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Financial Stability Report

2023. 6



BANK OF KOREA

Bank of Korea Mid- and Long-term Strategic Plan (BOK 2030)

- **Vision** **Bank of Korea**
 : Taking the lead in stabilizing and developing the national economy

- **Strategic** **Agility** Pursue Innovation in a Flexible and Swift Manner
Directions **Collaboration** Bolster Synergy Through Collaboration
 Expertise Reinforce Policy and Research Capability

BANK OF KOREA

Financial Stability Report

2023. 6

This Financial Stability Report is published in accordance with the provisions of Article 96 of the Bank of Korea Act, and upon the resolution of the Monetary Policy Board.

June 2023



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Governor
Bank of Korea

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Financial stability refers to a condition in which the financial system works smoothly with all of its key components satisfactorily performing their roles: financial institutions carrying out their financial intermediary functions, market participants maintaining a high level of confidence in the financial market, and the financial infrastructure being well developed.

Financial stability is regarded as one of the policy goals that must be achieved, together with price stability and economic growth, for a sustainable economic development. Policy authorities around the world thus devote great efforts to achieving financial stability.

As part of its conduct of macroprudential policies, the Bank of Korea has been publishing the Financial Stability Report on a biannual basis since 2003, analyzing and assessing the potential risks inherent in the Korean financial system and suggesting related policy challenges.

Notably, under the revised Bank of Korea Act of 2011 (Article 96), the Bank of Korea is obliged to draw up a Financial Stability Report and submit it to the Korean National Assembly at least two times each year.

The Bank of Korea is devoting its best efforts to qualitative improvement of the Financial Stability Report. This report takes the potential risks to financial stability highlighted until May 2023 as the objects of its analysis.

It is hoped that this Financial Stability Report will help financial market participants, regulators and policymakers to recognize the risk factors inherent in the financial system at an early stage, and deal with them appropriately.

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Report file users

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[Bank of Korea>Financial Stability>Financial Stability>Financial Stability Reports](#)

Report booklet users

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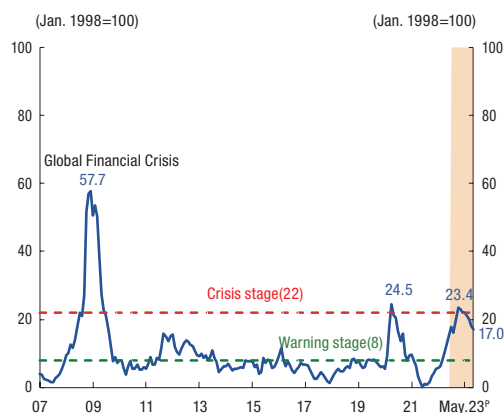
Executive Summary

Financial Stability Situation and Risk Assessment

1. Financial Stability Situation

Despite global banking turmoil during the first half of the year, Korea's financial system has remained stable, overall. The financial market maintained its stability with a decline in interest rates and an increase in stock prices. This was driven by expectations concerning the pace of adjustment in monetary tightening in major economies. The financial intermediation function of Korea's financial system operated smoothly, supported by sound loss absorbing capacity at financial institutions. However, the economic growth rate is slowing due to a range of factors, such as a trade deficit, and financial soundness among households and corporations has deteriorated, especially in vulnerable sectors. The Financial Stress Index (FSI), which reflects the level of short-term instability in the financial system, temporarily rose to the "crisis" stage (23.4) in October 2022 due to the Legoland-related incident, but has continued to decline since then, falling to the mere "warning" stage by February this year.

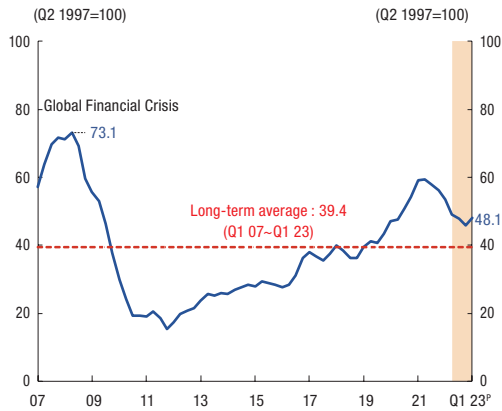
Financial Stress Index (FSI)



Source: Bank of Korea.

Potential vulnerabilities in the financial system have remained high. Until the second half of last year, accumulated financial imbalances appeared to be shrinking, as the growth of household debt slowed and as asset prices, such as stocks and real estate, declined due to the Base Rate hikes and a weakened risk preference among economic agents. This year, however, influenced by expectations of an easing of domestic and international monetary policy tightening, stock prices have risen, the decline in real estate prices has narrowed, and household loans have been increasing again since April, limiting the reduction of accumulated financial imbalances. Against this background, the Financial Vulnerability Index (FVI), which shows overall vulnerabilities in the financial system from a medium- to long-term perspective, has slightly increased this year.

Financial Vulnerability Index (FVI)



Source: Bank of Korea.

2. Financial Stability Situation by Sector

In the credit market, the rate of private credit growth slowed modestly, particularly in household debt, and the private credit-to-nominal GDP ratio declined slightly, but remained high. Meanwhile, since April 2023, the sluggishness in the housing market has been eased and housing-related household loans have been on the rise again, so it is necessary to closely monitor the possibility that financial imbalances will expand again. In addition, the delinquency rate on household and corporate debt is rising, and if high interest rates continue and if the economic recovery is delayed, it will be necessary to pay attention to the possibility that insolvencies could expand mainly among vulnerable borrowers, self-employed business owners, and marginal companies.

In asset markets, there had been heightened volatility in stock and bond prices caused by

global banking uncertainties. However, they increased significantly as expectations regarding domestic and international monetary tightening changed. Credit spreads on corporate bonds significantly narrowed as credit risk aversion was alleviated with the government's market stabilization measures. The level of housing price remains high compared to economic fundamentals, and the decline in housing prices has slowed this year. Price volatility could be amplified in response to changes in domestic and international financial and economic conditions, such as the pace of monetary tightening in major countries and real estate market policies.

With regard to financial institutions, asset growth slowed and asset soundness deteriorated. Asset growth slowed at banks due to alleviated lending growth and also at non-bank financial institutions (NBFIs) owing to a decrease in investor deposits at securities firms and to the effect of the implementation of new accounting standards for insurance companies. Asset soundness worsened across all financial sectors, affected largely by rising lending rates. Asset quality might deteriorate further as higher rates are gradually applied and as financial support measures for households and corporations are normalized.

As for capital flows, foreigners' domestic portfolio investment, both stocks and bonds, recorded a net inflow, but attention should be paid to the possibility of increased capital flow volatility depending on the occurrence of credit events at home and abroad, and the direction of monetary policy in major countries.

3. Resilience of Financial System

The financial system's resilience, which means its capacity to withstand domestic and external shocks, has remained stable, with capital adequacy ratios and liquidity ratios exceeding the regulatory standards. However, since resilience at some NBFIs has been deteriorating, they should take proactive efforts to build more provisions and increase capital in preparation for any future changes in internal or external conditions or for shocks. Meanwhile, financial institutions need to prepare for the possibility of sudden withdrawals of funds in line with increasing non-face-to-face digital transactions.

Korea's external payment capacity has remained solid overall. Net external assets have fallen, while the ratio of external debt to nominal GDP edged up higher, but official foreign reserves remained at a similar level as at the end of last year.

Meanwhile, payment and settlement systems operated smoothly under increased uncertainties at home and abroad. The amount of settlement on major payment and settlement systems, such as BOK-Wire+, has continued to increase, driven mainly by securities settlements by financial institutions and electronic funds transfers by individuals and companies. Settlement risks have also been managed stably.

4. Major Financial Stability Risk Assessment

As discussed above, the high level of household debt, housing price adjustments, and worsening corporate financial soundness, as well as weakened asset quality at financial institutions, all still remain as the main vulnerabilities in Korea's financial system. Going forward, continued high interest rates, a delayed real economic recovery, a continuous slowdown in the real estate market, and possible instability in international financial markets could all have negative impacts on financial stability. This report thus mainly examines the effects of these domestic and overseas risk factors on the financial system.

First of all, overall financial stability risk related to the housing market seems to be managed at an appropriate level, considering that the actual volume of loan-related insolvencies due to the housing market slowdown in the second half of last year is not significant, and that the resilience of financial institutions, remains at favorable levels. However, public guarantees, which have greatly expanded due to the boom in the real estate market since COVID-19 broke out, are partially easing the impact of the adjustment of the housing market, but in the event of insolvency, the burden of subrogation of public guarantee agencies may increase.

If housing prices are adjusted in an orderly manner in the future, it will contribute to the gradual reduction of household debt by easing the burden of housing costs on households that rent and by slowing demand for leasehold deposit loans in the medium- to long-term.

However, if the slowdown in the real estate market continues, the possibility of increasing the burden of landlords having to return the leasehold deposit amount, an increase in the inventory of unsold housing units, and an expansion of insolvency in the real estate PF sector, cannot be ruled out.

In addition, the results of an analysis of potential risks at non-bank deposit-taking institutions since the Silicon Valley Bank (SVB) bankruptcy shows that non-bank deposit-taking institutions, such as mutual savings banks and mutual credit cooperatives, are unlikely to experience the materialization of potential risks, such as liquidity shortages, given the ample capacity of their central federations to provide liquidity. Since these institutions are not closely interconnected with other financial sectors, the possibility that the potential failure of a financial institution spill over into systemic risk is assessed to be limited. However, with the recent increase in NBFIs deposit-taking through non-face-to-face channels, attention should be paid to the possibility of higher volatility in deposit inflows and outflows.

Meanwhile, although soundness indicators related to domestic bank corporate credit have remained favorable, it is highly likely that potential credit risks at corporations have not yet been fully realized due to financial support measures during the COVID-19. The result of an examination of potential credit risks at corporations found that corporate credit risks could have been underestimated due to the application of lower interest rates than those reflecting actual risks. Therefore, financial institutions need to prepare for unexpected delays in the economic recovery and for the expiration of financial support measures in

the near future.

Policy Recommendations

To begin, if the recovery in the real economy is delayed longer than expected amid sustained high interest rates, financial support measures for households and corporations suffering from momentary liquidity shortages need to be provided. However, policy authorities should encourage those household and corporate borrowers with debt repayment capacity to pay off their loans in order to reduce any pressure of debt accumulation. Along with this, they should also refinance the debt of vulnerable borrowers and carry out necessary restructuring at the same time.

While a slowdown in the real estate market could act as a factor in easing pressure on household debt accumulation, it could also lead to a deterioration in the soundness of financial institutions through an increase in non-performing loans. Therefore, it is necessary to clarify the targets and objectives of any policy to ensure a soft landing for the real estate market. As for real estate project financing (PF) in particular, authorities should provide support for businesses through micro measures or carry out prompt liquidation processes for each project site, while over the medium- to long-term horizon overhaul the PF-related regulatory framework to ease excessive risk taking and search for yield by investors.

In order to respond actively to risks in-line with changes in domestic and global conditions, financial institutions should be encouraged to enhance their loss absorbing capacity

by building additional loan-loss provisions and through recapitalization. In particular, non-bank deposit-taking institutions, such as savings banks and mutual credit cooperatives, are likely to experience a deterioration in soundness, as well as a higher risk of the large-scale withdrawal. Therefore, it is necessary to strengthen supervision of these institutions to ensure that they maintain a stable deposit-taking structure and have sufficient liquidity.

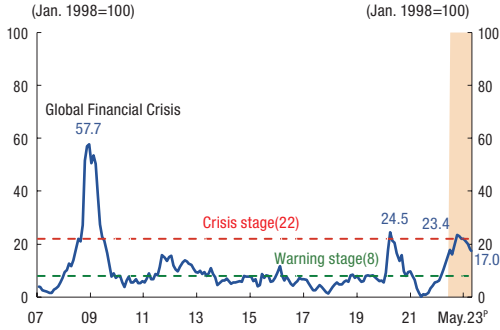
In addition, policy authorities will need to strengthen the early warning system and continue with their policy coordination efforts in light of heightened uncertainties at home and abroad. Besides, while examining financial institution readiness for digital bank runs, which are more likely now in this new financial environment that includes mobile banking, authorities need preemptive management to prevent excessive market jitters by coming up with liquidity support measures for emergency situations in advance, and by taking swift action in case of emergency.

[Key indicators of Financial Stability]

1 Overall Assessment

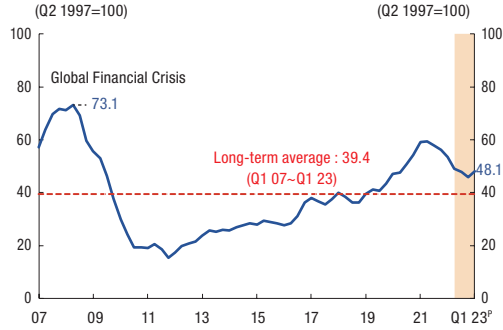
Decline in short-term financial stress (FSI)
Slight increase in mid- to long-term vulnerabilities (FVI)

Financial Stress Index (FSI)



Source: Bank of Korea.

Financial Vulnerability Index (FVI)

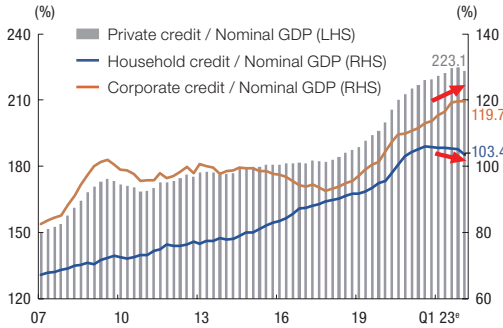


Source: Bank of Korea.

2 Credit Leverage

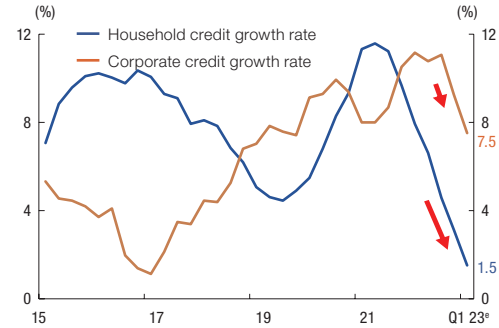
Private credit leverage remained high
Growth declined in household credit
Continued growth in corporate credit

Private credit-to-nominal GDP ratio



Source: Bank of Korea.

Credit growth by sector

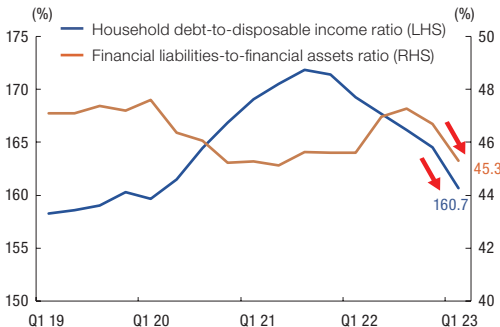


Source: Bank of Korea.

3 Household

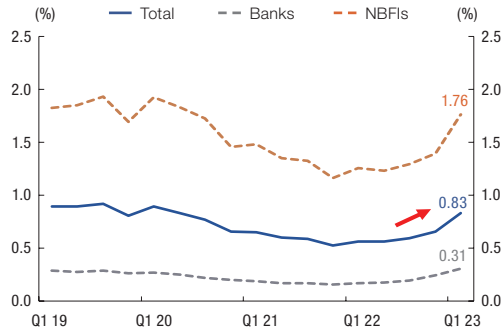
Solid household financial soundness
Increase in household loan delinquency rates

Debt repayment capacity



Source: Bank of Korea.

Household loan delinquency rates

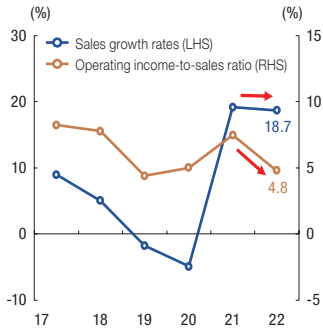


Source: Financial institutions' business reports.

4 NFC

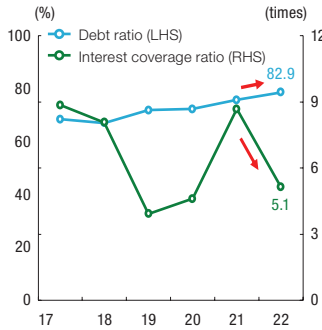
Decline in corporate profitability & interest payment ability
Increase in corporate loan delinquency rates

Growth potential & profitability



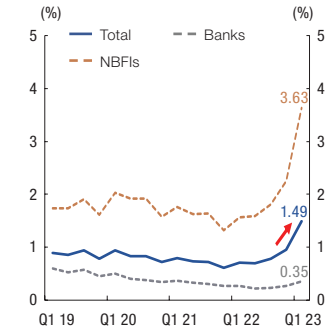
Source: KIS-Value.

Debt ratio & interest coverage ratio



Source: KIS-Value.

Delinquency rates of corporate loans

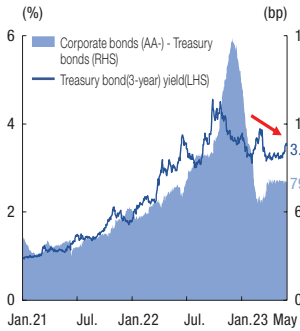


Source: Financial institutions' business reports.

5 Asset Market

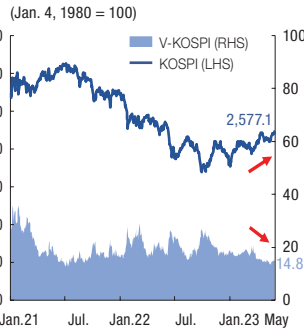
Decline in Korea Treasury bond (KTB) yields
Increase in stock prices
Slower decline in housing prices

Treasury bond yield & corporate bond credit spreads



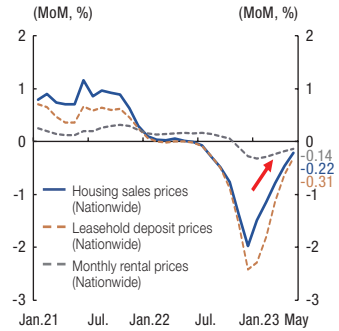
Source: Korea Financial Investment Association.

Stock prices & Stock price volatility



Source: KOSCOM.

Rates of increase in housing prices

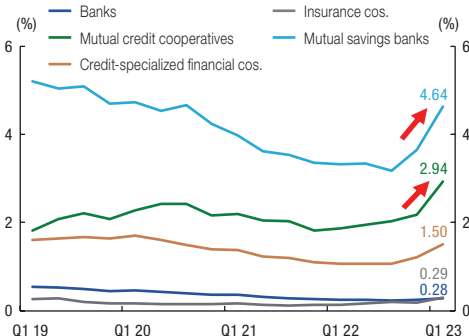


Source: Korea Real Estate Board.

6 Soundness of Financial Institutions

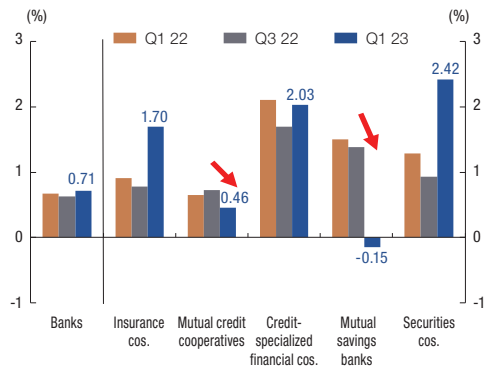
Decline in financial institution asset quality
Weaker profitability at some NBFIs

Substandard-or-below loan ratio



Source: Financial institutions' business reports.

Return on assets (ROA)

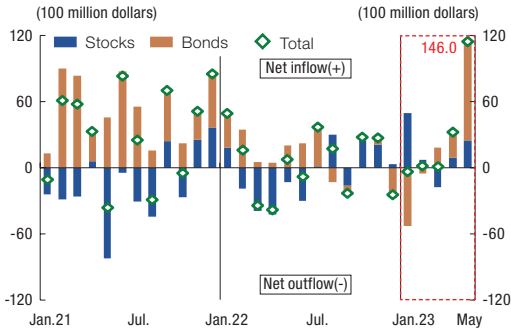


Source: Financial institutions' business reports.

7 Capital Flows

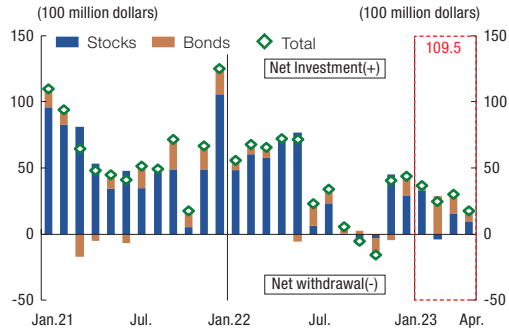
Net inflow of foreigners' domestic portfolio investment
Slower growth in residents' overseas portfolio investment

Changes in foreigners' domestic portfolio investment



Source: Bank of Korea.

Changes in residents' overseas portfolio investment

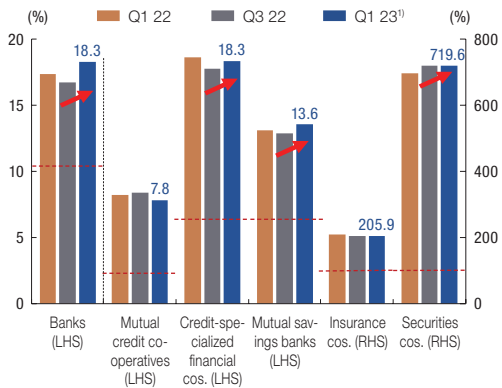


Source: Bank of Korea.

8 Resilience of Financial System

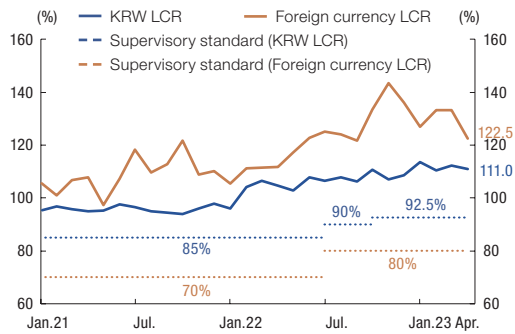
Strong resilience of banks & NBFIs

Financial Institutions capital adequacy ratios



Note: 1) As of Q4 2022 for Insurance cos.
Source: Financial institutions' business reports.

Commercial banks liquidity coverage ratio (LCR)

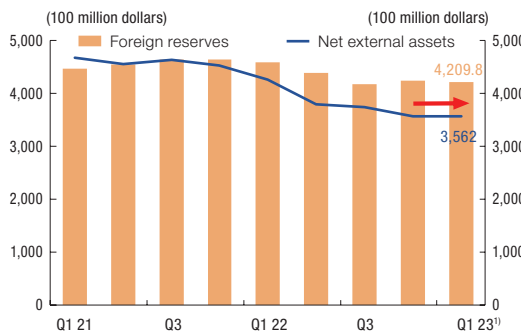


Source: Financial institutions' business reports.

9 External Payment Capacity & Payment and Settlement Systems

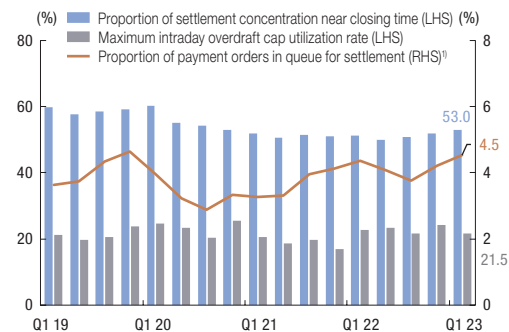
Favorable external payment capacity
Stable settlement risk management

Official foreign reserves¹⁾ & net external assets



Note: 1) As of May 2023.
Source: Bank of Korea.

Risks related to BOK-Wire+



Note: 1) Participating institution payment orders in queue for settlement/ total settlement amount during the period (excluding payment orders for liquidity savings).
Source: Bank of Korea.

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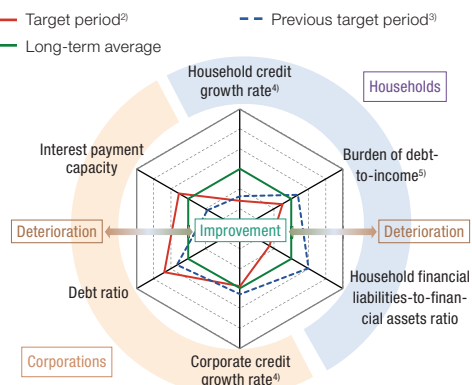
I. Credit Markets

The private credit-to-nominal GDP ratio¹⁾ declined moderately as private credit growth contracted sharply, led by household credit,²⁾ but remained high.

Household credit decreased year on year during the first quarter, but rose in April, while the delinquency rate of household loans edged up.

Corporate credit continued its upward trend, with the debt ratio climbing, and interest payment capacity weakened amid declining corporate profitability (Figure I-1).

Figure I-1. Map of changes in credit market conditions¹⁾



Notes: 1) Standardized on the basis of the long-term average (5-year) for each index, the relative levels of the target period and the previous target period are shown on the map.

2) As of end-1Q 2023. (As of end of 2022 for debt ratio and interest payment capacity.)

3) As of end-3Q 2022. (As of end of 2021 for debt ratio and interest payment capacity.)

4) On the basis of household and corporate credit-to-nominal GDP.

5) Household debt-to-disposable income ratio.

Source: Bank of Korea staff calculation.

1. Credit Leverage

Continued High Level of Private Credit Leverage

At the end of the first quarter of 2023, private credit³⁾ leverage (private credit-to-nominal GDP ratio) was 223.1% (estimate),⁴⁾ which is

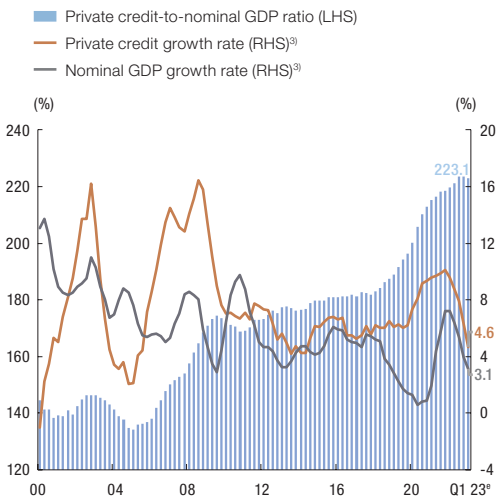
1) The level of private sector leverage can be assessed using a variety of financial and real economic indicators, such as the private credit growth rate by sector, debt repayment burdens of households and corporations, housing price levels, and bank leverage. In this section, the level of private sector leverage is discussed based primarily on the private credit-to-nominal GDP ratio, which is the common global reference recommended by the Basel Committee on Banking Supervision (BCBS, 2010) under the Bank for International Settlements (BIS).

2) While both household credit and household debt refer to debt held by households, the term “household credit” is used in relation to financial institutions, and “household debt” is used in relation to households. In this section, as sub-items of private credit, household credit and corporate credit were used.

3) The BCBS (2010) broadly defines private credit as “all types of debt funds provided to households and non-financial corporations.” In accordance with this definition, we use the sum of household debt (borrowings from financial institutions and government) and corporate debt (borrowings from financial institutions and government and issuance of securities other than shares) as reported in the flow of funds statistics.

still high, showing a decrease of 0.5%p from the end of the third quarter of 2022 (223.6%). This is because, despite the nominal GDP⁵⁾ growth rate (year-on-year) slowing from 5.4% at the end of the third quarter of 2022 to 3.1% in the first quarter of 2023, the private credit growth rate decreased from 7.9% to 4.6% year-on-year during the same period, showing a decline steeper than that of the nominal GDP growth rate (Figure I -2).

Figure I-2. Private credit¹⁾-to-nominal GDP²⁾ ratio



Notes: 1) Based on flow of funds statistics; estimated figure for Q1 2023.
 2) Sum of nominal GDPs in quarter concerned and immediately preceding three quarters.
 3) Year-on-year basis.
 Sources: Bank of Korea.

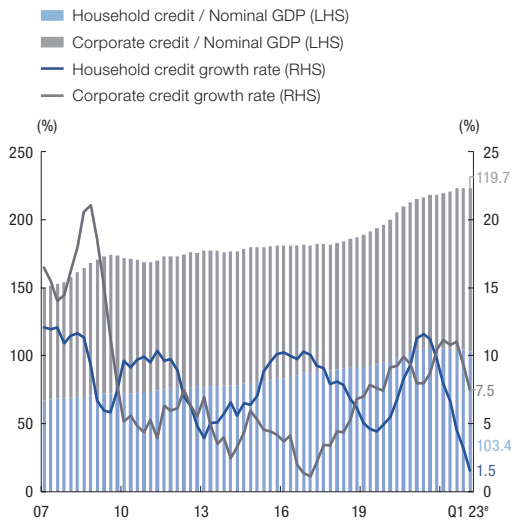
Decline in Household Credit Leverage and Continued Rise in Corporate Credit Leverage

By sector, household credit leverage has decreased, but corporate credit leverage has in-

creased steadily. At the end of the first quarter of 2023, while the household credit-to-nominal GDP ratio stood at 103.4%, down by 1.4%p from the end of the third quarter of 2022 (104.8%), the corporate credit-to-nominal GDP ratio rose from 118.7% to 119.7%, up 1.0%p during the same period.

While the growth of household credit has slowed significantly, due to sluggishness in the real estate sector and rising lending rates, corporate credit has continued to grow steadily, owing to banks' efforts to expand loans and to the continued net issuance of corporate bonds (Figure I-3).

Figure I-3. Credit leverage and credit growth rates,¹⁾²⁾ by sector



Notes: 1) Based on flow of funds statistics; estimated figure for Q1 2023.
 2) Year-on-year basis.
 Sources: Bank of Korea.

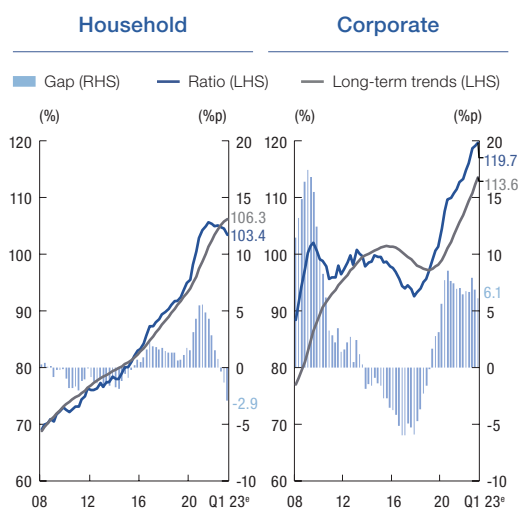
4) This is based on household and corporate credit in the flow of funds statistics for the first quarter of 2023 and was estimated using a linear regression model with the growth rate of household credit (based on household credit statistics) and growth rate of corporate credit of deposit-taking institutions as explanatory variables, respectively.
 5) This is the sum of nominal GDP for the given quarter and three immediately preceding quarters. It is different from the nominal GDP growth rate for the given quarter.

Accelerated Decline in Household Credit Leverage, Falling below the Long-term Trend

Household credit leverage has fallen⁶⁾ even further below its long-term trend. After shifting to a decline at the end of the third quarter of 2022 (-0.3%p), the household credit-to-nominal GDP gap widened to -2.9%p at the end of the first quarter of 2023.

Meanwhile, corporate credit leverage remained above its long-term trend, although its rate of increase has moderated. The corporate credit-to-nominal GDP gap was +6.1%p at the end of the first quarter of 2023, falling from +7.9%p in the third quarter of 2022 (Figure I-4).

Figure I-4. Private credit-to-nominal GDP ratios and gaps,¹⁾ by sector



Notes: 1) Differences between credit-to-nominal GDP ratio and long-term trend value (estimation period: Q1 1975 to Q1 2023, $\lambda=25,000$) based on one-sided HP filter, by sector.

Sources: Bank of Korea.

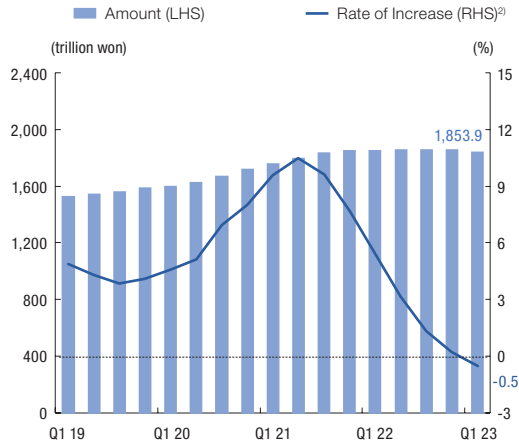
6) However, Korea's household credit leverage was higher than that in other countries. According to the Institute of International Finance (IIF), Korea's household credit leverage was 102.2% at the end of the first quarter of 2023, the highest among 34 economies (Hong Kong 95.1%, UK 81.6%, U.S. 73.0%, and Japan 65.2%), and based on statistics from the Bank for International Settlements (BIS), it hit 105.3% at the end of the third quarter of 2022, the third highest after Switzerland (128.9%) and Australia (113.6%).

2. Household Credit

Household Credit Shifting to a Decline Year on Year

At the end of the first quarter of 2023, household debt (household credit statistics) stood at KRW 1,853.9 trillion, having reversed its upward trend by edging down 0.5% year-on-year⁷⁾⁸⁾ (Figure I-5). By item, household loans amounted to KRW 1,739.5 trillion (93.8% of household debt), and merchandise financing, which is credit offered by sellers of goods and services, recorded KRW 114.4 trillion (6.2%). However, with household loans rising again in April, they are likely to increase in the second quarter over the first quarter.⁹⁾

Figure I-5. Household credit¹⁾



Notes: 1) Based on household credit statistics.

2) Year-on-year basis.

Source: Bank of Korea.

Among loan types, other loans, including unsecured loans, decreased significantly. Home mortgage loans at the end of the first quarter of 2023 amounted to KRW 1,017.9 trillion, rising by 2.5% year-on-year. The growth of home mortgage loans has moderated since the end of the fourth quarter of 2021 due to the sluggish housing market. Meanwhile, the decline in other loans accelerated. Other loans amounted to KRW 721.6 trillion, down by 5.5% year-on-year, owing to a rise in loan interest rates.¹⁰⁾ In terms of the value of loans (compared with

7) At the end of the first quarter of 2023, household credit decreased by KRW 17.2 trillion from the KRW 1,871.1 trillion recorded at the end of the third quarter of 2022, the highest level since statistics began to be collected in 2002.

8) Until recently, the extent of Korea's deleveraging has been less than that in major countries since the Global Financial Crisis.

	Korea	United States	United Kingdom	Canada	Germany	Australia	Japan
The number of quarters when deleveraging occurred since the global financial crisis	2	22	9	0	13	0	20

Notes: 1) From Q1 2007 to Q3 2022 (62 quarters) 2) In case the scale of household debt decreased compared to the previous quarter

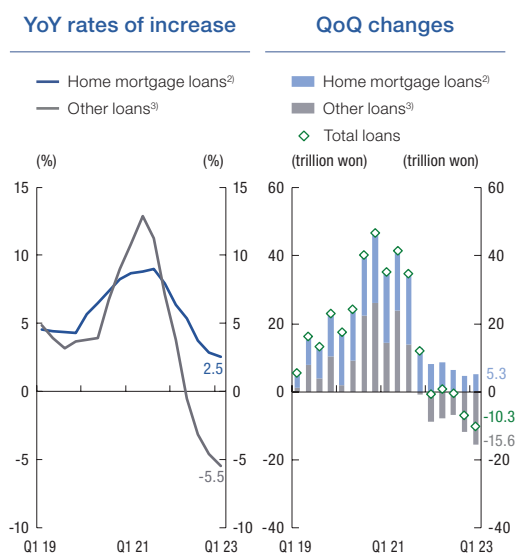
Source: BIS

9) Household loans during April and May of 2023 increased by KRW 3.0 trillion from the end of March, with the magnitude of the increase rising from KRW 0.2 trillion in April to KRW 2.8 trillion in May (press release of Financial Services Commission, June 9, 2023).

10) The weighted average interest rate of unsecured loans by deposit-taking banks (based on new loans) rose from 3.5% in December 2020 to 5.1% in December 2021, 8.0% in December 2022, and to 6.4% in March 2023.

the previous period), home mortgage loans increased by KRW 5.3 trillion during the first quarter of 2023, and other loans decreased by KRW 15.6 trillion¹¹⁾ (Figure I-6).

Figure I-6. Household loans,¹⁾ by loan type



Notes: 1) Based on household credit statistics.

2) Home mortgage loans, leasehold deposit fund loans, etc.

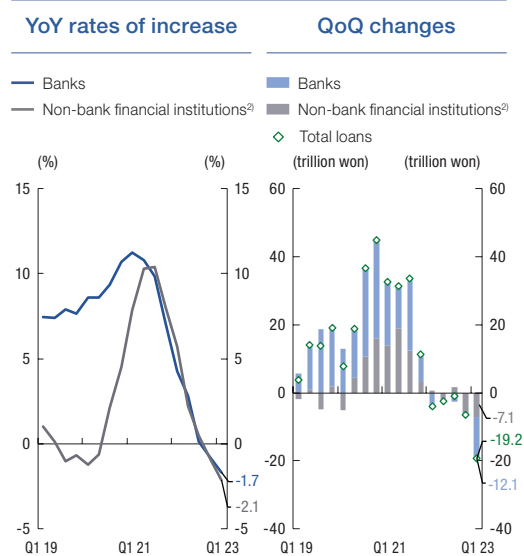
3) Secured loans not collateralized by housing, unsecured loans, guaranteed loans, etc.

Source: Bank of Korea.

By type of financial institution, at the end of the first quarter of 2023, household loans continued to fall in all sectors. Bank loans (KRW 890.5 trillion) declined 1.7% year on year, and loans extended by non-bank financial institutions (NBFIs) (KRW 639.1 trillion)¹²⁾ decreased 2.1% year on year. In terms of loan amount variation (over the previous period), loans of

both banks and NBFIs had increased until the end of 2021, but since the first quarter of 2022, the value of loans has declined at a gradually accelerating pace. In the first quarter of 2023, loans extended by banks and NBFIs fell by KRW 12.1 trillion and KRW 7.1 trillion, respectively, over the previous period (Figure I-7).

Figure I-7. Household loans,¹⁾ by financial sector



Notes: 1) Based on household credit statistics.

2) Non-bank deposit-taking institutions and other financial institutions (excluding Korea Housing Finance Corporation, etc.).

Source: Bank of Korea.

Declining Household Debt Burden in terms of Income and Assets¹³⁾

At the end of the first quarter of 2023, the ratio of household debt to disposable income (based

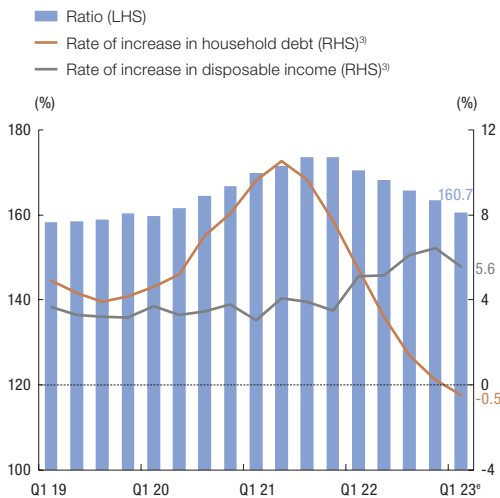
11) During April and May of 2023, by type of household loan, other loans decreased by KRW 2.5 trillion (April: KRW -1.7 trillion, May: KRW -0.8 trillion), while home mortgage loans climbed by KRW 1.0 trillion in March and another KRW 5.4 trillion in April and May (April: KRW +1.8 trillion, May: KRW +3.6 trillion) (press release of Financial Services Commission, June 9, 2023).

12) Among NBFIs, in the first quarter of 2023, loans from savings banks grew year on year (+4.3%), while loans from mutual credit cooperatives decreased substantially (-6.7%).

13) The ratio of household debt to disposal income and the ratio of financial debt to financial assets represent ratios between debt, income, and assets for entire households, regardless of whether the households hold debt. Generally, these ratios can move differently from the debt service ratio (DSR), which represents the debt repayment burden of households holding debt.

on household credit statistics) decreased by 5.1%p to 160.7% (estimate) from the end of the third quarter of 2022 (165.8%). While the growth of household debt is increasingly slowing due to the rising loan interest rates, disposable income continued to grow. Thus, in terms of income, the debt repayment burden across households has declined since the first quarter of 2022 (Figure I-8).

Figure I-8. Household debt¹⁾-to-disposable income²⁾ ratio



Notes: 1) Based on household credit statistics.

2) Disposable incomes for Q1 2023 are estimated using the average of the household disposable income-to-gross national income ratios for the immediately preceding three years.

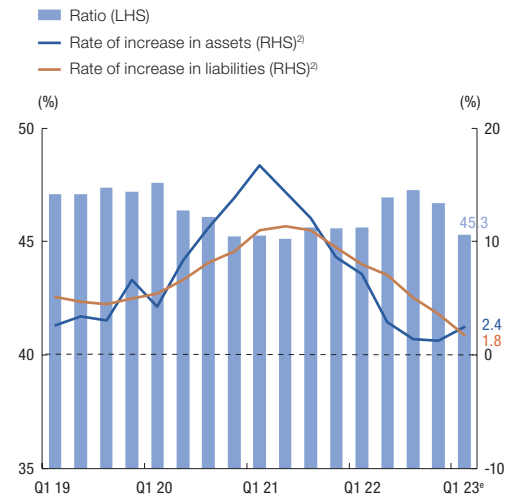
3) Year-on-year basis.

Source: Bank of Korea.

Meanwhile, the ratio of financial debt to financial assets of households (based on flow of funds statistics) decreased to 45.3% (estimate) at the end of the first quarter of 2023, down

from the third quarter of 2022 (47.3%), showing that the debt burden in terms of assets was alleviated. This is because, despite the moderated growth of financial liabilities due to the sluggish housing market and rising loan interest rates, the growth of assets is accelerating with the rise in stock valuations¹⁴⁾ (Figure I-9).

Figure I-9. Financial liabilities-to-financial assets ratio¹⁾



Notes: 1) Based on flow of funds statistics (estimated figure for Q1 2023).

2) Year-on-year basis.

Source: Bank of Korea.

No Change in Share of Vulnerable Borrowers

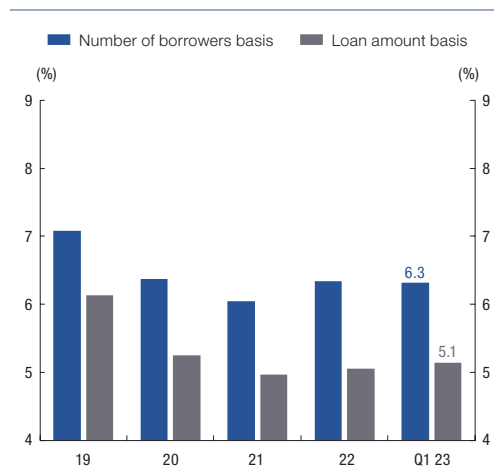
The share of borrowers with a comparatively low debt repayment capacity among total household borrowers remained at a level similar to that seen at the end of 2022. The number of borrowers with low income (bottom 30%)

14) The stock market, which was sluggish in 2022 amid a steady increase in cash and deposits in-line with rising deposit interest rates, gradually recovered (KOSPI 2,155 at the end of the third quarter of 2022 → 2,477 at the end of the first quarter of 2023), and equity and investment fund valuations climbed.

15) In 2021, the rating system for consumer creditworthiness was changed from a grade-based system to a score-based system. In this report, scores of 840 and above (based on credit scores given by the NICE Credit Information Service) are considered high, scores between 665 and 839 are in the middle, and scores below 664 are low. The share of potential vulnerable borrowers who are approaching vulnerable borrower status (borrowers with multiple loans and a medium income, or medium credit scores / borrowers with two loans and a low income or a low credit score) was 17.0% at the end of the first quarter of 2023.

or low credit (credit scores of 664 or below)¹⁵⁾ who also hold multiple household loans accounted for 6.3% of all borrowers at the end of the first quarter of 2023, showing no change since the 0.3%p increase recorded at the end of the first quarter of 2022 over the previous period. In terms of loan value, the share of vulnerable borrowers was 5.1% at the end of the first quarter of 2023, edging up from the end of 2022 (5.0%) (Figure I-10).

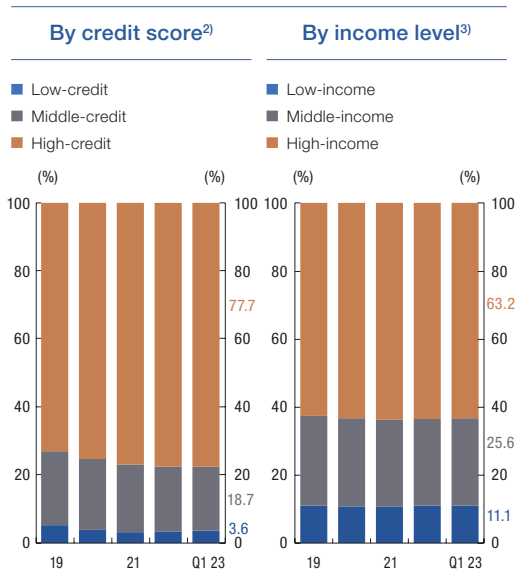
Figure I-10. Proportions of vulnerable borrowers



Source: Bank of Korea staff calculation (Consumer Credit Panel).

By borrower profile (based on loan amount), the proportion of borrowers with a high credit rating increased steadily. At the end of the first quarter of 2023, the proportion of borrowers with a high credit rating stood at 77.7%, edging up by 0.1%p from the end of the third quarter of 2022 (77.6%), while the proportion of high-income borrowers reached 63.2%, showing a decline of 0.2%p from the end of the third quarter of 2022 (63.4%) (Figure I-11).

Figure I-11. Share¹⁾ of household loans, by borrower credit score and income level

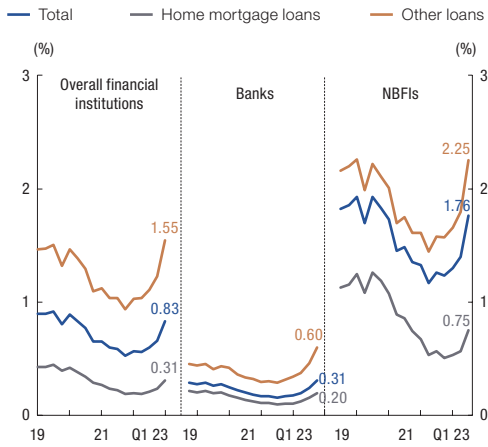


Notes: 1) Loan amount basis.
 2) High-credit (scores greater than or equal to 840), middle-credit (scores 665-839), low-credit (scores less than or equal to 664).
 3) High-income (top 30%), middle-income (30-70%), low-income (bottom 30%).
 Source: Bank of Korea staff calculation (Consumer Credit Panel).

Although the household loan delinquency rate¹⁶⁾ has risen at both banks and NBFIs, it still remains at a low level. At the end of the first quarter of 2023, the delinquency rate of household loans issued by banks and NBFIs was 0.31% and 1.76%, respectively, up by 0.12%p and 0.46%p from the third quarter of 2022. Meanwhile, by loan type, the delinquency rate of both banks and NBFIs was higher for "other loans" than for home mortgage loans, and the delinquency rate on such "other loans" has recently been rising at a relatively higher rate (Figure I-12).

16) As for recent trends in the delinquency rate of household loans, status of new delinquent loans, and prospects for the delinquency rate, refer to Box 1 "Recent Trends in Household Loan Delinquency Rates."

Figure I-12. Delinquency rates¹⁾ of household loans extended by banks and NBFIs²⁾³⁾



Notes: 1) Based on delinquencies of one month and longer (for mutual credit cooperatives and mutual savings banks, principal delinquencies of one day and longer or interest delinquencies of one month and longer).

2) Mutual savings banks, mutual credit cooperatives, insurance cos., credit-specialized financial cos., etc.

3) Excluding insurance contract loans for insurance cos.

Source: Financial institutions' business reports.

3. Corporate Credit

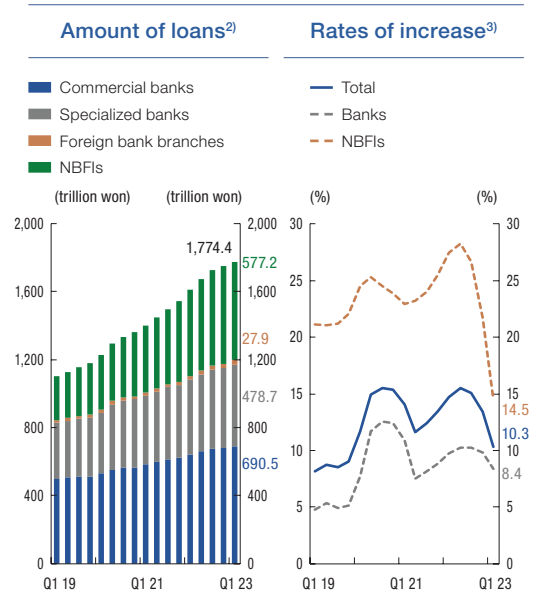
Continued Corporate Credit Growth

At the end of the first quarter of 2023, corporate loans from financial institutions stood at KRW 1,774.4 trillion, recording an increase of 10.30% year on year. Corporate loans showed a gradual slowdown, mainly among loans issued by NBFIs and loans issued to small- and medium-sized enterprises, amid the sluggish business conditions associated with stagnated exports, burden of loan interest rates, and lackluster real estate sector. Still, growth remained at a level higher than before the pandemic. Meanwhile, loans issued to self-employed business owners showed an annual growth rate of 7.6%.¹⁷⁾

In the financial sector, the growth of corporate loans slowed mostly among NBFIs. At the end of the first quarter of 2023, corporate loans of banks stood at KRW 1,197.1 trillion (commercial banks: KRW 690.5 trillion, special banks: KRW 478.7 trillion, branches of foreign banks: KRW 27.9 trillion), showing an increase by 8.4% (commercial banks: 7.7%, special banks: 8.5%) year on year. Corporate loans from NBFIs¹⁸⁾ amounted to KRW 577.2 trillion,¹⁹⁾

increased by 14.5% year on year. As the lending attitude of NBFIs tightened²⁰⁾ because of risk management and liquidity purposes, the growth of corporate loans across all sectors from NBFIs decelerated²¹⁾ compared with the end of the previous year (Figure I-13).

Figure I-13. Corporate loans of financial institutions¹⁾



Notes: 1) Banks include commercial banks, specialized banks, and foreign bank branches. NBFIs include mutual savings banks, mutual credit cooperatives, insurance cos., and credit-specialized financial cos.

2) End-period basis. Excluding financial and insurance cos.

3) Year-on-year basis.

Source: Financial institutions' business reports.

17) For details, refer to Box 2 "Vulnerability and Delinquency Risk of Self-employed Business Owners Debt."

18) The data for NBFIs are based on mutual savings banks, mutual credit cooperatives (Nonghyup, Suhyup, Forestry Cooperatives, Sinhyup, and MG Community Credit Cooperatives), insurance companies (life insurance companies and general insurance companies), and credit-specialized financial companies. However, due to limited data availability, some sectors' data include loans to financial and insurance companies.

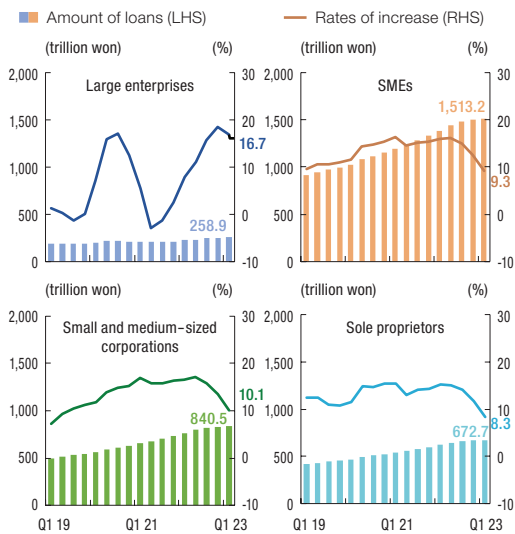
19) In the business sector, mutual credit cooperatives accounted for KRW 350.9 trillion (60.8% of corporate loans offered by NBFIs), followed by insurance companies at KRW 100.2 trillion (17.4%), credit-specialized finance companies at KRW 69.5 trillion (12.0%), and savings banks at KRW 56.7 trillion (9.8%).

20) The survey on the lending attitude of financial institutions found that all NBFIs that participated in the survey were expected to continue to tighten their lending attitude: mutual savings banks (-57 in fourth quarter of 2022 → -35 in first quarter of 2023 → -33 in second quarter (predicted)); credit card companies (-44 → -14 → -7), mutual credit cooperatives (-48 → -25 → -22), and life insurance companies (-22 → -12 → -20). For details, refer to "Results of the survey of financial institutions' lending attitude" (Bank of Korea press release, April 26, 2023).

21) Growth rates of corporate loans by sector (year-on-year) mutual credit cooperatives 29.6% at end of 2022 → 22.9% at end of first quarter of 2023; Insurance companies 4.4% → 1.3%; credit-specialized financial companies 16.6% → 6.6%; savings banks 19.2% → 4.1%.

By company size,²²⁾ corporate loans to small- and medium-sized enterprises, such as sole proprietor loans, showed declining growth. Loans to large enterprises (KRW 258.9 trillion, year-on-year, 16.7%) continued their high growth due to the demand for working capital. On the other hand, loans to small- and medium-sized enterprises (KRW 1,513.2 trillion, 9.3%) showed slower growth, owing to the sluggishness of the real estate sector and high lending rates, as reflected in loans to small- and medium-sized enterprises (KRW 840.5 trillion, 10.1%) and sole proprietor loans (KRW 672.7 trillion, 8.3%) (Figure I-14).

Figure I-14. Corporate loans,¹⁾²⁾³⁾ by company size

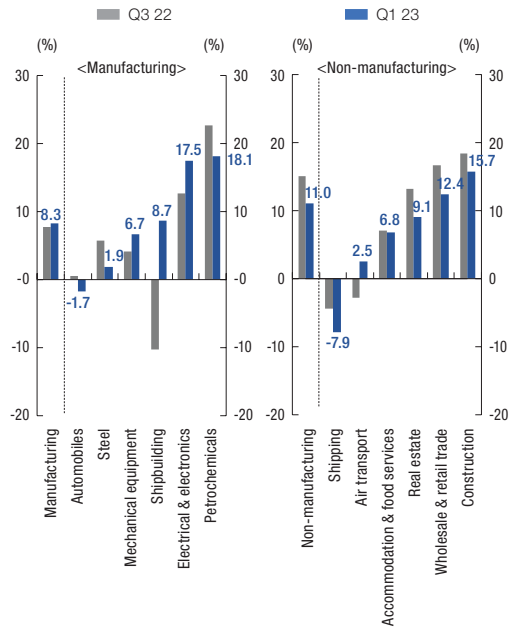


Notes: 1) Based on sum of banks and NBFs.
 2) End-period basis. Rates of increase are year-on-year basis.
 3) "Small and medium-sized corporations" refers to SMEs other than sole proprietorships.
 Source: Financial institutions' business reports.

By industry,²³⁾ corporate loans to the manufacturing sector continued to grow (year-on-year,

8.3%), driven by petrochemicals and electric and electronic device. On the other hand, in the non-manufacturing sector, loan growth slowed to 11.0%, mostly in construction, wholesale & retail trade, and real estate (Figure I-15).

Figure I-15. Growth rates¹⁾ of financial institutions' corporate loans,²⁾ by industry



Notes: 1) Year-on-year basis.
 2) Sum of banks and some NBFs that can be classified by industry.
 Source: Financial institutions' business reports.

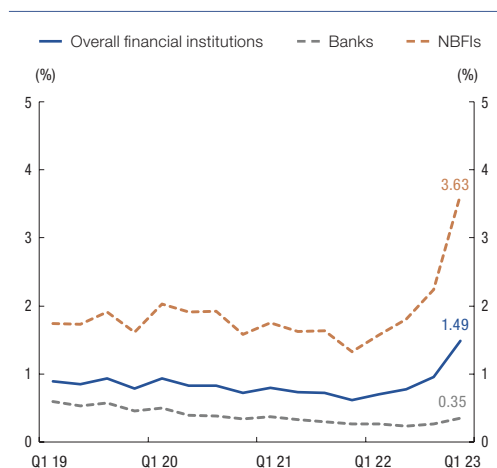
Rising Delinquency Rate of Corporate Loans

The delinquency rate of corporate loans rose for both banks and NBFs.²⁴⁾ At the end of the first quarter of 2023, the delinquency rate of corporate loans extended by banks rose to

22) In the analysis of loans by company size, some loans from NBFs that do not differentiate by company size were excluded due to data limitations.
 23) Corporate loans from some NBFs were excluded from the analysis because they were not classified by industry.
 24) However, these are lower than the long-term average delinquency rates of corporate loans before the COVID-19 pandemic (based on average quarterly delinquency rates from 2009 to 2019, banks: 0.93%, NBFs: 6.13%).

0.35%, up 0.12%p from the end of the third quarter of 2022. The delinquency rate of NBFIs climbed to 3.63%, up 1.83%p during the same period (Figure I-16).

Figure I-16. Delinquency rates¹⁾ of corporate loans extended by banks²⁾ and NBFIs³⁾



Notes: 1) Based on delinquencies of one month and longer (for mutual credit cooperatives and mutual savings banks, principal delinquencies of one day and longer or interest delinquencies of one month and longer).

2) Based on domestic banks.

3) Mutual savings banks, mutual credit cooperatives, insurance cos. (excluding insurance contract loans), credit-specialized financial cos.

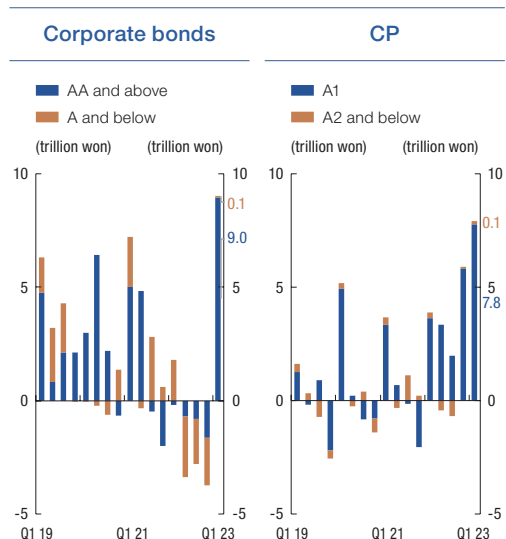
Source: Financial institutions' business reports.

Net Issuance in Corporate Bonds and CPs

In the direct financial market, corporate bonds recorded a net issuance largely among prime bonds, due to the easing of credit concerns and improved issuance conditions associated with the recovery of investment demand in the first quarter of 2023. CPs also saw a net

issuance, led by prime bonds and public corporations (Figure I-17).

Figure I-17. Corporate bond and commercial paper (CP) issuance¹⁾



Note: 1) Excluding issuance by financial holding companies and special purpose companies (SPCs). Net-issuance basis.

Source: Bank of Korea, Korea Securities Depository, Korea Credit Information Services.

Increase in Debt Ratio

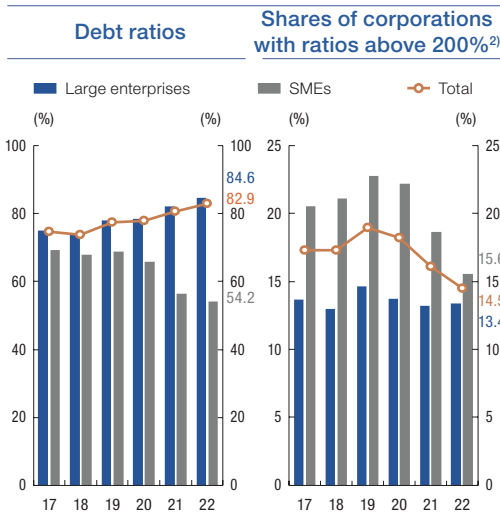
The corporate debt ratio (debt / equity), which indicates a firm's stability,²⁵⁾ recorded 82.9% at the end of 2022, rising from the end of 2021 (80.6%). By company size, while the debt ratio of large enterprises rose (82.0% at the end of 2021 → 84.6% at the end of 2022), that of small- and medium-sized enterprises declined (56.5% → 54.2%).

