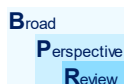




# **BOJ** *Reports & Research Papers*

July 2024



**Broad-Perspective Review Series**

## **The Effects of Monetary Easing on Japan's Financial System**

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## **The Effects of Monetary Easing on Japan's Financial System**

### **Abstract**

This paper analyzes the effects of the monetary easing measures over the past 25 years on the financial system from three perspectives: (1) financial cycles, (2) banks' lending in the low interest rate environment, and (3) potential risk factors.

#### **Financial cycles**

- Banks' lending attitudes have been active except for the periods immediately after the financial crises around 2000 and in the late 2000s.
- The financial gap, which quantifies changes in the financial cycle, does not show that the large financial imbalances seen around the bubble period have accumulated in the low interest rate environment. A contracting phase in the financial cycle after the bursting of the bubble economy ended by the mid-2000s. The expansion of the financial cycle has been continuing since the 2010s due to the increase in private debt. That said, the effects of increasing real investment and rising asset prices have been limited so far.

#### **Banks' lending in the low interest rate environment**

- Looking at financial intermediation activities, corporate loans decreased in the first half of the 2000s, mainly due to balance sheet adjustments by banks and firms and the disposal of non-performing loans. Thereafter, the balance between corporate credit and the level of economic activity has been more or less stable. That said, the amount outstanding of real estate-related loans, which are highly sensitive to interest rates, has remained at its historical peak range. With regard to the increase in loans, there were cases where the borrowers' resilience to a decline in income or a rise in loan interest rates was relatively low.
- The counterfactual simulation on the financial system suggests that, in addition to lower interest rates and faster economic improvement, the effect of improving

collateral value stemming from stable land prices has contributed to the increase in lending over the past 10 years.

- Competition among banks in the lending market has intensified as they faced a structural decline in loan demand and tried to increase loan volume to cover the decline in profits due to lower interest rates. These changes have contributed to the narrowing interest margins and the increase in lending.

#### Potential risk factors

- Under the smooth functioning of financial intermediation, the borrowing term of firms has become longer, which has become a factor that increases the interest rate risk. Firms have secured stable funding at long-term fixed interest rates and contained refinancing risk. This borrowing behavior by firms has also contributed to an increase in banks' duration risk, while it has helped banks secure interest margins in a low interest rate environment.
- Among the firms that have increased borrowings, there are firms that have improved their profitability and financial conditions while others have not been able to improve their sluggish performance. The former firms have been proactive in investment and have contributed to economic improvement. On the other hand, there has always been a certain proportion of firms of the latter type, even during the period of low interest rates and economic improvement. They are less resilient to stress than other firms. In a future phase of rising interest rates, these borrower firms could be subject to downgrading.
- Banks' profitability has declined significantly over the past 25 years. Although their return on equity (ROE), based on pre-provision net revenue (PPNR) excluding trading income, has recently started to increase, it remains at a historically low level at regional and *shinkin* banks. Consequently, there are banks that have become less resilient to stress. If interest rates rise significantly in a short period of time, the valuation losses on securities holdings could be a constraint on banks' financial intermediation activities. In addition, if the external environment changes, credit costs could increase.

## 1. Introduction

As part of the "Review of Monetary Policy from a Broad Perspective," this paper examines the effects and side effects of monetary easing measures on the financial system, including those covered in previous issues of the *Financial System Report*.<sup>1</sup>

The structure of this paper is as follows. Section 2 divides the past 25 years into three phases and reviews the financial cycle in each phase. Section 3 examines past lending developments, mainly from the viewpoint of the effects of monetary easing. Section 4 outlines issues related to financial intermediation activities, mainly from the viewpoint of the potential risk factors. Section 5 concludes.

## 2. Developments in financial cycles

### (1) Banks' lending attitudes as perceived by firms

First, this section divides the past 25 years into three phases in line with the Bank of Japan's monetary easing measures -- from 1999 to 2006, from 2008 to 2012, and from 2013 onwards -- and outlines the characteristics of banks' lending operations during each phase.

#### *The period from 1999 to 2006*

The period from 1999 to 2006 corresponds to the phase during which economic activity was undermined by the problem of non-performing loans after the collapse of the bubble. On the financial system front, crisis management had to be prioritized before the full removal of blanket guarantee of deposits in 2005. The problem of non-performing loans had a significant adverse impact on the real economy through a credit crunch.<sup>2</sup> At that time, many banks faced two types of constraints, namely capital constraints due to non-performing loans and funding liquidity constraints, and banks' lending attitudes, as perceived by firms, clearly tightened (Chart 1(1)).

The quantitative easing policy introduced in 2001 contributed to the relaxation of the funding liquidity constraint. Banks' liquidity concerns were softened by the massive supply of funds under the quantitative easing policy and the resultant increase in the Bank

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<sup>1</sup> See also Bank of Japan (2016, 2021) for an assessment of the effects of monetary easing policy.

<sup>2</sup> As a consequence of the credit crunch at that time, curbs on new loans and forcible withdrawal of outstanding loans by banks became a social issue. This contributed to an increase in the credit risk of firms, leading to further tightening of banks' lending attitudes.

of Japan current account deposits held by banks.<sup>3</sup> At the same time, a narrowing of banks' credit spreads contributed to a reduction in market funding premiums. Banks' lending attitudes became active in the mid-2000s, as a consequence of measures to alleviate banks' capital constraints, such as the Program for Financial Revival in 2002, as well as their balance sheet adjustments.

### *The period from 2008 to 2012*

The period from 2008 to 2012 was affected by the global financial crisis and the yen was appreciated during this period. At that time, banks were forced to follow a cautious risk-taking stance due to an increase in credit risk and valuation losses on stockholdings. In addition, as the liquidity of the foreign exchange (FX) swap market dried up temporarily, banks faced uncertainty in foreign currency funding, especially those banks with large foreign currency positions. Under these circumstances, banks' lending attitudes once again tightened (Chart 1(1)).

Funds-supplying operations for yen and foreign currencies introduced after the global financial crisis in 2008, and the asset purchase under the comprehensive monetary easing policy introduced in 2010, relaxed banks' funding liquidity constraints and reduced the possibility that both funding liquidity and market liquidity might dry up in tandem.<sup>4</sup> In particular, the U.S. dollar funds-supplying operation under the swap agreements between central banks led not only to the recovery of banks' U.S. dollar funding liquidity, but also to the recovery of liquidity in the FX swap market.<sup>5</sup> In addition, under the Small and Medium-sized Enterprise (SME) Financing Facilitation Act enacted in 2009, banks were willing to accept changes in the terms and conditions of loans, and the lending attitudes as perceived by firms became active in a relatively short period of time.

### *The period from 2013 onwards*

Since 2013, the Bank of Japan has implemented large-scale monetary easing. The lending operation of banks has been consistently accommodative, which has already lasted for 10 years (Chart 1(1)). Banks' lending attitudes have not changed since the pandemic.

Accommodative lending operations are also reflected in banks' interest margins (Chart

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<sup>3</sup> See Ugai (2006) and Shioji (2019) for the effects and channels of the quantitative easing policy.

<sup>4</sup> These operations include, for instance, the introduction of the U.S. dollar funds-supplying operation in September 2008, special funds-supplying operations to facilitate corporate financing in December 2008, and an asset purchase program in October 2010.

<sup>5</sup> See Box 2 in the August 2009 issue of the *Financial Markets Report*.

1(2)). Banks' interest margins were differentiated by rating throughout the 2000s. Since the 2010s, however, interest margins for middle-risk firms, which are rated in the middle range and have relatively high credit risk, have narrowed to the same level as low-risk firms with higher ratings. This suggests that, whereas banks' lending attitudes were active only for low-risk firms in the 2000s, their lending attitudes for firms rated one-notch lower also became active in the 2010s. These active lending attitudes and the resultant accommodative financial conditions have removed funding concerns not only of firms that actually borrowed from banks, but also of firms that did not borrow.

## (2) Financial cycles of the past 25 years

As mentioned above, banks' lending attitudes as perceived by firms have been active except for the periods immediately after the financial crises around 2000 and in the late 2000s. Financial intermediation has continued its smooth functioning in general during this period. Next, by examining a heat map and the financial gap, this paper reviews whether these financial conditions have led to a buildup of financial imbalances that could cause a significant downturn in future economic activities.

### *Heat map*

The heat map shows whether various Financial Activity Indexes (FAIXs) point to an overheating or contraction of activity, using the bubble period in the late 1980s as reference, indicating financial conditions in three different colors (Chart 2(1)).<sup>6</sup> The heat map does not show any period in which, as in the bubble period, many indicators have simultaneously turned "red," which signals an overheating.

Since the pandemic, several FAIXs that represent debt of firms and households, such as the "total credit to GDP ratio," turned red, indicating an overheating (Chart 3). These indicators use nominal GDP as a denominator and credit (private debt) as a numerator. The rise in these indicators therefore reflected a decline in economic activity since the pandemic (which decreased the nominal GDP in the denominator), as well as banks' active lending, such as effectively interest-free and unsecured loans, and firms' moves to secure ample cash (both of which increased private debt in the numerator). The rebalancing of private debt and economic activity reflecting the recovery in economic activity after the pandemic led to all these indicators returning to "green" by the end of 2023.

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<sup>6</sup> The heat map represents a mechanical assessment of whether financial activity is overheating or contracting. Specifically, the colors represent the following: (1) red indicates that an index is above its upper threshold; (2) blue indicates that an index is below its lower threshold; and (3) green indicates no signs of either extreme. For details on the FAIXs, see Ito et al. (2014).

### *Financial gap*

The financial gap -- a summary measure of the 14 FAIXs -- is examined to quantify changes in the financial cycle. It is calculated as the weighted average of the deviations of the 14 FAIXs from their trends (Chart 2(2)).<sup>7</sup>

The financial gap between 1999 and 2006 suggests a contracting trend of financial activities, as it remained negative mainly due to the decline in private debt (the "debt factor"). Although the negative financial gap continued for a long time after the bursting of the bubble economy, it did not deteriorate significantly, due to the various measures mentioned above. The financial gap turned positive in the mid-2000s.

During the phase from 2008 to 2012, the financial gap once again turned negative against the backdrop of a decline in real investment (the "asset factor"). Due to the effects of the global financial crisis and the appreciation of the yen, domestic financial intermediation activities, including lending, were put under severe stress. However, the negative financial gap did not widen significantly, also owing to the various measures introduced during this period. Furthermore, the financial gap turned positive in a relatively short period of time.

Since 2013, the financial gap has become significantly positive after fluctuating during the period of the global financial crisis. The expansion of the financial cycle as seen from the financial gap has already lasted for 10 years. One feature of the current phase has been that the positive gap is mainly due to the increase in private debt (the "debt factor"). The effects of increasing real investment (the "asset factor") and rising asset prices (the "price factor") have been limited so far.

### *Signs of financial imbalances*

As mentioned above, the heat map and financial gap do not indicate that large financial imbalances, such as significant overheating and contraction as seen around the bubble period, have accumulated in the low interest rate environment. Looking at the financial intermediation activities during this period, corporate loans decreased mainly due to balance sheet adjustments and disposal of non-performing loans, but the balance between corporate credit and the level of economic activity after that has been more or less stable. That said, some developments warrant attention. One is the accumulation of duration risks

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<sup>7</sup> Larger weights are assigned to indexes that have a higher correlation with other indexes in calculating the weighted average of individual FAIXs. The weights vary based on changes in the degree of correlation over time.

(Chart 4(1)). Accommodative financial conditions could prolong borrowing terms for firms and households. Households have reduced their monthly repayment burden for housing loans through long-term floating-rate loans at low interest rates (Chart 4(2)). Firms have secured stable funding at long-term fixed interest rates and contained refinancing risk, seizing the opportunity of the decline in long-term interest rates (Chart 4(3)). Such borrowing behavior by firms has also partly contributed to the increase in banks' duration risk, while it has helped banks secure interest margins in a low interest rate environment.

Another development that warrants attention is the change surrounding real estate businesses, which are sensitive to interest rates.<sup>8</sup> On the liability side for real estate businesses, the "real estate loans to GDP ratio" has remained high at its historical peak range (Chart 5(1)). In addition to loans to real estate leasing businesses, loans to real estate investment trusts (REITs, included in "small firms" in the chart) and loans to real estate funds through special purpose companies (SPCs) have also been increasing. On the asset side, the "real estate firms' investment to GDP ratio" has been high, reflecting urban redevelopment projects (Chart 5(2)). Also, in terms of real estate prices, valuations of some properties seem relatively high. Although land prices have shown only small fluctuations across Japan, transactions in the higher price range have been increasing in a limited number of commercial areas in central Tokyo (Chart 5(3)(4)).

### 3. Banks' lending in the low interest rate environment

This section reviews the characteristics of banks' lending in the accommodative financial environment.

Over the past 25 years, from a macro perspective banks' lending has experienced large swings of decreases and increases (Chart 6). The period from 1999 to 2006 corresponds to the phase that saw a decrease in lending. Due to the balance sheet adjustments by banks and firms and the disposal of non-performing loans, the loans outstanding of about 450 trillion yen decreased by nearly 70 trillion yen. The change in lending practices also seems to have contributed to the decline in loans outstanding. For example, short-term loans that continue to be rolled over and play a role similar to capital were discontinued.

Since then, lending has been on an uptrend. In particular, real estate-related loans such as housing loans and loans to real estate businesses, which are highly sensitive to interest

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<sup>8</sup> See the April 2024 issue of the *Financial System Report* for recent developments in the real estate market.



rates, have continued to increase. As a background, it can be pointed out that loan demand was spurred by low interest rates. This is confirmed by comparative analysis using a counterfactual simulation assuming the case in which the lowering of interest rates due to large-scale monetary easing did not take place. However, even though the accommodative financial environment lasted for a long time with the loan interest rates declining to a historically low level, loans at a macro level did not increase significantly compared with the level of economic activity, except for the period immediately after the pandemic (Chart 3(1)(2)). It is possible that the effects of monetary easing through lending channels were partially offset by structural declines in loan demand.

#### (1) Effects of low interest rates on loan demand

To estimate the effects of low interest rates, a simulation is conducted, assuming the counterfactual case in which the interest rate did not fall. The comparative analysis using the simulation results suggests that low interest rates may have triggered an increase in loan demand. Here, the simulation employs a plug-in approach. Specifically, it estimates interest rates and real economic variables that exclude the effects of lower interest rates due to large-scale monetary easing (Japanese Government Bond (JGB) purchases) and the accompanying economic improvement. Then it uses these results as exogenous variables (plug-ins) for the Financial Macro-econometric Model (FMM), which models the real economy and financial sector. The simulation examines the effects of low interest rates on banks' risk-taking and financial conditions.<sup>9,10</sup>

Looking at major exogenous variables, the shape of the counterfactual yield curve is steeper than the actual (Chart 7(1)). This means that the counterfactual yield curve has a shape that makes it easier for banks to gain interest margins from the differentials between long- and short-term interest rates. On the other hand, the counterfactual economic growth rate is always below the actual. Therefore, the counterfactual GDP gap continues to be negative (Chart 7(2)).

The results of the comparative analysis are as follows. First, it is confirmed that the actual lending margins (lending rates minus funding rates) are smaller than those of the counterfactual in the absence of large-scale monetary easing (Chart 8(1)). The reason for this is that while deposit interest rates have had little room to decrease further, the lending

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<sup>9</sup> The counterfactual simulation covers 2013 onwards when the interest rate differentials between the actual and the counterfactual become large. See Abe et al. (2024) for details of the counterfactual simulation.

<sup>10</sup> See Abe et al. (2023) for details of the FMM.

base rates have declined in pace with the market interest rates, and the lending spreads have narrowed reflecting the improving financial conditions of the firms. On the other hand, the actual loans outstanding exceed the counterfactual. In addition to lower interest rates and faster economic improvement, the effect of improving collateral value stemming from stable land prices (included in the "financial factors" in the chart) has been stronger in the actual case.<sup>11</sup>

Between the actual and counterfactual, there is no significant difference in the economic capital ratio of banks -- the capital ratio which, even for domestic banks, takes into account valuation gains/losses on securities holdings in line with capital regulations for internationally active banks (Chart 9(1)). In all types of banks -- major banks, regional banks, and *shinkin* banks -- the decline in net interest income (included in the "pre-provision net revenue (PPNR) excluding trading income" in the chart) due to shrinking interest margins exerts downward pressure on the economic capital ratio in the actual case. On the other hand, factors that exert upward pressure on the economic capital ratios in the actual include the following mechanisms: the increase in the market price of bonds and stocks improves both the unrealized and realized gains/losses on securities holdings; and the suppression of credit downgrades of firms reduces the credit costs and improves the quality of loans, leading to the reduction of risk-weighted assets. As these factors that contribute to the increase/decrease in the economic capital ratio offset each other, in the actual case, banks as a whole have maintained sufficient capital that have enabled them to continue with risk-taking even in the low interest rate environment.

As shown above, there is no evidence that a mechanism in which excessive monetary easing curtails financial intermediation activities has come to the fore, as "reversal interest rate" supposes.<sup>12</sup> The increase in lending during this period has contributed not only to supporting economic activity, but also to partly offsetting the downward pressure on loan profits by the narrowing interest margins, maintaining banks' capital to enable risk-taking. Low interest rates and economic improvement have also contributed to improving the quality of loan portfolios. Looking at the quality of loan portfolios by borrower

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<sup>11</sup> Both in the actual and the counterfactual, interest margins narrow and lending increases during this period. This is attributable to the intensifying competition among banks in the lending market as banks faced structural decline in loan demand and tried to increase loan volume to cover the decline in profits due to lower interest rates. See Box 3 in the April 2017 issue of the *Financial System Report* for competition among banks in the lending market.

<sup>12</sup> The reversal interest rate is the rate below which interest rate cuts become contractionary for lending and the real economy. It is assumed that once the policy rate reaches the reversal interest rate, banks face capital constraints, and thus additional risk-taking becomes difficult for them. See Abadi et al. (2023) for details.

classification, the share of "normal" loans in the actual clearly exceeds that in the counterfactual (Chart 8(2)).<sup>13</sup> In the actual case in which the economy has improved, credit downgrades of firms are suppressed in all types of banks. Thus, an increase in risk-weighted assets has been suppressed due to a decrease in credit costs and an improvement in the quality of lending, which has helped maintain sufficient economic capital ratios and enabled banks to continue with risk-taking.<sup>14</sup>

The side effects of monetary easing, as assumed by the reversal interest rate, may have been alleviated by the diversification of revenue sources and cost reduction that many banks have been working on. These revenue sources include foreign assets, non-interest banking services, and alternative investments. However, as a result of the diversification of revenue sources, banks have been taking additional foreign currency liquidity risks and market risks (Chart 13).

## (2) Structural changes in loan demand

Regarding structural changes in loan demand, two features can be pointed out. One is that, since the end of the 1990s, the savings-investment balance of the corporate sector has shifted from excess investment to excess savings (Chart 10(1)). Demand for external funding including loans has declined as retained earnings have been accumulated, mainly by large firms. Moreover, large firms have expanded their foreign operations, and business investment in foreign countries has become more active than in Japan. This has also accelerated the trend decline in loan demand.

Another structural change is the decrease in the total number of firms, which is one of the underlying factors determining loan demand (Chart 10(2)). The number of firms has declined by 30 percent relative to the early 2000s. In addition, the number of *de facto* debt-free firms -- firms whose cash and deposits exceed their interest-bearing debts -- has increased. As a result, the share of firms with excess borrowing in all firms has dropped from 70 percent in the early 2000s to 50 percent. Taking into account also the population decline during this period, potential loan demand has likely been shrinking.

In addition, the amount outstanding of accounts receivable has decreased due to the spread of real-time settlements and the shortening terms of payment, especially for bills,

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<sup>13</sup> In the chart, the share of "normal" loans in the actual is higher than in the counterfactual by a few percentage points. In addition, the share of "special attention" borrowers and that of borrowers classified as "in danger of bankruptcy" and below in the actual are lower than in the counterfactual by slightly less than 1 percentage point.

