BANK OF KOREA

Financial Stability Report

2022. 12

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.

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Governor
Bank of Korea

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 their 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 the realization of 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 and report 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 November 2022 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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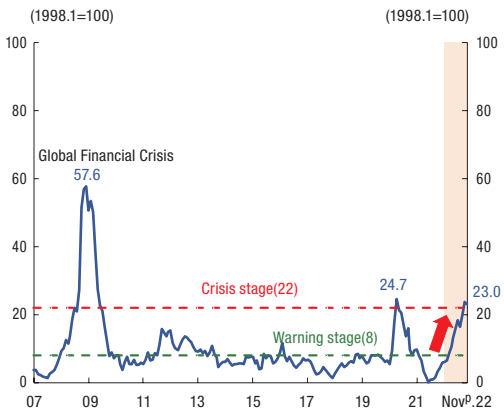
1. Financial Stability Situation

Stability of Korea's financial system has been undermined somewhat in some financial markets, amid hightened uncertainties about domestic and global macro-financial conditions in the second half of 2022. Financial intermediation functions of the bond and money markets have weakened due to an accidental credit event on top of expanded financial market volatility and growing concerns for credit risks stemming from the monetary policy tightening by major countries and ongoing global geopolitical risks. Accordingly, the Financial Stress Index (FSI), which reflects the level of short-term instability in the financial system, rose to the crisis stage (threshold 22) in October this year, but then has decreased slightly following the implementation of market stabilization measures by the government and the Bank of Korea in November.

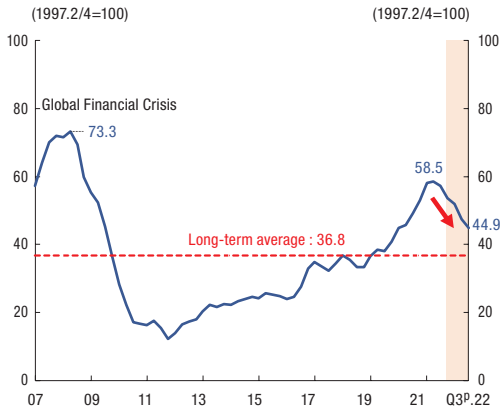
Financial Stress Index (FSI)



Source: Bank of Korea

Meanwhile, the vulnerability within the financial system from a medium- to long-term perspective has been moderated somewhat, as financial imbalances built over the years have been gradually reduced along with weakened risk appetite of economic agents. Prices of assets such as stock and property further decreased and a slowdown in household debt growth continued. Financial institutions generally remained stable overall on the back of the favorable soundness and resilience of the banking sector, despite liquidity risks were crystallized and resilience was slightly reduced at some non-bank financial institutions (hereinafter 'NBFIs') with large exposures to real estate project financing (hereinafter 'PF'). Against this background, the Financial Vulnerability Index (FVI), which shows overall vulnerabilities in the financial system from a medium- to long-term perspective, has been declining steadily since the second half of last year.

Financial Vulnerability Index (FVI)



Source: Bank of Korea

2. Financial Stability Situation by Sector

In the credit market, the private credit-to-nominal GDP ratio remained high, as corporate credit continued to expand at a high growth rate, despite a significant slowdown in the household credit growth. The household debt-to-disposable income ratio declined, and the debt servicing capacity of non-financial corporates (hereinafter 'NFCs') in general appeared favorable, boosted by corporate sales recovery and government's financial support measures. However, attention should be paid to the possibility of insolvencies among vulnerable households, self-employed businessmen, and marginal firms depending on the pace of interest rate hikes and changes in real estate market conditions in coming months.

The asset markets experienced heightened volatility and a drastic decline of prices. Treasury bond yields rose and corporate bond credit spreads widened significantly, and stock prices continued to show wide fluctuations. Though the financial market conditions are gradually improving, boosted by market stabilization measures of the government and the Bank of Korea, and the financial sector's own efforts, price volatility could be amplified again in the hightened uncertainty about the pace of monetary tightening in major countries. In the real estate market where real estate financing has been expanding rapidly since the outbreak of COVID-19, housing prices have reversed to a decline and the number of unsold new houses is rising, all of which are increasing the possibility of financial distress related to real estate financing.

With regard to financial institutions, banks continued to report favorable profitability, along with their substantial asset growth, thanks to the corporate lending growth and inflows of market liquidity into bank time deposits. In the meantime, NBFIs saw their asset growth and profitability weakened, particularly in insurance companies, securities companies, and mutual savings banks, due to a decline in asset valuations and concentration of liquidity in the banking sector. Nevertheless, asset soundness of financial institutions generally remained favorable, at both banks and NBFIs.

As for capital flows, foreigners' domestic portfolio investment continued a net inflow, but the inflow narrowed due to heightened uncertainties surrounding the global financial markets and the strong dollar. While foreigners' domestic bond investment showed a slight net inflow driven by increased arbitrage incentives, foreigners' funds for domestic stock investment saw a net outflow.

3. Resilience of Financial System

The financial system's resilience, which means the capacity to withstand domestic and external shocks, has remained stable overall, backed by commercial banks' strong loss absorption and liquidity capacities. NBFIs also has remained resilient with the capital ratios of most non-bank sectors significantly exceeding the regulatory standards. However, liquidity risks of securities companies and credit-specialized financial companies, which have a high dependence on wholesale funding, have expanded due to a combination of liquidity inflows to the banking sector and growing concerns about the deterioration of their real estate PF exposures.

Korea's external payment capacity deteriorated somewhat compared to the first half, even though it remained solid overall, as net external assets have decreased due to a decline in official foreign reserves following the government's measures to reduce foreign exchange market volatility as well as a decrease in overseas securities investment by other financial institutions.

Meanwhile, payment and settlement systems have operated smoothly under the 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 we have seen above, the high level of private credit, increased exposures to real estate financing, and weakened resilience of NBFIs still remain as vulnerabilities of Korea's financial system. Under these circumstances, changes in domestic and external conditions following the second half of this year such as the persistent rise in interest rates at home and abroad, falls in asset prices, currency depreciation, and unrest of global financial markets could not only affect our financial system either directly or indirectly, but also pose financial risks to the financial system. This report thus mainly examines the effects that these changes in macro-financial conditions may have on the financial system and related potential risks.

First of all, our analysis results show that the policy rate rises have contributed to easing financial imbalances such as the steep credit accumulation and overvaluation of asset prices to some extent, in the meantime that market liquidity has been reduced notably in the money market due to the rises in the policy rate combined with external uncertainties, Kepco and bank bonds' crowding-out of corporate credit bonds, and the spread of credit risk aversion triggered by the unexpected credit event. In addition, with NFC and household debt repayment burdens increasing due to the rise in interest rates amid a high level of private debt, it is analyzed that the default risk of vulnerable households, self-employed businessmen, and marginal firms increased more significantly. Going forward, financial institutions are expected to remain resilient, even if drops in asset prices and economic slowdown take place at the same time as interest rates are raised. However, in case of unexpected shocks including abrupt collapses in asset prices, some NBFIs could be exposed to increasing liquidity and credit risks and their capital ratio could fall below the regulatory standard.

In addition, as real estate prices are decreasing, concerns about liquidity and credit risks of real estate-related corporate financing have grown. Real estate PF and other loans to the construction and real estate sectors extended especially by NBFIs have rapidly increased so far, and the real estate PF has become increasingly intertwined with capital markets due to growing securitization of the PF loans, which have expanded the vulnerability of real estate financing in line with the declining housing prices. Recently, as the slowdown in the real estate market is met with an unexpected credit event, the new issuance and rollover of PF asset-backed commer-

cial paper (PF-ABCP) have been reduced significantly and liquidity risks of securities companies and construction companies that provided guarantees to purchase unsold PF-ABCPs have increased greatly. The soundness indicators of real estate PF exposures still remains solid, but if falls in housing prices widen and property markt recession prolongs going forward, the capital ratio of NBFIs, in particular which have relatively large exposures to the real estate PF and insufficient capital buffer, could decrease sharply.

Meanwhile, the channels through which exchange rates affect the domestic financial system have become diversified, and the impact of exchange rates has become greater. It is analyzed that the weakening won has had bigger effects on foreign currency market, the bond market, and the money market compared to the previous period of great depreciation of the won, and that it has led to the fall in banks' BIS total capital ratio through the rise in the won-converted value of foreign currency-denominated risk-weighted assets due to the weak won. Moreover, the weaker won has also increased liquidity risks of financial institutions through the higher foreign exchange hedging costs and the additional margin call payment in foreign exchange derivatives and foreign currency-denominated repo transactions. It has been assessed that financial institutions are capable of fully handling the decline in the capital ratio and liquidity ratio stemming from the currency depreciation so far. However, we need to manage the situation as to prevent the greater exchange rate volatility from escalating into a liquidity crunch of financial institutions and money market.

Policy Recommendations

The policy authorities need to take preemptive and active measures to mitigate market liquidity risks. They need to respond actively with microscopic market stabilization measures to prevent liquidity crunch in some financial markets from spreading throughout the whole financial system, while maintaining harmony with the stance of monetary policy. In addition, financial institutions should also make their own efforts at the same time as to ensure smooth fund flows and continuous credit provision within the financial system.

In preparation for ongoing interest rate hikes and economic slowdown, efforts to manage risks associated with private credit should be maintained as well. While restricting excessive credit provision to a specific sector such as the real estate rental business, the authorities need to continue to provide selective support such as the debt refinancing for vulnerable groups, with encouraging existing non-vulnerable borrowers to pay off their loans through the increase in the share of amortization at the same time.

It is necessary to improve resilience of financial institutions. NBFIs in particular need to expand emergency liquidity funding channels, build additional loan-loss provisions, and enhance their total loss absorption capacity through recapitalization. Banks should reexamine their credit risk assessment and the level of loan-loss provisions given the possible underestimation of credit risks, and pay attention to foreign currency liquidity management in order to prevent risks caused by foreign exchange volatility from being transmitted to the financial system as a whole.

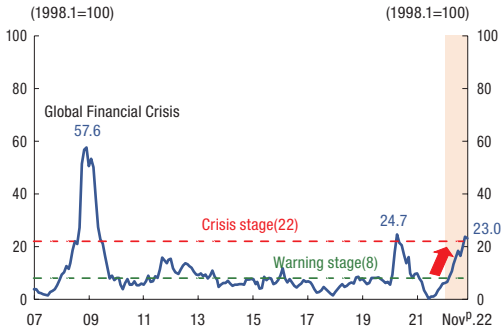
Moreover, it is also necessary to prepare against mid- to long-term financial stability risks that could be created by changes in the new financial environment. The authorities also need to take measures preemptively to cope with the international community's carbon neutrality policy, while improving the regulatory framework for the crypto asset market given its growing influence in the financial market.

【 Key indicators of Financial Stability 】

1 Overall Assessment

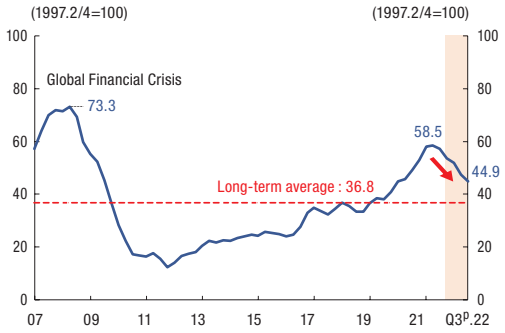
Increase in short-term financial stress (FSI), Decline in mid- to long-term vulnerabilities (FVI)

Financial Stress Index (FSI)



Source: Bank of Korea

Financial Vulnerability Index (FVI)

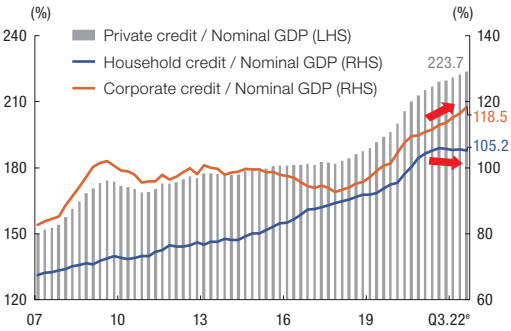


Source: Bank of Korea

2 Credit Leverage

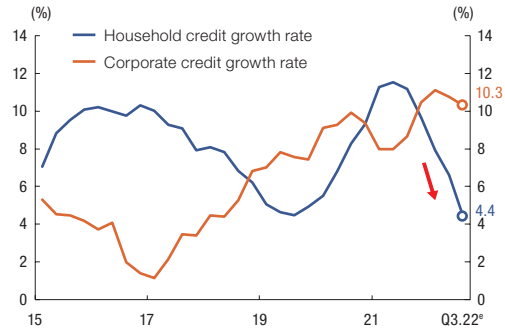
Continued growth in private credit leverage (Household credit growth ↓, High corporate credit growth)

Private credit-to-nominal GDP ratios



Source: Bank of Korea

Credit growth by sector

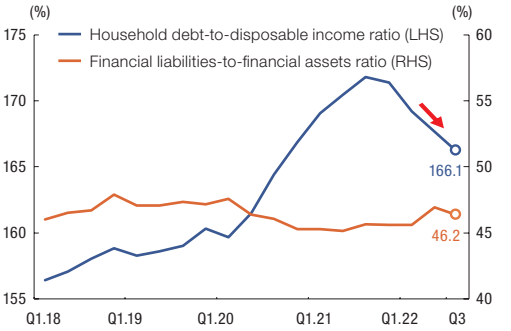


Source: Bank of Korea

3 Household

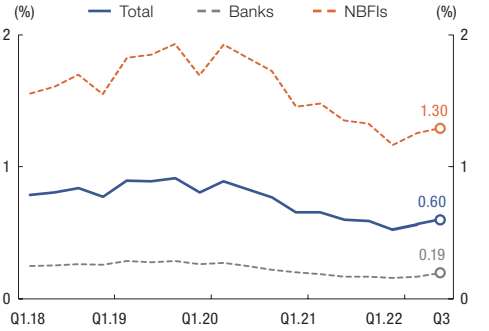
Solid household financial soundness (Household debt to income ↓, delinquency rates inches up)