Meanwhile, the proportion of companies with a debt ratio exceeding 200% (excessively-indebted firms) was 14.5% at the end of 2022,

25) Based on 2,786 firms (1,360 large enterprises and 1,426 SMEs), including listed companies that had to file a business report at the end of the Q4 2022, pursuant to the Financial Investment Services and Capital Markets Act, and some unlisted companies (excluding those in the financial and insurance industries). It is necessary to note that, for the sake of speed, the analysis was done for mostly listed companies, and thus the results of the analysis of the financial soundness of small- and medium-sized enterprises may differ from those conducted based on large samples that include firms subject to external audits.

falling from the end of 2021 (16.1%). By company size, the debt ratio of large enterprises remained at a level similar to that of the previous year (13.2% at the end of 2021 → 13.4% at the end of 2022), while the ratio of small- and medium-sized enterprises dropped (18.6% → 15.6%) (Figure I-18).

Figure I-18. Corporate debt ratios,¹⁾ by company size



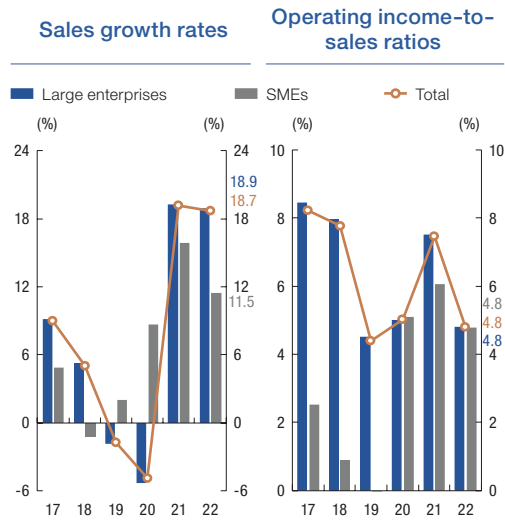
Notes: 1) Debt/equity, end-period basis.
 2) Including corporations with capital erosion.
 Source: KIS-Value.

Continued High Growth amid Moderating Profitability

The growth rate (year-on-year) of corporate sales, which represents a company’s growth, in 2022 was 18.7%, continuing the high growth from 2021 (19.1%). By company size, the rate of growth in sales among large enterprises remained high (19.3% in 2021 → 18.9% in 2022), while that among small- and medi-

um-sized enterprises slowed (15.9% → 11.5%). The operating income-to-sales ratio (operating income / sales), representing a firm’s profitability, fell to 4.8% in 2022 from the previous year (7.5%). By industry, some export sectors with low operating income saw their ratios decline.²⁶⁾ By company size, both large enterprises (7.5% at the end of 2021 → 4.8% at the end of 2022) and small- and medium-sized enterprises (6.1% → 4.8%) showed a decrease in profitability (Figure I-19).

Figure I-19. Sales growth rates¹⁾ and operating income-to-sales ratios,²⁾ by company size



Notes: 1) Year-on-year basis.
 2) Operating income/sales.
 Source: KIS-Value.

Decline in Interest Payment Ability

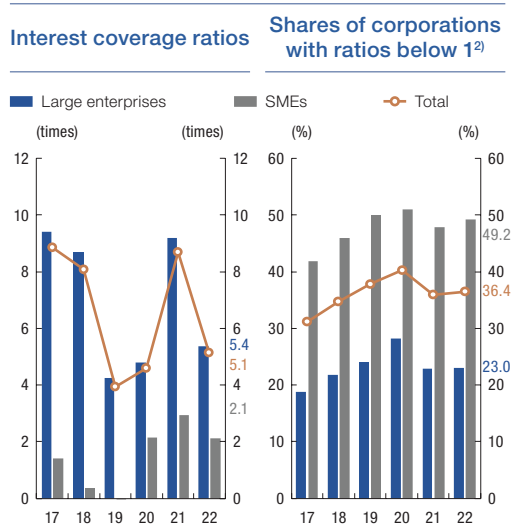
The interest coverage ratio (operating income / total interest expenses), which indicates a company’s ability to make interest payments,²⁷⁾ was 5.1 in 2022, dropping from 8.7

26) As for profitability by industry, operating loss in the electricity and gas supply sector increased significantly (-2.8% at end of 2021 → -13.9% at end of 2022), while the steel (12.8% → 5.2%), electric and electronic device (12.5% → 8.8%), and petrochemical (8.1% → 5.7%) sectors saw their operating income-to-sales ratios slip moderately.
 27) When calculating the interest coverage ratio, the numerator is the operating income, and the denominator is the total interest expenses, including interest on bonds.

in 2021, due to the rising market interest rates and low profitability.²⁸⁾ By company size, both large enterprises (9.2 in 2021 → 5.4 in 2022) and small- and medium-sized enterprises (2.9 → 2.1) showed a decrease in their interest coverage ratios.

The proportion of companies with an interest coverage ratio of less than 1 edged up from 36.0% at the end of 2021 to 36.4% at the end of 2022. By company size, large enterprises showed a level similar to that of the previous year (22.9% at the end of 2021 → 23.0% at the end of 2022), while SMEs showed an increase (47.8% → 49.2%) (Figure I-20).

Figure I-20. Corporate interest coverage ratios,¹⁾ by company size



Notes: 1) Operating income/total interest expenses.

2) Including corporations recording operating losses.

Source: KIS-Value.

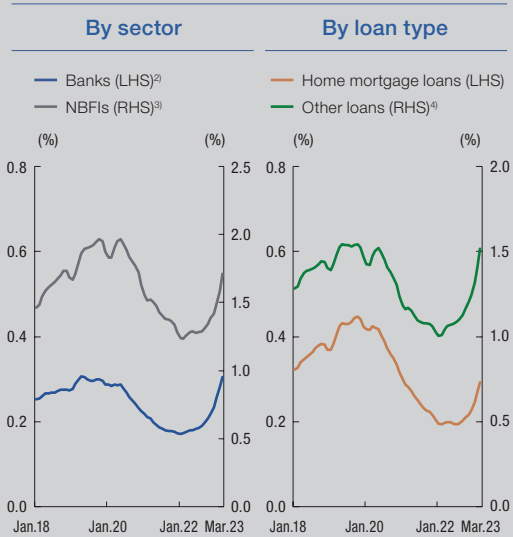
28) As for the interest coverage ratio by industry, sluggishness persisted in electricity & gas supply (-1.4 at the end of 2021 → -7.0 at the end of 2022), shipbuilding (-9.5 → -7.5), and accommodations & restaurants (-0.2 → 0.4). Electric & electronic devices (36.5 → 19.1), steel (17.4 → 8.8), petrochemicals (13.8 → 8.9), construction (8.2 → 4.7), and real estate (3.5 → 2.4) all saw their ratios decline from the previous year, due to lackluster operating results and the rising burden of interest payment.

Box 1.

Recent Trends in Household Loan Delinquency Rates¹⁾

The delinquency rate on household loans, which had remained low throughout the pandemic, started to edge up in the second half of 2022 across all segments of the financial sector, with the upswing seen in both housing mortgage and unsecured loans. The rising delinquency rate amid the slowdown in new loan originations is fanning concerns about default risk in the household debt market, as it is mainly the result of growing delinquent balances on existing loans.²⁾ Below is an examination of the recent status of delinquent loans and delinquency rates by vintage (year of origination), along with their implications for the management of household loan delinquencies.

Trend¹⁾ of delinquency rate of household loans



Notes: 1) Based on 3-month moving average.

2) Domestic banks (same as below).

3) Mutual savings banks, mutual credit cooperatives, insurance cos., credit-specialized financial cos. (same as below).

4) Secured loans not collateralized by housing, unsecured loans, guaranteed loans, etc.

Source: Financial institutions' business reports.

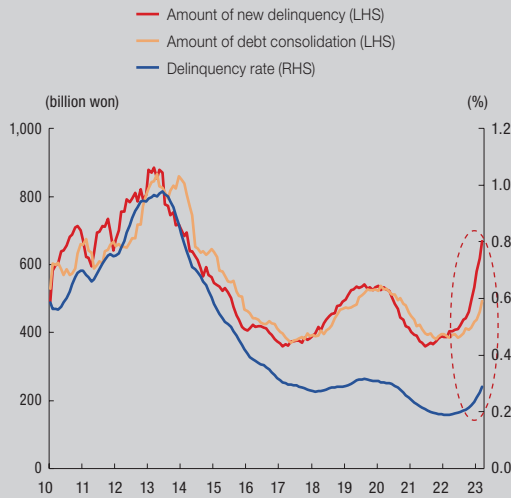
Recent Household Loan Delinquency Rate and New Delinquencies

Delinquent loans generally tend to increase with rising loan interest rates. The recent surge in interest rates, as it drives up the debt service burden for households, has resulted in a rapid growth in new delinquencies. Financial institutions are responding to this situation by increasing the resolution volume. However, as new delinquencies outpace resolutions, there has been a gradual uptick in household loan delinquency rates.

1) This article was authored by Noh Yu-cheol, Lee Do-hong, and Lee Hae-in (Financial Stability Affairs Team) and was reviewed by Park Ku-do (director of the Financial Stability Strategy & Coordination Division), Lim Kwang-kyu (head of the Financial Stability Affairs Team), and Kim Jeong-hoon (director of the Money & Financial Markets Division).

2) During the second half of 2022, while the balance of outstanding household loans (based on those included in the delinquency rate analysis) decreased by 0.9%, the balance of delinquent loans (30 days or more past the due date) jumped 16.4%. Between December 2022 and January 2023, the balance of delinquent loans increased particularly sharply by over 20% from the month prior.

Amount¹⁾²⁾ of new delinquency and debt consolidation³⁾ of bank household loans



Notes: 1) Amount of new delinquency and debt consolidation during month.

2) Based on 6-month moving average.

3) Sale amortization, normalization, withdrawal, etc.

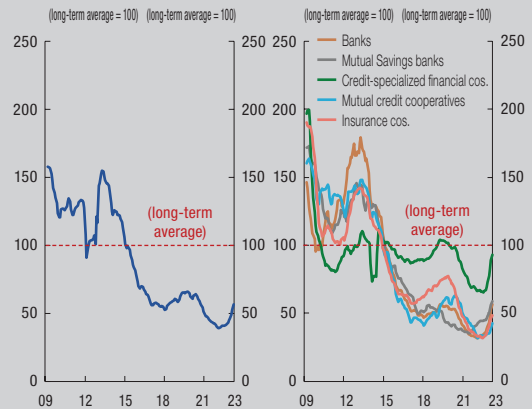
Source: Financial institutions' business reports.

Notwithstanding, the current household loan delinquency rate is still below the level during the Global Financial Crisis and its pre-pandemic long-term average (2009-2019) across all segments of the financial industry. At the end of March 2023, domestic banks' delinquency rate on household loans stood at 0.31%, which is lower than both the corresponding rate during the Global Financial Crisis (about 0.8%) and the long-term average (0.54%).³⁾ Among non-bank financial institutions (NBFIs), the delinquency rates of mutual savings banks and credit-specialized financial companies were comparatively high, amounting to 5.6% and 2.8%, respectively, as of the same date. These figures are, however, below their long-term averages (9.3%, 3.2%)

and are significantly lower than during the Global Financial Crisis (15.8%, 6.3%).

Comparison¹⁾ of household loan delinquency rate²⁾ with long-term average

Entire financial sector Detailed financial sector



Notes: 1) Based on 3-month moving average.

2) The long-term average (average of monthly delinquency rate from 2009 to 2019) is set as the reference value of 100, and the delinquency rate at each point is converted to the level compared to the long-term average.

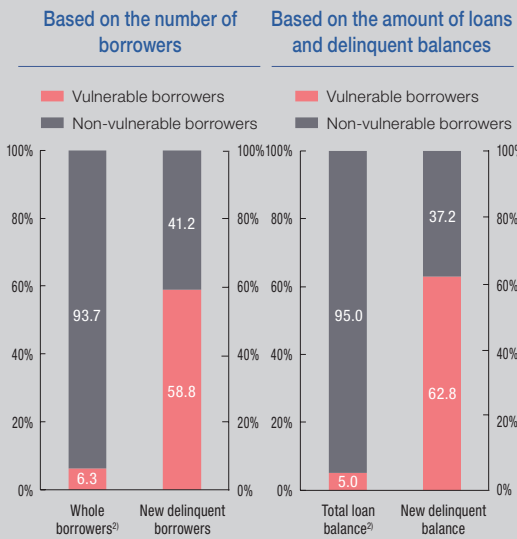
Source: Financial institutions' business reports.

Meanwhile, the recent spike in delinquent household loans appears to have been mainly driven by vulnerable borrowers that are low-income or low-credit households with loans from three or more institutions at the same time. Although vulnerable borrowers accounted for only 6.3% and 5.0% of all household borrowers and the balance of total outstanding household loans, respectively, at the end of 2022, they represented as much as 58.8% and 62.8% of all newly-delinquent borrowers and the balance of total newly delinquent loans during the second half of 2022. Moreover, for 39.5% of newly-delin-

3) Among banks, the household loan delinquency rate of regional banks has recently risen at a comparatively fast rate to reach 0.55% at the end of March 2023, which is above its long-term average (0.40%), although still below the corresponding rate during the Global Financial Crisis (about 0.8%). The household loan delinquency rate of internet-only banks, even though no long-term average is yet available, demands attention, as it grew at an accelerated rate to stand at 0.77% at the end of March 2023, well above the averages of nationwide banks (0.30%) and regional banks (0.55%).

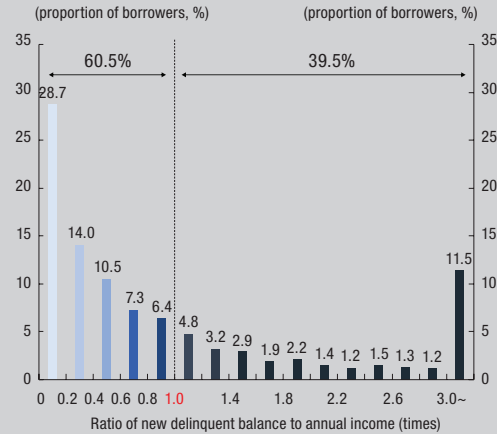
quent borrowers, the newly delinquent balance exceeded their annual income. Hence, it cannot be ruled out that a significant portion of delinquent loans, whose recent increase is largely attributable to vulnerable borrowers, may become classified as substandard-or-below loans (delinquent for 90 days or longer), rather than be paid and brought up-to-date, which will negatively impact the asset soundness and capital ratios of financial institutions.⁴⁾

New delinquent borrowers:¹⁾ Vulnerable and non-vulnerable borrowers



Notes: 1) Borrowers with an increase in delinquent balance at the end of Q4 2022 compared to at the end of Q2 2022.
 2) As of the end of Q4 2022.
 Source: Bank of Korea staff calculation (Consumer Credit Panel).

Distribution of new delinquent balance to annual income ratio of new delinquent vulnerable borrowers¹⁾



Note: 1) Vulnerable borrowers at the end of Q2 2022 with an increase in delinquent balance at the end of Q4 2022 compared to at the end of Q2 2022.
 Source: Bank of Korea staff calculation (Consumer Credit Panel).

Delinquency Trends Based on Vintage Analysis

This situation suggests the possibility that the upward trend in the delinquency rate on household loans may continue for some time to come. When household loans were divided by period of origination,⁵⁾ based on the concept of vintage delinquency, and the change in delinquency rate was examined over time, the delinquency rate on loans issued in 2013-2019 increased steeply during six to eight quarters immediately following the origination date and then embarked on a slow downward trend after peaking to 1.0-1.5%.⁶⁾

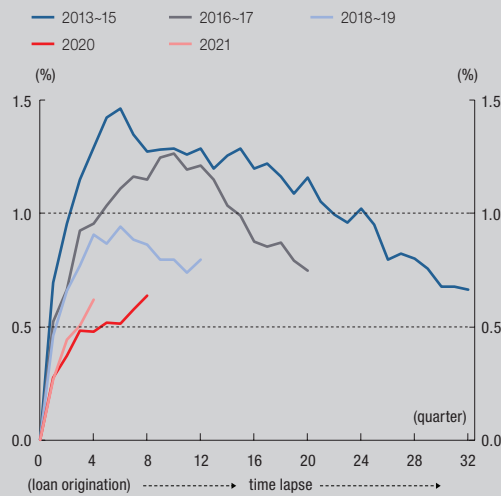
4) For example, for precautionary loans, which are loans that have been delinquent for more than 30 days, but less than 90 days, banks are required to set aside loss provisions in an amount equal to 7% of the loan value. However, if the delinquency extends past 90 days, precautionary loans are re-classified as substandard-or-below loans (substandard, doubtful, estimated loss), in which case, the amount of the loss provisions to be made increases to 20-100% of the loan value.

5) Household loans were divided by quarter of origination and quarterly vintage delinquency rates were calculated. As the results showed that vintage delinquency trends were similar from quarter to quarter, annual vintage delinquency rates were calculated based on quarterly rates.

6) After 2013, the declining interest rate environment saw a gradual slowdown in the increase in vintage delinquency rates, with the peak delinquency rate also progressively dropping from 1.5% in 2013-2015 → 1.3% in 2016-2017 → 0.9% in 2018-2019. This trend is corroborated by the financial sector-wide aggregate household loan delinquency rate (1.2% on average 2013-2019), calculated based on data reported in financial institutions' annual reports, which followed a slow downward curve during the same period.

For household loans that were issued in 2020 and downward, the rise in delinquency rate was more moderate than for earlier vintages, which could be explained by low interest rates in this period and the pandemic-related forbearance measures. The delinquency rate on these loans appears to be still in progress towards the peak. Given the current rising interest rate environment and the phasing out of forbearance measures, some increase in delinquencies in 2020 and later vintages, which have been deferred until now, seems all but inevitable. These changes in the lending environment are expected to exert upward pressure on household loan delinquencies for the foreseeable future.

Trend¹⁾ of vintage delinquency rate of household loans



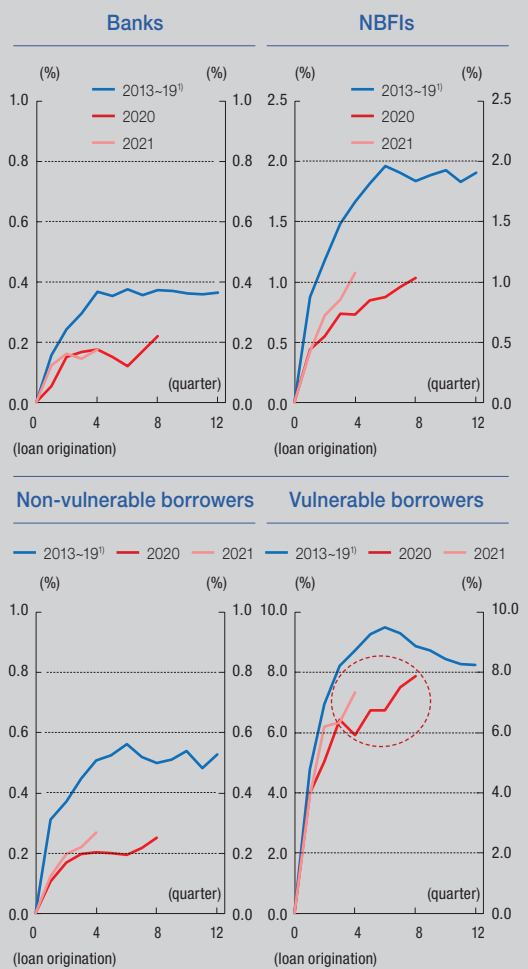
Note: 1) Annual vintage delinquency rate calculated using quarterly vintage delinquency rate.

Source: Bank of Korea staff calculation (Consumer Credit Panel).

Meanwhile, the upward pressure on the delinquency rate of household loans issued in 2020 and downward is likely to be more considerable for vulnerable borrowers and NBFIs.⁷⁾ The delinquency rate on household loans issued

by NBFIs in 2020 onwards has been kept artificially low until now and, as was noted earlier, the recent increase in new delinquencies are concentrated in loans to vulnerable borrowers who have more significantly benefited from the government's COVID-19 responses than other groups. As a matter of fact, the vintage analysis of loans to vulnerable borrowers confirms that the delinquency rate has recently risen rapidly in 2020 and later vintages.

Trend of vintage delinquency rate by sector, borrower type



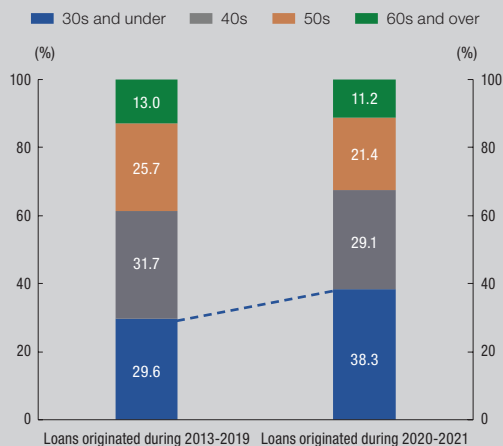
Note: 1) Calculated based on quarterly vintage delinquency rate from 2013 to 2019.

Source: Bank of Korea staff calculation (Consumer Credit Panel).

7) As of the end of 2022, 60.8% of household loans to vulnerable borrowers were issued by NBFIs, suggesting that loans to this group are concentrated in NBFIs.

Also of note is the fact that the share of borrowers in their 30s and younger across all household borrowers has grown from 2020 and downward. For household loans issued in 2013-2019, borrowers in their 30s and younger represented only 29.6% of all borrowers. For loans issued in 2020-2021, this figure has risen sharply to 38.3%. As their income base is somewhat more constrained compared to borrowers of other age groups,⁸⁾ the possibility of an unexpectedly high increase in the delinquency rate on household loans issued in 2020 and onwards, driven by this segment of borrowers, needs to be reckoned with.

Proportion¹⁾ of household loan borrowers by age group



Note: 1) Household loan balance by originated period.

Source: Bank of Korea staff calculation (Consumer Credit Panel).

Assessment and Implications

As was discussed above, given the possibility of a sustained upswing in delinquencies, especially among vulnerable borrowers and NBFIs loans, the household loan delinquency rate is likely to continue on an upward trajectory for some time.⁹⁾ In particular, as potential loan losses, which were kept at bay in 2020-2021 by the low interest rate environment and lending support measures by the government, are gradually realized and accumulate, this could undermine the soundness of financial institutions.

That being said, rising household loan delinquencies should not have an undue impact on the resilience of financial institutions since they have steadily set aside loan loss provisions in a preemptive response to credit risk.¹⁰⁾ Nevertheless, as new delinquencies could rise at a faster than expected rate, financial institutions must make special efforts to enhance the efficiency of the resolution process for non-performing loans at the same time as increase capital buffers.

In phasing out COVID-19 measures, the government and supervisory authorities must be mindful of the rapid surge in delinquencies, concentrated in vulnerable borrowers, this can lead to and must step up the monitoring of the household loan delinquency status. They must also take steps to facilitate vulnerable borrowers' recourse to appropriate debt relief programs,

8) About 9.1% of total borrowers in their 30s and younger that took out a loan in 2020-2021 were low income borrowers (bottom 30% of all borrowers by income), slightly higher than the corresponding share among borrowers in their 40s and 50s (7.0%). On the other hand, low credit borrowers represented a smaller share of the 30s and younger age group (2.9%) than the 40s-50s age group (4.0%).

9) However, the rise in the household loan delinquency rate, resulting from an increase in new delinquencies, could also be more limited than expected if the increase is offset by a sizably equivalent increase in resolutions by financial institutions, in the form of sales or write-offs of non-performing loans. Therefore, in order to more accurately estimate default risk trends in household loans, the volume of new delinquencies also needs to be monitored in addition to the delinquency rate.

including debt consolidation, consumer proposal, and personal bankruptcy,¹¹⁾ so as to ease the burden of managing delinquencies for financial institutions. Meanwhile, in the medium and long term, to mitigate the effect of rising interest rates and prevent the sudden increase in debt service burden from causing waves of default, the government and supervisory authorities must also implement measures to increase the share of fixed rate loans.

10) In anticipation of a rise in non-performing loans, banks have been building up loan loss reserves. As a result, their loan loss reserve ratio (ratio of loan loss reserves to substandard-and-below loans) has continuously increased from 199.7% at the end of the first quarter of 2022 → 219.8% at the end of the second quarter → 228.1% at the end of the third quarter → 231.0% at the end of the fourth quarter (based on the loan loss provisions of commercial banks). The loan loss reserve ratio and capital ratios of NBFIs have also remained stable across all types of institutions in spite of the recent rise in substandard-and-below loans.

11) Although debt consolidation requests, as well as consumer proposal and bankruptcy filings, have recently edged upward, there are concerns that such debt relief programs may not be easily accessible for vulnerable populations, such as borrowers with multiple loans, basic livelihood security recipients, or the elderly. To allow vulnerable borrowers to make active use of debt relief resources by comparing available options and choosing one that is appropriate for their individual circumstances, policy efforts are needed to provide relevant and detailed support, including offering broader credit counseling opportunities and lowering the cost of debt relief programs.

Box 2.

Vulnerability and Delinquency Risk of Self-employed Business Owners Debt¹⁾

Since the start of the COVID-19 pandemic, loans to self-employed business owners (SEBOs)²⁾ have massively increased. The delinquency rate on these loans, which has remained low until now, has recently shifted to an upward trend amid rising interest rates and the economic slowdown, sparking concerns that the buildup of potential non-performing loans over the past several years in the self-employed sector could lead to a sudden and rapid realization of losses.

In what follows, the vulnerability factors of loans to SEBOs are analyzed from several angles, using micro data including those from the Consumer Credit Panel Database, and the effects of the downturn in real estate prices, the high debt service burden, and the economic slowdown on the delinquency risk of related loans are examined to identify policy implications.

Current Conditions and Lending Trends in the Self-employed Sector

The pace of output recovery in the service industry accelerated from the second quarter of last year, on the discontinuation of social distancing measures, to surpass its level at the end of 2019. However, the income of the SEBOs

has not recovered to pre-pandemic levels as the improvement has been slowed by high loan interest rates and soaring raw materials prices.

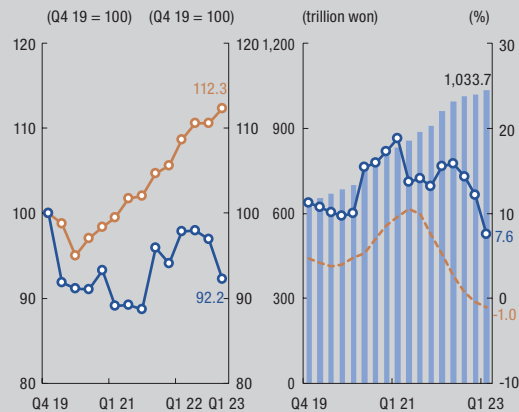
Because of this, unlike for household loans, the growth of loans to SEBOs is continuing unabated. At the end of the first quarter of 2023, the balance of loans to SEBOs reached KRW 1,033.7 trillion,³⁾ a year-on-year increase of 7.6% and an increase of 50.9% compared to the end of 2019 (KRW 684.9 trillion), prior to the COVID-19 pandemic.

Service industry production¹⁾ and income²⁾ of SEBOs

—○— Service industry production
—○— Income of SEBOs

Amount and rate of increase in SEBO loans³⁾

■ Amount of SEBO loans (LHS)
—○— Rate of increase in SEBO loans (RHS)
—○— Rate of increase in household loans (RHS)⁴⁾



Notes: 1) Based on index of services (real & seasonally adjusted).

2) Based on sum of business and wage income (real & seasonally adjusted).

3) Year-on-year basis.

4) Based on household credit statistics.

Source: Bank of Korea staff calculation (Consumer Credit Panel, Service Industry Survey, Household Income, and Expenditure Survey).

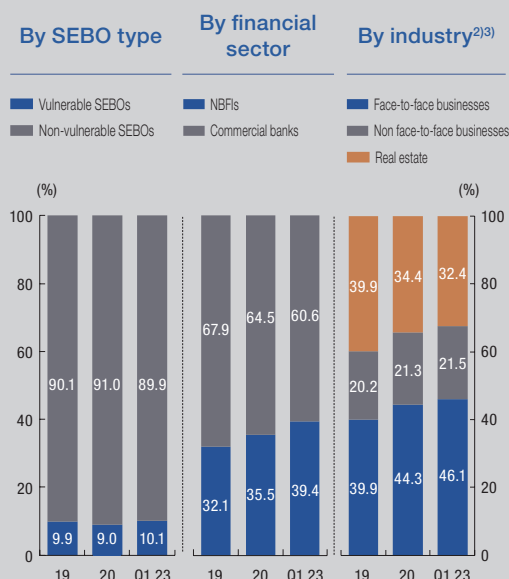
1) This article was authored by Kim Jae-young and Shin Jung-hoo (Financial Stability Analysis Team) and reviewed by Park Gu-do (director of the Financial Stability Strategy & Coordination Division), Lee Jung-yeoun (head of the Financial Stability Analysis Team), Lee Jeong-heon (head of the Financial Market Affairs Team), and Han Kyung-cheol (head of the Examination Affairs Team).

2) Using the Consumer Credit Panel Database (panel data of about one million borrowers), Bank of Korea identified borrowers of sole proprietor loans as self-employed business owners and estimated the size of loans to SEBOs by summing up their household loans and sole proprietor loans.

3) Loans to SEBOs at the end of the first quarter of 2023 (KRW 1,033.7 trillion, 3.133 million borrowers) consist of sole proprietor loans (KRW 680.2 trillion) and household loans (KRW 353.5 trillion).

In 2022, the increase in loans to SEBOs was concentrated in vulnerable borrowers,⁴⁾ non-bank financial institutions (NBFIs), and customer-facing service sectors, suggesting that the overall quality of debt has deteriorated somewhat. Vulnerable borrowers' share of SEBOs, which fell after the pandemic, bounced back to 10.1% at the end of the first quarter of 2023 from 9.0% at the end of 2021. The share of loans by NBFIs, which charge comparatively higher interest rates, edged up from 35.5% at the end of 2021 to 39.4% at the end of the first quarter of 2023. The share of loans to customer facing service industries, which are largely made up of small businesses and are sensitive to business cycle fluctuations, also increased from 44.3% to 46.1% during the same period.

Share of SEBO loans¹⁾



Notes: 1) Compared to SEBO loan amounts.

2) Compared to industry identified SEBO loan amounts.

3) Face-to-face businesses: wholesale & retail trade, accommodation & food, personal services, leisure services. Non face-to-face businesses: manufacturing and other services, except for face-to-face services and real estate.

Source: Bank of Korea staff calculation (Consumer Credit Panel).

Meanwhile, the delinquency rate of loans to SEBOs (based on loans to sole proprietors), on a steady decline until recently, stood at 1.00% at the end of March 2023, near its long-term average (1.05% on average between 2012 and 2019). During the second half of last year, the delinquency rate began an upswing, pointing to a gradual deterioration in the soundness of loans.

While the delinquency rate of vulnerable borrowers jumped 4.30%p since the second half of last year, among non-vulnerable borrowers, the increase was limited to 0.09%p during the same

4) Vulnerable borrowers were defined as low income or low credit borrowers with multiple loans. However, in this article, due to the limited availability of data, only those borrowers with household loans from three or more financial institutions or three or more sole proprietor loans were considered borrowers with multiple loans. Just like vulnerable borrowers, the share of borrowers with multiple loans to SEBOs (69.3% at the end of 2021 → 71.3% at the end of the first quarter of 2023) has increased.

period.⁵⁾ By financial sector, the delinquency rate of loans to SEBOs by NBFIs rose by 1.25%p from the second half of last year, while the corresponding rate for commercial bank loans only inched up by 0.21%p. By industry, the increase in the delinquency rate was most significant for sole proprietor loans to customer-facing industries, amounting to 0.38%p.

Delinquency rate of SEBO loans¹⁾

	Average 2012- 2019	Q4 2019	Q2 2022 (A)	Q1 2023 (B)	B-A
▶All ²⁾	1.05	0.76	0.47	1.00	+0.53
▶By SEBO type ³⁾					
-Vulnerable SEBOs	11.16	10.27	5.70	10.00	+4.30
Borrowers with multiple loans	1.85	1.43	0.75	1.42	+0.67
-Non-vulnerable SEBOs	0.24	0.09	0.08	0.17	+0.09
▶By financial sector ²⁾					
-Banks	0.48	0.29	0.16	0.37	+0.21
-NBFIs	6.10	2.47	1.27	2.52	+1.25
▶By industry ⁴⁾					
-Face-to-face businesses	0.58	0.38	0.22	0.60	+0.38
-Non face-to-face businesses	0.53	0.42	0.19	0.37	+0.18
-Real estate	0.33	0.13	0.09	0.16	+0.07

Notes: 1) Based on delinquencies of one month and longer.

2) Based on sole proprietor loans.

3) Based on SEBO loans on Consumer Credit Panel.

4) Based on sole proprietor loans at commercial banks.

Source: Bank of Korea staff calculation (Consumer Credit Panel), financial institutions' business reports.

Vulnerability Factors of Loans to SEBOs

Mortgage loans account for a significantly higher share of SEBOs loans (72.7%)⁶⁾ compared to loans to wage workers and other non-self-employed workers (54.3%), which makes them susceptible to volatility in real estate prices. The LTV rules applying to SEBOs are lax⁷⁾ and as much as 58.6% of mortgage loans are backed by non-residential real estate (hereafter “non-residential mortgage loans”), which are highly sensitive to cyclical fluctuations.

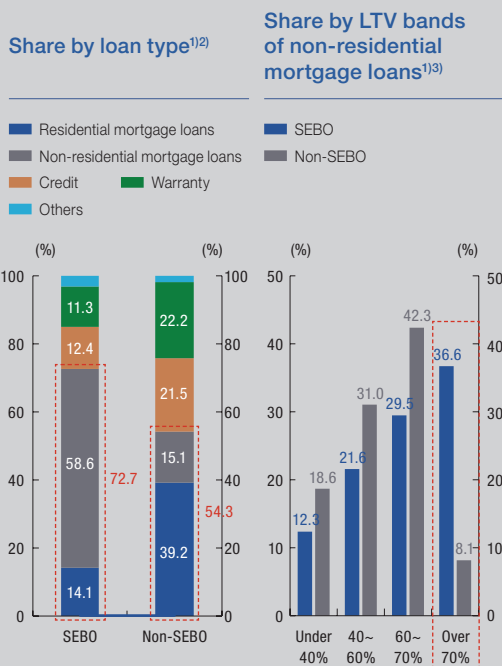
When non-residential mortgage loans to SEBOs (based on loans by mutual credit cooperatives⁸⁾) are broken down by LTV bracket, high LTV loans with an LTV of 70% or higher represent 36.6% (8.1% for non-self-employed loans). Amid the recent decline in commercial real estate prices,⁹⁾ non-performing loans could quickly increase as most of SEBOs loans are secured by retail stores whose auction price ratio¹⁰⁾ is significantly lower than for residential property.

5) The uptick in the delinquency rate was more moderate (0.67%p) for borrowers with multiple loans than for vulnerable borrowers, suggesting that having multiple loans does not necessarily increase default risk especially if the borrowers are high-grade borrowers with high income or good credit.

6) Although the self-employed tend to own commercial property and other forms of business assets and, because of this, have more real assets than wage workers, it is often difficult for them to obtain an unsecured loan due to the irregularity of income.

7) While for households, the LTV ratio of non-residential mortgage loans is regulated by financial authorities and is capped at 70% effective as of September 2022, there are no set rules for sole proprietors. The LTV ratio applied to non-residential mortgage loans to sole proprietors is most often decided at the discretion of individual lenders, based on their internal regulations, although it rarely exceeds 80%.

8) Due to the lack of data, the breakdown of non-residential mortgage loans by LTV bracket was based only on those of mutual credit cooperative (accounting for 29.7% of the aggregate balance of outstanding self-employed loans at the end of the first quarter of 2023).



Notes: 1) End of Q1 2023.

2) Based on household loans and sole proprietor loans.

3) Based on household loans and sole proprietor loans of mutual credit cooperatives.

Source: Financial institutions' business reports.

As SEBOs rely on loans to raise operating capital and take out larger loans than non-SEBOs, the debt service ratio (DSR) and interest expenses tend to be higher for self-employed households than for non-self-employed households.¹¹⁾

Also, a high percentage of loans to SEBOs are

made up of loans with a rather elevated rollover risk, such as interest only loans in which the principal is paid in a lump sum or short-term loans with a maturity of less than 12 months. As of the end of the first quarter of 2023, interest only loans account for 44.2% of all loans to loans to SEBOs, considerably higher than the corresponding figure for loans to non-SEBOs (37.7%). Meanwhile, as much as 73.2% of loans to SEBOs are loans maturing within a year. Most SEBOs are able to extend their loans for the time being.¹²⁾ However, if real estate prices continue to fall, this could lower their borrowing limit or restrict their ability to extend maturing loans.

9) The increase in the prices of medium- to large-sized retail stores (based on return on capital, Korea Real Estate Board data) slowed nationwide starting in 2022. During the fourth quarter of 2022, prices began to slide and the downward trend is currently accelerating (0.83% in Q1 2022 → 0.70% in Q3 → -0.01% in Q4 → -0.15% in Q1 2023).

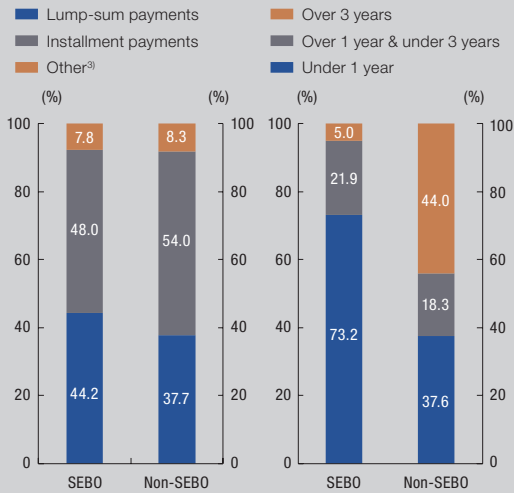
10) The auction price ratio (price / appraised value, Court auction information) of retail stores has continuously declined nationwide since the first quarter of 2022 (71.8%) to stand at 66.2% at the end of the first quarter of 2023, which is substantially lower than the corresponding figure for apartments (73.2%).

11) At the end of the first quarter of 2023, the average loan balance per self-employed borrower (Consumer Credit Panel) amounted to KRW 330 million, nearly 3.7 times the corresponding figure for non-self-employed borrowers (KRW 90 million). Meanwhile, the DSR (Household Financial Welfare Survey) of self-employed households was 33.7% as of 2021, significantly above the DSR of non-self-employed households (27.8%). Likewise, the Household Income and Expenditure Survey found that the monthly interest expense of self-employed households (KRW 144,000) was also substantially higher than that of non-self-employed households (KRW 125,000).

12) In January to March 2023, the extension rate in sole proprietor loans (based on eight banks) was quite elevated at 96.7% (96.1% on monthly average between 2012 and 2022).

Share of lump-sum & installment payments¹⁾²⁾

Share by loan maturity¹⁾⁴⁾



Notes: 1) End of Q1 2023.

2) Based on SEBO and non-SEBO household loans.

3) Capped loans, revolving, etc.

4) Based on sole proprietor loans and household loans at commercial banks.

Source: Bank of Korea staff calculation (Consumer Credit Panel), financial institutions' business reports.

Forecasting Delinquency Risk for loans to SEBOs

For a comprehensive assessment, delinquency risk was more broadly defined than under standard delinquency rate indicators by including loans at an early stage of delinquency (five business days or more past the due date) as well as

the full balances of outstanding loans to SEBOs with tax arrears in the value at risk.¹³⁾ The delinquency risk rate, calculated as the percentage of total SEBOs loans represented by loans at risk, started to pick up again since the second half of last year, concentrated in the vulnerable segment. While the delinquency risk rate of SEBOs loans edged up from 1.3% at the end of the second quarter of 2022 to 2.0% at the end of 2022, the corresponding ratio for vulnerable borrowers increased from 9.5% to 14.4% during the same period. Going forward, should the heavy debt service burden from higher interest rates be compounded by an unexpected delay in economic recovery or a persistent slump in the commercial real estate market, the delinquency risk rate could further rise, particularly among vulnerable borrowers.

Hence, a delinquency risk rate model¹⁴⁾ was constructed to estimate changes in the delinquency risk of loans to SEBOs under the scenario of a prolonged recessionary environment, accompanied by a downturn in commercial real estate prices and continuously high loan interest rates. It was assumed that the output growth in service industries would slow down this year compared to last year,¹⁵⁾ that commercial real estate prices would follow their current trend to take a minor dip,¹⁶⁾ and that loan inter-

13) Delinquency indicators commonly used to assess the soundness of loan assets are calculated based only on balances that are 30 or more days past due dates and, for this reason, may not sufficiently capture the credit risk of borrowers that are at high risk of delinquency. In the case of SEBOs, many of whom are borrowers with multiple loans (71.3% at the end of the first quarter of 2023), one delinquent or defaulted loan could lead to the delinquency or default of other loans of the same borrower.

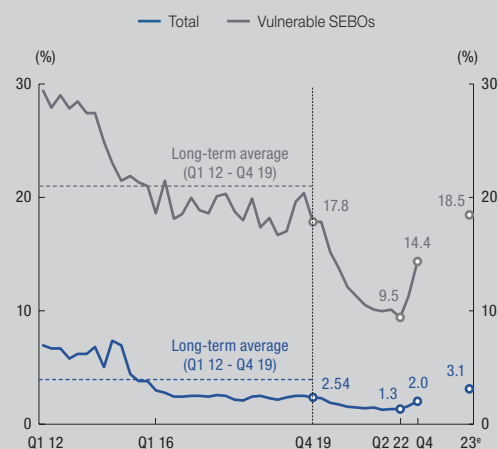
14) A linear regression model was used, including the rate of increase (year-on year basis) in output indices of service industries in the first to fourth quarters of 2022, the rate of increase (year-on year basis) in the prices of commercial property, the interest rate on SME loans (based on balance, monthly averages during the estimation period), and the delinquency risk rate of the previous period.

15) The output of the service industry is assumed to rise by 3.7% this year based on data including the economic forecast by Bank of Korea (1.4%, as of May 2023) and last year's output growth (6.0%, GDP growth of 2.6%).

16) The return on capital for commercial real estate (based on medium- to large-sized retail stores) were assumed to decline by 0.5% this year by taking into consideration the recent downward trend (-0.15% from the previous quarter during the first quarter of 2023).

est rates¹⁷⁾ would remain at their current levels until the end of 2023.¹⁸⁾ The estimation found that delinquency risk rate of SEBOs loans would rise to 3.1% (3.9% on average between 2012 and 2019) by the end of this year and the corresponding ratio for vulnerable borrowers would jump to 18.5% (long-term average of 21.6%).

Estimate of delinquency risk rate¹⁾ of SEBO loans later this year



Notes: 1) Early stage of delinquency (5 business days or more past the due date) & loans of tax delinquency borrowers / total SEBO loans.

Source: Bank of Korea staff calculation.

Implications

Even though the delinquency rate of loans to SEBOs has so far remained within an acceptable range, there are undeniable risk factors, including the vulnerability of the SEBOs' financial position to fluctuations in real estate prices, their high debt service burden, and a debt structure heavily weighted toward short-term loans and bullet loans. Going forward, should the strain from a continuously heavy loan interest rate burden be worsened by an unexpected delay in economic recovery or the downturn in the commercial property market, this could lead to a rise in delinquencies, centered in the most vulnerable segment of borrowers. However, as was seen in the above estimation, loans at risk of delinquency account for only a modest share of total loans to SEBOs, suggesting that their impact on the stability in the domestic financial system is likely to be limited.

In order to prevent a sudden and rapid surge in delinquencies on high-risk loans, in the short term, vulnerable borrowers that are likely to become delinquent must be urged to turn to debt restructuring through resources such as the New Start Fund.¹⁹⁾ In the medium and long term,

17) During the first quarter of 2023, interest rates on SME loans (balance basis, monthly average during the estimation period) by deposit-taking banks averaged to 5.3%.

18) According to financial authorities (Financial Services Commission press release, June 8, 2023), loan extension, representing 92% (KRW 78.8 trillion) of the total value of loans to SEBOs impacted by COVID-19, benefiting from the government's loan relief programs (KRW 85.3 trillion, as of the end of March 2023), is available for up to three years (until September 2025). For deferred loans, representing 8% (KRW 6.5 trillion), there will be a grace period (1 year) after the program's expiration and deferred balances can be paid on an installment plan of up to 60 months (until September 2028). In this article, the impact of the expiration of the deferment program was not considered given the fact that most borrowers (98%) that use this program have completed and submitted a payment plan and that a sufficient amount of time is being allowed to make up for the deferred principal and interest payments.

19) On October 4, 2022, the government launched a debt restructuring program (New Start Fund) for small businesses and self-employed business owners that were impacted by COVID-19, with a budget of up to KRW 30 trillion over three years. However, the total value of debt for which applications have so far been received amounts only to KRW 4.2 trillion (as of the end of May 2023, cumulative basis). To encourage more applications, they must consider either easing eligibility requirements or removing or reducing the downsides of workouts (credit penalty points, restrictions on future financial transactions).

borrowers with a stable financial position, whose income has returned to pre-pandemic levels, must be encouraged to pay back their loans, at the same time as shifting the debt structure of the SEBOs from a short-term loan to a long-term loan-centered structure, as well as one that is based on amortized loans rather than bullet loans. Meanwhile, given SEBOs' high reliance on non-residential real estate as loan collateral, changes in the prices of commercial property need to be closely monitored. In tandem, efforts must also be made to gradually build a regulatory framework for non-residential mortgage loans to SEBOs, based on a balanced approach to avoid creating sudden and excessive funding difficulties for them.

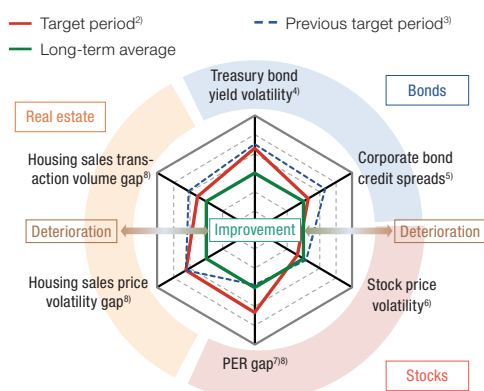
II. Asset Markets

In asset markets, Korea Treasury bond (KTB) yields fluctuated and fell significantly, due to change in expectations regarding monetary tightening at home and abroad and unrest in global banks, but rebounded in May.

Stock prices soared as foreigners' purchases flowed in amid expectations for an adjustment in the pace of interest rate hikes in major countries and a rebound in the domestic electric and electronics industry.

The decline in housing prices and leasehold deposit (jeonse) prices moderated mostly in the Seoul metropolitan area this year. On the other hand, return on equity for commercial real estate continued on a downward trend (Figure II-1).

Figure II-1. Map of changes in asset market conditions¹⁾



Notes: 1) Standardized on the basis of the long-term average (5-year) for each index, the relative levels of the target period and the previous target period are shown on the map.

2) During January to May 2023 (housing sales transaction volume gap being from January to April 2023).

3) During June to December 2022.

4) Monthly average volatility of Treasury bond yield (3-yr).

5) Corporate bond yield (A-) - Treasury bond yield (3-yr).

6) Daily average V-KOSPI.

7) MSCI (12-month forward PER).

8) The gap refers to the deviation from the long-term average of each indicator.

Source: Bank of Korea staff calculation.

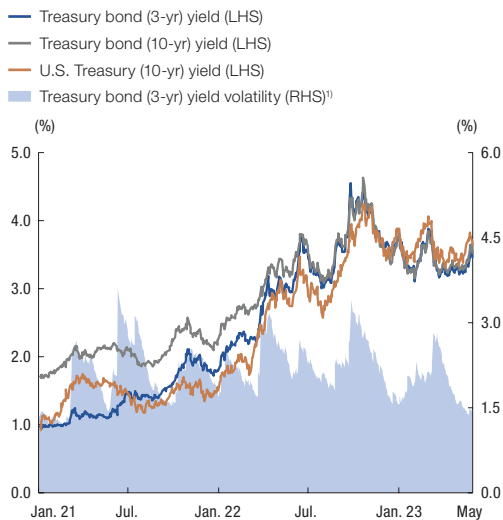
1. Bond Markets

Long-term Market Interest Rates Rebound after a Sharp Decline

KTB yields fell significantly and then rebounded on expectations for monetary tightening at home and abroad, trends of prices and economic indicators, and change in global risk aversion sentiment related to the Silicon Valley Bank (SVB) and Credit Suisse (CS) incidents in mid-March. By period, KTB yields fell sharply and remained below the Base Rate from mid-January amid the resumption of investment by institutional investors at the beginning of the year and on expectations¹⁾ that the tight monetary policy in major countries would be eased. In February, however, KTB yields rebounded significantly as concern emerged that the tightening stance would be strengthened due to solid employment indicators in the United States and Personal Consumer Expenditures (PCE) exceeding the expected value in the United States. After mid-March, however, as the preference for safe assets strengthened amid concern over defaults at banks in the United States and Europe and the expectations for interest rate hikes by the U.S. Federal Reserve weakened,²⁾ KTB yields fell below the Base Rate again. After the Monetary Policy Board meeting in April, as upside factors, such as the burden of the decline in interest rates, easing³⁾ of unrest over U.S. regional banks, and optimism for the U.S. debt ceiling negotiations, mixed with downside factors, including the assessment that the May FOMC meeting results were more relaxed than expected and U.S. price indicators dipping below the expected levels, KTB yields fluctuated within a relatively limit-

ed range (three-year, 3.20 to 3.34%). However, since mid-May, with U.S. price and employment indicators being above the expected values and given the hawkish remarks made by U.S. Federal Reserve officials, expectations for earlier interest rate cuts at home and abroad subsided, and concern⁴⁾ over the supply and demand of KTBs associated with a shortage of tax revenue emerged, leading KTB yields to rebound significantly (Figure II-2).

Figure II-2. Korean, U.S. Treasury bond yields

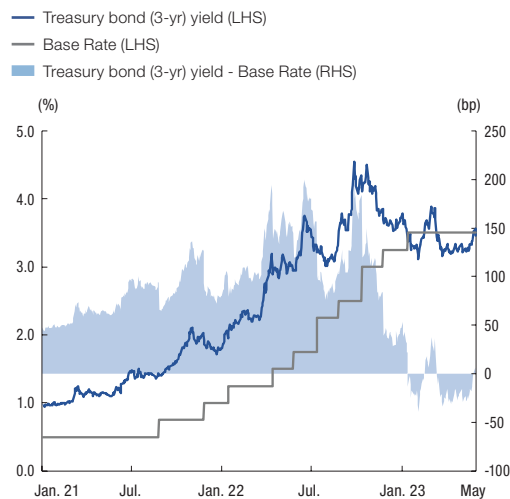


Note: 1) Daily volatility calculated using exponential weighted moving average (EWMA) method.

Source: Korea Financial Investment Association, Bloomberg.

The spread between KTBs (3-year) and the Base Rate reversed for about one month after mid-January and was relieved after mid-February. In mid-March, the spread reversed again after the SVB-CS incident. However, as KTB yields rebounded after the Monetary Policy Board meeting in May, the yield reversal was eased⁵⁾ among most maturities of KTBs (Figure II-3).

Figure II-3. Base Rate and Treasury bond yield



Source: Bank of Korea, Korea Financial Investment Association.

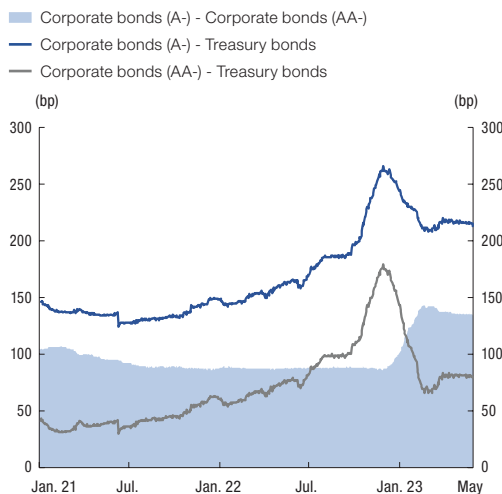
Narrowing Credit Spread of Corporate Bonds

The credit spread of corporate bonds nar-

- 1) This is attributable to the Bank of Japan's decision to maintain its yield curve control (YCC) policy (January 18), indication of the Bank of Canada's possible suspension of interest rate hikes (January 25), remarks made by U.S. Federal Reserve Chair Powell regarding disinflation (February 1), and statement made by ECB President Lagarde about more balanced inflation risk (February 2).
- 2) At the FOMC press conference on May 2, Chair Powell said that tighter credit conditions after the turmoil in the banking sector, such as the SVB incident, have the effect of replacing interest rate hikes, and the majority of FOMC participants reflected this view in the summary of their economic projections (SEP).
- 3) Due to the announcement of massive deposit withdrawals at First Republic Bank in the first quarter of 2023 and plunge in stock prices (April 25), concern over US regional banks reemerged, but with the decision of JP Morgan to take over all assets and deposits of the bank (May 1), related uneasiness subsided.
- 4) National tax revenue for January to April of 2023 (KRW 134 trillion) decreased by KRW 33.9 trillion year-on-year amid sluggish exports and declining asset prices.
- 5) After May 26, the reversal disappeared among all maturities, and as KTB yields declined slightly, yields for only three- and five-year KTBs remained reversed on May 31.

rowed substantially as the investment of institutional investors resumed at the beginning of the year, and the merit of yields over KTB yields emerged as credit concerns moderated thanks to the government's market stabilization measures. After mid-March, however, as risk aversion surged and interest rate volatility increased, investor sentiment cooled, and the credit spread of corporate bonds widened moderately. After April, despite lingering credit concerns over some vulnerable sectors, the credit spread of corporate bonds fluctuated around the level seen at the end of March due to the reduction in interest rate volatility and emergence of yield merit. Meanwhile, the spread between credit ratings (AA- and A-) widened significantly, owing to credit concerns over non-prime bonds at the beginning of the year, and then narrowed slightly after late March⁶⁾ (Figure II-4).

Figure II-4. Corporate bond credit spreads,¹⁾ and spreads across credit ratings

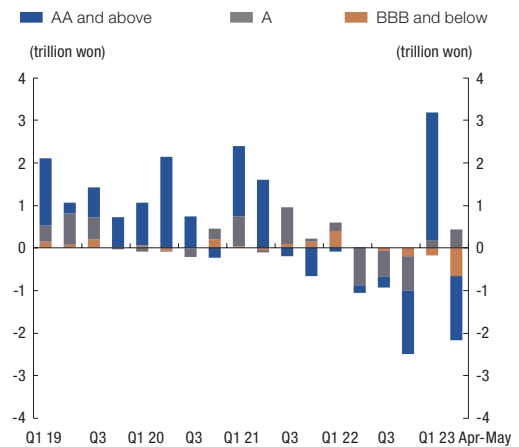


Note: 1) 3-year maturity basis.

Source: Korea Financial Investment Association.

Meanwhile, regarding corporate bond issuance in the first half of the year, a remarkable net issuance of corporate bonds was recorded until March, as companies began to raise funds amid the easing of credit concerns and the investment demand of institutional investors increased. However, the value of net issuance shrank after mid-March due to a surge in yield uncertainty and seasonal factors, followed by a significant net redemption due to the maturation of a massive amount of bonds of some companies in April and seasonal factors and an increase in bonds maturing in May (Figure II-5).

Figure II-5. Net corporate bond¹⁾ issuances²⁾



Notes: 1) Public offer basis; excluding issuance by financial companies.

2) Monthly average basis.

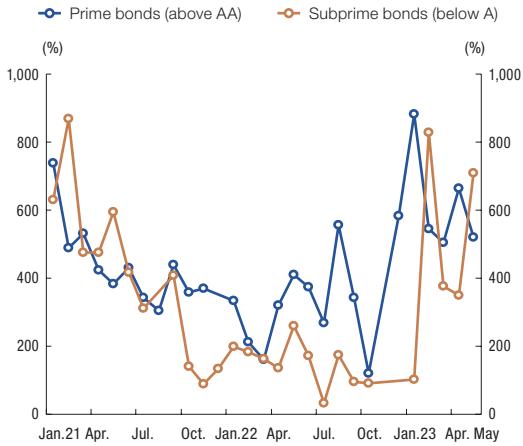
Source: Bank of Korea, Korea Securities Depository.

Participation in book building for corporate bonds rose significantly, led by prime bonds, as credit concerns eased. After mid-March, under the influence of the SVB-CS incident, participation in book building for corporate bonds moderated but, excluding firms in some

6) Spread between corporate bond credit ratings (A- minus AA-) (bp): 129 at end of January 2023 → 142 at end of February → 137 at end of March → 136 at end of April → 134 at end of May.

vulnerable sectors, remained at a high level, indicating favorable demand for investment (Figure II-6).

Figure II-6. Rate of participation¹⁾ in book-building for prime/subprime bonds²⁾



Notes: 1) Participation amount in book-building /expected issuance amount.

2) Public offer basis; excluding issuance by financial companies.

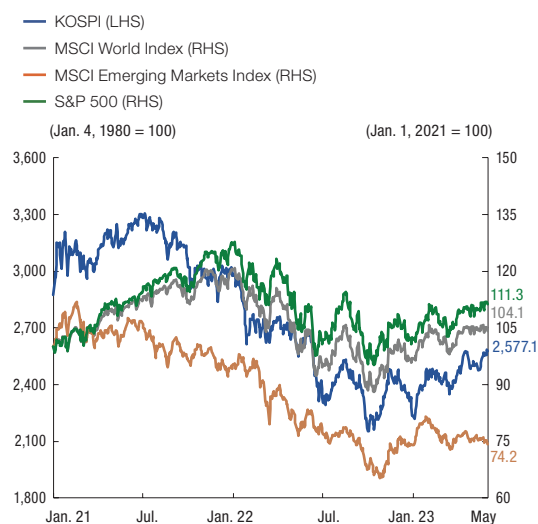
Source: Bank of Korea, Financial Supervisory Service.

2. Stock Markets

Significant Rise in Stock Prices

Stock prices rose as foreigners' purchases surged significantly at the beginning of the year on expectations for the adjustment of the pace of interest rate hikes in major countries and a rebound in the electric and electronics sector as well as the effect of China's reopening. In March, stock prices plunged as investment sentiment cooled rapidly following the SVB-CS incident and the reemergence of concern over prolonged monetary tightening by the U.S. Federal Reserve, affected by favorable U.S. employment data and hawkish remarks by U.S. Federal Reserve officials. However, thanks to prompt policy responses in major countries, moderation of expectations for tightening by the U.S. Federal Reserve, and growing expectations for improvement in the domestic electric and electronics industry, stock prices staged a substantial rebound from mid-March and then declined after late April, reflecting turmoil among U.S. regional banks, worries over delays in the U.S. debt ceiling negotiations, and vigilance over some heated stocks.⁷⁾ After late May, stock prices climbed on the back of stronger expectations for a successful U.S. debt ceiling deal and expectations for a rebound in the semiconductor industry (Figure II-7).

Figure II-7. KOSPI and global stock prices

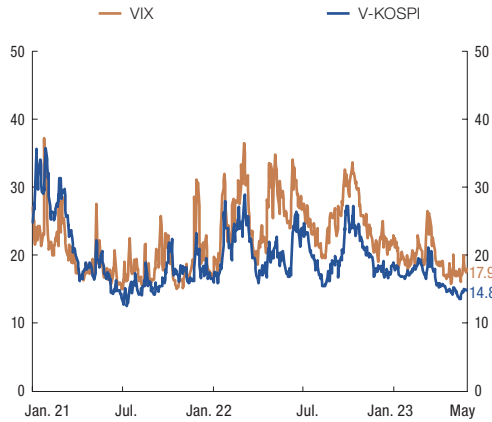


Source: KOSCOM, Bloomberg.