<sup>14</sup> Similar effects are pointed out in the ECB Strategy Review. See Altavilla et al. (2021) for details.

which has led to a reduction in demand from SMEs for working capital. Furthermore, as the markets for corporate bonds and commercial paper have developed and strengthened, external financing by these means has expanded, mainly among large firms. The amount outstanding of corporate bonds and commercial paper has increased by 90 trillion yen over the past 25 years.<sup>15</sup>

#### 4. Potential risk factors

As described in the previous sections, financial intermediation has continued its smooth functioning, except for the periods immediately after the financial crises around 2000 and in the late 2000s. Even though banks' lending has been affected by the structural decline in loan demand, the loans, especially those related to real estate, have continued to increase at a moderate pace due to the stimulative effects of low interest rates on loan demand. However, banks have engaged in additional risk-taking to counter the impact of shrinking interest margins, which has increased the risks that they have to manage. This section considers the factors that could affect financial intermediation activities: (1) banks' interest rate risk-taking, (2) banks' risk-taking on lending to middle-risk firms, and (3) banks' loss-absorbing capacity.

##### (1) Banks' interest rate risk-taking

Low interest rates appear to have accelerated banks' interest rate risk-taking.<sup>16</sup> Over the past 25 years, net interest income on loans and securities investment has declined due to shrinking interest margins. Furthermore, deposit income -- the net interest income from investing deposits in safe assets -- turned negative in 2016 when negative interest rates were introduced (Chart 11(1)).<sup>17</sup> As deposit income, a stable revenue source, has diminished, banks have been taking on various interest rate risks to maintain profitability.

##### *Duration risk-taking*

One such risk is duration risk. Looking at the duration gap -- the difference between

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<sup>15</sup> The expansion of the private fund market under a low interest rate environment, which has been observed in other countries, has so far been limited in Japan. The assets under management of private funds in Japan are estimated at 21 trillion yen. See Box 3 in the April 2024 issue of the *Financial System Report* for details.

<sup>16</sup> Similar mechanisms were at work not only for depository financial institutions such as banks but also for non-bank financial institutions (NBFIs) such as life insurers and pension funds. See Ito et al. (2023) for risk-taking by corporate pension funds and life insurers.

<sup>17</sup> The profitability of deposit business, taking into account the administrative expenses associated with it, likely worsened more than the deposit income.

repricing schedules of interest payments for assets and liabilities -- by type of bank, the duration gap of major banks has expanded since the late 2010s (Chart 11(2)). The reason for this is that the loan duration has been prolonged due to the increase in long-term fixed-rate loans. Specifically, there were widespread moves by large firms to borrow long-term fixed-rate loans at low interest rates, seizing the opportunity of the decline in long-term interest rates.

The duration gap of regional banks and *shinkin* banks has been steadily expanding. Regional banks have focused on long-term loans such as loans to real estate businesses, which led to longer durations for loans. *Shinkin* banks have shifted to investments in long-term bonds to secure interest margins, which led to longer durations for bonds. In addition, the decrease in time deposits has made deposit durations shorter, which has contributed to an expansion in the duration gap of both regional banks and *shinkin* banks.

As a result, the amount of yen interest rate risk (in terms of 100 basis point value) on the asset side has increased significantly over the past 25 years, especially for regional and *shinkin* banks (Chart 12(1)). While the amount of interest-rate risk associated with yen-denominated bonds has been reduced by recent rebalancing, that on the asset side as a whole remains at a high level. On the other hand, the amount of yen interest rate risk on the liability side, taking core deposits into account, has increased significantly, mainly due to the increase in deposits. Consequently, the risk is generally balanced between assets and liabilities. However, the maturities of core deposits measured by models exceed an average maturity of 2.5 years or less set by the standardized approach (Chart 12(2)). Therefore, if the core deposits on the liability side are not as sticky as expected, it is possible that the interest rate risk will weigh on profits in a future phase of rising interest rates.<sup>18</sup>

#### *Foreign currency interest rate risk-taking and associated funding liquidity risk*

The banks' interest rate risk-taking has expanded not only in yen-denominated assets but also in foreign currency-denominated assets in foreign bases where profitability is relatively high (Chart 13(1)). As a result of the risk-taking on foreign currency interest rates, the management of foreign currency funding liquidity risk has been a major challenge for banks that do not have a stable retail deposit base in foreign currency. In

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<sup>18</sup> Of deposits that contractually have no maturity and can be withdrawn at any time, such as ordinary deposits, core deposits refer to sticky deposits, which are not actually withdrawn and remain in an account for a long time. In general, core deposits are less sensitive to interest rate changes. There are banks for which the residual maturity composition of core deposits is longer than other banks. See Box 2 in the October 2023 issue of the *Financial System Report* for details.

recent years, relatively stable funding has exceeded loans, as banks have maintained the stability of funding: this is apparent from the foreign currency loan-to-funding gap among major banks -- the difference between, on the one hand, the amount outstanding of loans, and on the other hand, deposits plus the amount outstanding of long-term funding, such as through the issuance of corporate bonds (Chart 13(2)). However, they are always exposed to liquidity risk in foreign currency funding markets such as the FX swap market.<sup>19</sup> Besides the availability of foreign currency funding, another challenge is relatively high funding costs.<sup>20</sup>

## (2) Banks' risk-taking on lending to middle-risk firms

Banks' risk-taking to maintain profitability has also been extended toward lending to middle-risk firms. Middle-risk firms are those firms that are classified either into the bottom group of "normal" in the borrower classification or into the top group of "need attention."<sup>21</sup>

### *Economic effects of lending to middle-risk firms*

Prolonged monetary easing has helped banks increase loans to middle-risk firms through portfolio rebalancing channels (Chart 14(1)). In fact, three quarters of the increase in loans to SMEs since the 2010s consists of loans to middle-risk firms. Looking at the decline in loan interest rates by firm characteristics, until around 2013, the decline for firms in relatively favorable financial conditions (high return on asset (ROA) and low leverage) was larger, and the effects of monetary easing materialized for those firms (Chart 14(2)). Subsequently, as monetary easing continued, while the decline in loan interest rates for these low-risk firms gradually became smaller, the decline for middle-risk firms became larger. Meanwhile, the decline for high-risk firms (the lowest ROA and the highest leverage) has remained limited.

Middle-risk firms hold a smaller amount of internal funds and are more sensitive to loan interest rates than financially sound firms. Therefore, the potential loan demand easily materialized in response to the lower interest rates offered by banks. Also, under the gradual economic improvement since the 2010s, pent-up investment to rebuild production

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<sup>19</sup> For foreign currency liquidity risk management of major banks, see Financial System and Bank Examination Department, Bank of Japan and Strategy Development and Management Bureau, Financial Services Agency (2024).

<sup>20</sup> See Iida et al. (2016) for the mechanism of fluctuations in dollar funding premiums.

<sup>21</sup> See Chapter VI and Box 4 in the April 2018 issue of the *Financial System Report* for the middle-risk firms and loans to them.

capacity and labor-saving investment to alleviate employee shortages have led to the expansion of loan demand for middle-risk firms (Chart 15(1)). Focusing on lending to middle-risk firms whose loan demand is relatively large can be viewed as a reasonable option for banks, as they have been forced to maintain revenues by increasing loan volume.

### *Risks in lending to middle-risk firms*

In the accommodative financial environment and with lending competition among banks, it has become more difficult for banks to maintain loan profitability. Lending margins by borrowers' credit rating -- the difference between the loan interest rate and the break-even loan interest rate -- have been reduced over time (Chart 15(2)). Most recently, the margins for loans to firms with high credit ratings (credit ratings A to C in the chart) have been almost zero, and it has also become difficult to ensure profits from loans to middle-risk firms (credit ratings D to F). This suggests that there is limited room for banks to expand lending to middle-risk firms from the perspective of loan profitability.

Under these circumstances, the loan interest rate yield curve by credit rating has not only shifted downward, but has also flattened. As a result, firms with relatively low credit ratings have been able to access loans from banks without paying large premiums (credit spreads). This has contributed to the development of a more accommodative financial environment. On the other hand, as credit spreads have shrunk, the screening of borrower firms by loan interest rates have become less effective, and loan interest rates have been less efficient in allocating funds.

So far, there is no evidence that loans to middle-risk firms have contributed to significant credit costs. Only a fraction of middle-risk firms later became "distressed" firms -- firms that are both insolvent and are making operating losses (Chart 16(1)).<sup>22</sup> However, there has always been a certain proportion of distressed firms, even during the period of low interest rates and economic improvement. The distressed firms are less resilient to stress than other firms. In a future phase of rising interest rates, those loan borrowers who were not screened effectively by loan interest rates could be subject to downgrading (see Box for heterogeneity in the financial conditions of SMEs).

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<sup>22</sup> The share of distressed firms, not only among middle-risk firms but among SMEs as a whole, did not increase during the 2010s, but instead was unchanged. However, once firms become distressed, it is difficult for them to get out of that situation. The share of firms that continued to be distressed was on a gradual upward trend. See Chapter IV in the April 2023 issue of the *Financial System Report* for the details.

Active lending to middle-risk firms has led to a concentration of banks' loan portfolios in certain industries, such as the real estate industry. While loan interest rates have declined for all industries, the pace of the decline for the real estate industry stands out (Chart 16(2)). As mentioned above, "real estate loans to GDP ratio" has remained high at its historical peak range. Regarding the increase in loans, there were cases where the borrowers' resilience to a decline in income or a rise in loan interest rates was relatively low. In addition, the share of real estate loans in total loans has increased, and banks have become more susceptible to developments in the real estate market (Chart 16(3)).<sup>23</sup>

### (3) Banks' loss-absorbing capacity

To perform financial intermediation activities and provide settlement services into the future, banks need to maintain sufficient capital bases and at the same time secure stable profitability. In this regard, banks have sufficient loss-absorbing capacity, both in terms of regulatory capital and profit buffers (Chart 17(1)). However, looking at the actual capital adequacy ratios, the number of banks whose capital adequacy ratios are below 10 percent has increased compared with 10 years ago. The domestic net interest income of major banks and regional banks has decreased by one-third over the past 25 years (Chart 17(2)). Under these circumstances, there are banks that have been slowing down the pace of capital accumulation by prioritizing returns to shareholders including dividends.

In addition, banks' capital adequacy ratios in the results of stress tests have been on a declining trend (Chart 18(1)). The level of the ratio have been below 8 percent in some recent stress tests. Some banks, even though they have the capital to withstand a one-time shock, would find it difficult to restore their capital once it is impaired.<sup>24</sup>

Banks' profitability has declined significantly over the past 25 years. Although their return on equity (ROE) based on pre-provision net revenue (PPNR) excluding trading income has recently started to increase, it remains at a historically low level at regional and *shinkin* banks (Chart 18(2)). Consequently, as mentioned above, there are banks that have become less resilient to stress. If interest rates rise significantly over a short period of time, the valuation losses on securities holdings could be a constraint on banks' financial intermediation activities. In addition, if the external environment changes, credit costs could increase. From a medium- to long-term perspective, if the improvement in banks' core profitability and capital accumulation were to stall, financial intermediation could

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<sup>23</sup> See Chapters III, IV and V in the April 2024 issue of the *Financial System Report* for risks related to the real estate market.

<sup>24</sup> See Chapter V in the April 2024 issue of the *Financial System Report*.



be impaired due to a decline in banks' loss-absorbing capacity. Moreover, vulnerabilities in the financial system could increase through excessive search for yield.

## 5. Conclusion

This paper analyzed the impact of the monetary easing measures over the past 25 years on the financial system from three perspectives: (1) financial cycles, (2) banks' lending in the low interest rate environment, and (3) potential risk factors. The main conclusions of our analysis are as follows.

(1) From the viewpoint of financial cycles, banks' lending attitudes have been active except for some periods. The financial gap does not show that the large financial imbalances seen around the bubble period have accumulated in the low interest rate environment.

(2) Looking at banks' lending in the low interest rate environment, corporate loans decreased in the first half of the 2000s, mainly due to balance sheet adjustments by banks and firms and the disposal of non-performing loans. Thereafter, however, the balance between corporate credit and the level of economic activity has been more or less stable. The counterfactual simulation suggests that in addition to lower interest rates and faster economic improvement, the effect of improving collateral value stemming from stable land prices has contributed to the increase in lending over the past 10 years.

(3) As for potential risk factors, under the smooth functioning of financial intermediation, the borrowing term of firms has become longer, which has become a factor that increases the interest rate risk. In addition, in a future phase of rising interest rates, borrower firms whose profitability remains low could be subject to downgrading. Furthermore, there are banks that have become less resilient to stress. If interest rates rise significantly in a short period of time, that could become a factor that inhibits the smooth functioning of financial intermediation. It will be necessary to examine potential vulnerabilities through on-site examinations and off-site monitoring, and to closely monitor the impact on the financial system of the various kinds of risk-taking by banks.

### BOX: Heterogeneity in financial conditions of SMEs

Low interest rates and the accompanying economic improvement have had a variety of effects on the firms' financial conditions. One macroeconomic effect is that corporate earnings have improved against the backdrop of the economic improvement. In addition, the accommodative financial environment has contributed to the stability of firms' funding. That said, the effects of the accommodative financial environment may differ depending on the degree of a firm's reliance on external funding. This box outlines the effects of the accommodative financial environment on SMEs by their financial position, specifically their reliance on loans.<sup>25</sup>

The composition of firms by financial position (based on the number of firms) suggests that the share of firms with excess borrowings has recently dropped to around 50 percent (BOX Chart (1)). Two-thirds of these firms are those with ample cash reserves -- firms with cash reserves equal to half or more of their annual administrative expenses. On the other hand, a third of the firms are those without ample cash reserves -- firms with cash reserves of less than half of their annual administrative expenses. The share of the remaining debt-free firms and *de facto* debt-free firms has risen to around 50 percent in total.

SMEs generally have used leverage by increasing interest-bearing debt to make investments, such as business fixed investment including land investment, and securities investment including corporate acquisition. As a result, their profitability (return on asset) has improved (BOX Chart (2)). This tendency is typically observed among firms with excess borrowings and ample cash reserves. Given the easier access to bank loans in the accommodative financial environment, those firms have taken advantage of loans to increase their supply capacity and improve their profitability. The increase in loans from banks and the resulting increase in investment were concentrated in the mid-2010s, when borrowing interest rates dropped significantly.

On the other hand, firms with excess borrowings that do not have ample cash reserves correspond to the least profitable firms. These firms, like those with ample cash reserves, have been proactive in investment, but the improvement in their operating cash flow has been limited. Therefore, a large portion of loans from banks has been allocated to maintaining financial conditions such as securing working capital, in addition to funding for investment. This method of maintaining financial conditions has been facilitated by

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<sup>25</sup> See The Small and Medium Enterprise Agency (2016) for the role that SME finance has played.

the low interest rate environment. Among these firms, there are firms that have not been able to improve their sluggish performance even amid continued economic improvement.<sup>26</sup>

Finally, debt-free firms (including *de facto* debt-free firms) have benefitted from the accommodative financial environment in a different way from firms with excess borrowings and ample cash reserves. These are firms whose marginal profitability (increase in profit per unit of investment) is low in contrast to their high average profitability. Therefore, they have prioritized the repayment of remaining debt over investment and have improved their financial conditions, thereby enhancing their profitability. It is not the case that loans to low-profitability firms have been crowding out loans to debt-free firms. Rather, the confidence that they can access loans from banks at any time may have led these firms to improve their financial conditions. In this way, low interest rates have had diverse effects on firms' financial conditions.

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<sup>26</sup> See Yamada et al. (2023) for distressed firms. Their analysis shows that the number of distressed firms increased sharply after the bursting of the bubble economy, decreased over the early 2000s, and has remained at low levels recently. Yagi et al. (2022) points out that the productivity gap between high-productivity firms and low-productivity firms has expanded.

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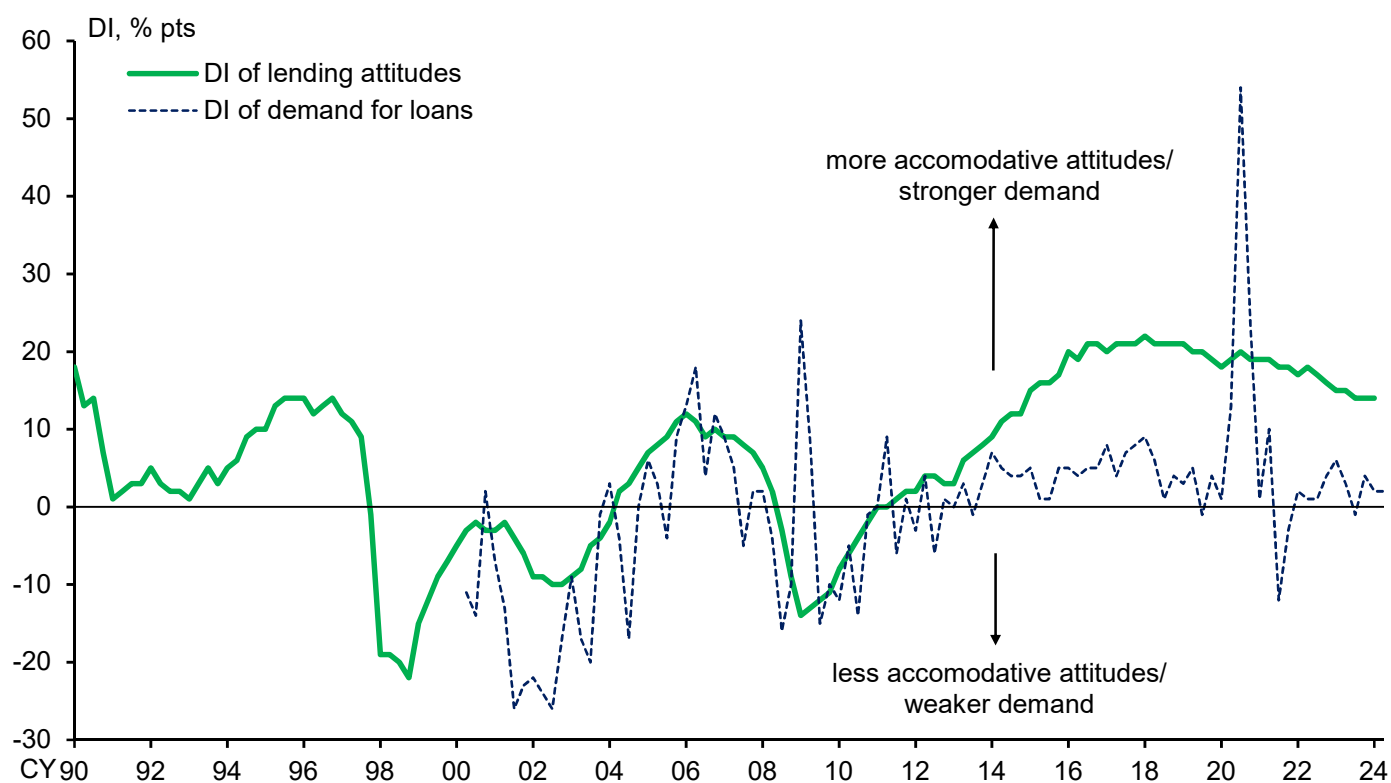
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## Lending stance of banks

### (1) DIs of lending attitudes and demand for loans



### (2) DI of interest margins for loans

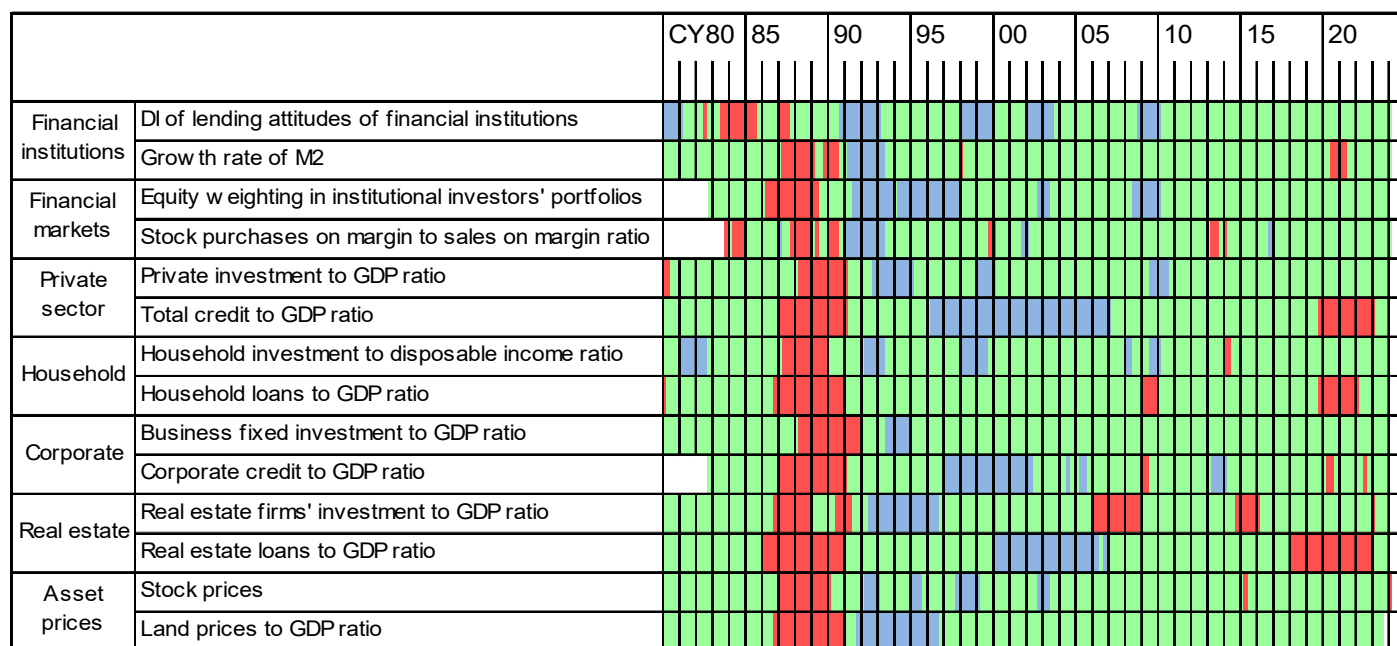


Note: (1) covers SMEs.

