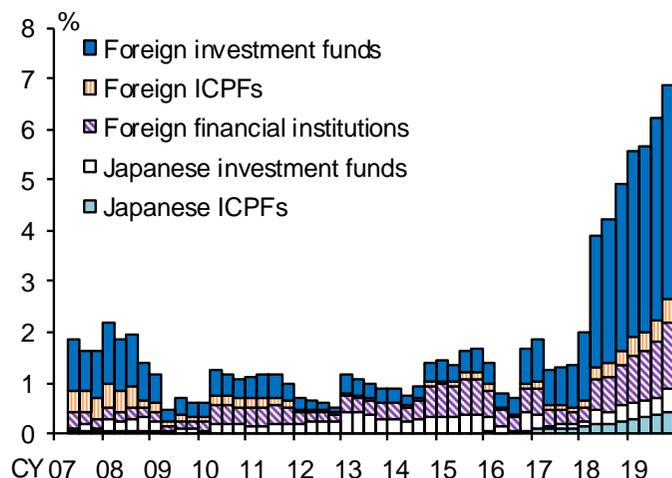
Note: The figures indicate elasticities. 8-quarter backward moving averages. Latest data as at the October-December quarter of 2019.

## Interlinkage effect faced by Japanese FIs

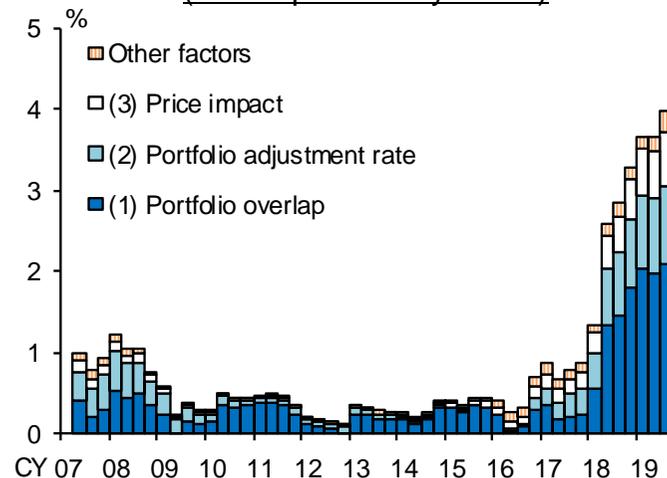
- As the epicenter of the interlinkage effect faced by Japanese FIs, the importance of foreign investment funds has been increasing with substantial contributions of their degree of portfolio overlap, as well as the portfolio adjustment rate and the degree of price impact.
- The interlinkage of the Japanese and overseas financial systems has strengthened, through active investments in securities by Japanese FIs. This suggests that the market risk faced by FIs in Japan can be amplified through trading activities of overseas investment funds and other entities by more than before.

Chart B5-7: Decomposition of interlinkage effect faced by Japanese financial institutions

By entity



Interlinkage effect from foreign investment funds to Japanese financial institutions (decomposition by factor)



Note: 1. The interlinkage effect is the amplification mechanism of a price shock through transactions between entities, which shows how much one standard deviation price shock is amplified in terms of percentage.  
 2. Latest data as at the October-December quarter of 2019.

## Scenarios for macro stress testing

- Macro stress testing examines the resilience of Japan's financial system under two downside scenarios that reflect two major risks; domestic credit risk and securities investment risk.
- "The COVID-19 resurgence scenario" assumes that the real economy will experience a shock again, considering remaining uncertainty about developments in the spread of the COVID-19.
- "The financial stress scenario" assumes that market shocks will occur, considering uncertainty in financial markets.

Chart V-2-1: Scenarios for simulation

		Real economy	Financial variables
Baseline scenario		Average forecasts of professionals and markets	Unchanged from the level at end-January 2021
Downside scenarios	COVID-19 resurgence scenario	Downturn of Japan's and overseas economies comparable to the average impact during the past infection spread phase	Historical average reaction to shocks on the real economy
	Financial stress scenario	Downturn of Japan's and overseas economies through a negative influence on financial intermediation activities in response to financial shocks	Financial shocks comparable to the GFC

Note: Long- and short-term interest rates evolve in line with the forward rates under the baseline scenario while they fall to the lowest level observed until January 2021 under the downside scenarios.