The KOSPI 200 volatility index (V-KOSPI) remained at a stable level overall, in line with the easing expectations for monetary tightening in major countries, and temporarily surged in March with the growing concern over unrest among global banks. Afterward, with the alleviation of market unrest after late March following policy responses in major countries, the V-KOSPI remained at a low level overall (Figure II-8).

7) While some securities companies issued warnings against short-term heating of stocks related to secondary batteries, which had rallied substantially during the first quarter of 2023, eight stocks, including Samchully Co., Ltd. and Daou Data Corp., continued to plunge rapidly, as massive amounts of selling orders for these stocks were placed through SG Securities (April 24), heightening market vigilance.

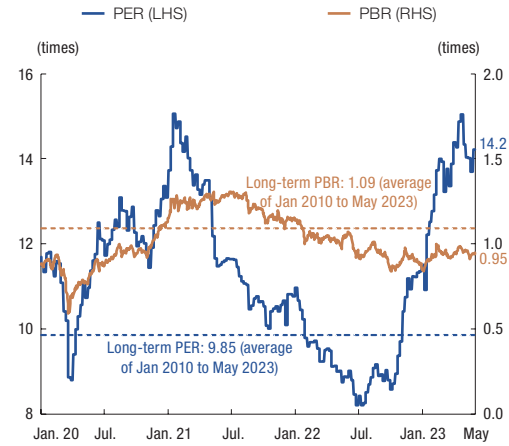
Figure II-8. Stock price volatility indices¹⁾



Note: 1) Volatility indices are calculated using prices for options on KOSPI 200 and S&P 500 indices.

Source: KOSCOM, Bloomberg.

Figure II-9. PER¹⁾ and PBR²⁾



Notes: 1) MSCI basis (12-month forward).

2) KOSPI basis.

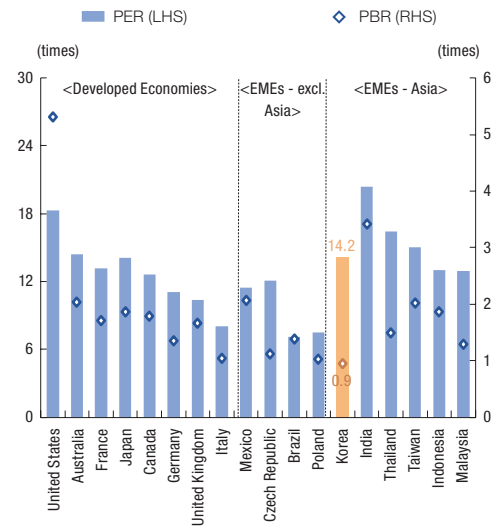
Source: Bloomberg, Refinitiv.

Rising PERs and PBRs

The average price-to-earnings ratio (PER)⁸⁾ rose to 14.2 at the end of March, well above the long-term average (9.85, since 2010), as stock prices shot up sharply amid a decline in expected earnings due to the delayed rebound of major industries, including semiconductors. Meanwhile, the average price-to-book value ratio (PBR) climbed from 0.85 at the end of 2022 to 0.95 at the end of May (Figure II-9).

The domestic market PER averages rose to a level similar to those in advanced countries and major emerging markets, while the PBR averages remained lower (Figure II-10).

Figure II-10. PERs¹⁾²⁾ and PBRs¹⁾ of major countries



Notes: 1) May 2023.

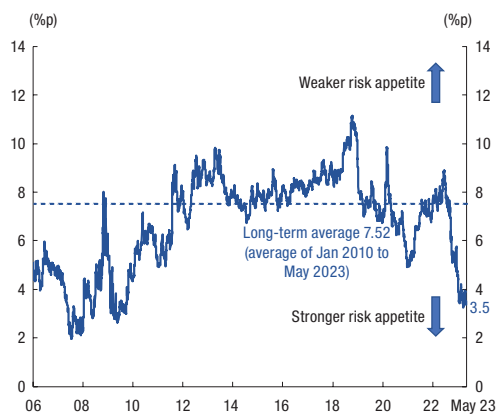
2) MSCI (12-month forward).

Source: Bloomberg, Refinitiv.

8) Based on the 12-month forward MSCI PER, the ratio is calculated by dividing the sum of stock market capitalizations of companies included in the MSCI index by the sum of their expected net profits (values forecast by Korean and foreign securities companies) for the following one-year period.

Meanwhile, the stock risk premium⁹⁾ declined rapidly as the risk appetite of investors strengthened this year, reaching 3.5%p in May, well below the long-term average (7.52%p since 2010) (Figure II-11).

Figure II-11. Stock risk premium¹⁾



Note: 1) Treasury bond (10-year) yield subtracted from the earnings-to-price ratio (reciprocal of the 12-month forward MSCI PER).

Source: Bloomberg, Refinitiv.

9) The equity risk premium is calculated by subtracting the Treasury yield(10-year) from the earnings-to-price ratio (reciprocal of MSCI-based 12-month leading PER). The fact that investors hold stock even when the excess return relative to the risk-free rate is lower than in the past means a higher risk appetite.

3. Real Estate Markets

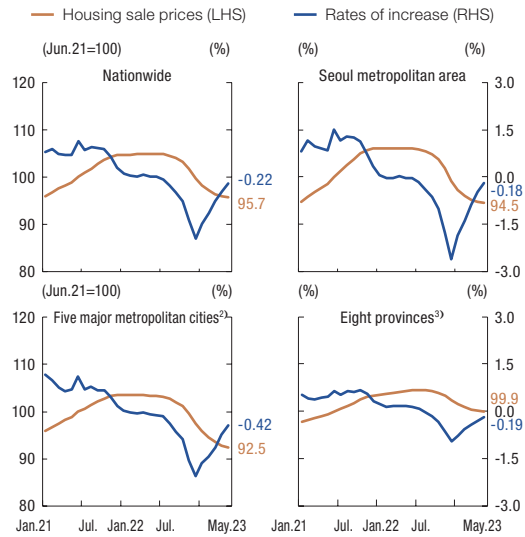
Slower Decline in Housing Prices

46

Since December 2022, the housing price decline has moderated due to the government's real estate market stabilization measure¹⁰⁾ and perceived price undervaluation. By region, the extent of the fall in housing prices is slowing in the Seoul metropolitan area, five metropolitan cities, and eight provinces.

In particular, in the Seoul metropolitan area, the decline has swiftly moderated from -2.60% in December 2022 to -0.18% in May 2023. In five metropolitan cities, it slowed from -2.05% to -0.42%. In eight provinces where housing prices had not risen significantly, the pace of the price fall has moderated from -0.96% to -0.19% (Figure II-12).

Figure II-12. Trends and rates of increase¹⁾ in housing sale prices



Notes: 1) Total of House Sales Price Index, compared to previous months.

2) Busan, Daegu, Daejeon, Gwangju, and Ulsan.

3) Gangwon, Chungbuk, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk, Gyeongnam, and Jeju.

Source: Korea Real Estate Board.

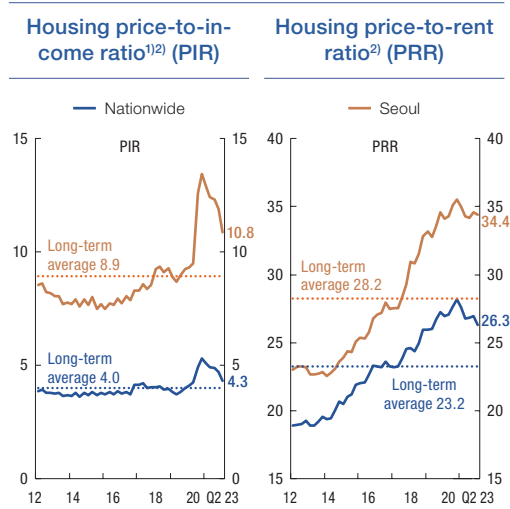
The price-to-income ratio (PIR), which compares housing prices with income, and price-to-rent ratio (PRR), which compares housing prices with rent, both declined.

In the first quarter of 2023, the PIR (nationwide) fell by 0.6 to 4.3 from the end of the third quarter of 2022 (4.9). The PRR (nationwide) has declined steadily¹¹⁾ since it peaked at 28.2 in the fourth quarter of 2021. In the first quarter of 2023, the PRR was 26.3, down by 0.5 from the third quarter of 2022 (Figure II-13).

10) On January 3, 2023, the government announced measures to ease real estate market regulation, which included the elimination of regulation zones and housing sales price-restricted zones, a reduction of the restricted period for reselling the rights to purchase newly-built apartment, an abolition of the actual residence requirement for new housing units with sales price restrictions in the Seoul metropolitan area, and the abolition of the criteria for intermediate payment loan guarantees.

11) The fall of the PRR in 2022 is mainly due to the slower decline in rents (estimated) associated with the rising conversion rate of leasehold deposits to monthly rents.

Figure II-13. Price-to-income ratio and price-to-rent ratio



Notes: 1) Housing price (third quintile) / annual household income (third quintile).

2) Housing price / annual rent.

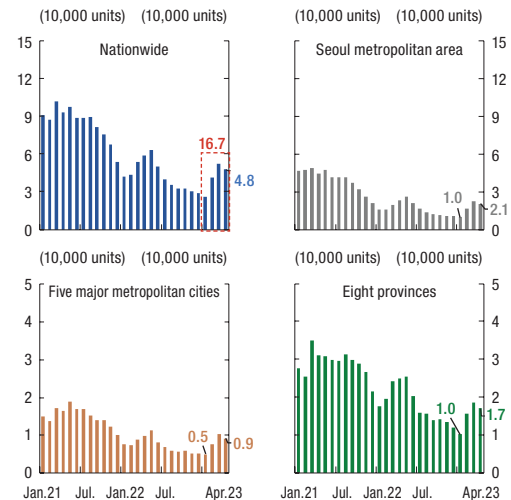
Source: Bank of Korea staff calculation, Korea Real Estate Board.

The volume of housing sales transactions, which has contracted significantly since the second half of 2022, is recovering gradually.

From January to April 2023, the volume of housing sales transactions decreased by 15.2% to 167,000 units from the same period of last year (197,000 units), although the decline has slowed considerably compared to the second half of 2022 (-56.4%). In particular, from February to April, the volume increased dramatically,¹²⁾ owing to government policies such as the Bogeumjari loan.¹³⁾ By region, in the Seoul metropolitan area, the volume of housing

sales transactions remained at 10,000 units in January, but sharply increased to 21,000 units in April. In five metropolitan cities and eight provinces, it rose from 5,000 to 9,000 units and from 10,000 to 17,000 units, respectively, during the same period. Purchase sentiment has also gradually recovered since February¹⁴⁾ (Figure II-14).

Figure II-14. Housing sale transaction volumes



Source: Ministry of Land, Infrastructure and Transport.

Eased Decline in Leasehold Deposits and Monthly Rental Prices

In the housing rental market, the downward trend in leasehold deposits *jeonse* and in monthly rental prices have both moderated.¹⁵⁾

12) Volume of housing sales transactions: 29,000 units in December 2022 → 26,000 units in January 2023 → 41,000 units in February → 52,000 units in March → 48,000 units in April

13) The *Bogeumjari loan* is a policy loan product that aims to provide low-interest funds for various purposes to people who desire to purchase housing units without concern over interest rates increasing (loan of up to KRW 500 million for a home valued at less than KRW 900 million, and within the LTV-DTI limits, Financial Services Commission press release). Caution is needed to ensure that new demand for the product does not increase to the extent that it restricts the gradual decline in household debt.

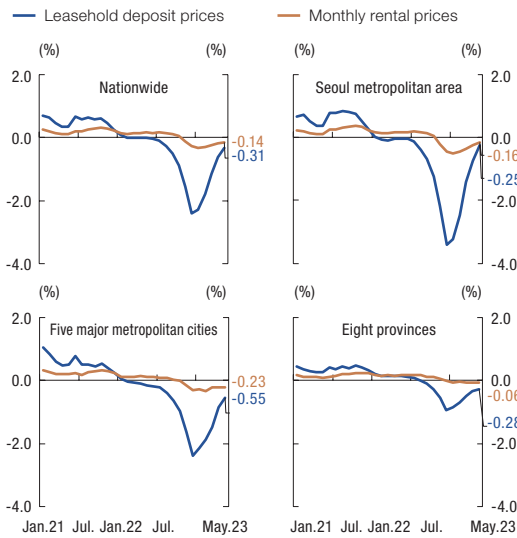
14) Buyer Superiority Index (KB Kookmin Bank): 17.9 in January 2023 → 21.1 in February → 21.9 in March → 22.3 in April → 24.8 in May

15) Growth rate of leasehold deposit prices (mom): -2.29% in January 2023 → -1.80% in February → -1.13% in March → -0.63% in April → -0.31% in May

Growth rate of monthly rental prices (mom): -0.33% in January 2023 → -0.29% in February → -0.24% in March → -0.18% in April → -0.14% in May

Leasehold deposit prices fell at a slower pace after recording a decline of 2.4% in December 2022, dropping by 0.31% in May 2023 compared with the previous month. The fall of leasehold deposit prices, which had accelerated due to the sudden drop in housing prices in the second half of 2022 and increase in new housing supply, is gradually moderating in 2023 as the decline in housing prices eased and the volume of new housing supply decreased¹⁶⁾ (Figure II-15).

Figure II-15. Rates of increase¹⁾ in leasehold deposits and monthly rental prices

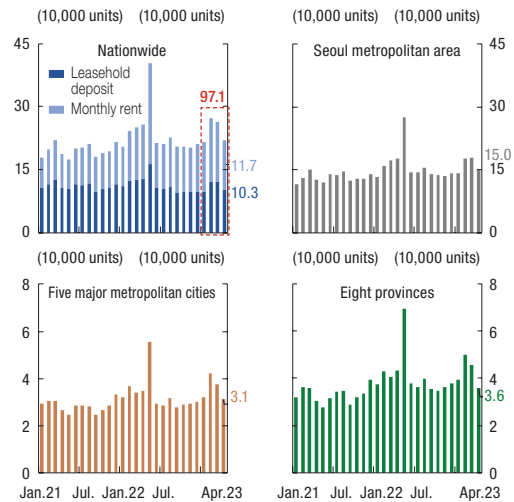


Note: 1) Compared to previous months.
Source: Korea Real Estate Board.

The transaction volume of leasehold deposits and monthly rentals amounted to 971,000 housing units from January to April of 2023, rising by 1.85% from the same period of last year (954,000 units), slower than in the second half of 2022 (5.9%). By rental type, the volume of leasehold deposit transactions was 442,000

units, down by 9.8% from the same period of last year (490,000 units), while that of monthly rentals was 530,000 units, up by 14.2% from the same period of last year (464,000 units). As a result, the proportion of monthly rentals out of the sum of leasehold deposits and monthly rentals rose by 3.9%p to 54.5% from January to April, compared with the same period of last year (50.6%) (Figure II-16).

Figure II-16. House leasehold deposits and monthly rental transaction volumes¹⁾²⁾



Notes: 1) Since June 2021, the scope of calculation has been expanded from registered fixed date data to housing rental transaction report data.
2) During May 2022, the number of reports temporarily increased due to the expiration of the guidance period for reporting rental transactions.
Source: Ministry of Land, Infrastructure and Transport.

The supply of new apartment¹⁷⁾ in 2023 is expected to exceed the previous year's level (330,000 units) and reach 362,000 units, surpassing the average level in previous years (an annual average of 332,000 units from 2013 to 2022). However, the new apartment sales

16) Monthly average new apartment supply (10,000 units): 2.4 in first half of 2022 → 3.1 in second half of 2022 → 2.6 from January to May of 2023
17) By region, in 2023, both the Seoul metropolitan area (179,000 units → 187,000 units) and non-Seoul metropolitan areas (151,000 units → 175,000 units) are expected to show an increase in new apartments over the previous year.

volume for 2023 is expected to reach 236,000 units, showing a substantial decline of 35.9% from the previous year (368,000 units) (Figure II-17).

Figure II-17. New apartment supply and new apartment sales¹⁾



Note: 1) As of June 16, 2023. Based on sum of monthly planned amount for 2023.

Source: Real Estate 114.

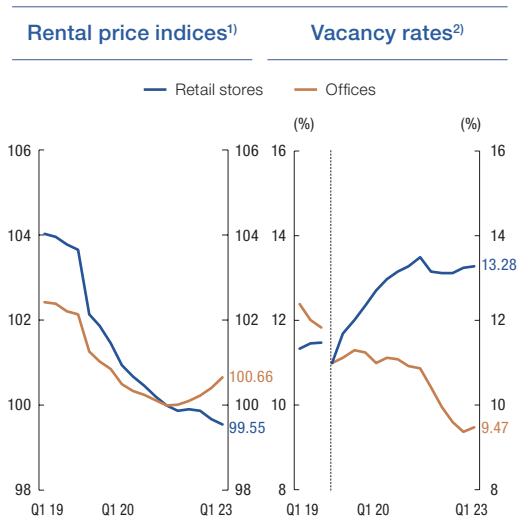
Meanwhile, the volume of unsold new apartments was 71,000 units¹⁸⁾ at the end of April 2023 (Seoul metropolitan area: 11,000 units, non-Seoul metropolitan areas: 60,000 units), showing an increase of 4.7% over the end of the previous year (68,000 units).¹⁹⁾

Continued Rise in Rent for Office and Decline in Rent for Retail Stores

At the end of the first quarter of 2023, office rental prices increased by 0.43% (100.66) compared to the third quarter of 2022 (100.23) due

to the restriction of new supply and solid demand for rentals in major office districts. On the other hand, retail rental prices slipped by 0.32% (99.55) from the third quarter of 2022 (99.87) as the recovery of domestic demand was delayed and consumption sentiment contracted.²⁰⁾ The vacancy rate for office was 9.47% as of the end of the first quarter of 2023, down 0.13% from the third quarter of 2022 (9.61%), while the vacancy rate for retail stores was 13.28%, up slightly by 0.16% from the end of the third quarter of 2022 (13.12%) (Figure II-18).

Figure II-18. Commercial real estate rental price indices and vacancy rates



Notes: 1) Q4 2021 = 100. Retail stores are based on medium- to large-sized units.

2) Interrupted due to redesign of the sample of the commercial real estate market rent survey in Q1 2020.

Source: Korea Real Estate Board.

18) Unsold new apartments, which recorded their lowest level (14,000 units) in September 2021 since statistics began to be collected in 2001, have risen since October 2021 (18,000 units at end of 2021 → 68,000 units at end of 2022 → 71,000 units at end of April 2023).

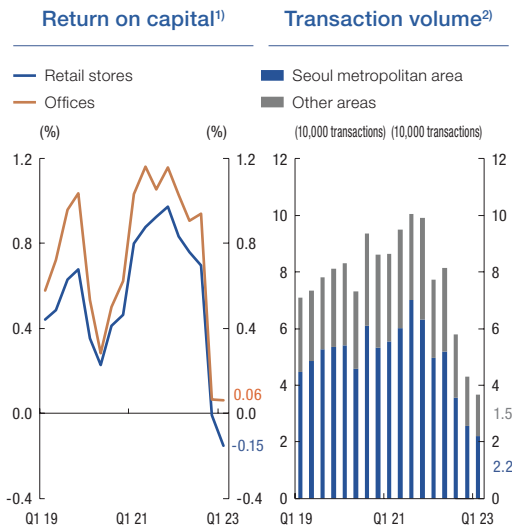
19) For details regarding unsold new housing units, refer to Analysis of Financial Stability Issues I “Review of Major Financial Stability Risks Related to Housing Market.”

20) The consumer sentiment index was 91.6 in September 2022, 90.2 in December 2022, and 92.0 in March, staying below 100 (pessimistic).

Sharply Declining Return on Capital for Office and Retail Stores

The return on capital for commercial real estate for both office and retail stores continued to decline dramatically. In the first quarter of 2023, the return on capital for offices stood at 0.06%, down 0.88%p from the third quarter of 2022 (0.94%), while the return on capital for retail stores was -0.15%, down by 0.85%p from the third quarter of 2022 (0.70%), recording negative growth. The volume of commercial real estate transactions recorded 37,000 in the first quarter of 2023, showing a significant decrease of 52.7% from the first quarter of 2022 (77,000) (Figure II-19).

Figure II-19. Return on capital and transaction volume of commercial real estate



Notes: 1) Quarter-on-quarter rate of increase in asset value reflecting changes in land and building prices. Retail stores are based on medium- to large-sized units.

2) Based on buildings used for commercial purposes, including so-called "officetels," dual-purpose one-room studios used for both commercial and residential purposes. Including transactions other than sales, such as allotments of new apartments, gifts, or exchanges.

Source: Korea Real Estate Board, Ministry of Land, Infrastructure and Transport.

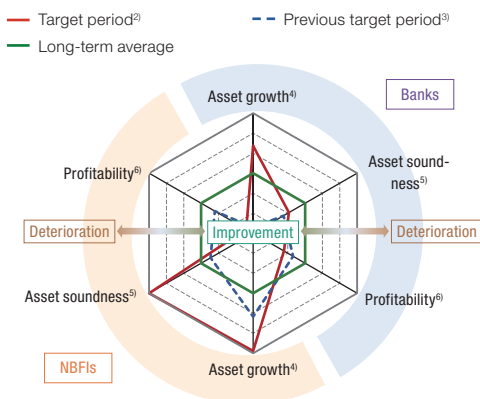
III. Financial Institutions

Commercial bank¹⁾ asset growth slowed and asset soundness decreased, although profitability remained favorable.

Asset growth of non-bank financial institutions (NBFIs) slowed significantly and asset soundness has also declined. Profitability, however, varied by sector.

Meanwhile, as mutual transactions among financial institutions increased, the risk of default contagion between financial sectors rose slightly (Figure III-1).

Figure III-1. Map of changes in financial soundness conditions at financial institutions¹⁾



Notes: 1) The standardized level of the current and the previous target periods relative to the long-term average.

2) End of Q1 2023.

3) End of Q3 2022. (For profitability, end of Q1 2022.)

4) Rate of increase in total assets.

5) Substandard-or-below loan ratio.

6) Return on assets (ROA).

Source: Bank of Korea staff calculation.

1. Banks

Declining Asset Growth

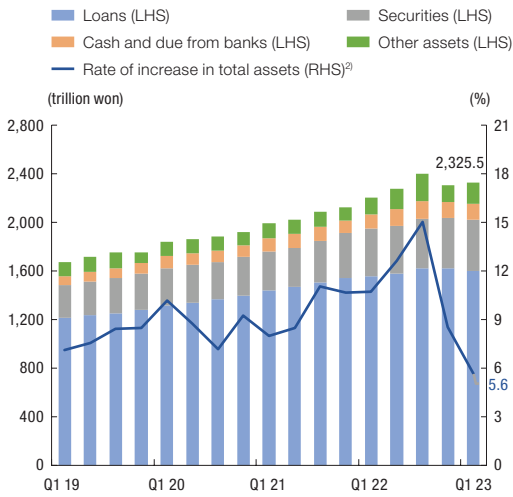
The total assets of commercial banks stood at KRW 2,326 trillion at the end of the first quarter of 2023, up 5.6% YoY, with the pace of growth slowing compared with the third quarter of 2022 (15.0%).

By asset type, loans rose by 2.6% YoY, a slower pace than in the third quarter of 2022 (8.1%). As the burden of borrowers increased due to the persistently higher loan interest rates, compared to the previous year, loans to small- and medium-sized enterprises and households showed a slower growth rate or shifted downward.²⁾ In addition, securities (8.1%) and cash and cash equivalents (12.8%) climbed more slowly than in the third quarter of last year (17.4% and 24.7%, respectively) (Figure III-2).

1) Commercial banks (nationwide and regional banks) are analyzed in the Financial Stability Report, while special banks (KDB, IBK, EXIM Bank, Nonghyup Bank, and Suhyup Bank) with different business models are not. Internet-only banks such as K-Bank, Kakao Bank, and Toss Bank are included in commercial banks.

2) Considering that household loans have been rising since April, they are expected to shift upward in the second quarter.

Figure III-2. Commercial bank total assets¹⁾



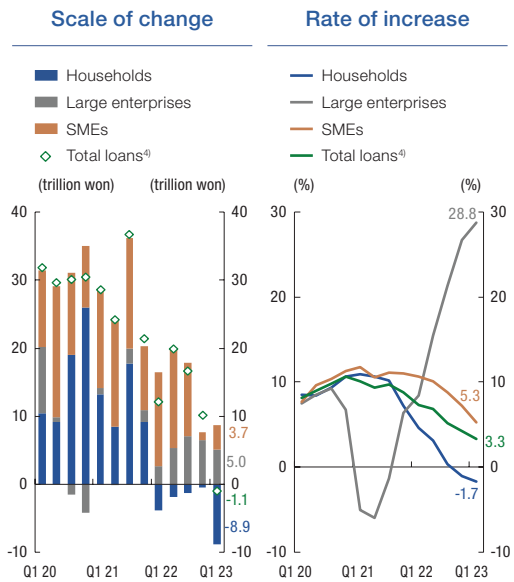
Notes: 1) End-period bank account balances.
 2) Year-on-year basis.
 Source: Commercial banks' business reports.

In terms of loans by type of borrower (Korean won-denominated loan basis), household loans decreased by KRW 8.9 trillion in the first quarter of 2023, compared to the previous quarter, and corporate loans increased by only KRW 8.7 trillion. As a result, the YoY growth rate of all loans of commercial banks in the first quarter of 2023 (3.3%) recorded the lowest level since the third quarter of 2013 (3.3%). In particular, household loans fell by the largest margin (-1.7%) since the first quarter of 1999 (-34.5%), as loan interest rates rose YoY,³⁾ and the demand for leasehold deposit funds declined.⁴⁾

Meanwhile, the growth rate of loans to large enterprises rose by 28.8% in the first quarter of 2023 as financial institutions made efforts to attract large enterprises in response to the

contraction of household loans and the conditions for raising funds in the corporate bond market deteriorated.⁵⁾ Loans to SMEs showed slower growth YoY (8.8% in third quarter of 2022 → 5.3% in first quarter of 2023) due to the growing burden of principal and interest repayment amid high interest rates and conservative lending attitude of financial institutions for risk management (Figure III-3).

Figure III-3. Scale of change¹⁾ and rate of increase²⁾ in commercial bank loans³⁾



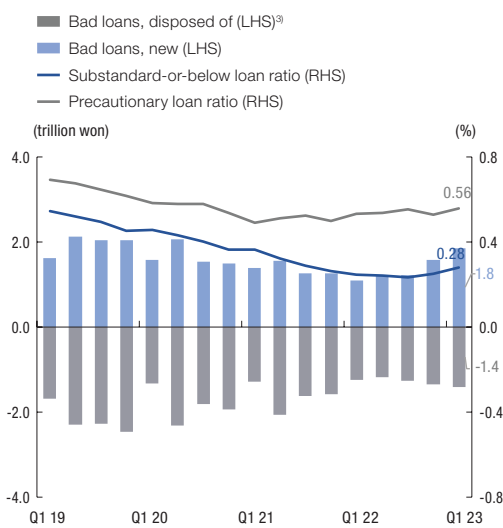
Notes: 1) Compared to previous quarters.
 2) Year-on-year basis.
 3) Bank account won-denominated loans.
 4) Including household, corporate, public purpose loans and others.
 Source: Commercial banks' business reports.

3) The household loan interest rate based on the quarterly average balance of deposit-taking banks at the end of the first quarter of 2023 was 4.93%, rising 1.76%p from the same period of last year (3.17%).
 4) In the first quarter of 2023, leasehold deposit fund loans decreased by 3.4% YoY, recording the first decline since statistics began to be collected in the first quarter of 2020.
 5) From January to March 2023, the fundraising of large enterprises through stocks and corporate bonds (excluding financial bonds and ABS) amounted to KRW 20.5 trillion, down by 17.0% YoY (KRW 24.7 trillion).

Decline in Asset Soundness

The substandard-or-below loan ratio, which is an indicator of the asset soundness of commercial banks, stood at 0.28% in the first quarter of 2023, rising 0.05%p from the end of the third quarter of 2022 (0.23%)⁶⁾ (Figure III-4).

Figure III-4. Commercial bank bad loans¹⁾ and substandard-or-below loan ratio²⁾



Notes: 1) During the period.

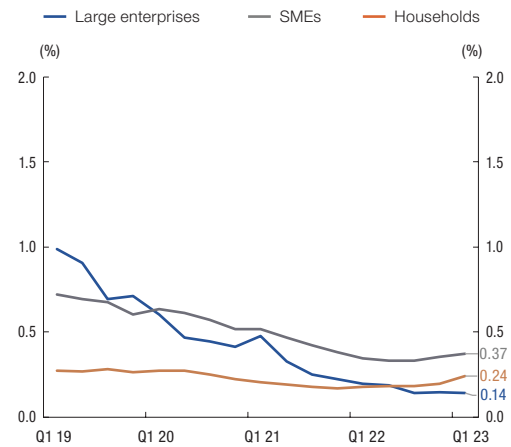
2) End-period basis.

3) Including those disposed of through loan withdrawals, loan loss write-offs, loan sales, soundness reclassifications, debt restructuring, etc.

Source: Commercial banks' business reports.

By type of borrower, the substandard-or-below loan ratios for households and SMEs were 0.24% and 0.37%, respectively, at the end of the first quarter, up 0.04%p and 0.06%p from the third quarter of 2022, while that of large enterprises recorded 0.14%, remaining unchanged from the third quarter of 2022 (Figure III-5).

Figure III-5. Commercial bank substandard-or-below loan ratios, by borrower type

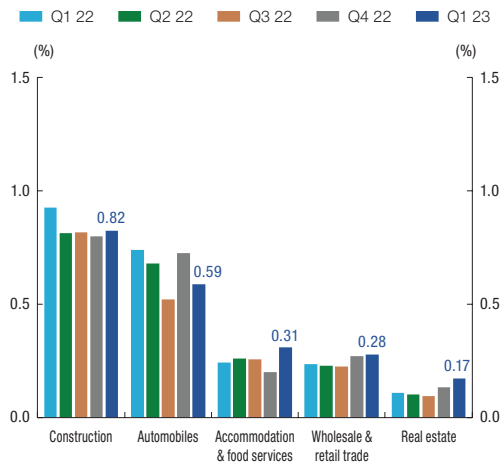


Source: Commercial banks' business reports.

Looking at the substandard-or-below loan ratio for corporate loans by industry, automobiles (0.52% in third quarter of 2022 → 0.59% in first quarter of 2023), real estate (0.10% → 0.17%), wholesale and retail trade (0.22 → 0.28%), and accommodations and restaurants (0.26% → 0.31%) all rose, while construction (0.82% → 0.82%) remained unchanged from the third quarter of 2022 (Figure III-6).

6) Meanwhile, at the end of the first quarter of 2023, the precautionary loan ratio rose by 0.01%p from the third quarter of 2022 (0.55% → 0.56%). Looking at the precautionary loan ratio by type of borrower, the ratio for household loans rose by 0.07%p (0.29% → 0.36%) from the third quarter of 2022, while the ratios for loans to large enterprises and SMEs fell by 0.16%p (1.30% → 1.14%) and 0.01%p (0.58% → 0.57%), respectively.

Figure III-6. Commercial bank substandard or below loan ratios in major industries

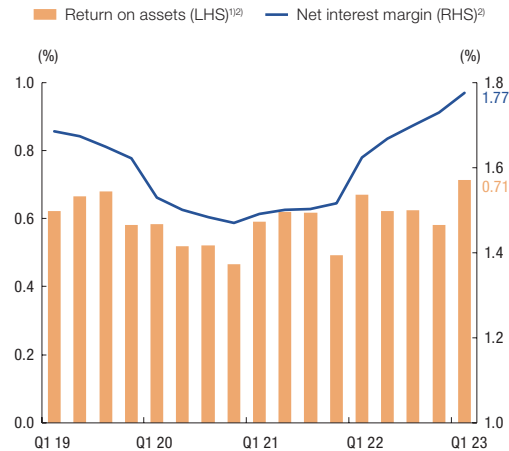


Source: Commercial banks' business reports.

Satisfactory Profitability

The profitability of commercial banks improved YoY. The return on assets (ROA) of banks was 0.71% (annualized basis) in the first quarter of 2023, the highest level since the third quarter of 2018 (0.72%). The net interest margin (NIM) stood at 1.77%, rising YoY (1.62%) owing to the widening gap between deposit and loan interest rates⁷⁾ and recording the highest level since the fourth quarter of 2014 (1.83%) (Figure III-7).

Figure III-7. Commercial bank profitability



Notes: 1) Loan loss reserves excluded.

2) Accumulated quarterly incomes, annualized.

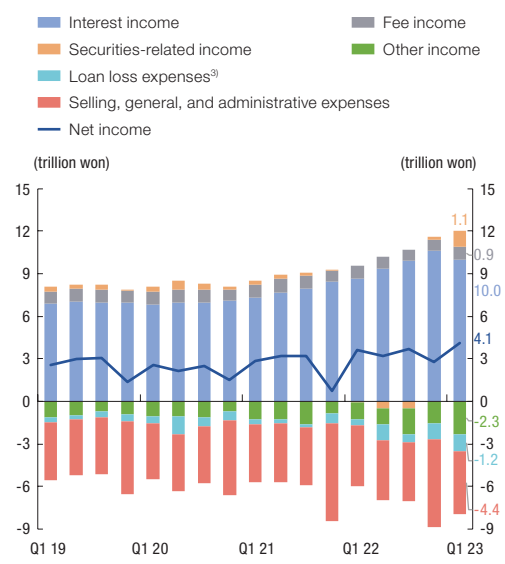
Source: Commercial banks' business reports.

The net income of commercial banks amounted to KRW 4.1 trillion in the first quarter of 2023, up KRW 0.5 trillion from the same period of the previous year (KRW 3.6 trillion). This is attributable to a surge in interest income, which expanded by KRW 1.3 trillion compared with the same period of the previous year (KRW 8.7 trillion), driven by a rising net interest spread and despite the slowing growth of loan assets. Securities-related income rose by KRW 1.2 trillion YoY, led by gains from trading, contributing to banks' total net income. Meanwhile, as banks increased their loan loss provisions⁸⁾ as a preemptive response to uncertainty, loan loss expenses climbed to KRW 1.2 trillion, up KRW 0.8 trillion from the same period of the previous year (KRW 0.4 trillion) (Figure III-8).

7) The net interest spread of deposit-taking banks based on the quarterly average balance was 2.59%p in the first quarter of 2023, rising from the same period of last year (2.28%p).

8) At the end of the first quarter of 2023, the provision coverage ratio (loan loss provisions / substandard-or-below loans) reached 224.3%, up 24.6%p YoY (199.7%).

Figure III-8. Commercial bank net income composition¹⁾²⁾



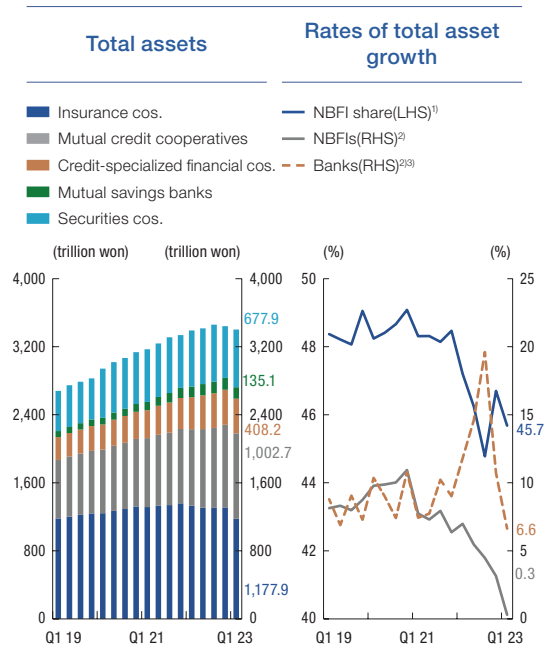
Notes: 1) Loan loss reserves excluded.
 2) During the period basis.
 3) Including bad debt expenses, net provisions transferred, and profits and losses from loan sales and purchases.
 Source: Commercial banks' business reports.

2. Non-bank Financial Institutions

Slowing Asset Growth

Total assets held by NBFIs at the end of the first quarter of 2023 stood at KRW 3,401.7 trillion, up only 0.3% YoY, showing that the rate of growth is slowing rapidly. As a result, the proportion of total assets held by NBFIs in the overall financial sector⁹⁾ (KRW 7,446.7 trillion) fell to 45.7% at the end of the first quarter of 2023¹⁰⁾ (Figure III-9).

Figure III-9. NBF total assets, growth rate



Notes: 1) Total assets of NBFIs / (Total assets of banks + Total assets of NBFIs).
 2) Year-on-year basis.
 3) Including commercial banks, specialized banks, and foreign bank branches.

Source: Financial institutions' business reports.

By type of NBF, the assets of insurance companies declined by 11.5% YoY due to the application of new insurance accounting standards,¹¹⁾ while the assets of securities companies rose by only 1.2% YoY owing to a decrease in investor deposits regarding stock investment.¹²⁾ The assets of savings banks

9) This includes banks and NBFIs. Banks include commercial banks, special banks, and Korean branches of foreign banks.

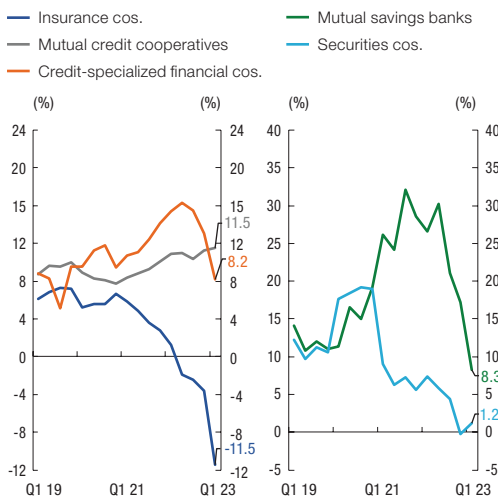
10) In the third quarter of 2022, the proportion of NBFIs temporarily declined temporarily and significantly, which is attributable to banks' substantial expansion of the issuance of bank debentures prior to the normalization of the LCR regulation. (The LCR was originally scheduled to rise to 92.5% by the end of 2022, but was postponed by six months at the end of October 2022).

11) As financial assets classification and measurement standards were changed from the existing IAS 39 to IFRS 9 in 2023, evaluation method was changed from cost-based to market value in some financial assets, resulted in declining in asset value due to the rise of interest rates during the period. Furthermore, as the accounting standards related to insurance contracts were changed from IFRS 4 to IFRS 17, deferred acquisition cost, which was an asset item (1.0% of total assets as of the end of 2022), was excluded from assets. In addition, as insurance contract loans (4.7% of total assets) were changed to be deducted from insurance liabilities, liabilities decreased. For details, refer to Box 4 (Impact of the Introduction of New Reporting Standards on Insurance Companies' Financial Status and Assessment).

climbed by 8.3% YoY, significantly slower, in line with the slower loan growth associated with rising funding interest rates and deterioration of asset soundness. The assets of credit-specialized financial companies grew only by 8.2% YoY, reflecting the moderating loan growth of capital companies.¹³⁾

On the other hand, the total assets of mutual credit cooperatives rose 11.5% YoY, continuing their solid growth, driven by corporate loans (Figure III-10).

Figure III-10. NBFIs rates of total asset growth by sector¹⁾²⁾



Notes: 1) Year-on-year basis.

2) Excluding accounts receivable for securities companies.

Source: Financial institutions' business reports.

Deterioration of Asset Soundness

The asset soundness of NBFIs fell in all sectors.

The substandard-or-below loan ratio of savings banks stood at 4.64% at the end of the first quarter of 2023, shifting to an increase from the third quarter of 2022 as loans decreased from the third quarter of 2022 and the amount of substandard-or-below loans rose rapidly.¹⁴⁾ The substandard-or-below loan ratio of mutual credit cooperatives rose to 2.94% as substandard-or-below loans increased rapidly, led by corporate loans. Also, the ratio of credit-specialized financial companies reached 1.50%, showing an upward trend from the end of the third quarter of 2022. The substandard-or-below loan ratio of insurance companies remained low at 0.29% (Figure III-11).

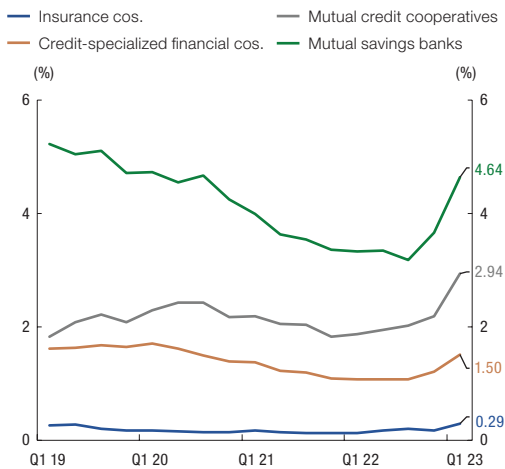
The decline in the asset soundness of NBFIs seems to be attributable to the increased debt repayment burden associated with interest rate hikes and the rise in the delinquency rate of real estate-related corporate loans amid the sluggishness of the real estate sector.

12) Customer deposits with securities companies fell due to the contraction of investment sentiment amid the rising interest rates and economic downturn in 2022 and picked up back in 2023, but remained at a level lower than in the same period of last year (-20.0% at end of first quarter of 2023).

13) So far, capital companies have expanded their loans to households and businesses (annual growth rate from 2018 to 2022 of 3.4% and 17.1%, respectively) in response to growing competition in the installment and lease financing sectors, leading to high asset growth. However, in 2022, they restricted new loans amid rising funding interest rates and the slump in the real estate sector in the second half of the year. As a result, in the first quarter of 2023, household loans declined by 12.2%, while corporate loans grew much more slowly (4.2%).

14) Total loans of savings banks at the end of the first quarter of 2023 decreased by 4.1% from the third quarter of 2022, while the balance of substandard-or-below loans soared by 40.2%. By borrower type, substandard-or-below loans to households rose by 13.3%, while those issued to businesses jumped by 70.5%, showing a significant increase.

Figure III-11. NBFIs substandard-or-below loan ratios



Source: Financial institutions' business reports.

Profitability Varying by Sector

The profitability of insurance and securities companies improved, while that of credit-specialized financial companies remained at the level seen last year. On the other hand, mutual credit cooperatives and savings banks saw their profitability decline.

In the first quarter of 2023, the ROA of insurance companies was 1.70%, up 0.80%p YoY due to the change in the insurance profit recognition standard¹⁵⁾ with the introduction

of IFRS 17 as well as the rise in the valuation gain of financial assets recognized in the current period with the introduction of IFRS 9. The ROA of securities companies recorded 2.42%, up 1.13%p YoY due to the increase in valuation gain from securities and dividend income.¹⁶⁾ The ROA of credit-specialized financial companies stood at 2.03%, similar to the level seen in same period of last year (2.11%), thanks to the reversal¹⁷⁾ of the loan loss reserves of credit card companies after a system change and despite an increase in interest expenses.

On the other hand, the ROA of mutual credit cooperatives stood at 0.46%, down by 0.19%p YoY in the first half of 2023, as a result of an increase of loan loss expenses associated with the rising delinquency rate. The ROA of savings banks was -0.15%, recording the first negative value since the third quarter of 2014, owing to the contraction of interest income caused by the rising deposit interest rates and increase in loan loss expenses along with the rising delinquency rate¹⁸⁾ (Figures III-12 and III-13).

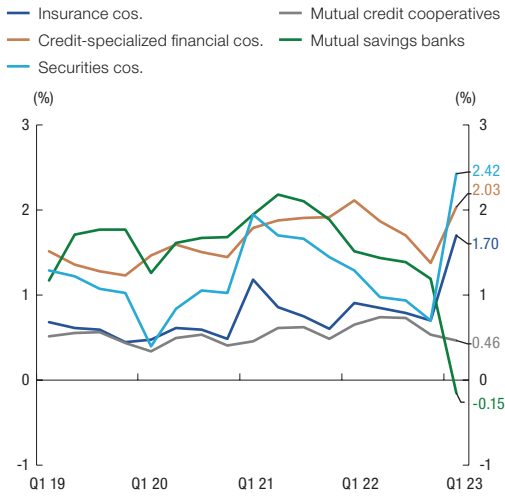
15) In 2023, the accounting standard for insurance contracts for insurance companies was changed from IFRS 4 to IFRS 17. The standard for insurance profit recognition was changed from a cash basis to an accrual basis, and the period for the amortization of acquisition costs was changed from a maximum of seven years to the entire term of an insurance contract.

16) In the first quarter of 2023, some securities companies earned large amounts of dividend income temporarily (KRW 1.7 trillion).

17) The credit conversion factor for credit sales and unused card loan commitments of credit card companies for which loan loss reserves are provided was adjusted down to the level of other financial sectors, such as banks and insurance companies (50% → 40%). As a result, the amount of provisions required by supervisory regulations decreased, leading to the reversal of loan loss reserves.

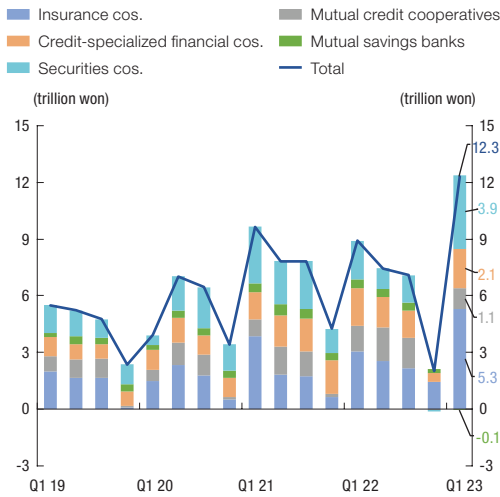
18) The delinquency rate of savings banks was 5.06% at the end of the first quarter of 2022, up 2.48%p. By borrower type, the delinquency rate of household loans was 5.58%, up by 1.49%p YoY, while that of corporate loans was 5.07%, up 3.21%p YoY, showing that the delinquency rate increased more for corporate loans. As a result, loan loss expenses were KRW 1.0 trillion in the first quarter of 2023, up by KRW 0.7 trillion YoY.

Figure III-12. NBFi ROAs¹⁾



Note: 1) Accumulated quarterly incomes, annualized.
Source: Financial institutions' business reports.

Figure III-13. NBFi net income¹⁾



Note: 1) During the quarter.
Source: Financial institutions' business reports.

3. Interconnectedness

Increased Growth in Mutual Transactions

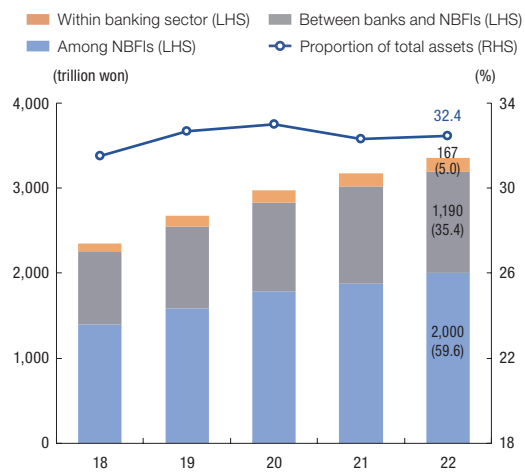
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Mutual transactions between financial institutions¹⁹⁾ reached KRW 3,357 trillion at the end of 2022, up by 5.8% YoY, but the rate of growth moderated slightly.²⁰⁾ This is attributable mainly to the decrease²¹⁾ in investment in bonds by insurance and securities companies due to the rising interest rates despite the increase in derivatives transactions of banks and branches of foreign banks amid the heightened volatility in financial markets last year. Meanwhile, the share of mutual transactions out of the total assets of the financial sector (KRW 10,347 trillion, based on flow of funds statistics) was 32.4% at the end of 2022, similar to the level recorded at the end of 2021 (32.3%).

As for mutual transactions between financial institutions by sector, transactions between banks²²⁾ (KRW 167 trillion) rose by 11.4% YoY due to an increase in banks' purchasing bonds issued by special banks, showing the highest growth rate of all sectors. Transactions between NBFIs (KRW 2,000 trillion) increased

by 6.6% YoY owing to an increase in investment funds operated by insurance companies and trusts' fund operation with securities companies. Mutual transactions between banks and NBFIs (KRW 1,190 trillion) rose by 3.8%, reflecting an increase in non-bank deposit-taking institutions' fund operation with banks²³⁾ (Figure III-14).

Figure III-14. Mutual transactions among financial institutions and across sectors¹⁾²⁾



Notes: 1) Mutual transaction amounts are on an end-period basis (flow of funds statistics).

2) Figures in () are the proportion of the total amount of mutual transactions.

Source: Bank of Korea.

19) Based on detailed data about financial assets and liabilities, cash and deposits, borrowings, securities, and other details in the flow of funds statistics, the degree of interconnectedness among financial institutions is analyzed for 19 individual banks, 34 financial sectors, and nine other sectors, with 48 financial products, including deposits, loans, and derivative products. For details, refer to the December 2016 Financial Stability Report, Analysis of Financial Stability Issues, III "Analysis of Banking System Interconnectedness, and Measurement of Cross-sectional Systemic Risk."

20) The YoY growth rate of mutual transactions between financial institutions was 11.2% at the end of 2020, 6.5% at the end of 2021, and 5.8% at the end of 2022.

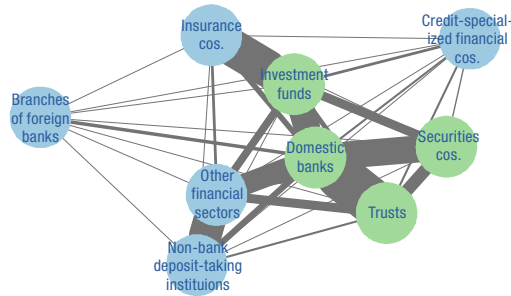
21) Changes in bond investment in 2021 and 2022: insurance companies, + KRW 1.5 trillion → -15.5 trillion; securities companies, + KRW 6.0 trillion → -15.2 trillion.

22) "Banks" refers to domestic banks, including commercial banks and special banks. Korean branches of foreign banks were included in the non-banking sector for analysis.

23) The value of non-bank deposit-taking institutions' fund operations with banks increased from KRW 62.4 trillion at the end of 2021 to KRW 74.1 trillion at the end of 2022.

By financial sector, domestic banks, securities companies, trusts, and investment funds are playing central roles in mutual transactions between financial sectors. As for the size of mutual transactions between financial sectors at the end of 2022, mutual transactions between banks and trusts were the largest (KRW 270.7 trillion), followed by transactions between insurance companies and investment funds (KRW 241.7 trillion) and between securities companies and banks (KRW 207.6 trillion) (Figure III-15, Table III-1).

Figure III-15. Map of financial sector interconnectedness¹⁾²⁾³⁾



- Notes: 1) The green dot (●) indicates the four highest-ranked financial sectors in terms of their mutual transaction volumes.
 2) Using a network visualization analysis, line thicknesses are all proportional to the mutual transaction volumes.
 3) End of 2022.

Source: Bank of Korea.

Table III-1. Volumes of mutual transactions across financial sectors¹⁾

(trillion won)

Sectors	Domestic banks	Branches of foreign banks	Trusts	Investment funds	Insurance cos.	Securities cos.	Others ²⁾
Domestic banks	167.5	44.7	257.9	130.6	81.5	159.4	188.2
Branches of foreign banks	29.8	36.3	6.7	7.3	4.4	11.9	8.8
Trusts	12.8	5.3	60.4	15.7	19.0	18.9	86.8
Investment funds	73.0	1.7	70.2	43.1	235.3	60.1	70.3
Insurance cos.	13.2	4.8	6.7	6.4	19.4	5.5	10.9
Securities cos.	48.2	16.2	123.5	59.2	25.6	109.7	42.5
Others	150.5	11.8	142.5	121.4	83.8	98.9	349.0

Notes: 1) The horizontal sector refers to fundraising from the vertical sector, while the vertical sector means fund management through the horizontal sector.

2) Credit-specialized financial cos., non-bank deposit-taking institutions, etc.

Source: Bank of Korea.

Looking at mutual transactions by product, transactions in derivatives and stocks increased. Notably, the value of derivative transactions jumped in line with the surge in foreign exchange swaps²⁴⁾ between banks and branches of foreign banks (KRW 60.1 trillion → KRW 131.0 trillion) (Table III-2).

24) At the end of 2022, the balance of derivatives at deposit-taking institutions amounted to KRW 195 trillion, 2.4 times the balance at the end of 2021 (KRW 81 trillion), which is mainly attributable to a surge in demand for swap transactions amid an increase in the exchange rates (end of 2021, KRW 1,185 → end of 2022 KRW 1,267) and higher market interest rates (three-year Treasury bonds, end of 2021 1.80% → end of 2022 3.73%).

Table III-2. Volumes of mutual transactions across financial sectors, by product

(trillion won, %)

Product	End of 2021		End of 2022		B-A
	Amount (A)	Share	Amount (A)	Share	
Deposits	778.1	24.5	803.0	23.9	24.9
Bonds	716.3	22.6	709.6	21.1	-6.7
Stocks ¹⁾	657.1	20.7	706.0	21.0	48.9
Loans	153.6	4.8	195.4	5.8	41.8
Repos	172.8	5.4	178.4	5.3	5.6
Derivatives	60.1	1.9	131.0	3.9	70.9

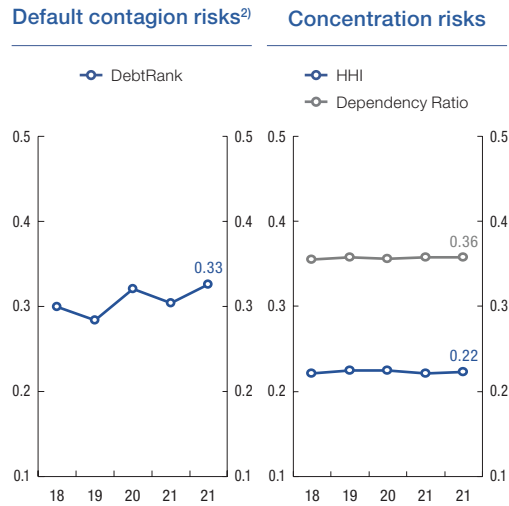
Note: 1) Including investment fund shares, equity-linked securities (ELS), etc.

Source: Bank of Korea.

Slight Rise in Default Contagion Risk

DebtRank,²⁵⁾ an indicator of default contagion risk, rose slightly YoY in transactions between financial sectors, owing to an increase in foreign exchange swap transactions by branches of foreign banks. Meanwhile, the Herfindahl-Hirschman Index (HHI),²⁶⁾ which indicates the concentration risk and the dependency ratio²⁷⁾ of a single counterparty in mutual transactions between financial sectors, remained at a level generally similar to that of the same period of last year (Figure III-16).

Figure III-16. Default contagion and concentration risks among financial sectors¹⁾



Notes: 1) End-period basis.

2) This refers to the average ratio of aggregate losses resulting from the bankruptcy of a specific sector, relative to total financial sector assets. The higher the value, the higher the risk of default contagion.

Source: Bank of Korea.

25) As the simple average of the ratio of aggregate losses incurred when a shock from the insolvency of an individual sector (a bank) spreads to its transaction counterparties through their mutual exposure, relative to total financial (banking) sector assets, a DebtRank of 0.05 means that losses following the insolvency of an individual sector (banking) will, on average, give rise to a loss of 5% of total financial (banking) sector assets (Battiston et al. "DebtRank: Too Central to Fail - Financial Networks, the Fed, and Systemic Risk," 2012).

26) The HHI is the weighted average value of the summed squares of the proportions of individual sector transactions with other sectors and indicates the level of dependence on a small number of transaction counterparties. The shares of transactions and weight were based on the size of the funding transactions.

27) The dependency ratio is the weighted average value of the proportion of individual sector transactions with the single sector with which they have the largest transaction values and signifies the level of dependence on a single transaction counterparty. The shares of transactions and weight are based on the size of the funding transactions.

Box 3.

Assessment of Internet-only Banks and Implications¹⁾

After their first introduction in 2017, domestic internet-only banks²⁾ have experienced rapid growth, with the number of customers skyrocketing from 5.6 million (at the end of 2017) to 34.3 million at the end of 2022. Although internet-only banks have helped spur competition in the banking industry³⁾ by capitalizing on the convenience of non-face-to-face banking and offering competitive interest rates thanks to low overhead costs, since the recent bankruptcy of Silicon Valley Bank (hereafter “SVB”), their management practices and financial positions have become a focus of renewed attention. Below is an examination of the general operating status of internet-only banks and their funding structure and asset composition, accompanied by implications.

General Status

At of the end of April 2023, internet-only banks’ total assets amounted to KRW 92.0 trillion,

representing a year-on-year increase of 16.9%. Although their asset growth rate slowed sharply during 2021 when the momentum created by the launch of Toss Bank fizzled out, it still outstrips the average rate among the four major commercial banks (4.6%). Until the first half of last year, they rapidly expanded their holdings of marketable securities, including government and public bonds, in a bid to boost their capital adequacy ratio and liquidity position. Later, from the second half onwards, asset growth has been primarily driven by loans.⁴⁾

In terms of profitability, internet-only banks’ interest income increased significantly since the second half of last year, on the widening of loan-deposit margins.⁵⁾ However, their net income still remains rather low (KRW 80 billion in Q1 2023) due to the initial IT investment costs, loan loss expenses and securities-related losses, as well as a non-diversified revenue base. As a result, the return on assets (ROA) of internet-only banks (0.51% in Q1 2023) continues to be below the level among other traditional banks (0.74%).

1) This article was authored by Kim Ja-hye, Hong Jun-eui, Park Seo-jung (Bank Risk Analysis Team), and Lim Young-ju (Internet Bank Team) and was reviewed by Lee Jong-han (director of the Financial Risk Analysis Division), Park Jang-ho (head of the Bank Risk Analysis Team), and Lee Jang-wook (head of the Internet Bank Team).

2) In 2017, K-Bank (in April) and KakaoBank (in July) were licensed and opened as a bank, followed by Toss Bank launched in October 2021. In this article, the status of internet-only banks is examined based on aggregate sector-wide data. Because of this, some results of analysis may not reflect the circumstances of individual banks.

3) See “Effects of the Introduction of Internet-only Banks and Policy Tasks” (Kim, Oh and Lim, 2021). However, some studies found that the actual competition-promoting effects of internet-only banks are fairly limited as they are still too modest-sized operations to meaningfully compete with legacy banks (Financial Services Commission Financial Industry Competition Assessment Committee, 2022).

4) While the rate of increase in marketable securities holdings fell drastically from 311.5% (YoY) at the end of June 2022 to 6.1% at the end of April 2023, won-denominated loans grew steadily at a rate of close to 40% during the same period.

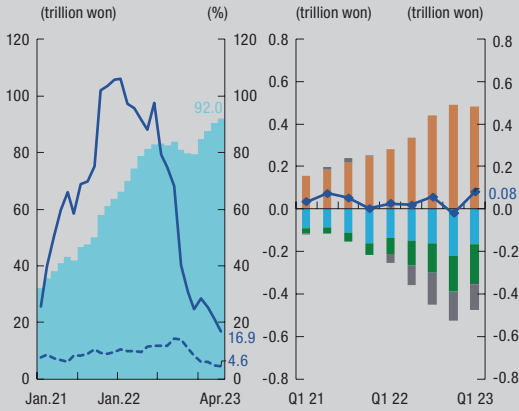
5) At the end of March 2023, internet-only banks’ net interest margin (NIM) stood at 2.29%, up by 0.65%p year-over-year.

Total asset size and growth rate¹⁾

Size (LHS)
 Growth rate (internet-only banks, RHS)
 Growth rate (four major commercial banks, RHS)

Selling, general and administrative expenses

Selling, general and administrative expenses
 Interest gain or loss
 Loan loss expenses
 Non-interest gain or loss
 Net income



Note: 1) Year-on-year basis.
 Source: Financial institutions' business reports.