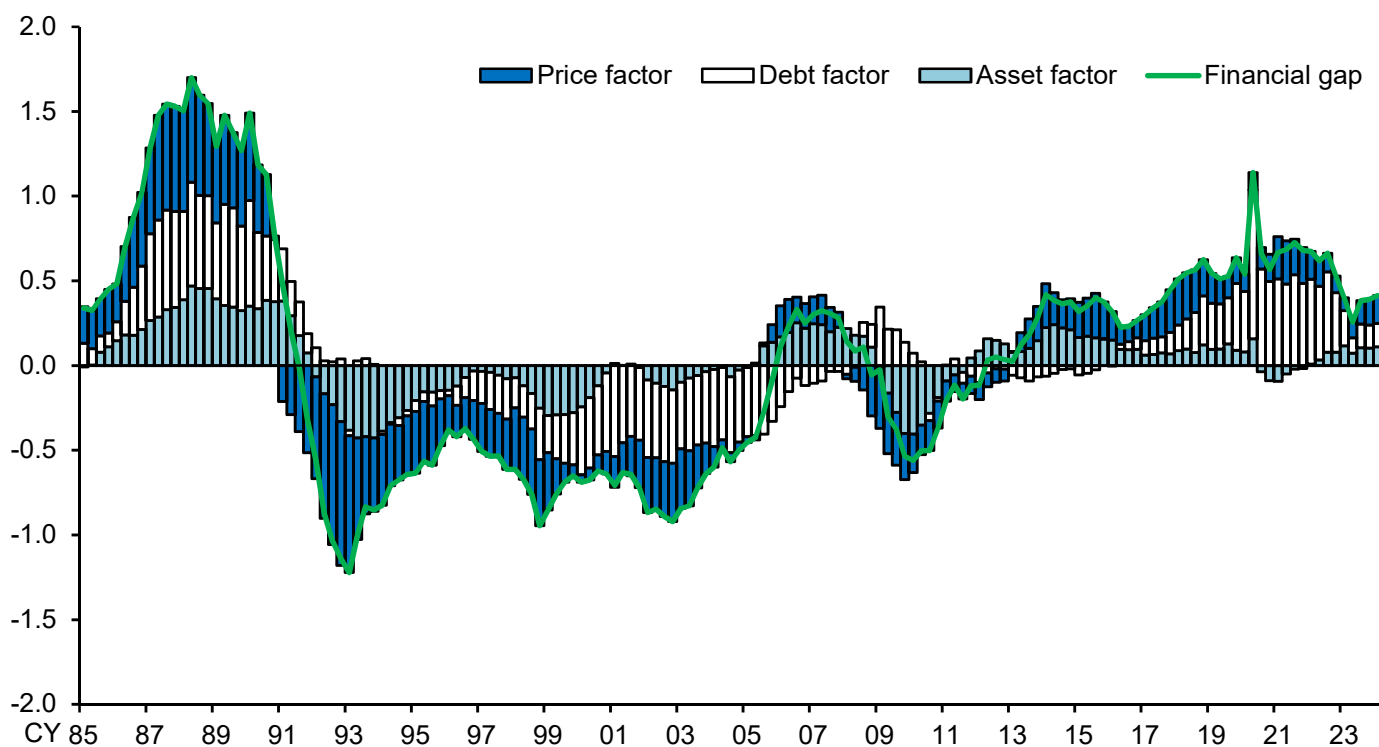
Source: BOJ

# Financial cycle

## (1) Heat map



## (2) Financial gap

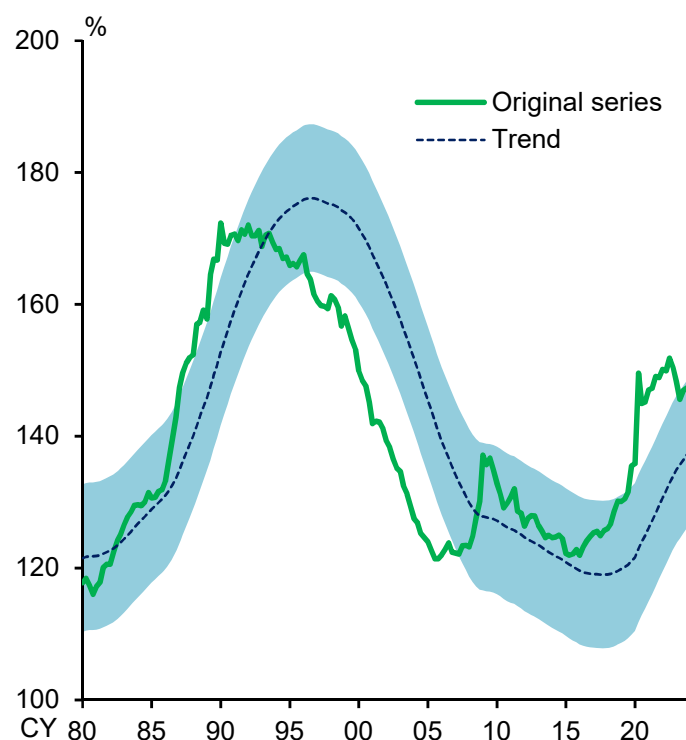


Note: Among Financial Activity Indexes that make up the heat map, "Asset factor" consists of indexes of fixed investment by the private sector, households, firms, and real estate businesses. "Debt factor" consists of indexes of their debt financing. "Price factor" consists of the remaining indexes.

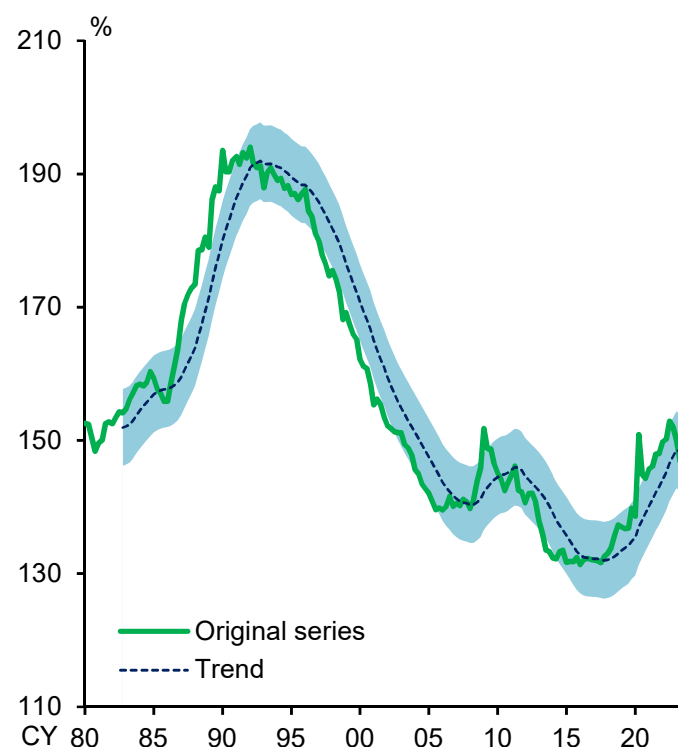
Source: Bloomberg; Cabinet Office; Japan Real Estate Institute; Ministry of Finance; Tokyo Stock Exchange; BOJ.

## Financial imbalances (1)

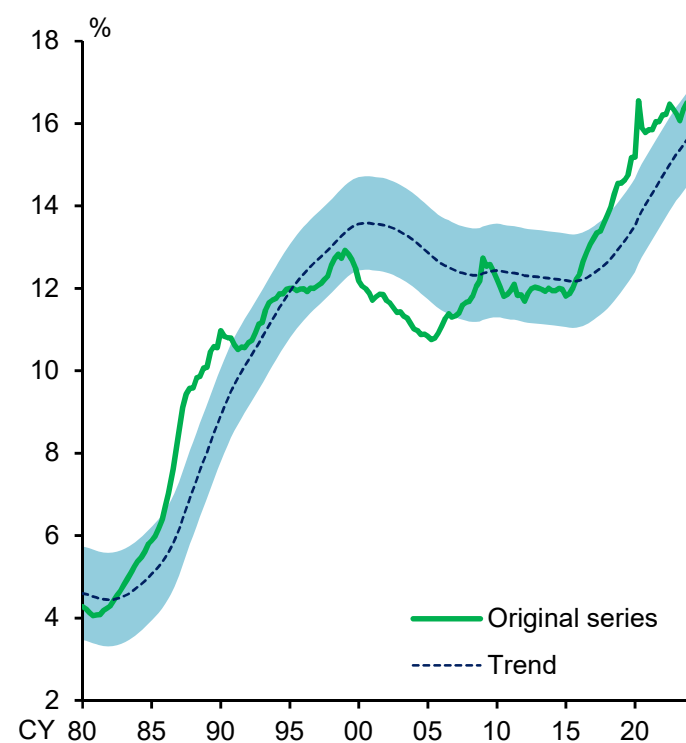
(1) Total credit to GDP ratio



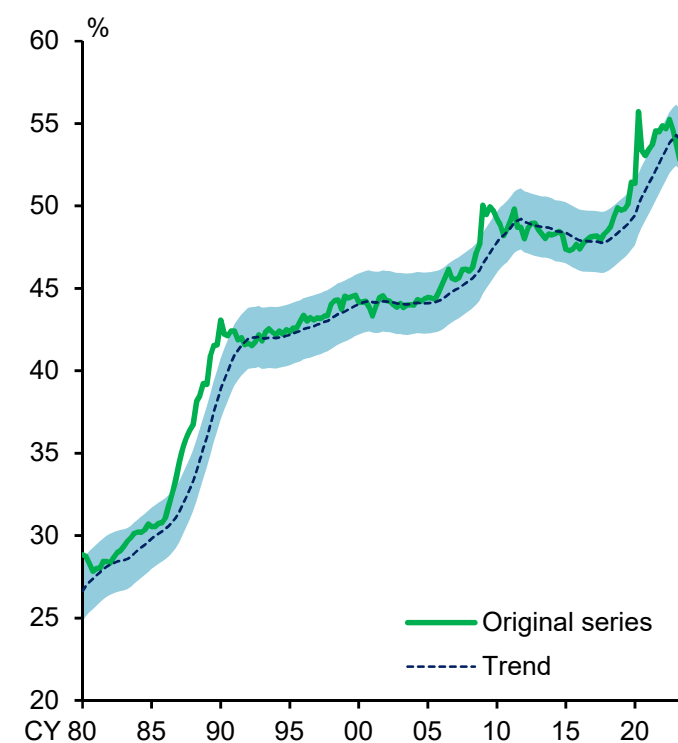
(2) Corporate credit to GDP ratio



(3) Real estate loans to GDP ratio



(4) Household loans to GDP ratio



Note: 1. "Trend" of (1) and (3) are calculated using the one-sided HP filter and those of (2) and (4) are calculated using 3-year backward moving averages.

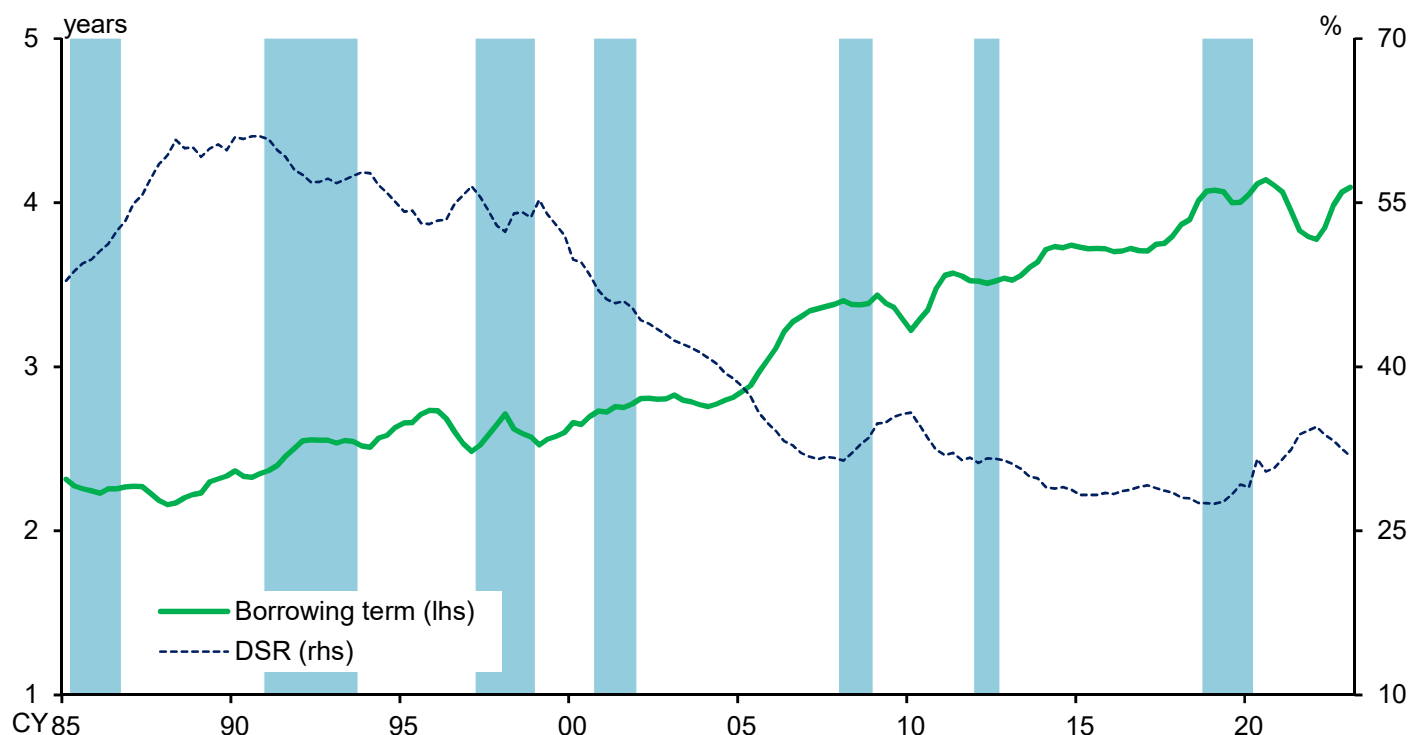
2. The shaded area of (4) indicates 1.25 times the root mean square of the deviation from the trend, while those of the other panels indicate the root mean square of the deviation from the trend.

Source: Cabinet Office; BOJ.

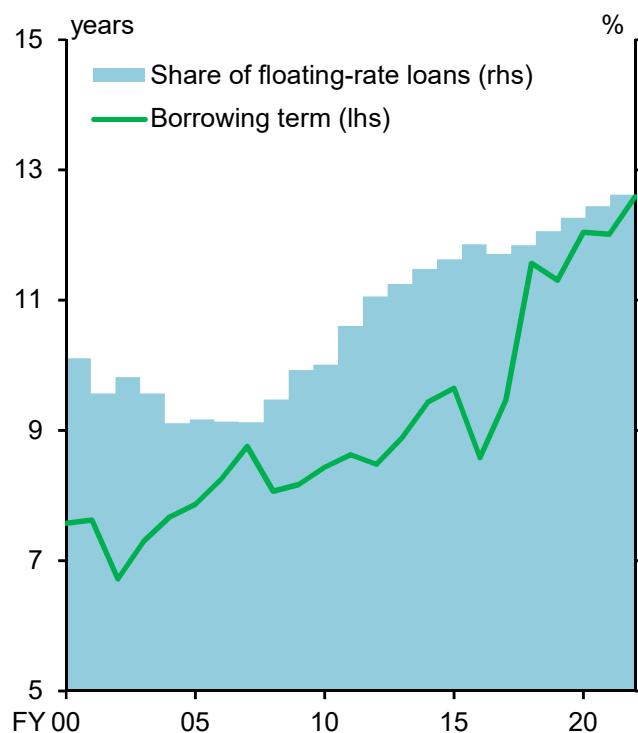


## Financial imbalances (2)

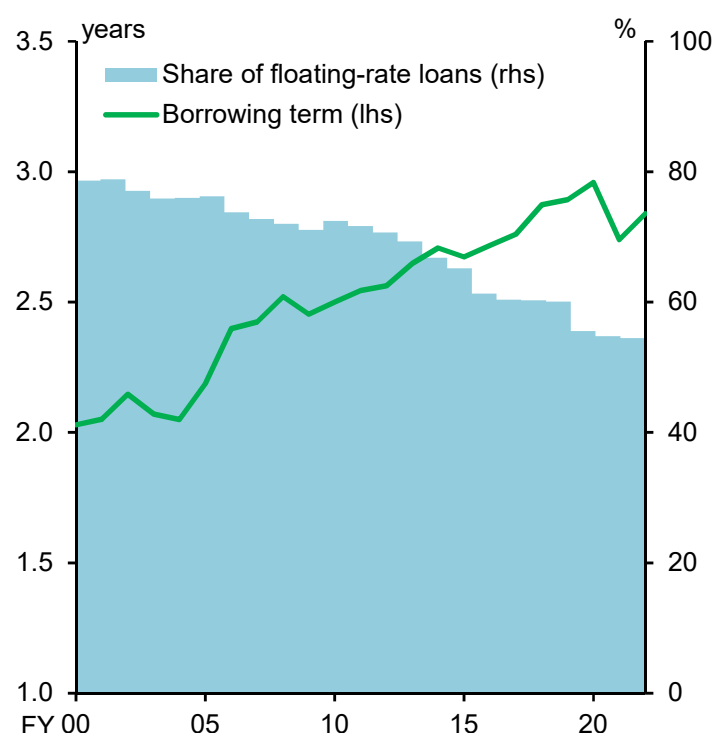
## (1) Borrowing term and DSR



## (2) Borrowing term of household loans



## (3) Borrowing term of corporate loans



Note: 1. "Borrowing term" shows estimated values.