Debt repayment capacity



Source: Bank of Korea

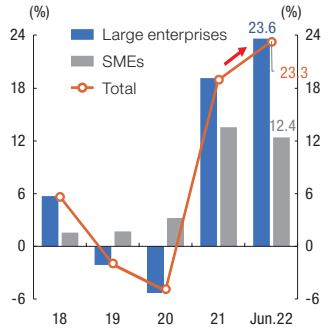
Household loan delinquency rates



Sources: Financial institutions' business reports

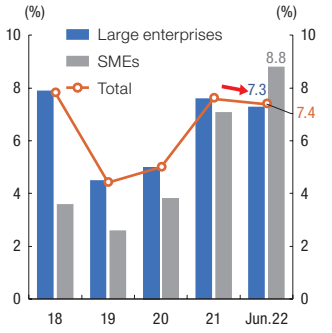
④ NFC — Solid profitability, Weaker interest coverage ratios

Sales growth rates



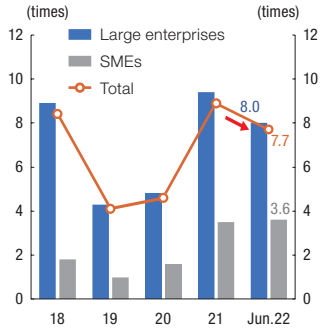
Source: KIS-Value

Operating income-to-sales ratios



Source: KIS-Value

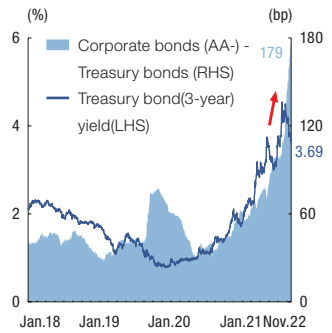
Interest coverage ratios



Source: KIS-Value

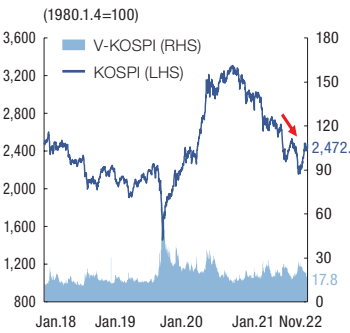
⑤ Asset Market — Higher price volatility (Treasury bond yield ↑, Stock prices ↓, Housing sales prices ↓)

Treasury bond yield & Corporate bond credit spreads



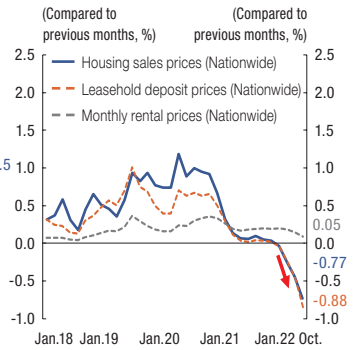
Source: Korea Financial Investment Association

Stock prices & Stock price volatility



Source: KOSCOM

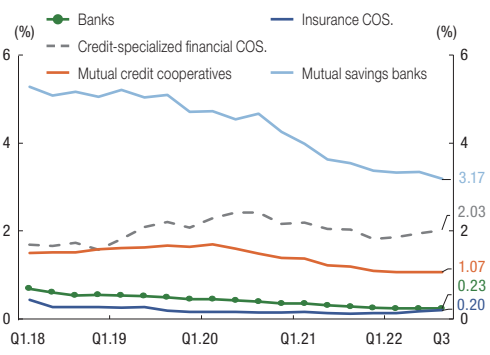
Rates of increase in housing prices



Source: Korea Real Estate Board

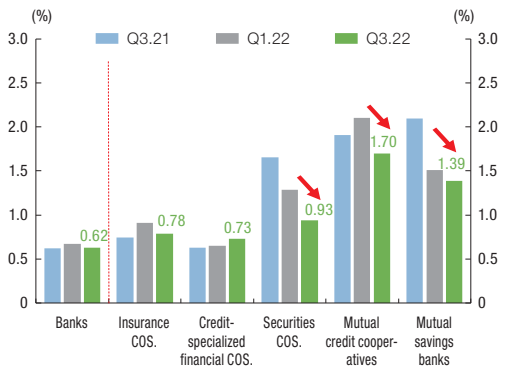
⑥ Soundness of Financial Institutions — Sound financial institution asset quality, Weaker NBFI profitability

Substandard-or-below loan ratio



Sources: FInancial institutions' business reports

Return on assets (ROA)

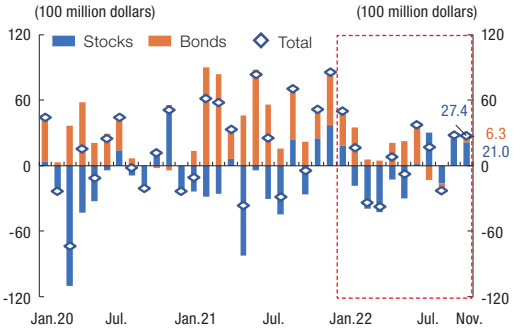


Sources: FInancial institutions' business reports

7 Capital Flows

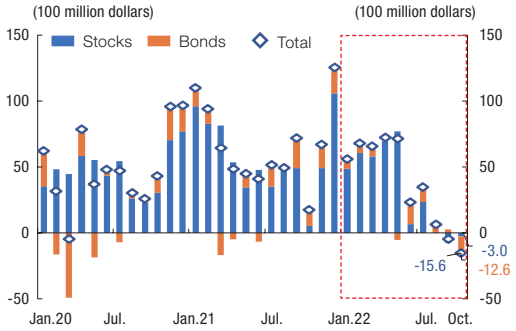
Slowing net inflow of foreingers' domestic portfolio investment, Slower growth in residents' overseas portfolio investment

Changes in foreigners' domestic portfolio investment



Source: Bank of Korea

Changes in residents' overseas portfolio investment

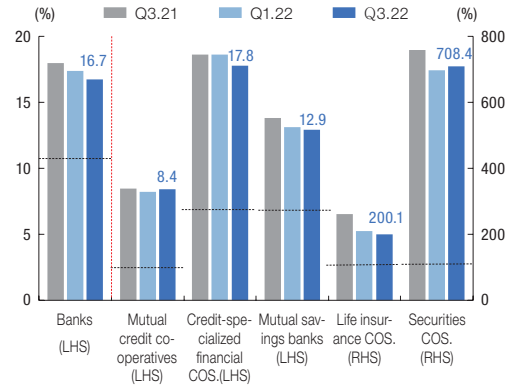


Source: Bank of Korea

8 Resilience of Financial System

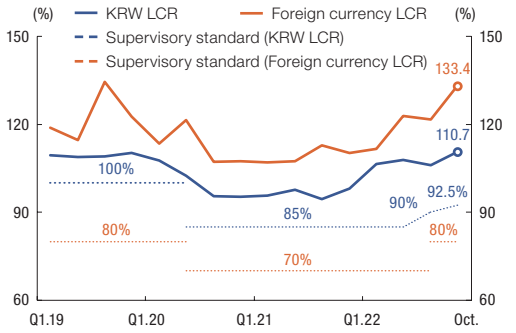
Strong resilience for banks, Moderate decline for NBFIs

Financial Institutions capital adequacy ratios



Source: Bank of Korea

Commercial banks liquidity coverage ratio (LCR)

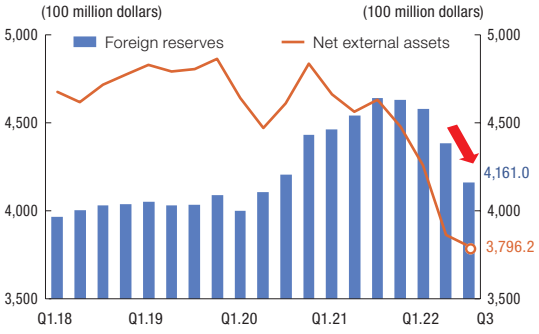


Sources: Commercial banks' business reports

9 External Payment Capacity & Payment and Settlement Systems

Lower external payment capacity, Stable payment risk management

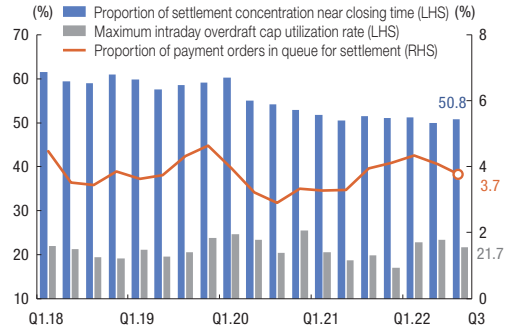
Official foreign reserves[1] & net external assets



Note: 1) End-Nov. basis.

Source: Bank of Korea

Risks related to BOK-Wire+



Source: Bank of Korea

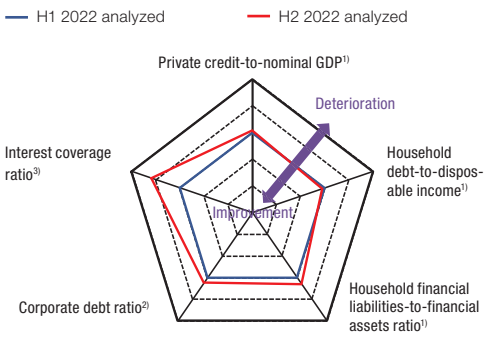
Financial Stability Situation by Sector

Ⅰ. Credit Markets

The rate of increase in the private credit-to-nominal GDP ratio[1] continued rising despite the slowing growth of household credit. While the rate of household credit growth, which had been high, has fallen well below that of income growth, the delinquency rate of household loans has risen.

On the other hand, corporate credit has climbed at a rapid pace, driven mainly by corporate loans. Although corporate profitability is favorable overall, the debt ratio has soared, and interest payment capacity has deteriorated (Figure I-1).

Figure Ⅰ-1. Map of changes in credit market conditions



Notes: 1) Extents of change as of end-Q3 2022 compared to end-Q1 2022 indexed.
2) Extents of change as of end-H1 2022 compared to end 2021 indexed.
3) Extents of change as of H1 2022 compared to 2021 period indexed.

Source: Bank of Korea.

1. Credit Leverage

Moderate Rise in the Private Credit-to-Nominal GDP Ratio

At the end of the third quarter of 2022, the private credit[2]-to-nominal GDP ratio rose by 2.8%p to 223.7% (estimated)[3] from the end of the first quarter (220.9%). Since 2021, the growth rate of private credit has slowed significantly due to base rate hikes and more stringent restrictions on loans, but still ex-

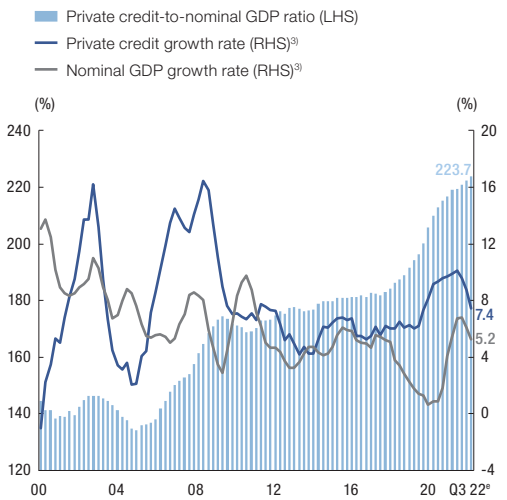
1) The level of private sector leverage can be assessed using a variety of financial and real economic indicators, such as the private credit growth rate by sector, debt repayment burdens of households and corporations, housing price levels, and bank leverage. In this section, the level of private sector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

2) 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.

3) This is based on household and corporate credit in the flow of funds statistics for the third quarter of 2022 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.

ceeded the rate of nominal GDP[4] growth. The growth rate of private credit (YoY) declined from 9.6% at the end of the first quarter of 2022 to 7.4% at the end of the third quarter, while the rate of nominal GDP growth (YoY) slid from 6.8% to 5.2% during the same period (Figure I-2).

Figure I-2. Private credit[1]-to-nominal GDP[2] ratio



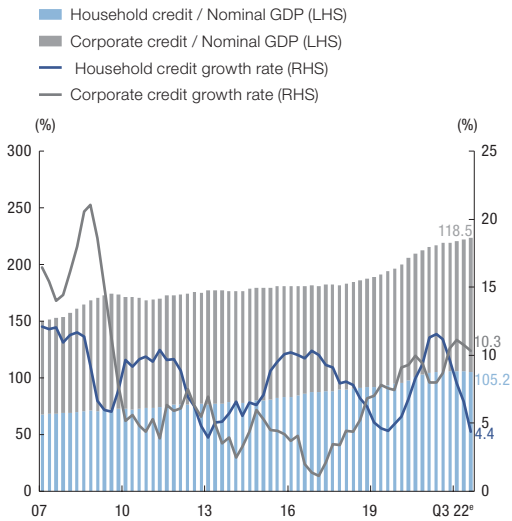
Notes: 1) Based on flow of funds statistics; estimated figure for Q3 2022.
2) Sum of nominal GDPs in quarter concerned and immediately preceding three quarters.
3) Year-on-year basis.
Source: Bank of Korea.

Decline in Household Leverage and Continued Increase in Corporate Leverage

By sector, household leverage decreased, while corporate leverage increased continuously. At the end of the third quarter of 2022, while the household credit-to-nominal GDP ratio declined to 105.2%, down 0.3%p from the end of the first quarter, the corporate credit-to-nominal GDP ratio rose to 118.5%, up 3.2%p from the first quarter.

Household credit growth slowed significantly due to rising interest rates and the decrease in housing transactions, while corporate credit continued growing at a quick pace, driven by an increase in demand for working capital (Figure I-3).

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



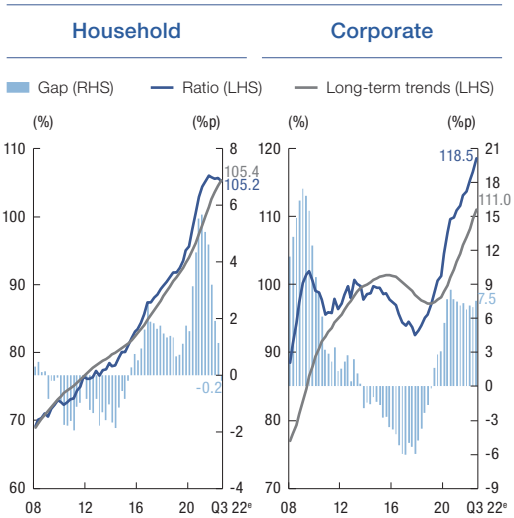
Notes: 1) Based on flow of funds statistics; estimated figure for Q3 2022.
2) Year-on-year basis.
Source: Bank of Korea.