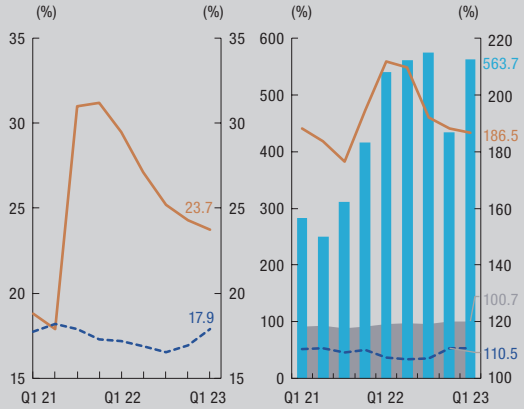
Meanwhile, internet-only banks have maintained a sound level of loss absorption capacity and liquidity coverage.⁶⁾ Their BIS capital adequacy ratio was recorded at 23.7% at the end of March 2023, far exceeding the corresponding figure for the four major commercial banks (17.9%) as well as the regulatory minimum (10.5%). Their liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) at 563.7% and 186.5%, respectively, also largely exceed the regulatory minimums (LCR of 92.5% between October 2022 and June 2023).

Total capital ratios¹⁾

Internet-only banks²⁾
 Four major commercial banks

Regulatory liquidity ratio¹⁾

LCR (four major commercial banks, LHS)
 LCR (internet-only banks, LHS)
 NSFR (internet-only banks, RHS)
 NSFR (four major commercial banks, RHS)



Notes: 1) End-period basis (LCR is monthly average balance basis).

2) The total capital ratio increased significantly due to the launch of new banks and the recapitalization of existing banks in 2021.

Source: Financial institutions' business reports.

Funding and Asset Composition

Compared to traditional banks, the funding and asset composition of domestic internet-only banks are more heavily weighted toward deposits and securities, respectively. In what follows, the funding structure and asset allocation of internet-only banks are examined in detail to assess the stability of deposits and the soundness of their loan and securities portfolios.

6) This is mainly thanks to their funding structure reliant on retail deposits and large holdings of high-quality liquid assets such as government and public bonds.

Funding and asset operation structure¹⁾²⁾

(%)

Assets		Liabilities and Equity	
Cash and deposits	6.9 (5.8)	Demand deposits	59.6 (28.0)
Securities	32.6 (18.1)	Other savings deposits	27.7 (36.2)
Loans	55.9 (62.6)	Wholesale funding	1.3 (6.6)
Fixed assets	0.4 (0.8)	Other liabilities	1.6 (22.9)
Other	4.2 (12.7)	Equity	9.8 (6.3)

Notes: 1) Percentage of total assets as of the end of March 2023.

2) Figures in parentheses represent the proportion at the four major commercial banks.

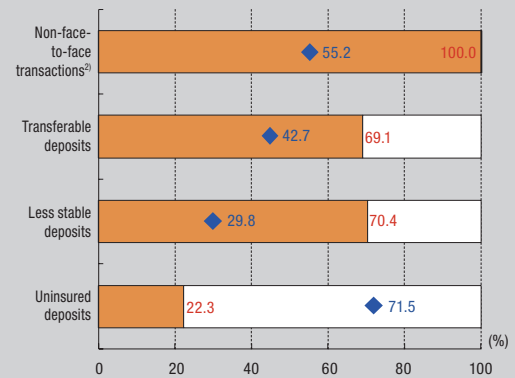
Source: Financial institutions' business reports.

Stability of Deposits

Internet-only banks rely more heavily on deposits for funding than traditional banks. Due to an online-based business model, all deposits with internet-only banks are non-face-to-face deposits and demand deposits (69.1%) and less stable deposits according to the Basel III criteria⁷⁾ (70.4%) account for high percentages of them, far above those for the top four nationwide banks (42.7% and 29.8%, respectively). This

could suggest a comparatively low stability of internet-only banks' deposits. However, depositors' concerns about the stability of funds are significantly allayed by the fact that most deposits are small-value retail deposits and that 77.7% of them are protected under the government's deposit insurance scheme and only 22.3% are not covered.⁸⁾

Indicators of stability of deposits¹⁾



Notes: 1) Percentage of total deposits as of the end of March 2023.

The diamond (◆) represents the figures at the four major commercial banks.

2) Sum of internet, mobile and phone banking, and CD/ATM transactions.

Source: Financial institutions' business reports, Korea Deposit Insurance Corporation.

7) Under the LCR framework, deposits that are fully insured, deposits linked to a checking account, including a payroll direct deposit account, or deposits by customers with an established relationship with the bank are classified as stable deposits, to which a run-off rate of 5% is applied. Other retail deposits are classified as less stable deposits to which a run-off rate of 10% is assigned.

8) Including balances in excess of KRW 50 million of insured deposits and uninsured deposits. The table below lists the value of uninsured deposits as of the end of March 2023 (Korea Deposit Insurance Corporation):

Size of uninsured deposits at the end of March 2023

(trillion won)

Protected deposits		Non-protected deposits(B)	Total deposits	(A+B) Uninsured deposits
KRW 50 mil or less	More than KRW 50 mil(A)			
61.4	17.4	0.2	78.9	17.6

Sources: Korea Deposit Insurance Corporation.

9) Based on the "Internet-only Banks to Increase Credit Lending to Individuals with Mid to Low Credit Standings" (joint press release of the Financial Services Commission and the Financial Supervisory Service, May 2021), financial authorities are set to raise the share of loans to mid to low credit holders in total loans by internet-only banks to over 30% by the end of 2023. KakaoBank, K-Bank, and Toss Bank are each working toward a target goal of 30%, 32%, and 44%, respectively.

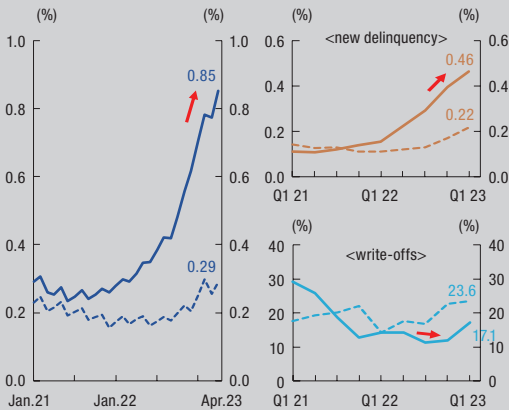
Loan Soundness

66

Amid a continuously solid growth in internet-only banks' loans (39.7% at the end of April 2023), driven by household loans, their delinquency rate has also continuously climbed since 2022 to reach 0.85%, more than twice the rate among traditional brick-and-mortar banks. This is due to a recent surge in new delinquencies, caused by the expansion of loans to medium and low credit borrowers,⁹⁾ delinquencies on loans initially issued by new banks, and the increased interest burden on borrowers amid higher loan interest rates, combined with a rise in debt restructuring requests by borrowers delaying the write-offs of delinquent loans.

internet-only banks, enhancing vulnerable populations' financial access and contributing to financial inclusion, it can also have a negative outcome on the soundness of loan assets. Variable rate loans (including hybrid rate loans, based on unsecured household loans) represent an elevated share of internet-only banks' loans (96.1%), well above the corresponding figure among the four major commercial banks (80.2%). Amid the recent increase in the share of unsecured loans to medium and low credit borrowers and low income borrowers, the delinquency rate on loans to medium and low credit borrowers has continuously edged up since the second half of last year.¹⁰⁾

Delinquency rate¹⁾²⁾
Rates of new delinquencies¹⁾³⁾ and write-offs¹⁾⁴⁾

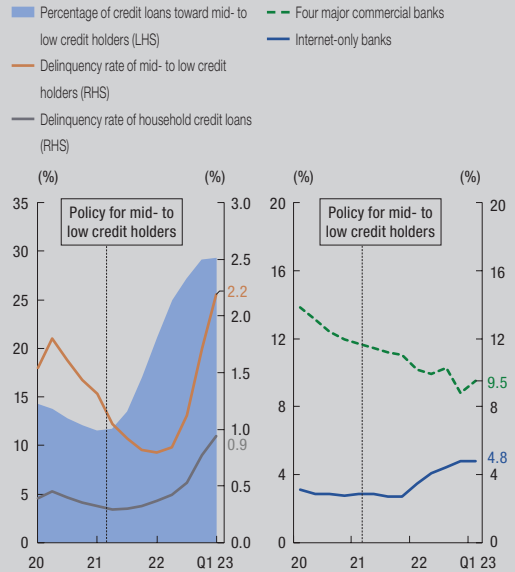


Notes: 1) Solid lines mean internet-only banks, and dotted lines mean the four major commercial banks.
 2) Based on delinquencies of one month and longer.
 3) New delinquencies during the quarter / Korean won loan amounts in the previous quarter (%).
 4) Write-offs during the quarter/ delinquent loan amounts in the previous quarter (%).

Source: Financial institutions' business reports.

While the increase in lending to mid to low credit holders is a positive move on the part of

Percentage of loans toward mid- to low credit holders¹⁾ and their delinquency rate²⁾ at internet-only banks
Percentage of loans toward low income borrowers³⁾



Notes: 1) Lending to borrowers with the bottom 50% of KCB credit ratings.

2) Based on delinquencies of one month and longer.

3) Based on annual income of KRW 20 mil. or less.

Source: Financial institutions' business reports, Korea Federation of Banks, individual banks.

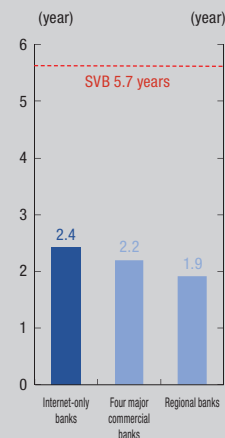
10) Given that a key purpose of introduction of internet-only banks is to increase financial inclusion through innovation, a high loan share of medium and low credit borrowers is only natural and to be expected. In the U.S, where internet-only banks have existed for quite some time, the delinquency rate hovers at 3%.

Marketable Securities-related Interest Rate Risk¹¹⁾

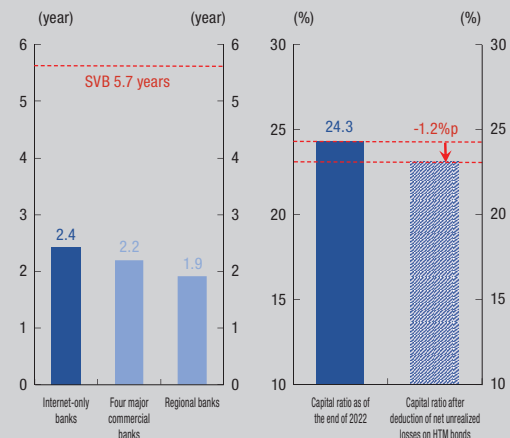
As marketable securities represent an important share of internet-only banks' asset portfolio (32.6% of total assets, 18.1% among the four major commercial banks), if funds from demand deposits are invested in long-term bonds, in times of rising market interest rates, this can expose them to the risk of a decline in net asset value.¹²⁾

In order to assess the interest rate risk of internet-only banks' securities holdings, the average duration¹³⁾ was calculated. The average duration of securities held by internet-only banks, standing at 2.4 years at the end of April 2023, was not significantly longer than the duration among other types of banks (1.9-2.2 years) and was far shorter than that of SVB (5.7 years), suggesting that the impact of interest rate volatility is likely to be limited on these institutions' securities holdings. The unrealized loss of securities held by internet-only banks due to rising market interest rates last year was 8.7 percent of total capital. This translates into only a 1.2%p drop in their capital ratio even when expected losses from the early redemption of held-to-maturity (HTM) securities are taken into consideration.

Average duration¹⁾ of securities held



Decline²⁾ in capital ratios resulting from valuation losses on bonds



Note: 1) End-April 2023 basis.

2) Changes in capital ratios reflecting the HTM of unrealized losses resulting from the upsurge in market interest rates during 2022 (AFS of unrealized losses are already reflected in capital ratios).

Source: Korea Securities Depository, financial institutions' business reports, individual banks.

Response Capacity to Deposit Run-off

Proportion of high-quality liquidity assets (HQLAs) relative to uninsured deposits was calculated in order to check whether internet-only banks can respond to a rapid outflow of deposits caused by a widespread fear among depositors by depositing of high-quality liquidity assets (HQLAs).¹⁴⁾ Despite last year's surging market interest rates, the ratio largely exceeded 100% to stand at 178.3% as of the end of March 2023. In other words, even if 100% of uninsured deposits leave internet-only banks, they are likely to

11) Defined as the risk of a drop in the value of securities holdings as a result of interest rate volatility.

12) For example, SVB, the U.S. bank that recently filed for bankruptcy, excessively engaged in maturity transformation by investing a substantial portion of funds from low-cost deposits in long-term securities, which magnified its losses when market interest rates rose.

13) The effective maturity period of bonds, corresponding to the average time it takes for a bank to receive cash flows (principal and interest) from a bond.

14) Here, HQLA refers to won-denominated high-quality liquid assets (average balance), which is a component of the numerator of the LCR. Calculated by applying HQLA haircuts (0-50%) to mark-to-market securities, this amount reflects unrealized losses on marketable securities (including held-to-maturity securities) incurred last year from rising market interest rates.

be able to meet withdrawal demands based on their high-quality liquid assets.

Proportion of HQLAs¹⁾ relative to uninsured deposits



Note: 1) Calculated by applying LCR HQLA haircuts (0%-50%) to mark-to-market securities.

Source: Financial institutions' business reports, Korea Deposit Insurance Corporation.

Meanwhile, the expansion of loans to medium and low credit borrowers must be viewed as a natural development that is consistent with internet-only banks' purposes. At the same time, to prepare for the potential impairment of loans, internet-only banks need to improve their write-offs process for delinquent loans and increase loss provisions, while also enhancing their credit scoring system to better evaluate the repayment capacity of borrowers.

Assessment and Implications

The above examination of the operating status, funding structure, and asset composition of domestic internet-only banks suggests that the likelihood of a massive outflow of deposits like the one experienced by the U.S. bank SVB is fairly low for them and that they have an adequate capacity to respond to stress situations. Notwithstanding, given the characteristics of non-face-to-face deposits, which make run-offs easier technically, internet-only banks must make efforts to increase the stability of deposits, among others, by actively attracting deposits from customers with established relationships.¹⁵⁾ Financial authorities must closely monitor the funding and asset allocation status of these institutions and periodically check for liquidity stress.

15) For example, they could increase payroll direct deposit accounts or accounts that are tied to a credit or check card or have automatic bill payments set up.

Box 4.

Impact of the Introduction of New Reporting Standards on Insurance Companies' Financial Status and Assessment¹⁾

The introduction of IFRS 9 and IFRS 17 in 2023 has brought on dramatic changes in financial management and reporting for the domestic insurance industry.²⁾ The implementation of the new reporting standards, originally planned for 2021,³⁾ was put off by two years as insurance companies felt they needed time to prepare for the transition. In 2023, the two standards came into force across the industry, for all companies. What follows is an examination of the highlights of the new reporting standards and their impact on the financial position of insurance companies.

Highlights of the New Reporting Standards

Of the two standards, IFRS 9, the international financial reporting standard for financial instruments, redefines the scope of financial assets and introduces a new approach to the classification and measurement of assets, based on objective criteria rather than at the discretion

of individual companies (IAS39). Meanwhile, IFRS 17, the standard for insurance contracts, requires that contract liabilities are assessed according to their market value. Under IFRS 17, insurance contract liabilities are comprised of three elements, the best estimate of liabilities (BEL), risk adjustment (RA), and contractual service margin (CSM),⁴⁾ to allow financial reports to better reflect future cash outflows and profits.

Summary of major changes in accounting principles applied in Korean insurance industry in 2023

	Existing	New	
	IAS39	IFRS9	
Investment assets	Criteria for classifying financial assets	Purpose or intention of holding financial assets	SPPI test, business model
	Category	- Securities at fair value through profit or loss - Available for sale - Held to maturity - Loans and receivables	- FVPL, fair value through profit or loss ¹⁾ - FVOCI, fair value through other comprehensive income ²⁾ - AC, amortized cost ³⁾
	Recognition of impairments	Incurred losses model	Expected credit losses model
Insurance contracts		IFRS4	IFRS17
	Liability assessment	Book value measurement	Fair value measurement
	Components of liability	Premium reserve	Best estimate liability Risk adjustment Contractual service margin
Recognition of revenue	Cash basis	Accrual basis	

Source: Financial Supervisory Service (FSS), Korea Insurance Research Institute (KIRI), Korea Accounting Institute (KAI).

1) This article was authored by Lee Yeong-seon, Choi Sin, and Do Ji-yun (Financial Markets Research Team) and was reviewed by Kim Myoung-chul (director of the Open Market Operations Division) and Han Min (head of the Financial Markets Research Team).

2) Under the new reporting standards, the return on assets (ROA) of insurance companies for the first quarter of this year increased sharply from the same period a year earlier (0.91%) to 1.70%.

3) IFRS 9 (K-IFRS 1109) is a financial reporting standard issued in 2014 for the classification and measurement of financial instruments. Although this standard entered into force in Korea, in 2018, the insurance industry was exempted from the requirement until 2023, the year of the introduction of IFRS 17. However, IFRS 9 has been in use by some insurance companies, belonging to financial groups for which insurance is not the main line of business, since 2018, for the preparation of their consolidated financial statements.

4) The BEL is defined as the expected present value of net future cash flows stemming from insurance contracts. Meanwhile, the RA refers to the amount added to the BEL to compensate for the uncertainty associated with the estimate. The CSM is the present value of future profits recognized from insurance contracts.

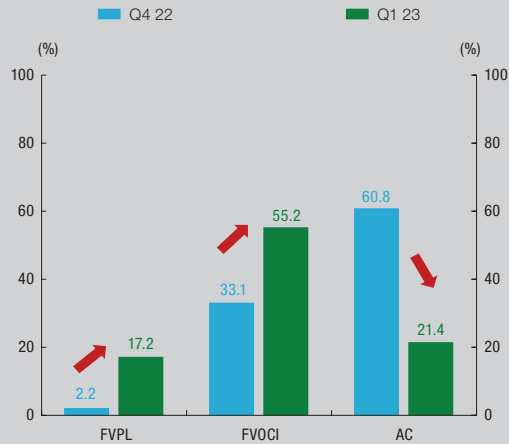
Impact on the Financial Position of Insurance Companies

Massive Increase in Assets Subject to Mark-to-Market Accounting

70

With the shift to IFRS 9, a substantial portion of insurance companies' financial assets are now subject to mark-to-market accounting. When insurance companies' financial asset composition is compared between the end of 2022 and the end of the first quarter of 2023, the share of assets measured at fair value through profit or loss (FVPL) and at fair value through other comprehensive income (FVOCI) increased by 15.0%p and 22.1%p, respectively, while the share measured at amortized cost (AC) shrank by 39.4%p.⁵⁾ Such an increase in assets measured based on market value appears to be due, on the one hand, to insurance companies' business model in which financial assets are held for the routine management of liquidity and the collection of interest cash flows⁶⁾ and on the other, due to the effect of their re-classification of bond holdings last year.⁷⁾

Changes in the classification of financial assets in insurance cos., s financial statements applying IFRS9¹⁾²⁾



Notes: 1) Excluding data on separate assets.

2) In case of Q4 2022, "FVPL" indicates securities at fair value through profit or loss, "FVOCI" indicates available for sale, and "AC" indicates held to maturity or loans and receivables.

Source: Financial institutions' business reports.

Growing Impact of Beneficiary Certificates on Profit and Loss

As the increase in FVPL assets is largely driven by beneficiary certificates,⁸⁾ this has magnified their impact on insurance companies' profit and loss. Insurance companies have thus far classified beneficiary certificate at their discretion as available-for-sale securities, reporting only interest (dividend). revenue in net income in their profit and loss statements.

5) Considering the fact that loan assets account for over 80% of assets measured at amortized cost, most marketable securities held for investment purposes, such as bonds and stocks, appear to have been classified as assets subject to mark-to-market accounting. According to insurance companies' financial reports for the first quarter 2023, 22.2% and 69.6% of total marketable securities were classified as assets measured at FVPL and FVOCI, respectively, with only 5.0% classified as AC assets. Meanwhile, loans represented 81.8% of all AC assets.

6) Under IFRS 9, a business model whose objectives are ① managing everyday liquidity needs, ② maintaining a particular interest yield profile, and ③ matching the duration of the financial assets to the duration of the liabilities that those assets are funding is referred to as a "FVOCI business model"(or "hold to collect and sell business model").

7) Last year, when capital management emerged as a prime issue amid a massive spike in valuation losses on bond holdings, the domestic insurance companies re-classified record KRW 163 trillion worth of available-for-sale securities as held-to-maturity securities.

8) Beneficiary certificates are issued by trusts and operators of collective investment schemes, investing pooled funds in securities, including stocks, derivatives, bonds, call money, CP, and repos, to distribute the return to investors, which generate dividend cash flows.

However, from this year on, under IFRS 9, those beneficiary certificates yielding dividend income are included in FVPL assets,⁹⁾ which means all unrealized gains and losses on these instruments are recognized in profit and loss. Based on the data of insurance companies that disclosed the details of unrealized gains and losses during the first quarter of this year, the value of FVPL assets rose amid falling interest rates and this boosted their net income for the period.

Net income and gains or losses on valuation of FVPL in income statements

(100 million won)

	Q1 2022			Q1 2023		
	Entity A	Entity B	Entity C	Entity A	Entity B	Entity C
Net income	3,570	196	263	7,948	1,007	1,054
Unrealized gains or losses on FVPL ¹⁾	5	-35	-18	1,841	1,553	1,764

Notes: 1) Unrealized gains or losses on assets classified as FVPL from other categories in Q1 2023 as applying IFRS9.

Source: Entities' quarterly reports.

Mark-to-Market of Liabilities Boosting the Capital Position

The capital of the insurance industry appears to have improved substantially as under IFRS 17, mark-to-market accounting is used not only for assets, but also for liabilities. Under the negative duration gap, insurance companies' insurance finance reserve was measured at KRW 62.9 trillion during the first quarter of 2023, far surpassing the fair value reserve (- KRW 33.8 trillion),

as the value of liabilities declined more than the value of assets. This resulted in a dramatic increase in insurance companies' capital (+ KRW 69.6 trillion), which is likely to have allayed some of the burden associated with managing capital in the face of last year's surge in valuation losses on bonds.¹⁰⁾

Capital status of insurance companies

(trillion won)

	All insurance companies		Life insurance companies		General insurance companies	
	Dec.22	Mar.23	Dec.22	Mar.23	Dec.22	Mar.23
Total equity	88.8	158.5	50.0	100.6	38.8	57.9
Accumulated other comprehensive income	-18.9	32.3	-12.9	28.4	-6.0	3.9
(Fair value reserves)	-15.6	-33.8	-10.1	-20.4	-5.5	-13.4
(Insurance finance reserves)	-	62.9	-	49.0	-	13.9

Source: Financial institutions' business reports.

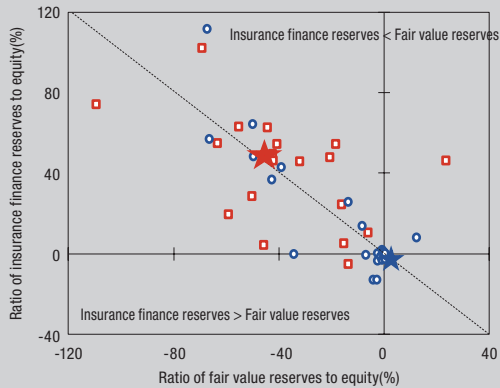
However, when the financial position is examined by sector and at the level of individual companies, the impact of the introduction of new reporting standards appears to vary according to the individual companies' situations that the composition of financial assets and insurance contracts they issued. In the general insurance sector, most companies have similar positions between fair value reserve (- KRW 13.4 trillion) and insurance finance reserve (+ KRW 13.9 trillion). with the distribution of data points of them along the 45 degree line. On the other hand, in the case of the life insurance sector, insurance

9) Under IFRS 9, debt instruments that are not held to collect cash flows and sell are classified as FVPL assets.

10) After the second half of 2021, extensive valuation losses incurred on bond holdings amid rising interest rates caused the RBC (risk-based capital) ratio of insurance companies to drop sharply. Although the resulting capital management-related burden was alleviated somewhat by the regulatory easing by financial authorities (40% of the liquidity adequacy test (LAT) surplus (insurance liabilities measured based on cost-insurance liabilities measured based on market value), previously not qualifying as available capital, is now recognized as available capital, capped at the amount of valuation losses on available-for-sale securities), the RBC ratio continued to slide for some insurance companies until the end of 2022.

finance reserve largely surpassed fair value reserve and the distribution of firms was more random. This suggests that some life insurance companies still face some challenges in capital management from volatile financial conditions.

Distribution of the ratios of insurance finance reserves to equity and the ratios of fair value reserves to equity of individual insurance cos.¹⁾



Note: 1) Blue circles indicate general insurance companies. Red squares indicate life insurance companies. Asterisks indicate the median of both.

Source: Financial institutions' business reports.

Wide Variation in Contractual Service Margin According to Sector

The contractual service margin (CSM)¹¹⁾ a new concept introduced in IFRS 17, is initially measured as insurance liabilities at the time of contract acquisition, and is progressively recognized as revenue as rendering insurance services. The amount of CSM is heavily influenced by the

characteristics of insurance contracts an individual company issued. At the end of the first quarter of 2023, domestic insurance companies' CSM stood at KRW 117 trillion, representing 15.9% of total insurance contract liabilities. By sector, the CSM proportion was higher for general insurance companies (30.5%) than for life insurance companies (10.3%), which appears to be due to the difference in the composition of types of insurance contracts issued.¹²⁾

Changes in composition of insurance contract liability¹⁾ under IFRS17

All insurance cos.	Life insurance cos.	General insurance cos.
IFRS 4(Dec.22)		
Premium reserves (941.7, 100%)	Premium reserves (674.2, 100%)	Premium reserves (267.5, 100%)
IFRS17(Mar.23)		
Best estimated liabilities (578.0, 78.6%)	Best estimated liabilities (466.4, 87.7%)	Best estimated liabilities (111.6, 54.8%)
Contractual Service margin (117.0, 15.9%)	Contractual Service margin (54.8, 10.3%)	Contractual Service margin (62.2, 30.5%)
Risk adjustment (22.0, 3.0%)	Risk adjustment (10.7, 2.0%)	Risk adjustment (11.3, 5.5%)
Premium allocation approach (18.8, 2.5%)		Premium allocation approach (18.8, 9.2%)

Note: 1) Trillion won.

Source: Financial institutions' business reports.

Among individual companies,¹³⁾ the share of CSM in total insurance contract liabilities, which showed a generally positive correlation with the share of insurance contracts not saving type, ranged from 2% to 34%. Within the general in-

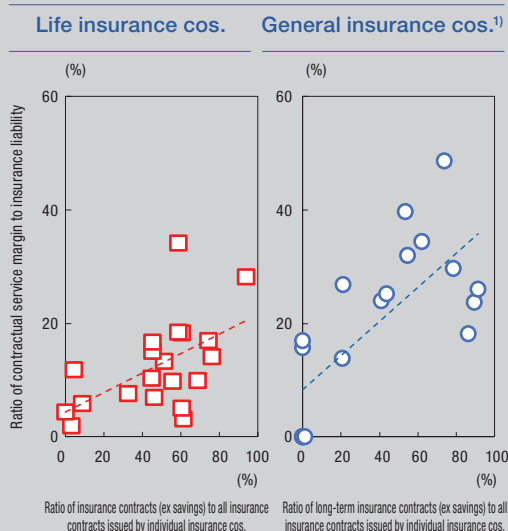
11) The CSM is calculated as the expected net future cash inflow from contracts at the present value (estimate) minus the adjustment for the uncertainty associated with the estimate. As the contractual service margin, amortized according to the coverage units serviced, is recognized as profit under IFRS 17, the higher the CSM, the higher the profit recognized at a future date.

12) Usually, insurance contracts not saving type have a higher CSM as the amount of money returned to customers, including maturity benefits, is lower than the premiums received from them. In comparison, maturity benefits of saving type insurance contracts are greater than premiums paid, which reduces their contractual service margin.

13) IFRS 17 does not provide a specific method for calculating the CSM and its measurement relies on a significant number of estimates. It has therefore been pointed out that this could cause insurance companies to make arbitrary actuarial assumptions. To remedy this problem, the supervisory authorities issued guidelines (Financial Supervisory Service press release, May 31, 2023), setting out objective calculation criteria, which will be applied starting from the book closing in June 2023.

surance sector, in which most contracts are not saving type, the share of CSM varied across a wide range of 14%-49% according to the percentage of long-term contracts.

Distribution of the ratios of contractual service margins to insurance liability of individual insurance cos.



Notes: 1) Because general insurance companies seldom issue savings insurance contracts, long-term insurance contracts (ex savings) data were used for the analysis.

Source: Financial institutions' business reports, Financial supervisory service (FISIS).

Assessment and Implications

With the introduction of IFRS 9 and IFRS 17, the financial position of domestic insurance companies appears to have improved significantly, as their capital was boosted under the new report-

ing standards. However, the effects of the new reporting standards vary widely among individual firms according to the asset composition and the characteristics of the insurance contracts they issued.

Going forward, insurance companies are expected to adopt new approaches to asset liability management (ALM) and asset allocation in their investment portfolio in an attempt to enhance their value under the new reporting standards. Firstly, as both assets and liabilities are not measured at historical cost, this has magnified the importance of the duration gap (assets-liabilities)¹⁴⁾ and is likely to cause a change in insurance companies' ALM strategies. Given the difficulty of reducing the duration gap through the restructuring of liabilities, they could instead focus on increasing asset durations and matching cash flows between assets and liabilities. This is also expected to lead to a more frequent use of interest rate derivatives,¹⁵⁾ in addition to spot and forward transactions in long-term bonds which have been popularly used by insurance companies for ALM purposes. Policy efforts are therefore needed to enhance investment conditions for insurance companies.

Furthermore, insurance companies are expected to make efforts to mitigate the volatility of net income, which can rise with the increase in FVPL assets. This could take the form of a grad-

14) Under the older financial reporting standards, in which assets were marked to market and liabilities were measured based on cost, capital flow volatility was determined by the durations of interest-bearing assets. Under the new reporting standards, capital flow volatility is determined by the duration gap.

15) Even though interest rate derivatives are an effective as well as low cost—compared to purchasing bonds—tool to increase asset durations and meet cash flow matching needs, their use by domestic insurance companies have been limited until now for several reasons, including the restricted availability of hedge accounting, limits imposed on derivatives transactions, and an underdeveloped long-term futures market. Based on monitoring results, insurance companies appear to be reluctant to make derivative transactions as related gains and losses are recognized in their net income, unless these transactions qualify for hedge accounting, suggesting that the qualification for hedge accounting is an important factor for the broad use of derivatives.

ual reduction of the allocation of beneficiary certificates and an increase in safe-haven assets¹⁶⁾ rather than high-yield assets. As such a change in insurance companies' investment behavior will not be without some repercussions, their impact on the financial and foreign exchange markets needs to be closely monitored.

Also, amid the emergence of contractual service margin-related indicators as key determinants of the value of an insurance company, the insurance industry will likely turn their focus to qualitative growth rather quantitative growth. Insurance companies' efforts to increase the share of insurance contracts not saving type with a higher CSM in their business portfolio, which have been ongoing for some time already, in anticipation of the introduction of IFRS 17, are expected to further accelerate. However, as the new focus on not saving type contracts, which generate less premium revenue than saving type contracts, could weaken insurance companies' cash flows, liquidity conditions in the sector need to be regularly monitored.

16) According to the Korea Insurance Research Institute (2023), in response to the heightened volatility in profit and loss, caused by beneficiary certificates, insurance companies have indicated the intention to reduce their overall share in the asset portfolio, switch from equity-linked to debt-linked ones, or to hedge the positions using derivatives.

IV. Capital Flows

From January to May 2023, domestic portfolio investment by foreigners fluctuated significantly by month, with stock and bond investment recording net inflows. This is attributed mainly to a change in expectations regarding the tightening stance of the U.S. Federal Reserve and unrest among banks in major countries. As for bonds, the increase in incentive for arbitrage also contributed to the inflow of funds.

Overseas portfolio investment by residents saw a net decrease, mostly in stocks, as investment sentiment cooled amid unrest among banks in the U.S. and Europe and persistent geopolitical risks.

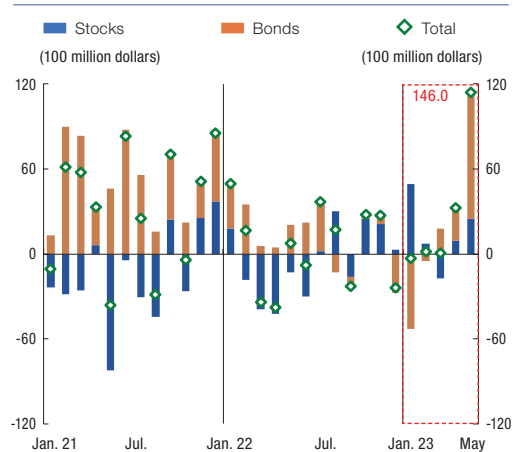
Net Inflow of Foreign Portfolio Investment in Domestic Securities

From January to May 2023, portfolio investment in domestic securities by foreigners¹⁾ varied significantly MoM, recording a net inflow of USD 14.60 billion (USD 7.32 billion in stocks, USD 7.28 billion in bonds). In January, stock investment by foreigners registered a net inflow on the back of eased concerns over further tightening by the U.S. Federal Reserve and expectations for economic recovery in China, but in February, the net inflow moderated amid worries over tightening by the U.S. Federal Reserve due to the favorable U.S. employment indicators. In March, it returned to a net outflow with the growing risk aversion in

the wake of the SVB-CS incident. After April, stock investment by foreigners shifted to a net inflow amid expectations for improved business conditions in the semiconductor sector.

In January, bond investment by foreigners saw a significant outflow due to the decline in investment capacity of overseas public institutions, adjustment of investment portfolios in emerging market economies, and reduction in incentive for arbitrage. However, as incentive for arbitrage recovered in February, investment seeking profits through arbitrage increased. After April, due to the impact of an increase in the foreign exchange reserves of major countries investing in domestic bonds, net inflows continued, led by public funds (Figures IV-1 and IV-2).

Figure IV-1. Change in foreigners' domestic portfolio investments¹⁾

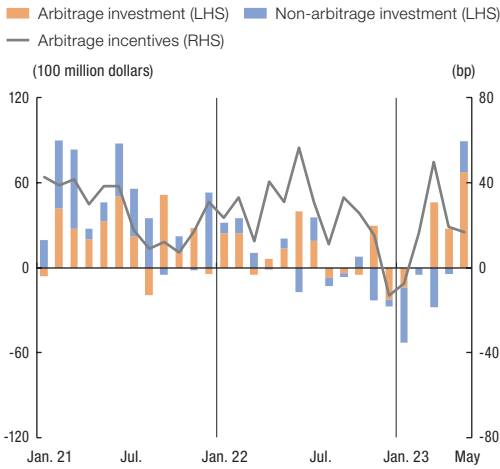


Note: 1) A plus sign (+) means a net inflow and a minus sign (-) means a net outflow.

Source: Bank of Korea.

1) In this section, stock investment includes exchange and OTC transactions of both KOSPI- and KOSDAQ-listed equity as well as initial public offerings (IPOs, excluding ETFs, ELWs, ETNs, etc.), while bond investment is based on exchange and OTC transactions of listed bonds (with repo transactions and amounts reaching maturity taken into consideration).

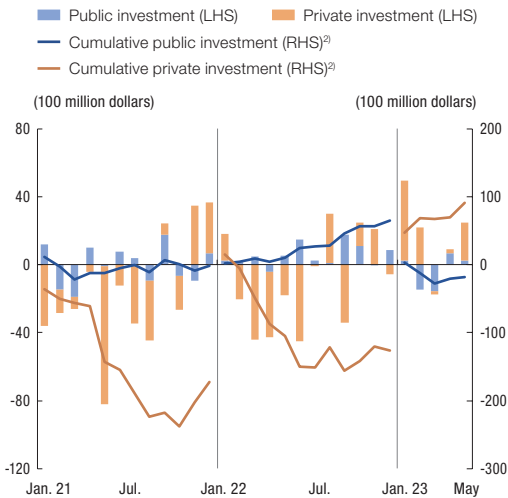
Figure IV-2. Inflows and outflows of arbitrage investments



Source: Bank of Korea.

By investor type, stock investment recorded a net inflow, driven by private investors, and bond investment saw a net inflow after April, led by public funds (Figures IV-3 and IV-4).

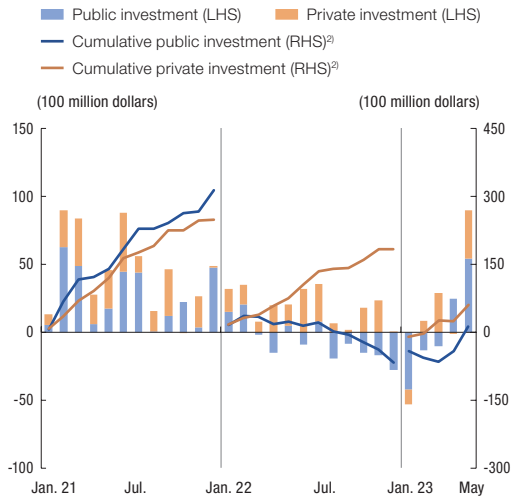
Figure IV-3. Net foreigner stock investment inflows,¹⁾ by investor type



Notes: 1) A plus sign (+) means a net inflow and a minus sign (-) means a net outflow.
 2) Cumulative sums of monthly net inflows since January, by year.

Source: Bank of Korea.

Figure IV-4. Net foreigner bond investment inflows,¹⁾ by investor type



Notes: 1) A plus sign (+) means a net inflow and a minus sign (-) means a net outflow.
 2) Cumulative sums of monthly net inflows since January, by year.

Source: Bank of Korea.

At the end of May 2023, the balance of stock investment by foreigners reached KRW 698 trillion, accounting for 28.4%²⁾ of market capitalization,³⁾ up 0.4%p from the end of last year (28.0%). Meanwhile, the balance of bond investment by foreigners amounted to KRW 238 trillion, representing 9.7% of total listed bond value, remaining unchanged from the end of last year (9.7%).

Considering the recent improvement of investment capacity in major countries investing in domestic securities and the favorable external soundness of Korea, the possibility of a sudden outflow of domestic portfolio investment by foreigners in a short period of time does not appear to be high. However, given that the movement of funds for arbitrage is highly volatile depending on the fluctuations

2) Based on the balance of stocks listed on the KOSPI and KOSDAQ, excluding ETFs, out of the balance of stock investment by foreigners.

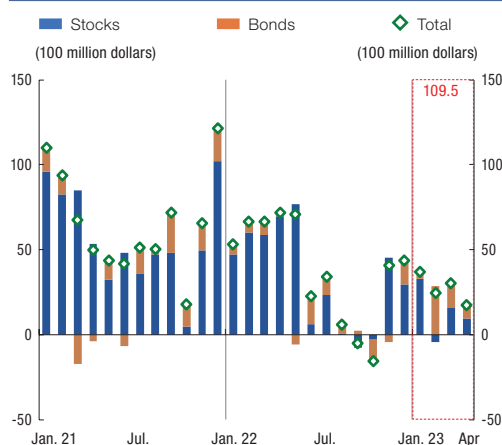
3) Sum of the total market capitalizations of the KOSPI and KOSDAQ markets.

of factors for arbitrage transactions and due to the likelihood of the reemergence of unrest among banks in advanced economies and persistent concern over a global economic recession, the flows of domestic portfolio investment by foreigners need to be monitored constantly.

Slowing Growth of Overseas Portfolio Investment by Residents

From January to April 2023, overseas portfolio investment by Korean residents stood at USD 10.95 billion (USD 5.42 billion in stocks, USD 5.52 billion in bonds), showing a significant decline (-USD 14.94 billion) compared to the same period of last year (total of USD 25.89 billion, with USD 23.53 billion in stocks and USD 2.36 billion in bonds) (Figure IV-5).

Figure IV-5. Change in residents' overseas portfolio investments¹⁾



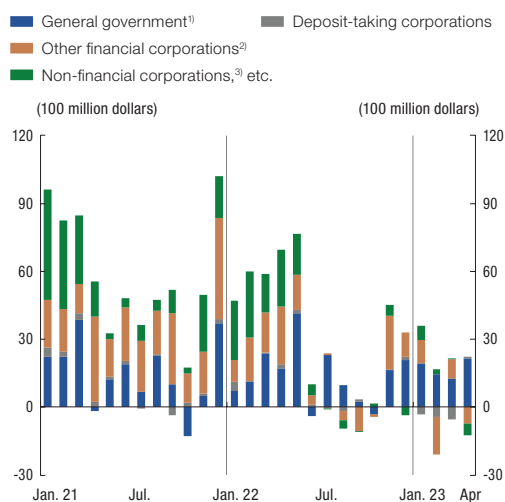
Note: 1) A plus sign (+) means a net investment and a minus sign (-) means a net withdrawal.

Source: Bank of Korea.

For stocks, the general government, including the National Pension Service, increased its net investment overseas YoY. However, other financial and non-financial corporations de-

creased their net investment overseas due to concern over a global economic downturn and financial unrest among U.S. and European banks, and deposit-taking institutions transitioned to a net decrease (Figure IV-6).

Figure IV-6. Residents' net overseas stock investment outflows, by investor type



Notes: 1) National Pension Service (NPS), Korea Investment Corporation (KIC), etc.

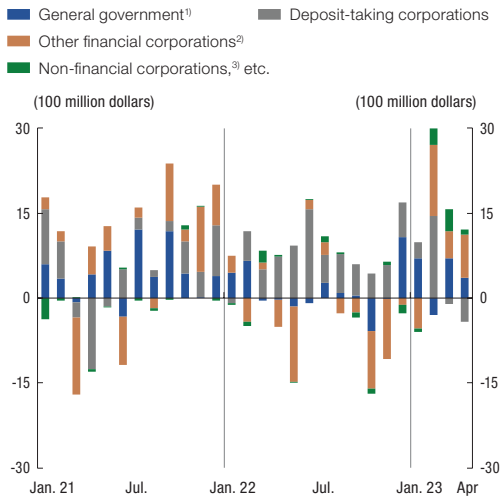
2) Insurance cos, asset management companies, etc.

3) Including individual investors.

Source: Bank of Korea.

For bonds, deposit-taking institutions decreased their net investment, while the general government and other financial and non-financial corporations expanded their net investment significantly on expectations that interest rates in major countries would decline (Figure IV-7).

Figure IV-7. Residents' net overseas bond investment outflows, by investor type



Notes: 1) National Pension Service (NPS), Korea Investment Corporation (KIC), etc.

2) Insurance cos, asset management companies, etc.

3) Including individual investors.

Source: Bank of Korea.

Overseas portfolio investment by Korean residents is expected to maintain a net outflow as pension funds are planning to expand their share of overseas portfolio investment and given the prospect of declining interest rates in major countries.

However, shifting expectations regarding the policy rates of central banks in major economies, unrest among small- and medium-sized U.S. banks, and geopolitical risks such as global economic fragmentation may serve as factors that boost volatility in overseas portfolio investment.

Box 5.

Impact of the Recent Global Banking Stress on U.S. Dollar Flows¹⁾

Since March this year, events such as the collapse of Silicon Valley Bank (hereafter “SVB”), the acquisitions of Credit Suisse by UBS and of First Republic Bank by JPMorgan Chase²⁾ have prompted widespread fears over the global banking system. Banking turmoil can have an adverse impact on the cross-border flows of U.S. dollars. This is because global U.S. and European banks play a key role in the intermediation of dollar liquidity. In Korea, borrowings from global banks by domestic banks and foreign bank branches and global banks’ portfolio investment in domestic securities serve as important source of dollar funding.

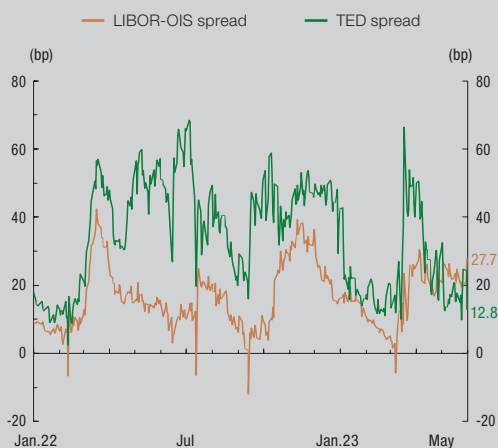
Fortunately, the shock the domestic foreign exchange sector sustained from the recent banking turmoil was minimal. However, fears over a wider banking crisis still run high. In light of this situation, global dollar liquidity conditions and fund flows since the SVB collapse are examined below, along with the inflows and outflows of foreign currency in Korea.

Global Dollar Liquidity

On the heels of SVB’s collapse, dollar liquidity conditions tightened rapidly. The TED spread and the Libor-OIS spread, key indicators of liquidity and credit risk in the USD money market,

widened sharply. The EUR/USD and the JPY/USD swap bases, representing the cost of funding dollars by pledging euro and yen as collateral, respectively, slid further into negative territory. However, compared to during the Global Financial Crisis or the COVID-19 pandemic, the extent of deterioration in liquidity was relatively moderate. Later, as fears subsided on the proactive response by governments of major countries, dollar liquidity conditions quickly improved.

Global U.S. dollar liquidity¹⁾



Notes: 1) 3-month term.

Source: Bloomberg.

1) This article was authored by Kwon Na-eun, Kim Dong-wook, Lee Han-sae, and Kim Sang-hee (International Finance Affairs Team) and was reviewed by Sung Kwang-jin (director of the International Finance Division) and Yang Yang-hyeon (head of the International Finance Affairs Team).

2) For detailed information about the collapse of SVB and the acquisition of Credit Suisse by UBS, refer to Box 8 “SVB and Credit Suisse Crisis: Policy Responses and Implications.”

Dollar liquidity during crises

	LIBOR-OIS spread ¹⁾	TED spread ¹⁾	BNP Paribas global liquidity index ²⁾
Global Financial Crisis (GFC) (Oct 2008)	364 (Oct. 10, 2008)	463 (Oct. 10, 2008)	0.90 (Oct. 20, 2008)
COVID-19 (Mar 2020)	138 (March 27, 2020)	146 (March 26, 2020)	0.94 (March 24, 2020)
Collapse of SVB (Mar-Apr 2023)	30 (April 4, 2023)	66 (March 17, 2023)	0.78 (March 29, 2023)

Notes: 1) Each unit is a basis point.

2) Values between 0-1, with closer to 1 indicating worse liquidity.

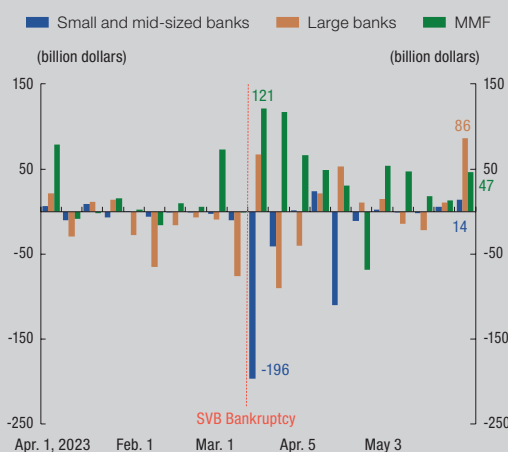
Source: Bloomberg, BNP Paribas.

U.S. Dollar Flows

In the immediately aftermath of SVB's failure, U.S. households and companies pulled massive amounts of money from small and mid-sized banks and transferred them to large banks (top 25 banks in assets) or money market funds (MMFs).³⁾ The deposit flight was particularly severe for super regional banks.⁴⁾ Meanwhile, amid rising volatility in the money market, U.S. banks temporarily reduced USD credit to their foreign branches. The U.S. branches of foreign banks increased borrowings from their head office to protect against deposit flight.⁵⁾ However, compared

to past times of crisis, such as the Global Financial Crisis and the early months into the COVID-19 pandemic, the inflow of offshore money into the U.S. was not as significant. From late March, deposit flight slowed and cross-border dollar transactions returned to previous levels, but the flow of money into MMFs continued unabated.⁶⁾

U.S. bank deposits and MMF¹⁾



Note: 1) Weekly change in volume. Deposits are seasonally adjusted.

Source: U.S. Federal Reserve, Investment Company Institute.

In order to help banks meet liquidity needs amid deposit outflows and stem the panic, the U.S. Federal Reserve added a massive amount of short-term liquidity to the banking system. The U.S. Fed's loan assets surged by USD 303.0 billion within the one week period immediately following the SVB meltdown. Initially, banks mainly

3) During the one week period following the SVB crisis (March 9 to March 15), the deposit balance of small and mid-sized banks dropped by USD 196.3 billion, while that of large banks grew by USD 67.1 billion. Meanwhile, the assets under management (AUM) of MMFs rose by USD 120.9 billion during the same period, concentrated in Treasury MMFs.

4) Using micro data from "Assets and Liabilities of Commercial Banks" (H. 8, U.S. Federal Reserve Bank), Luck et al. (2023) re-classified U.S. banks into four categories: small banks (less than USD 5 billion in assets), regional banks (USD 5 billion or more, but less than 50 billion in assets), super regional banks (USD 50 billion or more, but less than 250 billion in assets), and large banks (USD 250 billion or more in assets). They reported that the deposits of super regional banks fell sharply (-USD 531.9 billion) in March, while the decrease was more moderated for small banks (-USD 9.2 billion) and regional banks (-USD 70 billion) during the same period.

5) After SVB's failure, large U.S. banks cut their credit to their foreign branches by USD 12 billion and U.S. branches of foreign banks increased borrowings (based on net value) from their head office by USD 63.7 billion.

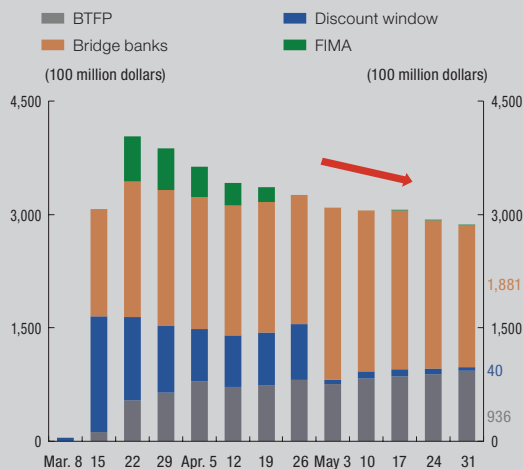
6) According to Afonso et al. (2023), MMF yields are much more sensitive to policy interest rates than deposit or CD rates. Concretely, a 1% point increase in policy rates caused the AUM of the average MMF to rise by roughly 6% over two years.

turned to the discount window, but the use of the new lending program BTFP⁷⁾ (Bank Term Funding Program) also increased progressively. Moreover, loans were issued to bridge banks temporarily operating insolvent banks⁸⁾ and the FIMA Repo⁹⁾ facility for foreign central banks was reactivated, resulting in a substantial increase in liquidity in the market. Later, as banks' liquidity stress eased gradually, the Federal Reserve reduced the amount of its liquidity injection. However, liquidity demand continued to be high into May amid worries about small and medium-sized banks. As a result, the Fed's balance sheet is still quite elevated.¹⁰⁾

Foreign Currency Liquidity in the Domestic Market

In the days immediately following SVB's collapse, the volatility of some price variables also increased in the domestic foreign currency money market. Amid a sharp rise in the swap basis for major currencies, there were wild fluctuations in the KRW/USD swap basis. On March 13, the KRW/USD swap basis (3-month) surged to 100bp, well above the recent 10-year average of 35bp.¹¹⁾ While this was mainly due to the effect of SVB's collapse, some domestic factors,¹²⁾ including the quarter-end demand for foreign currencies, also contributed. As these domestic factors were resolved and calm was gradually restored in the banking sector, the swap basis was rapidly normalized to hover at around its average level at the end of May.

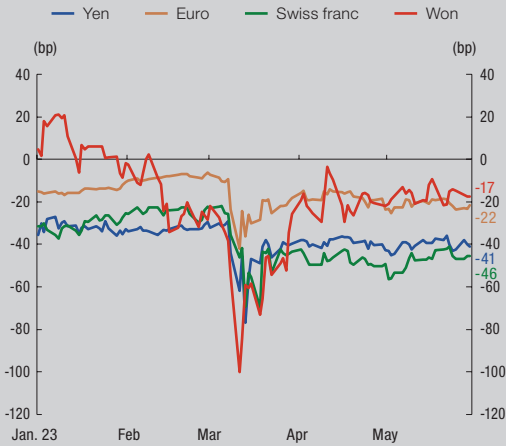
Federal Reserve lending outstanding, selected programs



Source: U.S. Federal Reserve.

- 7) This program offers loans with a maximum term of 1 year to depository institutions for up to the value of collateral securities pledged, which are priced at par value.
- 8) The U.S. Federal Deposit Insurance Corporation (FDIC) set up bridge banks to take over the assets and liabilities of failed banks and the Federal Reserve provided them with liquidity in the form of loans.
- 9) A facility in which the Fed purchases U.S. Treasury repos from foreign central banks to boost the supply of U.S. dollars.
- 10) Following the acquisition of First Republic Bank by JPMorgan Chase, the Fed's loans to the failed bank (including BTFP loans) were transferred to the bridge bank loan account.
- 11) However, this increase remains moderate compared to corresponding figures during past crises including the Global Financial Crisis (982bp, December 5, 2008) and the COVID-19 pandemic (270bp, March 24, 2020).
- 12) The domestic factors included the ample won liquidity from the redemption of a large volume of Korea Treasury bonds and the sell-off of non-deliverable forwards (NDFs) by non-residents. Non-residents sold off NDFs as the U.S. dollar softened. Banks that bought NDFs kept their aggregate position neutral through "buy&sell FX swap" transactions and sales of spot currency, which exerted downward pressure on the swap rate (increase in arbitrage incentives or the swap basis).

Three-month swap basis¹⁾ for each currency

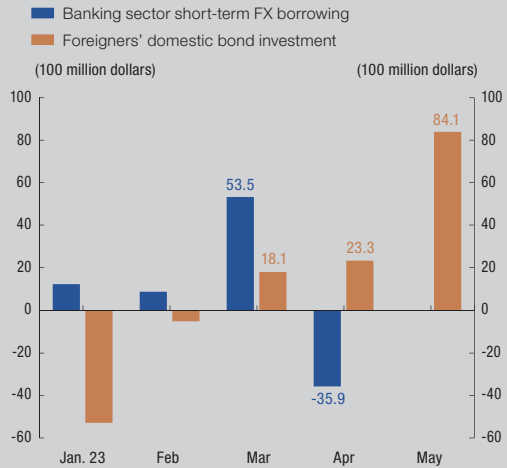


Note: 1) Against the U.S. dollar.
Source: Bloomberg.

Hence, despite a temporary increase in volatility in the foreign currency money market, foreign currency flows in the banking sector appeared stable. Unlike in past times of crisis, the banking sector's short-term borrowings (other investment under the financial account of the balance of payments) surged sharply instead of dropping, indicating that banks' supply of foreign currencies through borrowings was unaffected by the turmoil. However, short-term borrowings decreased on April as following the improvement of foreign currency liquidity, foreign bank branches reduced borrowings from their head office. Meanwhile, amid the rise in foreign portfolio investment in domestic bonds, driven by overseas commercial banks, aimed at profiting from an increase in arbitrage incentives, a net inflow of foreign capital into the bond market continued from March on. Overseas commercial banks' investment in domestic bonds, as it led to the increased supply of swap funds, also contributed to the stabilization of the foreign currency money market. Such foreign currency flows in the banking sector make the current situation unlike the situation during the Global Financial Crisis in which deleveraging by global banks caused a

drastic deterioration in domestic foreign currency funding conditions.

Changes in banking sector short-term FX borrowing¹⁾ and foreigners' domestic bond investment²⁾



Notes: 1) Deposit-taking corporations' short-term FX borrowings, other investments, financial account (BOP).
2) Based on payment date.
Source: Bank of Korea.

Flow of funds before and after crises¹⁾

Banking sector short-term FX borrowing²⁾ Foreigners' domestic bond investment³⁾



Notes: 1) T is when the crisis occurred; Sep. 2008 (GFC) and Mar. 2023 (SVB).
2) Deposit-taking corporations' short-term FX borrowings, other investments, financial account (BOP).
3) Cumulative change since T-2, based on payment date.
Source: Bank of Korea.

The relative stability in the domestic foreign currency money market appears to be due to the weakening of the U.S. dollar,¹³⁾ caused by expectations that the U.S. Federal Reserve might pause or slow rate hikes amid concerns that the SVB meltdown could lead to a credit crunch. The fact that U.S. stock prices tumbled briefly but quickly recovered also seems to have helped to avoid a dollar squeeze in emerging market countries including Korea.¹⁴⁾

Assessment and Implications

As was discussed above, although volatility in the swap basis and some other key indicators increased in the domestic markets in the days immediately following SVB's collapse, fund flows in the banking sector stayed relatively stable. The movement of funds towards super-sized banks that are the pipelines of global money supply and the depreciation of the U.S. dollar on the expectation of an easing in the Federal Reserve's contractionary policy seem to have contributed to mitigating the shock from the banking turmoil in domestic markets. The external soundness of the domestic foreign exchange sector and the global community's confidence in the strong fundamentals of the Korean economy

were also likely contributors to this stable flow of funds.

However, risk factors surrounding small and mid-sized U.S. banks still remain and necessitate continuous vigilance.¹⁵⁾ As the confidence in the overall banking industry has declined under a high interest rate environment, if the current slide in commercial real estate prices, closely watched as another potential trigger for a banking crisis, further accelerates, this could cause related loans to turn sour, once again bringing to a head concerns over small and mid-sized banks.¹⁶⁾ Meanwhile, amid an increasing call for a tighter regulation of the banking industry in the wake of the SVB meltdown,¹⁷⁾ the potential impact of an evolving financial environment on the global dollar supply also needs to be considered.

13) Between March 10 and March 31, 2023, the U.S. dollar retreated from recent highs, with the dollar index (DXY) slipping 2.0%.

14) According to some studies (Bruno and Shin (2015), Avdjiev et al. (2020)), the depreciation of emerging-market currencies and increased volatility in stock prices are key factors influencing global money flows.

15) In an opinion piece for the *Financial Times* (May 10), Mohamed A. El-Erian, President of Queen's College, pointed out that the banking turmoil has reached the point where the market is scrutinizing the funding costs and balance sheet vulnerabilities of even banks with no known issues and warned that more bank failures can heavily weigh on the overall bank system and the real economy.

16) In a recent expert survey of salient risks to financial stability, conducted by the U.S. Federal Reserve, banking-sector stress was selected as the top potential risk (U.S. Federal Reserve, "Financial Stability Report," May 23).

17) During the Senate Banking Committee hearing (March 28, attended by Michael S. Barr, Vice Chair for Supervision of the Board of Governors of the Federal Reserve System), as well as in the "Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank" (released on April 28), the U.S. Federal Reserve stated that there is a need to review the regulatory framework for banks with USD 100 billion or more in assets. More recently, the *Wall Street Journal* (June 5) also reported that the Fed is poised to increase capital requirements for banks with USD 100 billion or more in assets.

Resilience of Financial System

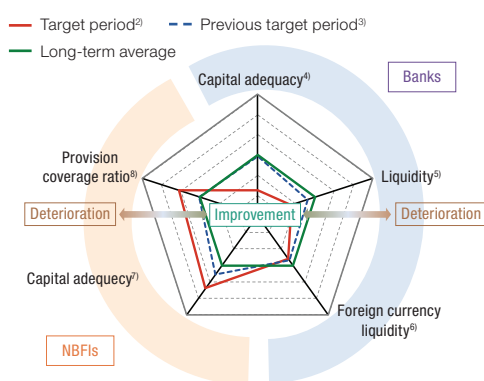
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I. Financial Institutions

Commercial banks⁽¹⁾ resilience has remained strong. The capital adequacy ratio, a gauge of bank's loss absorption capacity, inched up while the liquidity coverage ratio, measuring their ability to withstand capital outflows, was substantially above the regulatory minimum for all institutions.

As for non-bank financial institutions (NBFIs), despite a drop in the provision coverage ratio, their resilience has remained at an adequate level, with capital ratios exceeding the regulatory minimums for all types of institutions (Figure I-1).