## Economic and financial market scenarios

Chart V-2-2: Economic scenarios for simulation (Japan)  
Quarterly real GDP

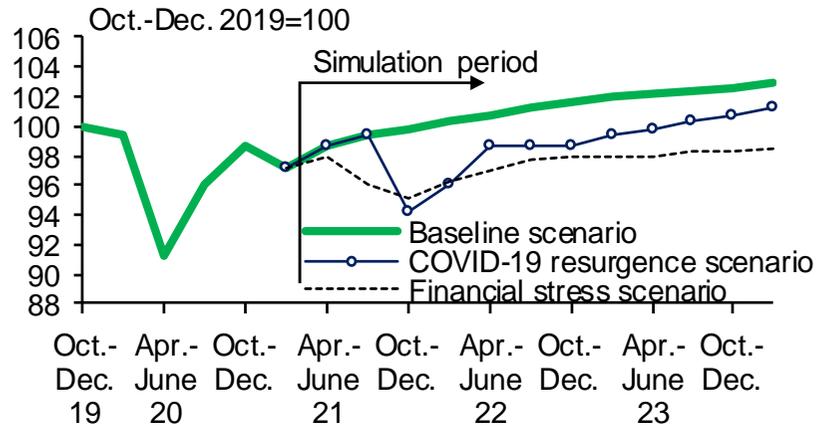


Chart V-2-3: Economic scenarios for simulation (Overseas)  
Quarterly real GDP

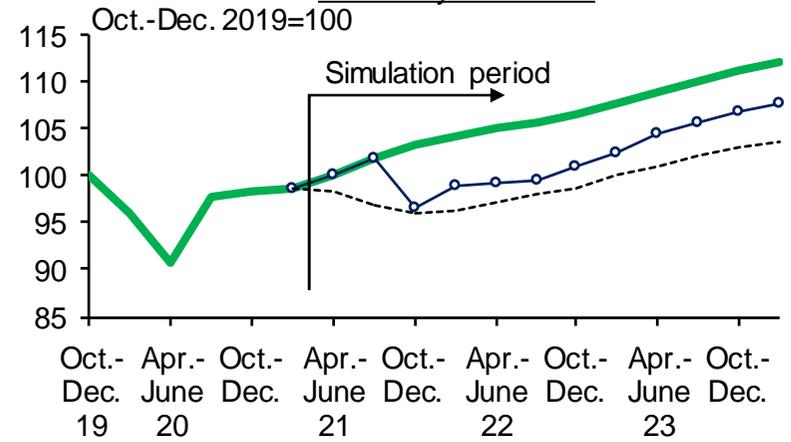
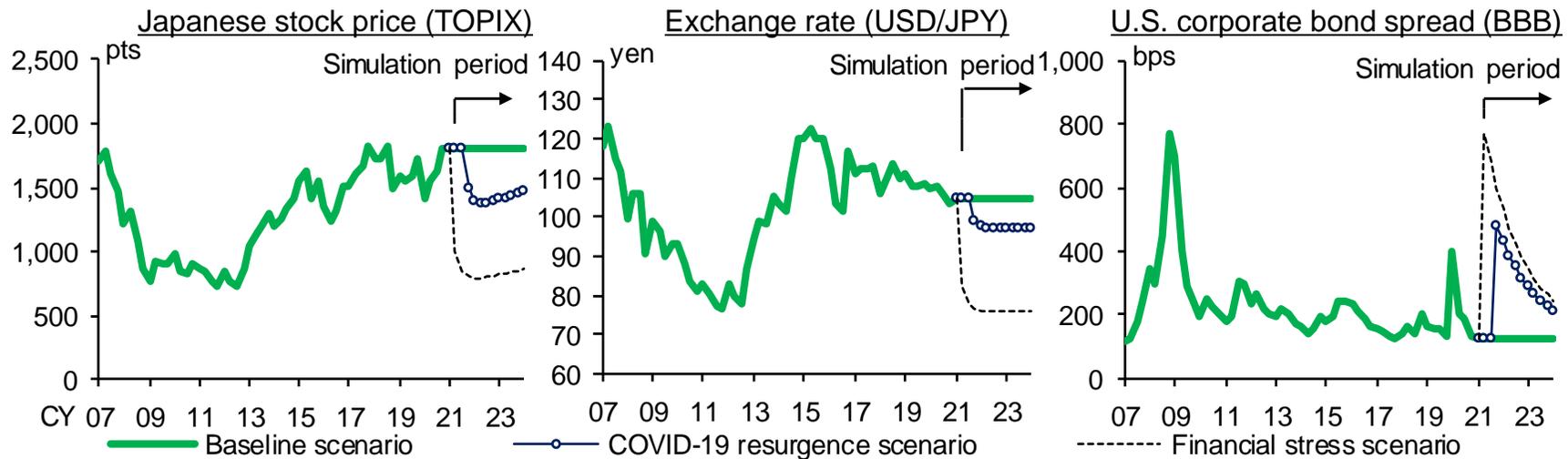