4) This is the sum of nominal GDP for the given quarter and three immediately preceding quarters. It is different from quarterly nominal GDP in the national income statistics.

Narrowing Household Credit-to-Nominal GDP Gap

The gaps between the credit leverage ratios of households and corporations and their long-term trends[5] are gradually narrowing. The household credit-to-nominal GDP gap was -0.2%p in the third quarter of 2022, recording a negative value for the first time since having begun declining in the first quarter of 2021. The corporate credit-to-nominal GDP gap stood at +7.5%p in the third quarter of 2022, maintaining its high level and showing an increase of 0.4%p from the first quarter (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 based on one-sided HP filter, by sector.
Source: Bank of Korea.

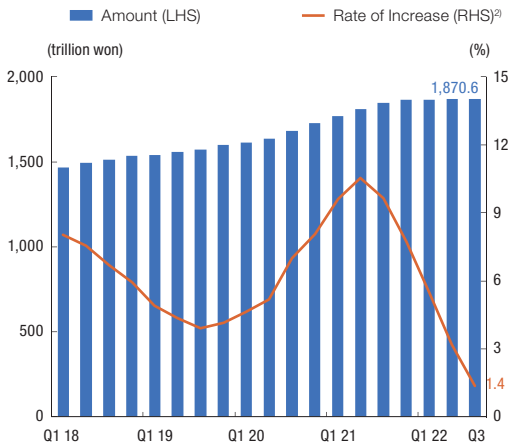
5) As the household or corporate credit-to-nominal GDP ratio tends to rise over the long run as a result of financial deepening, the gap between this ratio and its long-term trend, i.e., its deviation from the long-term trend, is used as a common indicator for measuring systemic risk in time series. Although the BCBS (2010) recommends a smoothing parameter of 400,000 when calculating long-term trend values using an HP filter (one-sided), in this report, we opted for a significantly smaller smoothing parameter (25,000), given that the financial cycle in Korea is much shorter than in other OECD economies.

2. Household Credit

Continued Slowdown in Household Credit Growth

Household debt (based on household credit statistics) reached KRW 1,870.6 trillion at the end of the third quarter of 2022, recording an increase of 1.4% compared to the same period of the previous year, but showing a continued slowdown in its growth (Figure I-5). Household loans amounted to KRW 1,756.8 trillion (93.9% of household debt), with merchandise financing recording KRW 113.8 trillion (6.1%).

Figure Ⅰ-5. Household credit[1)]

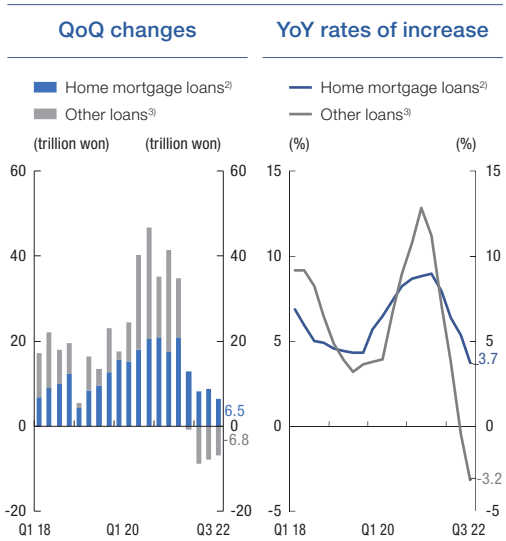


Notes: 1) Based on household credit statistics.
2) Year-on-year basis.
Source: Bank of Korea.

Among loan types, the slowdown in the growth of other loans, including unsecured loans, stood out. Home mortgage loans reached KRW 1,007.9 trillion at the end of the third quarter of 2022, rising by 3.7% compared to the same period of the previous year.

The loan growth has slowed since the fourth quarter of last year due to a contraction in the housing market. Meanwhile, other loans recorded KRW 748.9 trillion, down by 3.2% YoY, with the drop increasing gradually amid rising loan interest rates[6)] and DSR regulations, among other factors (Figure I-6).

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

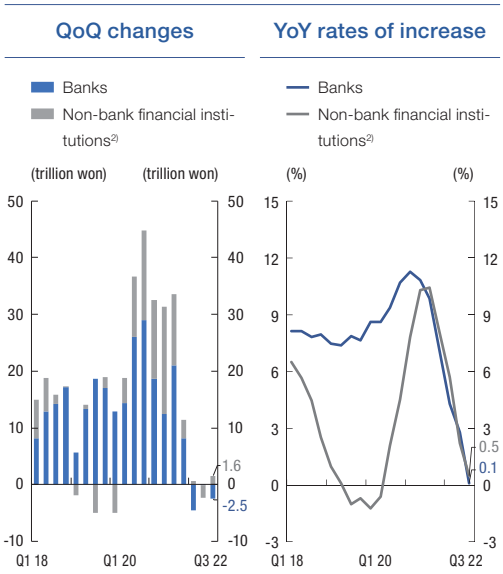


Notes: 1) Based on household credit statistics.
2) Home mortgage loans, leasehold deposit fund loans, etc.
3) Secured loans not collateralized by housing, unsecured loans, guaranteed loans, etc.
Source: Bank of Korea.

By type of financial institution, household loans issued by banks increased by 0.1% YoY to KRW 902.9 trillion at the end of the third quarter of 2022, recording the lowest growth rate since statistics began to be collected in 2002, while household loans issued by non-bank financial institutions (NBFIs) climbed by only 0.5% to KRW 652.3 trillion (Figure I-7).

6) The weighted average interest rate on unsecured household loans at deposit-taking banks (based on newly-taken / extended amounts) rose from 3.5% in December 2020 to 5.1% in December 2021, 5.5% in March 2022, 6.0% in June 2022, 6.6% in September 2022, and to 7.2% in October 2022.

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

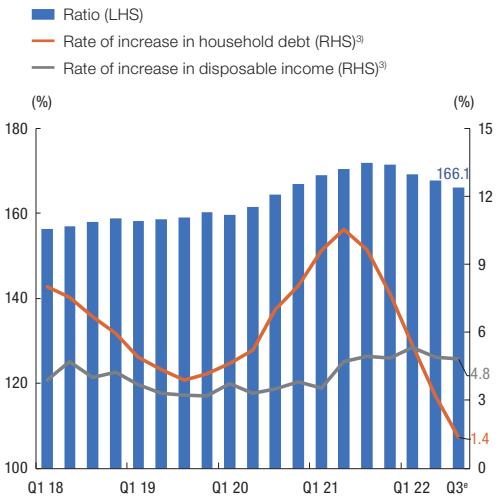


Notes: 1) Based on household credit statistics.
2) Non-bank deposit-taking institutions and others (excluding Korea Housing Finance Corporation, etc.).
Source: Bank of Korea.

Slight Improvement in Debt Service Capacity in Terms of Income, but Moderate Decrease in Terms of Assets

At the end of the third quarter of 2022, the household debt-to-disposable income ratio (based on household credit statistics) decreased by 3.1%p to 166.1% (estimated) from the end of the first quarter (169.2%). As the growth rate of household debt fell significantly below the growth rate of income, the debt repayment capacity at households improved slightly in terms of income. However, with the level of household debt remaining high, the surging interest burden due to rising loan interest rates, and the decline in lessors' ability to return leasehold deposits[7] are likely to have a significant impact on households' debt servicing capacities[8] (Figure I-8).

Figure Ⅰ-8. Household debt[1]-to-disposable income[2] ratio

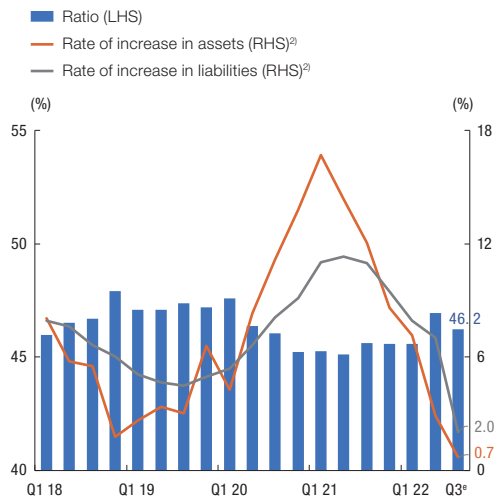


Notes: 1) Based on household credit statistics.
2) Disposable incomes for Q3 2022 are estimated using the average of the household disposable income-to-gross national income ratios for the immediately preceding three years.
3) Year-on-year basis.
Source: Bank of Korea.

Meanwhile, the financial liabilities-to-financial assets ratio (based on flow of funds statistics) rose slightly to 46.2% (estimated) at the end of the third quarter of 2022, edging up from 45.6% in the first quarter. This is because, despite the slow growth of financial liabilities (8.0% at the end of the first quarter → 2.0% at the end of the third quarter, YoY), financial assets grew at a slower pace due to a decrease in stock valuation[9] (7.2% → 0.7%) (Figure I-9).

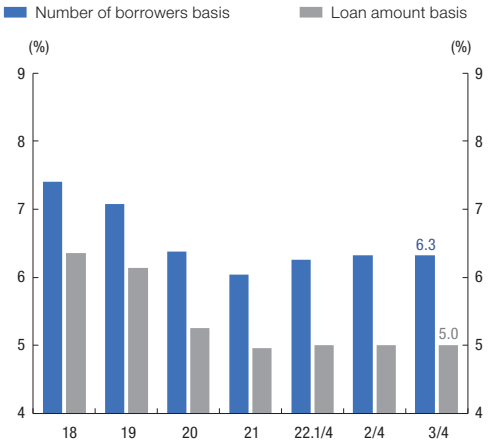
7) For details, refer to Box 1 "Impact of Recent Changes in Housing Rental Market Conditions on Household Debt Soundness."
8) For details, refer to Analysis of Financial Stability Issues Ⅰ "Impact of the Accelerated Monetary Policy."
9) Although deposits increased along with deposit interest rates, the stock market was significantly depressed as the KOSPI fell to 2,155 at the end of the third quarter of 2022, its lowest point in the year, due to the tight monetary policy in advanced economies and concern over a global economic downturn.

Figure Ⅰ-9. Financial liabilities-to-financial assets ratio[1)]



Notes: 1) Based on flow of funds statistics (estimated figure for Q3 2022).
2) Year-on-year basis.
Source: Bank of Korea.

Figure Ⅰ-10. Proportion of vulnerable borrowers



Source: Bank of Korea, Consumer Credit Panel.

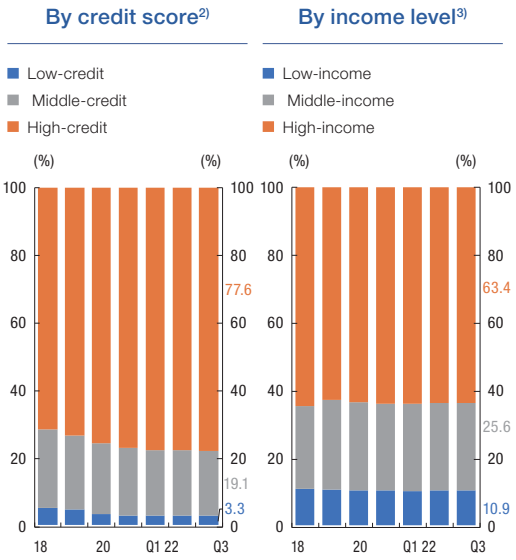
No Change in the Share of Vulnerable Borrowers

The share of borrowers with comparatively low debt repayment capacities among total household borrowers remained at a level similar to the one at the end of the first quarter. The number of borrowers with low income (bottom 30%) or low credit (credit scores of 664 or below)[10)] who also hold multiple household loans accounted for 6.3% of all borrowers at the end of the third quarter of 2022. In terms of loan value, the share of vulnerable borrowers was 5.0%, showing no change from the end of the first quarter (Figure I-10).

By borrower profile (based on loan amount), the proportion of borrowers with a high credit rating increased steadily, and the proportion of high-income borrowers declined slightly. At the end of the third quarter of 2022, the proportion of borrowers with a high credit rating stood at 77.6%, marking an increase of 0.2%p from the end of the first quarter, while the proportion of high-income borrowers reached 63.4%, showing a decline of 0.2%p from the end of the first quarter (Figure I-11).

10) In 2021, the rating system for consumer creditworthiness was changed from a grade-based system to a score-based one. 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, middle; and scores below 664, low. The share of potential vulnerable borrowers who are approaching vulnerable borrower status (borrowers with multiple loans and middle income or middle credit scores / borrowers with two loans and low income or low credit scores) was 16.8% at the end of the third quarter of 2022.

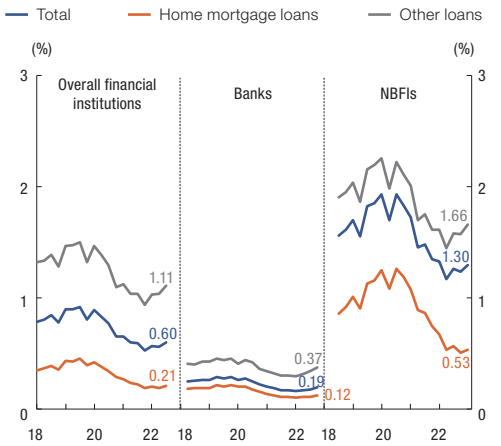
Figure Ⅰ-11. Share[1] of household loans, by borrower credit score and income level



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, Consumer Credit Panel.

Figure Ⅰ-12. Delinquency rates[1] of household loans extended by banks and NBFIs[2][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 companies, credit-specialized financial companies, etc.
3) Excluding insurance contract loans for insurance companies.

Sources: Financial institutions' business reports.

The household loan delinquency rate has remained low at both banks and NBFIs. At the end of the third quarter of 2022, however, the delinquency rate of household loans issued by banks and NBFIs was 0.19% and 1.30%, respectively, up by 0.03%p and 0.04%p from the first quarter (Figure I-12).