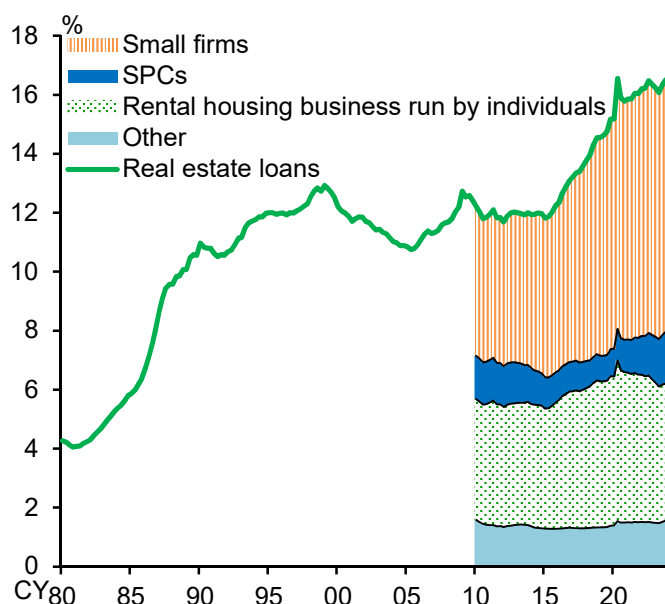
2. (1) shows 4-quarter backward moving averages. The shaded area indicates the recession phases.

3. The data of (2) and (3) for "Share of floating-rate loans" from fiscal 2018 are actual values of major and regional banks; those up to fiscal 2017 are estimated values.

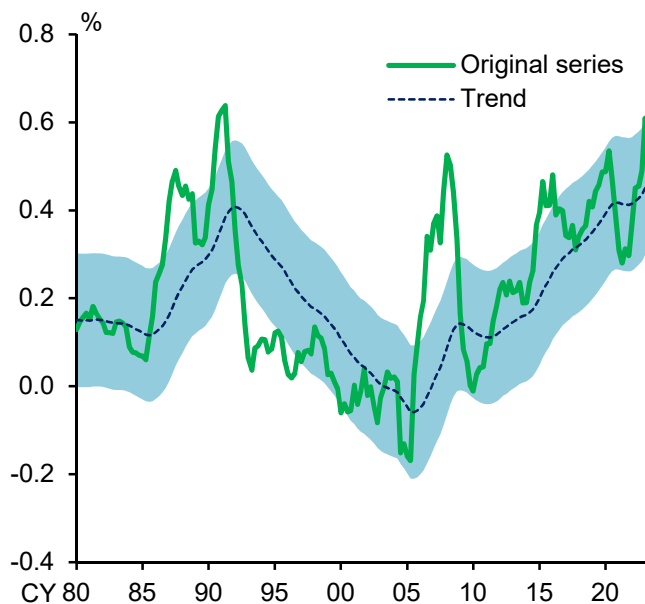
Source: Cabinet Office; Japan Housing Finance Agency; JSDA; Ministry of Finance; Ministry of Land, Infrastructure, Transport and Tourism; BOJ.

## Financial imbalances (3)

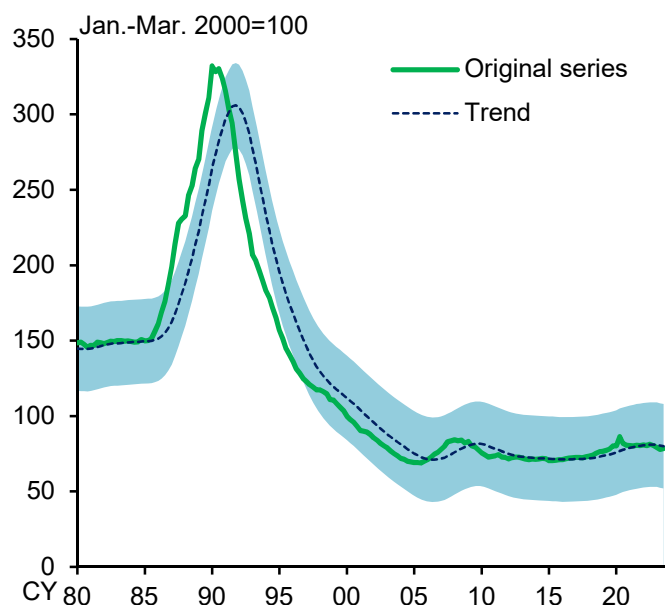
(1) Real estate loans to GDP ratio



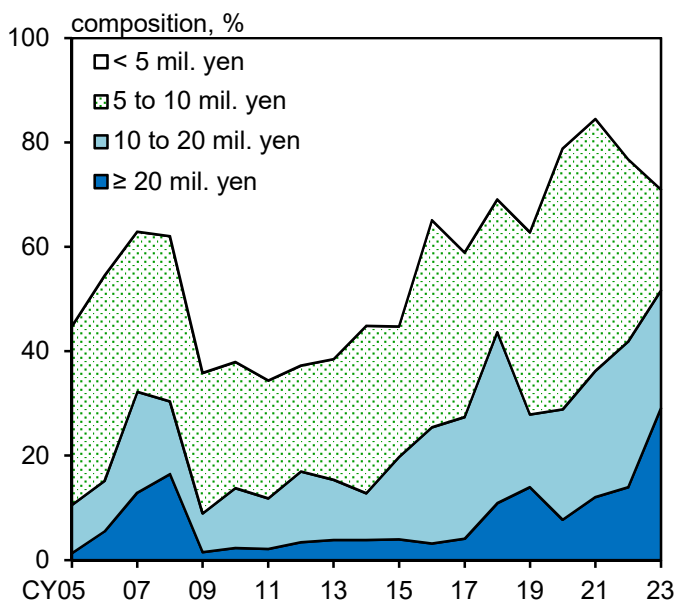
(2) Real estate firms' investment to GDP ratio



(3) Land prices to GDP ratio



(4) Distribution of commercial land transaction prices in central Tokyo



Note: 1. (1) shows 4-quarter backward moving averages. "Small firms" includes J-REITs.

2. "Trend" is calculated using the one-sided HP filter for (2) and 3-year backward moving averages for (3).

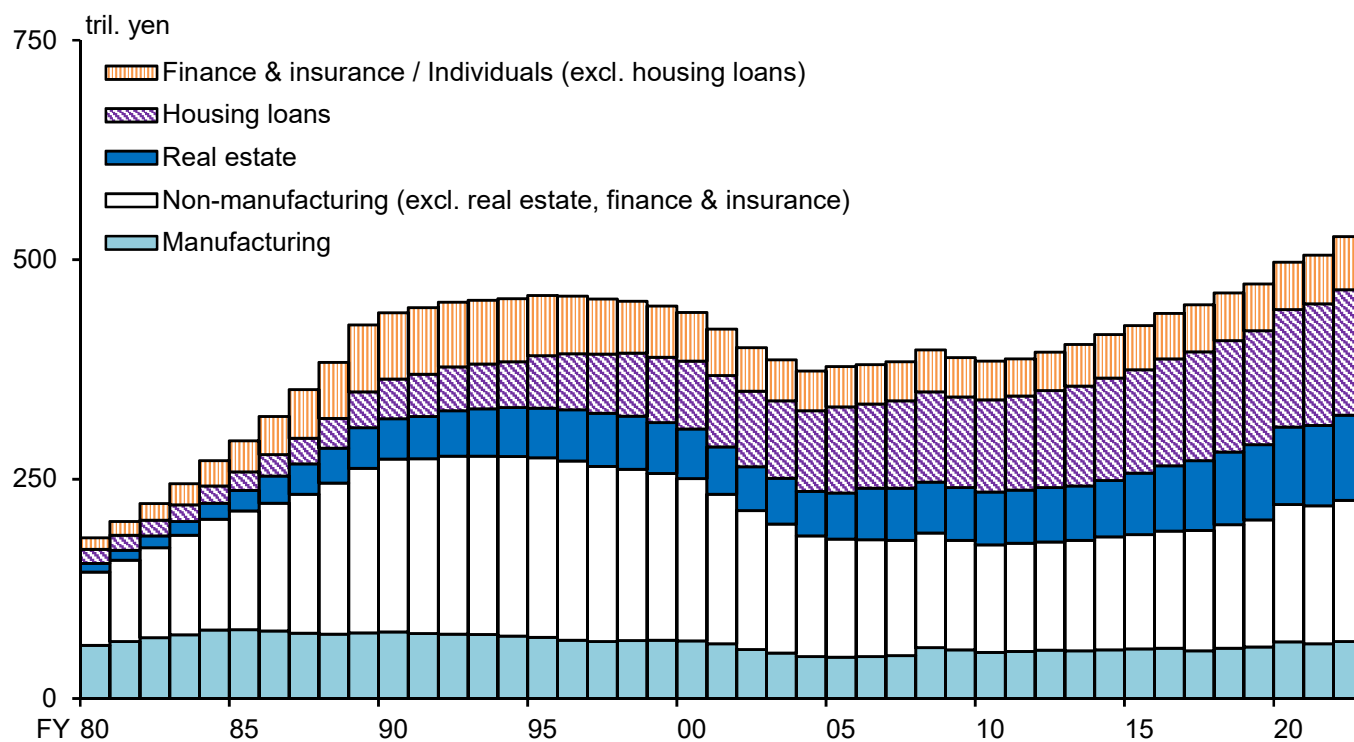
3. The shaded area of (2) and (3) indicates the root mean square of the deviation from the trend.

4. (4) shows the composition of transaction prices per unit of commercial land in the 5 central wards of Tokyo, based on Ministry of Land, Infrastructure, Transport and Tourism, "Real Estate Transaction-price Information."

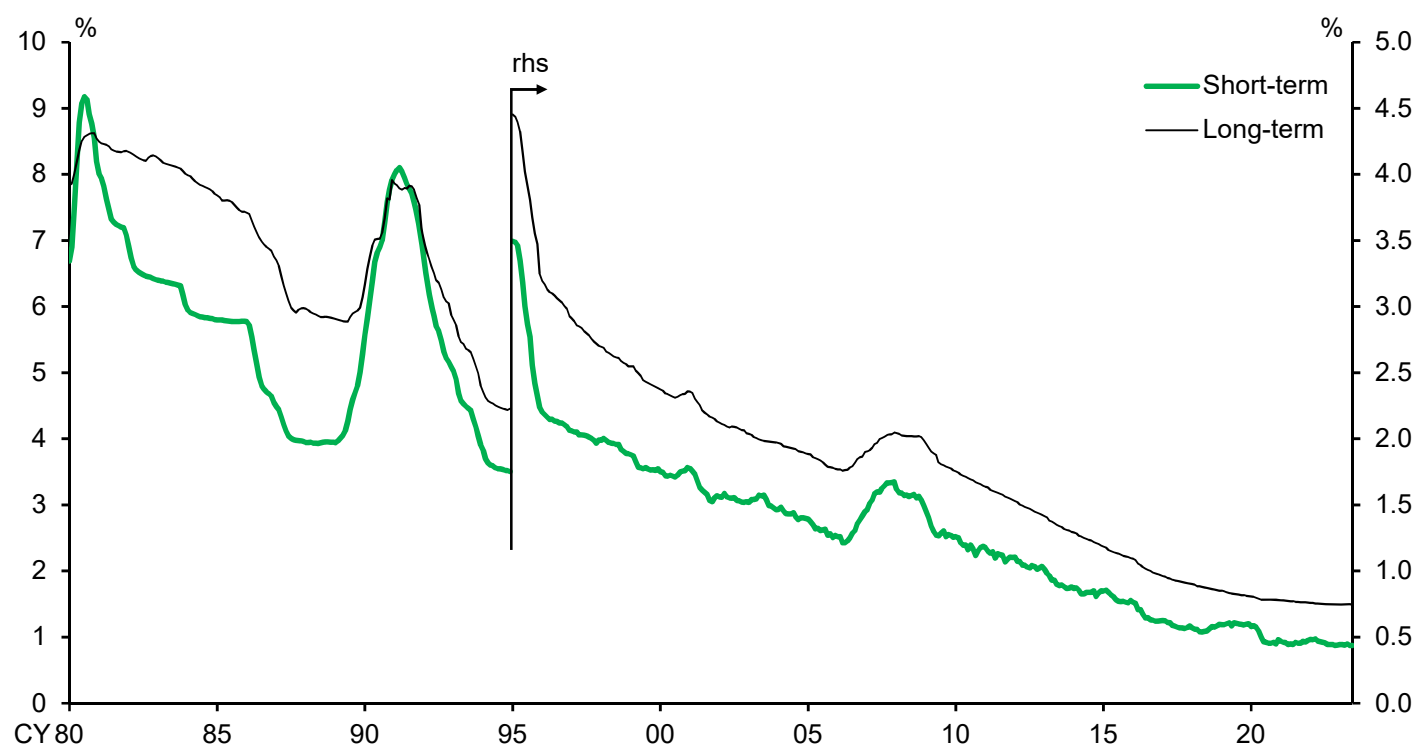
Source: Cabinet Office; Japan Real Estate Institute; Ministry of Finance; Ministry of Land, Infrastructure, Transport and Tourism; BOJ.

## Banks' loans

### (1) Loans outstanding



### (2) Loan interest rates



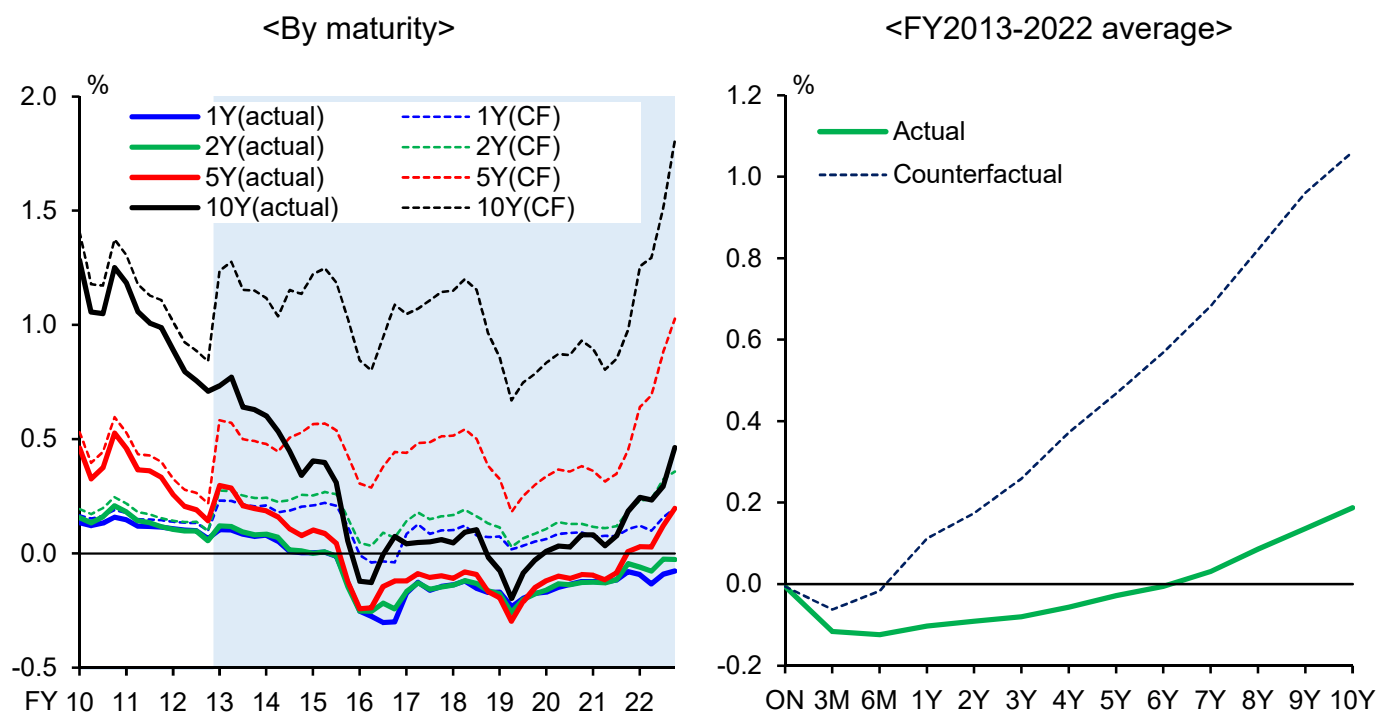
Note: 1. (1) covers domestic branches of domestically licensed banks (banking book).

2. (2) covers the loans and bills discounted of domestically licensed banks.

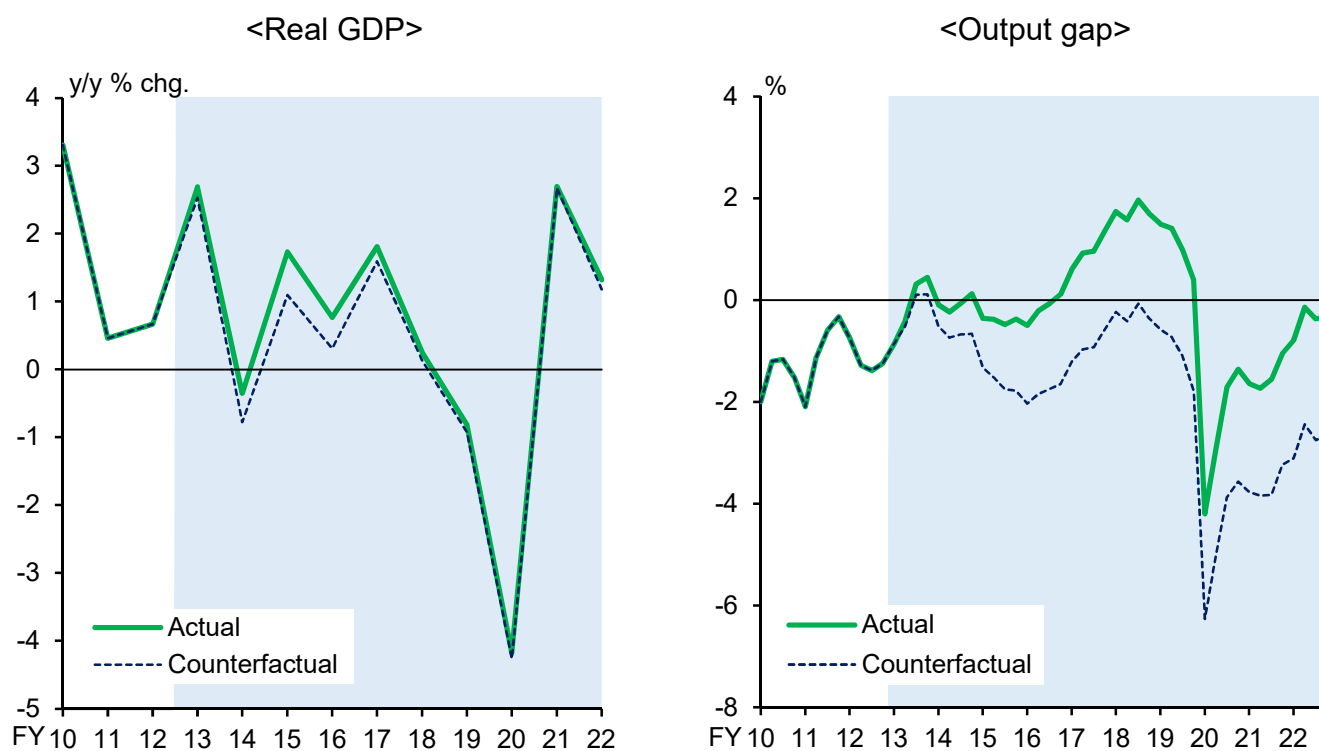
Source: BOJ.