Figure I-1. Map of changes in financial institution resilience⁽¹⁾



- Notes: 1) Standardized based on the long-term average (5 years) for each indicator and showing the relative level of the indicator for the target period and the previous target period.
 2) End-Q1 2023. End-April 2023 for bank liquidity and foreign currency liquidity, end-Q4 2022 for insurance cos.
 3) End-Q3 2022.
 4) Total capital ratio under Basel III.
 5) Liquidity coverage ratio.
 6) Foreign currency LCR.
 7) Weighted average of NBFI sectors' capital adequacy ratios by their total assets.
 8) Weighted average of NBFI sectors' (excluding securities companies) provision coverage ratio by their total assets.

Source : Bank of Korea staff calculation.

1. Banks

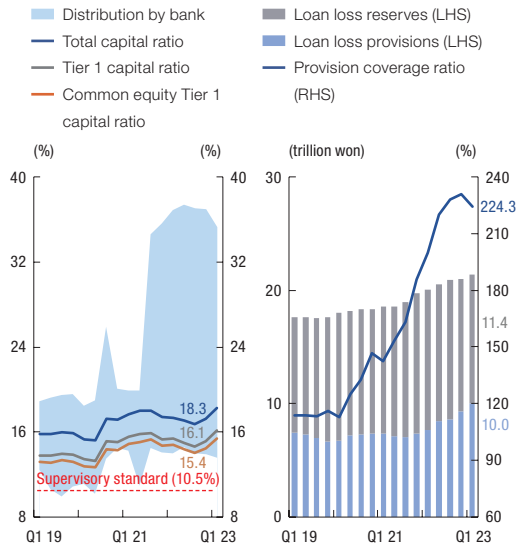
Robust Loss Absorption Capacity

Commercial banks' capital adequacy ratio (BIS ratio) and Common Equity Tier 1 capital ratio edged up by 1.6%p and 1.3%p, respectively, from the end of the third quarter of 2022 (16.7%, 14.1%) to 18.3% and 15.4% at the end of the first quarter of 2023. Banks' capital was boosted by the increase in net income, while their risk-weighted assets were reduced as the appreciation of the Korean won lowered the won-converted value of foreign currency-denominated assets.²⁾ The total capital ratio was significantly above the supervisory minimum standards for 2023 (10.5%, D-SIB³⁾ 11.5%) for all banks and the capital adequacy ratio improved compared to the end of the third quarter last year for most banks.

The loan loss provision coverage ratio (loan loss provisions to substandard-or-below loans), reflecting banks' ability to absorb expected losses, fell 3.8%p from 228.1% at the end of the third quarter of 2022 to 224.3% at the end of the first quarter of 2023. The decline in the loan loss provision coverage ratio came as a result of a substantial rise in substandard- or-below loans (+KRW 0.7 trillion) during this period, which more than offset the effect of the increase in loss provisions for normal and precautionary loans (+KRW 1.3 trillion) (Figure I-2, Figure I-3).

- 1) In this report, the banking sector analysis only considers commercial banks (nationwide and regional). Special banks (Korea Development Bank, Industrial Bank of Korea, Export-Import Bank of Korea, Suhyup Bank and Nonghyup Bank) were excluded due to the difference in business model, while internet-only banks (K Bank, KakaoBank, and Toss Bank) were included among nationwide banks.
- 2) Commercial banks' total capital grew 1.5% from the end of the third quarter of 2022 while their risk-weighted assets shrank by 7.2% during the same period.
- 3) Domestic systemically important banks (D-SIBs) include Shinhan Bank (Shinhan Financial Group), Hana Bank (Hana Financial Group), Kookmin Bank (KB Financial Group), Nonghyup Bank (Nonghyup Financial Group) and Woori Bank (Woori Financial Group).

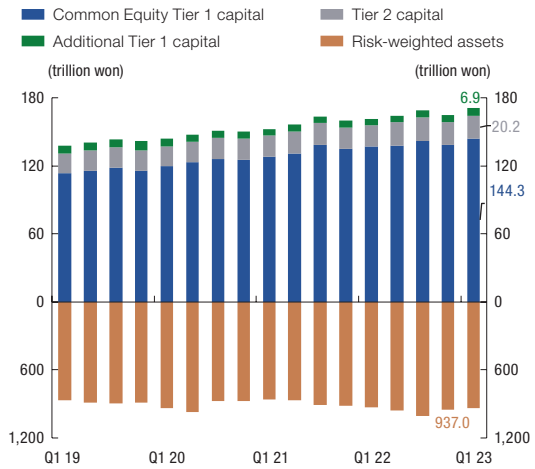
Figure I-2. Commercial bank Basel 3-basis capital ratios¹⁾²⁾³⁾ and provision coverage ratio¹⁾²⁾



Notes: 1) End-period basis.
 2) Provision coverage ratio = Loan loss provisions / Substandard-or-below loans. Loan loss reserves were included in loan loss provisions until Q3 2016, and loan loss reserves have been included in common equity Tier 1 capital since then.
 3) Supervisory standard: Common equity Tier 1 capital ratio 7%, Tier 1 capital ratio 8.5%, and total capital ratio 10.5% (8%, 9.5% and 11.5% for D-SIBs, respectively).

Source : Commercial banks' business reports.

Figure I-3. Commercial bank capital ratio decomposition¹⁾²⁾



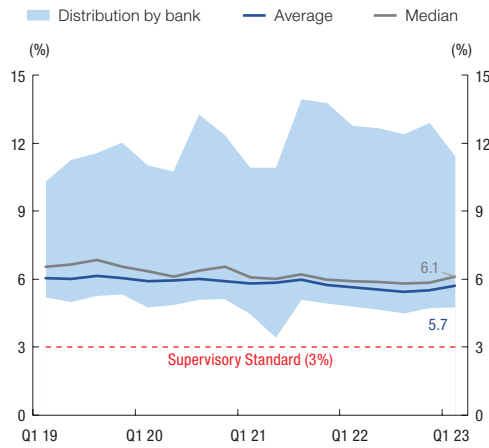
Notes: 1) End-period basis.
 2) Since Q4 2016, loan loss reserves have been included in common equity Tier 1.

Souces : Commercial banks' business reports.

At the end of the first quarter of 2023, commercial banks' leverage ratio⁴⁾ stood at 5.7%, representing a slight uptick from the end of the third quarter last year. The leverage ratio, which was well above the regulatory minimum requirement (3%) for all institutions, edged up by 0.3%p during this period as rising net income increased capital and the strength of Korean won reduced the won-converted value of total exposures (Figure I-4).

4) Here, the leverage ratio means the simple Tier 1 capital ratio under the Banking Business Supervision Regulations. The leverage ratio aims to limit excessive leverage in the banking sector to prevent abrupt deleveraging in times of crisis and the resulting amplification of shocks to the financial system. Calculated based on total exposures, the leverage ratio plays a supplementary role to minimum capital adequacy requirements. In Korea, it was first introduced as a supplementary indicator during the first quarter of 2015 and was later officially adopted as a regulatory measure in 2018. Starting in January 2020, the leverage ratio is also applied to internet-only banks.

Figure I-4. Commercial bank leverage ratios¹⁾²⁾



Notes: 1) Tier 1 capital (common equity Tier 1 capital + additional Tier 1 capital) / Total exposure. End-period basis.

2) Supplementary indicators until 2017, and regulations implemented from 2018.

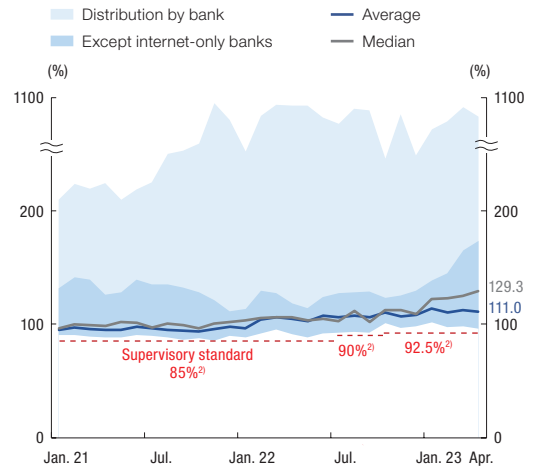
Source: Commercial banks' business reports.

Strong Liquidity Coverage

In April 2023, banks' liquidity coverage ratio (LCR)⁵⁾ jumped 4.9%p from September 2022 (106.1%) to 111.0%. While this was in part due to favorable policy changes including the broadening of the range of collateral securities eligible for BOK loans,⁶⁾ it was also the result of an increase in high-quality liquid assets (HQLA) as banks strove to hold more time deposits and government bonds⁷⁾ ahead of the normalization of the LCR requirement and in anticipation of volatility in the funding markets. Although all banks' LCR was in excess of

the current minimum requirement (92.5% for October 2022-June 2023), it fell slightly short of the regular supervisory threshold (100%) that was in place before it was lowered in response to the pandemic (Figure I-5).

Figure I-5. Commercial bank LCRs¹⁾



Notes: 1) High-quality liquid assets (monthly average balance)/ total net cash outflows over next 30 calendar days.

2) Temporary adjustment in place from 85% from April 2020 to June 2022, 90% July to September 2022, 92.5% from October 2022 to June 2023.

Source: Commercial banks' business reports.

The foreign currency LCR⁸⁾ also inched up by 0.8%p from September 2022 (121.7%) to 122.5% in April 2023. The foreign currency LCR was comfortably above the supervisory minimum requirement (80%) for all banks (Figure I-6).

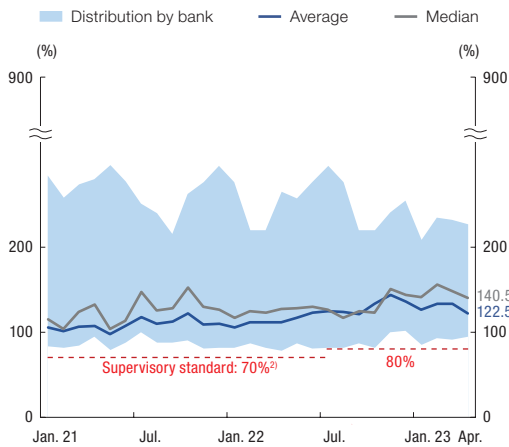
5) The leverage coverage ratio (LCR) is calculated as the ratio of high-quality liquid assets (HQLA) to total expected net cash outflows over the next 30 calendar days, using the intra-month average balance of HQLA.

6) In October 2022, in an effort to stabilize the short-term money market, the BOK widened the range of eligible collateral securities for BOK loans, net settlement, and open market repo operations on a temporary basis.

7) The balance of commercial banks' government bond holdings increased by KRW 7.8 trillion between September 2022 and April 2023, from KRW 69.4 trillion to KRW 77.2 trillion. Meanwhile, banks' balance of time deposits grew by KRW 56.6 trillion during the same period, from KRW 742.0 trillion to KRW 798.6 trillion.

8) Although the foreign currency LCR is not a Basel III ratio, it was adopted as an official regulatory indicator in Korea (regulatory standard 80%), effective as of January 2017, to ensure the steady supply of foreign currencies to the real sector even under a stress situation. The foreign currency LCR is a requirement for most domestic banks with the exception of Korea Eximbank, internet-only banks and some regional banks with only small amounts of foreign currency liabilities (Kwangju and Jeju banks).

Figure I-6. Commercial bank foreign currency LCRs¹⁾



Notes: 1) High-quality liquid foreign currency assets (monthly average balance)/ total net cash outflows in foreign currency over next 30 calendar days.
 2) Temporary adjustment in place from April 2020 to June 2022.

Source: Commercial banks' business reports.

At the end of the first quarter of 2023, the net stable funding ratio⁹⁾ (NSFR), providing a picture of the long-term stability of banks' funding structure, stood at 112.2%. All banks met or exceeded the supervisory NSFR requirement (100%) during this period (Table I-1).

Table I-1. Commercial bank net stable funding¹⁾²⁾

	2021			2022				2023
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1
Average	111.7	110.1	111.2	108.9	108.2	108.2	111.9	112.2
Median	109.6	106.9	109.2	107.7	107.7	106.6	109.7	108.6

Notes: 1) Available stable funding / required stable funding. End-period basis.

2) The supervisory standard is 100%.

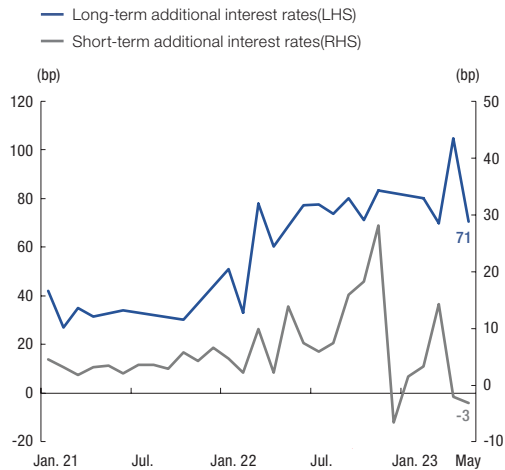
Source: Commercial banks' business reports.

Improving External Foreign Currency Funding Conditions

In 2023, commercial banks' external foreign currency funding conditions improved sig-

nificantly as the risk premium, which sharply increased during 2022 amid worries over the U.S. Federal Reserve's monetary tightening leading to a global dollar squeeze and the spike in credit risk in the domestic markets triggered by the Heungkuk Life incident, slipped off its highs for both long-term and short-term borrowings. Although the risk premium on short-term borrowings resumed its climb in March 2023 when the Silicon Valley Bank (SVB) and Credit Suisse (CS) crisis set off widespread panic across the financial markets, it rapidly fell back once into April thanks to the aggressive policy response from the U.S. Federal Reserve and the FINMA (Figure I-7).

Figure I-7. Commercial bank short- and long-term foreign currency borrowing spreads¹⁾²⁾³⁾



Notes: 1) Additional interest rates based on LIBOR before March 2022, and additional interest rates based on SOFR after April 2022 (weighted average of U.S. dollar borrowings by Kookmin, Shinhan, Woori, and Hana banks).

2) Excluding borrowings between domestic financial institutions, inter-office borrowings (between head office and foreign branches) and overnight (O/N) borrowings.

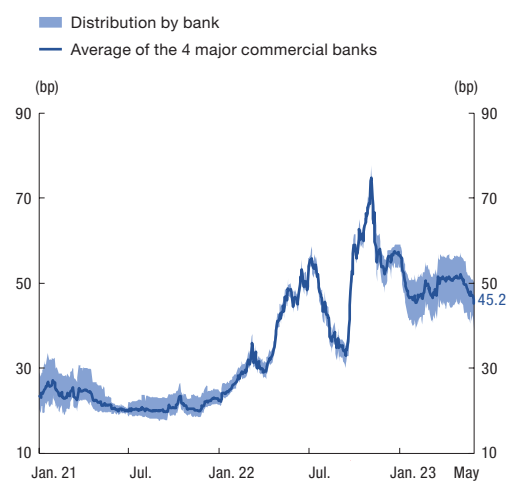
3) Among spreads on long-term borrowings performance was absent in May 2021, July to September 2021, November to December 2021, December 2022 and January 2023.

Source: Bank of Korea staff calculation.

9) The NSFR limits banks' overreliance on short-term wholesale funding by requiring them to fund some of their long-term assets under management with stable debt and capital.

Commercial banks' CDS premium also headed lower compared to last year. Even though still high compared to 2021 when the CDS premium was consistently maintained at a historic low level (annual average of 22bp), its current level is significantly below the pre-pandemic long-term average (2016-2019) of 65bp. The CDS premium has remained stable even after the SVB and CS crisis in March this year (Figure I-8).

Figure I-8. Commercial bank¹⁾ CDS premium²⁾



Notes: 1) Kookmin, Shinhan, Woori, and KEB banks.

2) 5-year maturity basis.

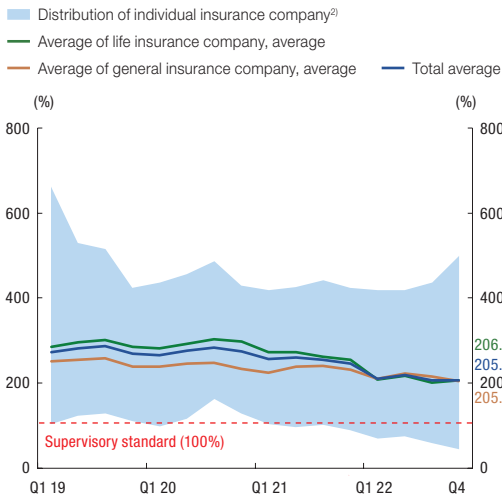
Source: Markit.

2. Non-bank Financial Institutions

Varying Levels of Resilience by Type of Institution

The risk-based capital (RBC) ratio,¹⁰⁾ at insurance companies measuring their loss absorption capacities, stood at 205.9% at the end of 2022,¹¹⁾ roughly unchanged from the end of the preceding quarter (205.6%) (Figure I-9).

Figure I-9. Insurance company risk-based capital (RBC) ratio¹⁾



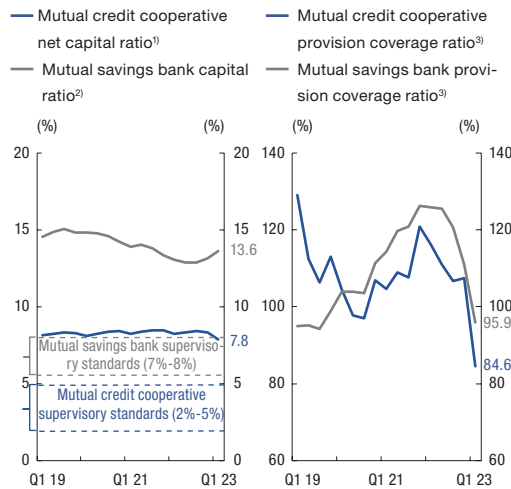
Notes: 1) Amount of available capital / amount of required capital.
 2) Assets of more than 1 trillion won.
 Source: Financial institutions' business reports.

Mutual credit cooperatives' net capital ratio dropped by 0.6%p from the end of the third quarter of 2022 (8.4%) to 7.8% at the end of the first quarter due to a decline in equity cap-

ital. The provision coverage ratio fell due to a sharp rise in substandard-and-below loans, falling 22.2%p from the end of the third quarter of 2022 to 84.6%.¹²⁾

Mutual savings banks' BIS capital ratio edged up by 0.7%p from the end of the third quarter of 2022 (12.9%) to 13.6% as loan growth slowed. The provision coverage ratio fell quarter after quarter after reaching a peak (126.2%) in 2021 to stand at 95.9% at the end of the first quarter of 2023 (Figure I-10).

Figure I-10. Mutual credit cooperative and mutual savings bank resilience indicators



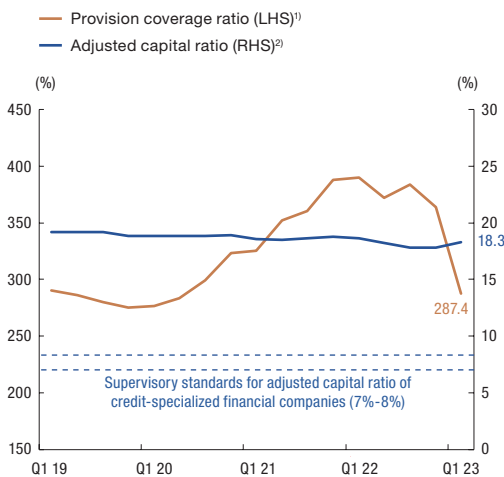
Notes: 1) Supervisory standard 2% (4% for MG community credit cooperatives, 5% for Nonghyup).
 2) Capital / risk-weighted assets. Supervisory standard 7% (8% for institutions with assets of more than 1 trillion won).
 3) Loan loss provisions / substandard-or-below loans.
 Source: Financial institutions' business reports.

The adjusted capital ratio of credit-specialized financial companies rose due to slowing as-

10) The RBC ratio is the amount of available capital divided by required capital. Required capital is calculated by estimating the amounts of insurance risk, interest rate risk, credit risk, market risk and operational risk.
 11) In conjunction with changes in insurance companies' reserve standard (RBC → K-ICS), scheduled to become effective in 2023, the disclosure deadline was temporarily extended by one month to three months from the quarter-end (four months from the year-end for annual book closing). Because of this, the latest available data are RBC from the end of 2022.
 12) While mutual credit cooperatives' provision balance increased 16.2% from the end of the third quarter of 2022 to KRW 17.3 trillion, the balance of substandard-and-below loans rose 46.6% to KRW 20.5 trillion during the same period.

set growth and capital expansion by issuing new shares in some institutions,¹³⁾ rising to 18.3% from 17.8% at the end of the third quarter of 2022. At the end of the first quarter of 2023, the provision coverage ratio dropped to 287.4%, which still remains at a stable level, even though this figure is substantially lower than 384.0% at the end of the third quarter of 2022¹⁴⁾ (Figure I-11).

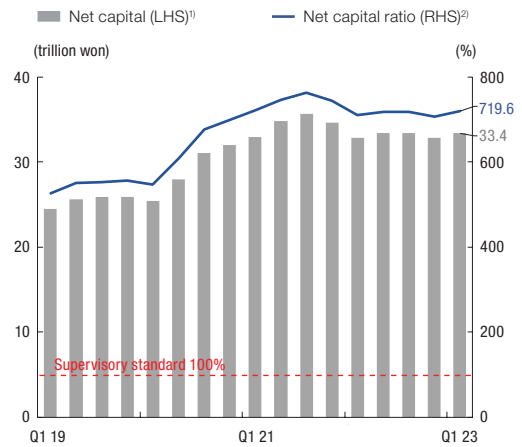
Figure I-11. Credit-specialized financial company resilience indicators



Notes: 1) Loan loss provisions / substandard-or-below loans.
 2) Adjusted capital / adjusted total assets. Supervisory standard 7% (credit card companies 8%).
 Source: Financial institutions' business reports.

Securities companies' net capital ratio has been maintained at a high level above 700% since the end of the first quarter of 2021 to stand at 719.6% at the end of the first quarter of 2023 (Figure I-12).

Figure I-12. Securities company resilience indicators



Notes: 1) Net operating capital minus total risk.
 2) (Net operating capital - total risk) / required maintenance equity.
 Source: Financial institutions' business reports.

Although NBFIs' resilience declined, particularly among mutual credit cooperatives, mutual savings banks, and credit-specialized financial companies, their capital ratios still exceed regulatory minimum requirements. However, the rising debt service burden for households and companies amid high interest rates and a persistent slump in the real estate market is raising concerns about the asset soundness of these institutions. To effectively respond to risks arising from changing domestic and external conditions, NBFIs need to enhance their loss absorption capacity by setting aside sufficient provisions and build up capital buffers.

13) During the first quarter of 2023, some capital companies with high proportion of real estate-related loans (including PF loans), have expanded their capital via issuing new shares or merging with to enhance their loss absorption capacity and manage the leverage ratio (assets capped at nine times shareholders' equity in 2024, eight times in 2025). Some credit card companies also issued hybrid capital securities to manage capital adequacy.
 14) By type of institution, credit card companies' provision coverage ratio declined by 216.9%p from the third quarter of 2022 to 619.6% at the end of the first quarter of 2023 as the amount of loss provisions (including loss reserves) increased only marginally in spite of a sharp rise in substandard-and-below loans during this period. Capital companies' provision coverage ratio fell by 30.4%p to 123.2% due to a surge in substandard-and-below loans which more than offset the increase in loss provisions.

Box 6.

Capital Buffer Schemes in Major Countries under the Basel III Framework and Implications¹⁾

In major countries, the countercyclical capital buffer (CCyB) rate, which was lowered in the immediate wake of the COVID-19 pandemic, was recently restored to pre-pandemic levels as part of an effort to enhance banks' resilience to future shocks. A string of bank failures that occurred this year, including the collapse of SVB, have served as reminders of the importance of loss absorption capacity in a volatile and uncertain global financial market environment. This article examines the capital adequacy rules under the Basel III framework and capital buffer²⁾ schemes implemented in major countries in recent years and identifies implications for Korea.

Basel III Capital Framework

The Basel regulatory framework, established by the Basel Committee on Banking Supervision

(BCBS), provides regulatory and supervisory standards aimed at improving the resilience of global banks. The Basel framework was updated several times over the years in-line with the changing global financial environment before arriving at the current set of standards, known as "Basel III."³⁾ Basel III, consisting of three pillars,⁴⁾ adds a variety of capital buffer requirements in addition to minimum capital requirements.

The Basel III regulatory capital rules require banks to maintain their resilience (total regulatory capital) relative to risk underlying their assets (risk-weighted assets) above a certain level (at least 8.0%), the Pillar I Minimum Capital Requirements. Moreover, in order to strengthen their ability to withstand crises, banks are required to build up capital buffers, which will encourage them to reduce discretionary distributions of earnings, including dividend payments, and to reaccumulate capital. Concretely, to boost banks' ability to absorb losses that may be incurred in a future crisis, the capital conservation buffer (CCoB), to reduce credit procyclicality,⁵⁾ the countercyclical capital buffer (CCyB), and the G-SIB and D-SIB surcharges to enhance the resilience of systemically important banks,⁶⁾ were

1) This article was authored by Baek Yoon-ah and Kim Ji-eun (International Financial Regulation Team) and was reviewed by Seo Pyoung-seok (director of Financial Stability Research Division) and Kwon Joon-suk (head of the International Financial Regulation Team).

2) In this article, all capital requirements above and beyond the minimum required capital were designated as capital buffers.

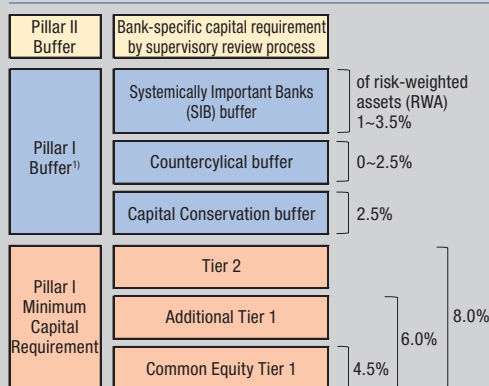
3) Basel I, introduced in the late 1980s, was amended and replaced in 2004 by Basel II to remedy the problem of regulatory avoidance, caused by the uniform application of risk weights. Basel III was introduced in the aftermath of the Global Financial Crisis to address issues that became apparent during its unfolding. Basel III enhances the quality, quantity, and transparency of a bank's capital, broadens the scope of risk coverage, as well as adds a variety of capital buffers and a macroprudential leverage ratio, which are intended to reduce systemic risk and interconnectedness. In addition to capital adequacy rules, the Basel III framework also includes rules related to liquidity management and the management of large exposure limits.

4) Under Basel III, bank capital adequacy is managed via three pillars aimed at strengthening market discipline: Pillar I sets out capital requirements that are applicable to all banks subject to the Basel Committee's supervision, Pillar II is related to risk management by individual banks and the supervisory review process, and Pillar III provides rules on disclosures.

5) National authorities activate the countercyclical capital buffer to prevent overheating during periods of credit expansion, when systemic risk is judged to be increasing, at a rate appropriate for the size of the risk build-up. In times of credit contraction, they remove the buffer requirement to prevent a credit crunch. The countercyclical capital buffer rate may be up to 2.5%.

put in place by Basel III, and that increases the minimum requirement for the Common Equity Tier 1 (CET1) capital, the highest-quality regulatory capital that immediately absorbs losses, the Pillar I Capital Buffers. In tandem, supervisory authorities have the right to impose additional capital requirements based on the risk profiles of individual banks, the Pillar II Capital Buffers.

Basel III Capital Requirements



Notes: 1) Must be held as CET1 capital.

Source: BCBS.

Accordingly, as of the end of 2022, supervised banks under the Basel Committee member jurisdictions including Korea are required to satisfy the CCoB requirement of 2.5% and the CCyB requirement,⁷⁾ set by the national supervisory authorities based on economic conditions, above and beyond the minimum capital requirement of 8.0%. Individual banks must moreover meet other capital buffer requirements depending on whether they are selected as a G-SIB or a D-SIB and according to other Pillar II measures.

Meanwhile, in addition to the capital ratios under pillars I and II, banks are also expected to set and meet an internal capital requirement ratio, calculated based on risks associated with their individual business models, which generally exceeds regulatory capital ratios.

Recent Status of Capital Buffer Regulations in Major Countries and Assessment

Positive (+) Cycle-Neutral CCyB Rates

In major countries, based on Operational experience with the CCyB and in light of recent changes in financial and economic conditions, the optimal CCyB rate for periods in which systemic risk is within a normal range (the cycle-neutral rate) was adjusted upward from 0% to 1%-2%. This move, signaling an intention to make increased use of the CCyB, a requirement that can be removed immediately if necessary, aims to ensure that banks exercise prudence when distributing earnings and maintain sufficiently high capital ratios at all stages of the economic and financial cycle.⁸⁾

The BCBS issued a statement in support of setting a positive cycle-neutral CCyB rate at the discretion of national authorities, citing the results of a study assessing the effectiveness of the CCyB and other capital buffer regulations,⁹⁾ which confirmed their benefits. Based on an examination of national authorities that have adopted a positive cycle-neutral CCyB rate, the BCBS established

6) Including global systemically important banks (G-SIB) and domestic systemically important banks (D-SIB).

7) The Financial Services Commission (FSC) decided to raise the CCyB rate for domestic banks and bank holding companies from 0% to 1% effective as of May 2024. For further details, refer to “Decision to Impose a Countercyclical Capital Buffer on Banks and Bank Holding Companies” (FSC press release, May 24, 2023).

8) ECB. 2023. “A Positive Neutral Rate for the CCyB — State of Play in the Banking Union.” *Macprudential Bulletin* 21.

9) For more detailed information, refer to the BCBS newsletter (BIS, October 5, 2022). See also “Early Lessons from the COVID-19 Pandemic on Basel Reforms” (BIS, July 2021) and “Evaluation of the Impact and Efficacy of Basel III Reforms” (BIS, December 2022). However, the same report states that due to limited examples of actual uses of a CCyB, its effects as a single regulatory tool so far lack statistical significance.

that capital buffers were also beneficial to banks in times of sudden shocks to the economic system, such as the COVID-19 pandemic. In a crisis, bank capital ratios can drop below the regulatory capital ratios as they absorb losses and this can send a signal that their resilience is severely compromised. In such a situation, to mitigate bank reputational risks and to prevent any sudden credit contraction, financial authorities can explicitly release capital buffers.

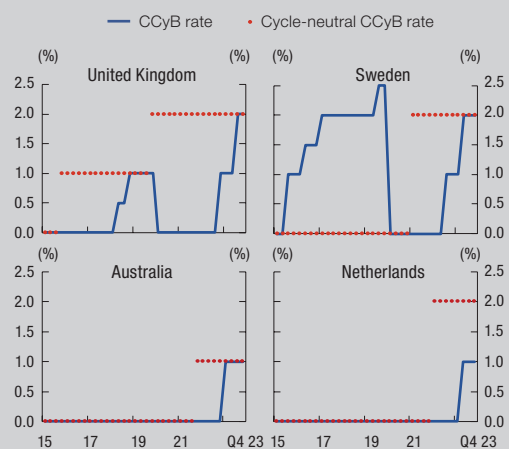
The U.K., the first country to adopt a positive cycle-neutral CCyB rate, set its rate at 1% in November 2015 and later adjusted it upward to 2% at the end of 2019. This move was based on the reasoning that it is better and more advantageous in terms of economic costs to raise the CCyB rate well in advance, given the difficulty of measuring systemic risk and the lag (12 months) that exists between a rate decision and the actual implementation of the new rate.

In Sweden, a cycle-neutral CCyB rate was set at 2% effective as of March 2021. Experience from the COVID-19 pandemic played an important role in this decision. In March 2020, Swedish authorities lowered the CCyB rate from its pre-pandemic level of 2.5% to 0%, which allowed them to effectively respond to the pandemic-induced economic downturn and to volatility in financial markets. Based on lessons from the recent crisis, the regulator decided in favor of an early build-up of capital buffers by taking into consideration (1) a certain delay before systemic risks may appear in the statistical record, (2) the lag between the decision on a new CCyB rate and its implementation, and (3) the fact that it is easier to gradually build capital buffers (a postponement of dividends) than to suddenly raise capital (the issuance of new shares, etc.).

In Australia, a cycle-neutral CCyB rate of 1% was adopted effective as of November 2021, as part of the bank capital reforms introduced in the overall capital regulation system. This regulatory reform was carried out with the objective of not only meeting the Basel III requirements, but also strengthening the resilience of the Australian financial system through “unquestionably strong” capital levels. To enable a more flexible response to stress situations, the authorities also raised the cycle-neutral rate.

In the Netherlands, a cycle-neutral CCyB rate of 2% was introduced effective as of February 2022. During its response to the COVID-19 crisis, the need to establish a positive CCyB rate became apparent. Concretely, the decision to set the cycle-neutral rate at 2% was so as to have enough room to cut the rate in the event of an unexpected shock, as well as in consideration of the cost associated with the build-up of capital. After the introduction of a positive cycle-neutral rate, credit indicators relative to GDP and variables related to the macroeconomic environment, non-financial sectors, and the financial markets were newly included among indicators to be considered when adjusting the CCyB rate.

CCyB rate¹⁾ and cycle-neutral CCyB rate in major countries



Note: 1) Based on CCyB announcements, as of end of April 2023.

Source: Financial authorities(BOE, FI, APRA, DNB).

Other Capital Buffer Schemes

In other countries, including Canada and the U.S., additional capital buffer schemes are in place to address systemic vulnerabilities that are not fully captured under Pillar I.

In Canada, the domestic stability buffer (DSB) was implemented in June 2018. Under this scheme, systemically important Canadian banks (D-SIB) set aside additional capital and the rate is currently set at 3% for all institutions. The DSB rate is re-established semiannually (June and December) or as necessary within the range of 0%-4% of risk-weighted assets. As is the case with the CCyB rate, while there is a lag before the entry into force of a new rate after a rate hike, a rate cut is immediately effective. The DSB rate is raised when there is an imbalance in household or corporate debt or in asset markets, or an increase in external system-related vulnerabilities to enhance bank resilience, and is lowered when vulnerabilities decrease or when certain risks are deemed to be in the process of realization for a sustained supply of credit.

In the U.S., in order to strengthen the resilience of individual banking institutions during stress situations, a stress capital buffer (SCB) was imposed on large banks in March 2020. The SCB rate is annually determined based on the results of the stress test conducted by the U.S. Federal Reserve and varies between banks.¹⁰ The SCB is calculated by adding total dividends that are

expected to be distributed during the upcoming 12-month period to the capital required under an unfavorable scenario.

Capital buffer schemes in the euro area include the Combined Buffer Requirement (CBR), comprised of a CCoB and a CCyB, the Pillar I Requirement (P2R), and the Pillar II Guidance (P2G). The P2R is a legally binding requirement for additional capital to help avoid bank failures due to risks that are not captured under Pillar III, and it allows for the absorption of related losses. The P2G is a non-binding recommendation for an additional capital buffer at the rate of up to 4.5% (as of 2021), according to the expected capital losses of each bank. The ECB has assessed that the impact of these schemes¹¹ to alleviate capital ratios in response to the COVID-19 pandemic has positively contributed to banks' ability to absorb losses and to continue to supply credit, despite increased risk.

Domestic Bank Capital Adequacy Ratios and Capital Headroom

Since the entry into force of the Basel III standards in 2013, domestic bank (both bank holding companies and banks) Common Equity Tier 1 (CET1) ratio has mostly continued on an upward trend to record 13.9% at the end of the first quarter of 2023,¹² which is well above the regulatory minimum. Therefore, even if a CCyB rate of 1% were to be imposed in the future, the banking sector's capital headroom, which is the

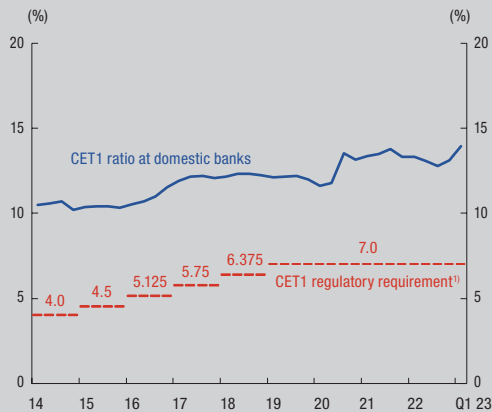
10) In 2022, the SCB rate ranged from 2.5% (Bank of New York Mellon, Charles Schwab, State Street, etc.) to 9% (Credit Suisse).

11) Banks were allowed to meet the P2R by partially substituting Common Equity Tier 1 capital with Additional Tier 1 (AT1) capital and supplementary capital (Tier 2). This measure was furthermore combined with the lowering of the CBR rate. Supervisory authorities also explicitly signaled that banks are allowed to let their capital ratios fall below the level recommended under the P2G.

12) Based on the simple average of 26 banks and bank holding companies, excluding KakaoBank, which is an outlier with an elevated capital ratio (34.1%), and Toss Bank, which is still in the exemption period for any Basel III compliance.

surplus of a bank's capital resources above all minimum requirements and buffers,¹³⁾ are sufficient for all institutions to meet the requirement.¹⁴⁾ However, there is a significant disparity among banking groups, as the capital headroom of a bank holding company are limited to the range of 3.1%-4.7%, while those of foreign banks are in the range of 8.4%-18.1%.

Trends in CET1 ratio at domestic banks



Note: 1) In line with the transitional arrangements of Basel III, CET1 regulatory requirements gradually reached 7.0%, with a minimum CET1 capital requirement of 4.5% and a CCoB of 2.5%. (D-SIBs should build up an additional 1%).

Source: Financial institutions' business reports.

Going forward, with the upward adjustment of the CCyB rate, banks are likely to determine the size of their capital headroom based on expected future risk and in consideration of related practices at other banks and in major countries. Institutions that wish to maintain their level of capital headroom undiminished are expected to cut dividend payments or reduce risk-weighted assets.

Implications

Financial authorities recently announced a plan to revise the capital adequacy-related rules,¹⁵⁾ in which they indicated their intention to consider introducing a stress capital buffer. Among the highlights, were the increase of the CCyB rate to 1%, as well as a series of measures to enhance bank resilience. Financial authorities must couple these measures with more aggressive efforts to strengthen domestic bank capital buffers, for example, by adopting a positive cycle-neutral rate, discussed above, which has been favorably assessed by the BCBS and in major countries. In addition to the capital buffer requirements under Pillar I, authorities must also encourage banks to build up selective capital buffers that are deemed appropriate for the risk profile of individual institutions, based on stress tests, as is currently practiced in several countries, including the U.S. and many European states. An effective use of the Basel III capital buffer schemes leading to a further improvement in domestic bank resilience could have a positive impact on Korea's external reputation, which will, in turn, enhance its global competitiveness and the stability of its financial system.

13) BCBS, Newsletter on positive-cycle-neutral countercyclical capital buffer rates (Oct.5, 2022).

14) Although the CCyB rate for individual banks is normally calculated by applying the CCyB rate in effect in a country to their private sector credit exposure, in this article, for simplicity's sake, a 1% increase in the CCyB rate was considered to result in a 1% decrease in capital reserves.

15) See "Directions for Improving the Regulation of Bank Soundness to Enhance Loss Absorption Capacity," a joint press release from the Financial Services Commission and the Financial Supervisory Service, March 16, 2023.

Box 7.

Issuance of Capital Securities by Financial Institutions and Potential Risks¹⁾

Capital securities have been popularly used by domestic financial institutions, including banks, bank holding companies, and insurance companies, as a capital management tool. However, during the recent resolution of Credit Suisse, the full write-off of the bank's contingent convertible bonds (CoCos)²⁾ has caused investor sentiment toward capital instruments to sour, which has in turn prompted concerns over the capital adequacy management of domestic financial companies.

Capital securities fall into two main categories: hybrid bonds, issued in the form of perpetual bonds for which a financial institution retains discretion over dividend payments and subordinated bonds, issued for a maturity period of at least five years, on which interest must be paid on a regular schedule.³⁾ They are moreover divided into contingent capital securities (contingent convertible bonds), which are written off or converted into common shares upon the occurrence of a trigger event, and non-contingent

capital securities that are not subject to such contingencies.

In what follows, the capital securities issuance activity of domestic financial institutions and associated potential risks are examined to identify implications.

Key features of hybrid bonds and subordinated bonds

	Hybrid bonds	Subordinated bonds
Maturity	30 years or longer (Perpetual)	5 years or longer
Limitation on interest payment	Issuer's Discretion	Fixed interest payment
Accounting treatment	Equity	Debt
Write-down or conversion	Contingent type ¹⁾ (write-down or conversion to common stock in a triggering event) Non-contingent type ²⁾ (no write-down or conversion conditions)	
Type of Capital	Additional Tier 1 or Tier 2	
Seniority	Subordinated to subordinated bonds	Subordinated to deposits and general bonds

Notes: 1) Banks recognize hybrid bonds and subordinated bonds issued as contingent capital requirements, in accordance with Basel III regulations introduced in December 2013 as equity.

2) As of the end of 2022, all hybrid bonds and subordinated bonds issued by non-bank financial institutions have a non-contingent type.

1) This article was authored by You Jae-weon, Park Seo-jung, Hong Jun-eui (Bank Risk Analysis Team), Kwon Yoon-jeong, and Ahn Jun-ki (Non-bank Risk Analysis Team) and was reviewed by Lee Jong-han (director of the Financial Risk Analysis Division), Park Jang-ho (head of the Bank Risk Analysis Team) and Shin Jun-young (head of the Non-bank Risk Analysis Team). While domestic financial institutions covered in this article include banks, bank holding companies, insurance companies, securities companies, and credit-specialized financial companies, the analysis focuses particularly on the hybrid bonds and subordinated bonds issued by banks, bank holding companies, and insurance companies.

2) On March 19, 2023, the Swiss Financial Supervisory Authority (FINMA) took the decision to write down CHF 16 billion (USD 17.2 billion) worth of Credit Suisse's CoCos (Additional Tier 1 capital) to zero.

3) By regulatory capital category, hybrid bonds issued by banks and bank holding companies, satisfying related Basel III standards, are classified as Additional Tier 1 (AT1) and subordinated bonds as Tier 2. Hybrid bonds and subordinated bonds issued by insurance companies are classified as Tier 1 and Tier 2, respectively. Meanwhile, capital instruments issued by securities companies are classified as net working capital and those issued by credit-specialized financial companies as Tier 2 capital, regardless of whether they are hybrid bonds or subordinated bonds.

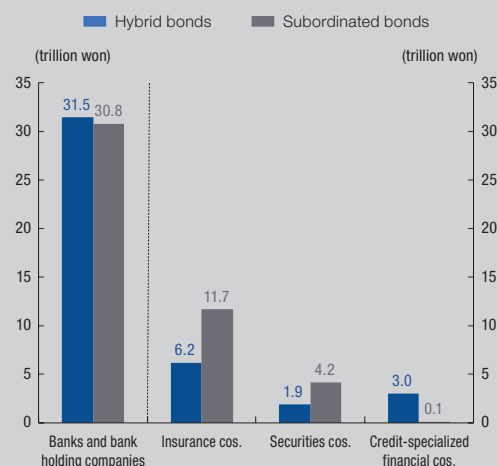
Issuance of Capital Securities

At the end of 2022, the aggregate outstanding balance of all capital securities issued by domestic financial institutions reached KRW 89.4 trillion, including KRW 42.6 trillion's worth of hybrid bonds and KRW 46.8 trillion's worth of subordinated bonds. By type of issuer, the balance of banks and bank holding companies' capital securities stood at KRW 62.3 trillion,⁴⁾ of which about one half is accounted for by hybrid bonds (KRW 31.5 trillion) and subordinated bonds (KRW 30.8 trillion), respectively. After 2018, amid the growing investment demand for high-yield securities, banks' issuance of hybrid bonds increased steadily, as they moved to shore up their AT1 capital in order to meet the regulatory leverage ratio requirement.⁵⁾

The outstanding balance of capital securities issued by non-bank financial institutions (NBFIs) totaled KRW 27.1 trillion at the end of 2022, of which the largest share was accounted for by insurance companies (KRW 17.9 trillion),⁶⁾ followed by securities companies (KRW 6.1 trillion), and credit-specialized financial companies (KRW 3.1 trillion), in this order. By type of securities, subordinated bonds represented close to 60%

of all outstanding capital securities. Insurance companies have shown a particular propensity to issue subordinated bonds rather than hybrid bonds. This tendency could be explained by the fact that insurance companies are not subject to specific Tier 1 capital thresholds⁷⁾ and because of this, they prefer to issue subordinated bonds (Tier 2) with low coupon rates over hybrid securities (Tier 1) as capital categories are a moot issue for them.⁸⁾

Outstanding balance¹⁾ of hybrid bonds and subordinated bonds issued by domestic financial institutions



Notes: 1) As of the end of 2022.

Source: Financial institutions' business reports, business reviews, and annual reports of each financial institution.

4) As of the end of 2022, the aggregate balance of all contingent capital securities issued by banks across the global financial markets stood at USD 653.0 billion (Bloomberg).

5) At the end of 2022, the outstanding balance of capital securities issued by domestic banks and bank holding companies more than tripled compared to the end of 2017 (KRW 20.7 trillion including KRW 8.8 trillion's worth of hybrid bonds and KRW 11.9 trillion's worth of subordinated bonds). The increase in the issuance of capital securities during this period was concentrated in subordinated bonds (+KRW 16.6 trillion) among banks and hybrid bonds (+KRW 16.8 trillion) among bank holding companies.

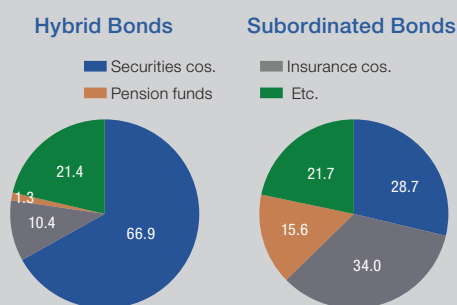
6) The outstanding balance of insurance companies' capital securities nearly tripled between the end of 2017 and the end of 2022, from KRW 6.0 trillion to KRW 17.9 trillion. Insurance companies' issuance of capital securities increased particularly sharply during 2022 (KRW 2.9 trillion in 2021 → KRW 5.7 trillion in 2022) amid a push to raise capital ahead of the entry into effect of the new reserve rules (K-ICS). The transitional measures announced by financial authorities for capital securities issued before the entry into force of the K-ICS were also a contributing factor.

7) Unlike banks whose capital is divided into tiers and separate capital ratio requirements exist for each tier (common stock/Tier 1/BIS capital ratio), insurance companies are subject only to the minimum K-ICS ratio (former RBC ratio) requirement of 100%, with the recommended level set at 150%. The Tier 1 capital ratio is only used during the evaluation of an insurance company's performance as a quantitative indicator.

8) Hybrid bonds offer higher coupon rates than subordinated bonds to compensate for a low repayment priority, long nominal maturities of 30 or more years, and the risk of no interest payments.

By investor type, investment in hybrid bonds was driven by securities companies, while insurance companies were the biggest investors in subordinated bonds. This difference in investment behavior may be due to the fact that securities companies are less risk-averse than insurance companies and tend to invest more aggressively in hybrid bonds which yield higher return than subordinated bonds, even if riskier.

Investors in hybrid bonds and subordinated bonds issued by domestic financial institutions¹⁾



Notes: 1) As of end 2022 and domestic issuance. Share (%) of investors investing in hybrid bonds and subordinated bonds, respectively.

Source: Korea Securities Depository.

Potential Risks

Capital securities positively contribute to the stability of the financial system and the protection of taxpayers' interest as they restore the resilience of a troubled financial institution through a bail-in mechanism, in which losses are borne by investors, rather than through a bailout funded by taxpayers' money. However, the recent massive rise

in the issuance of capital securities by domestic financial institutions is raising concerns about related risks. Below potential risks associated with capital securities are examined from the point of view of both financial institutions and investors.

Capital Ratio Management-related Challenges from Early Redemption

The early redemption of capital securities⁹⁾ by investors can pose challenges for issuers in managing capital ratios, especially in situations where they cannot be readily refinanced or limited alternative funding vehicles are available. In the absence of other suitable options to raise capital, such as the issue of new shares, a financial institution, faced with early redemption requests, may be forced to refund their capital securities on unfavorable terms by offering high coupon rates. Moreover, in situations where the demand for capital securities is brought down by deteriorating investor sentiment, financial institutions may be unable to refinance their outstanding capital securities through refunding and have to redeem them using cash or cash equivalent assets,¹⁰⁾ which can have a negative consequence on their capital adequacy as well as cause liquidity strain.

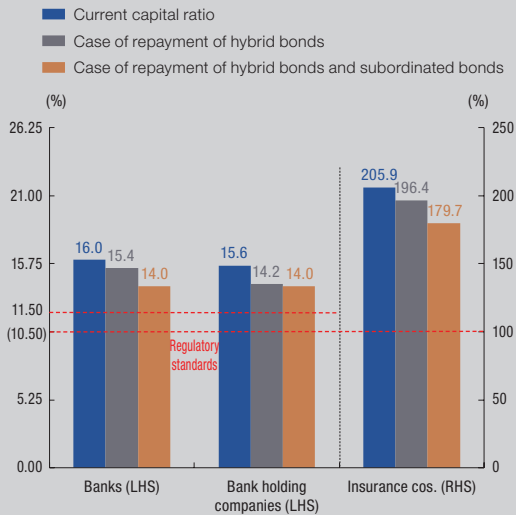
The impact of the early redemption of capital securities on domestic financial institutions' capital ratios was estimated by assuming an extreme scenario in which refunding has become

9) Capital securities generally provide an early redemption option, most often after five or ten years from the issued date. Financial institutions that are large issuers of capital securities to meet capital ratio requirements tend to voluntarily exercise the early redemption option when redemption becomes available by refunding their outstanding securities as part of an effort to meet the expectations of the market and maintain investors' trust.

10) On November 1, 2022, amid the turmoil in the domestic financial markets that followed the Legoland default, Heungkuk Life notified investors of its intention not to exercise the early redemption option (call option) on USD 500 million worth of foreign currency-denominated hybrid bonds, which were issued in 2017. However, the company reversed its decision on November 7 to announce that it will exercise the early redemption option after all. Heungkuk Life redeemed its outstanding capital securities using funds raised through the issuance of repos and increased its capital base by offering new shares to large shareholders.

challenging for all outstanding securities. The estimation results indicated that such a situation will lead to a sharp decline in the capital ratio of the insurance sector which relies heavily on these instruments to meet their capital needs. The impact was particularly severe for insurance companies whose capital ratio is below the regulatory minimum (100%), suggesting the need for these companies to make special efforts to manage related risk.

Decrease in capital ratio¹⁾ in case of full redemption of hybrid bonds and subordinated bonds issued by domestic financial institutions



Notes: 1) As of the end of 2022. Banks and bank holding companies are based on BIS total capital ratio (10.5% and 11.5% for D-SIB). Insurance cos. are based on RBC ratio.

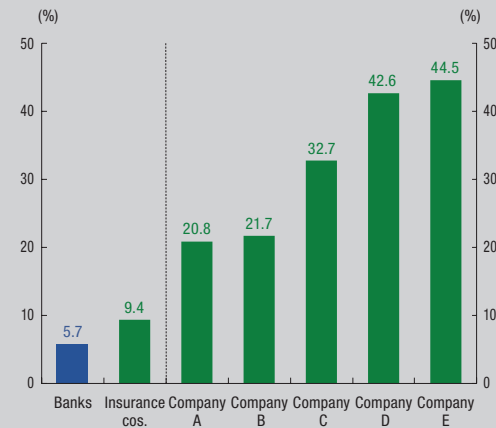
Source: Financial institutions' business reports, Bank of Korea calculations.

Interest (dividend) Payment Burden

An increase in the issuance of capital securities by domestic financial institutions can negatively impact their financial soundness as higher interest (dividend) payments erode their net income and retained earnings.

In 2022, while the interest (dividends) payout ratio on capital securities stood at 5.7% for the banking sector, this ratio was significantly higher for the insurance sector at 9.4%. Some insurance companies posted net losses before tax or had an interest (dividend) payout ratio in excess of 20%, suggesting the need for continuous monitoring.

Domestic financial institutions interest (dividend) burden ratio¹⁾²⁾



Notes: 1) Defined as interest (dividend) payments on hybrid bonds and subordinated bonds to the sum of net income before deducting corporate tax and interest (dividend) payments on hybrid bonds and subordinated bonds (as of 2022).

2) Excluding insurance cos. that recorded a net loss during 2022.

Sources: Financial institutions' business reports, Bank of Korea staff calculations.

Risk of Principal Write-offs and Cancellation of Interest Payments

The occurrence of a trigger event can expose capital securities investors to the risk of a principal write-off or the cancellation of interest payments. Although there were cases outside Korea where this became an actual risk for investors,¹¹⁾ the likelihood of such a scenario is low in the domestic market for the time being, given the strict rules related to principal write-offs and the cancellation

11) In March this year, the full amount of the principal of outstanding hybrid bonds of Credit Suisse was written off. In February 2016, the report of massive losses by Deutsche Bank sparked concerns over the non-payment of interest on hybrid bonds.

of interest payments, as well as the strength of domestic institutions' financial position.

There is zero probability of principal write-offs on capital securities issued by domestic non-bank financial institutions (NBFIs) as all of them are non-contingent securities. Also, domestic banks and bank holding companies issuing contingent capital securities are subject to tighter regulation concerning trigger events for principal write-offs,¹²⁾ compared to other countries.¹³⁾ The likelihood of principal write-offs is also kept low by the fact that the loss absorption rules adopted by domestic financial authorities prioritize common equity, in consistency with international standards.

The cancellation of interest payments is a potential risk associated with hybrid bonds. Investors need to be aware that interest payments may be suspended if the issuer is designated as a distressed institution or receives recommendations or orders to improve business operations or practices or if the pre-established performance or financial targets are not met.¹⁴⁾

Implications

The recent increase in the use of capital securities by domestic financial institutions as a means of shoring up the capital base could lead to

situations where they become a costly burden for issuing institutions and investors alike, should financial and economic conditions take an unfavorable turn. In their efforts to strengthen their capital position, domestic financial institutions must focus on boosting common equity capital. They must resort to the issuance of capital securities only in situations where raising capital by issuing common stock is not an option.

Moreover, call options provided with most capital securities and the step-up provision that comes with securities issued by NBFIs¹⁵⁾ tend to encourage early redemption, which make these instruments inferior to other components of equity, such as capital stock or retained earnings. This suggests the need to create an institutional framework for enhancing the quality of capital by structuring capital securities in a way similar to perpetual bonds.

Meanwhile, in order to ensure that risks associated with capital securities, discussed above, are clearly understood by retail investors, financial institutions must make special efforts to thoroughly explain the nature of instruments concerned so as to avoid mis-selling. This must be combined with a continuous effort to improve access to disclosures related to capital securities.

12) Principal write-offs based on a trigger event are limited to financial institutions that have been designated as distressed institutions in accordance with the Act on the Structural Improvement of the Financial Industry or situations where conditions related to the issuing bank's performance or financial position, pre-established at the time of issuance, are met. The Common Equity Tier 1 (CET1) ratios of domestic banks and bank holding companies, standing at 13.5% and 12.6%, respectively, as of the end of 2022, are far above the regulatory threshold (2.3%) below which a financial institution is considered to be in distress.

13) European banks, which are large issuers of contingent capital securities, use a CET1 ratio of 5.125% (based on the low trigger) as a trigger event.

14) In late 2022, some insurance companies cancelled interest payments on their hybrid bonds due to insufficient distributable earnings pursuant to the Commercial Act, which was one of the pre-established trigger events.

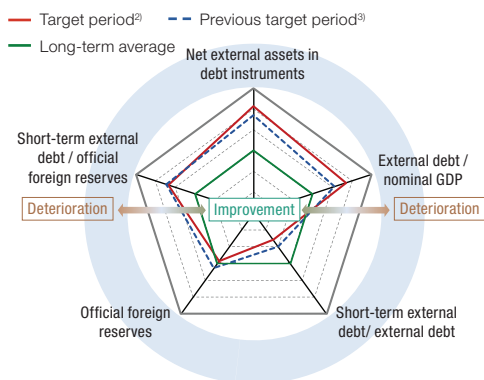
15) A provision whereby the interest rate payable on a bond is liable to be increased after a certain period of time (generally five to 10 years after the issued date), which is sometimes included in the indenture of bonds issued by companies with low credit ratings or bonds with a long maturity period.

II. External Payment Capacity

Korea's external payment capacity has remained strong overall.

Official foreign exchange reserves were mostly unchanged from the end of last year, while the share of short-term debt in total external debt decreased slightly. Although net external assets fell, the decline slowed compared to the immediately preceding period. However, the ratio of external debt to nominal GDP registered a small uptick (Figure II-1).

Figure II-1. Map of changes in external payment capacity indicators¹⁾



Notes : 1) Standardized based on the long-term average (5 years) for each indicator. The relative level of the indicator for this target period and the previous target period are shown on the map.

2) As of the end of Q1 2023.

(As of the end of May 2023 for official foreign reserves.)

3) As of the end of Q3 2022.

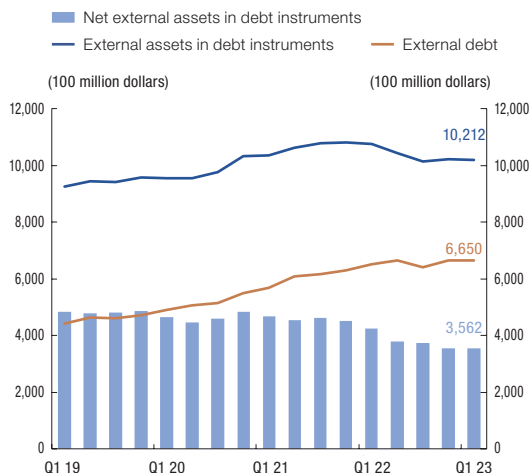
Source: Bank of Korea staff calculation.

Drop in Net External Assets

At the end of the first quarter of 2023, Korea's net external assets (external assets - external debt) stood at USD 356.2 billion, down by USD 18 billion from the end of the third quarter of 2022. However, the pace of decline

decelerated compared to the immediately prior period (-USD 51.1 billion between the first and third quarters of 2022) (Figure II-2).

Figure II-2. Net external assets in debt instruments¹⁾

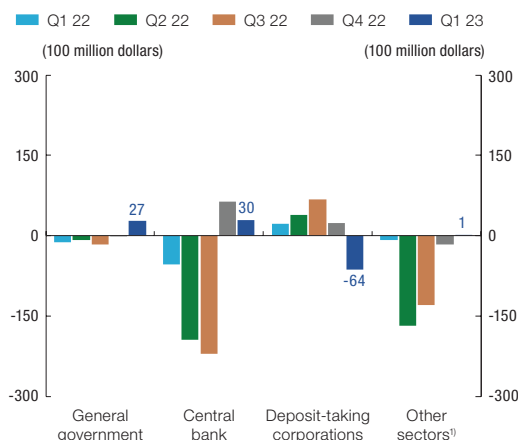


Note: 1) End-quarter balance basis.

Source: Bank of Korea.

External assets totaled USD 1,021.2 billion at the end of the first quarter of 2023, representing an increase of USD 6.4 billion from the end of the third quarter of 2022. The external assets of the general government, including the National Pension, and the central bank rose by USD 2.6 billion and USD 9.4 billion, respectively, boosted by an increase in portfolio investment in overseas securities and foreign exchange reserves. The external assets of deposit-taking corporations decreased by USD 4 billion as domestic banks reduced their external foreign currency funding and investment in external assets amid the turmoil in the international financial markets in the wake of the SVB and CS crisis. Other sectors' external assets fell by USD 1.5 billion on the decline in trade credit (Figure II-3).

Figure II-3. Changes in external assets in debt instruments, by sector

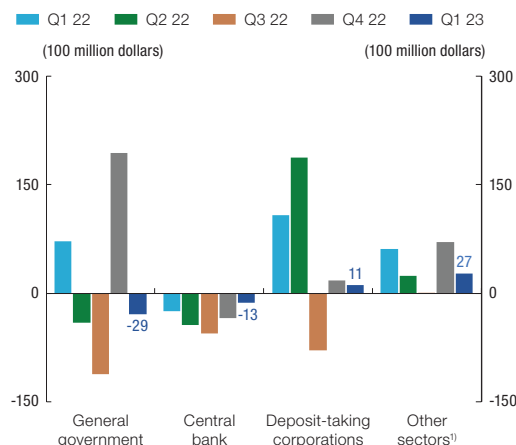


Note: 1) Including other financial corporations (securities cos., asset management companies, insurance cos., etc.) and non-financial corporations.