Chart V-2-4: Financial market scenarios for simulation

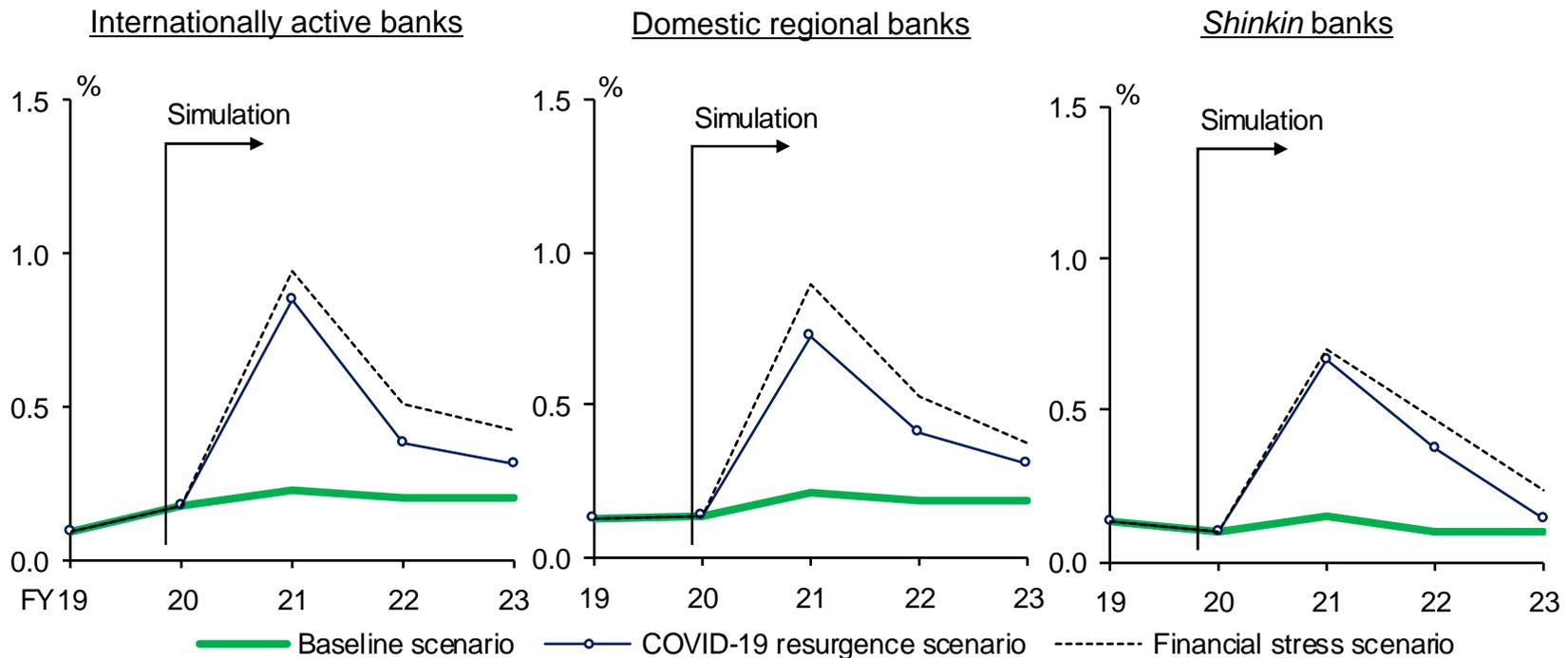


Source: Bloomberg; Cabinet Office; Japan Center for Economic Research, "ESP forecast"; IMF.

## Stress testing results: credit cost ratios

- Under the baseline scenario, the credit cost ratios increase somewhat through fiscal 2021 for all types of banks and then decline moderately.
- Under the downside scenarios, credit cost ratios increase more than in the baseline scenario. In the financial stress scenario, credit cost ratios increase further than in the COVID-19 resurgence scenario, as the cumulative decline in the real economy is severer.

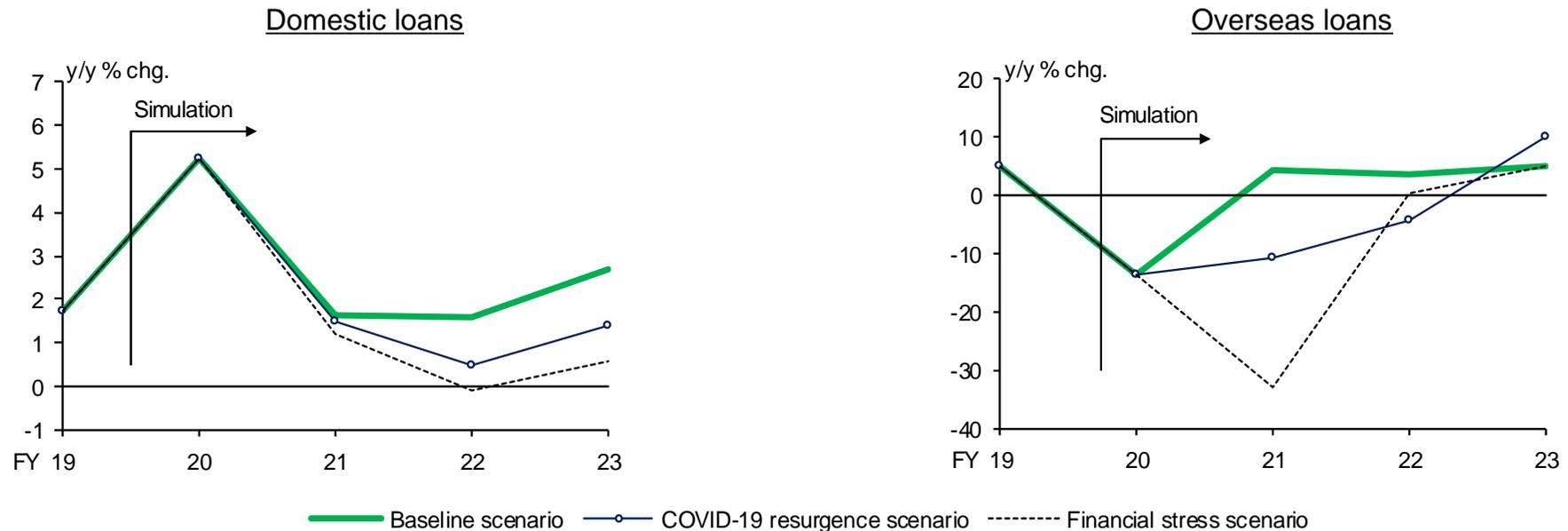
Chart V-2-7: Credit cost ratios



## Stress testing results: loans outstanding

- Under the baseline scenario, domestic loans outstanding increase substantially in fiscal 2020, mainly due to the increase in special loans offered in response to COVID-19, and continue to increase throughout the simulation period. Under the financial stress scenario, growth turns negative in fiscal 2022, due mainly to a decline in demand for funds amid the downturn in the global economy and to a deterioration in lending capacity amid lower capital ratios of FIs.
- Under the downside scenarios, overseas loans outstanding remains sluggish in fiscal 2021 and 2022, mainly due to the downturn in overseas economies and to yen appreciation.