## Counterfactual simulation (1)

### (1) Assumptions on interest rates



### (2) Assumptions on real GDP

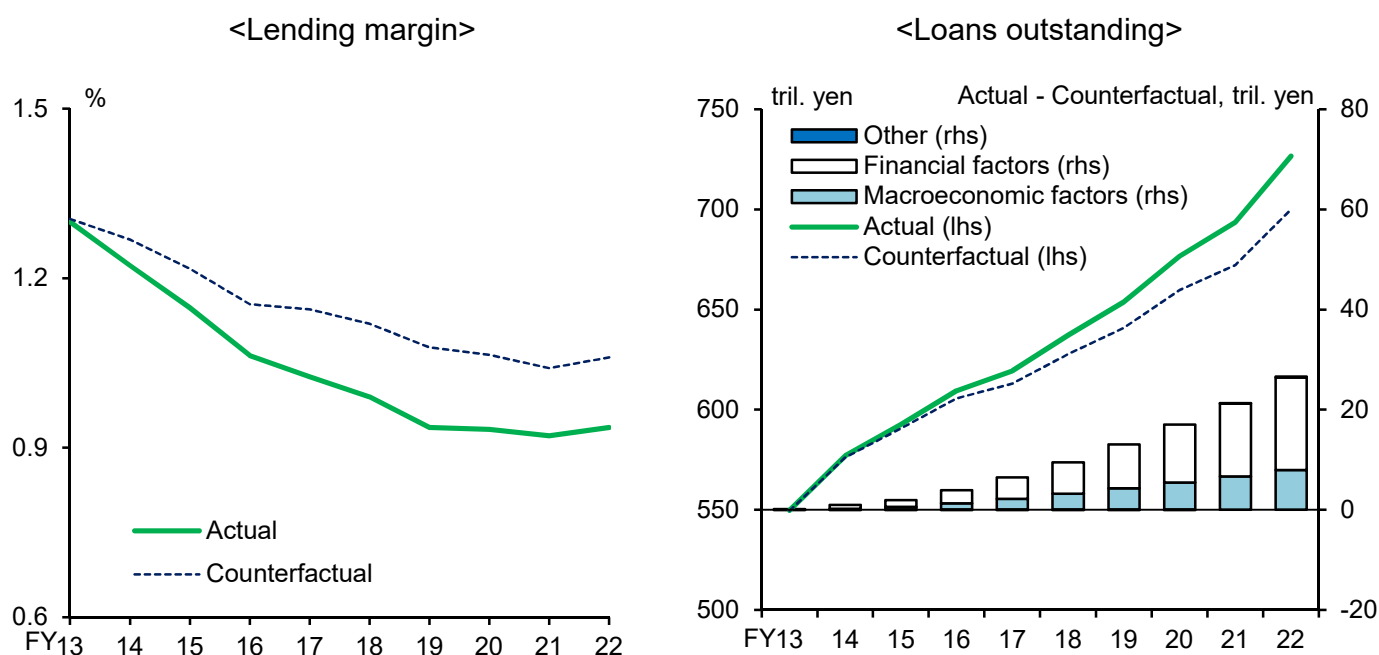


Note: The shaded areas in the charts indicate simulation periods.

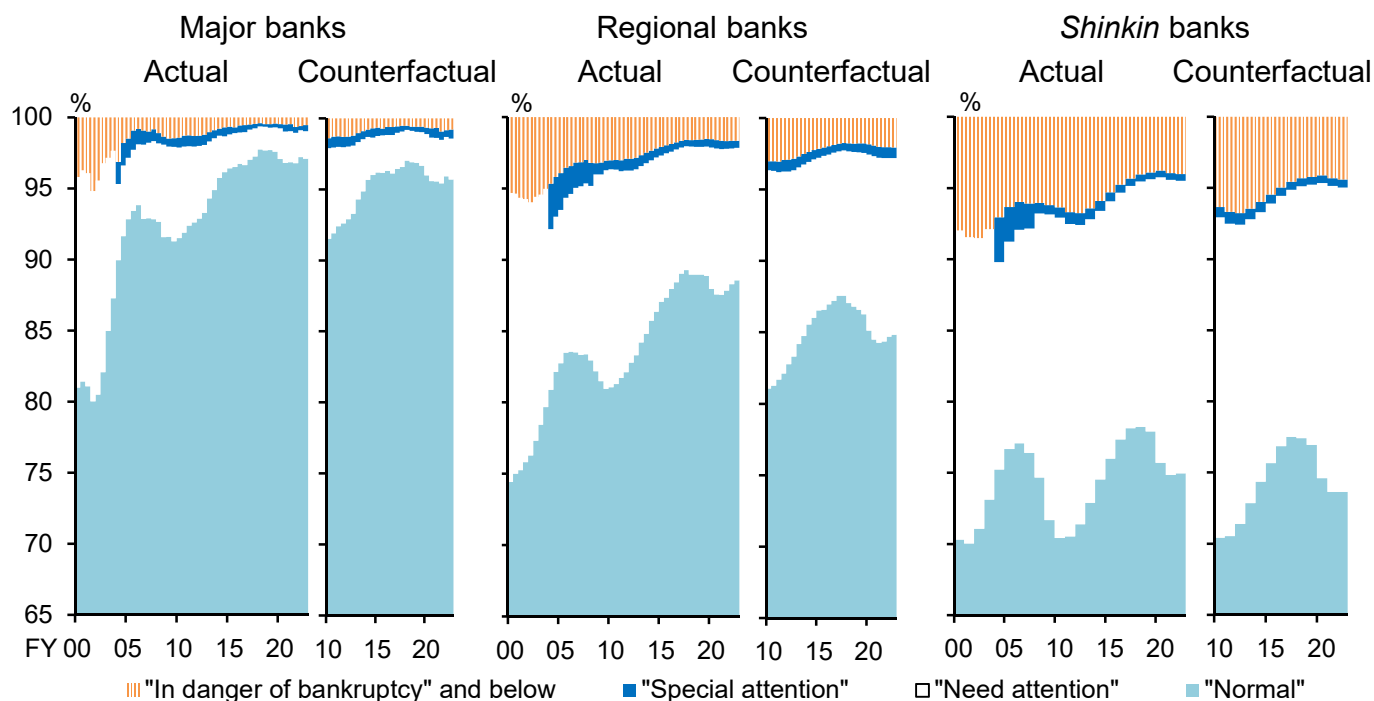
Source: Cabinet Office; Ministry of Finance; BOJ.

## Counterfactual simulation (2)

### (1) Lending margin and loans outstanding



### (2) Borrower classification



Note: 1. In the left-hand chart of (1), lending margin is defined as lending rate minus funding rate.

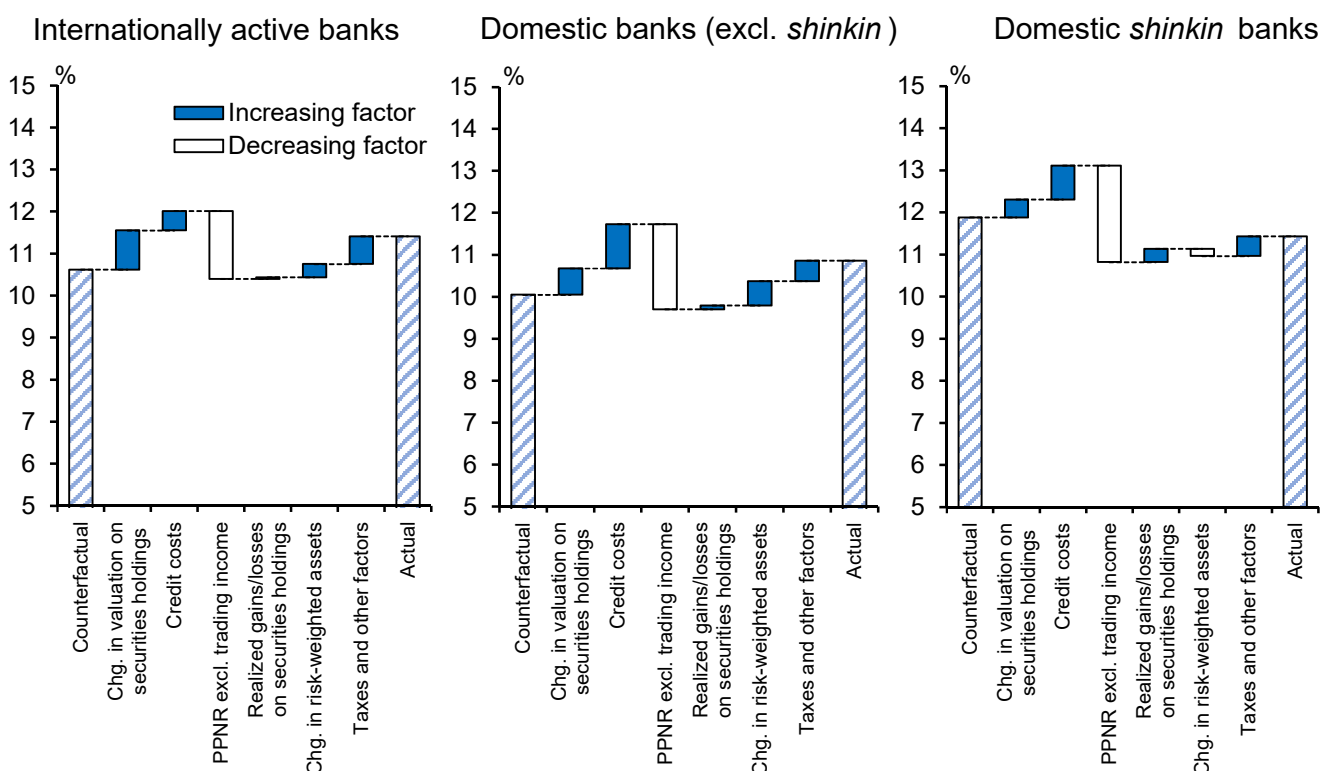
2. The right-hand chart of (1) shows actual and counterfactual loans outstanding and the contribution of each factor to the difference between the actual and counterfactual. "Financial factors" includes the effects of lending rate, land prices, banks' financial conditions, etc. "Macroeconomic factors" includes the effects of output gap, population, etc.

3. "Need attention" in (2) indicates "Need attention excluding special attention" from fiscal 2004.

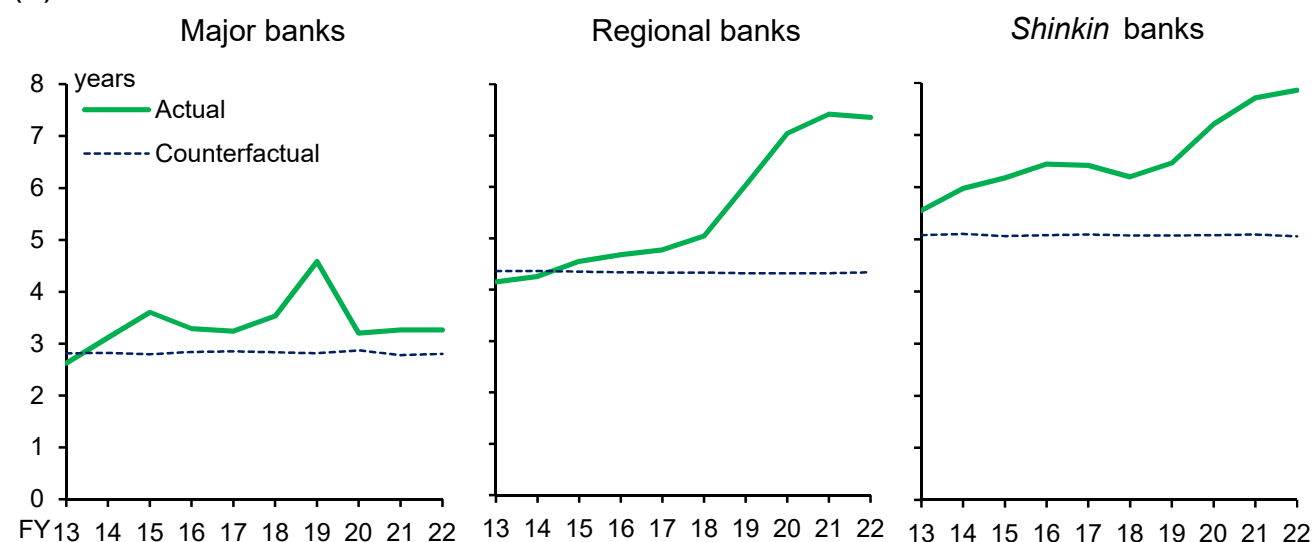
Source: BOJ.

## Counterfactual simulation (3)

### (1) Economic capital ratios



### (2) Duration of bonds



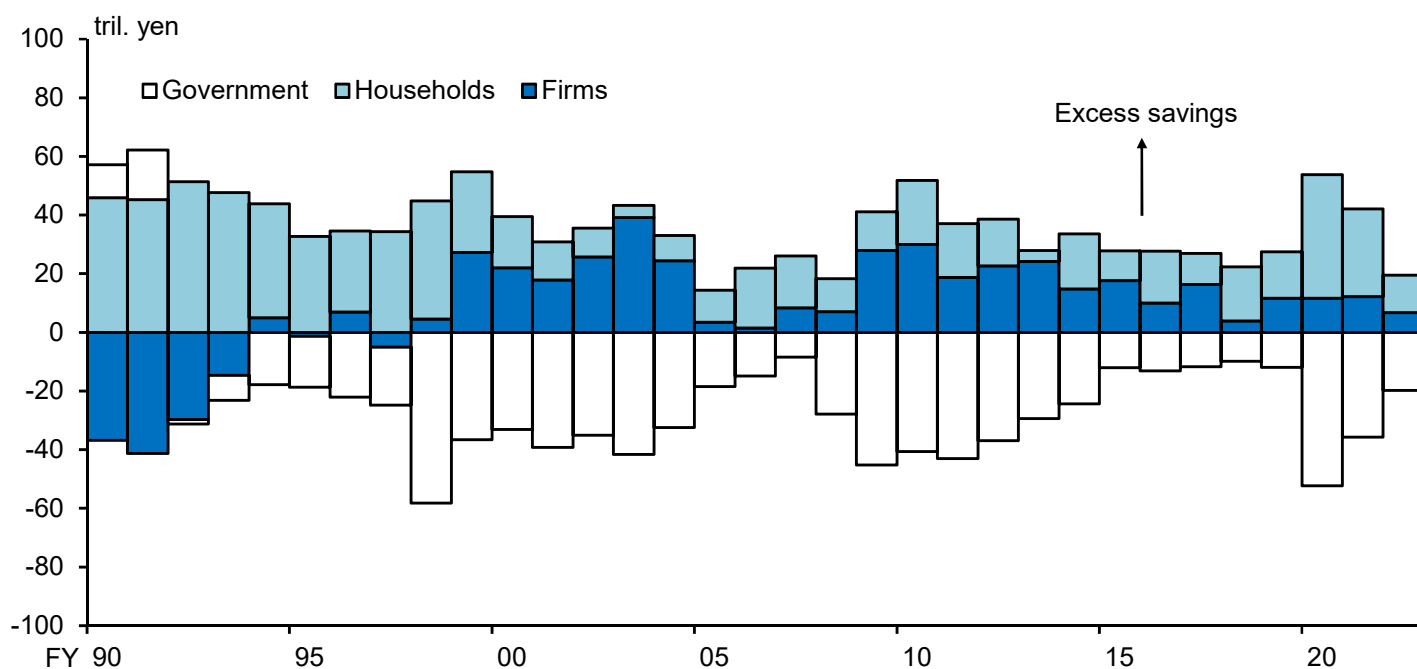
Note: 1. (1) indicates the contribution of each factor to the difference between the economic capital ratios under the counterfactual scenario and the actual economic capital ratios at the end of the simulation period (as of end-fiscal 2022). The left-hand chart shows the CET1 capital ratio of internationally active banks. The middle and right-hand charts show the core capital ratio of domestic banks taking into account the changes in valuation on securities holdings.

2. (2) covers domestic bonds.

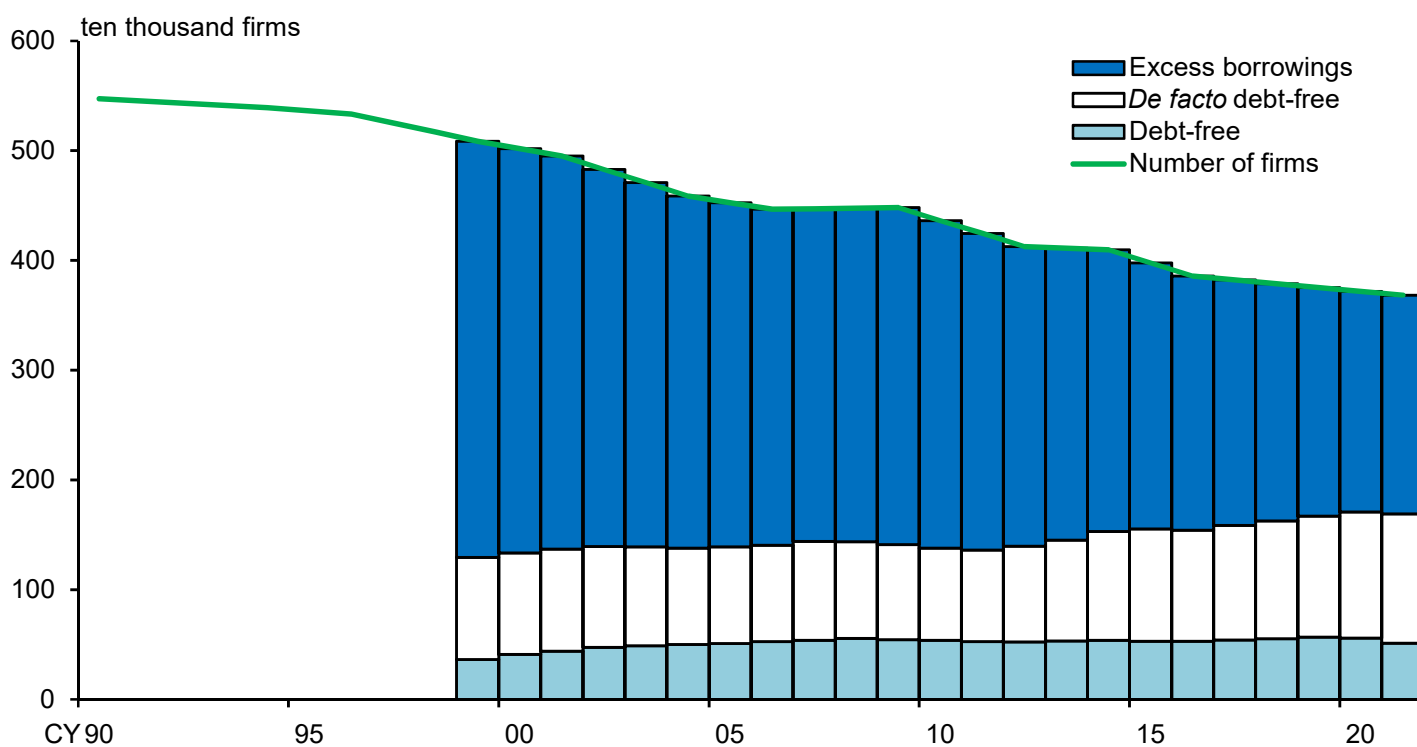
Source: BOJ.

## Structural changes in loan demand

### (1) Savings-investment balance



### (2) Number of firms



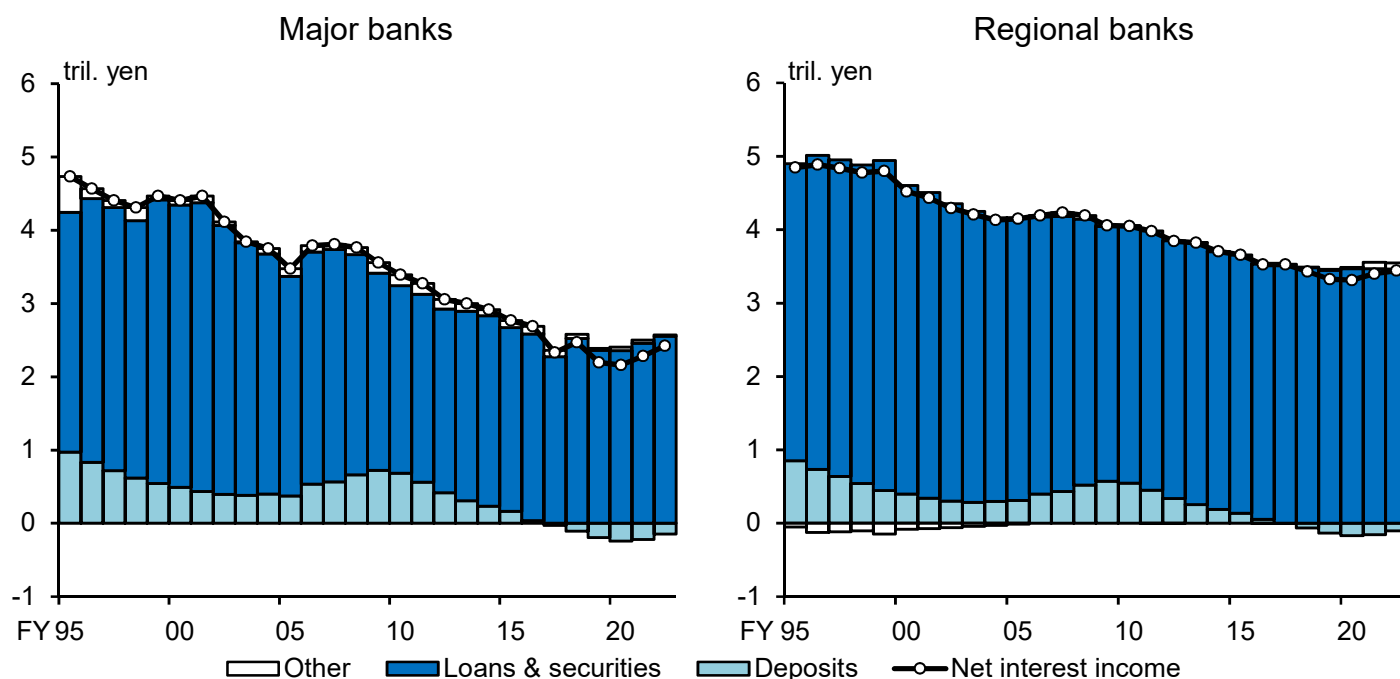
Note: 1. (1) is based on the Flow of Funds Accounts.