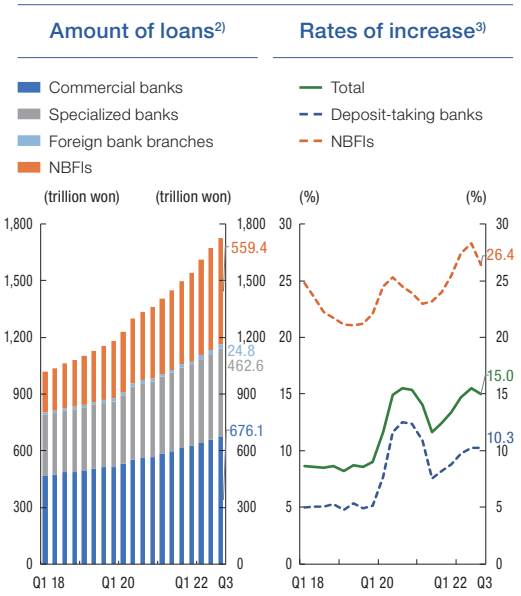
3. Corporate Credit

Continued Increase in Corporate Credit Growth

At the end of the third quarter of 2022, corporate loans from financial institutions stood at KRW 1,722.9 trillion, recording an increase of 15.0% YoY. Corporate loans continued to show a high growth rate, despite the higher interest rates, driven mainly by the deterioration of conditions for the issuance of corporate bonds and CP amid uncertainty in the capital market and surging demand for funds caused by the rising exchange rate and raw material prices. In addition, loans issued to self-employed business owners showed a high annual growth rate of over 14%.[11)]

In the financial sector, both banks and NBFIs showed high growth. At the end of the third quarter of 2022, corporate loans from banks reached KRW 1,163.5 trillion (commercial banks KRW 676.1 trillion, special banks KRW 462.6 trillion), showing an increase of 10.3% (commercial banks 9.9%, special banks 9.3%) compared to the same period of the previous year. Corporate loans from NBFIs[12)] amounted to KRW 559.4 trillion,[13)] increasing by 26.4% YoY, led by savings banks (34.9%) (Figure I-13).

Figure I-13. Corporate loans of financial institutions[1)]



Notes: 1) Deposit-taking banks include commercial banks, specialized banks, and foreign bank branches. NBFIs include mutual savings banks, mutual credit cooperatives, insurance companies, and credit-specialized financial companies.
2) End-period basis. Excluding financial and insurance companies.
3) Year-on-year basis.

Sources: Financial institutions' business reports.

By company size,[14)] loans to both large enterprises and to small and medium-sized enterprises (SMEs) showed a high rate of growth. Loans to large enterprises (KRW 239.2 trillion, up 14.8% YoY) rose steeply amid the continued demand for working capital and depressed corporate bond market. Loans to small and medium-sized enterprises (KRW 1,480.4 trillion, 15.0%) continued their rapid

11) For details, refer to Box 2 "Estimation of Default Risk of Loans Issued to SEBOs and Implications."

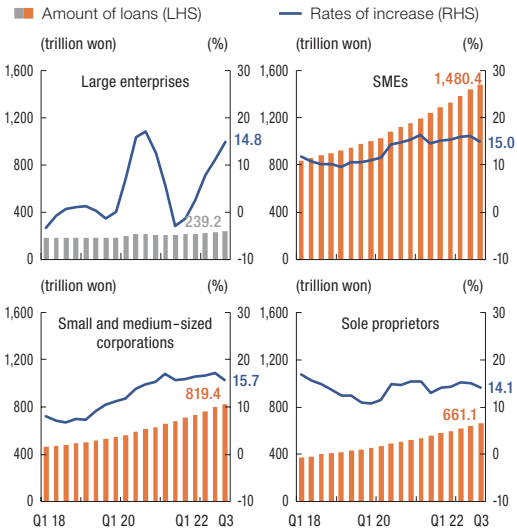
12) The data for NBFIs are based on mutual savings banks, mutual credit cooperatives (Nonghyup, Suhyup, Forestry Cooperatives, Sinhyup, and MG Community Credit Cooperatives), insurance companies (life insurance companies and general insurance companies), and credit-specialized financial companies. However,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

13) In the business sector, mutual credit cooperatives accounted for KRW 328.9 trillion (58.8% of corporate loans offered by NBFIs), followed by insurance companies at KRW 100.4 trillion (17.9%), credit-specialized financial companies at KRW 71.1 trillion (12.7%), and savings banks at KRW 59.1 trillion (10.6%).

14) In the analysis of loans by company size, some loans from NBFIs that do not differentiate by company size were excluded due to data limitations.

growth trend, driven by demand for working capital, amid the continuation of financial support related to COVID-19 (SMEs KRW 819.4 trillion, 15.7%; sole proprietors KRW 661.1 trillion, 14.1%) (Figure I-14).

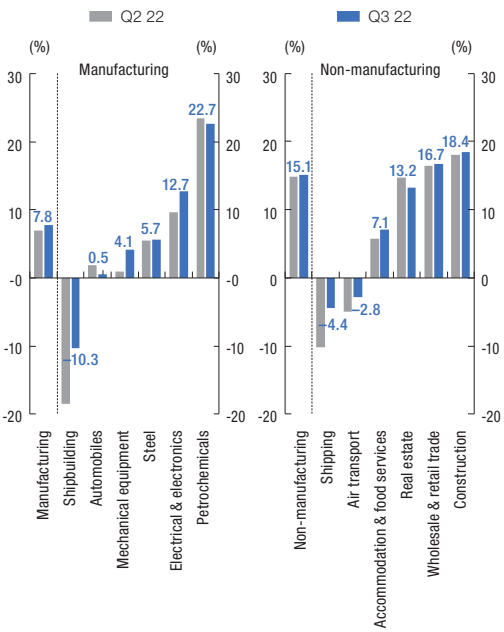
Figure I-14. Corporate loans,[1)2)3)] by company size



Notes: 1) Based on sum of banks and NBFIs.
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.
Sources: Financial institutions' business reports.

By industry,[15)] manufacturing showed a high rate of increase in loans, mainly in petrochemicals, while in the non-manufacturing sector, the increase was concentrated on wholesale and retail, construction, and real estate[16)] (Figure I-15).

Figure I-15. Growth rates[1)] of financial institution corporate loans,[2)] by industry

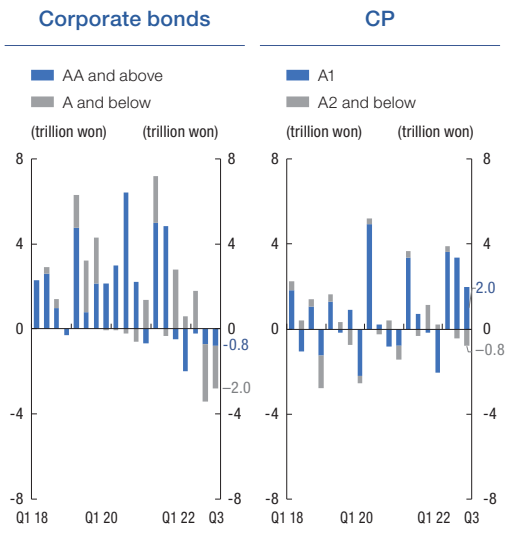


Notes: 1) Year-on-year basis.
2) Sum of banks and some NBFIs that can be classified by industry basis.
Sources: Financial institutions' business reports.

In the direct financial market, corporate bonds recorded a net redemption because of the persistent sluggishness in issuance, with an increase in the issuance of bank and KEPCO bonds crowding out demand for corporate credit bonds, as well as due to the contraction of investment sentiment amid elevated market vigilance (Figure I-16). CP recorded a net issuance, led mostly by prime bonds, with the magnitude of issuance declining.

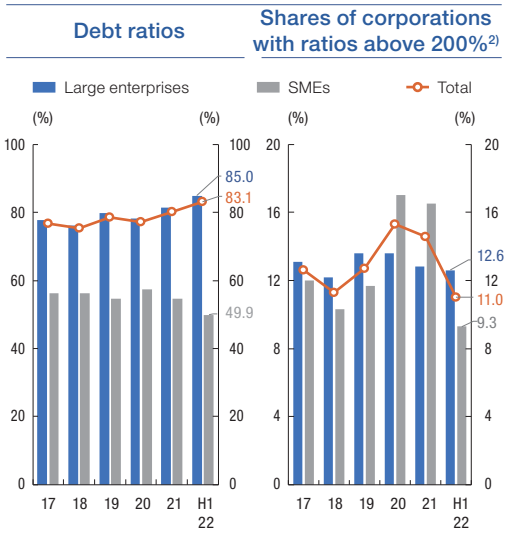
15) Corporate loans from some NBFIs were excluded from the analysis because they were not classified by industry.
16) With the rise in exchange rates and raw material prices, working capital loans increased significantly in most industries, particularly for large exporting enterprises in the petrochemicals and electrical and electronics industries, and the construction industry. Meanwhile, in the real estate industry, both facility loans and working capital loans continue to grow at a high rate, but the growth rate has slowed slightly due to the slowdown in the industry.

Figure Ⅰ-16. Corporate bond and commercial paper (CP) issuance[1)]



Note: 1) Excluding issuance by financial holding companies and special purpose companies (SPCs). Net-issuance basis.
Sources: Bank of Korea, Korea Securities Depository, Korea Credit Information Services.

Figure Ⅰ-17. Corporate debt ratios,[1)] by company size



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

Increase in the Debt Ratio

The corporate debt ratio[17)] (debt / equity) was 83.1% at the end of the second quarter of 2022, showing an increase compared to the end of 2021 (80.1%), led by large companies.[18)] However, the proportion of companies with a debt ratio exceeding 200% (excessively-indebted firms) fell significantly from 14.6% at the end of the previous year to 11.0%, driven by small and medium-sized enterprises (SMEs)[19)] (Figure I-17).

Maintaining High Growth Potential and Profitability

The sales growth rate of companies (compared to the same period of the previous year) was 23.3% during the first half of 2022, continuing its upward trend following a rise in 2021 (18.9%). Excluding real estate, sales in most industries rose compared to the previous year, with relatively large increases in the shipping, airline, and petrochemicals industries. By company size, large enterprises showed an increase in sales growth rate (19.1% in 2021 → 23.6% in the first half of 2022), while small

17) Based on 2,238 firms (1,185 large enterprises, 1,053 SMEs), including listed companies that had to file a business report at the end of the second quarter of 2022 pursuant to the Financial Investment Services and Capital Markets Act, and some unlisted companies (excluding 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 based on large samples that include firms subject to external audits.

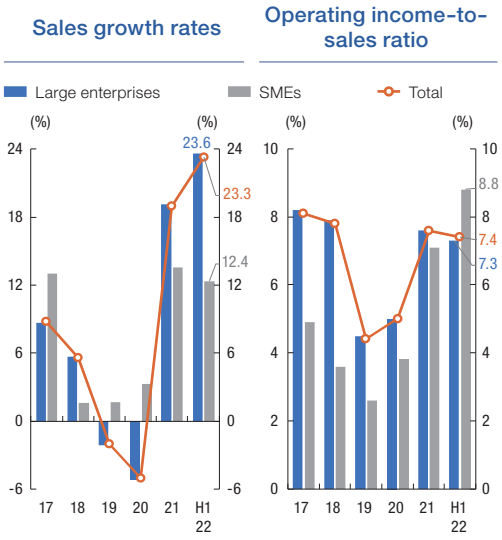
18) By company size, large enterprises (81.5%, end of 2021 → 85.0%, end of June 2022) showed an increase, while SMEs (54.6% → 49.9%) showed a decline.

19) When looking at the proportion of excessively-indebted firms by company size, both large enterprises (12.8%, end of 2021 → 12.6%, end of June 2022) and SMEs (16.5% → 9.3%) showed a decline.

and medium-sized enterprises showed a slight moderation (13.6% → 12.4%).

In the first half of 2022, the operating income-to-sales ratio (operating income / sales), which indicates the profitability of a company, edged down (7.6% in 2021 → 7.4% in the first half of 2022) as the rate of increase in sales exceeded that of operating income. By company size, large enterprises recorded a slight decline (7.6% → 7.3%), while small and medium-sized enterprises saw an increase (7.1% → 8.8%) (Figure I-18).

Figure I-18. Sales growth rate[1] and operating income-to-sales ratio,[2] by company size



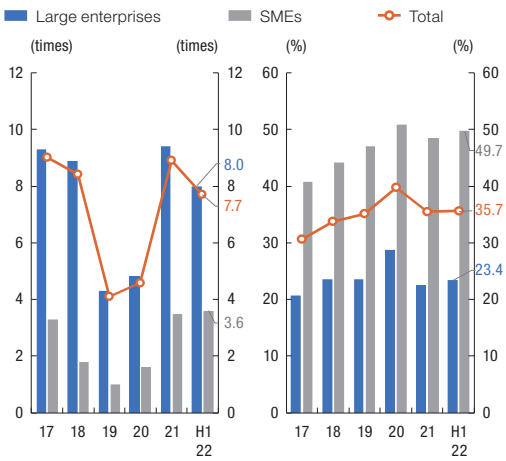
Notes: 1) Year-on-year basis.
2) Operating income/sales.
Source: KIS-Value.

Decline in the Interest Coverage Ratio

The interest coverage ratio[20] (operating income / total interest expenses), which indicates a company's ability to make interest payments, was 7.7 in the first half of 2022, showing a significant drop from 8.9 in 2021, as interest expenses increased rapidly amid higher interest rates.[21] By company size, large enterprises showed a remarkable decrease in their interest coverage ratio (9.3 in 2021 → 8.0 in the first half of 2022), while the ratio among small and medium-sized enterprises remained at a level similar to that in the previous year (3.5 → 3.6).

The proportion of companies with an interest coverage ratio of less than 1 edged up from 35.5% in 2021 to 35.7% in the first half of 2022. By company size, both large enterprises (22.5%, end of 2021 → 23.4%, first half of 2022) and SMEs (48.4% → 49.7%) showed an increase from the previous year (Figure I-19).

Figure I-19. Corporate interest coverage ratios,[1] by company size



Notes: 1) Operating income/total interest expenses.
2) Including corporations recording operating losses.
Source: KIS-Value.