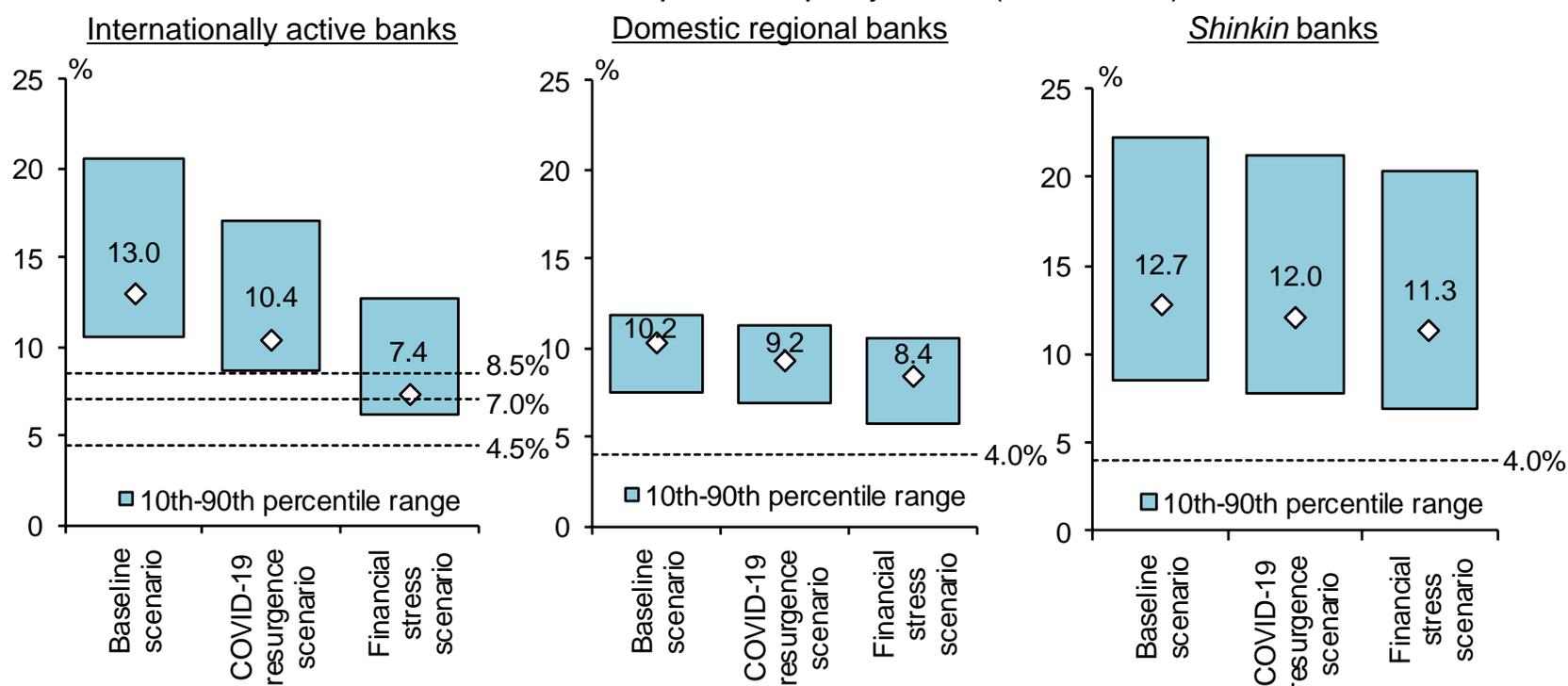
Chart V-2-9: Loans outstanding (total of financial institutions)



## Stress testing results: capital ratios and summary of stress testing

- Even in the case of future resurgence of COVID-19, Japan's financial system is likely to remain highly robust.
- However, in the event of a substantial and rapid adjustment in global financial markets, a deterioration in FIs' financial soundness and the resultant impairment of the smooth functioning of financial intermediation could pose a risk of further downward pressure on the real economy.

Chart V-2-13: Capital adequacy ratios (fiscal 2023)



Note: 1. The left-hand chart shows the CET1 capital ratios of internationally active banks. The middle and right-hand charts show the core capital ratios of domestic regional banks and *shinkin* banks. The transitional arrangements are taken into consideration.  
 2. Markers in the charts indicate the total of financial institutions for each type of bank.

## Challenges for FIs and actions by the Bank of Japan

### (Challenges for the time being)

- The major challenge for FIs is to smoothly fulfill their financial intermediation function by balancing their financial soundness and risk taking, under the high uncertainty of the developments in the spread of COVID-19 and their impact on the economy.
- In this regard, FIs need to take the following three actions in terms of risk management: (1) an accurate assessment of their borrowers' business conditions; (2) an enhancement of their risk management framework through refining quantification and close monitoring of market risks; and (3) ensuring the stability of their foreign currency funding bases. In addition to these, offering support and adequate loan-loss provisioning based on the sustainability of borrowers' businesses as well as sound capital planning under considerable uncertainty are the keys to maintaining their financial soundness.

### (Challenges in the medium- to longer-run)

- The environment surrounding Japan's economy and society is undergoing major changes, e.g., digital transformation and climate change, amid the decline in and aging of the population. Against this background, FIs are expected to contribute to achieving a sustainable society in the post-COVID-19 era by improving their services while maintaining their soundness.

### (Actions by the Bank of Japan)

- The Bank of Japan, in close cooperation with the Japanese government and overseas financial authorities, will make efforts to ensure the stability of the financial system and the smooth functioning of financial intermediation. As part of such efforts, the Bank will facilitate the strengthening of business foundations of regional FIs through the Special Deposit Facility to Enhance the Resilience of the Regional Financial System. From a medium- to long-term perspective, the Bank will actively support FIs' initiatives by preparing institutional frameworks for the financial system, by taking measures to respond to climate-related financial risks, and by facilitating digital transformation.