2. (2) shows the number of privately owned establishments from the "Economic Census for Business Frame/ Business Activity" ("Establishment and Enterprise Census" up to CY2006, interpolated for years with no data), decomposed using the shares of each group based on data from the Teikoku Databank. Covers privately owned establishments (single unit establishments and head offices).

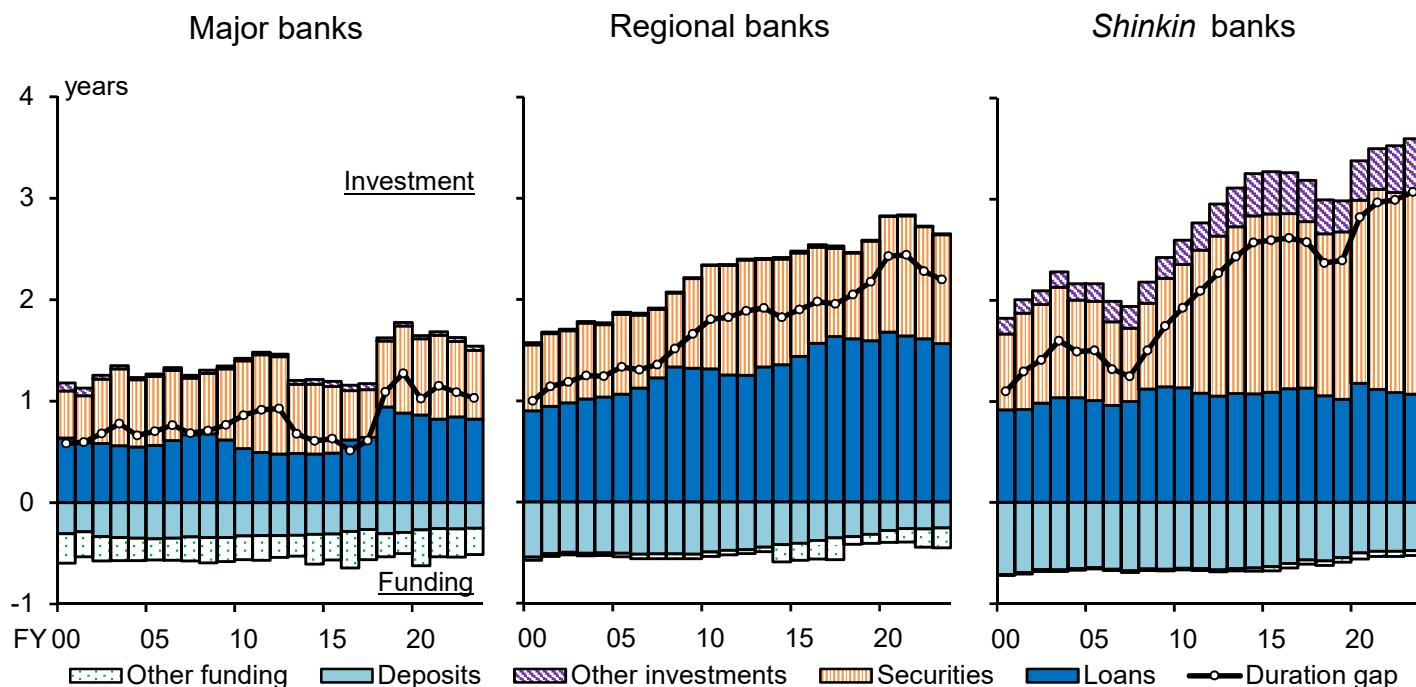
Source: Ministry of Internal Affairs and Communications; Teikoku Databank; The Small and Medium Enterprise Agency; BOJ.

## Banks' interest rate risk (1)

### (1) Net interest income



### (2) Duration gap



Note: 1. (1) covers domestic business. "Deposits" is calculated by subtracting the cost of core deposits (accounting for half of demand deposits) from the income that would be gained if core deposits were invested equally in 1- to 5-year JGBs. "Loans & securities" is calculated by multiplying the interest margins on loans and securities by their respective amounts outstanding ("Deposits" is excluded).

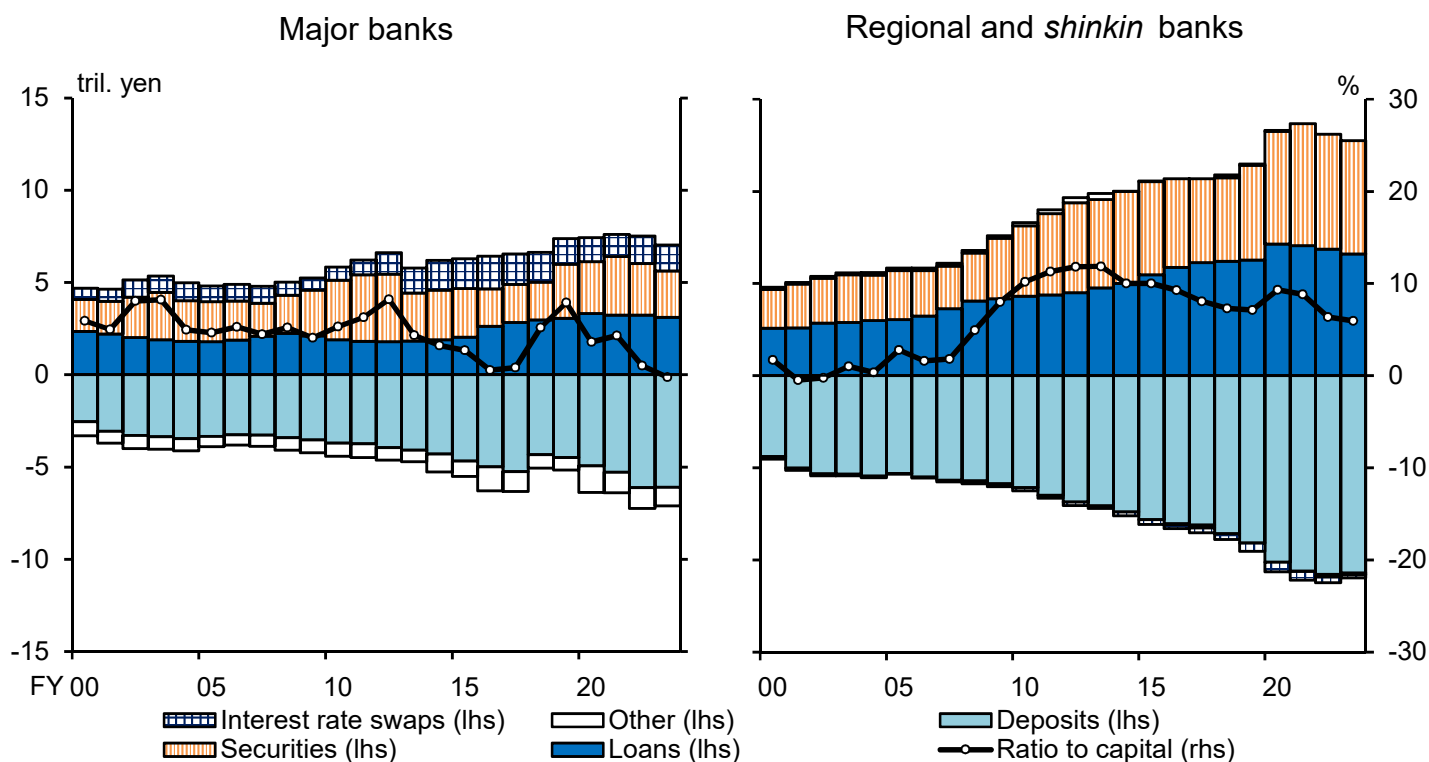
2. (2) does not take into account core deposits. The data for fiscal 2023 are as of end-September 2023.

Source: Ministry of Finance; BOJ.

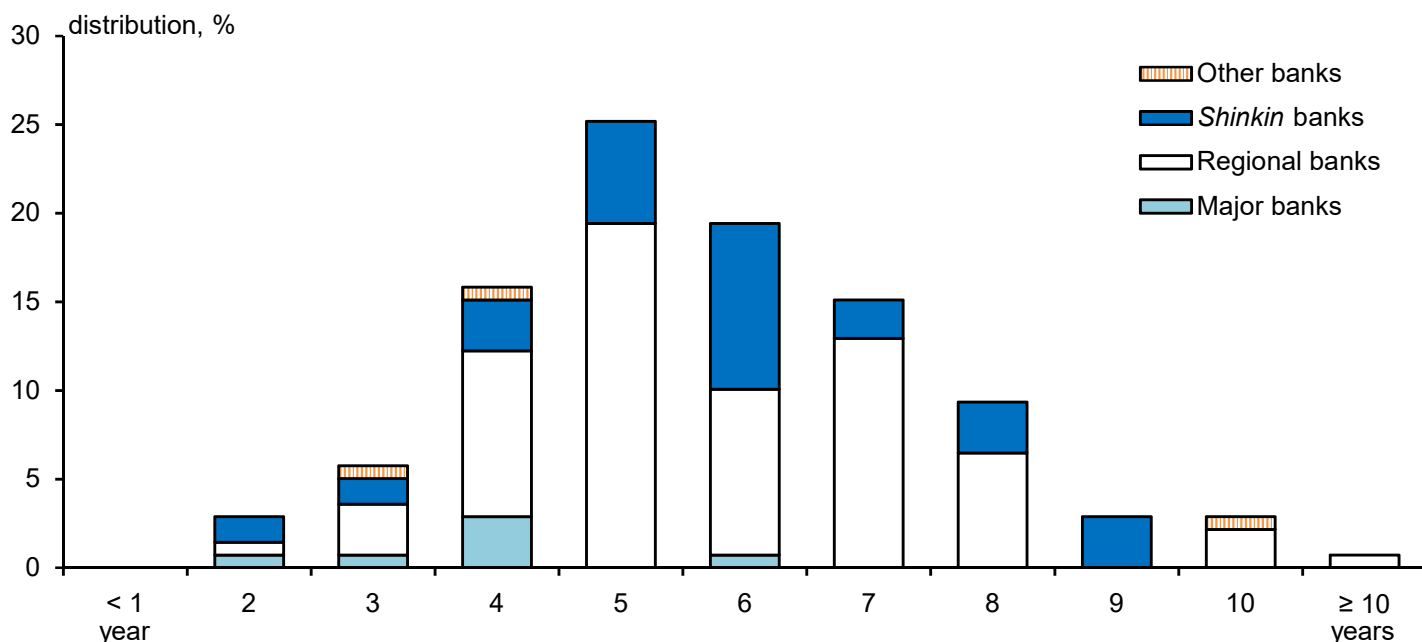


## Banks' interest rate risk (2)

### (1) Interest rate risk in the banking book



### (2) Distribution of the average maturity of core deposits



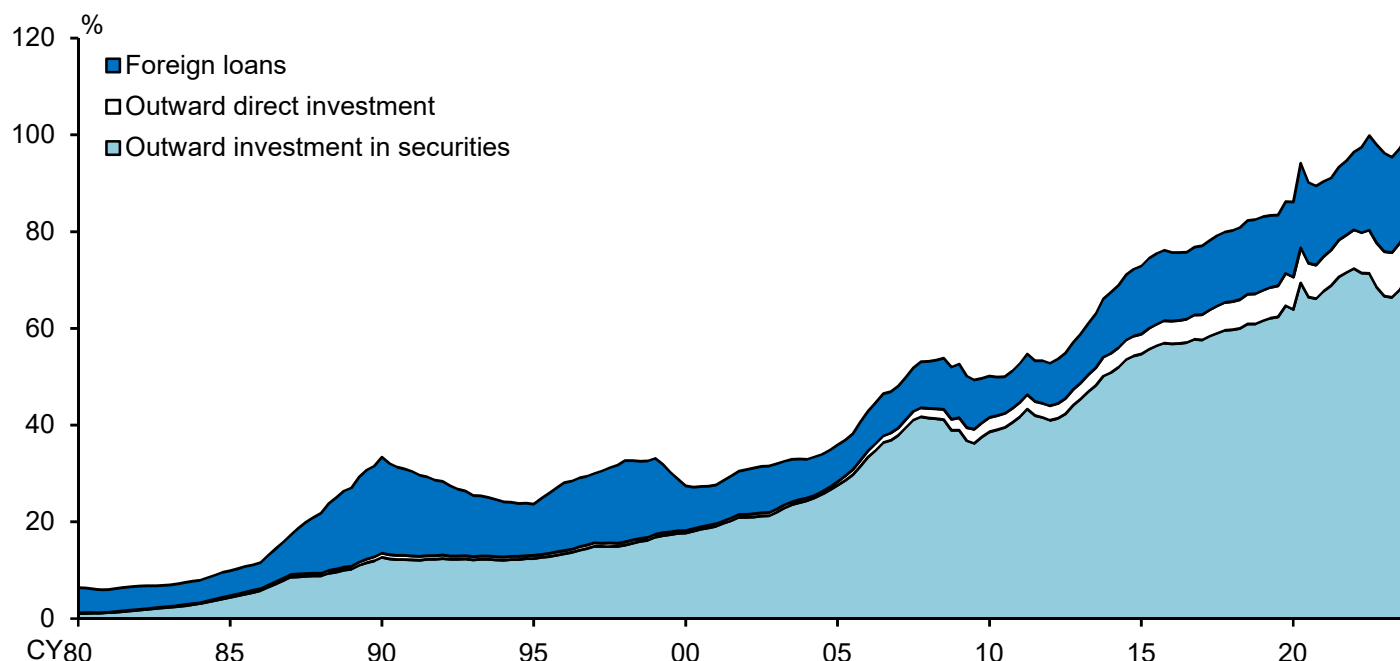
Note: 1. (1) takes into account core deposits (the data for core deposits up to fiscal 2017 are estimated values). "Ratio to capital" is calculated using CET1 capital for internationally active banks from fiscal 2012 onward, core capital for domestic banks from fiscal 2013 onward, and Tier 1 capital for all others (excl. the transitional arrangements). The data for fiscal 2023 are as of end-September 2023.

2. (2) covers banks that use the internal modeling approach. Data as of end-March 2023.

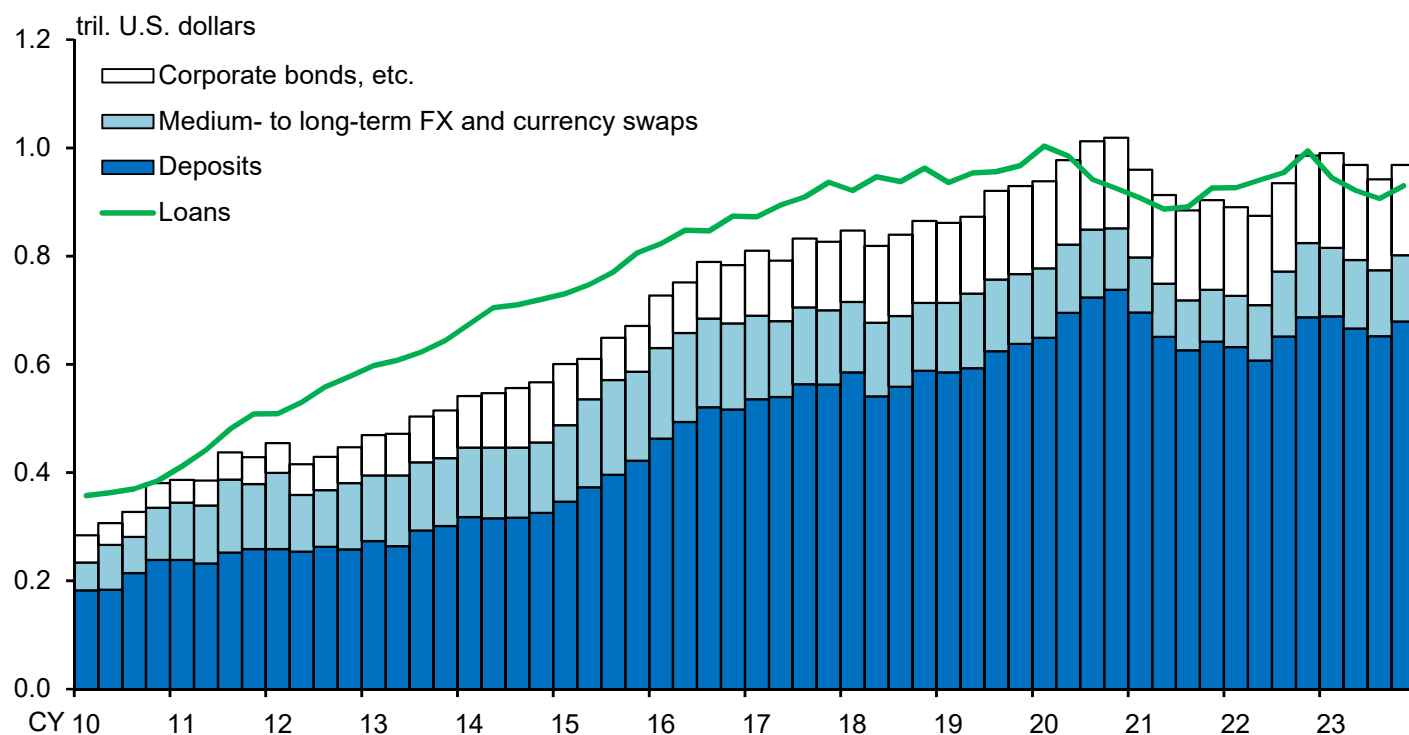
Source: BOJ.

## Banks' interest rate risk (3)

### (1) Foreign currency assets



### (2) Loan-to-funding gap among major banks



Note: 1. (1) shows external credit to GDP ratio. 4-quarter backward moving averages.