Source: Bank of Korea.

At the end of the first quarter of 2023, external debt reached USD 665.0 billion, USD 24.5 billion more than in the third quarter of last year. While the external debt of the general government increased by USD 16.5 billion on the rise in foreign portfolio investment in domestic government and public bonds, that of the central bank fell by USD 4.7 billion, brought down by a reduced volume of issuance (-USD 0.9 trillion in net issuance) of Monetary Stabilization Bonds (MSBs) during this period. Deposit-taking corporations' external debt was lifted by USD 2.9 billion as the increase in arbitrage opportunities in March this year led to foreign bank branches ramping up borrowings from their head offices. Other sectors' external debt grew by USD 9.8 billion on the sharp increase in the issuance of foreign currency-denominated bonds by companies, coupled with the rise in direct investment in debt instruments (Figure II-4).

Figure II-4. Changes in external debt, by sector

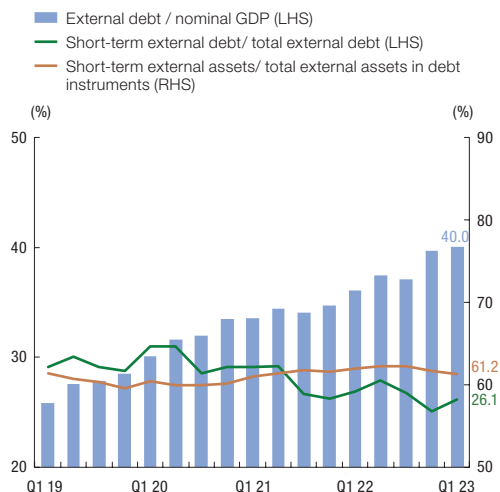


Note: 1) Including other financial corporations (securities cos., asset management companies, insurance cos., etc.) and non-financial corporations.

Source: Bank of Korea.

The ratio of external debt to nominal GDP edged higher at the end of the first quarter, compared to the third quarter of last year (37.1%), to stand at 40.0%. The share of external debt made up by short-term debt decreased from the third quarter of 2022 (26.8%) to 26.1%. The share of short-term credit in total external assets fell to 61.2% from 62.2% during the third quarter of last year (Figure II-5).

Figure II-5. Proportion¹⁾ of short-term external debt and assets in debt instruments



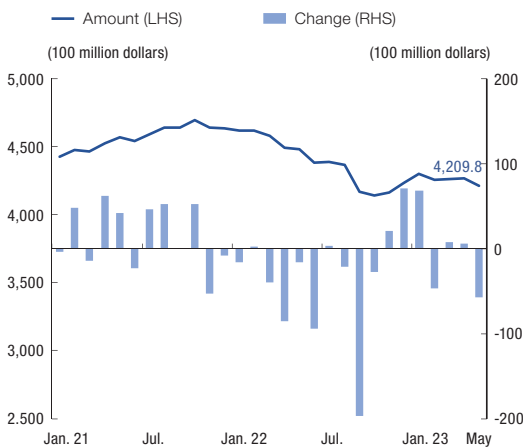
Note : 1) End-quarter balance basis.

Source: Bank of Korea.

Rising Foreign Exchange Reserves

At the end of May 2023, Korea's foreign exchange reserves totaled USD 420.98 billion. Foreign exchange reserves increased during the fourth quarter of last year, amid the weakness of the U.S. dollar, which lifted the value of non-USD assets, but slipped from their highs early this year (Figure II-6).

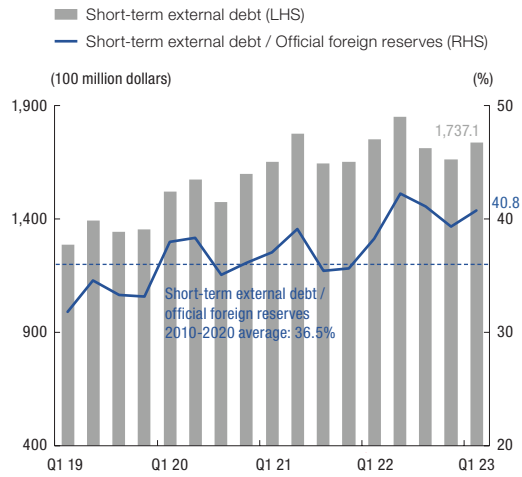
Figure II-6. Balance, changes in official foreign reserves¹⁾



Note: 1) Amounts at month-ends, changes during the months.
Source: Bank of Korea.

Meanwhile, the ratio of short-term external borrowings to foreign exchange reserves stood at 40.8% at the end of the first quarter of 2023, representing a decrease of 0.3%p compared to the end of the third quarter of last year (41.1%) (Figure II-7).

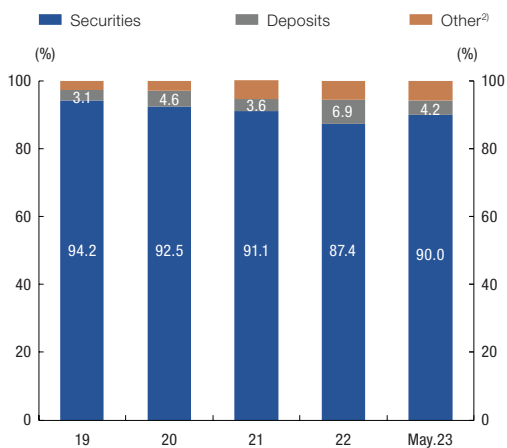
Figure II-7. Short-term external debt-to-official foreign reserves ratio¹⁾



Note: 1) End-quarter balance basis.
Source: Bank of Korea.

As of the end of May 2023, marketable securities (90.0%) and deposits (4.2%) made up the bulk of foreign exchange reserves. Marketable securities were composed mainly of highly-liquid safe assets, including government bonds, government institution bonds, and asset-backed securities (Figure II-8).

Figure II-8. Composition¹⁾ of official foreign reserves



Notes: 1) End-period basis.
2) Gold, SDRs, etc.
Source: Bank of Korea.

III. Financial Market Infrastructures

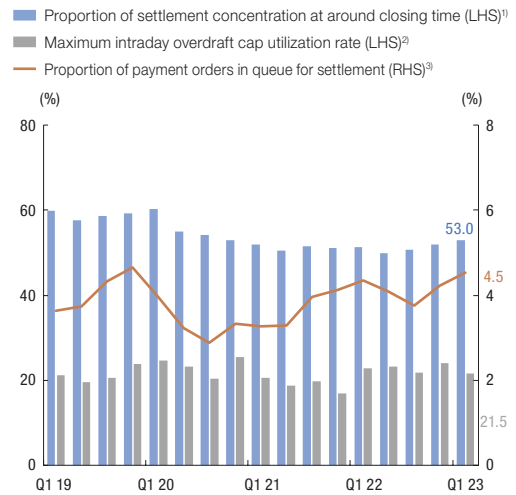
The value of settlement in BOK-Wire+ and other major payment and settlement systems have continuously increased, driven by the steady rise in securities settlements by financial institutions and electronic funds transfers by individuals and companies. Settlement risk was managed appropriately, remaining at a stable level.

BOK-Wire+

During the first quarter of 2023, the average daily value settled over BOK-Wire+, providing final settlement of obligations between financial institutions, reached KRW 548.0 trillion, continuing on the upward trend from the prior year (KRW 524.3 trillion). Settlement risk was managed at a stable level.

The maximum intraday overdraft cap utilization rate and the proportion of payment orders in queue for settlement, which are two indicators of the level of settlement liquidity among BOK-Wire+ participants, were maintained at a generally stable level of 21.5% and 4.5%, respectively, in the first quarter of 2023. Of the total settlement value, the portion that was settled near the closing time (16:00-17:30) increased slightly from the same period of the previous year (51.2%) to 53.0% (Figure III-1)

Figure III-1. Risk indicators related to BOK-Wire+

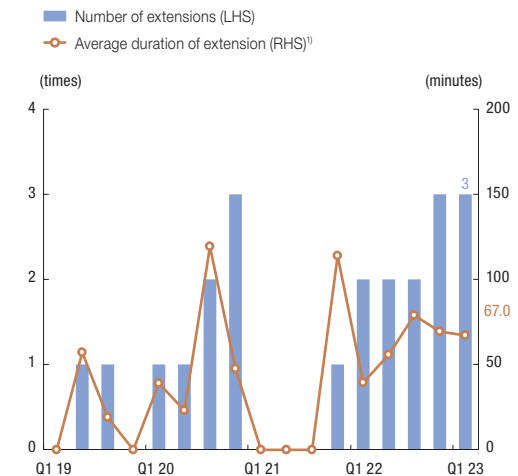


Notes: 1) Amount of settlements processed after 16:00 / Total settlement amount during the period.
 2) Average of daily maximum amount of participating institutions' overdraft cap utilization rate.
 3) Participating Institutions' payment orders in queue for settlement / Total settlement amount during the period (excluding payment orders for liquidity savings).

Source: Bank of Korea.

Meanwhile, the closing time of BOK-Wire+ was extended three times during the first quarter of 2023, mostly due to technical issues at some participating institutions. (Figure III-2).

Figure III-2. Extension of BOK-Wire+ operating hours



Notes: 1) Total duration of extension / Number of extensions during the quarter.

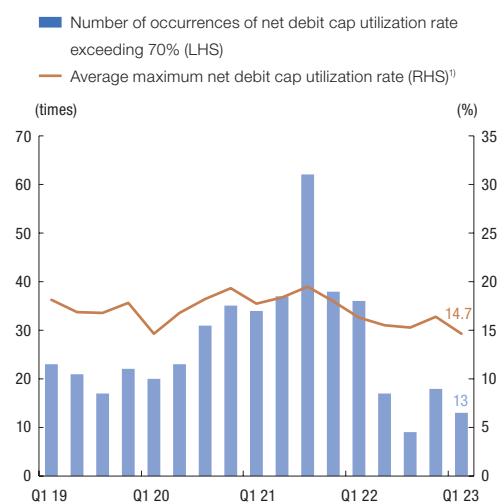
Source: Bank of Korea.

Retail Payment Systems

During the first quarter of 2023, the average daily value settled over the retail payment systems, operated by the Korean Financial Telecommunications and Clearings Institute (KFTC), was lifted by an increase in electronic funds transfers by individuals and companies to 101.2 trillion won, higher than in 2022(99.3 trillion won). In spite of this increase, related settlement risk was managed smoothly overall.

Among the risk indicators in the retail payment systems, the number of times where the net debit cap¹⁾ utilization rate of net settlement participants exceeded the cautionary level (70%) sharply fell to 13 times during the first quarter of 2023, from 36 times during the same period a year earlier. The average maximum net debit cap utilization rate also decreased slightly from the same period of the previous year (16.3%) to 14.7%, suggesting that settlement risk was managed adequately overall (Figure III-3)

Figure III-3. Net debit cap utilization rate



Notes: 1) Average of daily maximum net debit cap utilization rates of participants during the period.

Source: Bank of Korea.

Securities Settlement Systems

The value settled in the securities settlement systems, operated by the Korea Exchange and the Korea Securities Depository, continued on a rising trend in the first quarter of 2023. Settlement risk was managed stably during this period. The average daily value settled over these systems was lifted by inter-institutional repo transactions to KRW 259.7 trillion, extending the upward trend from last year (KRW 236.8 trillion).

In the first quarter of 2023, settlements on transactions in exchange-traded stocks and exchange-traded government bonds, as well

1) In the retail payment systems, including the CD/ATM System, the Interbank Funds Transfer System, and the Electronic Banking System, although funds are immediately made available to the payee, the resulting credits and debits between the financial institutions are settled at a designated time (11:00 A.M.) of the following business day through BOK-Wire+. Hence, financial institutions are exposed to credit risks. In order to mitigate the net settlement risk in the retail payment systems, the BOK requires participants to independently establish an upper limit on their own unsettled net debit positions, in other words, a "net debit cap".

as OTC stock transactions by institutional investors, were completed by their respective deadlines (16:00, 17:00, 16:50) (Table III-1)

Table III-1. Proportion¹⁾ of securities settlements completed after the deadline

	Penalty deadline ²⁾	Proportion (%)				
		2022				2023
		Q1	Q2	Q3	Q4	Q1
Exchange-traded stocks	16:00	-	-	-	-	-
Exchange-traded government bonds	17:00	-	-	-	-	-
Institutional investors for OTC stocks	16:50	-	-	-	-	-

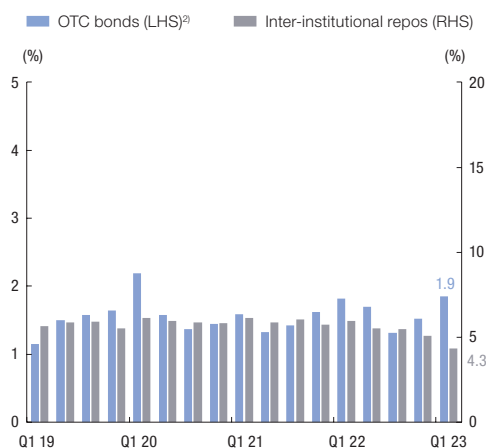
Notes: 1) Value of settlements processed after the deadline / Total settlement amount during the period.

2) Deadlines after which settlement delay penalties are imposed.

Source: Bank of Korea.

Of the OTC bond transactions and inter-institutional repo transactions, the proportions settled on a free-of-payment (FoP) basis, rather than through the delivery-versus-payment (DvP) system, remained at the stable levels of 1.9% and 4.3%, respectively, during the first quarter of 2023 (Figure III-4).

Figure III-4. Share¹⁾ of FOP settlements



Notes: 1) Proportion of settlements not processed through the DvP (delivery-versus-payment) system, among the total settlement amount (of OTC bonds and inter-institutional repos).

2) Based on final settlement after deduction of linked settlements.

Source: Korea Securities Depository.

Foreign Exchange Settlement Systems²⁾

In the first quarter of 2023, the average daily value of settlement in the foreign exchange payment-versus-payment (PvP) system operated by the CLS Bank (CLS System)³⁾ decreased slightly to USD 74.33 billion from USD 74.84 billion a year earlier

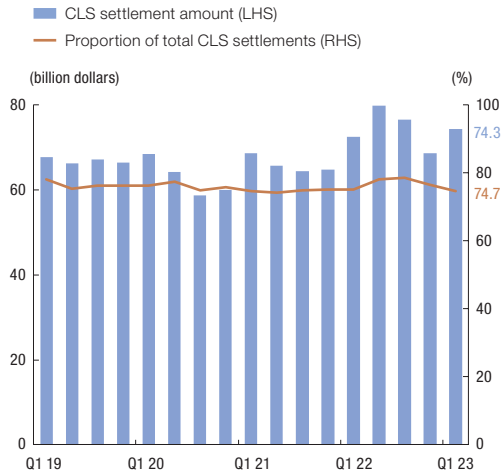
PvP settlement via the CLS system accounted for a continuously high share of 74.7% in total foreign exchange transactions, and any related

2) Foreign exchange settlements are conducted through the interbank correspondent network, the PvP system operated by CLS Bank, and domestic foreign currency funds transfer systems. In this report, we focus on foreign exchange PvP settlements routed through the CLS System in which the settlement amounts can be accurately determined.

3) To address time differences between countries, which are a fundamental cause of foreign exchange settlement risk, the CLS (Continuous Linked Settlement) Bank settles most transactions during a designated settlement period (07:00-12:00 CET). In continuous linked settlements, actual fund transfers (payments) are linked and processed within this settlement period, between the accounts of settlement member banks and the CLS Bank, held at the central banks issuing the currencies concerned. At present, the CLS PvP system is connected to large-value payment systems (including BOK-Wire+) run by central banks issuing the 18 CLS settlement currencies (including the USD, EUR, and JPY)

settlement risk is assessed to have remained stable (Figure III-5).

Figure III-5. Settlement amount¹⁾ and proportion²⁾ made through the CLS system



Notes: 1) Daily average amount of transactions made by domestic banks and foreign banks' branches during the quarter.
 2) Proportion of trades settled through the CLS system among the total amount of CLS-eligible FX transactions (at domestic banks and foreign banks' branches).

Source: Bank of Korea.

Overall Assessment

In spite of the turmoil that rocked the global banking sector during the first half of this year, the domestic financial system appeared generally stable. Financial markets showed signs of stabilization as interest rates slid and stock prices rallied on the expectation concerning the pace of adjustment in monetary tightening in major countries. The financial intermediation function of Korea's financial system operated smoothly, supported by sound loss absorbing capacity at financial institutions. However, the economic growth rate is slowing due to certain factors, such as the trade deficit, and financial soundness among households and corporations has deteriorated, especially among vulnerable sectors.

The Financial Stress Index (FSI),¹⁾ which reflects the level of short-term instability in the financial system, temporarily rose to the "crisis" stage (23.4) in October last year due to the Legoland-related incident, but it fell back to the mere "warning" stage in February this year and since then has continued on a downward trajectory.

Meanwhile, the potential vulnerability of the financial system appears to be continuously high. Until the second half of last year, accumulated financial imbalances appeared to be shrinking as the growth of household debt slowed and as asset prices,²⁾ such as stocks and real estate, declined due to the Base Rate hikes and a weakened risk preference among

economic agents. However, since early this year, stock prices have bounced back and the decline in real estate prices slowed on the expectation of an easing of monetary tightening in Korea and in major countries, and household debt has been increasing again since April, limiting any reduction in accumulated financial imbalances.

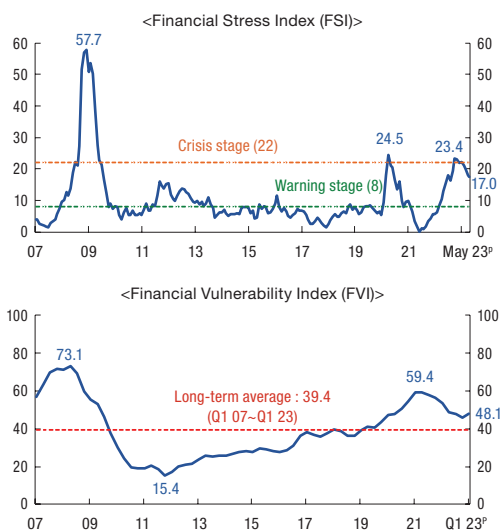
Against this background, the Financial Vulnerability Index (FVI),³⁾ which shows overall vulnerabilities in the financial system from a medium- to long-term perspective, recorded 48.1 in the first quarter of 2023, up slightly from the fourth quarter of 2022.

1) The Financial Stress Index (FSI) is a composite index (on a scale of 0-100) calculated by standardizing 20 monthly stress indicators from the real and financial sectors. The "warning" and "crisis" thresholds are set at 8 and 22, respectively, using the "noise-to-signal ratio" method.

2) Although there is no official, agreed-upon definition of "financial imbalance" among central banks and academics, the term generally refers to the simultaneous occurrence of excessive leverage and overvalued asset prices, resulting in an excessive increase in the scale of liabilities and asset prices compared to the real sector.

3) The Financial Vulnerability Index (FVI) is a composite index (on a scale of 0-100) calculated by standardizing 39 indicators related to three assessment items: asset prices, credit accumulation, and financial system resilience.

Financial Stress Index (FSI)¹⁾ and Financial Vulnerability Index (FVI)²⁾



Notes: 1) A composite index (0-100) is calculated by standardizing 20 monthly financial and real sector indicators to indicate short-term financial system instability. The warning and crisis stage thresholds are set at 8 and 22, respectively, using the "noise-to-signal" ratio method.

2) A composite index (0-100) is calculated by standardizing 39 quarterly indicators related to the three criteria (asset prices, credit accumulation, and financial system resilience) for an assessment of mid- to long-term financial vulnerability.

Source: Bank of Korea.

Vulnerability Assessment

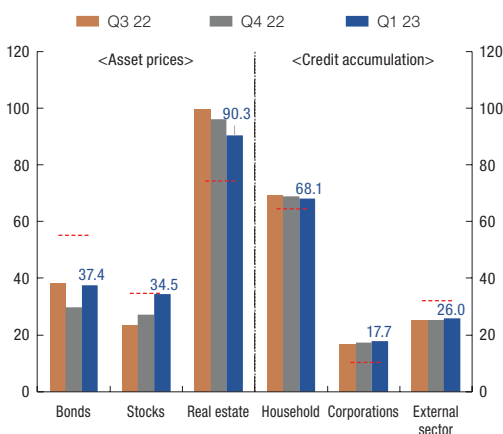
By sector, the rate of private credit growth slowed modestly, particularly in household debt, and the private credit-to-nominal GDP ratio declined slightly, but remained high. However, since April this year, the sluggishness in the housing market has been eased and housing-related household loans have been on the rise again, so it is necessary to closely monitor the possibility that financial imbalances will expand again. As for corporate credit, although corporate credit growth slowed modestly, particularly in SME loans, direct funding from the bond or corporate paper (CP) markets appears to be favorable compared to the second half of last year. However, companies' ability to make interest payments

has been weakened by rising loan interest rates and declining earnings performance. In particular, the debt service burden is high for self-employed business owners whose loans increased massively during COVID-19.

In asset markets, there had been heightened volatility in stock and bond prices caused by global banking uncertainties. However, they increased significantly as expectations regarding domestic and international monetary tightening changed. Credit spreads on corporate bonds significantly narrowed as credit risk aversion was alleviated with the government's market stabilization measures. The level of housing price remains high compared to economic fundamentals, and the decline in housing prices has slowed this year. Price volatility could be amplified in response to changes in domestic and international financial and economic conditions, such as the pace of monetary tightening in major countries and real estate market policies.

As for financial institutions, the soundness of assets has deteriorated for most types of institutions, with rising delinquency rates and the substandard-and-below loan ratio. This situation is attributed to increased borrowers' debt burden caused by the past rise in interest rates and a sluggish real estate market. In addition to these factors, as higher interest rates are progressively applied to more loans and financial support measures for households and companies are phased out, asset soundness could be further undermined. However, the resilience of financial institutions, which acts as a buffer against internal and external shocks, is sound, with their capital ratios exceeding the regulatory minimums.

Financial imbalance-related indices¹⁾



Note: 1) Dotted lines are the long-term average (Q1 2007-Q1 2023).
Source: Bank of Korea.

Risk Factors

Although the domestic financial system appears generally stable in spite of the recent global banking turmoil, there are several potential risk factors that could undermine its stability.⁴⁾

Continuously high interest rates, delays in the recovery of the real economy, a prolonged downturn in the real estate market, and the possibility of turmoil in the global financial markets are among key risk factors concerning the stability of the financial system.

Rising market interest rates, while they have led to a slight reduction in financial imbalance-

ances built up over the past few years, have also increased the debt service burden and resulted in a surge in delinquencies or defaults among the vulnerable segments of borrowers. If this situation is compounded by unexpected delays in the economic recovery, it could make it increasingly difficult for vulnerable borrowers and self-employed business owners to meet their debt obligations. Even though asset soundness at financial institutions has not deteriorated to a worrisome level for the time being,⁵⁾ thanks in part to low interest rates during the pandemic and due to the government's financial relief measures, when potential default risks, which have been masked until now, rise to the surface, this could have a negative consequence on asset soundness and resilience, particularly at non-bank financial institutions (NBFIs) with a relatively high proportion of loans to vulnerable borrowers.

Furthermore, if the weakness in the real estate market, which has resulted in a decline in housing sales and in leasehold deposit prices, and the increase in the inventory of unsold housing units both continue for an extended period, it will weigh on the stability of the financial system by making it more difficult for landlords to return the complete leasehold deposit amounts at the lease's end and by driving up delinquencies and defaults on real estate and construction-related loans.⁶⁾ The interconnectedness between real estate proj-

4) According to respondents to the Systemic Risk Survey of 80 financial and economic experts, conducted during the first half of 2023, the key risk factors were: high debt levels and debt service burdens at households (53.9%); the downturn in the real estate market (48.7%); defaults on financial institution loans, the materialization of contingent liabilities, and massive withdrawals of funds (43.4%); and, increased default risk caused by deteriorating business and funding conditions at companies (42.1%). For detailed results, refer to "Results of Systemic Risk Survey, H1 2023" (BOK press release, May 3, 2023).

5) For a detailed discussion of this issue, refer to the section "Review of Potential Credit Risk in the Corporate Sector and Domestic Bank Stress Test" found in "Analysis of Financial Stability Issues III."

6) For further details, refer to the "Review of Major Financial Stability Risks Related to Housing Market" section in "Analysis of Financial Stability Issues I."

ect financing (PF) loans and capital markets has been strengthened in recent times due to the use of vehicles such as project financing asset backed corporate paper (PF-ABCP) and the volume of real estate PF loans from NBFIs with a comparatively weak capital base has also recently increased. A persistent weakness in the real estate market could therefore exacerbate financial market instability along with undermining financial institution soundness.

Additionally, amid high uncertainty related to monetary tightening in major countries, the instability in global financial markets, including the resurfacing of concerns over the solvency of the banking system, could worsen volatility in capital flows and asset prices. In times of turbulence in global financial markets, an increase in high-grade bond issuance, such as MBSs issued by the Korea Housing Finance Corporation, can lower demand for credit securities, such as corporate and bank bonds, and put upward pressure on coupon rates, thereby increasing funding costs at companies and financial institutions.

Policy Recommendations

To begin, if the recovery in the real economy is delayed more than expected due to sluggish exports amid sustained high interest rates, financial support measures for households and corporations suffering from momentary liquidity shortages need to be provided. However, policy authorities should encourage those household and corporate borrowers with debt repayment capacity to pay off their loans in order to reduce the pressure of debt

accumulation. Along with this, they should also refinance the debt of vulnerable borrowers and carry out necessary restructuring at the same time.

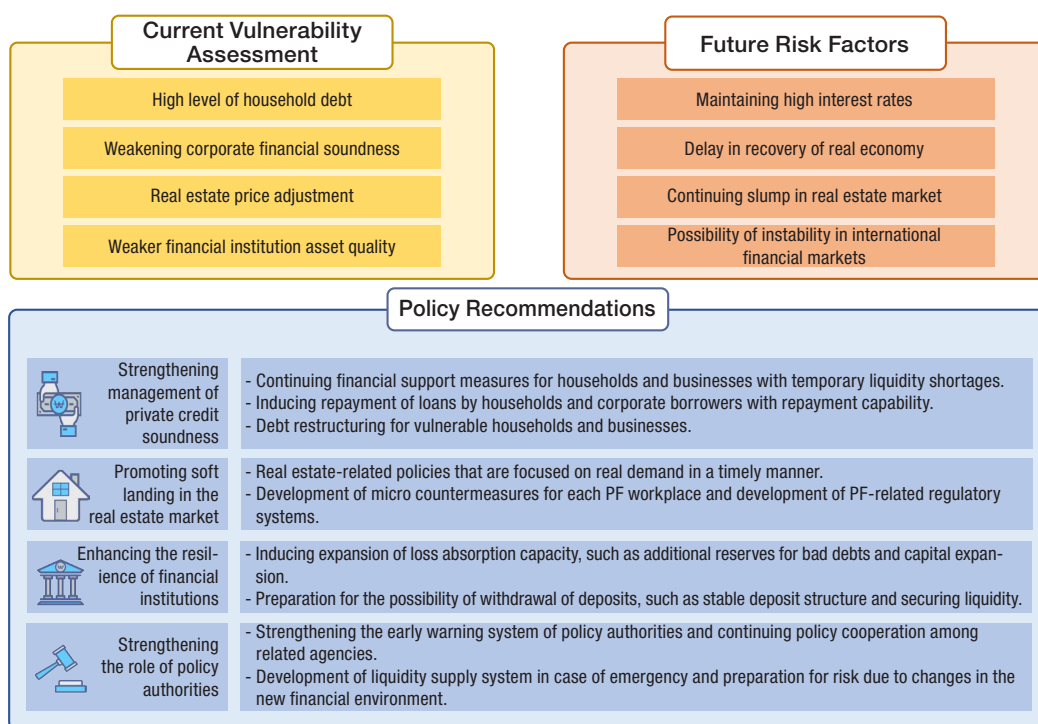
While a slowdown in the real estate market could act as a factor in easing pressure on household debt accumulation, it could also lead to a deterioration in the soundness of financial institutions through an increase in non-performing loans. Therefore, it is necessary to clarify the targets and objectives of any policy to ensure a soft landing for the real estate market. As for real estate PF in particular, authorities should provide support for businesses through micro measures or carry out prompt liquidation processes for each project site, while over the medium- to long-term horizon overhaul the PF-related regulatory framework to ease excessive risk taking and search for yield by investors.

In order to respond actively to risks in line with changes in domestic and global conditions, financial institutions should be encouraged to enhance their loss absorbing capacity by building additional loan-loss provisions and through recapitalization.⁷⁾ In particular, financial institutions based on deposits, such as savings banks, are likely to experience a deterioration in soundness, as well as a higher risk of large-scale withdrawal when solvency concerns surface.⁸⁾ Therefore, it is necessary to strengthen supervision of these institutions to ensure that they maintain a stable deposit-taking structure and have sufficient liquidity.⁹⁾

7) Financial authorities recently took steps to enhance the resilience of banks, announcing a plan for the improvement of capital adequacy regulation and raising the countercyclical capital buffer (CCyB) ratio from 0% to 1%. For more information, refer to Box 6 "Capital Buffer Schemes in Major Countries under the Basel III Framework and Implications."

In addition, policy authorities will need to strengthen the early warning system and continue with their policy coordination efforts in light of heightened uncertainties at home and abroad. While examining financial institution readiness for digital bank runs, which are more likely in a new financial environment that includes mobile banking, authorities need preemptive management to prevent excessive market jitters by coming up with liquidity support measures for emergency situations in advance, and by taking swift action in case of an emergency.

Finally, response measures are also needed for medium- and long-term risks arising from the changing financial environment. As in the future more countries could also introduce trade barriers similar to the EU's Carbon Border Adjustment Mechanism (CBAM), both policy authorities and individual companies must make efforts to build capacity here in Korea to respond to short-term liquidity stress that could occur as part of the export process.¹⁰⁾



8) As deposits made through non-face-to-face channels, i.e., online, have sharply increased since COVID-19, this has increased the likelihood of the spread of negative information about the solvency of a bank quickly leading to a deposit outflow. However, analysis has found that the probability of a massive deposit flight, like the one experienced by SVB, is low at domestic Korean institutions, and that even if this were to happen, they have sufficient capital buffers to withstand it. For a detailed discussion of this, refer to the "Review of Potential Risks at Non-Bank Depository Institutions" section in Analysis of Financial Stability Issues II, and to Box 3 "Assessment of Internet-only Banks and Implications."

9) For a detailed discussion of this topic, refer to Box 8 "SVB and Credit Suisse Crisis: Policy Responses and Implications."

10) For a detailed discussion of this topic, refer to Box 9 "Carbon Emissions Embedded within Korean Exports and Vulnerability Factors at Companies."

Box 8.

SVB and Credit Suisse Crisis: Policy Responses and Implications¹⁾

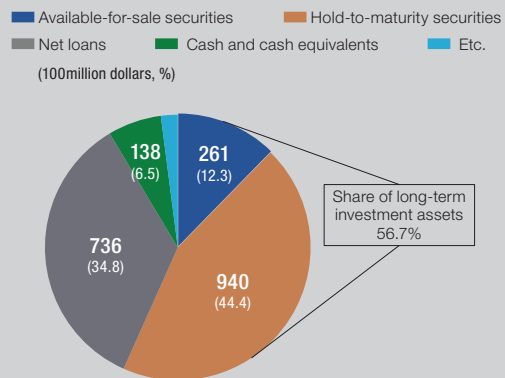
During the first half of 2023, there were repeated bouts of financial market turmoil in the U.S. and Europe, which were caused by fears over the solvency of some banking institutions. In March 2023, several U.S. banks failed, including Silicon Valley Bank (hereafter “SVB”) and around the same time, Credit Suisse (hereafter “CS”), a global investment bank based in Switzerland, was brought to the brink of collapse before it was acquired by UBS. Although some calm has returned to the markets thanks to the speedy responses from the U.S. and Swiss financial authorities, market participants’ concerns are far from laid to rest as similar crises can re-occur unless timely and appropriate measures are taken to prevent them. Below is a summary of the unfolding of the recent banking crisis that roiled global markets, set off by institutions including SVB and CS and the details of responses by national authorities, along with a discussion of implications for domestic financial institutions and policy authorities.

U.S. Bank Failures Including the Collapse of SVB

SVB²⁾ is a California-based regional bank, specializing in financing solutions for startups. Over the course of the COVID-19 pandemic, its assets grew exponentially on the huge inflow of deposits from biotech and cutting-edge technology firms, which enjoyed a flush of investment

during this period. Its deposit base nearly tripled between the end of March 2020 and the end of 2022, rising from USD 62 billion to USD 175.4 billion (2.8-fold increase). Under the hyper-low interest rate environment created by an accommodative monetary policy adopted in response to the COVID-19 crisis, SVB sought to boost its investment return by placing a substantial portion of funds in long-term Treasury securities, paying comparatively higher interest rates.

SVB asset structure¹⁾²⁾ before bankruptcy



Notes: 1) As of the end of 2022.

2) Figures in parentheses are share of total assets.

Source: Silicon Valley Bank (SVB).

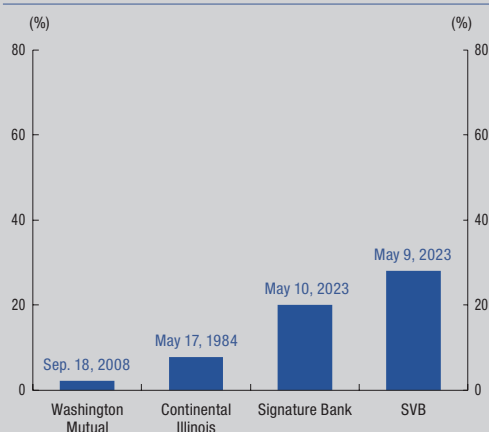
However, in 2022, when the U.S. Federal Reserve started to raise federal funds benchmark rate to combat inflation caused by global supply chain disruptions and the “revenge spending” unleashed as the economy reopened, SVB faced huge unrealized losses on its Treasury holdings. This sparked worries over SVB’s financial soundness, triggering a wave of withdrawal requests from depositors. SVB succumbed to the bank run and began bankruptcy proceedings (March 10). In the immediate wake of SVB’s collapse, the bank run spread to other institutions, leading to the bankruptcy of Signature

1) This article was authored by Kim Hye-yeon and Hur Jung (Financial Stability Analysis Team) and was reviewed by Park Gu-do (director of the Financial Stability Strategy & Coordination Division) and Lee Jung-yeoun (head of the Financial Stability Analysis Team).

2) SVB’s assets totaled USD 209.0 billion at the end of 2022, which makes it the 16th largest U.S. bank in assets.

Bank (March 12). First Republic Bank followed suit a few days later despite the rescue package created by big banks (USD 30 billion deposited by 11 big banks, March 16).³⁾

Peak 1-day withdrawal rates¹⁾ of SVB and Signature Bank



Notes: 1) Based on peak 1-day deposit withdrawal compared to total deposits before bank run.

Source: Fed re-citation (Financial Stability Report, May 2023).

To minimize the shock on the financial markets, U.S. financial authorities responded quickly to the bank failures. The Federal Deposit Insurance Corporation (FDIC), appointed as receiver, immediately took over the assets and liabilities of SVB and Signature Bank⁴⁾ and set up bridge banks, at the same time as announcing the decision that it will fully protect all depositors, insured and uninsured.⁵⁾ To supply the liquidity needed to meet the withdrawal demand from the depositors of the failed banks, the Federal Reserve issued loans to the bridge banks, secured by collateral⁶⁾ and protected by the FDIC's repayment guarantee.

Moreover, on the heels of the SVB collapse, in

order to prevent the contagion of risk across the broader banking system, the Federal Reserve set up the Bank Term Funding Program (BTFP). This program offering loans to depository institutions against eligible securities—limited to safe assets including Treasury bonds and MBS—which are priced at par value, for up to 12 months is considered to have greatly contributed to reassuring investors.

Comparison of BTFP and existing loan programs

	BTFP	Existing loan programs
Borrower eligibility	Depository institution (including a bank, savings association, credit union, or agency of a foreign bank) that is eligible for primary credit under the Federal Reserve discount window.	Classified into primary and secondary according to the target institution's credit rating, etc.
Eligible collateral ¹⁾	<u>U.S. Treasuries, government bonds, government MBSs</u> (limited to safe assets)	<u>U.S. Treasuries, government bonds, government MBSs</u> , foreign government bonds, international organization bonds, corporate bonds, ABS, CDO, CLO, CD, ABCP, etc.
Collateral valuation	Par value	Fair market value
Margins for securities	100%	100% ^{2)-59%} (different with type and maturity)
Loan term	Up to one year	Up to 90 days (primary)
Interest rate	OIS (1-year) + 10 bp	Effective federal funds rate (primary)

Notes: 1) Eligible collateral for BTFP includes any collateral that is eligible for purchase by the Federal Reserve Bank in open market operations (12 CFR 201.108(b)).

2) In the case of underlined government bonds, government agency bonds, and government agency MBSs (same as BTFP eligible collateral), margins will be 100% of par value (after March 13).

Source: BTFP "Frequently Asked Questions (FAQs)."

3) As of the end of 2022, Signature Bank and First Republic Bank ranked 29th (USD 110.4 billion) and 14th (USD 212.6 billion) among U.S. banks, respectively, based on asset size.

4) After being placed in FDIC receivership, SVB was acquired by First Citizen Bank (March 26), Signature Bank by New York Community Bank (March 19), and First Republic Bank by JPMorgan Chase (May 1).

5) The losses incurred by the FDIC by undertaking these measures are estimated at USD 22.5 billion (USD 20 billion for SVB, USD 2.5 billion for Signature Bank), which it plans to make up for by requiring additional contributions from insured banks (U.S. Federal Reserve Board, "Financial Stability Report," 1st half, 2023).

6) Although under the Dodd-Frank Act, the U.S. Federal Reserve Bank is not allowed to directly issue loans to bail out individual financial institutions, this rule can be circumvented by providing loans to bridge banks against eligible collateral.

The primary cause of the failures of SVB and other U.S. banks is the insufficiency of risk distribution resulting from a funding structure and investment portfolio that are heavily skewed toward a limited number of sources and assets. In the case of SVB, its investment portfolio consisted exclusively of U.S. Treasury securities, which made severe losses inevitable when interest rates spiked. Meanwhile, as its funding structure was reliant on large deposits from a small number of tech startups, the bank was highly vulnerable to a bank run. Another contributing factor that has been frequently pointed out is the lack of proper oversight of supervisory authorities after a significant regulatory relaxation in 2018 for banks with less than USD 250 billion in assets.⁷⁾

It is also worth noting the role played by the widespread adoption of social media and the digital innovation of financial services in this crisis. Their concurrence enabled the bank run to take place at an unprecedented speed.⁸⁾ As soon as concerns surfaced about the solvency of these banks, the news rapidly spread on social media platforms, prompting depositors to simultaneously initiate withdrawals using mobile banking apps or other online channels, bringing institutions with hundreds of billion dollars in assets to their knees in a matter of days. The accelerated pace at which these events unfold-

ed simply did not leave enough time for policy authorities to attempt to avert the crisis using the rediscount window or other traditional tools for supplying liquidity.

CS-induced European Banking Crisis

Credit Suisse (CS)⁹⁾ saw its business conditions and reputation deteriorate steadily over the past several years as the Switzerland-based global bank was plagued with internal management issues,¹⁰⁾ which led to huge investment losses. In the wake of the SVB collapse, amid growing fears over the solvency of the global banking system, CS ran into a liquidity crisis. In order to stabilize the markets, the Swiss government and regulator swung into action and injected liquidity and made arrangements for UBS, the country's largest bank, to take over CS.

7) In accordance with the Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA), passed to law in 2018, banks with less than USD 250 billion in assets (category IV) have been exempted from liquidity ratio and internal stress testing requirements.

8) According to the U.S. Federal Reserve's "Financial Stability Report" for the first half of 2023, while the intraday peak withdrawal ratio (relative to total deposits prior to the bank run) of Washington Mutual, a bank that succumbed to a bank run in 2008 during the global financial crisis, was about 2%, the ratio for SVB and Signature Bank reached over 20%. In the case of Continental Illinois, a regional U.S. bank that collapsed in 1984, an intraday peak withdrawal ratio of 7.8% was recorded.

9) As of the end of 2022, CS had CHF 531.4 billion in assets. CS is the second largest Swiss bank (after UBS), designated by the Financial Stability Board (FSB) as a global systemically important bank (G-SIB).

10) In 2021, CS suffered losses of USD 5.4 billion from the default of the failed hedge fund Archegos Capital Management. The Swiss bank was otherwise involved in several scandals, charged with bribery (2021) and money laundering and tax evasion (2022), and was also hit by a data breach (2022), which severely damaged its reputation.

Pre-acquisition CS stock price and CDS premium



Source: Bloomberg.

Although the rapid response of the Swiss authorities helped avoid the spread of the CS crisis to other European banks, a number of issues emerged in the process of wrapping up the acquisition of the failing bank by UBS. In the process of transfer of CS' assets and liabilities, Swiss regulator decided to fully write off its contingent convertible bonds (AT1 securities), thereby forcing the creditors, holding these instruments, bear the losses before the shareholders.¹¹⁾ As a result, the sentiment of capital market investors toward contingent capital securities cooled sharply.

Meanwhile, it has also become apparent that the current environment makes it impossible to implement the various bank resolution plans put in place by national authorities after the global financial crisis to prevent the "too big to fail" problem. As the herding behavior of market participants is magnified in scale and intensity by the increasing interconnectedness of global financial markets and the accelerated speed of

the movement of money, there is only a limited window of opportunity for an orderly resolution of failing banks before the situation leads to widespread panic in the markets. Finally, concerns have also been raised about the possibility that dealing with bank failures through M&A, rather than through resolution, will only make large institutions even bigger, which can potentially worsen the vulnerabilities of the financial system in the medium and long term.

Policy Implications

The recent banking crisis, sparked by SVB and CS, has demonstrated that cross-border and cross-market risk contagion takes place today at a significantly faster pace than in the past. In Korea where the availability of advanced IT infrastructure has led to a ubiquitous use of mobile and internet-based financial transactions, it is especially important for its authorities to carefully examine and respond to the vulnerabilities revealed through the recent crises in major countries.

By micro-monitoring conditions in individual sectors of the financial system, policy authorities must try to detect signs of unusual market behavior early on and take necessary measures to address and mitigate related risks in order to help avoid extreme volatility and instability in the markets. In the latest banking crisis, the U.S. and Swiss policy authorities took unprecedented and bold response measures to quickly bringing the situation under control. When these response measures were first announced, they were met with the criticism from some quarters where they were perceived excessive and potentially leading to moral hazard. However, so

11) Unlike the creditors, the shareholders of CS was able to recover some of their investment as they received one UBS share for every 22.8 outstanding shares.

far the prevailing assessment seems to be that regulators achieved their goals at a cost less than initially expected by restoring stability in the markets in a timely manner.

Since the Global Financial Crisis, national policy authorities have made sustained efforts to improve the resilience and liquidity position of financial institutions. However, it has recently transpired that existing regulations and safeguards may not be sufficient to protect against extremely stressed circumstances, such as the current situation marked by a severe degree of interest rate volatility, far surpassing previous expectations. Recent developments have also suggested the need to preemptively respond to new emerging types of risks associated with information sharing via social media. Accordingly, it is necessary for domestic policy authorities to periodically assess the resilience of financial institutions by conducting stress tests and encourage them to build up sufficient capital reserves to cushion against unexpected contingencies. Moreover, the funding structure of financial institutions must be reviewed and improved so that they can better guard themselves against a digital run and new liquidity mechanisms must be explored to quickly inject liquidity into institutions experiencing a social media-induced bank run.

Box 9.

Carbon Emissions Embedded within Korean Exports and Vulnerability Factors for Companies¹⁾

The European Union's Carbon Border Adjustment Mechanism (CBAM),²⁾ a regulatory tool to control carbon emissions released from imported goods' production processes, is set to be operational its transitional phase starting in October 2023.³⁾ Throughout the transitional phase, which will last until the end of 2025, businesses are obligated to submit a "CBAM Report" detailing the estimated embodied carbon of goods exported to the EU, along with verification documents, to the importing member state's government via the importer. Upon the CBAM's full implementation in January 2026, exporting enterprises must acquire "CBAM Certificates" for emissions surpassing the EU benchmark. Currently, the CBAM only applies to six products identified as highly susceptible to carbon

leakage: steel, cement, aluminum, fertilizers, electricity, and hydrogen. However, the range of applicable products is expected to expand in the future based on outcomes from the trial implementation during the transitional phase.⁴⁾

Given the potential for other countries to adopt similar carbon tariffs in the future, the subsequent discussion delves into the analysis of carbon emissions inherent within Korean exports and the corresponding susceptibility factors for domestic enterprises. This examination centers on exports to the EU and aims to draw policy insights from the findings.

Carbon Emissions Embedded within Korean Exports

As of 2018, carbon emissions embedded within Korean exports totaled 0.37 billion tons (0.37 Gt CO₂), which accounted for 3.8% of total global embodied carbon emissions (9.70 Gt CO₂).⁵⁾ This puts Korea as the sixth-highest contributor globally to total global embodied carbon emissions, following China (20.1%, 1.95 Gt CO₂), the

1) This article was authored by Song Byeong-heon (Sustainable Growth Research Team), and was reviewed by Seo Pyoung-seok (director of the Financial Stability Research Division) and Song Kil-sung (head of the Sustainable Growth Research Team).

2) The main purpose of the CBAM is to reduce "carbon leakage," a phenomenon characterized by the shift of production and associated emissions from countries with stringent decarbonization policies to those with less rigorous regulations, or the increased dependence on imports from nations with low carbon prices, based on the "polluter pays principle" (PPP).

3) In December 2022, the European Commission, the European Parliament, and the Council of the European Union reached a provisional agreement on the CBAM, which received final approval from the Council of the European Union in April 2023. The CBAM holds a central position within the framework of the "Fit for 55" initiative, a comprehensive legislative proposal aimed at achieving the EU's new greenhouse gas (GHG) reduction target of 55% (previously 40%) from 1990 levels by 2030. Alongside the CBAM, this legislative package encompasses environmentally focused policies across 13 sectors, including initiatives such as the reduction of carbon emissions from passenger cars and compact vehicles, enhancements to the emissions trading scheme (ETS), and broader efforts towards GHG reduction.

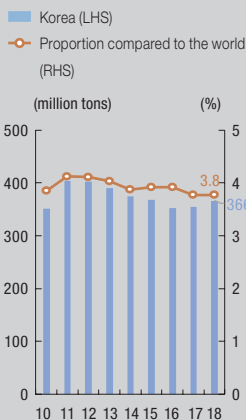
4) While the majority of secondary goods are exempt, certain downstream products such as screws and bolts are covered by the CBAM. The question of whether chemical products will be included within its scope is set to be determined during the transitional phase.

5) Since specific product-level data for carbon emissions regulated by the CBAM framework and related statistics are not readily available, this article relies on the analysis of the overall volume of carbon emissions embedded in Korean exports. The emissions data for Korean exports up to 2018 were obtained from OECD statistics, which cover emissions from 66 countries and the rest of the world. From 2018 onwards, the volume of carbon emissions embodied in the Korean export industry has remained relatively stable, estimated at 0.35 Gt CO₂ in 2019, 0.33 Gt CO₂ in 2020, and 0.38 Gt CO₂ in 2021, as indicated by the IMF Dashboard.

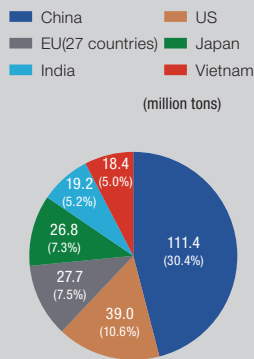
U.S. (6.3%, 0.61 Gt CO₂), Russia (5.2%, 0.51 Gt CO₂), India (5.0%, 0.48 Gt CO₂), and Germany (4.1%, 0.40 Gt CO₂), in that respective order.⁶⁾

Carbon dioxide emissions¹⁾ embodied in the Korean export industry

Trends in carbon dioxide emissions



Emissions by trade partners²⁾



Notes: 1) Total emissions data for the world were aggregated from 66 countries and other countries labeled as "other."
2) As of 2018.

Source: OECD, Carbon dioxide emissions embodied in international trade.

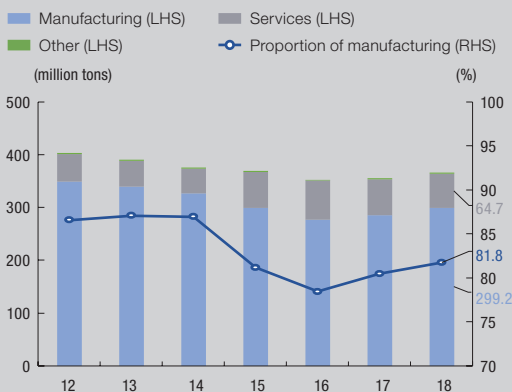
The share of carbon emissions embodied in total Korean exports attributed to exports to the EU (27 countries) stood at 7.5% (27.7 Mt CO₂) in 2018. This places it as the third largest share, following exports to China (30.4%, 111.4 Mt CO₂) and exports to the U.S. (10.6%, 39.0 Mt CO₂). When considering EU member states individually, exports to major European countries contributed significantly to embodied carbon emissions. Notably, exports to Germany constituted 23.0% (6.4 Mt CO₂), exports to Italy accounted for 11.4% (3.2 Mt CO₂), and exports to France represented 8.5% (2.3 Mt CO₂).⁷⁾

6) Considering that Korea's contribution to the global carbon emissions (37.12 Gt CO₂ as of 2021) amounts to 1.7% (0.62 Gt CO₂), the volume of carbon emissions embodied within its exports appears relatively substantial.

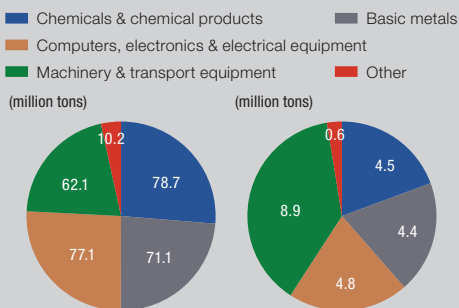
7) In 2018, the carbon emissions embedded in goods imported into the EU from outside the region totaled 2.21 Gt CO₂. Among the exporting countries, China had the largest share of embodied carbon emissions entering the EU, accounting for a 12.2% (0.27 Gt CO₂), followed by Russia (7.9%, 0.17 Gt CO₂), the U.S. (4.4%, 0.10 Gt CO₂), and India (3.1%, 0.07 Gt CO₂), all of which rank above Korea in terms of their respective contributions to the total imported embodied carbon.

Current status of carbon dioxide emissions embodied in export by industry

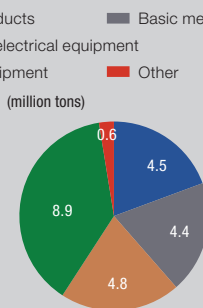
Trends in carbon dioxide emissions embodied in export industries



Emissions by major export industries¹⁾



Emissions embodied in exports to the EU¹⁾



Notes: 1) As of 2018.
Source: OECD, Carbon dioxide emissions embodied in international trade.

In terms of industry breakdown, manufacturing was the primary source of embodied carbon emissions exported globally, constituting a substantial proportion of 81.8% (299.2 Mt CO₂), while the service sector accounted for 17.7% (64.7 Mt CO₂) in 2018. Within manufacturing subsectors, industries with significant carbon intensity, such as chemicals & chemical products (78.7 Mt CO₂), basic metals (71.1 Mt CO₂), com-

puters, electronics & electrical equipment (77.1 Mt CO₂), and machinery & transport equipment (62.1 Mt CO₂), collectively represented 79.0% (289.0 Mt CO₂) of total embodied carbon emissions in overall exports.

When considering embedded carbons that are exported to the EU as of 2018, machinery & transport equipment claimed the highest share of 8.9 Mt CO₂, followed by computers, electronics & electrical equipment at 4.8 Mt CO₂, and then basic metals at 4.4 Mt CO₂. These three industries, primarily comprising CBAM-covered products, collectively accounted for a significant 65.4% (18.1 Mt CO₂) of the total carbon emissions embodied in all exports to the EU. If we include chemicals & chemical products (4.5 Mt CO₂) as CBAM-covered products, these four industries would encompass 81.6% (22.6 Mt CO₂) of the total exported embodied carbon, indicating that nearly all domestic exporting firms will be affected by the CBAM.

Vulnerability Factors for Exporting Firms

In the transitional phase, the CBAM could present challenges for domestic exporting firms, manifesting as additional administrative costs for measuring and verifying embodied carbon emissions, as well as the obligation to submit the

CBAM Report. Inadequate preparation of the CBAM Report or non-compliance with reporting regulations could result in issues and delays in the export process. Given that SMEs constitute 90.5% (16,206 firms) of all Korean companies exporting to the EU (17,914 firms, as of 2021), this is likely to exert a significant pressure on a significant portion of them.⁸⁾

After the full implementation of the CBAM in 2026, it is likely that the financial burden associated with acquiring CBAM Certificates will rise for Korean enterprises, due to the considerable carbon intensity of the domestic manufacturing sector as well as the EU's efforts to strengthen its ETS.⁹⁾ In terms of export sectors, the carbon intensity (tons per USD 1 million of exports, as of 2018) of manufacturing firms exporting to the EU is estimated at 498.7, which is comparable to the global average (66 countries, 496.1). Among the CBAM-covered products, the carbon intensity of basic metals (1,291.2) significantly surpasses the corresponding global average (915.7).

As for CBAM Certificates, the wider the price disparity in emission allowances between the EU and Korea and the lower the allocation of free EU ETS allowances, the higher the cost of acquiring these certificates will be.¹⁰⁾ As the total cost of acquiring CBAM Certificates is calculated by subtracting the carbon price already

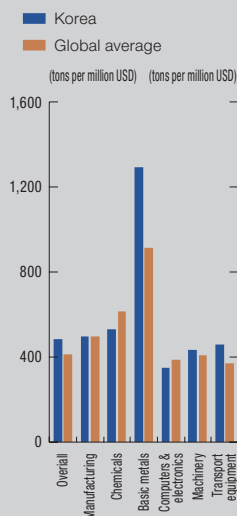
8) According to the "2021 Trade Statistics by Company Characteristics" from Statistics Korea, large enterprises make up 2.9% (527 firms) of all firms engaged in exports to the EU, while mid-size companies comprise 6.6% (1,181 firms) of the total.

9) The carbon intensity of the export industry is calculated as the volume of emissions for a certain value of exports (tons per USD 1 million). A higher carbon intensity indicates a strong dependence of the export industry on carbon-intensive sectors.

10) While precise details needed to calculate the cost of a CBAM Certificate, such as the quantity of free allowances and the methodology for applying the emission allowance price, are currently unavailable, the fundamental calculation formula is as follows: Total Cost for acquiring CBAM Certificate = [(embodied carbon emissions of exported goods - free EU allowances) × (EU ETS price)] - [(embodied carbon emissions of exported goods - free allowances in the country of origin) × (the price of an allowance in the country of origin)]. Given this, considering the significant proportion of free allowances in Korea (97% of all allowances), and the notably lower allowance price compared to the EU, it is anticipated that the total cost of acquiring CBAM Certificate and the associated burden on exporting firms are likely to rise with a reduction in free EU allowances and an upsurge in the EU ETS price.

paid by domestic exporting firms in Korea from the carbon price in Europe, any divergence in carbon costs between two regions is borne by companies.

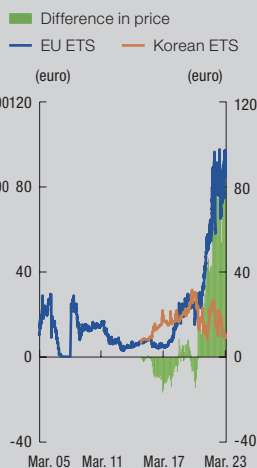
Carbon intensity¹⁾ of exports to the EU, by industry



Notes: 1) As of 2018.

Source: OECD, Carbon dioxide emissions embodied in international trade.

Trends¹⁾ in carbon price difference in ETS between Korea and the EU



Notes: 1) EU ETS data represent forward prices, while Korean ETS data represent spot prices.

Source: International Carbon Action Plan.

As of the end of March 2023, the price of an emission allowance in Korea is KRW 14,650 (EUR 10.5), which is notably lower than the price in Europe (EUR 89.2). Meanwhile, the EU's allocation of free allowances, constituting 43% of total allowances (as of 2022), are expected to undergo a substantial reduction in the coming years, as the free allowances are scheduled to be completely phased out by 2034. With the impending decrease in the availability of free allowances, domestic exporting firms will likely need

to acquire more CBAM Certificates, leading to an overall increase in their cost of exports.

Policy Implications

Upon the implementation of the CBAM, the government's primary concern should be mitigating any immediate adverse effects on domestic exports. Throughout the transitional phase, the government should prioritize improving the system for measuring and verifying domestic exporting firms' carbon emissions, while concurrently expanding consultation services aimed at aiding small exporting businesses in navigating new export procedures. Additionally, the government should promote the involvement of domestic MRV (measurement, reporting, verification)-related certification bodies in international certification organizations. This move would help lower the administrative costs for exporting firms associated with CBAM verification.¹¹⁾

Financial institutions, as well as the government and the BOK, should intensify their oversight of liquidity conditions for businesses engaged in EU exports. It is imperative to establish streamlined mechanisms for promptly extending financial assistance to companies facing momentary liquidity constraints resulting from minor snags in the exporting operations. Simultaneously, financial institutions could incorporate specific information from CBAM Reports in the carbon emissions database that are currently under development, intended for enhancing borrower management. This strategic move would facilitate the construction of comprehensive environmental profiles for individual customers.

11) The government issued "Status of the EU CBAM and Response Measures" in December 2022, which set out measures, including i. developing carbon reduction technologies, ii. strengthening the response capacity of firms exporting to the EU, and iii. expanding infrastructure for measuring carbon emissions of products. At the same time as accelerating the pace of implementation of these measures, the government must also increase administrative support for small companies.

Analysis of Financial Stability Issues

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I. Review of Major Financial Stability Risks Related to Housing Market¹⁾

-
1. Background
 2. Risk Related to Decline in Housing Prices
 3. Risk Related to Accumulated Unsold New Housing Units
 4. Risk Related to Soundness of Housing Guarantees
 5. Implications
-

1. Background

Korea's housing market showed significant sluggishness in terms of prices and transaction volume during the second half of 2022. Although the sluggishness has moderated somewhat due to government measure to stabilize the real estate market in 2023, there is concern that the slump is likely to deepen due to the high interest rates and contraction in the real economy.

Generally, signs of a slump in the housing market include a decline in housing prices, reduction in the number of transactions, contraction of purchasing sentiment, and increase in unsold new housing units. While the decline in collateral value and leasehold deposits due to the fall of housing prices alleviates the burden of residential costs for tenants and moderates household debt growth, it can also increase

pressure for the redemption of household loans and lessors' return of leasehold deposits. In addition, as unsold new housing units increase due to the narrowing gap between sales prices and actual transaction prices and contraction of purchase sentiment, the default risk of related corporate loans and real estate PF rises as well. This section examines financial stability risks related to the housing market in terms of the decline in housing prices, accumulation of unsold new housing units, and soundness of housing guarantees, and assesses the impacts on households and businesses.