20) When calculating the interest coverage ratio, the numerator is operating income, and the denominator is total interest expenses, including interest on bonds.

21) The interest coverage ratio declined significantly, driven mainly by shipbuilding (-9.9), food and accommodations (-0.8), and real estate (3.3), which had sluggish operating performances.

Meanwhile, while corporate loans from financial institutions have increased significantly, the conditions for corporate fundraising have gradually deteriorated amid rising loan interest rates and funding difficulties in the direct financial market. Moreover, as defaults on real estate corporate finance may expand amid the slowing of the real estate market, related potential risks and spillovers need to be closely monitored.[22)]

22) For details, refer to Analysis of Financial Stability Issues Ⅱ "Evaluation of Potential Risks of Real Estate Corporate Finance in Korea"

Box 1.

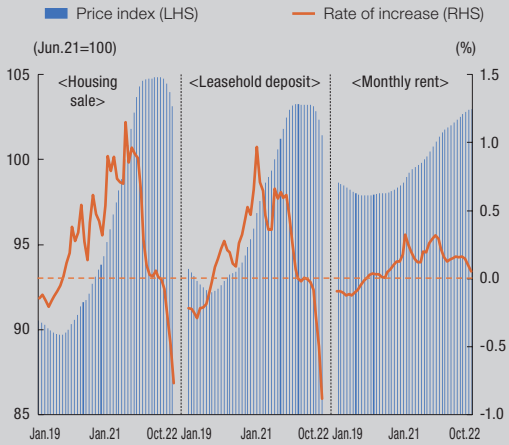
Impact of Recent Changes in Housing Rental Market Conditions on Household Debt Soundness[1)]

The rate of increase in leasehold deposit (jeonse) prices slowed significantly from the fourth quarter of 2021, following the rise in loan interest rates, with prices shifting to a decline from June 2022 and the rate of decline increasing. On the other hand, monthly rental prices continued rising as demand for leasehold deposits shifted to monthly rents, driving change in the housing rental market. Hereunder, with a focus on the leasehold deposit and monthly rent markets, is an examination of housing market conditions and the impact of recent changes in such conditions on a landlord's ability to return the leasehold deposit to the tenant and on the soundness of household debt.

Recent Housing Rental Market Conditions

When housing purchase sentiment shrank in Korea due to moderating expectations for increasing housing prices, demand for housing purchases tended to shift to demand for leasehold deposits, leading to a rise in leasehold deposit prices, despite the decline in housing prices.[2)] However, recently in the housing market, both leasehold deposit prices and housing purchase prices have been falling, while monthly rental prices have been rising. In particular, as loan interest rates increase steeply and as the burden of interest surges, demand for monthly rent housing is increasing, instead of demand for leasehold deposit housing that requires a large leasehold deposit.[3)]

Indices and increase rates[1)] of nationwide housing sale, leasehold deposit and monthly rental[2)] prices



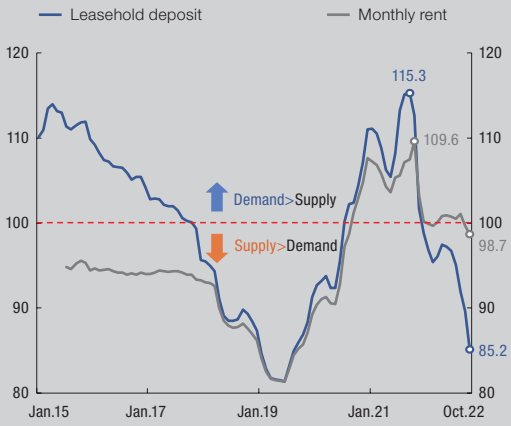
Notes: 1) Compared to previous months.
2) Includes quasi-leasehold deposit, which is the case where both deposit and monthly rent are paid.
Source: Korea Real Estate Board.

As a result, the leasehold deposit supply-demand index, which indicates the demand for against supply of leasehold deposits, transitioned to a supply superiority trend after December 2021, and this trend has recently been intensified with the leasehold deposit supply-demand

1) This article was authored by Lee Ju-yeon, Yoo Hyun-joo, Kwak Seung-joo (Financial Stability Department) and was reviewed by Lim Kwang-kyu (head of the Financial Stability Planning & Coordination Team), and by Lim Hyun-joon (head of the Inflation Analysis Team).
2) For example, from 2012 to 2013, when the housing purchase market contracted, housing prices fell by 1.4%, while leasehold deposit prices rose by 5.8%.
3) In the Seoul metropolitan area, including Gyeonggi-do and some other regions, an increase in the supply of new apartments put downward pressure on leasehold deposit prices.

index falling far below that of monthly rent.[4] During the period of January through September 2022, the proportion held by leasehold deposits of the total of both leasehold deposits and monthly rent transactions dropped to 48.2%, down 8.3%p from 2021.

Supply-demand indices[1] of nationwide leasehold deposit and monthly rent



Note: 1) Ranges from 0 (supply superiority) to 200 (demand superiority).
Source: Korea Real Estate Board.

Proportion held by leasehold deposit of nationwide total leasehold deposit and monthly rental transactions[1]

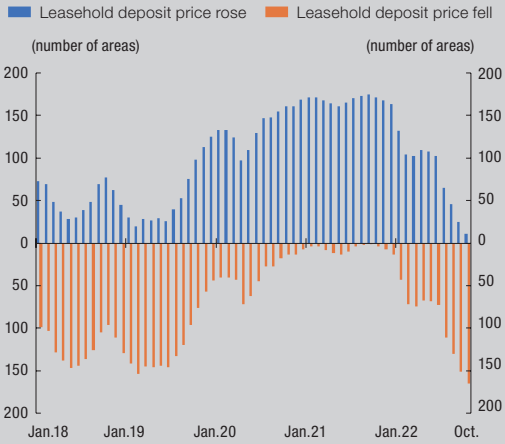
(%)

2014	2015	2016	2017	2018	2019	2020	2021	2022
61.2	57.8	56.7	57.5	59.5	59.9	59.5	56.5	48.2

Note: 1) Based on annual transaction volumes (sum of transactions from January to September for 2022).
Source: Ministry of Land, Infrastructure and Transport.

As for leasehold deposit price fluctuations by region (over the previous month), among 176 administrative divisions (cities, counties, and districts),[5] leasehold deposit prices declined in only four areas in October 2021. In October 2022, however, prices fell in 165 areas, indicating that the decline is spreading nationwide.

Number of administrative divisions where leasehold deposit price rose or fell[1] at each time point



Note: 1) Among 176 administrative divisions (cities, counties and districts), each area is classified by whether leasehold deposit price has risen or fallen compared to previous months, based on leasehold deposit price index.
Source: Korea Real Estate Board.

Impact of Changes in Housing Rental Market Conditions

The recent decline in leasehold deposit prices represents some adjustment of such prices, which had risen excessively, and is having a positive effect on the stability of the housing market through various channels, such as the reduced burden of raising large leasehold deposits by tenants with real demand and reduced incentives for “gap investment.” On the other hand, the sharp fall in leasehold deposit prices over a short period of time increases the burden on a landlord’s requirement to return the leasehold deposit to the tenant.

4) Since November 2021 the monthly rent supply-demand index has been above the leasehold deposit supply-demand index, marking the first time it has been so since July 2015, when such statistics first became available.
5) The leasehold deposit price index for the most subdivided administrative divisions available by city and province from the “National Survey of House Price Trends” of the Korea Real Estate Board was used.

Using the 2021 Survey of Household Finances and Living Conditions, a landlord household's ability to return the leasehold deposit was analyzed through various scenarios of declining leasehold deposit prices. First, about 80% of all landlord households is estimated to be affected by the declining leasehold deposit prices.[6] If the decline in leasehold deposit prices continues, landlords will be required to return the difference in the leasehold deposit to the tenant by raising funds through the sale of financial assets or through borrowing from a financial institution. It is thus assessed that some landlord households may have difficulty in returning the leasehold deposits.[7] For example, if leasehold deposit prices were to decline by 10%,[8] 85.1% of landlord households would need to raise the funds needed to cover the difference through the sale of financial assets, followed by 11.2% of landlord households that would do so by both the sale of financial assets and by borrowing from a financial institution. The remaining 3.7%, however, would be unable to raise sufficient funds, not even through both the sale of financial assets and borrowing. The average shortfall of these landlord households is estimated to be about KRW 30 million per household.

6) Among landlord households with leasehold deposit liabilities (about 1.187 million households in total), the households to be affected, for the time being, by the decline of leasehold deposit prices include: households whose leasehold deposits have risen significantly since 2017, i.e., leasehold deposits rose by over 5% from 2019 to 2021 (not subject to the "Housing Lease Protection Act" and "Act on Report on Real Estate Transactions, etc.") and households whose leasehold deposits rose by over 5% from 2017 to 2019 but did not rise by over 5% from 2019 to 2021 (subject to the "Housing Lease Protection Act" and "Act on Report on Real Estate Transactions, etc.").

The landlord households affected by the decline of leasehold deposit prices[1]

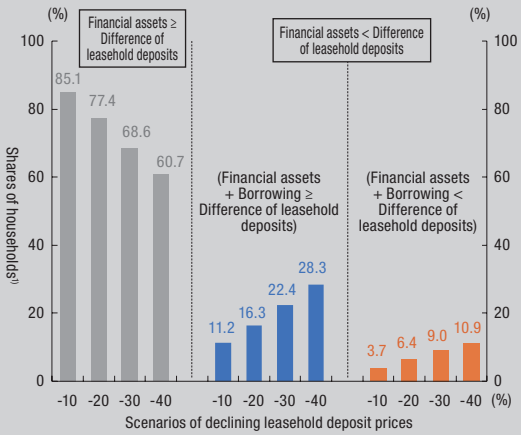
	Number of households(10,000 households)	Proportions in total number of landlord households(%)
Non-affected	24.1	20.3
Affected	94.6	79.7
Total landlord households	118.7	100.0

Notes: 1) Survey of Household Finances and Living Conditions in 2021 basis, based on landlord households with leasehold deposit liabilites.
Source: Bank of Korea staff calculation.

7) A landlord household's ability to return the difference in leasehold deposits (difference between current leasehold deposits minus leasehold deposits after a decline) through the sale of financial assets and borrowing was analyzed. It was assumed that the amount by which the difference in leasehold deposits exceed financial assets should be funded by borrowing from financial institutions, and that the maximum loan limit was estimated by applying restrictions on home mortgage loans for livelihood stabilization funds (LTV of 50%, [40% for owners of multiple homes], annual ceiling of up to KRW 200 million) and DSR rules on individual borrowers (DSR of 50% for loans of over KRW 100 million). Borrowing conditions may vary depending on the specific situation of a household according to the terms and conditions for home mortgage loans for livelihood stabilization funds, but such variations were not considered due to constraints of data availability.

8) Given that leasehold deposit prices rose by about 11% nationwide amid the COVID-19 pandemic from 2020 to 2021, it was assumed that leasehold deposit prices have returned to their pre-pandemic levels.

The landlord households' ability to return the difference of leasehold deposits by scenarios of declining leasehold deposit prices



Note: 1) Compared to total landlord households(about 1.187 million households).

Source: Bank of Korea staff calculation(Survey of Household Finances and Living Conditions).

Distribution and amount of shortfall by households

(%, KRW mil.)

	Scenarios of declining leasehold deposit prices			
	10%	20%	30%	40%
Less than KRW 20mil.	63.7	41.9	28.8	14.7
KRW 20~50mil.	21.9	28.1	26.3	27.9
KRW 50~100mil.	3.9	20.1	22.8	27.1
More than KRW 100mil.	10.5	9.9	22.1	30.4
Total	100.0	100.0	100.0	100.0
Average shortfall per household	30.44	54.54	76.42	103.25

Source: Bank of Korea staff calculation(Survey of Household Finances and Living Conditions).

In particular, as for "gap investments," where houses are purchased with the leasehold deposit for investment purposes, it is highly likely that the difference between purchase prices and leasehold deposit prices was small at the time of purchase. In the case of a downward adjustment in housing prices, housing prices may fall below leasehold deposit prices, suggesting that the risk of a landlord being unable to return the leasehold deposit to the tenant may increase.

Meanwhile, for tenants, demand for large loans to fund leasehold deposits has declined with the decrease in leasehold deposit prices, but higher loan interest rates mean there is an increased burden of interest payment for borrowers with existing leasehold deposit fund loans. Hence, as the cost of leasehold deposits exceeds the cost of monthly rent, demand to convert leasehold deposits to monthly rent is likely to rise. Higher monthly rental prices associated with the increase in demand for monthly rents will increase the burden of residential costs for existing tenants with monthly rents, undermining the financial soundness of households.

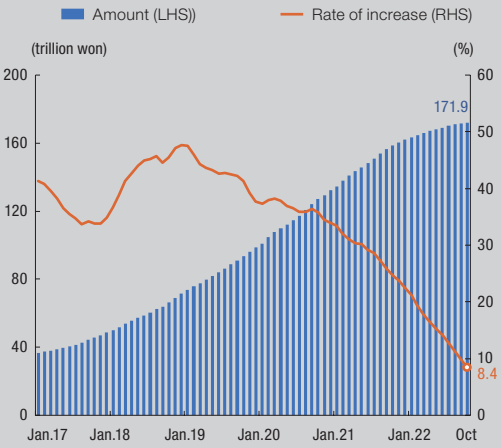
Impact on the Soundness of Household Debt

Relieving household debt accumulation

Recent changes in the housing rental market can moderate the accumulation of household debt by slowing the rate of increase in leasehold deposit fund loans, which had increased significantly along with the rise in leasehold deposit prices, and by prompting the repayment of existing leasehold deposit fund loans. Leasehold deposit fund loans increased rapidly by over 30% from 2017 to the first half of 2021, and with the higher loan interest rates, falling leasehold deposit prices, and transfer of demand for leasehold deposits to monthly rent, the rate of growth of leasehold deposit fund loans slowed significantly to 8.4% in October 2022. The rate of leasehold deposit fund loan repayment (except replacements) rebounded recently, which seems to show that loans are being repaid to an extent matching the decline in leasehold deposits as

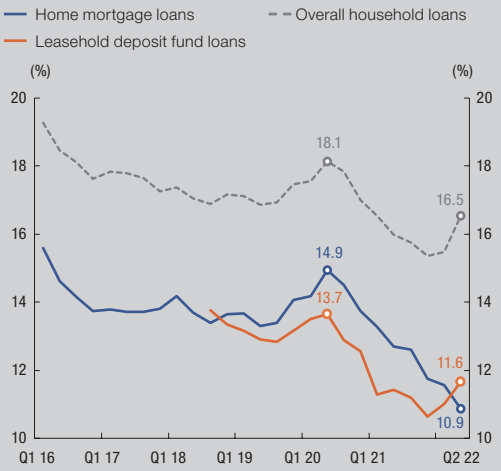
the prices fell, amid the stronger incentive for repayment according to the accumulating interest burden driven by the higher loan interest rates.