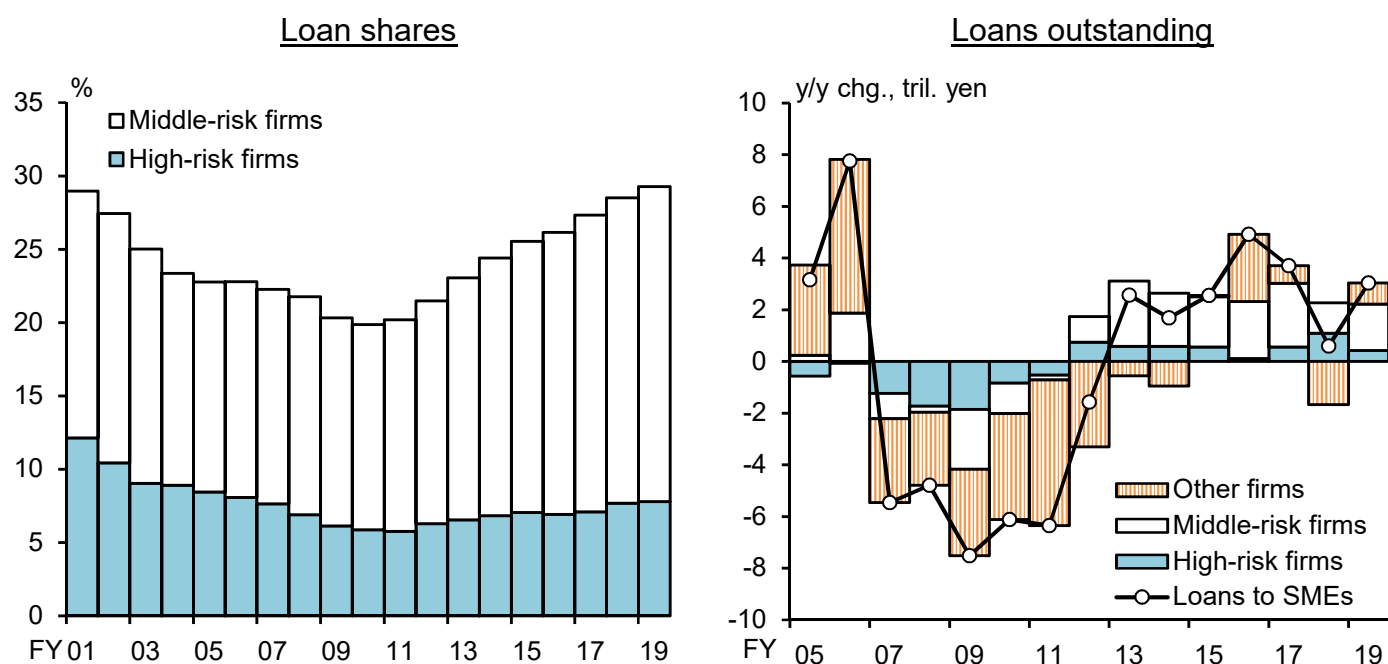
2. "Corporate bonds, etc." and "Medium- to long-term FX and currency swaps" in (2) indicate funding maturing in over 1 year from end-June 2012 onward, with funding maturing in over 3 months prior to that time.

3. (1) covers depository financial institutions and NBFIs. (2) covers internationally active banks.

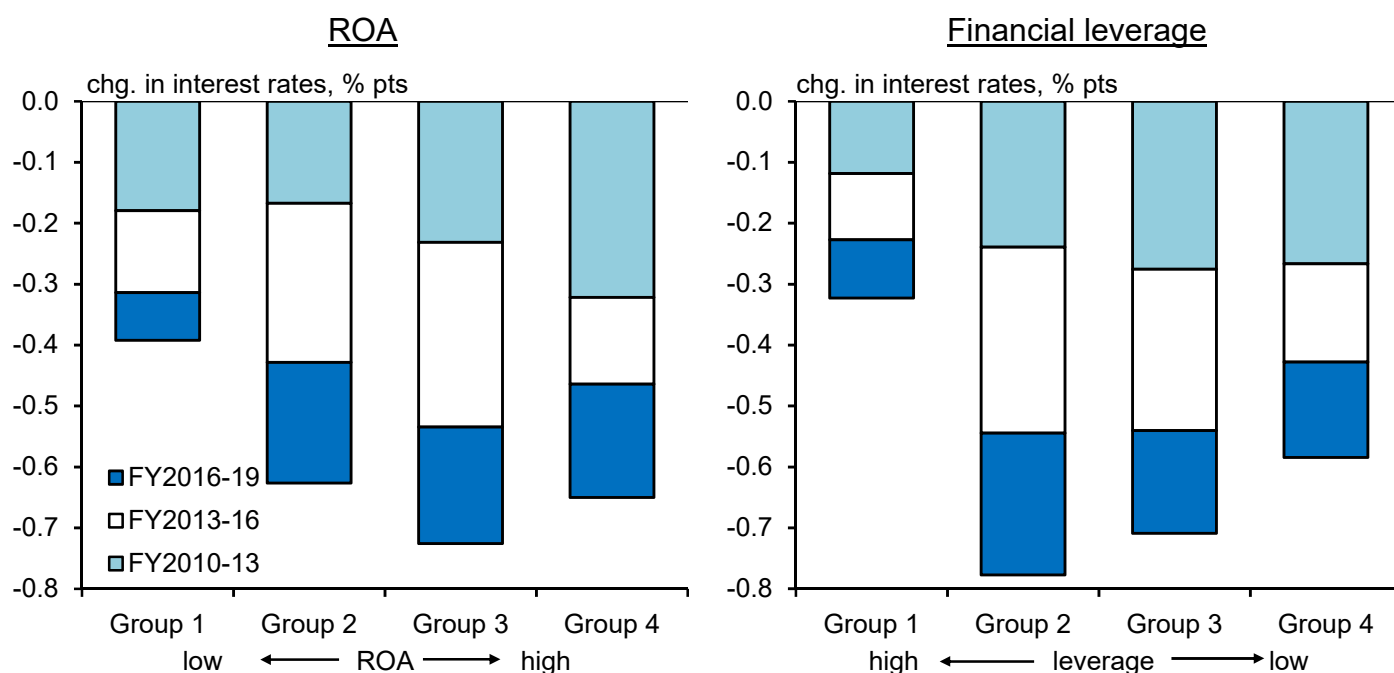
Source: Cabinet Office; BOJ.

## Bank loans to middle-risk firms (1)

### (1) Loans to SMEs



### (2) Declines in loan interest rates by firm characteristic



Note: 1. "High-risk firms" in (1) is low-return borrowers whose ROA fell in the bottom 25% of firms for two consecutive years (for criterion (a) described below), or whose leverage fell in the top 25% for two consecutive years (for criterion (b)). "Middle-risk firms" is the other low-return borrowers. Low-return borrowers are firms that meet one of the following two criteria for two consecutive years:

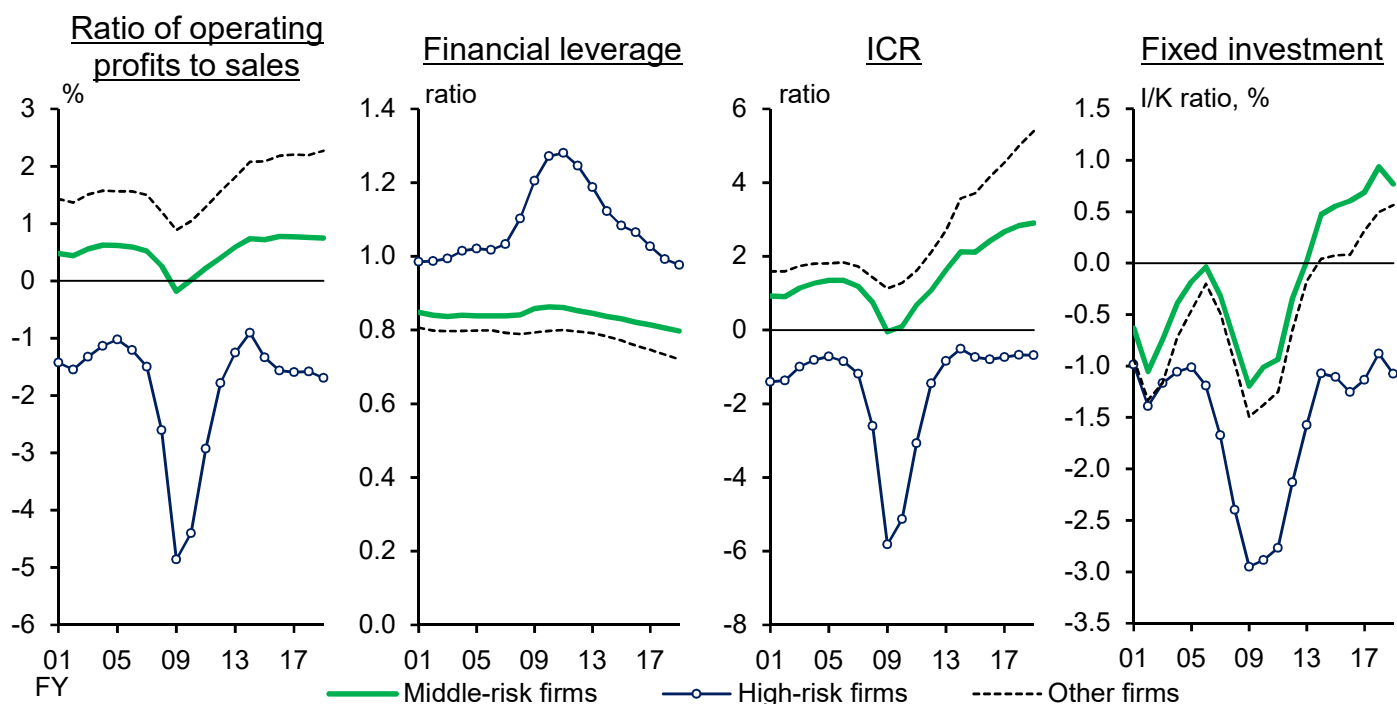
- (a) Operating ROA is below median, but the borrowing interest rate is lower than firms with ROA in the top 10%
- (b) Leverage is above median, but the borrowing interest rate is lower than firms with leverage in the bottom 50%

2. In (2), SMEs are grouped by quartile of their operating ROA and financial leverage, respectively, and the average change in loan interest rates is shown for each group.

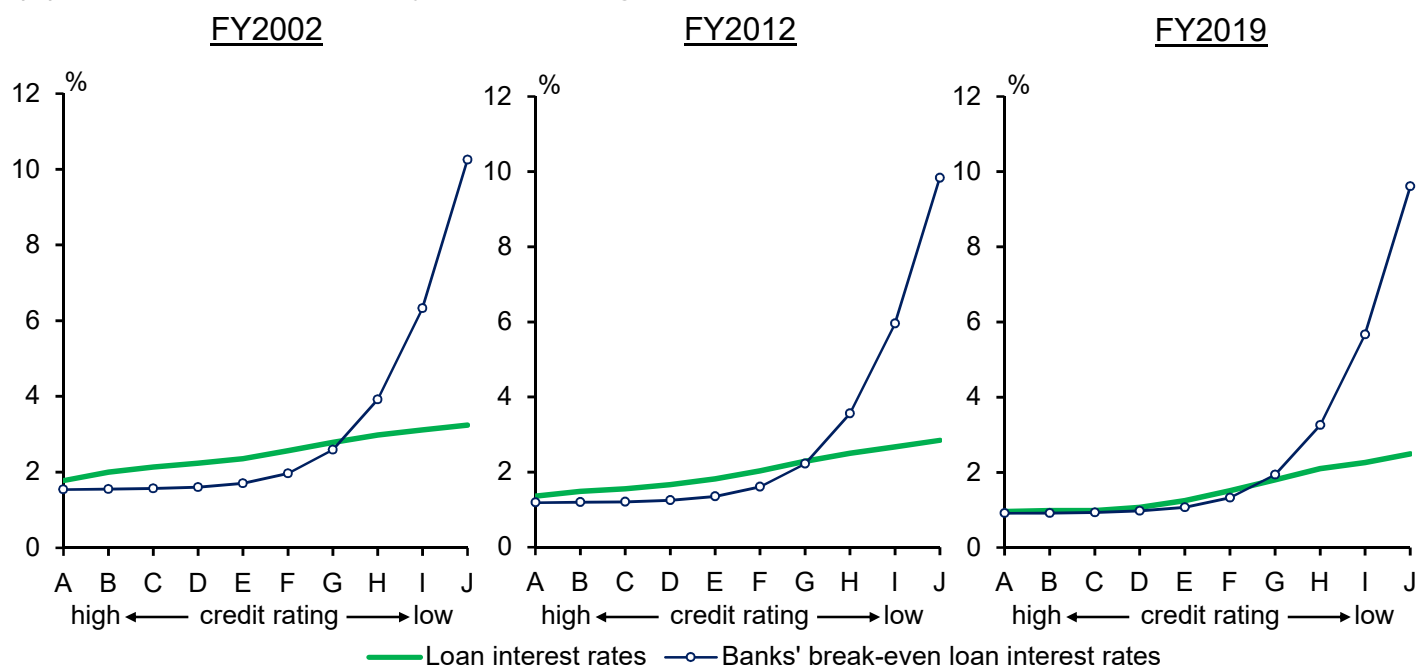
Source: Teikoku Databank; BOJ.

## Bank loans to middle-risk firms (2)

### (1) SME financial indicators



### (2) Loan interest rates by credit rating for loans to SMEs



Note: 1. For (1), financial leverage is the ratio of total debt to total assets. ICR is kinked-ICR, which adjusts for negative values. Investment (I) is calculated as the year-over-year change ( $\Delta K$ ) in fixed assets (K). The medians are shown.

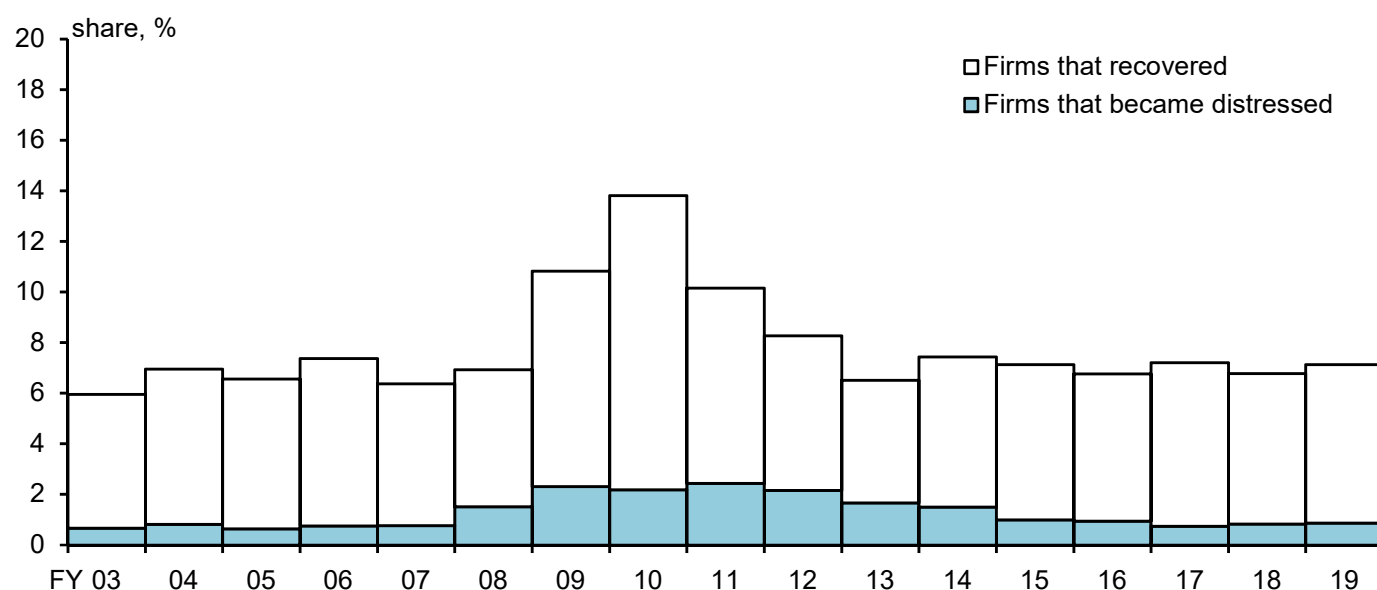
2. For (2), break-even loan interest rate = funding interest rate + overhead cost ratio + credit cost ratio (assuming 50% recovery rate). Credit ratings are credit scores by the CRD Association (0-100) grouped into 10 even intervals. Credit cost ratio is based on the 1-year ahead probability of default calculated by the CRD Association.

3. (1) covers SMEs with capital of less than 100 million yen and employees of 300 or less. (2) covers SMEs with capital of 10 million yen to less than 100 million yen.

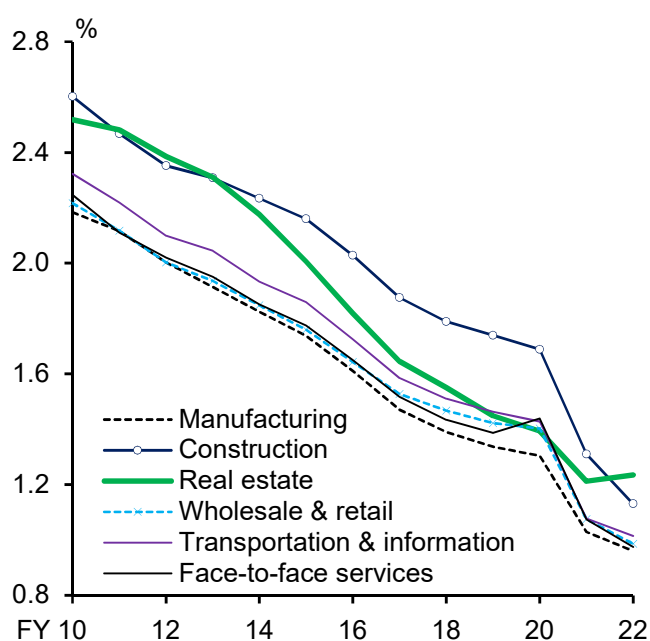
Source: CRD Association; Teikoku Databank; BOJ.

## Bank loans to middle-risk firms (3)

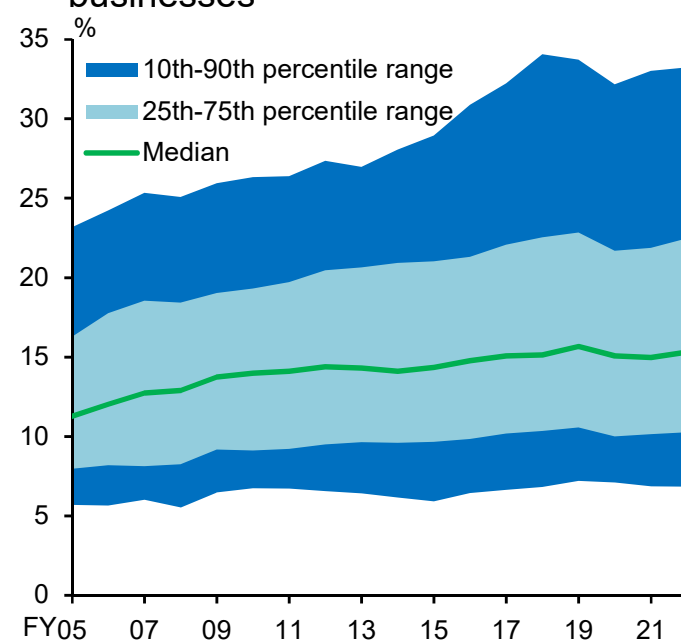
### (1) Firms that became distressed and those that recovered



### (2) Loan interest rates by industry



### (3) Share of loans to real estate businesses



Note: 1. (1) shows the share of "Firms that became distressed" and "Firms that recovered." "Firms that became distressed" indicates middle-risk firms in the previous year that became insolvent and operated at a loss this year. "Firms that recovered" indicates firms that were middle-risk firms 2 years before, but improved their financial conditions and were not classified as low-return borrowers (borrower firms with ROA below the median or financial leverage above the median) for the next 2 years.