2. Risk Related to Decline in Housing Prices

A. Decrease in Net Assets of Homeowners

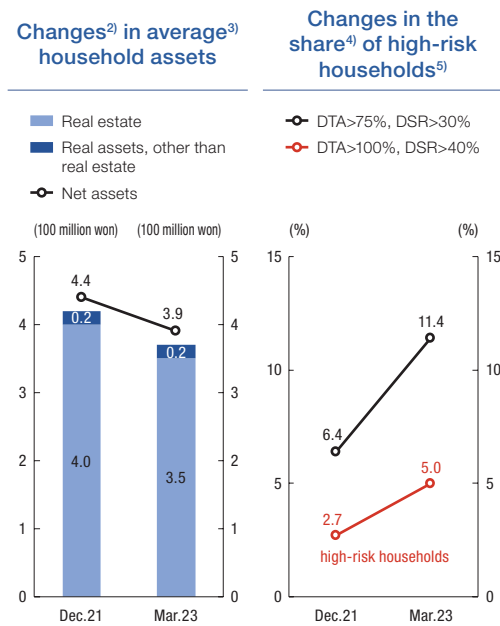
Households in Korea hold about 78%(as of the end of March 2022) of their total assets in real assets such as housing, and if housing prices fall sharply, their assets shrink, which could reduce the financial soundness of households. Based on the 2022 Survey of Household Finances and Living Conditions, recent changes in the assets of households were estimated, with the results showing that the average net assets of households decreased by about KRW 50 million, falling from KRW 440 million at the end of 2021 to KRW 390 million at the end of March 2023, due to the decline in housing prices since the second half of last year. The share of high-risk households²⁾ with vulnerability in terms of debt servicing capacity rose

1) This article was authored by Park Jae-hyun, Pyoun Do-hoon, Jung Yoon-jae, and Hur Jung (Financial Stability Analysis Team) and was reviewed by Park Ku-do (director of the Financial Stability Strategy & Coordination Division), Lee Jung-yeoun (head of the Financial Stability Analysis Team), and Kim Kyung-sup (Financial Stability Department).

2) High-risk households were defined as those with a large burden of principal and interest repayment (DSR > 40%, debt service ratio) and those who cannot repay their debts through asset liquidation (DTA > 100%, debt-to-asset ratio) among households with financial debts.

from 2.7% of households with financial debts to 5.0%³⁾ (Figure I-1).

Figure I-1. Changes in household asset composition and share of high-risk households¹⁾



Notes: 1) March 2023 basis (estimated using data from the end of March 2022, reflecting changes in asset prices and debt balances, etc.).
 2) Net assets = Financial assets + Real assets - Financial debt.
 3) Based on an average household.
 4) The proportion of high-risk households, as a share of households with financial debt.
 5) Households with DTA>100%, DSR>40%.
 Source: Bank of Korea staff calculations, survey of Household Financial and Living conditions.

B. Increase in Burden of Landlord Households to Return Jeonse Deposits

As for landlord households that rented out their housing units, in addition to a decrease in net assets due to the decline in housing

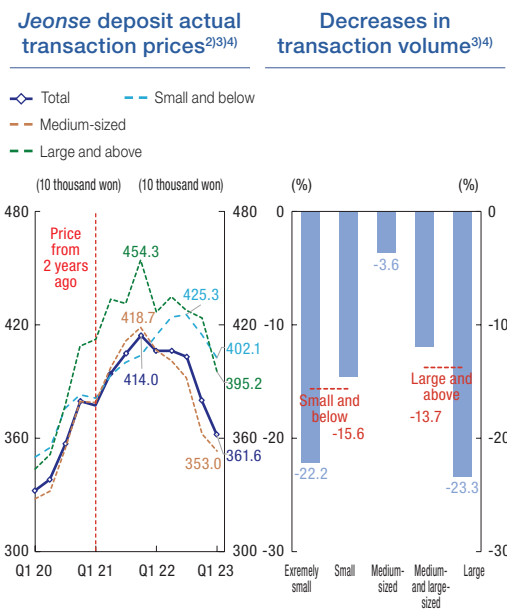
prices, the burden of returning leasehold (hereafter 'Jeonse') deposits could increase owing to a decline in Jeonse deposit prices. The median Jeonse prices (nationwide) per unit area (m²) of apartments for which Jeonse transactions are common fell to KRW 3.616 million in the first quarter of 2023, down 12.6% from the peak (KRW 4.140 million) in the fourth quarter of 2021. By size of apartment, medium-sized apartments (60 to 85m²) saw Jeonse prices fall more than small apartments. Jeonse prices of small apartments⁴⁾ fell by only 5.4% (4.253 million → 4.021 million) from the peak, while those of medium-sized and large apartments⁵⁾ declined by 15.7% (4.187 million → 3.530 million) and 13.0% (4.543 million → 3.952 million), respectively. In particular, as the median Jeonse prices of medium-sized apartments fell below the level seen two years ago since the end of 2022, landlord households are unable to return existing Jeonse deposits to lessees using Jeonse deposits from new lessees, which means that the likelihood of existing lessees not receiving their Jeonse deposits upon maturity of their lease contracts has risen.

In addition to the decline in Jeonse prices, as the demand for Jeonse shifted to demand for monthly rentals, the burden on landlord households to return the Jeonse deposits has increased further. The results of an analysis of actual transaction data on apartments nationwide from the Ministry of Land, Infrastructure and Transportation showed that, during the first quarter of 2023, the Jeonse transaction volume dropped year-on-year for all apartment sizes, with the transaction volume de-

3) The share of high-risk households among households with home mortgage loans climbed from 5.2% to 9.6% during the same period.
 4) The arithmetic mean of median prices of extra-small apartments (40m² or less) and small apartments (40 to 60m²) was calculated.
 5) The arithmetic mean of median prices of medium-large apartments (over 85m² and below 135m²) and large apartments (over 135m²) was calculated.

clining by large margins for extra-small apartments (-22.2%), for which the shift to monthly rentals is relatively easy, and large apartments (-23.3%), for which *Jeonse* deposits are large (Figure I-2).

Figure I-2. *Jeonse* deposit prices and transaction trends by size¹⁾



Notes: 1) Based on actual apartment *Jeonse* deposit transaction data.
 2) Based on median *Jeonse* deposit price per unit area(m²).
 3) The simple average of extra small and small for "small and below," and medium-large and large for "large and above."
 4) As of Q1 2023, year-over-year basis.
 Source: Korea Real Estate Board, Ministry of Land, Infrastructure, and Transport.

Using actual transaction data (from the Ministry of Land, Infrastructure and Transportation), the value of *Jeonse* deposits to be returned due to the decline in *Jeonse* prices was estimated as follows. By estimating median *Jeonse* price and transaction volume, we calcu-

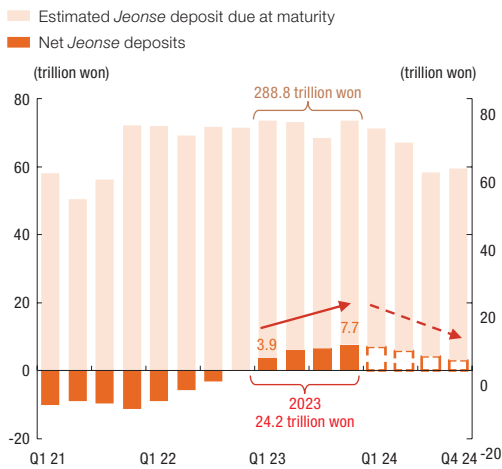
lated the net *Jeonse* deposits landlord households must return to lessees⁶⁾ at maturity of *Jeonse* contracts on a time basis.

$$rd_t = \sum_i (md_{i,t} - md_{i,t-24}) * tr_{i,t-24}$$

rd : *Jeonse* deposit return
md : Median *Jeonse* deposit price
tr : *Jeonse* transaction volume
i : Residence size
t : Monthly, assuming a 2-year maturity of *Jeonse* deposit contract

If *Jeonse* prices remain at the level of March 2023,⁷⁾ the value of net *Jeonse* deposits landlord households return to lessees is estimated to reach KRW 24.2 trillion in 2023, representing about 8.4% of the total *Jeonse* deposits (KRW 288.8 trillion) to reach maturity during this period. By time, net *Jeonse* deposits first shifted to a positive value in the fourth quarter of 2022, when *Jeonse* prices fell below those of two years ago, and are expected to rise until the fourth quarter of 2023 and decline thereafter. By region, in the Seoul metropolitan area, where *Jeonse* prices and transaction volume are high, the burden of having to return the *Jeonse* deposits soared.⁸⁾ However, if *Jeonse* prices recover, the burden of return may be less than projected (Figure I-3).

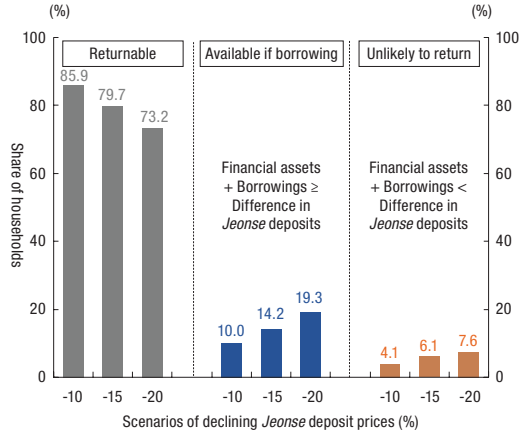
6) However, renewal transactions where *Jeonse* deposits were raised by up to 5% from the existing amount in accordance with the Housing Lease Protection Act during the same period were excluded from the analysis.
 7) In March 2023, the nationwide apartment *Jeonse* price index declined by about 14% from its peak (June 2022).
 8) Seoul and Gyeonggi accounted for 30.1% and 35.6%, respectively, of total net *Jeonse* deposits, followed by Incheon and Daegu, representing 6.7% each.

Figure I-3. Burden of *Jeonse* deposit return


Source: Bank of Korea staff calculations, Ministry of Land, Infrastructure, and Transport.

The ability of landlord households to return *Jeonse* deposits is assessed as generally favorable, given their asset size and ability to borrow. The results of a simulation⁹⁾ of the ability of landlord households to return *Jeonse* deposits conducted based on the Survey of Household Finances and Living Conditions showed that if *Jeonse* prices decline by 10 to 20% from the end of March 2022 to the end of 2023, most landlord households with *jeonse* rentals (1.167 million households) would be able to return *Jeonse* deposits through the sale of financial assets and borrowings, and that the share of households that are likely to have difficulty returning *Jeonse* deposits even after borrowing is about 4.1 to 7.6% of the total (48,000 to 88,000 households) (Figure I-4). Such shortage of funds for returning *Jeonse* deposits may lead to an increase in debts and

reduction in net assets for landlord households and a loss of *Jeonse* deposits for lessees. Meanwhile, it should be noted that borrowings taken by landlord households to return *Jeonse* deposits may contribute to an increase in household debt unless tenants use a significant portion of their returned *Jeonse* deposits to repay existing *Jeonse* deposit loans.

Figure I-4. Share¹⁾ of households by rental deposit returnability based on *Jeonse* deposit price decline²⁾


Notes: 1) Compared to total landlord households.

2) Scenarios are based on *Jeonse* deposit price declines from March 2022.

Source: Bank of Korea staff calculations, survey of Household Financial and Living conditions.

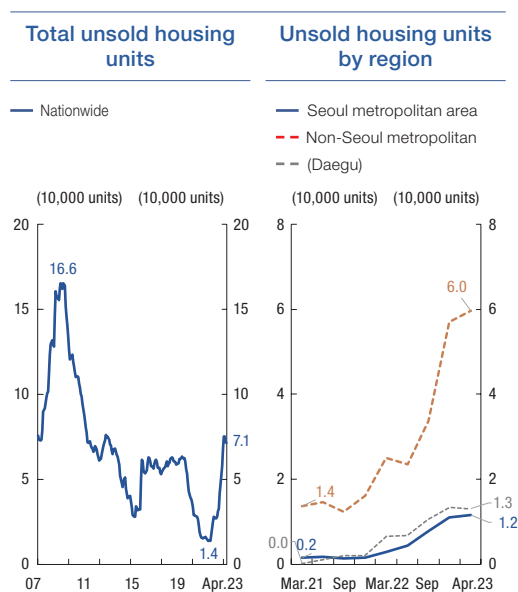
9) The ability of landlord households with *Jeonse* rentals to return net *Jeonse* deposits (existing *Jeonse* deposits - *Jeonse* deposits after *jeonse* price decline) through the disposal of financial assets and borrowings was analyzed. It was assumed that borrowings from financial institutions are needed for net *Jeonse* deposits that exceed the financial assets and amount of available borrowings per household was estimated by applying restrictions on households for living stability funds (LTV: 50%; 40% for owners of multiple housing units) and regulating borrower's DSR (DSR: 50% for loans of over KRW 100 million).

3. Risk Related to Accumulated Unsold New Housing Units

A. Increase in Unsold New Housing Units and Decline in Sales Rate

As of the end of April 2023, the number of unsold new housing units nationwide amounted to 71,000, showing a rapid rise from 14,000 units at the end of September 2021.¹⁰⁾ However, compared with periods of past PF defaults, it is still low. By region, the inventory of unsold new housing units in non-Seoul metropolitan areas such as Daegu increased rapidly, leading to an increase in total unsold new housing units. In the Seoul metropolitan area, unsold new housing units increased from 2,000 units at the end of March 2021 to 12,000 units at the end of April 2023, while in non-Seoul metropolitan areas, it rose significantly from 14,000 units to 60,000 units during the same period (Figure I-5).

Figure I-5. Trends¹⁾ in unsold housing units



Note: 1) End-period basis.

Source: Ministry of Land, Infrastructure, and Transport.

Looking at the trend of the initial sales rate of new private apartments nationwide,¹¹⁾ the rate fell rapidly from about 90% that had been since 2017 to 49.5% in the first quarter of 2023. In particular, while the rate declined significantly across all regions, the five metropolitan cities and other regions recorded 36.9% and 35.5%, respectively, showing significantly steeper declines than in the Seoul metropolitan area (77.7%). The exhaust rate of sales volume¹²⁾ has gradually declined since 2022, reaching 78.9% (annualized rate)¹³⁾ in April 2023, leading to sluggishness in the housing sales market (Figure 1-6). If the current initial

10) The 14,000 units of unsold new housing units recorded at the end of September 2021 is the lowest seen since such statistics began to be produced.

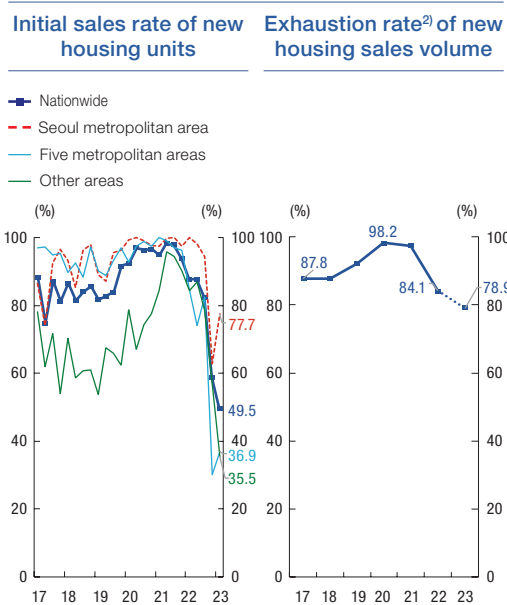
11) This is the ratio of the number of new housing units for which sales contracts were signed during the initial sales period (three months after the start of sales to six months after) to the total number of new housing units for sale at private apartment construction sites with at least 30 housing units, which obtained housing sales guarantees from the Korea Housing & Urban Guarantee Corporation (HUG) and approval for sales subscription.

12) This is defined as the ratio of sold units to the sum of unsold units in the previous year and units to be sold in the given year.

13) The cumulative exhaust rate until April 2023 was 41.0%, assuming that the number of unsold new housing units does not increase further until year end.

sales rate and exhaust rate levels persist without any improvement in housing demand, the number of unsold new housing units is expected to rise further during the year.

Figure I-6. Trends in initial sales rate and sales exhaustion rate for new units¹⁾



Notes: 1) (Unsold housing units at the end of previous year (excluding unsold after completion) + new unit sales - unsold housing units at the end of current year) / (unsold housing units at the end of previous year (excluding unsold after completion) + new unit sales).

2) The rate for 2023 is calculated by annualizing the exhaustion rate during the period from January to April.

Source: Bank of Korea staff calculation, Korea Housing & Urban Guarantee Corporation (HUG), Korea Real Estate Board.

However, while housing demand has recently been recovering somewhat, some project sites are postponing¹⁴⁾ their sales schedules because of sluggish demand, and local governments

have presented policy responses such as putting a hold on the issuance of permits or encouraging immediate sales after construction. Thus, it is less likely that the number of unsold new housing units will increase rapidly in a short period.

In particular, at the end of April 2023, there were 9,000 unsold new housing units that had completed construction, which put a significant strain on construction companies and financial institutions, which is quite low relative to in the past.¹⁵⁾ The exhaust rate¹⁶⁾ of new housing units whose construction was completed fell substantially to 93.3% in 2023, but in the case of the Seoul metropolitan area, it is relatively favorable at 97.7%. The exhaust rate for Jeju was low, but as the number of completed housing units there is not large,¹⁷⁾ any impact on the market overall is assessed to be limited (Figure I-7).

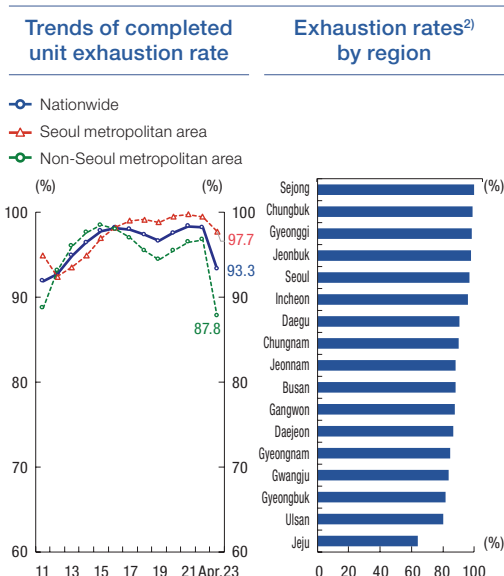
14) Apartment sales of the top 10 construction companies from January to April 2023 amounted to 16,000 units, well below the planned volume of december last year (55,000 units) (Source:Real Estate 114).

15) Number of unsold new housing units after construction completion (end of period, unit): 50,000 in 2009 → 11,000 in 2015 → 12,000 in 2020 → 8,000 in 2022

16) This is defined as the ratio of the number of sold new housing units in a given year to the sum of the number of unsold new housing units completed at the end of the previous year and number of new housing units completed in the given year.

17) The number of new housing units completed on Jeju from January to April of 2023 was 1,453, representing only 1.18% of the total number of new housing units completed nationwide (123,083).

Figure I-7. Trends of completed unit exhaustion rate¹⁾



Notes: 1) (Unsold housing units after completion at the end of previous year + new completed units - unsold housing units after completion at the end of current year) / (unsold housing units after completion at the end of previous year + new completed units).

2) Regional exhaustion rates of completed units for January to April 2023.

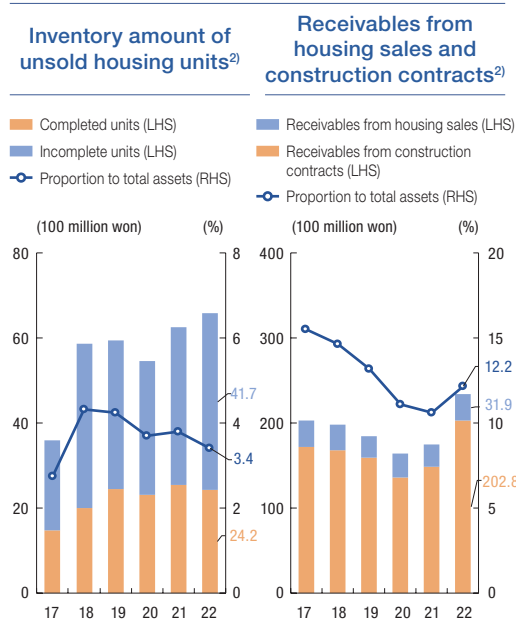
Source: Ministry of Land, Infrastructure, and Transport.

B. Decline in Financial Soundness at Construction Companies due to Unsold New Housing Units

An increase in unsold new housing units can delay construction companies' collection of proceeds, such as revenue from sales (sales project) and construction (subcontracting project), giving construction companies the burden of liquidity to raise working capital. Generally, when construction companies participate in real estate PF projects, they issue guarantees such as construction completion guarantees. Hence, they must proceed with the construction work using their own funds until the agreed-upon date regardless of sales. Therefore, if the number of unsold new hous-

ing units rises, construction companies' inventory of completed and uncompleted housing units rises, and accounts receivables increase as they fail to collect the proceeds from sales and construction. The average inventory of unsold new housing units accounted for about 3.4% of total assets, or KRW 6.6 billion in 2022 (completed units: KRW 2.42 billion, uncompleted units: KRW 4.17 billion). It edged down during COVID-19 and rose again recently. In addition, average accounts receivables related to sales and construction climbed to KRW 23.47 billion in 2022 (accounts receivables for sales: KRW 3.19 billion, accounts receivables for construction: KRW 20.28 billion), rising by 34.1% from 2021 (KRW 17.51 billion), with the share of accounts receivables among total assets rising from 10.6% to 12.2% (Figure I-8).

Figure I-8. Inventory and receivables related to unsold housing units by construction companies¹⁾



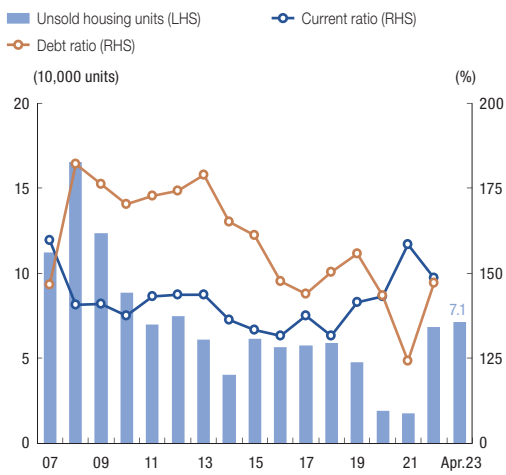
Notes: 1) Based on comprehensive construction companies subject to external audits (1,254 units as of 2022).

2) Average inventory and accounts receivable per company (end-year basis).

Source: KIS-Value.

In 2007 and 2008, when the number of unsold new housing units jumped, the liquidity ratio of construction companies dropped, and their debt ratio rose sharply, and thus their financial soundness in terms of liquidity and stability declined dramatically. Since last year, unsold new housing units have soared, leading to a decline in the liquidity ratio and an increase in the debt ratio (Figure I-9).

Figure I-9. Trends in unsold housing units and construction company financial soundness¹⁾²⁾

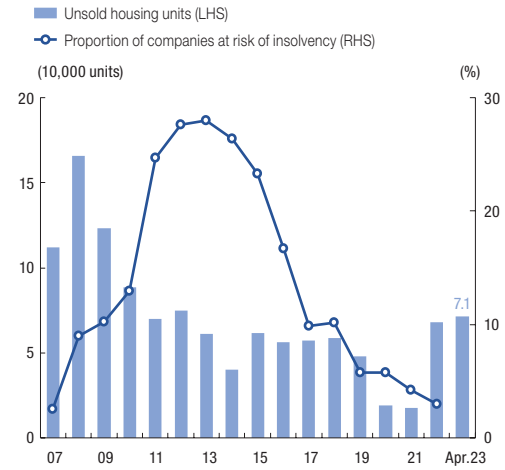


Notes: 1) Based on listed comprehensive construction companies by year.
 2) Based on median values of year-end current ratio and debt ratio.
 Source: Ministry of Land, Infrastructure, and Transport, KIS-Value.

The deterioration of the financial soundness of construction companies due to the increase in unsold new housing units is adding to their default risk with time lag, likely leading to defaults in related loans of financial institutions. In 2007 and 2008, after a sharp rise in unsold new housing units, the default risk of the construction industry remained elevated for three years, and the share of construction companies at risk of default rose significantly. The impact of the rapid increase in the num-

ber of unsold new housing units since the second half of last year will likely undermine the financial soundness of construction companies in 2023 and raise the delinquency risk of related loans (Figure I-10).

Figure I-10. Proportion¹⁾ of construction companies at risk of default²⁾



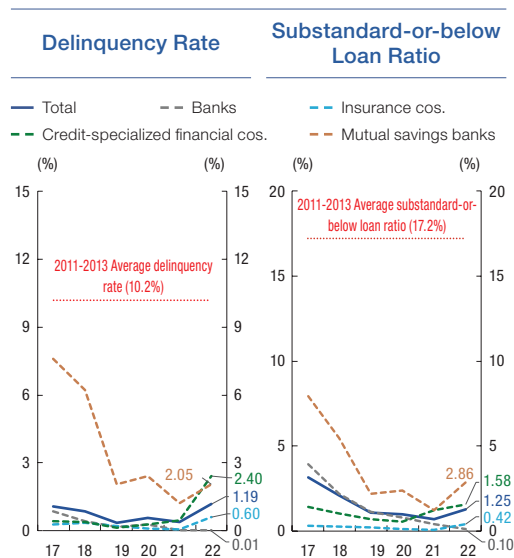
Notes: 1) Companies with a probability of transitioning to default (closure, capital erosion) exceeding 5% within a year.
 2) Proportion of companies at risk of default compared to the total number of listed general construction companies by year.
 Source: Bank of Korea staff calculations, Ministry of Land, Infrastructure, and Transport.

However, because the current overall financial conditions at construction companies and asset quality of financial institutions regarding loans to the construction industry are far more favorable than in the past, and the government is actively responding, it is judged that the increase in the number of unsold new housing units is unlikely to cause massive defaults at construction companies and concerning related loans, as occurred in the past.

C. Possibility of Expansion of Real Estate PF Loan Defaults

The deterioration in the profitability of housing projects due to sluggish sales could result in the expansion of defaults among real estate PF loans. Recently, for some real estate PF projects, the conversion of bridge loans to PF loans was not smooth, showing signs of increasing risk. At the end of December 2022, the delinquency rate on real estate PF loans stood at 1.19%, showing a steady increase since 2021. However, because of the growing concern over defaults on real estate PF loans, the growth in the balance of real estate PF loans has slowed significantly,¹⁸⁾ and financial institutions' soundness indicators regarding real estate PF loans remain favorable compared to past incidents of real estate PF loan defaults (Figure I-11).

Figure I-11. Trends in real estate PF loan quality indicators



Source: Financial institutions' business reports.

In addition, the results of the assessment of the impacts on the financial system of real estate PF loan defaults associated with prolonged sluggishness in the housing market and increase in unsold new housing units¹⁹⁾ showed that the capital ratio of the financial system would decline slightly, but remain above the regulatory level in all sectors of financial institutions (Table I-1, Figure I-12). Furthermore, as the management of asset soundness by supervisory authorities and financial institutions has been strengthened since the second half of last year, it is now less likely that real estate PF loan defaults would undermine the stability of the financial system.

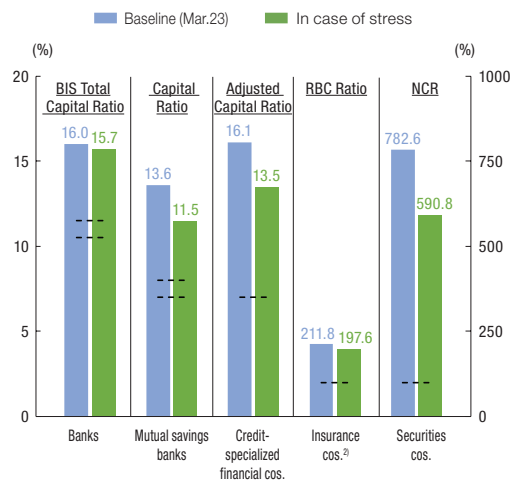
18) The balance of real estate PF loans increased from KRW 79.6 trillion at the end of 2019 to KRW 92.2 trillion at the end of 2020, KRW 112.6 trillion at the end of 2021, KRW 120.4 trillion at the end of June 2022, KRW 129.1 trillion at the end of September, and to KRW 129.8 trillion at the end of 2022, showing that the upward trend has moderated rapidly since the second half of 2022.

19) The stress test was conducted by referring to the test methods listed in "Evaluation of Potential Risks of Real Estate Corporate Finance in Korea" in the Financial Stability Report of December 2022. Considering that the scenarios of a decline in housing prices as assumed in the previous stress test were realized overall, this test assumed that, amid prolonged sluggishness in the housing market for two years from March 2023, housing prices (actual transaction prices of apartments nationwide, as reported by the Korea Real Estate Board) decline further by 10%, and the number of unsold completed new housing units increases significantly.

Table I-1. Stress test scenario design

	Stress situation
Housing price declines ¹⁾	-10%
Period of contraction	More than two years

Note: 1) Based on actual transaction price of apartments (nationwide), Mar. 23.

Figure I-12. Impact of real estate PF loan defaults on financial system¹⁾

Notes: 1) Based on financial institutions with real estate PF loans.

2) For insurance companies, based on figures before the introduction of K-ICS.

Source: Bank of Korea staff calculations, financial institutions' business reports.

4. Risk Related to Soundness of Housing Guarantees

Since 2020, amid the real estate market boom and government regulations to strengthen the responsibility of rental business entities,

public guarantees related to real estate rose dramatically.²⁰⁾ Such real estate-related guarantees made a considerable contribution to mitigating the direct impact of defaults among households and corporate sectors on the financial system amid the gradually-emerging risk of failure of landlord households to return *Jeonse* deposits and rising number of unsold new housing units due to the recent decline in housing prices. However, if the financial soundness of guarantee institutions deteriorates, the related burden on the government may increase.

A. Increase in Public Guarantees Related to Housing

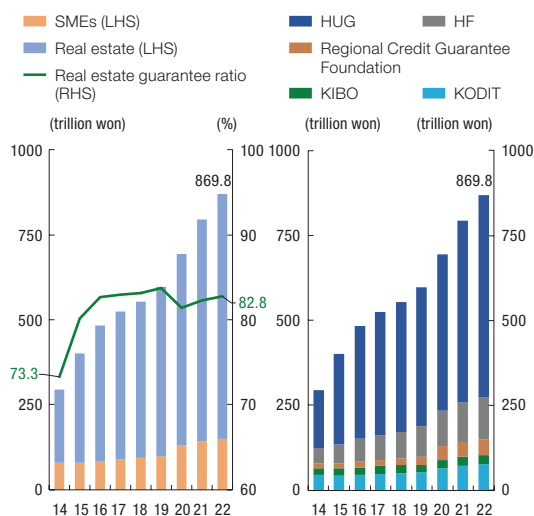
Public guarantees, which in the past were mostly used as a means to channel policy loans toward small and medium enterprises with lower credit ratings have also gained great importance in the real estate market as guarantees related to housing sales, *Jeonse*, and mortgages have increased substantially since 2015. As of the end of 2022, the balance of public guarantees stood at KRW 869.8 trillion (real estate guarantees: KRW 719.9 trillion, SME guarantees: KRW 149.9 trillion), a nearly three-fold increase compared to the end of 2014 (KRW 293.3 trillion), and the share of guarantees related to real estate rose significantly from 73.3% at the end of 2014 to 82.8% at the end of 2022. By guarantee institution, the Korea Housing & Urban Guarantee Corporation (HUG) and Korea Housing Finance Corporation (HF) provided additional

20) This paper looks at public guarantees by dividing them into guarantees for SMEs and real estate guarantees, depending on the guarantee beneficiary. Guarantees for SMEs include credit guarantees provided by the Korea Credit Guarantee Fund (including P-CBO guarantees), Korea Technology Finance Corporation, and Regional Credit Guarantee Foundations. Real estate guarantees include guarantees for housing purchase funds, guarantees for rental deposit loans, *Jeonse* deposit return guarantees, *Jeonse* deposit guarantees, and guarantees for housing sales provided by the Korea Housing Finance Corporation (Housing Finance Credit Guarantee Fund) and Korea Housing & Urban Guarantee Corporation.

guarantees of KRW 424.7 trillion and KRW 80.3 trillion, respectively, dominating the increase in total public guarantees (+KRW 576.5 trillion) (Figure I-13).

Figure I-13. Trends in public guarantee balance

By guarantee beneficiary By guarantee institutions



Source: Korea Housing & Urban Guarantee Corporation (HUG), Korea Housing Finance Corporation (HF), Regional Credit Guarantee Foundation, Korea Technology Finance Corporation (KIBO), Korea Credit Guarantee Fund (KODIT).

The growth in real estate-related public guarantees is largely attributed to the increase in demand for guarantees in relation

to the growth of the housing sales market and rise in *Jeonse* prices as well as to the government's policy concerning rental business entities. Guarantees for the sale of new housing units,²¹⁾ which had decreased due to the stricter regulation on sales of new housing in 2017 and 2018,²²⁾ transitioned to an upward trend after 2020 with the recovery in housing sales. Guarantees for *Jeonse* deposit loans and guarantees for *Jeonse* deposit return (individual guarantees) increased as *Jeonse* prices jumped²³⁾ following the implementation of the Housing Lease Protection Act. Meanwhile, as the government made the purchase of guarantee insurance mandatory for rental business entities as part its policy to strengthen the public responsibility at such entities, *Jeonse* deposit guarantees (business entity guarantees)²⁴⁾ rose significantly²⁵⁾ (Figure I-14).

21) Balance of guarantees for new housing sales (ending balance, KRW trillion): 211.9 in 2017 → 196.5 in 2018 → 184.2 in 2019 → 196.1 in 2020 → 213.7 in 2021 → 236.6 in 2022

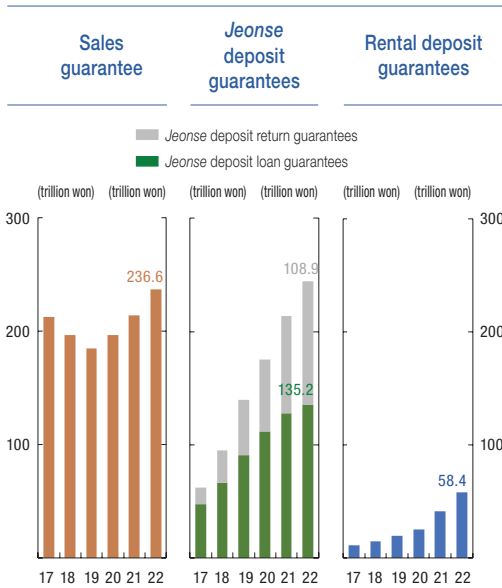
22) Related regulations were strengthened, such as LTV and DTI (in over-speculation zones, LTV limits: 60% → 40%, and DTI: 50% → 40%), a transfer tax of 50% for the resale of purchase rights, and stricter qualification for first priority housing subscriptions.

23) This is mainly attributed to the decrease in the supply of *Jeonse* and monthly rentals, with the enforcement of the Housing Lease Protection Act in August 2020 providing for the lease renewal option, rent control rules, regulations on the reduction of tax benefits for housing rental businesses, and actual residency requirements (two years) for participants in apartment redevelopment project unions.

24) A *Jeonse* deposit guarantee is a product that guarantees the return of the total amount of the *Jeonse* deposits to lessees in the event a rental business entity fails to return leasehold deposits. The purchase of leasehold deposit guarantee insurance was made mandatory for newly-registered rental business entities from August 2020 and for existing rental business entities from August 2021.

25) Leasehold deposit guarantees increased by KRW 15.6 trillion from 2015 to 2019, but rose by KRW 38.8 trillion from 2020 to 2022, after the enforcement of the policy to strengthen the public responsibility of rental business entities.

Figure I-14. Trends in real estate-related public guarantee balance



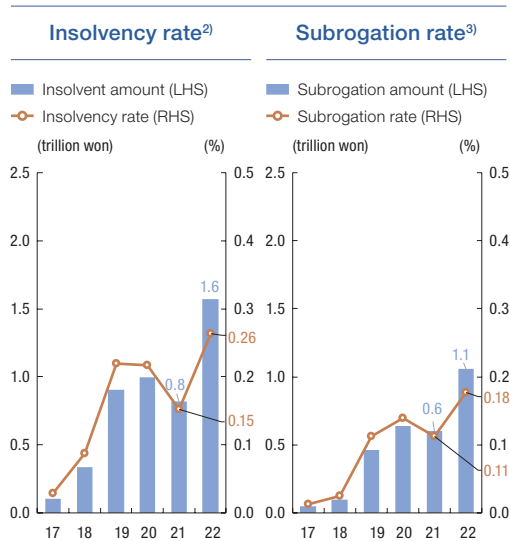
Source: Korea Housing Finance Corporation (HF), Korea Housing & Urban Guarantee Corporation (HUG).

B. Growing Concern over the Soundness of Guarantee Institutions

As the soundness indicators of public guarantees related to real estate are deteriorating again due to the slump in real estate markets after 2022, there is growing concern over the financial conditions of public guarantee institutions. The balance of defaults at HUG²⁶⁾ rose from KRW 0.8 trillion in 2021 to KRW 1.6 trillion in 2022, and the default rate (default amount / balance of guarantees) moved up from 0.15% to 0.26% during the same period. Subrogated payments²⁷⁾ also rose from KRW 0.6 trillion to KRW 1.1 trillion, and the incidence of subrogation (subrogated payments

/ balance of guarantees) climbed from 0.11% to 0.18% (Figure I-15). Notably, the share of *Jeonse* deposit-related guarantees²⁸⁾ among subrogated payments was 92.1% in 2022, recording a dramatic increase from 2017 (10.4%).²⁹⁾

Figure I-15. Trends in soundness of real estate-related public guarantees¹⁾



Notes: 1) Based on HUG.

2) Insolvency amount/guarantee balance.

3) Subrogation amount/guarantee balance.

Source: Korea Housing & Urban Guarantee Corporation (HUG).

5. Implications

The value of loan-related defaults caused by the sluggish real estate market during the second half of last year is not significant, and the resilience of financial institutions, excluding those in some non-bank sectors, remains

26) Defaulted guarantees refer to guaranteed loans for which borrowers failed to repay the principal and interest.

27) Subrogated payment refers to the amount that a guarantee institutions has to pay on behalf of borrowers due to defaults.

28) This refers to the sum of guarantees for *Jeonse* deposit loans and guarantees for the return of *Jeonse* deposits.

29) This refers to the share of guarantees related to *Jeonse* deposits among subrogated payments at the HUG: 10.4% in 2017 → 64.7% in 2019 → 87.9% in 2021 → 92.1% in 2022.

favorable. Therefore, it seems that financial stability risks are being managed at an appropriate level overall.

If housing prices are adjusted in an orderly way, tenants burdens concerning residential costs will be reduced and the demand for *Jeonse* deposit loans will be moderated in the long-term, contributing to the gradual reduction in household debt. However, if housing prices drop rapidly over a short period of time, the burden on landlords to return the *Jeonse* deposits will increase, the number of unsold new housing units will rise, and defaults in the real estate PF sector will rise. Thus, a preemptive response is necessary.

First, it is necessary to induce the unsold housing units to be resolved based on market principles by ensuring that the purchase sentiment of the housing market does not shrink excessively through the flexible regulation of real demand. In particular, considering that the volume of housing sales varies depending on housing sale prices and that, in some regions, high housing sale prices are pointed to as the cause of unsold new housing, it is necessary to buttress purchasing demand through the proper adjustment of housing sale prices, such as by providing discounts on housing sale prices. Meanwhile, as for the *Jeonse* market, measures to protect lessees facing the risk of not getting back their *Jeonse* deposit need to be developed, apart from measures to address *Jeonse* fraud.³⁰⁾

To prevent the spread of defaults on real estate PF loans, it is necessary to support normal

projects with favorable business prospects through the provision of various forms of financial assistance, as has already been implemented by the government and financial authorities. On the other hand, for risky projects, stakeholders, including project implementers, construction companies, and lenders, need to be guided to voluntarily assess whether to continue a project through the reasonable division of responsibilities. Moreover, if necessary, programs for purchasing non-performing loans from private and public financial institutions need to be developed so that debt resolution can proceed promptly. Furthermore, efforts to preemptively respond to future defaults are needed through financial institutions' expansion of loan loss provisions and capital increases.

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II. Review of Potential Risk of Non-bank Depository Institutions¹⁾

1. Background
2. Status of Non-Bank Depository Institutions
3. Potential Risk and Capacity to Respond
4. Assessment and Implications

1. Background

As the asset soundness of mutual savings banks (hereinafter “savings banks”) and mutual credit cooperatives²⁾ such as MG Community Credit Cooperatives has deteriorated rapidly since the fourth quarter of 2022, credit concern over non-bank depository institutions is rising. In addition, with the massive bank run at the United States’ Silicon Valley Bank (SVB) in early March 2023,³⁾ market vigilance against the liquidity risk of non-bank de-

pository institutions,⁴⁾ which operate under a regulatory environment similar to small- and medium-sized U.S. banks, has been temporarily heightened.

Hereunder, this section reviews the status of non-bank depository institutions and examines their exposure to real estate, loans to vulnerable borrowers, and securities investment as well as potential risks related to liquidity. In addition, this section analyzes the possibility of the potential risk of non-bank depository institutions materializing and being transmitted to systemic risk and the capacity of non-bank depository institutions to manage liquidity and then derives policy implications.

2. Status of Non-Bank Depository Institutions

At the end of the first quarter of 2023, the total assets of non-bank depository institutions stood at KRW 1,137.7 trillion, which, by sector, included agricultural, fishery, and forestry co-

1) This article was authored by Na Sung-o, Song Su-hyuk, and Nam Seung-hee (Non-Bank Risk Analysis Team) and Park Ji-soo, Lee Young-jae, Yeom ki-ju, and Lee Byung-ho (Systemic Risk Analysis Team) and was reviewed by Lee Jong-han (director of the Financial Risk Analysis Division), Shin Jun-young (head of the Non-Bank Risk Analysis Team), Lim Ho-sung (head of the Systemic Risk Analysis Team), and Woo Shin-wook (head of the Credit & Reserves Policy Team).

2) Mutual credit cooperatives include agricultural cooperatives (hereinafter “Nonghyup”), fishery cooperatives (hereinafter “Suhyup”), the credit business sector of forest cooperatives (collectively referred to as “agricultural, fishery, and forestry cooperatives”), credit cooperatives (hereinafter “credit union”), and MG Community Credit Cooperatives.

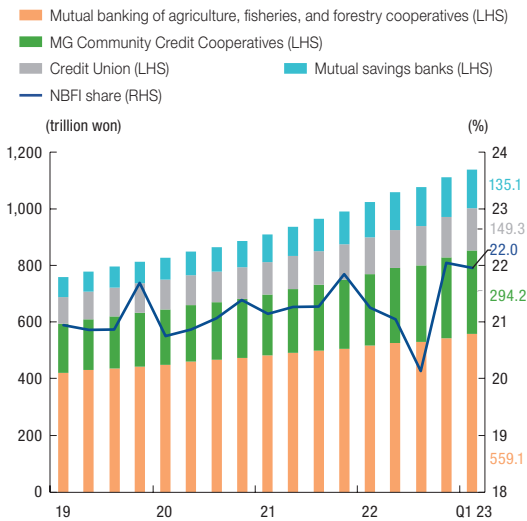
3) The surge in volatility in financial markets was contained by prompt responses by related policy authorities. For details, refer to Box 8 “SVB and Credit Suisse Crisis: Policy Responses and Implications.”

4) Like banks, non-bank depository institutions handle loans and deposits as their major businesses, but were established with limited purposes such as finance for communities. Hence, they are subject to different regulations from banks in fundraising and operation. SVB is a small- and medium-sized bank that is not subject to the global regulatory framework for more resilient banking systems (Basel III) and operates under a regulatory environment similar to that of Korea’s non-bank depository institutions. Although Korea Post is also a non-bank depository institution, it is a national financial institution that does not offer loan services. Due to its unique characteristics, it is excluded from various analyses in this section.

5) Banks include commercial banks, special banks, and branches of foreign banks.

operatives (KRW 559.1 trillion), MG Community Credit Cooperatives (KRW 294.2 trillion), credit union (KRW 149.3 trillion), and savings banks (KRW 135.1 trillion). The non-banking sector's share of total deposit-taking institutions, including banks,⁵⁾ declined temporarily⁶⁾ in the third quarter of 2022, but rose to 22.0% by the end of the first quarter of 2023 (Figure II-1).

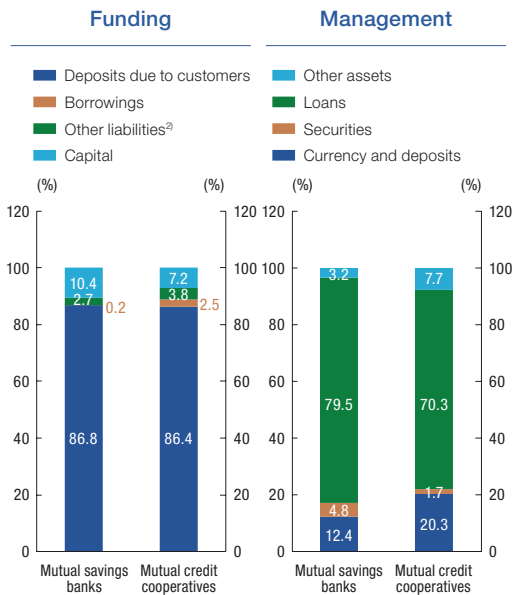
Figure II-1. Total assets of non-bank depository institutions¹⁾



Note: 1) End-quarter balances basis.
 Source: Financial institutions' business report, MG Community Credit Cooperatives.

The scope of business of non-bank depository institutions is not as wide as that of banks, and there are restrictions on their lending activities in terms of business areas and membership qualifications for cooperatives, depending on the sector. Hence, savings banks and mutual credit cooperatives raise most of their funds through deposit-taking, and use the funds mostly to extend loans (Figure II-2).

Figure II-2. Funding and management by financial sector¹⁾



Notes: 1) End of 2022 basis.
 2) Allowance for severance and retirement benefits, accounts payable, etc.
 Source: Financial institutions' business reports, MG Community Credit Cooperatives.

3. Potential Risk and Capacity to Respond

If the current high interest rates persist and economic recovery is delayed, the rising delinquency rate and continuously deteriorating profitability may heighten concern over the credit and liquidity risks of deposit-taking institutions. Hereunder, this section assesses the recent potential risk of non-bank depository institutions in terms of credit, market, and liquidity risks and examines the capacity of each sector in the event of losses or shortages of liquidity.

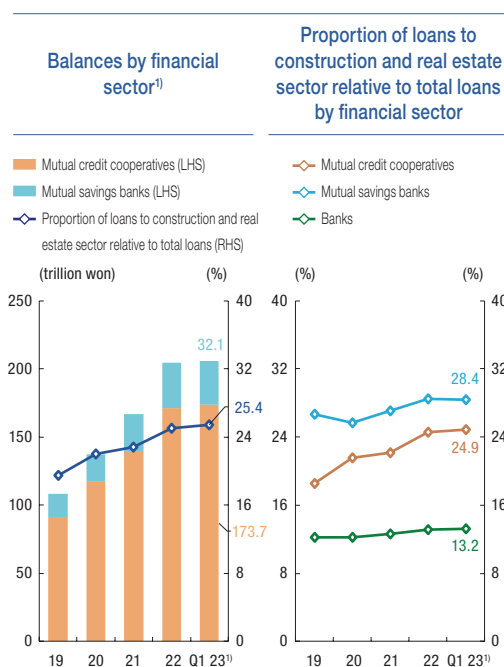
6) This is attributed to the fact that, in accordance with the LCR regulation normalization plan (in which the ratio was scheduled to be raised to 92.5% by the end of 2022, but the plan was delayed for six months at the end of October 2022), commercial banks rapidly expanded their share of highly liquid assets and increased their issuance of bank debentures.

A. Credit Risk and Market Risk

Expansion of Real Estate-related Exposure and Decline in Soundness

At the end of the first quarter of 2023, the value of loans extended by non-bank depository institutions to the real estate and construction industries amounted to about KRW 205.8 trillion (mutual credit cooperatives: KRW 173.7 trillion, savings banks: KRW 32.1 trillion), and the share of total loans stood at 25.4%, up 5.9%p from the end of 2019. By sector, savings banks accounted for 28.4%, and mutual credit cooperatives for 24.9%, significantly higher than banks' share of real estate-related loans (13.2%)⁷⁾ (Figure II-3).

Figure II-3. Trends in amount of loan to construction and real estate sector



Note: 1) The figures of MG Community Credit Cooperatives are based on end of January 2023.

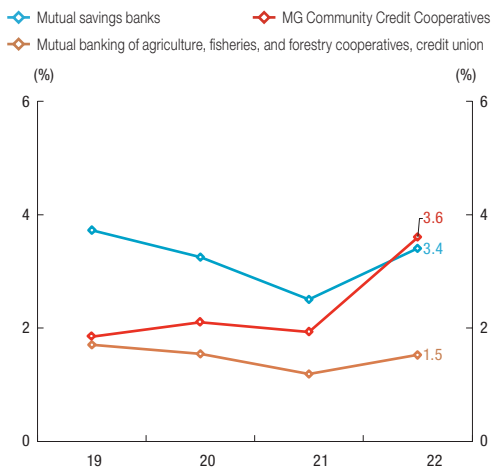
Source: Financial institutions' business reports, Ministry of the Interior and Safety, Bank of Korea.

As the real estate sector has remained sluggish amid the increased exposure to real estate, the overall soundness of the loans of non-bank depository institutions has declined. At the end of 2022, the delinquency rate of MG Community Credit Cooperatives was 3.6%, showing a substantial rise from the end of 2021 (1.9%), while delinquency rates in other sectors also rose, with savings banks at 3.4% and agricultural, fishery, and forestry cooperatives and credit union at 1.5%⁸⁾ (Figure II-4).

7) In particular, mutual credit cooperatives appear to have rapidly expanded their real estate loans using joint lending in which multiple cooperatives participate. Joint lending refers to a collateralized loan issued by at least two cooperatives to the same borrower with collateral security against the same property of the same quality. Borrowers can raise massive amounts of funds from mutual credit cooperatives in the same type without being subject to the loan limits set by individual cooperatives.

8) At the end of the first quarter of 2023, delinquency rates rose both for savings banks (5.1%) and agricultural, fishery, and forestry cooperatives and credit union (2.4%).

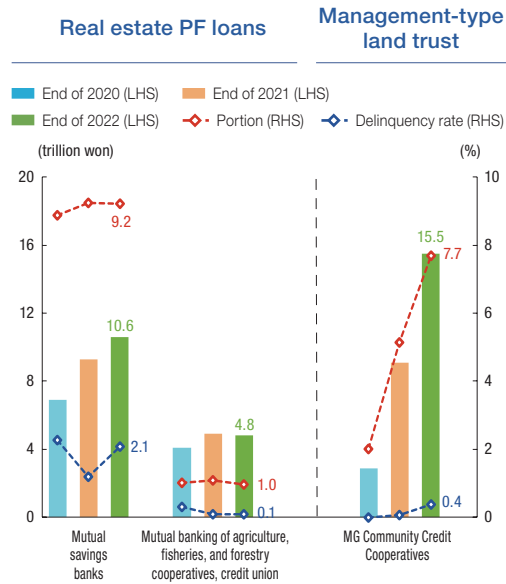
Figure II-4. Trends in delinquency rate by financial sector



Source: Financial institutions' business reports, MG Community Credit Cooperatives.

Meanwhile, regarding the balance of loans to real estate PF⁹⁾ won at the end of 2022, which have raised concern recently, while the balance of agricultural, fishery, and forestry cooperatives and credit union amounted to KRW 4.8 trillion, down slightly from the end of last year, the balance of loans extended by savings banks was KRW 10.6 trillion, showing a continuous upward trend. As for MG Community Credit Cooperatives, the balance of real estate PF loans under a management-type land trust¹⁰⁾ has expanded, accounting for 7.7% (KRW 15.5 trillion) of total loans, with the delinquency rate remaining low (Figure II-5).¹¹⁾

Figure II-5. Trends in amount of loan and delinquency rate related to real estate PF



Source: Financial institutions' business reports, Ministry of the Interior and Safety.

Expansion of Vulnerable Borrowers

According to the Consumer Credit Panel, the amount of loans to vulnerable borrowers¹²⁾ of savings banks at the end of 2022 rose by 32.5% from the end of 2019, while that of mutual credit cooperatives decreased by 24.3%, with savings banks showing remarkable growth among youths in their 20s and 30s (51.6%).¹³⁾ This appears to be due mainly to the tighter lending attitude of mutual credit

9) Funds are raised based on the business feasibility of real estate development projects as collateral, and the debts used to finance the project are paid back from the cash flow the project generates.

10) Land owners transfer land ownership and the project operators' rights to a trust company, and thus the trust company leads the project. The project can proceed without infringing upon the rights of the land owners and other creditors, and project risk can be reduced through an agreement with the construction and trust companies to ensure project completion.

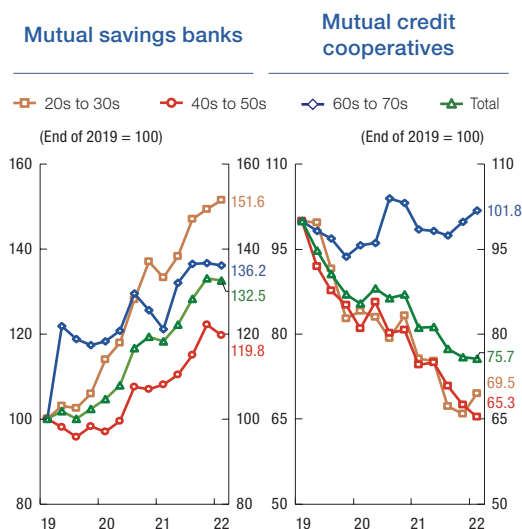
11) However, at the end of January 2023, the balance and delinquency rate of loans for management-type land trusts were KRW 15.8 trillion and 0.7%, respectively, both rising from the end of 2022.

12) Vulnerable borrowers are defined as borrowers with multiple loans (from at least three financial institutions) and low income (lower 30% of income bracket) or low credit (credit score of 664 or lower, based on NICE).

13) The share of vulnerable borrowers among savings banks' household loans stood at 24.7% at the end of 2022 (up 1.3%p from the end of previous year), which contrasts with the low 3.3% share of banks. The share of borrowers with multiple loans from savings banks was 77.4%, significantly higher than that from banks (27.3%).

cooperatives¹⁴⁾ and expansion of unsecured loans through online channels¹⁵⁾ (Figure II-6).

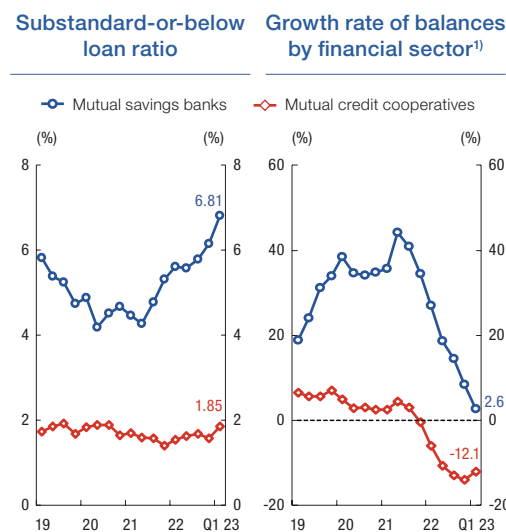
Figure II-6. Trends in amount of loan to vulnerable borrowers by age



Source: Bank of Korea staff calculations(Consumer Credit Panel).

As the size of loans to vulnerable borrowers surged, the substandard-or-below loan ratio of savings banks continued to rise after the third quarter of 2021, reaching 6.81% at the end of the first quarter of 2023. However, as concern¹⁶⁾ over household credit defaults has emerged, the extent of growth of unsecured loans has slowed or shifted to a decline in all sectors since the third quarter of 2021 (Figure II-7).

Figure II-7. Trends in soundness and growth rate of unsecured loans



Note: 1) Year-on-year basis.

Source: Financial institutions' business reports, MG Community Credit Cooperatives.

Insignificant Level of Losses on Investment in Securities

Although investment in securities by non-bank depository institutions expanded steadily while responding to the decline in profitability¹⁷⁾ caused by the low interest rate environment since COVID-19, the share of securities out of total assets by sector as of the end of the first quarter of 2023 is not significant for both savings banks (4.7%) and

14) According to the Bank of Korea's survey of financial institutions' lending attitude, the lending attitude of mostly mutual credit cooperatives has been tightened since COVID-19.

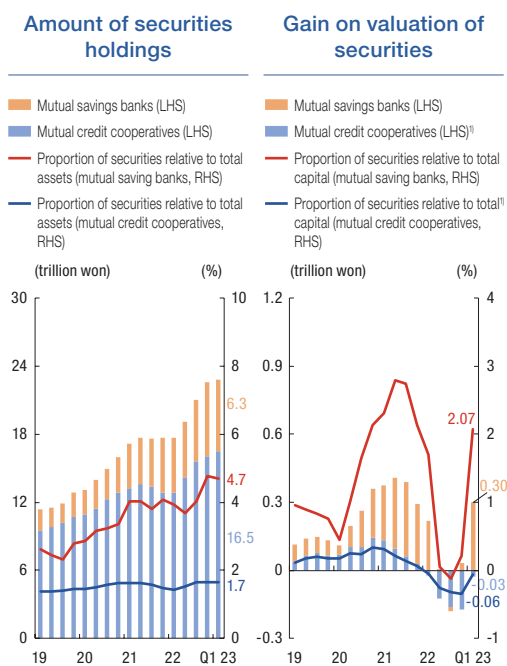
15) At the end of 2022, the balance of unsecured loans at non-bank depository institutions amounted to KRW 54.9 trillion, most of which were issued by savings banks (KRW 27.2 trillion) and agricultural, fishery, and forestry cooperatives and credit union (KRW 24.2 trillion). The share of the balance of loans extended through online channels among unsecured loans of savings banks was 34.5% at the end of 2022, up 10.7%p from the end of June 2020 (23.8%). Meanwhile, according to the Bank of Korea Consumer Credit Panel, the balance of unsecured loans for youths at the end of 2022 relative to the end of 2019 declined for mutual credit cooperatives (-4.9%), but jumped for savings banks (+85.0%), exceeding that of banks (17.0%).

16) According to reports of statistics on individual debtor rehabilitation events by Seoul Bankruptcy Court, the share of youths aged in their 30s or under in 2022 who applied for individual debtor rehabilitation was 46.6%, the highest among all age groups and up 1.5%p from the previous year (45.1%).

17) Meanwhile, the growing competition with Internet-only banks, reduction of legal maximum interest rates (July 2021), and measure to strengthen household debt management (October 2021) also contributed to the decline in profitability.

mutual credit cooperatives (1.7%), owing to the restriction on the share of investment.¹⁸⁾ With the interest rate increases in 2022, valuation loss¹⁹⁾ on securities occurred, but savings banks started to generate profit after the third quarter, and mutual credit cooperatives saw their losses moderate, representing a negligible level (-0.06%) of capital as of the end of the first quarter of 2023 (Figure II-8).

Figure II-8. Trends in amount of securities holdings and gains on valuation of securities



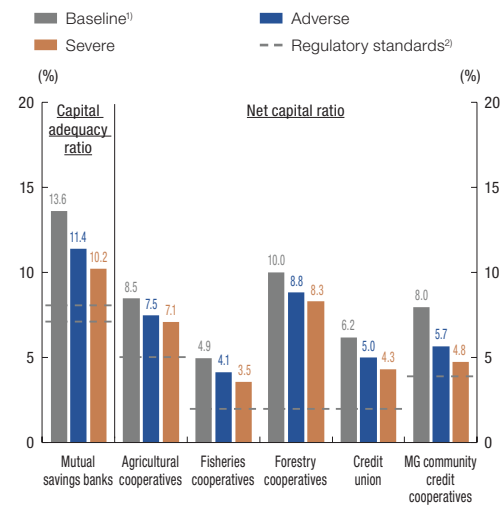
Note: 1) Mutual banking of agriculture, fisheries, and forestry cooperatives, credit union.

Source: Financial institutions' business reports, MG Community Credit Cooperatives.

Limited Possibility of Transmission to Systemic Risk

Regarding the impact of losses on capital adequacy due to the materialization of credit risk, even under negative scenarios,²⁰⁾ capital adequacy is found to remain above the regulatory level in all non-banking sectors (Figure II-9).

Figure II-9. Changes in capital adequacy ratio by scenario



Notes: 1) End of March 2023 basis.

2) Mutual savings banks 7% (assets more than 1 trillion won 8%), agricultural 5%, fisheries and forestry credit union 2%, MG 4%.