Amount and increase rate[1] of leasehold deposit fund loans[2]



Notes: 1) Year-on-year basis.
2) Extended by domestic banks using their own funds.
Source: Bank of Korea staff calculation.

Debt repayment rate[1] for existing leasehold deposit fund loans

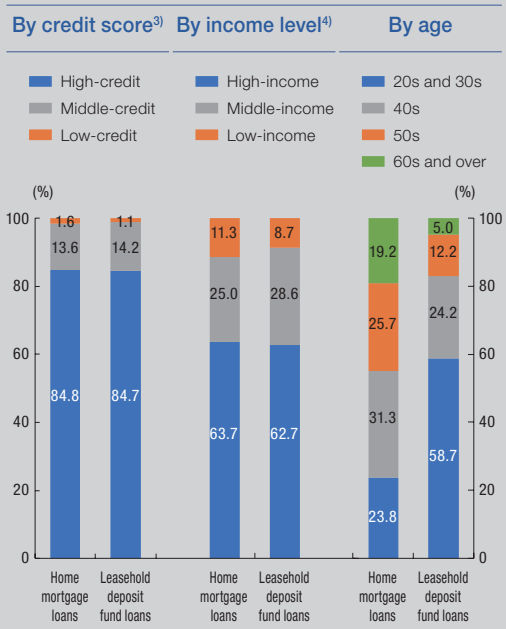


Note: 1) Ratio of annual repayment amount-to-loan amount from the same period of the previous year, by loan type (except replacements).
Source: Bank of Korea staff calculation (Consumer Credit Panel).

Assessment of soundness of leasehold deposit fund loans

As for the characteristics of borrowers of leasehold deposit fund loans, the share of high-credit and high-income borrowers stood at 84.7% and 62.7%, respectively, at the end of the third quarter of 2022, which are similar to those for borrowers of home mortgage loans, with the share of low-credit and low-income borrowers being somewhat lower for leasehold deposit fund loans. By the age of borrower, the share of young people in their 20s to 30s was 58.7%, more than double that of home mortgage loan borrowers (23.8%).

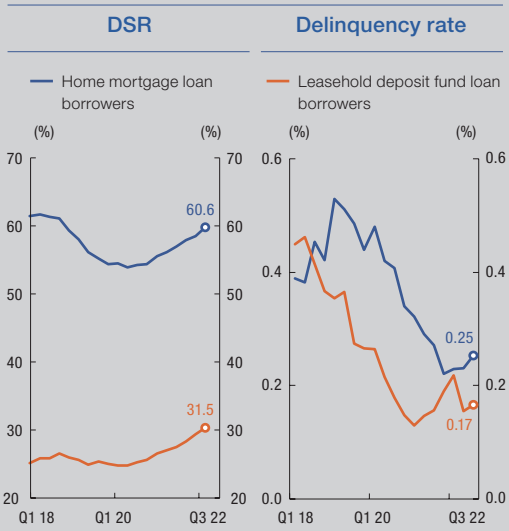
Shares[1][2] in leasehold deposit fund loan, by borrower type



Notes: 1) Loan amount basis.
2) As of the end of Q3 2022.
3) High-credit (scores greater than or equal to 840), middle-credit (scores 665-839), low-credit (scores less than or equal to 664).
4) High-income (top 30%), middle-income (30-70%), low-income (bottom 30%).
Source: Bank of Korea (Consumer Credit Panel).

The DSR was relatively low at 31.5% (60.6%[9] for borrowers of home mortgage loans), showing that debt repayment capacities are relatively favorable. The delinquency rate of leasehold deposit fund loans was lower than that of home mortgage loans and continued on a downward trend. During the COVID-19 pandemic, the amount of delinquent household loans did not rise much, and the delinquency rate declined, partly due to the fact that loan growth was driven by the increase in leasehold deposit fund loans.[10] Recently, however, due to the effect of higher loan interest rates, the delinquency rate of leasehold deposit fund loans, along with that of home mortgage loans, has moved upwards.

Debt service ratios (DSR) and delinquency rates of leasehold deposit fund loan borrowers



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

Most leasehold deposit fund loans, unlike home mortgage loans, are extended on a guarantee.[11] In the event of a breach of loan repayment obligations by landlords or tenants, loans can be repaid through subrogated payments by guarantee institutions. While financial institutions that extend loans can reduce their credit risk burden through guarantees, guarantee institutions take on the majority of credit risks. So far, the incidence of subrogation remains low relative to the supply of guarantees by guarantee institutions. Recently, however, subrogated payments have been increasing, owing to an uptick in defaults,

9) This is the DSR for individual borrowers, which is higher than the DSR calculated based on a household (which includes the income of all household members). In addition, the DSR level may fall if a borrower's actual burden of principal and interest repayment and future rental income are taken into consideration. For example, unlike the assumption made in the calculation of the DSR (for an unsecured loan, the principal is assumed to be paid annually through amortization), unsecured loans are often not repaid through amortization. Thus, if the principal repayment of these loans is excluded from the total principal and interest repayment, the actual DSR of a borrower will be lower. For details, please refer to the June 2021 Financial Stability Report, Analysis of Financial Stability Issues III "Assessment of Vulnerable Household Segments and Implications."

10) It should be noted that if the slower growth of household loans is supplemented by the growth of corporate loans, which carry higher credit risk, the soundness of loans at financial institutions may deteriorate.

11) As of the end of August 2022, 99.6% of leasehold deposit fund loans at domestic banks were being extended as loans secured by letters of guarantee.

as cases of landlords being unable to return the leasehold deposit due to the decline in leasehold deposit prices are rising.

Implications

As noted above, recent changes in the housing rental market have had a positive effect on the stability of the financial system through various channels, such as the alleviation of accumulated household debt. In particular, a tenant's burden to raise funds for a leasehold deposit has been alleviated, with increasing repayment of leasehold deposit fund loans by tenants as leasehold deposit prices have declined. On the other hand, the burden on landlords to return the leasehold deposit has risen, elevating liquidity and credit risks. Overall, a landlord's capacity to return the leasehold deposit is favorable, and any negative impact on the financial system stability is assessed to be not significant. However, such risks should be noted, as expectations of a decline in housing prices continue amid the trend of interest rate hikes.

In particular, in areas where leasehold deposit prices can decline significantly or for rented homes owned by "gap investors" or excessive borrowers, risks related to the repayment of leasehold deposits may surge. This may lead to an overall contraction in the housing market,[12] to a deterioration of the soundness of housing-related loans extended by financial institutions,[13] and to a rise in the risk of the guarantee institution not being able to guaranty the debt.

In this respect, the government has recently been preparing to ease regulations on home mortgage loans for livelihood stabilization funds needed to return leasehold deposits.[14] Meanwhile, considering the fact that some leasehold deposit fund loans that were used to fund "gap investments" have led to a rise in housing prices and elevated volatility in the housing market, ways in which different DSR regulations can be applied, depending on the purpose of the loan, may need to be devised.[15]

12) If more landlords want to sell houses due to difficulties in returning leasehold deposits, it may put downward pressure on housing prices.

13) For financial institutions, the credit risks of leasehold deposit fund loans are limited, but the quality of home mortgage loans owned by landlords experiencing difficulty to return leasehold deposits may deteriorate.

14) Through the revision of the Regulation on Supervision of Banking Business in early 2023, the government is preparing to abolish the loan limits specifically applied to home mortgage loans for livelihood stabilization funds, including those for the purpose of returning leasehold deposits for apartment units whose price exceeds KRW 1.5 billion in speculation and over-speculation zones. For details, see "FSC Introduces Revision to Supervisory Regulations to Ease Financing Burden of Homebuyers" (Financial Services Commission press release, November 10, 2022).

15) While it is necessary to continue supporting leasehold deposit fund loans in order to meet actual demand, including loans to the non-homeowner, and ensure residential stability, loans to homeowners, which are likely to be used for investment purposes, need to be extended based on a stringent assessment of the borrower's debt servicing capacity, among other factors.

Box 2.

Estimation of Default Risk of Loans Issued to SEBOs and Implications[1)]

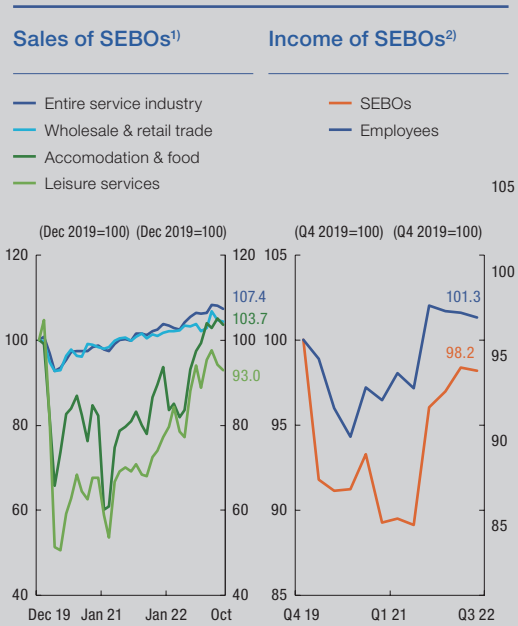
Since the COVID-19 pandemic, the income of self-employed business owners (SEBOs) has not recovered sufficiently, and loans issued to SEBOs[2)] are continuing to rise steadily despite higher loan interest rates. As a result, there is growing concern of potential defaults on accumulated loans extended to SEBOs whose repayment has been deferred.

Hereunder, based on microdata from the Consumer Credit Panel Database, among other sources, the trends and characteristics of the recent growth in loans to SEBOs and the size of any default risk on loans to SEBOs in relation to changes in economic and financial conditions are analyzed and policy implications are derived.

Status of SEBOs and Trends in Loans

Sales at SEBOs recovered quickly when life returned to normal after the withdrawal of measures that had been introduced to stem the spread of the coronavirus. Since September 2022, however, the recovery has stalled, and some services sectors, including leisure services, have not yet returned to their pre-pandemic sales levels.

In addition, with the surge in the loan interest burden due to interest rate hikes and rising operating costs associated with higher material prices,[3)] the burden of expenses has increased significantly, which is likely to constrain the income recovery of self-employed business owners.



Notes: 1) Index of services(real & seasonally adjusted).
2) Sum of business and wage income(real & seasonally adjusted).
Source: Bank of Korea staff calculation, Statistics Korea.

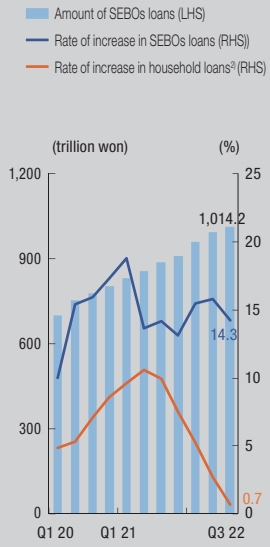
On the other hand, loans to SEBOs stood at KRW 1,014.2 trillion[4)] at the end of the third quar-

1) This article was authored by Kim Jae-young, and Hur Jung (Financial Stability Analysis Team) and was reviewed by Lee Dae-keon (head of the Financial Stability Analysis Team), and Cho Eun-a (Office of Economic Education).
2) Using the Consumer Credit Panel Database (panel data of about one million borrowers), the 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) Rate of increase in producer price index (year-on-year basis, %): 0.7 (2019) → 0.2 (2020) → 9.0 (2021) → 10.0 (June 2022) → 8.0 (September 2022) → 7.3 (October 2022).
4) Loans to SEBOs at the end of the third quarter of 2022 (KRW 1,014.2 trillion, 3.096 million borrowers) consist of sole proprietor loans (KRW 665.1 trillion) and household loans (KRW 349.0 trillion).

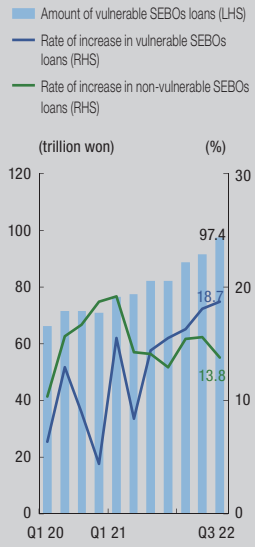
ter of 2022, and they have grown by 14.3% annually, despite a sharp increase in loan interest rates.

By type of borrower, the growth of loans to non-vulnerable borrowers (normal borrowers), who have dominated loans to SEBOs, has moderated somewhat since the second quarter of 2021, but the growth of loans to vulnerable borrowers[5] is increasing. During the third quarter of 2022, loans to vulnerable borrowers rose by 18.7% (year-on-year), well above the growth rate of loans to non-vulnerable borrowers (13.8%).

Amount and rate of increase[1] in SEBOs loans



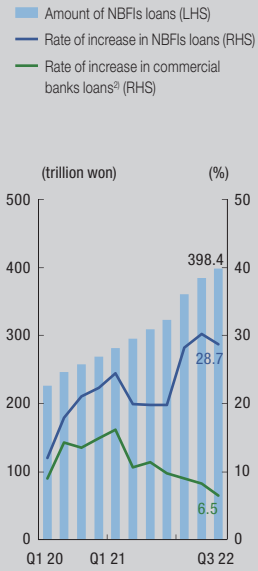
Amount and rate of increase[1] in SEBOs loans, by SEBOs type



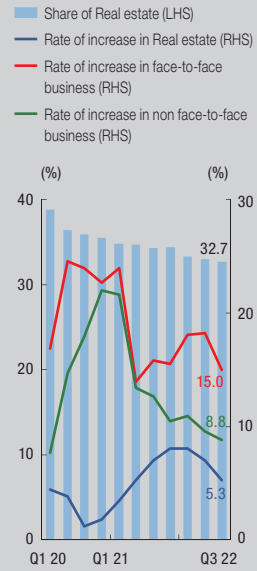
Notes: 1) Year on year basis.
2) Based on household credit statistics.
Source: Bank of Korea(Consumer Credit Panel, Household Credit Statistics).