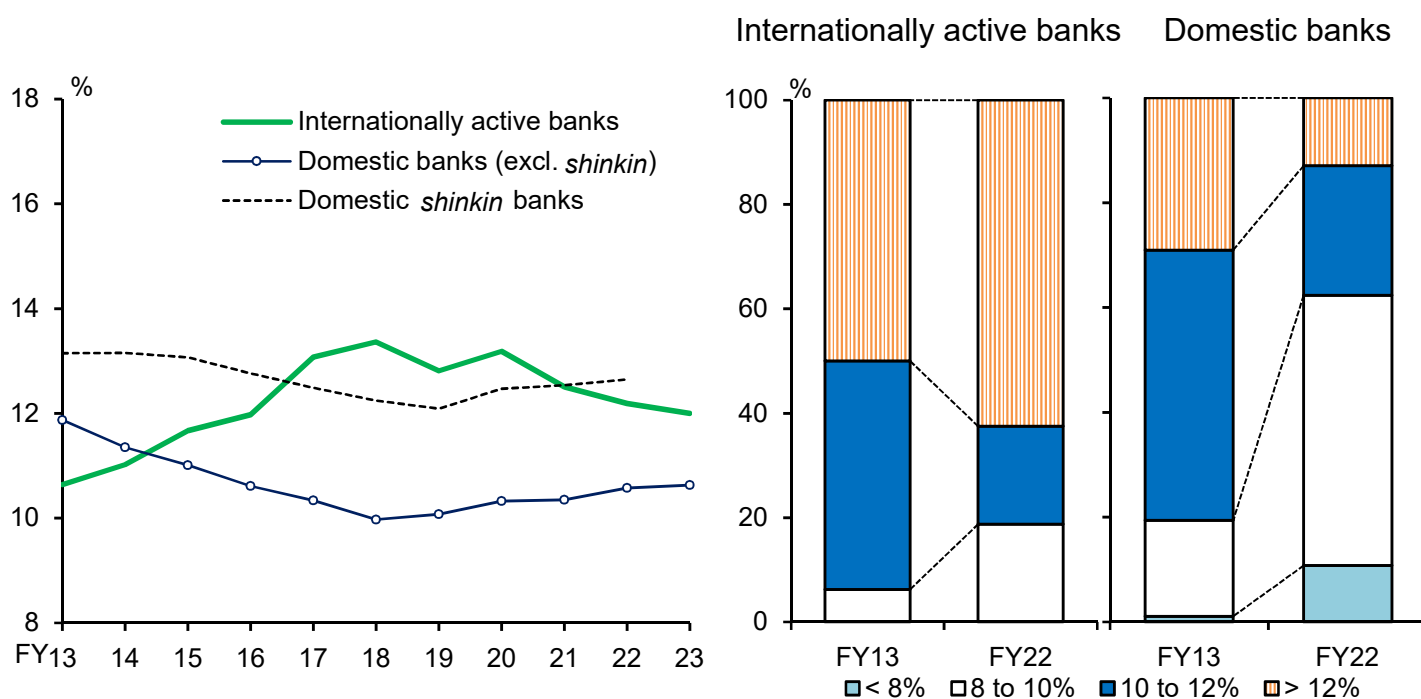
2. Loan interest rates in (2) are interest payment divided by borrowings at the beginning of the year. Covers continuing firms from FY2013 to 2019 (excluding firms with borrowing rates below zero or over 20%).

3. (3) shows the distribution of the ratio of real estate loans to total loans across major, regional, and *shinkin* banks.

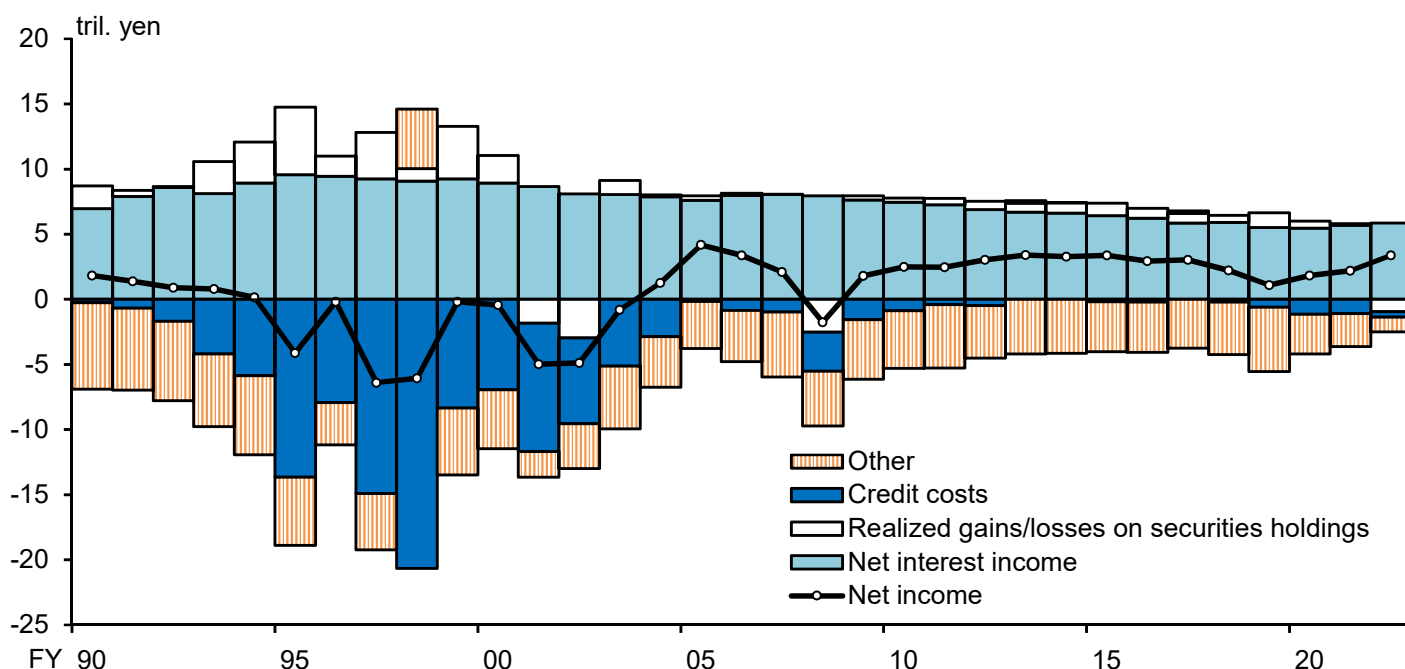
Source: CRD Association; Teikoku Databank; BOJ.

## Banks' loss-absorbing capacity (1)

### (1) Regulatory capital adequacy ratio and its distribution



### (2) Net income



Note: 1. For (1), in principle, the left-hand chart shows the capital ratio on a bank group basis.

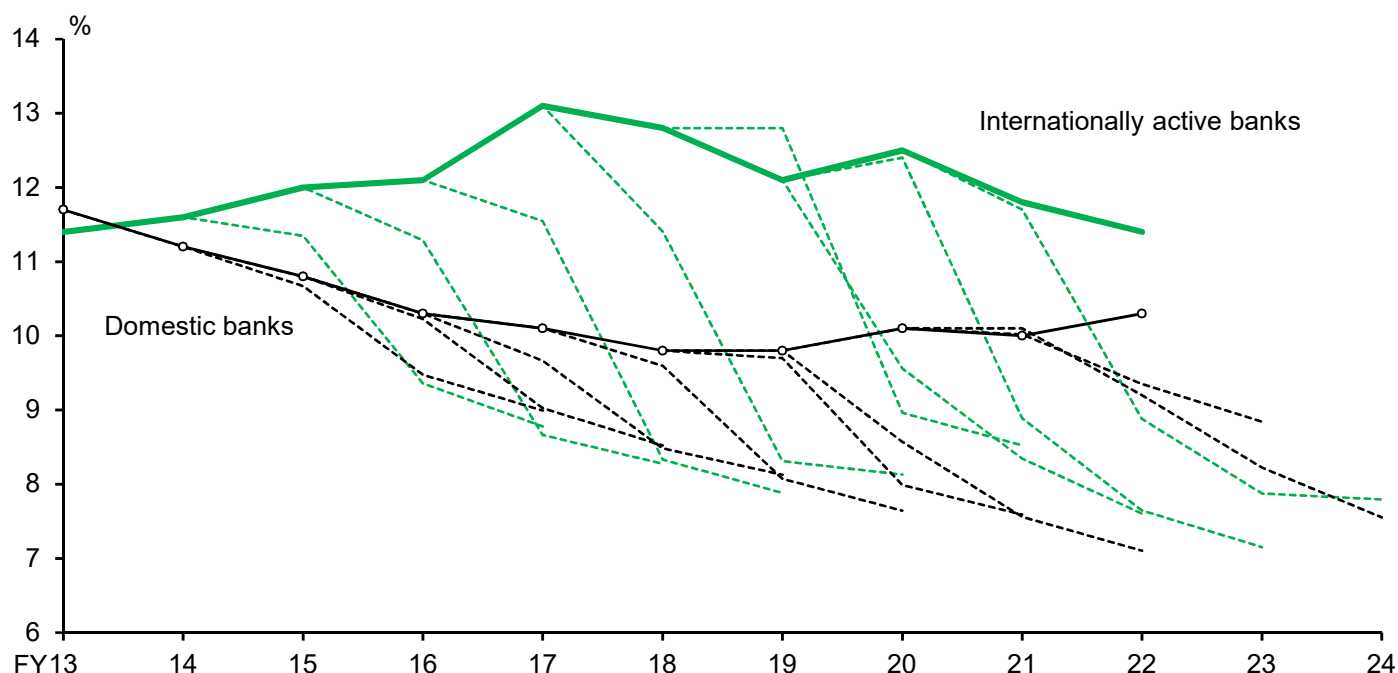
The right-hand charts show the share of banks by the level of capital adequacy ratios. The charts are calculated on a consolidated basis. Capital adequacy ratios are calculated using CET1 capital for internationally active banks and core capital for domestic banks. The transitional arrangements are taken into consideration.

2. (2) covers major and regional banks. "Net interest income" is for domestic business and the rest are for all branches (on a non-consolidated basis).

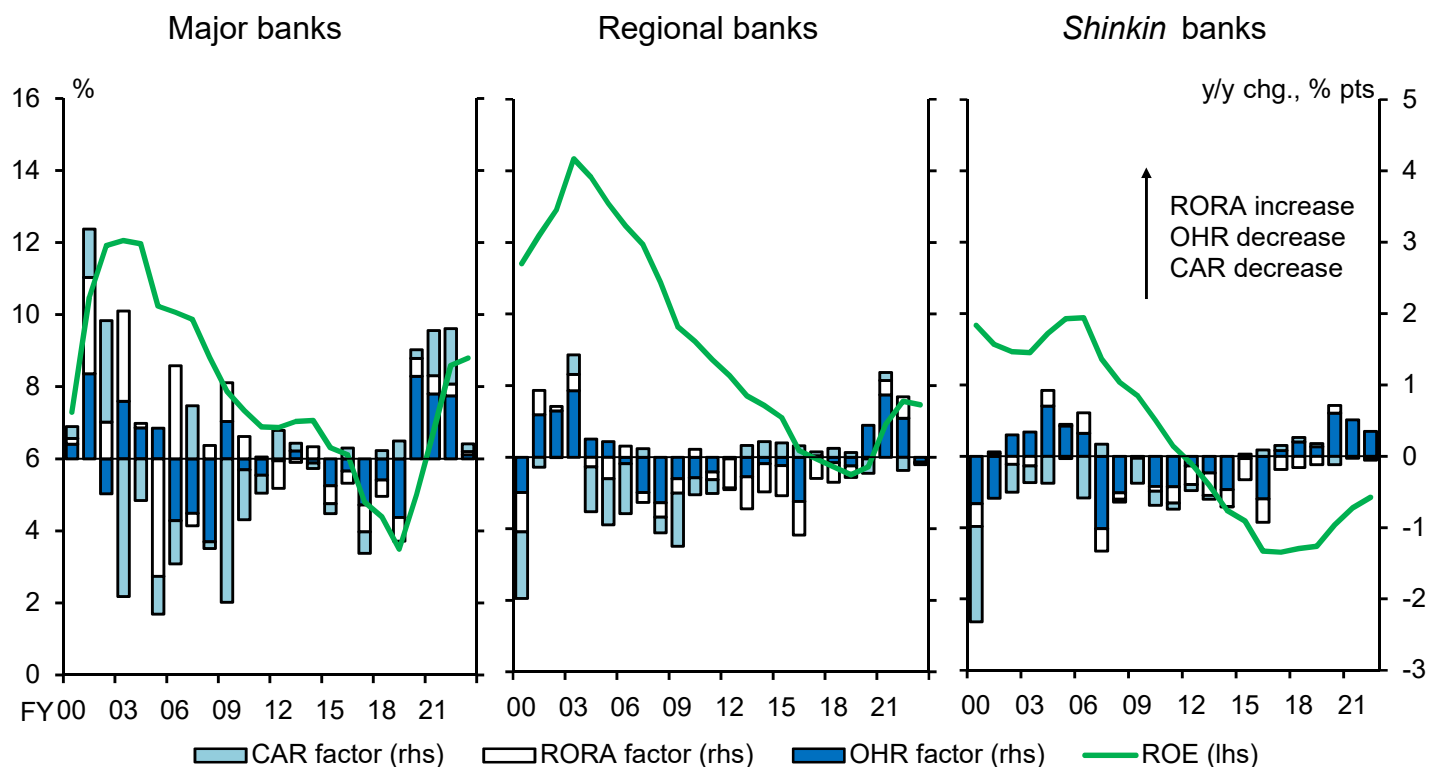
Source: BOJ.

## Banks' loss-absorbing capacity (2)

### (1) Capital adequacy ratios in the results of stress tests



### (2) ROE based on PPNR excluding trading income



Note: 1. The solid lines in (1) indicate actual values and the dotted lines indicate the results of stress tests.

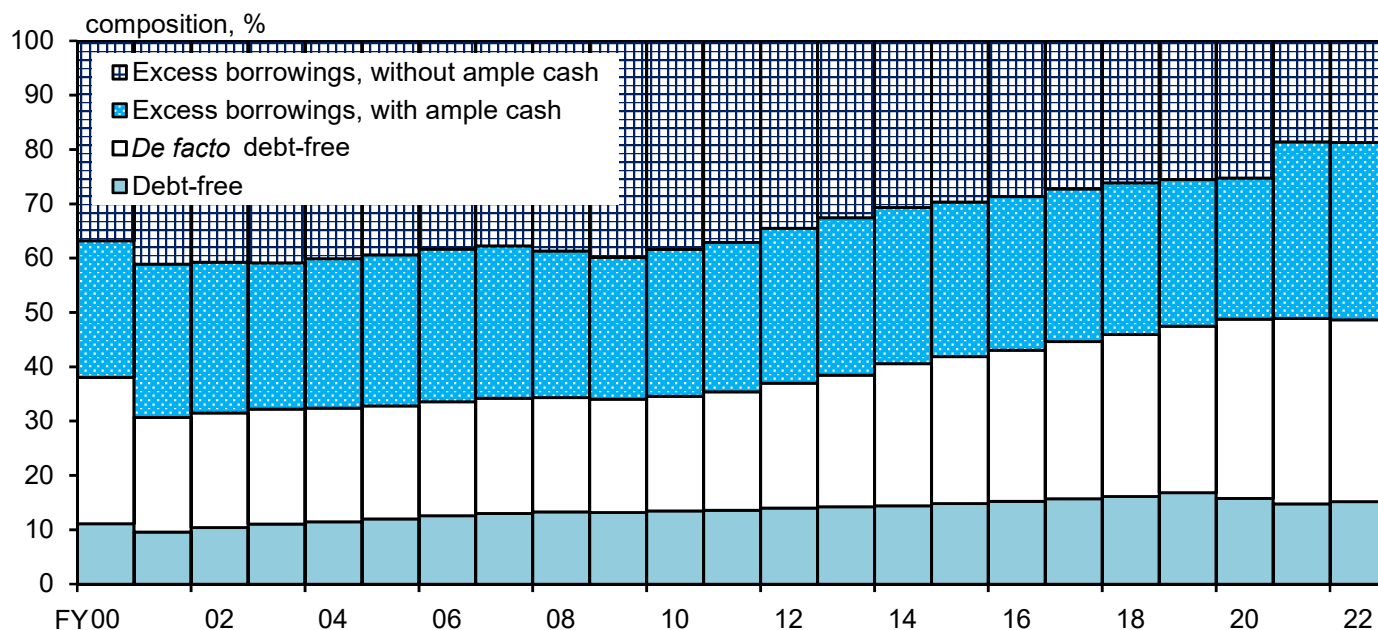
Covers banks. Capital adequacy ratios are calculated using CET1 capital for internationally active banks and core capital for domestic banks.

2. In (2), from fiscal 2012, profits and losses from investment trusts due to cancellations are excluded.

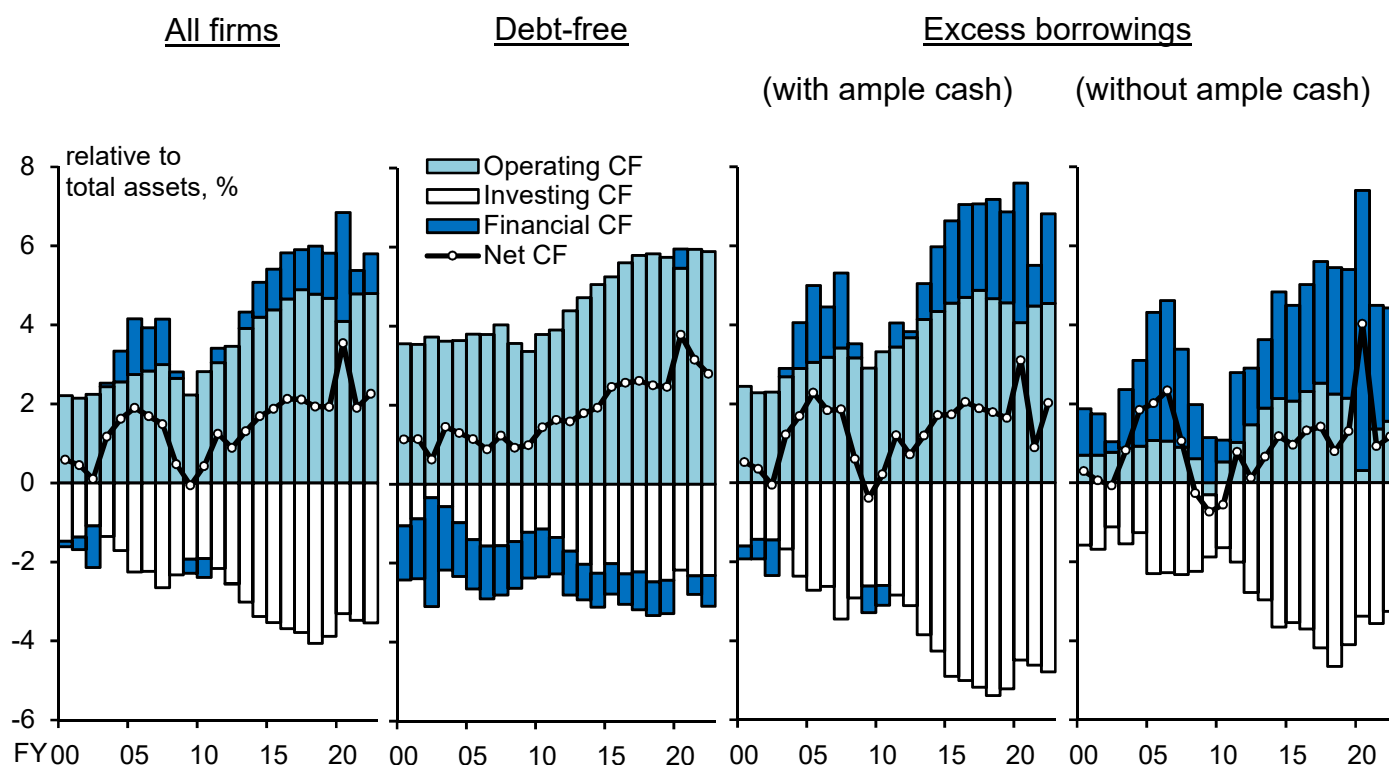
Source: BOJ.

# Heterogeneity in SME financial conditions

## (1) Firm composition



## (2) Cash flow



Note: 1. (1) covers SMEs with capital of 10 million yen to less than 100 million yen. "Excess borrowings" is firms with more interest-bearing debt than cash and deposits.

2. (2) covers SMEs with capital of 10 million yen to less than 100 million yen. "Debt-free" includes *de facto* debt-free firms. "Excess borrowings" is firms with more interest-bearing debt than cash and deposits. "Operating CF" is the sum of net income and depreciation. "Investing CF" is the sum of change in fixed assets, depreciation, and change in securities holdings, multiplied by (-1). "Financial CF" is the change in interest-bearing debt.

Source: Teikoku Databank.