# Appendixes

## Overview of measures to support corporate financing

- In response to the resurgence of COVID-19 since autumn 2020, the government extended the deadline to apply for effectively interest-free loans and raised their maximum amount, expanded the employment adjustment subsidies program, and established a cash-payment program for restaurants that shortened their business hours.
- The medium-term simulation takes into account the impact of these measures based on the actual government expenses.

Chart IV-1-8: Overview of measures to support corporate financing

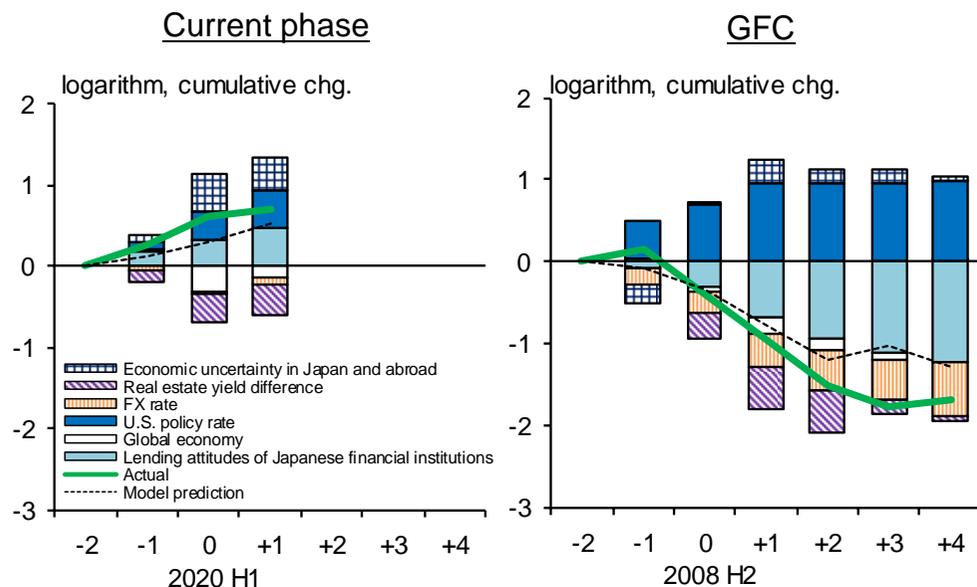
	Major measures to support corporate financing	Overview of measures	Fiscal expenses and total size of measures
Cash payments	Subsidies for sustaining businesses	Cash payments for SMEs and sole proprietors (up to 2 mil. yen)	5.7 tril. yen
	Rent assistance subsidies	Cash payments for supporting rent payments (up to 6 mil. yen)	1.2 tril. yen
	Expansion of employment adjustment subsidies program, etc.	Subsidy rates increased for leave allowance (up to 100%)	4.1 tril. yen
	Cooperation fees for shortening business hours	Cash payments for restaurants, etc. that cooperate with local governments' requests, such as shortening their business hours during the second state of emergency (grants are delivered to each prefecture)	1.9 tril. yen
	One-off support payments	Cash payments for SMEs and sole proprietors during the second state of emergency (up to 0.6 mil. yen)	0.5 tril. yen
Tax measures	Special tax measures such as tax payment moratorium	National and local taxes and/or social insurance contributions possibly deferred for one year	Approx. 26 tril. yen
Financial measures	Effectively interest-free loans by government-affiliated and private financial institutions	Interest subsidies provided to government-affiliated and private financial institutions	Approx. 110 tril. yen
	Crisis response loans to medium-sized and large firms by government-affiliated financial institutions	Long-term loans with preferential interest rates through government-affiliated financial institutions	Approx. 10 tril. yen
	Equity support by government-affiliated financial institutions and funds	Equity support, mainly through subordinated loans and capital injections	Approx. 12 tril. yen

Note: Based on announcements by the government until end-February 2021. "Fiscal expenses" includes the expenses from contingency funds and announced budget diversions.  
Source: Cabinet Office; Ministry of Economy, Trade and Industry; Ministry of Finance.

## Foreign investors' stance in the real estate market

- During the GFC, FIs' severe lending stance contributed to a considerable reduction in real estate property acquisitions by foreign investors. In contrast, during the current phase, FIs' accommodative lending stance, the decline in U.S. interest rates, and the relative calmness in Japan's financial markets have helped to push up real estate property acquisitions by foreign investors.

Chart B3-2: Decomposition of value of real estate property acquisitions by foreign investors



Note: The charts indicate cumulative contributions for every half year based on the estimation results shown in Chart B3-1. "Lending attitudes of Japanese financial institutions" represents "DI of lending attitudes of financial institutions (real estate industry)," "Global economy" represents "GDP growth rate of OECD countries," and "Economic uncertainty in Japan and abroad" represents the sum of "Nikkei VI" and "U.S. VIX." Latest data for left-hand chart as at the second half of 2020.

Chart B3-1: Estimation results for value of real estate property acquisitions by foreign investors

Dependent variable: Value of real estate property acquisitions by foreign investors in Japan (h/h % chg.)

Explanatory variables	Expected signs	Coefficients
Global factor		
GDP growth rate of OECD countries (h/h % chg.)	+	4.92 *
U.S. policy rate (h/h chg.)	-	-0.21 ***
Yield difference (Japan - U.S., h/h chg.)	+	0.26 ***
FX rate (U.S. dollar/yen, h/h % chg.)	+	2.14 ***
U.S. VIX (h/h chg.)	+ or -	0.06 ***
Domestic factor		
DI of lending attitudes of financial institutions (real estate industry)	+	0.01 ***
Nikkei VI (h/h chg.)	-	-0.04 ***
Constant		-0.06 *
Estimation period		2005-2020
Adj. R <sup>2</sup>		0.44
S.E. of regression		0.29

Note: 1. \*\*\* and \* indicate statistical significance at the 1 percent and 10 percent levels, respectively.