By financial sector, loans extended to SEBOs by non-bank financial institutions with relatively high loan interest rates are increasing by a larger margin than those extended by banks.[6] During the third quarter of 2022, the growth rate of loans to SEBOs by non-bank financial institutions was 28.7% year-on-year, more than four times higher than that extended by banks (6.5%).

Amount and rate of increase[1] in SEBOs loans, by financial sector



Rate of increase and share[2] in SEBOs loans, by industry[3]



Notes: 1) Year on year basis.
2) Face-to-face business : Wholesale & retail trade, accomodation & food, personal services, leisure services.
non face-to-face business : manufacturing and the rest of the services except for the face-to-face services.
3) Percentage of loan balance for SEBOs with industry identified.
Source: Bank of Korea(Consumer Credit Panel).

By sector, the loan growth rate in consumer-facing business sectors (15.0%, third quarter of 2022) is relatively higher than that in other

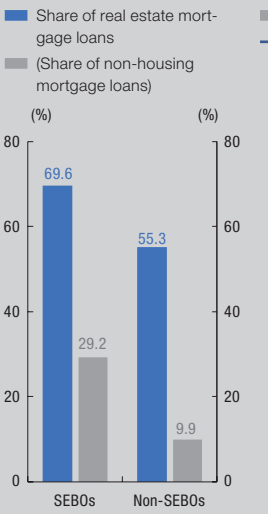
5) This refers to low-income, low-credit borrowers with multiple loans. Due to data constraints, this section estimates multiple loans based on the number of lenders and number of sole proprietor loan products.
6) The average interest rates on loans extended to SEBOs by the financial sector (based on the balance of household loans) at the end of the third quarter of 2022, estimated using the Consumer Credit Panel Database, were 3.6% for banks and 4.9% for non-bank financial institutions (4.5% for Nonghyup and Suhyup, 4.0% for the Korean Federation of Community Credit Cooperatives, 12.2% for savings banks, and 8.8% for credit-specialized financial companies).

sectors, but in terms of the share of loans, loans extended to businesses in the real estate sector still account for the largest share (32.7%).

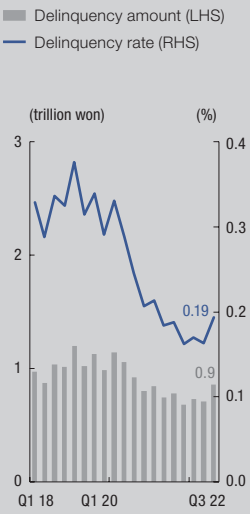
Meanwhile, in terms of collateral for loans to SEBOs, the share of real estate-collateralized loans (69.6%) is higher than that of loans issued to non-SEBOs (wage workers, etc., 55.3%). Among them, the share of non-housing real estate-collateralized loans (29.2%), which have relatively low marketability, is three times larger than the share of such loans extended to non-SEBOs (9.9%). Therefore, it is assessed that changes in the price of non-housing real estate, which is sensitive to the real economy, are likely to have a greater impact on the debt repayment capacities of self-employed business owners.

The delinquency rate of loans to SEBOs (based on loans to sole proprietors) remained low at 0.19% at the end of the third quarter of 2022, thanks to the government's active financial support measures. However, it has recently been rebounding due to the impact of higher loan interest rates.

Share[1)2)] of real estate mortgage loans



Delinquency rate[3)4)] of SEBOs loans



Notes: 1) End of Q3 2022 basis.
2) Compare to SEBOs(non-SEBOs) household loans amount.
3) Based on delinquencies of one month and longer.
4) Based on proprietor loans of Commercial banks.
Source: Bank of Korea(Consumer Credit Panel), financial institutions' business reports.

Trends and Characteristics of Default Risk of Loans to SEBOs

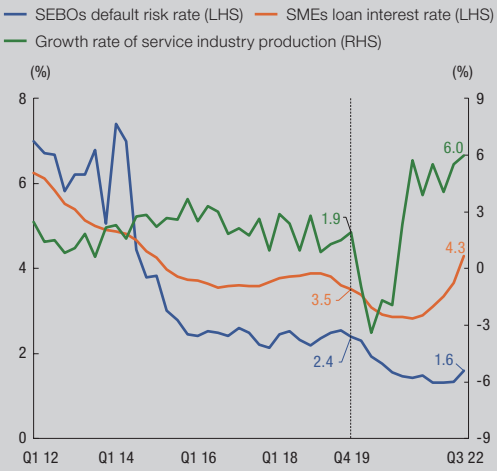
Here, to capture the broad default risk of loans extended to SEBOs,[7)] the balance of total loans held by borrowers whose loans have entered delinquency and borrowers who are registered as credit information management targets due to their failure to pay taxes, among other reasons, was classified as loans with a default risk, and the change in the share of such loans among the total amount of loans to SEBOs (hereinafter "default risk rate") was analyzed.

Regarding the default risk rate of SEBOs since

7) Considering that the delinquency rate index (based on delinquencies of one month and longer), which is usually used as an indicator of loan soundness, may not sufficiently reflect the credit risk of borrowers, and that self-employed business owners have a higher rate of multiple debts (70.7%, third quarter of 2022), meaning that the default of one specific account is likely to lead to defaults of other accounts, the balance of loans held by borrowers with high delinquency risk was set as loans with default risk.

2012, overall, it had an inversely proportional relationship with business conditions in the service sector before COVID-19 (2012 to 2019). After COVID-19, however, it fell, despite the business contraction in the service sector.[8] This is largely due to the active implementation of government financial support measures, such as the payment of loss compensation during COVID-19, maturity extensions for and deferment of principal and interest repayment, and interest rate reductions.

Trends of SEBOs default risk rate[1], service industry production[2], loan interest rate[3]

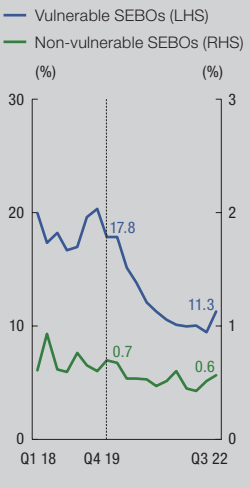


Notes: 1) Sum of commercial bank and NBFIs' SEBOs loan(NBFIs include insurance company, mutual credit cooperatives, credit-specialized financial companies, mutual savings banks). Available after 2012 due to data constraints.
2) Year on year basis.
3) SMEs loan interest rate(monthly average over the quarter, balance basis).

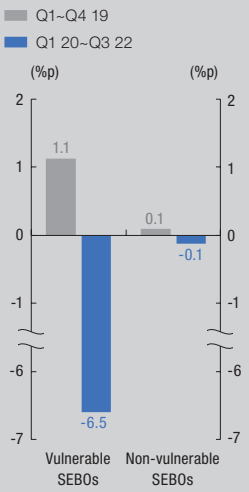
Source: Bank of Korea(Consumer Credit Panel), Statistics korea.

These characteristics were more prominent among vulnerable borrowers. While the default risk rate of vulnerable borrowers stood at 11.3% at the end of third quarter of 2022, down by 6.5%p from the pre-pandemic level (17.8%, end of 2019), the default risk rate of non-vulnerable borrowers was 0.6% during the same period, showing a decline of only 0.1%p.

Trends of SEBOs default risk rate, by SEBOs type



Changes in SEBOs default risk rate, by SEBOs type



Source: Bank of Korea(Consumer Credit Panel).

By financial sector, the default risk rate of non-bank financial institutions after COVID-19 fell by 1.5%p, exceeding the decline of the rate of banks (-0.6%p), and this was clearly observed for savings banks (-6.8%p) and credit-specialized financial companies (-2.3%p), which have a relatively higher proportion of vulnerable borrowers.[9]

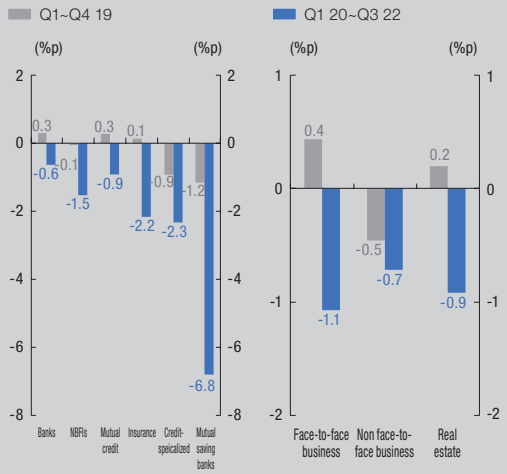
Moreover, by business sector, the decline (-1.1%p) of the default risk rate in consumer-facing business sectors, which were hit the hardest by the pandemic, was larger than that for

8) The correlation coefficient between the default risk rate of self-employed business owners and the production growth rate of the service industry was -0.31 (negative) from 2012 to 2019, but it was +0.33 (positive) in 2020, when the economy was hit by the shock of the pandemic.
9) At the end of the third quarter of 2022, the share of vulnerable borrowers among loans to SEBOs by financial sector (based on loan balance) was the highest for credit-specialized financial companies at 16.7%, followed by savings banks (15.3%), insurance companies (12.4%), mutual credit cooperatives (10.7%), and banks (8.1%).

non-consumer-facing business sectors (-0.7%p) owing to the effect of the government financial support measures. Meanwhile, the default risk rate in the real estate sector, which was not included in the industries subject to government financial support, dropped by a significant margin (-0.9%p), which seems to be attributable to the decline in interest rates and favorable business conditions of the real estate sector during the period of monetary easing.

Changes in SEBOs default risk rate, by financial sector

Changes in SEBOs default risk rate, by industry[1)]



Notes: 1) face-to-face business : Wholesale & retail trade, accomodation & food, personal services, leisure services.
non face-to-face business : manufacturing and the rest of the services except for the face-to-face services.

Source: Bank of Korea(Consumer Credit Panel).

Estimation of Default Risk of Loans to SEBOs

With rising interest rates on both existing and new loans, and the gradual dissipation of the effects of government financial support measures, such as loss compensation, unless the sales recovery among SEBOs improves, the default risk on loans to SEBOs may increase.

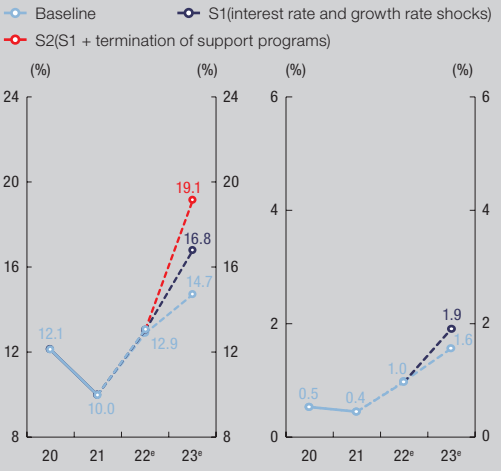
To estimate how much the default risk on loans to SEBOs might change with changes in the business conditions at SEBOs and policies, we estimated changes in the case of additional loan interest rate hikes (50bp in 2023, on average), slower growth of the service industry,[10)] and the disappearance of the effects of government financial support measures using the default risk rate model[11)] for SEBOs, which are influenced by the economy, interest rates, and policy effects.

The estimation results showed that the default risk rate of SEBOs will rise gradually with interest rate hikes. In addition to this, if the economic recession deepens, the default risk rate will increase at a higher rate. By type of borrower, in the event of both an interest rate and an economic growth rate shock, the default risk rate of non-vulnerable borrowers is estimated to rise to 1.9%, while that of vulnerable borrowers will increase to 16.8%. Furthermore, if the policy effects also disappear, the default risk rate of vulnerable borrowers will likely soar to 19.1%.

10) Considering the average rate of growth of the service industry in the past (2.0% from 2016 to 2019) and the chance that the economic growth rate (1.0%) may fall below the Bank of Korea's baseline (1.7%, based on the economic forecast made in November 2022), it was assumed that the production growth rate of the service industry in 2023 will be only 0.7%.

11) A linear regression model was set with the default risk rate of self-employed business owners as the dependent variable, and the service industry production index growth rate (year-on-year basis), the interest rate of loans to small and medium-sized enterprises (based on balance, monthly average during the period), the effect of the financial support policies, and the default risk rate of the previous period were used as explanatory variables. The estimation results are as follows.

Estimated path[1] of SEBOs default risk rate

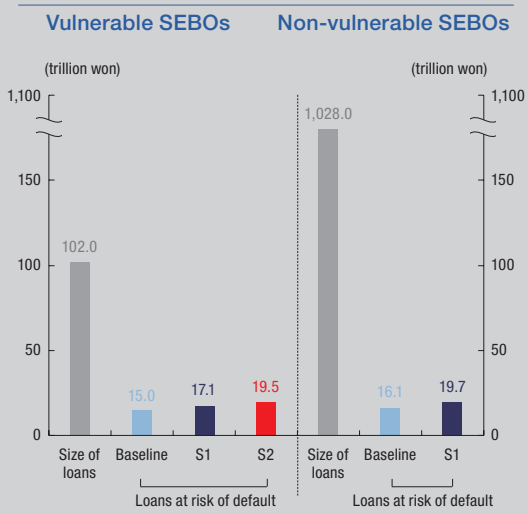


Notes: 1) baseline: Assumed SMEs loan interest rate is constant at the level of Q3 2022 and growth rate of service industry production is 1.2%(considered the average growth rate in 2016~2019 and BOK' economic growth forecast).
S1: Assumed interest rate increase 50bp amid of 2023 and growth rate of service industry production is 0.7%(considered the growth rate shock).
S2: S1 + Assumed the financial support policy effect disappear.

Source: Bank of Korea staff calculation.

borrowers. Furthermore, if the policy effects dissipate, too, the size of loans to vulnerable borrowers at risk of default will likely surge to KRW 19.5 trillion.

Estimated SEBOs loans[1] size at risk of default using default risk rate



Notes: 1) End of Q3 2022 Basis.