Source: Bank of Korea staff calculations.

Meanwhile, the impact of non-bank depository institutions' losses on other financial sectors due to the materialization of credit and

18) Stock investment by savings banks is restricted to within 50% of capital, and investment in non-listed stocks and corporate bonds is also limited to up to 10% of capital (Article 30 of the Regulations on Supervision of Mutual Savings Bank Business). The balance of securities at Nonghyup, according to internal regulations, is limited to less than 20% of surplus funds as of the previous business day (deducting operating assets (cash, loans, etc.) from total funds raised).

19) Valuation loss was calculated by deducting the acquisition cost from the market value of securities held at the end of the quarter for savings banks and mutual credit cooperatives.

20) Assumptions for the stress test by scenario were set as follows in consideration of the downside risk of the future economic growth rate for one year (GaR).

Scenarios for Stress Test

	GDP growth	House prices	Stock market index
Adverse	-2.0%p (10% GaR in 2023)	-10%	-40%
Severe	-2.9%p (1% GaR in 2023)	-20%	-50%

market risks needs to be examined in terms of systemic risk. For this, we examine mutual transactions between non-bank depository institutions to determine the extent of transmission to systemic risks.

First, regarding mutual transactions by counterparty institution, non-bank depository institutions raised funds from non-bank depository institutions (65.0%), trusts (13.8%), domestic banks (9.4%), and investment funds (3.3%), while they extended funds to other non-bank depository institutions (45.0%), domestic banks (20.0%), and investment funds (10.4%)²¹⁾ (Table II-1).

Table II-1. Mutual transactions across financial sectors¹⁾

(trillion won, %)

Counterpart sectors	Fundraising		Fund management	
	Amount	Share	Amount	Share
Non-bank depository institutions ²⁾	213.7	65.0	213.7	45.0
Domestic banks	30.7	9.4	95.1	20.0
Branches of foreign banks	6.7	2.0	6.0	1.3
Trusts	45.3	13.8	20.7	4.3
Investment funds	10.7	3.3	49.5	10.4
Insurance cos.	10.1	3.1	5.2	1.1
Securities cos.	7.3	2.2	23.4	4.9

Notes: 1) End of 2022 basis.

2) Mainly composed of transactions between the central federation of mutual credit cooperatives and its member institutions.

Source: Bank of Korea.

In addition, in terms of financial products for mutual transactions, deposits accounted for higher shares for both fundraising and fund management (71.7% and 50.8%, respectively). In particular, for fundraising, the share of bonds rose from 2017 (0.6% → 7.0%)²²⁾ (Table II-2).

Table II-2. Volumes of mutual transactions across financial sectors, by product¹⁾

(trillion won, %)

Product	Fundraising		Fund management	
	Amount	Share	Amount	Share
Deposits	235.7	71.7	241.2	50.8
Bonds	23.1	7.0	65.6	13.8
Stocks ²⁾	20.9	6.4	56.9	12.0
Loans	7.0	2.1	49.0	10.3
Repos	5.1	1.6	6.1	1.3
Derivatives	3.0	0.9	1.8	0.4

Notes: 1) End of 2022 basis.

2) Including investment fund shares, equity-linked securities (ELS), etc.

Source: Bank of Korea.

Using interconnectedness statistics, the risks of losses related to credit and market risk shocks of non-bank depository institutions being transmitted to other sectors were estimated. Specifically, the magnitude of losses transmitted to other sectors and the amount of capital loss²³⁾ reflecting the possibility of losses in a chain reaction were calculated, and a contagion index²⁴⁾ was constructed.²⁵⁾

21) The share of investment funds grew from 8.1% at the end of 2017 to 10.4% at the end of 2022, attributed largely to the fact that central federations of mutual credit cooperatives have substantially increased their alternative investments.

22) This is due mainly to the fact that some savings banks, as subsidiaries of financial holding companies, issued subordinated bonds to expand their capital.

23) This refers to the risks that a bankrupt sector (losses exceeding capital) transmits to its counterparty, consisting of the sum of credit risk (potential losses directly incurred by counterparties on assets in which they have invested in the bankrupt sector) and market risk (potential losses on the disposition of assets a counterparty may incur from the fire sale of assets in order to repay short-term liabilities owed to the bankrupt sector).

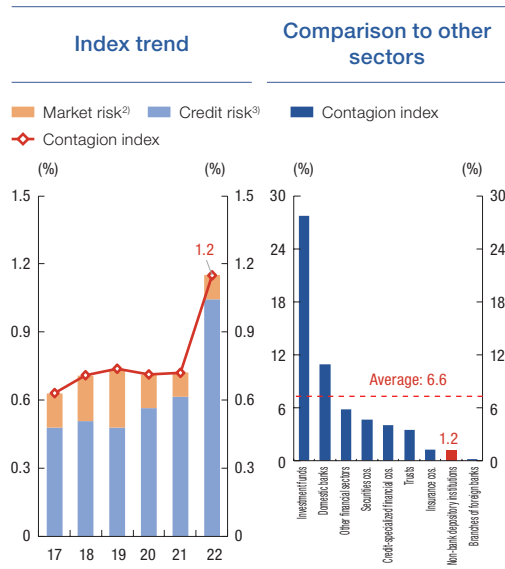
24) Contagion index = aggregate capital losses in other sectors caused by the bankruptcy of non-bank depository institutions / aggregate capital of other sectors x 100

25) This analysis used "CoMap: mapping contagion in the euro banking sector (Covi et al., 2021)" of the ECB. For details, refer to "IV. Recent Trends in Interconnectedness in the Financial Sector and Risk Assessment," Analysis of Financial Stability Issues of Bank of Korea Financial Stability Report, December 2021.

The estimated risks showed that, as of the end of 2022, the contagion index of non-bank depository institutions was 1.2%, up 0.6%p from the end of 2017 (0.6%). In particular, in 2022, the amount of funds that other financial sectors deposited with non-bank depository institutions through trust accounts increased, meaning that losses on trust accounts may rise in the event of the collapse of non-bank depository institutions. Thus, the contagion index rose (Figure II-10).

Nevertheless, although the share (17.6%)²⁶⁾ of non-bank depository institutions among total mutual transactions across financial sectors is not small, the contagion index is very low compared with the average of all sectors (6.6%). This is because a significant portion of the mutual transactions of non-bank depository institutions (36.2%)²⁷⁾ is transactions between central federations and member institutions, meaning that the share of funding from other financial sectors is low, and thus less likely to cause losses in a chain reaction, and the share of deposits, which are less likely to incur losses in the event of default due to the characteristics of the business structure, out of total funding is high.²⁸⁾

Figure II-10. Non-bank depository institutions' contagion index¹⁾



Notes: 1) End-year basis.

2) Potential losses on disposition of assets a counter party may incur from fire sales of assets in order to repay short-term liabilities owed to the bankrupt sector (nonbank deposit taking financial institutions).

3) Potential losses incurred on assets invested in the bankrupt sector (nonbank deposit taking financial institutions).

Source: Bank of Korea staff calculations.

B. Liquidity risk

Expansion of Online Deposits

At the end of the first quarter of 2023, deposits made through online channels²⁹⁾ represented 33.2% (KRW 38.5 trillion) of total deposits of savings banks, showing a rapid increase since the third quarter of 2022. This seems to be attributed to the fact that, with the increased convenience of transactions through the launch³⁰⁾ of

26) The volume of total mutual transactions in the financial sector amounted to KRW 3,357.3 trillion, of which the volume of mutual transactions for non-bank depository institutions was KRW 589.9 trillion.

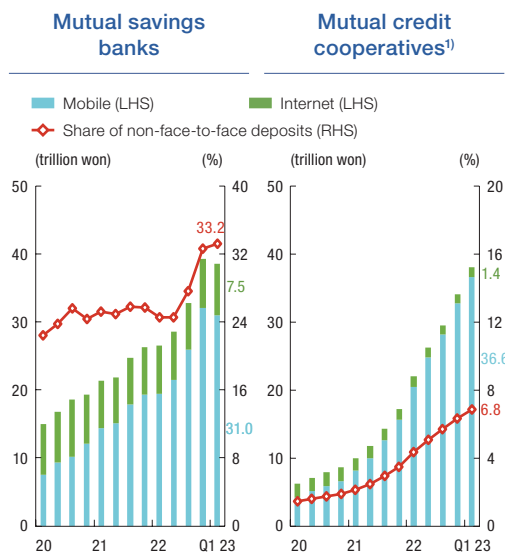
27) Of mutual transactions of non-bank depository institutions (KRW 589.9 trillion), the volume of transactions within the sector, mostly between central federations and member institutions, was KRW 213.7 trillion.

28) To calculate capital losses, the loss given default (LGD) of individual financial products in the case of bankruptcy, as per F-IRB approach of Basel II, was applied. As losses on deposits (10%) were lower than for other wholesale funding instruments (bonds: 45%, stocks: 75%), the average rate of losses that the bankruptcy of non-bank depository institutions causes to other sectors was lower than that for other sectors.

29) This refers to deposits raised via mobile banking applications or Internet banking, and the share of new deposits received through mobile banking applications by non-bank depository institutions (savings banks, Nonghyup, and credit unions) rose from 63.5% in the first quarter of 2020 to 90.3% in the first quarter of 2023.

integrated applications by savings banks, competition to attract deposits in the second half of last year grew. Although online deposits of mutual credit cooperatives have climbed steadily, their share of total deposits was only 6.8% (KRW 38.0 trillion), which is quite low³¹⁾ (Figure II-11).

Figure II-11. Trends in amount and portion of non-face-to-face deposits

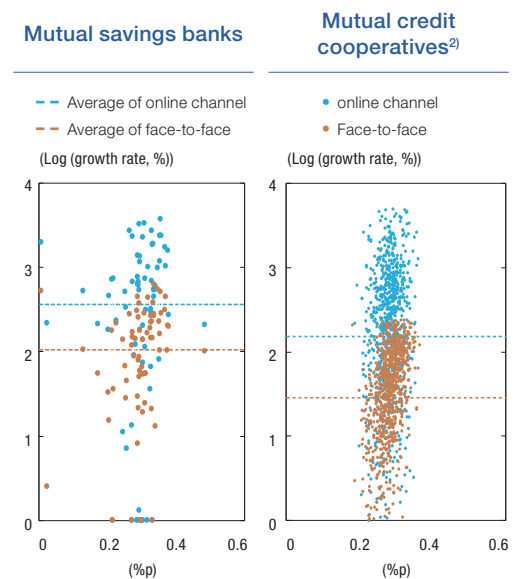


Notes: 1) Mutual banking of agriculture cooperatives, credit unions
Source: Financial institutions' business reports, federation of mutual banking of agriculture cooperatives, credit unions.

In particular, the growth rate of deposits of individual institutions by channel in relation to the extent of an increase in the deposit interest rate during the COVID-19 period (from the first quarter of 2020 to the fourth quarter of 2022) was examined, and it was found that, for both savings banks and mutual credit cooperatives (Nonghyup), deposits made via

online channels rose at a faster pace than those made through face-to-face channels³²⁾ (Figure II-12). This implies that depositors that use mobile applications are more sensitive to financial information, and thus if negative information about a certain financial institution spreads, they are highly likely to withdraw their deposits more rapidly than other depositors.

Figure II-12. Growth rate of deposit by channel¹⁾



Notes: 1) The x-axis is the average increase in deposit interest rates of individual mutual saving banks and mutual credit cooperatives compared to the end of the previous quarter from the end of Q1 2020 to the end of Q4 2022. The y-axis is the logarithm of the geometric mean of the deposit growth rate compared to the end of the previous quarter during the same period.

2) Mutual banking of agriculture cooperatives.
Source: Financial institutions' business reports, federation of mutual banking of agriculture cooperatives, Bank of Korea staff calculations.

30) An integrated application (SB Talk Talk Plus) for savings banks, offering comparisons of interest rates offered by 66 savings banks, checking deposit and installment deposit services, and loan services, was launched in September 2019, and a checking account dedicated to the opening of new time deposits was introduced in July 2020.

31) As mutual credit cooperatives such as Nonghyup can earn non-interest income through the issuance of credit cards and sale of insurance products via face-to-face channels, they have less incentive to take deposits via online channels than savings banks.

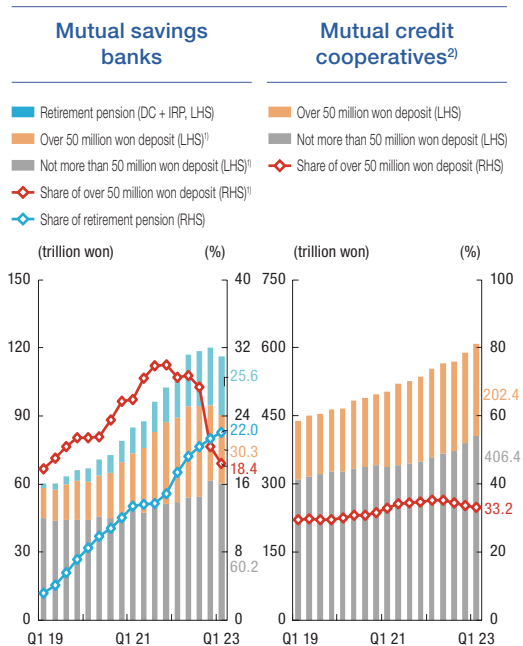
32) The average deposit growth rate for savings banks, compared with the previous quarter, was 17.2% for online non-contact channels and 7.8% for face-to-face channels, while that for Nonghyup was 10.2% for online channels and 4.7% for face-to-face channels.

Possibility of Movement of Savings Banks' Retirement Pensions

The value of retirement pensions deposited with savings banks has risen steadily since they were allowed to handle retirement pensions in September 2018, reaching 22.0% (KRW 25.6 trillion) of total funding at the end of the first quarter of 2023. However, if the pre-designated operation system (default option) for defined contributions (DC) and individual retirement pensions (IRP)³³⁾ is implemented after July 2023,³⁴⁾ as deposits with savings banks are not included on the list of pre-designated operation products, they are likely to move to retirement pension products of other financial institutions when they mature³⁵⁾ (Figure II-13).

As for deposits other than retirement pensions, for savings banks, the share of large deposits exceeding the depositor protection limit of KRW 50 million has significantly declined since the second half of last year, standing at 18.4% at the end of the first quarter of 2023. Such share for mutual credit cooperatives (33.2%) is higher than that for savings banks, but still well below that for banks (81.2%).

Figure II-13. Trends in deposit by type and amount



Notes: 1) Except for defined contribution (DC type) retirement pension and individual retirement pension (IRP).

2) Mutual banking of agriculture, fisheries, and forestry cooperatives, credit union.

Source: Financial institutions' business reports, Korea Deposit Insurance Corporation, Bank of Korea staff calculations.

Given these circumstances, caution is needed regarding the liquidity risk associated with deposit withdrawal from savings banks that raise funds mostly through online channels (Group A) or retirement pensions (Group B) (Table II-3).

33) Funds of retirement pension plans consist mostly of DC and IRP, for which depositor protection is offered, amounting to KRW 25.6 trillion. Meanwhile, defined benefits (DB), for which the responsibility for the operating contribution is attributed to companies, are not eligible for deposit protection.

34) If employees do not determine financial products to which contributions are operated, contributions are automatically operated according to the predetermined operating method (default option). The system was planned to be introduced in July 12, 2022, but implementation was postponed for one year.

35) According to the regulation on the supervision of retirement pensions, unlike products of other financial institutions such as banks, the deposit amount limit per purchaser (up to KRW 50 million per person, same as depositor protection system) is applied for DC and IRP retirement pension plans deposited with savings banks. To implement the pre-designated operation system, a total of 259 pre-designated portfolios of banks, insurance companies, and securities companies were approved in December 2022, but due to such limit on the deposit amount, deposits of savings banks were excluded from related portfolios (up to three products) of operating institutions. If there is no operation instruction from employees for up to six weeks from the maturity of existing products, retirement pension businesses operate the retirement pension funds concerned according to a pre-designated portfolio.

Table II-3. Concentration of deposits by mutual savings bank group¹⁾²⁾

Group	Online channel deposits ³⁾	Retirement Pension
A	62.7	9.2
B	12.8	55.1
Total	33.2	22.0

Notes: 1) End of Q1 2023.

2) Classifying mutual saving banks into group A and B based on whether they received more than 50% of their total through non-face-to-face channels or through retirement pensions.

3) The proportion of total deposit balances held by each group.

Source: Financial institutions' business reports.

Table II-4. Asset allocation of federation of mutual saving banks and mutual credit cooperatives¹⁾²⁾

	Currency and deposit	Securities	Other assets
Mutual saving banks	17.6	82.4	-
Mutual credit cooperatives	6.3	87.8	5.9

Notes: 1) End of 2022 basis.

2) Total balance of deposits and reserves.

Source: Calculated by using financial institutions' business reports, disclosure data from the federation of mutual saving banks and mutual credit cooperatives and MG Community Credit Cooperatives.

Favorable Records of Central Federations Providing Liquidity Support

Non-bank depository institutions place part of their deposits with central federations for reserves or the operation of surplus funds, and central federations can provide liquidity by using such funds in the event that individual savings banks, cooperatives, or MG Community Credit Cooperatives face liquidity shortages.³⁶⁾ As of the end of 2022, total deposits and reserves for repayment³⁷⁾ are estimated³⁸⁾ to be about KRW 193.9 trillion, and products for funds operation are mostly securities, through there is some variation by sector (Table II-4).

To assess the response capacity of each sector of non-bank depository institutions in the event of liquidity strain, the capacity of central federations to provide liquidity support under stress situations was analyzed. Three scenarios³⁹⁾ were established depending on the scope of target financial institutions and magnitude of deposit withdrawals (Table II-5).

36) Individual financial institutions, in the event of liquidity shortage, can meet the demand for liquidity by withdrawing deposits or reserves with central federations and, if that is insufficient, resorting to loans from central federations. In the examination of liquidity support capacity, it was assumed that the total amount of deposits and reserves with central federations could be used to support individual cooperatives suffering from liquidity shortage.

37) This refers to reserves for savings banks.

38) This was estimated using the financial statements and disclosure data of each central federation, and depositor protection funds were excluded from liquidity capacity as they are resources used in cases where deposit payment is not possible due to the bankruptcy of member institutions.

39) In the collapse of SVB on March 9, 2022, deposits of at least USD 42.0 billion were withdrawn, and considering the USD 100 billion that was not withdrawn after the closure decision, about 82% of the bank's total deposits of USD 173.1 billion (at the end of 2022) would have been withdrawn over two days. Given these facts, Scenarios 2 and 3 of this section, where 80% of deposits is withdrawn at multiple financial institutions simultaneously, assumed extreme situations.

Table II-5. Bank run scenarios

Scenario	S1	S2	S3
Target institutions	The institution within each financial sector ¹⁾ with the lowest 5% of capital ratio		
Size of withdrawal	50%	80%	
Further spread of withdrawal ²⁾	-		5% ³⁾

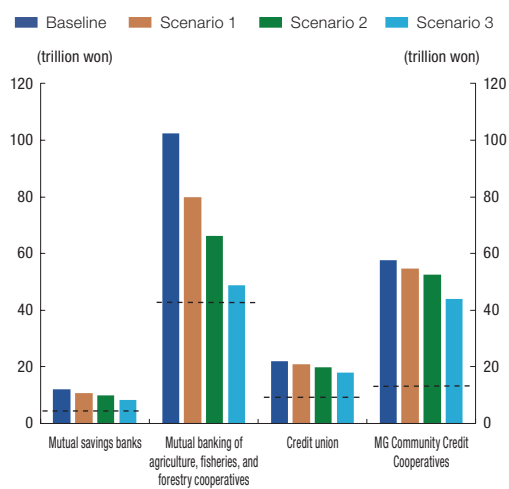
Notes: 1) Mutual savings banks, mutual banking of agriculture, fisheries, and forestry cooperatives, credit union, MG Community Credit Cooperatives.

2) Assuming a situation where concerns about the overall soundness of the financial sector spread, leading to deposit withdrawals in other institutions, as well.

3) Taking into consideration the overall decrease in deposit balances (4.2%) of small-sized banks in the U.S. before and after the SVB crisis (March 8, 2023 to March 22, 2023).

The results of the investigation of the capacity to respond under scenarios of massive deposit withdrawal showed that, under each scenario, even if deposits and reserves with central federations declined, the remaining balances exceeded the value of reserves at the end of 2022. Thus, the capacity of central federations to provide liquidity support is overall favorable⁴⁰⁾ (Figure II-14). However, caution is needed regarding the fact that, in the event of valuation losses on securities held, liquidity supply capacity decreases, and that if securities held are sold all at once to raise liquidity, volatility in the short-term financial market and bond market could increase dramatically.

Figure II-14. Results of evaluation of liquidity support capacity¹⁾²⁾³⁾



Notes: 1) End of 2022 basis.

2) Sum of deposits and reserves balances for each federation.

3) The dotted line refers to the reserves balances at the end of 2022 by sector.

Source: Bank of Korea staff calculations.

4. Assessment and Implications

The steady growth of non-bank depository institutions is contributing to financial inclusiveness by addressing the demand for community financing, but the credit risk of such institutions is rising along with the expansion of exposure to the real estate sector. However, as non-bank depository institutions do not have high interconnectedness with other financial sectors, the possibility of contagion to systemic risk is fairly limited.

Meanwhile, considering the capacity of central federations of non-bank depository institutions to provide liquidity support, even amid

40) At the end of 2022, the share of reserves held by central federations against aggregate deposits taken in each sector was 4.2% for savings banks; 9.5% for agricultural, fishery, and forestry cooperatives; 6.8% for credit union; and 5.0% for MG Community Credit Cooperatives.

an increase in deposit withdrawal, such a situation is less likely to become extreme, as was the case with the SVB incident. Meanwhile, if central federations need to execute a large-scale sale of securities in their portfolio to provide liquidity support, it would cause a decline in the market value of the financial products concerned and increase volatility in financial markets, undermining the stability of the financial system.

Moreover, if bank runs occur at an unexpectedly rapid pace, the possibility that central federations would have difficulty responding promptly cannot be ruled out. In this respect, ways of securing the central bank's access to the information of non-bank depository institutions and strengthening monitoring⁴¹⁾ need to be considered. Furthermore, a liquidity supply system needs to be developed that is sufficiently capable of dealing with any sudden surge in central federations' demand for temporary liquidity during emergencies such as bank runs of non-bank depository institutions.⁴²⁾

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41) The Financial Stability Board (FSB) recommended in its peer review of Korea's regulatory system for non-bank depository institutions (December 2017) that the supervision of central federations be strengthened.

42) Meanwhile, to cope with the spread of risks across the overall financial system, a situation or condition where the central bank's liquidity support is appropriate needs to be determined. The IMF Global Financial Stability Report (April 2023) said that, as the financial intermediation of non-bank financial institutions (NBFIs) has gained importance, it is necessary to include systemically-important NBFIs among the institutions eligible to receive liquidity support from the central bank. Regarding this, it mentioned the necessity for the proper supervision of target institutions and the possibility of expanding the scope of eligible collateral.

III. Review of Potential Credit Risk in the Corporate Sector and Domestic Bank Stress Test¹⁾

- 1. Background
- 2. Review of Potential Credit Risk in the Corporate Sector
- 3. Domestic Bank Stress Test
- 4. Implications

1. Background

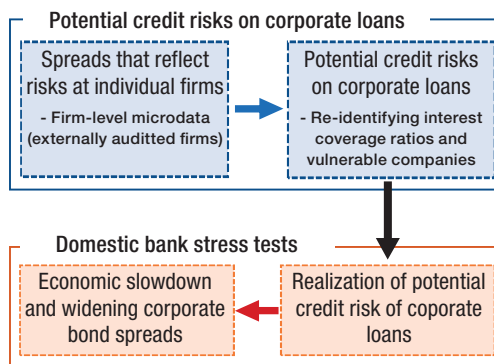
Since 2022, while the credit-to-nominal GDP gap ratio²⁾ in the household sector has declined significantly, the ratio in the corporate sector remains high, as corporate loans have been following an upward trend. Under such circumstances, with the growing uncertainty in the global economy causing the business environment for domestic companies to deteriorate, the credit risk of corporate loans is rising.

Meanwhile, the soundness indicators of corporate loans remain favorable compared with pre-pandemic levels. However, this may be attributed to the fact that default risk of corporate loans has not materialized, having been deferred due to the low interest rate conditions during the pandemic and the government’s financial support measures. If COVID-19-re-

lated financial support measures, such as the grace period for the repayment of principal and interest and extension of loan maturity, are terminated³⁾ and macroeconomic conditions change rapidly due to the expansion of domestic and international uncertainty, with the emergence of lingering potential credit risk, loan soundness may deteriorate.

This section estimates the latent potential credit risk of the corporate sector due to financial support measures using corporate micro data. Furthermore, assuming that risk in the corporate sector leads to the deterioration of soundness, such as an increase in the delinquency rate amid stress situations of economic downturn and rise in the spread of corporate bonds, the resilience of domestic banks is reviewed and implications are derived (Figure III-1).

Figure III-1. Analysis overview



1) This article was authored by Lee Do-kyung, Yeom Ki-ju, and Lee Byung-ho (Systemic Risk Team) and was reviewed by Lee Jong-han (director of the Financial Risk Analysis Division), Lim Ho-sung (head of the Systemic Risk Analysis Team), and Jung Dong-jae (Monetary Policy Affairs Team).

2) For details on the credit-to-nominal GDP gap ratio and trends by sector, refer to “Financial Stability Situation I. Credit Market - 1. Credit Leverage.”

3) The deferment of principal and interest repayment is scheduled to end in September this year, with borrowers being able to establish repayment plans and a grace period through consultations with financial institutions and repay loans in installments until September 2028. The extension of loan maturity is expected to remain in place until September 2025.

2. Review of Potential Credit Risk in the Corporate Sector

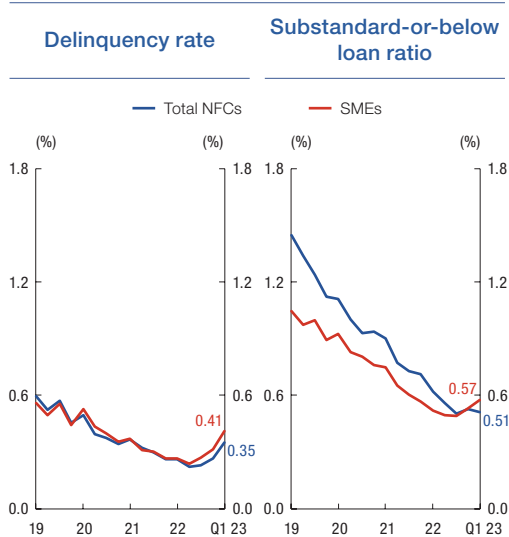
A. Soundness Indicators and Potential Risk Management

The soundness indicators of corporate loans have been fairly favorable despite the shock to the real economy during the COVID-19 pandemic. The delinquency rate of corporate loans extended by domestic banks at the end of the first quarter of 2023 was 0.34%, lower than the 0.49% recorded at the end of 2019, just before the pandemic, and the substandard-or-below loan ratio was 0.51%, significantly lower than the 1.12% seen at the end of 2019 (Figure III-2).

Such favorable soundness indicators of corporate loans are likely attributed to the fact that corporate funding costs remained low under the low interest rate environment during the pandemic, and potential risk has not materialized thanks to the government's financial support measures and loose lending attitude of financial institutions.⁴⁾ Although the delinquency rate and substandard-or-below loan ratio of loans to small- and medium-sized enterprises remain low, these ratios recently began to increase (Figure III-2). This may suggest that, as the interest expenses of companies rise gradually due to the rising market interest rates last year, the gap between soundness indicators and potential risk has narrowed. In addition to this, if the financial

support measures that have been introduced so far are terminated, latent credit risk may emerge rapidly.

Figure III-2. Bank corporate loan soundness ratios



Source: Banks' business reports.

In other countries as well, corporate default risk is being exposed as financial support related to the pandemic is terminated. In the UK, where corporate support measures such as government-backed loan schemes⁵⁾ were withdrawn relatively early (March 2021), the number of corporate bankruptcies soared,⁶⁾ and in Europe, as COVID-19 policy support came to an end, the corporate bankruptcy indexes for the transportation and warehousing, accommodation and restaurant, and wholesale and retail trade sectors, which had received relatively more support, rose by 29.3% from

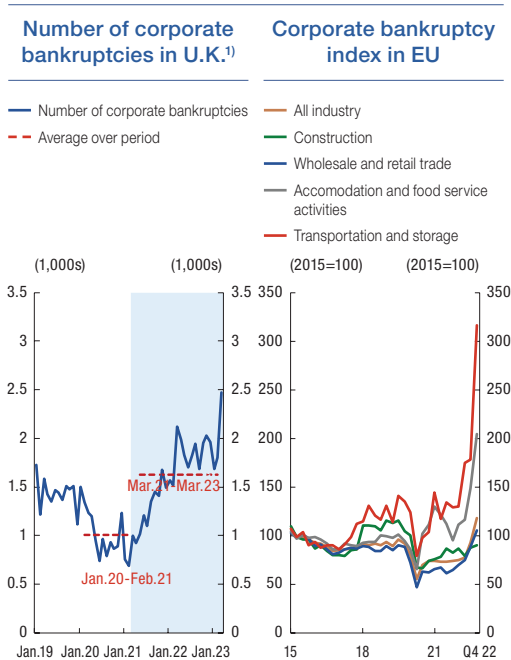
4) Banerjee et al. (2020) referred to the situation where defaults on loans did not increase despite the significant economic shock caused by COVID-19 as the "bankruptcy gap."

5) This included the Bounce Back Loan Scheme of up to GBP 50,000 for small- and medium-sized enterprises with a 100% government guarantee (exemption of interest and fees for one year) and a corporate loan scheme of GBP 25,000 to GBP 5 million (exemption of interest and fees for one year) for small- and medium-sized enterprises with an 80% government guarantee (Park Sang-uk 2020).

6) There were 1,991 corporate bankruptcies in the UK in April 2022, rising by over 39% from April 2019, before the pandemic (Kang Teuk-rok 2022).

the fourth quarter of 2019 (Figure III-3). For Canada, the number of corporate applications for bankruptcy returned to the pre-pandemic level.⁷⁾

Figure III-3. Corporate bankruptcies in major countries



Note: 1) The shaded area shows the period after the termination of COVID-19 support.

Source: U.K. Insolvency Service, European Commission (2023).

Hereunder, to precisely assess potential credit risk in the corporate sector, interest rates during the pandemic (2020 and 2021), assuming no financial support was provided, were estimated to determine whether the ability of individual companies to handle their debts was overestimated due to funding rates being lower than rates reflecting actual risks. Based on the recalculation of companies' interest coverage ratio using these estimated interest rates, firms with an interest coverage ratio of less than 1 (hereinafter "vulnerable firms"⁸⁾) were identified, thereby examining potential credit risk embedded in corporate loans.

B. Estimation of Spread Reflecting the Risk of Individual Companies

To estimate the latent credit risk in the corporate loan sector due to the COVID-19 financial support measures, it is necessary to confirm whether companies paid lower lending rates in 2020 and 2021 than they did before the pandemic.⁹⁾ The credit risk of individual companies is reflected in the spreads they pay in addition to the reference rate. Hence, the spreads of individual companies were measured,¹⁰⁾ and

7) Meanwhile, according to the Canadian Survey on Business Conditions, about half of firms that had received support through government-backed loans during the pandemic responded that repayment until the end of 2023 would be difficult (BOC 2023).

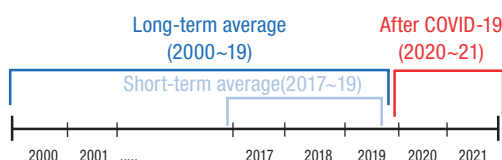
8) This section defines firms with interest coverage ratios of less than 1 as vulnerable firms, which are different from marginal firms, which are firms that have remained vulnerable for three consecutive years.

9) The reduction in the interest rate of the Bank of Korea Intermediated Lending Support Facility for SMEs, extension of loan maturity, and deferment of interest payment led to delayed delinquencies and loose lending attitude of financial institutions, which may have affected the decline in interest rates of corporate loans.

10) Data of individual firms were obtained from KIS-Value, and as the data of individual firms (based on firms subject to the external audit requirement) for 2022 were not sufficiently available, the analysis was conducted based on the data for 2000 to 2021, excluding data for 2022. For spread comparison before and after the pandemic, data of firms that opened in 2020 or closed before 2020 were excluded. To remove outlier data, after calculating spread by year, companies above and below the upper and lower 1% range were excluded from the analysis. The total number of firms subject to analysis was about 20,000, of which large enterprises accounted for 15% and small- and medium-sized enterprises accounted for 85%. Classification by firm size (large/small and medium) was based on the latest information of individual companies listed in KIS-Value. Companies classified as large and middle-market companies and unclassified firms whose assets exceed KRW 500 billion were classified as large enterprises, and all other firms were classified as small- and medium-sized enterprises.

spreads during the pandemic (2020-2021) were compared with the average spread for a long-term period (2000-2019) and short-term period (2017-2019) prior to the pandemic to determine whether firms paid interest costs lower than those reflecting actual risks (Figure III-4).¹¹⁾

Figure III-4. Definition of long-, short-term period when calculating average spreads



First, the interest rate (hereinafter “average interest rate for borrowings,” $r_{i,t}$)¹²⁾ for total borrowings of companies (borrowings + issued bonds) was calculated using companies’ financial statements. For the reference rate, market rates that do not reflect the risks of individual firms were used, and to estimate the timing of borrowings and maturity (long-term,

short-term), the average reference rate ($r_{i,t}^*$)¹³⁾ of firms was estimated using financial statements. Lastly, the spreads of individual firms by year ($s_{i,t}$) were calculated by estimating the difference between the average interest rate of borrowings of individual firms and the average reference rate.

$$s_{i,t} = r_{i,t} - r_{i,t}^*$$

The estimation results found that firms were paying spreads lower than those reflecting their actual risks on average in 2020 and 2021. The spread of individual firms in 2020 and 2021 was 1.06%p lower, on average, than the long-term average spread (2000-2019) and 0.84%p lower than the relatively recent short-term average spread (2017-2019)¹⁴⁾ (Figure III-5).

The distribution of the spread gap¹⁵⁾ of individual firms shows that firms with a spread difference of less than zero, i.e., those that

11) This section used the long-term average spreads of firms as a proxy for long-term equilibrium risk, which is not affected by the business cycle and financial conditions. This presupposes that change in the risk level of firms was not large, and the results of the analysis of credit scores (grades 1 to 10) of KIS-Value showed that the standard deviation of individual firms’ credit scores was 1.3 (average of firms), suggesting that change in credit scores was not significant during the analysis period. Moreover, to consider any recent change (reduction) in the credit risk of individual firms, in addition to long-term average spreads, short-term average spreads were compared to see if the results were similar.

12) Average interest rate of borrowings is the interest expenses incurred by individual firms for their total borrowings and is calculated as follows.

- Average interest rate for borrowings $r_{i,t}$ = interest expenses_{*i,t*} ÷ borrowings_{*i,t-1*}
- Total borrowings_{*i,t-1*} = (short-term borrowings + short-term bonds)_{*i,t-1*} + (long-term borrowings + long-term bonds)_{*i,t-1*} + (liquid long-term borrowings + liquid long-term bonds)_{*i,t-1*}

13) Although different reference rates are generally used for bank borrowings or corporate bond issuance, this section, for the sake of consistency in analysis, used corporate bond yields (three-year, AA-) for long-term liabilities (long-term borrowings and long-term bonds) and CP yields for short-term liabilities as reference rates, respectively. To reflect the difference in reference rates (market interest rates) at the time of loan issuance, “average reference rates” were calculated as follows by referring to the methods of Caballero et al. (2008), which estimated the lower limit of interest expenses (minimum required interest payment) of individual firms.

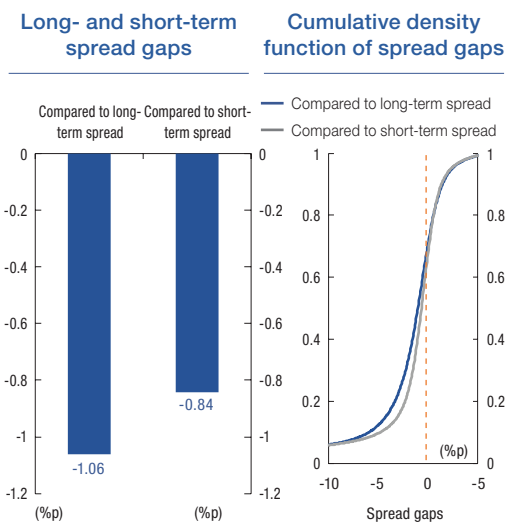
- Average reference rate $r_{i,t}^*$ = market interest expenses_{*i,t*} ÷ total borrowings_{*i,t-1*}
- Market interest expenses_{*i,t*} = (short-term borrowings + short-term bonds)_{*i,t-1*} × CP yield_{*t-1*} + (long-term borrowings + long-term bonds)_{*i,t-1*} × (corporate bonds (three-year, AA-) yield_{*t-1*} + corporate bond (three-year, AA-) yield_{*t-2*}) ÷ 2 + (liquid long-term borrowings + liquid long-term bonds)_{*i,t-1*} × corporate bond (three-year, AA-) yield_{*t-3*}

14) For some firms whose data were missing during the relevant period, the average rates for 2015 to 2019 were applied.

15) This refers to the difference between spreads during 2020 and 2021 and long-term and short-term spreads.

benefitted¹⁶⁾ from the relaxed financial conditions during 2020 and 2021, exceeded firms that did not benefit from such conditions. Comparison with long-term and short-term average rates shows that about 70% of firms paid lower spreads (Figure III-5).

Figure III-5. Long- and short-term gaps¹⁾ of estimated spreads in 2020-2021

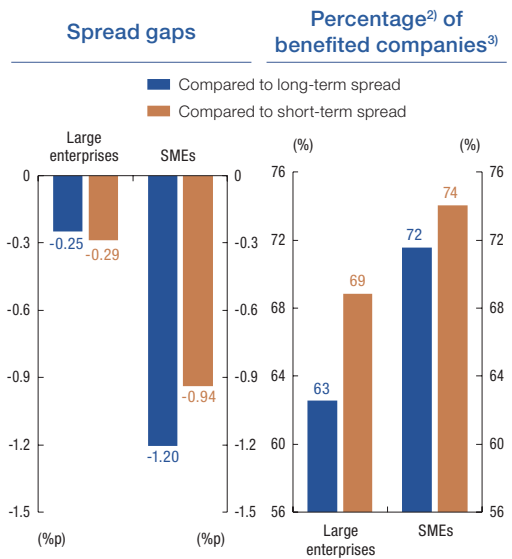


Notes: 1) Average spread in 2020-2021-long-/short-term spread.
Source: KIS-Value, Bank of Korea staff calculations.

By firm size, small- and medium-sized enterprises were found to have benefited more from the eased financial conditions than large enterprises and had a bigger spread gap than large enterprises, meaning that they benefitted more. In 2020 and 2021, the spreads of large enterprises and small- and medium-sized enterprises were 0.25%p and 1.20%p lower, respectively, than their long-

term average spreads and 0.29%p and 0.97%p lower than their short-term average spreads.¹⁷⁾ In terms of the number of firms, during 2020 and 2021, 63% of large enterprises and 72% of small- and medium-sized enterprises paid lower spreads than the long-term average spreads, while 69% of large enterprises and 74% of small- and medium-sized enterprises paid less than the short-term average spread, showing that a greater share of small- and medium-sized enterprises benefited from the lower interest rates (Figure III-6).

Figure III-6. Estimated spread gaps¹⁾ (by company size)



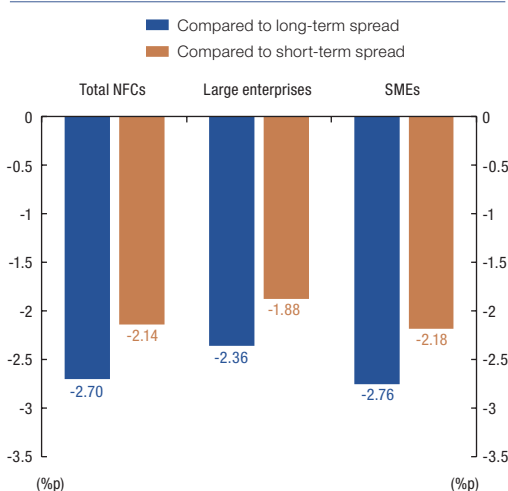
Notes: 1) Average spread in 2020-2021, long-/short-term spread.
2) Number of benefited companies/total companies (by company size).
3) Companies whose spreads in 2020-2021 were lower than the long-/short-term spread.
Source: KIS-Value, Bank of Korea staff calculations.

16) It is difficult to completely rule out the possibility that the reduction in credit risk of individual firms may have affected such decline in spreads. Actually, in terms of KIS credit scores, recent credit scores (average of 2020 to 2022) of firms with a spread difference of less than zero improved slightly (i.e., reduced credit risk) compared with 2000 to 2019. However, considering the extent of improvement in KIS credit scores of firms with a spread difference of above zero was greater, it seems that the reduction in credit risk may not have significantly affected the decline in spread.

17) Unlike large enterprises, for small- and medium-sized enterprises, the spread gap for the long-term average spread was smaller than that for the short-term average spread, which implies that small- and medium-sized enterprises were already enjoying spread-related benefits from 2017 to 2019.

Meanwhile, looking at only firms that enjoyed lower spreads during 2020 and 2021 (hereinafter “beneficiary firms”), the average spread of such firms during the period was 2.70%p lower than the long-term average spread and 2.14%p lower than the short-term average spread. By firm size, the spread of large enterprises was 2.36%p and 1.88%p lower than the long-term and short-term spreads, respectively, while the spread of small- and medium-sized enterprises was 2.76%p and 2.18%p lower (Figure III-7).

Figure III-7. Estimated spread gaps¹⁾ of benefited companies



Note: 1) Average spread in 2020-2021 - long-/short-term spread.

Source: KIS-Value, Bank of Korea staff calculations.

C. Review of Potential Credit Risk in the Corporate Sector

It was found that firms paid loan interest rates lower than those reflecting their credit risk due to financial support measures related to

COVID-19. Hence, to measure potential credit risk in the corporate sector, the extent of an increase in the share of vulnerable companies with an interest coverage ratio of less than 1 was estimated if interest rates reflecting actual risks without financial support (hereinafter “potential risk-reflecting interest rates”) are applied.

During 2020 and 2021, the potential risk-reflecting interest rates ($\hat{r}_{i,t}$) of individual companies were calculated as the sum of the average reference rate of individual companies ($r_{i,t}^*$) and long-term average spread (\bar{s}_p).¹⁸⁾

$$\hat{r}_{i,t} = r_{i,t}^* + \bar{s}_p, i = \text{firm}, t = 2020, 2021$$

After that, by applying the potential risk-reflecting interest rates, the interest expenses and interest coverage ratios of firms were calculated,¹⁹⁾ and the share of borrowings of vulnerable firms with an interest coverage ratio of less than 1 out of the total borrowings of all firms (hereinafter “share of loans to vulnerable firms”) was then estimated.

The estimation results showed that, if potential risk is reflected, the share of loans to vulnerable firms in 2020 and 2021 rises. By firm size, the share of loans to vulnerable large enterprises rises by 3.1%p and 2.7%p in 2020 and 2021, respectively, while the share for small- and medium-sized enterprises climbs by 8.6%p and 7.5%p (Figure III-8). The share of loans to total vulnerable firms increases by 4.5%p and 3.9%p (Figure III-9),²⁰⁾ and the estimation results using the 2022 corporate data

18) The long-term average spread of individual firms was calculated as the average of spreads from 2000 to 2019.

$$\bar{s}_p = \frac{1}{T} \sum_t (r_{i,t} - r_{i,t}^*), i = \text{firm}, t = 1, 2, \dots, T$$

19) The interest expenses and interest coverage ratio that reflect potential risks were calculated as follows.

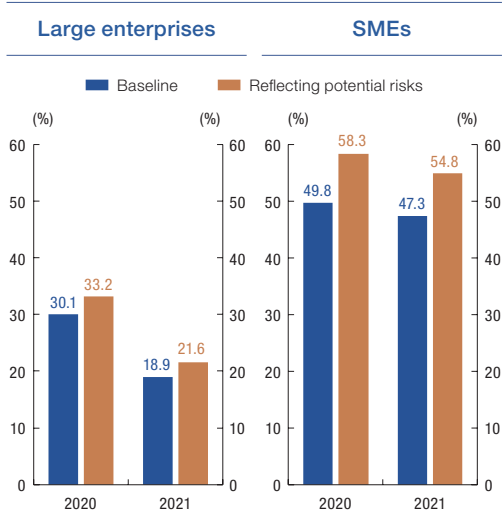
$$\cdot \text{Potential risk-reflecting interest expenses}_{i,t} = \text{potential risk-reflecting interest rates } (r_{i,t}^*) \times \text{total borrowings}_{i,t-1}$$

$$\cdot \text{Potential risk-reflecting interest coverage ratio}_{i,t} = \text{operating income}_{i,t} \div \text{potential risk-reflecting interest expenses}_{i,t}$$

20) If the short-term average spread is applied, the share of loans to vulnerable firms rose by 3.8%p and 3.2%p in 2020 and 2021, respectively.

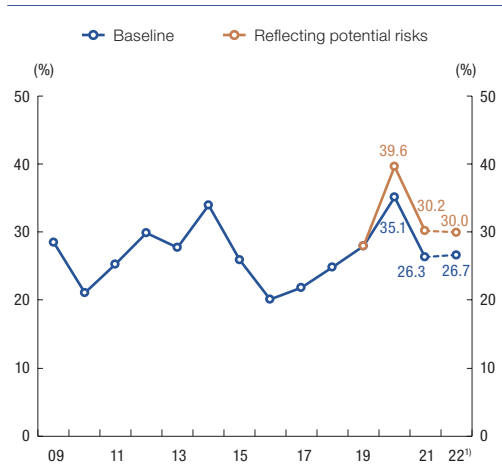
showed that the share of loans to vulnerable firms rises as well, indicating that potential risks have not eased.

Figure III-8. Changes in the proportion of loans to vulnerable companies (by company size)



Source: KIS-Value, Bank of Korea staff calculations.

Figure III-9. Trends in the proportion of loans to vulnerable companies with potential risks¹⁾²⁾



Notes: 1) Percentage of total borrowings (borrowing from financial institutions + bond issuance) of vulnerable companies (interest coverage ratios < 1) to total borrowings of all companies.

2) Estimation for 2022 is based on some available corporate data.

Source: KIS-Value, Bank of Korea staff calculations.

3. Domestic Bank Stress Test

Based on the risks of corporate loans identified above, scenarios where banks' potential credit risk materializes and scenarios of economic downturn and widening spreads of corporate bonds were established to conduct the stress test.

A. Estimation of Banks' Credit Losses with the Materialization of Potential Credit Risk in the Corporate Sector

In the event firms' potential default risk materializes with the termination of COVID-19-related financial support measures and tighter lending attitude of financial institutions, an increase in banks' credit losses was analyzed using the transition matrix of the soundness grade of banks' corporate loans.²¹⁾

First, the impact on banks' corporate loan soundness of an increase in the share of loans to vulnerable firms (i.e., credit risk of corporate loans) was estimated using pre-pandemic data from 2010 to 2019, and it was found that as the higher the share of loans to vulnerable firms across the economy, the higher the probability that corporate loan soundness grade for the next quarter deteriorates.²²⁾

Next, to reflect the materialization of potential risks of corporate loans, the increased share of loans to vulnerable firms (2020-2022) (Figure III-8), instead of existing data, was used. As a result, as banks' transition matrix changes and the probability of loan soundness grade deterioration rises, a higher default rate of loans was estimated.²³⁾ Lastly, based on higher default rates of banks, expected and unex-

pected losses of banks' corporate loans²⁴⁾ were estimated, and the extent to which reflecting potential risk causes banks' credit losses to increase was examined.

The estimation results showed that, if the potential credit risk of the corporate sector is in-

corporated, the default rate of corporate loans for domestic banks would rise by 0.24%p at the end of 2022. As a result, in terms of banks' potential credit losses, the expected losses for which additional loan loss provisioning is needed would rise by KRW 1.5 trillion, and the unexpected losses for which capital needs

- 21) The loan soundness grade transition matrix refers to the probability (P_{ij}) that loans classified as normal, precautionary, or substandard or below in the previous quarter, according to the soundness classification criteria, are classified as normal, precautionary, or substandard or below in the current quarter.

Loan soundness grade transition matrix _{t,t+1}		t+1			
		Normal (1)	Precautionary (2)	Substandard or below (3)	
Point of time	t	Normal (1)	P_{11}	P_{12}	P_{13}
		Precautionary (2)	P_{21}	P_{22}	P_{23}
		Substandard or below (3)	P_{31}	P_{32}	P_{33}

Information contained in the transition matrix of each bank by point of time can be expressed as a common factor (Z_t) affecting the overall economy and an individual factor (ϵ_{it}) by using the methods of Gross et al. (2020). For example, if a precautionary (2) classification of the next quarter's corporate loan soundness is determined by a probability variable, X_{2t} , that follows the standard normal distribution, X_{2t} can be expressed as follows using a common factor (Z_t) and individual factor (ϵ_{2t}).

$$X_{2t} = \sqrt{\rho} Z_t + \epsilon_{2t} \cdot \begin{bmatrix} Z_t \\ \epsilon_{2t} \end{bmatrix} \sim N \left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & 0 \\ 0 & 1 - \rho \end{bmatrix} \right)$$

If it is assumed that Z_t is known, the probability (P_{23}) that a precautionary loan is classified as a substandard-or-below loan can be explained as follows ($\Phi(\cdot)$ is the cumulative distribution function of the standard normal distribution).

$$P_{23|Z_t} = \Pr(X_{2t} < x_{23} | Z_t) = \Pr(\sqrt{\rho} Z_t + \epsilon_{2t} < x_{23} | Z_t) = \Pr(\epsilon_{2t} < x_{23} - \sqrt{\rho} Z_t | Z_t) = \Phi \left(\frac{x_{23} - \sqrt{\rho} Z_t}{\sqrt{1 - \rho}} \right)$$

Hence, Z_t at each point of time can be estimated as the value that minimizes the sum of squares of the difference between banks' original transition probability and the transition probability calculated based on Z_t .

$$Z_t = \arg \min_{Z_t} \sum (P_{ij} - P_{i|Z_t})^2, \quad i, j = 1, 2, 3$$

- 22) The impact of the share of loans to vulnerable firms on common factor (Z_t) of corporate loan soundness grade transition matrix of each bank was estimated with panel regression analysis, using pre-pandemic data during 2010-2019. $Z_{i,t} = \beta_0 - 3.8777 \times \text{Share of loans to vulnerable firms}_{t-1} + \gamma X_{i,t-1} + D_1 + D_2 + D_3 + u_i + e_{i,t}$, $i = \text{Banks}$, $t = 2010.1/4 \sim 2019.4/4$ (1.019)

X_i is a control variable (GDP growth rate, corporate bond yield, exchange rate variation rate, stock price variation rate), $D_{1,2,3}$ is a dummy variable for the quarter, and u_i refers to fixed effects. (\cdot) is standard error for the estimated coefficient (-3.8777) of the share of loans to vulnerable firms (explanatory variable) and was found to be valid at a significance of 1%.

- 23) Due to banks' insufficient transition matrix data and because the difference between the default rate and probability of substandard-or-below loan classification as per the soundness grade classification standard needs to be corrected, a hybrid method was used by referring to Gross et al. (2020). In addition, based on the estimation results of Footnote 22, the common factor (Z_t) of the transition matrix was revised. Using a transition matrix ($P_{11|Z_t}, \dots, P_{33|Z_t}$) based on a new Z_t , the probability that loans are classified as substandard-or-below loans for the next one year was estimated and used as a proxy for the default rate.
- 24) Expected loss is the average loss expected to occur given the current risk of loans, and is estimated by multiplying the default rate by the loss given default (LGD) and size of loans (exposure). As for the LGD, change in relation to change in the default rate was estimated using a credit loss model based on S&P (2010) within the BOK stress test model. Unexpected loss refers to loss that could exceed the expected loss though with a low likelihood. It is calculated by deducting the expected loss from the maximum loss (VaR) that could occur at a significance of 99.9%. The internal ratings-based approach of Basel III was used.

to be increased would rise by KRW 3.4 trillion.²⁵⁾ Consequently, the BIS ratio of banks is estimated to decline by 0.47%p (Table III-1).

Table III-1. Estimated potential credit losses at domestic banks¹⁾

Estimation item	Estimation result
Probability of default	+0.24%p
Expected losses (need to accumulate additional loan loss provision)	+1.5 trillion won
Unexpected losses (need to accumulate additional capital)	+3.4 trillion won
BIS capital ratio	-0.47%p

Note: 1) End of 2022.

B. Stress Test for Economic Downturn and Rising Corporate Bond Yields

As potential credit risk is materializing amid the termination of financial support, the default risk of domestic firms could rise further, depending on changes in macroeconomic conditions at home and abroad such as a global economic recession and growing risks in the financial sector. To examine banks' resilience in this scenario, a stress test was conducted.

To establish situations where corporate sector default risk rises, a total of eight scenarios in which economic downturn leads to a decrease in operating income or widening corporate bond spreads (corporate bond yields for firms with AA- minus Treasury bond yields (three-year))

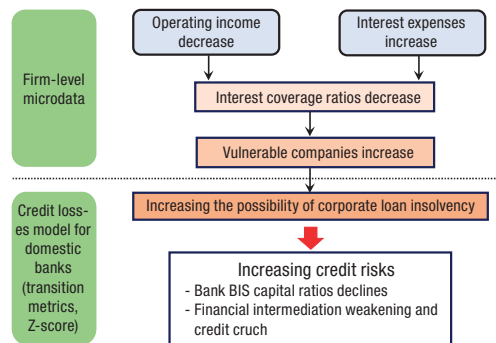
were selected²⁶⁾ (Table III-2). A decline in the economic growth rate decreases the operating income of firms and raises corporate risk, generating a rise in corporate yields. The resulting increase in interest expenses leads to a rise in vulnerable firms with an interest coverage ratio of less than 1. This surge in the share of vulnerable firms affects the transition matrix of banks' corporate loans, likely resulting in a rise in the default rate and credit losses (Figure III-10).

Table III-2. Stress test scenarios¹⁾

		Operating incomes, rate of change		
		-	-5.0%	-10.0%
Corporate bond spread	-	(0)	(1)	(2)
	+50 bp	(3)	(4)	(5)
	+100 bp	(6)	(7)	(8)

Note: 1) Scenario (0) refers to the situation where potential risks are reflected, as in "3. A. Estimation of banks' credit losses with the materialization of potential credit risk in the corporate sector"

Figure III-10. Impulse response channel of stress test scenarios

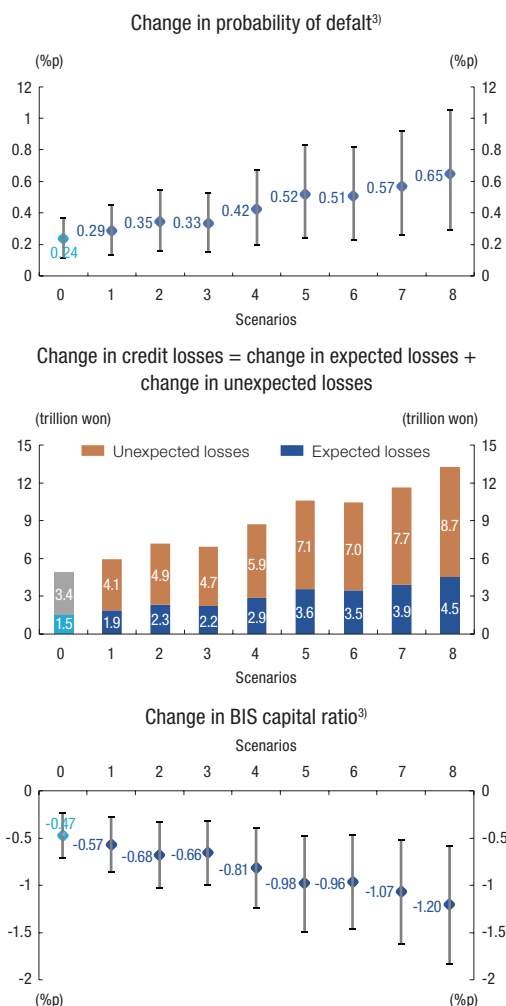


25) To estimate the potential credit losses of banks, this section calculated banks' transition matrix using the 3.9%p (increased share of loans to vulnerable firms as of 2021 based on long-term average spread of individual firms) (increase in potential credit risk), and estimated expected and unexpected losses using the default rates estimated from such transition matrix. Furthermore, applying the IFRS-9 standard, expected and unexpected losses were estimated using the default rate of normal loans for the next one year and default rate of precautionary and substandard-or-below loans based on the average maturity of all corporate loans.

26) For the scenarios, the operating income variation rate for the next one year was set at a decrease of 5% to 10% by considering the average of five years (decline of about 8%) when operating income (10th Korean Standard Industry Classification) fell during the period from 2009 to 2021. Corporate bond spread was set at an increase of 50bp to 100bp by considering that the spread of December 2022 (about 1.76%p) belonged to the upper 1% (+75bp) of the 12-month moving average spread (January 2000 to April 2023).

The stress test results found that in each scenario (1-8), the share of loans to vulnerable firms rises, and banks sustain significant credit losses in corporate loans. Under each scenario, the default rate was found to rise by 0.29%p (Scenario 1) to 0.65%p (Scenario 8) from the end of 2022. As a result, expected loss rises by KRW 1.9 to 4.5 trillion, and unexpected loss by KRW 4.1 to 8.7 trillion. The BIS capital ratio declines by 0.6 to 1.2%p,²⁷⁾ suggesting that, under stress scenarios, banks' credit losses increase. To maintain banks' resilience under such situations, it is necessary for banks to provide sufficient loan loss reserves and additional capital²⁸⁾ (Figure III-11).

Figure III-11. Stress test results, by scenario¹⁾²⁾



Notes: 1) Scenario (0) refers to the situation where potential risks are reflected, as in "3."

2) End of 2022.

3) The top and bottom of the graph show the 95% confidence intervals, and the markings show the average.

Source: Bank of Korea staff calculations.

27) The extent of the decline in the BIS ratio under these stress scenarios falls short of the -1.87%p (end of the third quarter of 2008 against the end of third quarter of 2007) recorded during the global financial crisis.

28) This section did not consider the secondary effect where the decrease in operating income and increase in credit risk of firms prompt a rise in corporate bond yields. This is to avoid overlapping with scenarios that assess the effect of rising corporate bond yields separately.

4. Implications

The analysis of potential credit risks of credit loans confirmed that in 2020 and 2021, individual companies were subject to interest rates lower than those reflecting their actual risks, resulting in corporate credit risks being underestimated. Considering banks' potential credit losses due to this, the current soundness indicators of corporate loans may not sufficiently reflect actual credit risk, which likely affected the corporate sector's accumulated credit-to-nominal GDP gap ratio.

A stress test with scenarios assuming the materialization of potential risk, economic downturn, and rising corporate bond yields showed that the default rates of corporate loans, and thus the credit losses of banks, increase. Hence, domestic banks need to further expand their capacity to absorb losses by increasing loan loss provisions and capital to cope with the growing downside risk of the economy and surge in credit losses.

Given the potential risks in the corporate sector and operating income of domestic banks, supervisory authorities' decision to require banks to put up a countercyclical capital buffer is deemed desirable in terms of the alleviation of corporate loan vulnerability and response to the possible materialization of potential risks.²⁹⁾ Moreover, supervisory authorities and the Bank of Korea need to strengthen the analysis of potential risk in the financial system by stepping up joint stress tests and

information sharing.

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29) Given that regulations on the capital ratio had a greater impact on corporate loans in the past, the imposition of a countercyclical capital buffer and stress capital buffer would be helpful in reducing the corporate credit-to-nominal GDP gap by inducing a tolerable deleveraging instead of a sudden credit crunch. Kim Ja-hye et al. (2022) estimated that a 1%p rise in banks' regulatory capital ratio leads the corporate lending growth rate to decline by 1.3%p, while it does not affect household lending.

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