2. Dependent variable is 1.5-year backward moving average.

Source: Bloomberg; FRB; IMF; Japan Real Estate Institute; JLL; OECD; BOJ.

## The price impact of transactions by foreign investors on the commercial real estate market

- The prices paid by foreign investors tended to be more than 10 percent higher than those paid by domestic investors, according to the estimation using transaction-level data of large commercial real estate transactions.
- If foreign investors' investment in Japan's real estate market were to decrease, this might exert a certain amount of downward pressure on commercial real estate transaction prices.

Chart B3-3: Estimation results for real estate transaction price

### Outline of database

Eligible transaction	Real estate investment worth 100 million yen or more
Start year	2002
Characteristics	Location, use, area, seller's and buyer's name, etc.
Sample size	Approx. 24,000 cases
Estimation sample size	9,539 cases (Approx. 7,500 sellers and buyers)

### Estimation results

Dependent variable:

Real estate transaction price (logarithm)

Explanatory variables	Coefficients
Foreign-buyer dummy	0.13 ***
Property quality	
Age	-0.04 ***
Age <sup>2</sup>	0.00 ***
Total floor area (logarithm)	0.74 ***
Number of aboveground floors	0.01 ***
Number of basement floors	0.12 ***
SRC-structure dummy	0.12 ***
Constant	0.27 **
Dummy variables for location, use, and transaction year	Yes
Estimation period	2002-2020
Adj. R <sup>2</sup>	0.78
Sample size	9,539

Note: 1. Estimation samples contain all the characteristics required for estimation at December 2020.

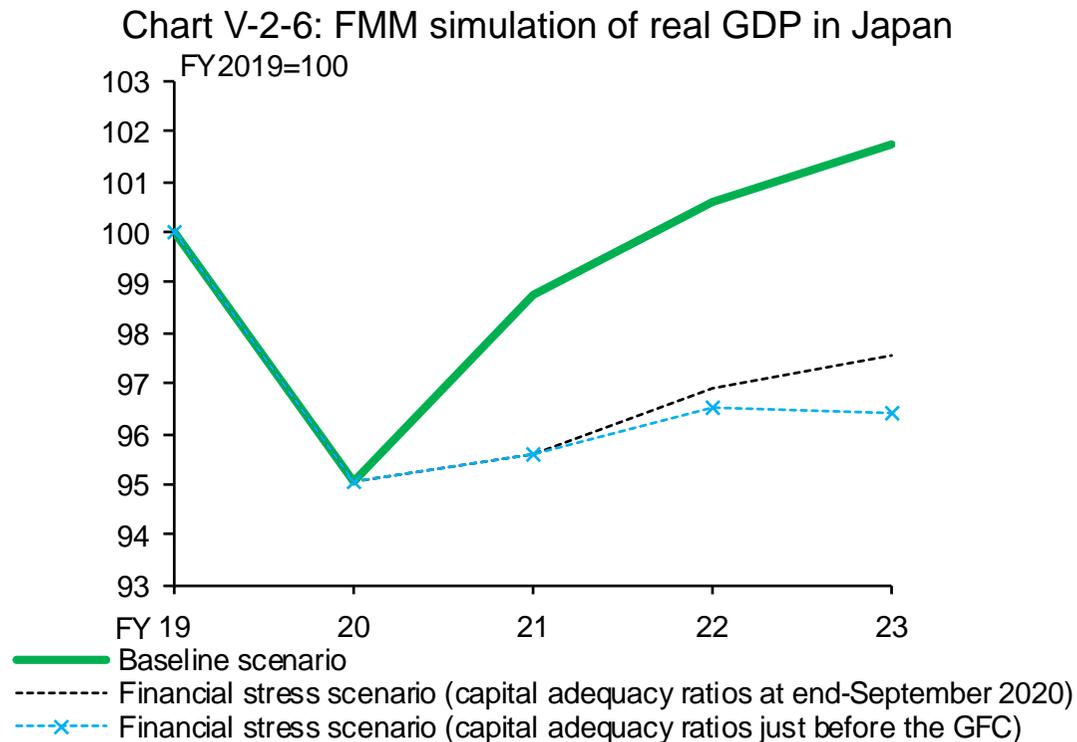
2. \*\*\* and \*\* indicate statistical significance at the 1 percent and 5 percent levels, respectively.

3. Estimated by the BOJ.

Source: BOJ calculations based on "Nikkei real estate market information DEAL SEARCH."

## FMM simulation of real GDP in Japan

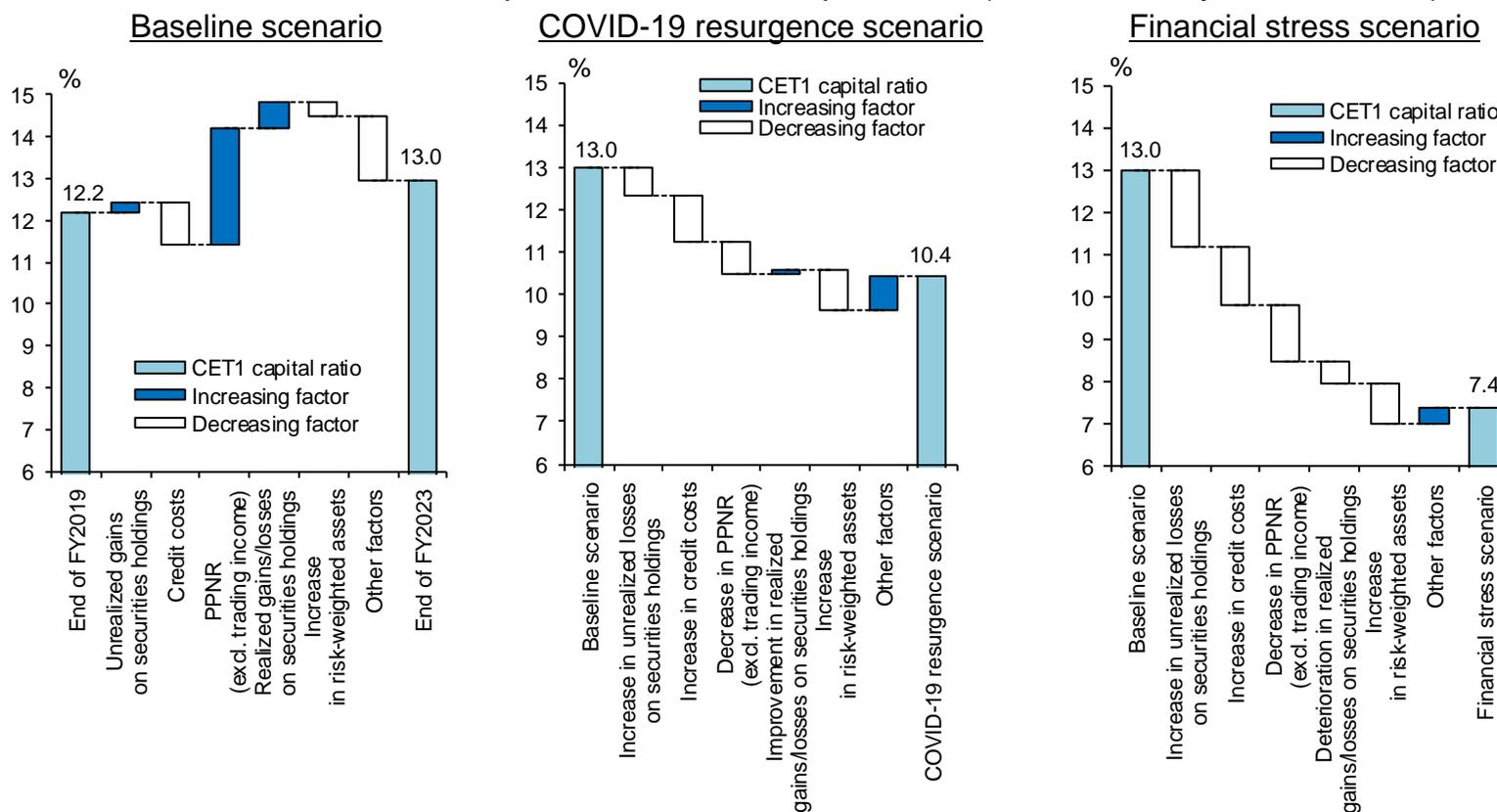
- A counterfactual simulation using the Financial Macro-econometric Model (FMM) shows hypothetical real GDP under the assumption that the capital adequacy ratios of Japan's FIs were at the same level just before the GFC.
- As the Japanese FIs have accumulated their own capital after the GFC, the cumulative decline of real GDP over 3 years under the "financial stress scenario" is about 10% smaller than that when assuming the capital adequacy ratios are at the level just before the GFC.



## Decomposition of CET1 capital ratio (internationally active banks)

- In the baseline scenario, the CET1 capital ratio for internationally active banks is likely to rise in fiscal 2023 from the level in fiscal 2019 as a result of an increase in pre-provision net revenue (PPNR) reflecting an increase in lending and of realized gains on securities holdings.
- In the two downside scenarios, the CET1 ratios decline through fiscal 2023, mainly due to the rise in credit costs and unrealized losses on securities holdings.

Chart V-2-14: Decomposition of CET1 capital ratio (internationally active banks)

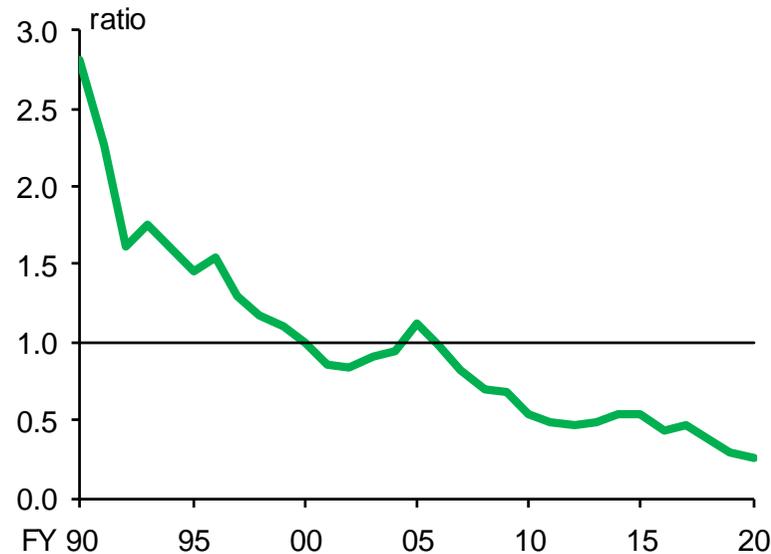


- Note: 1. The chart for the baseline scenario indicates the contribution of each factor to the difference between the capital adequacy ratios at end-March 2020 and the end of the simulation period (as at end-March 2024), and the charts for the COVID-19 resurgence scenario and financial stress scenario indicate the contribution of each factor to the difference between the capital adequacy ratios at the end of the simulation period (as at end-March 2024) under the baseline and downside scenarios.
2. Unrealized gains/losses on securities holdings take tax effects into account.
3. "Other factors" includes taxes, dividends, and CET1 regulatory adjustments.

## Developments in P/B ratios of Japanese listed banks

- The price-to-book ratios (P/B ratios) of Japanese listed banks have generally remained below 1 since the early 2000s. This implies that the stock market considers FIs' capacity to absorb losses to be below the book value of their capital when such institutions' business is valued at market value.
- The developments in P/B ratios may suggest a downward pressure on FIs' profits due to the low interest rate environment and structural factors such as the declining population.

Chart V-1-7: P/B ratios of banks



Note: 1. Annual average of median of major financial groups, regional banks, and regional financial groups whose P/B ratios are available in a given period.

2. The figure for fiscal 2020 is estimated based on the data by end-February 2021.

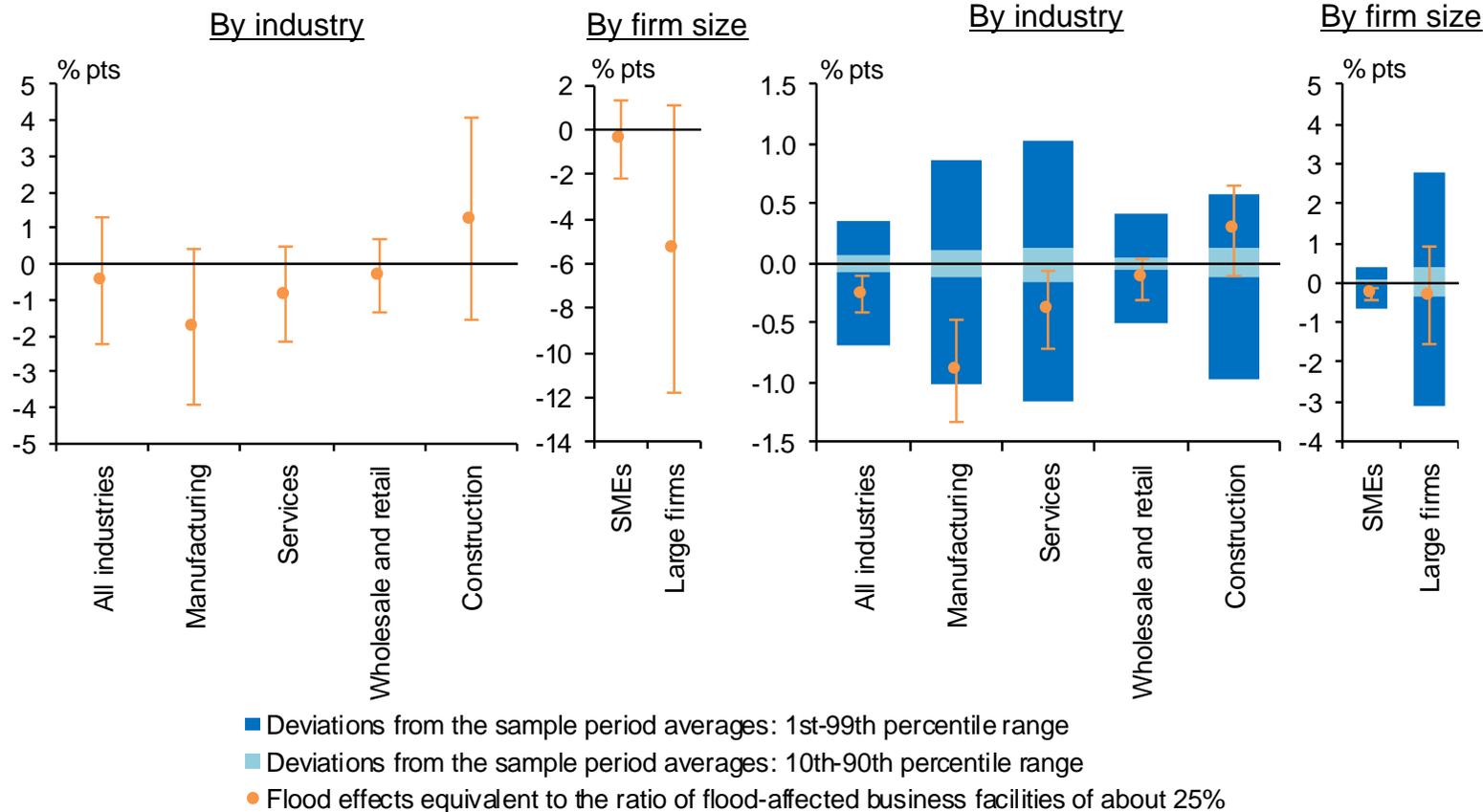
Source: Nikkei Inc., "NEEDS-Financial QUEST."

## The impact on floods on firms' financial conditions

- In recent years, floods have often damaged economic activities in Japan. The estimation by matching data in *Flood Statistics*, which record almost all flood damages in Japan since 1961, with financial data of domestic firms, suggests that flood damage can have a negative impact on firms' financial conditions, especially in the manufacturing sector and among SMEs.

Chart B6-1: Flood effects on firms' financial conditions

Year-on-year rates of change in sales



- Note: 1. The error bar indicates a 95 percent confidence interval.  
 2. "Wholesale and retail" includes food services. "SMEs" represents firms with capital of less than 1 billion yen. "Large firms" represents firms with capital of 1 billion yen or more.  
 3. Under the interpretation that the error terms estimated here are shocks experienced by firms in the past, the percentile range of profits to sales indicates the distribution of the error terms averaged by municipality.  
 4. The estimation uses the unbalanced panel data from 1993 to 2018.