Source: Bank of Korea staff calculation.

In addition, if the size of loans to SEBOs at risk of default at the end of 2023 is estimated under the assumption that loans to SEBOs grow at the long-term average rate recorded before COVID-19 (11.5%, annual average growth rate from 2013 to 2019), the size of loans will be KRW 15.0 to 17.1 trillion for vulnerable borrowers and KRW 16.1 to 19.7 trillion for non-vulnerable

Implications

With the income base of SEBOs having not recovered sufficiently after COVID-19, loans to SEBOs classified as vulnerable borrowers and extended by non-bank financial institutions are causing a rapid increase in related risks. Although the soundness of loans to SEBOs

Model to estimate SEBOs default risk rate[1)2)3)]

Dependent variable	Independent variable					R-squared
Default risk rate	Default risk rate(t-1)	Growth rate of service industry production	SMEs loan interest rate	Financial support policy	Constant	
SEBOs	0.559***	-0.045	0.841**	0.020	-1.927**	0.907
(Vulnerable SEBOs)	0.532***	-0.226*	1.859***	-2.378***	2.270	0.952
(Non-vulnerable SEBOs)	0.598**	-0.019	0.470*	0.141	-1.383*	0.730

Notes: 1) ***, **, and * refer to significance levels of 1%, 5%, and 10%, respectively.
2) Anaylsis period was from the first quarter of 2012 to thrid quarter of 2022.
3) Financial support policy is a dummy variable which has 0 for the period before Covid-19 and 1 for the period after Covid-19(Q1 2020~Q3 2022).

remains favorable, defaults on loans to SEBOs classified as vulnerable borrowers could increase rapidly if the effects of government financial support dissipate gradually, with the upward trend of loan interest rates persisting and the pace of sales recovery slowing.[12)]

To prevent defaults on loans to SEBOs from undermining the stability of the financial system, debt restructuring for vulnerable borrowers with high default probability needs to be promoted.[13)] For normal borrowers, a phased rollback of government financial support and a conversion of bullet loans to amortized loans need to be implemented. Also, any excessive credit supply to real estate leasing industries, whose collateral value is expected to fall,[14)] should be suppressed in order to reduce default risks.[15)] Moreover, to prevent SEBOs with good viability from experiencing difficulty in securing funding due to the termination of government financial support, which has been delayed several times, careful policy consideration is necessary. Meanwhile, financial institutions need to expand their loan loss provisions in order to brace for the increase in defaults on loans to SEBOs and to preemptively boost their capital.

In addition to short-term funds support, the government needs to provide assistance for the digital transformation of business structure,16 so that SEBOs can secure competitiveness in tandem with the rapid changes underway in the business environment, and expand support for business closure and business conversion programs for businesses that cannot subsist.

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12) As vulnerable borrowers have weaker debt repayment capacities than non-vulnerable borrowers, and the share of loans secured by collateral and guarantees (79.0% for vulnerable borrowers, 82.3% for non-vulnerable borrowers, at the end of the third quarter of 2022) is also lower, the delinquency of loans issued to vulnerable borrowers is more likely to lead to losses at financial institutions.

13) The government will be operating a debt adjustment program (New Start Fund) with KRW 30 trillion for up to three years from October 4, 2022, for small business owners and self-employed business owners who were hit by the pandemic. So far, however, applications for debt adjustment have totaled only KRW 1.7 trillion (cumulative balance as of November 30). Hence, ways of relaxing the requirements for application or reducing the disadvantages for applicants need to be derived. For details about the New Start Fund, please refer to the press release from the Financial Services Commission (August 29, 2022) titled “New Start Fund for small merchants and self-employed business owners hit by COVID-10 to be launched.”

14) Regarding the LTI (loan-to-income) ratio of self-employed business owners at the end of the third quarter of 2022 by industry, the LTI for real estate leasing industries stood at 403.2%, higher than the LTI for all industries (350.0%), indicating that, in the event of a decline in collateral value, default is more likely.

15) Self-employed business owners who recovered income need to be encouraged to repay their loans voluntarily, and borrowers without the possibility of rehabilitation need to be offered debt adjustments, thereby shifting the focus of support policy for self-employed business owners from liquidity support to debt adjustment support. For details, please see Issue 4 “Growth of Loans Issued to Self-employed Business Owners After COVID-19 and Assessment of Debt Repayment Risks” in the Financial Stability Report released in June 2022.

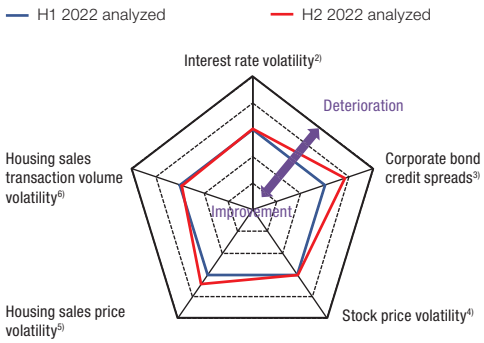
16) The IMF assessed that digitally-enabled firms faced a 4%p smaller decline in sales during the pandemic compared to digitally-constrained firms. For details, please see “Digitalization and Resilience: Firm-level Evidence During the COVID-19 Pandemic” (IMF Working Paper, February 2022).

Ⅱ. Asset Markets

In the asset markets, the volatility of price variables remained high amid the policy rate hikes, the change in expectations regarding the monetary policies in major economies, and uncertainty surrounding the domestic PF-ABCP market. Korea Treasury Bond (KTB) yields rose and the corporate bonds credit spread widened significantly while stock prices fluctuated sharply.

The decline in housing prices since June this year accelerated in both the Seoul metropolitan area and in other regions. Amid the depressed sentiment for housing purchases due to the higher interest rates, the volume of unsold housing units rose significantly compared to the end of the first quarter (Figure II-1).

Figure Ⅱ-1. Map of changes in asset market conditions[1)]



Notes: 1) Extents of change in Jun-November 2022 period (Jun-October 2022 period for housing sales price and housing sales volume) compared to December 2021-May 2022 period indexed.
2) Daily volatility of Treasury bond yield (3-yr) calculated using exponential weighted moving average (EWMA) method.
3) Corporate bond yield (A-) - Treasury bond yield (3-yr), with its extent of change as of end-November 2022 compared to end-May 2022 indexed.
4) V-KOSPI basis.
5) Standardized monthly housing sales price index (housing sale price index for the month/standard deviation of housing sale price index for overall period)
6) The same as the method of calculating indexed monthly volatility of housing sales price.

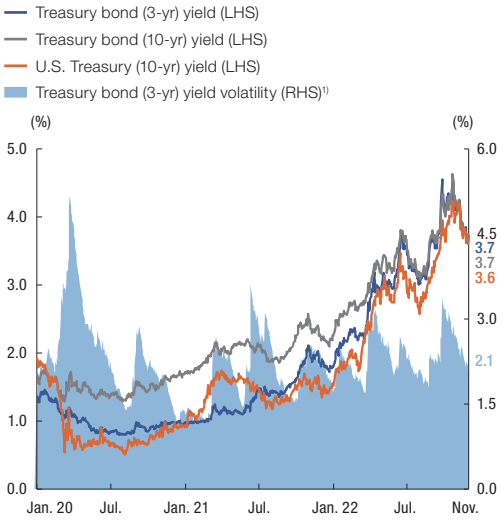
Source: Bank of Korea.

1. Bond Markets

Stabilization of Long-Term Market Interest Rates after a Sharp Rise

KTB yields rose sharply, displaying high volatility amid the policy rate hikes (four times, of a total of 150bp), expectations regarding stronger monetary policy tightening in advanced economies, and uncertainty in financial markets at home and abroad, though they stabilized at a lower level since late October. After July, the KTB yields fell due to concern over a global economic recession and expectations of a pivot in the interest rate hikes in major economies. However, due to stronger expectations of Fed tightening after the Jackson Hole Economic Policy Symposium at the end of August, the release of the FOMC results in September, the sharp rise in the KRW/USD exchange rate, and unrest in U.K. financial markets, KTB yields increased significantly, reaching their highest level of the year in late September (3-year bonds, 4.55%, September 26). In October, volatility increased again due to uncertainty in the PF-ABCP market. Afterwards, however, KTB yields fell significantly thanks to market stabilization measures implemented by the government and by the Bank of Korea, to a decline in the KRW/USD exchange rate, to a lower-than-expected U.S. CPI for October, and thanks to expectations of slower tightening in major economies (Figure II-2).

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

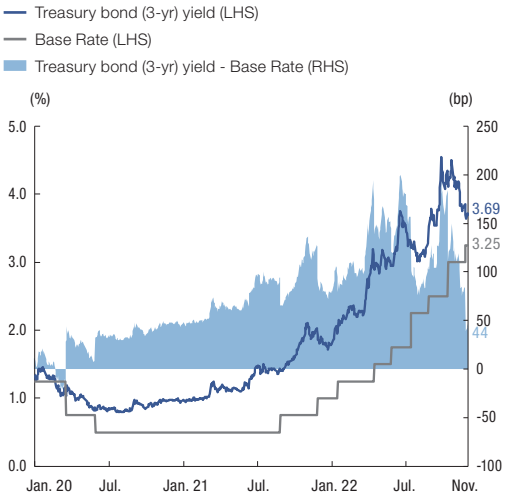


Note: 1) Daily volatility calculated using exponential weighted moving average (EWMA) method.

Sources: Korea Financial Investment Association, Bloomberg.

During the second half of the year, the difference between the short-term and long-term interest rates (3-year government bond yield, base interest rate) increased significantly and then narrowed rapidly after October as KTB yields declined, despite the base interest rate hike (Figure II-3).

Figure Ⅱ-3. Base Rate and Treasury bond yield



Source: Bank of Korea, Korea Financial Investment Association.

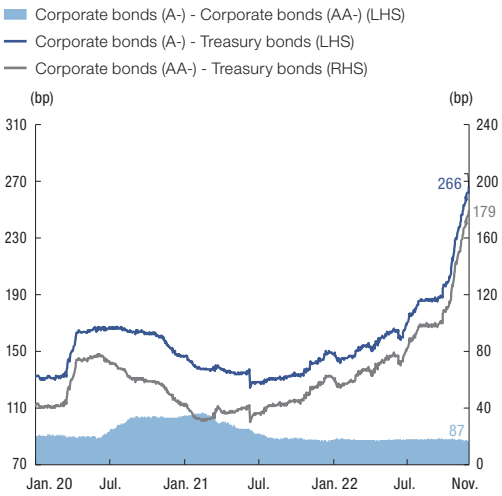
Significant Expansion in the Credit Spread of Corporate Bonds

The credit spreads on corporate bonds widened significantly for both prime bonds and subprime bonds, as market vigilance climbed due to the shrinking of investment demand in response to the higher interest rates in the second half of the year, to the crowding-out effect of the massive issuance of KEPCO and bank bonds,[1] and due to unrest in the ABCP market.[2] However, the spread between credit ratings (AA- and A-based) did not change significantly, as the credit spread between prime bonds and subprime bonds rose by a similar margin (Figure II-4).

1) Bank bonds continued to record a net issuance by a large margin, and in October, with the inflow of time deposits and postponement of the normalization of the LCR deregulatory measure, net issuance shrank (July 2022, KRW 7.1 trillion → August, KRW 1.0 trillion → September, KRW 7.5 trillion → October, KRW 0.3 trillion → November, KRW -3.2 trillion). On the other hand, KEPCO bonds continued to record a large net issuance until recently (July 2022, KRW 1.5 trillion → August, KRW 2.1 trillion → September, KRW 2.9 trillion → October KRW, 1.9 trillion → November, KRW 3.4 trillion).

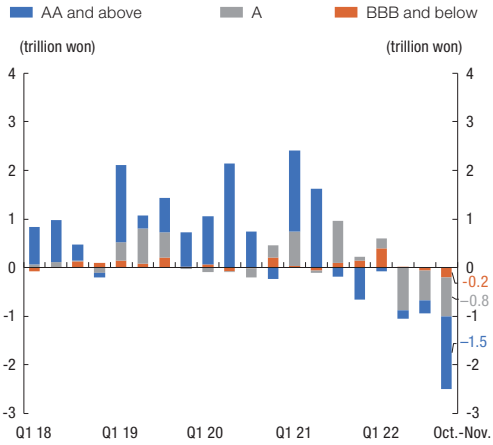
2) For details, refer to Box 3 “CP Market Trends since the Legoland PF-ABCP Defaultand Assessment.”

Figure II-4. Corporate bond credit spreads,[1] and spread across credit ratings



Note: 1) 3-year maturity basis.
Source: Korea Financial Investment Association.

Figure II-5. Net corporate bond[1] issuances[2]

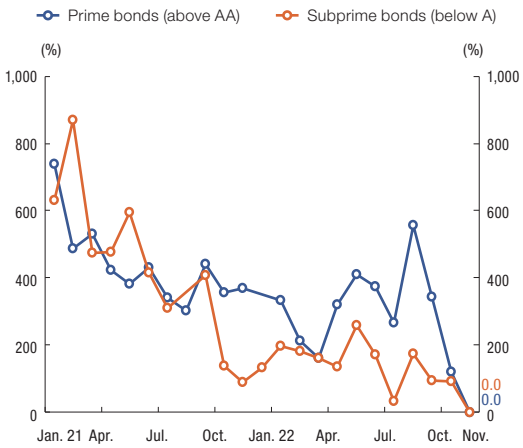


Notes: 1) Public offer basis, excluding issuance by financial companies.
2) Monthly average basis.
Source: Bank of Korea, Korea Securities Depository.

Looking at corporate bond issuance in the second half of the year, net redemptions continued among non-prime bonds (A rating or lower) amid sluggish investment demand from major institutions due to the higher market interest rates and the migration to alternative funding instruments, such as bank loans. In particular, issuance conditions deteriorated significantly after October amid growing market vigilance associated with unrest in the ABCP market, and the depression of even prime bonds (AA rating or higher) deepened, showing a significant increase in net redemptions (Figure II-5).

Participation in book-building for corporate bonds remained low for non-prime bonds, and fell significantly in October with the emergence of unsold prime bonds. In November, there were no companies that participated in book-building for bond issuance (Figure II-6).

Figure II-6. Rate of participation[1] in book-building for prime bonds[2]



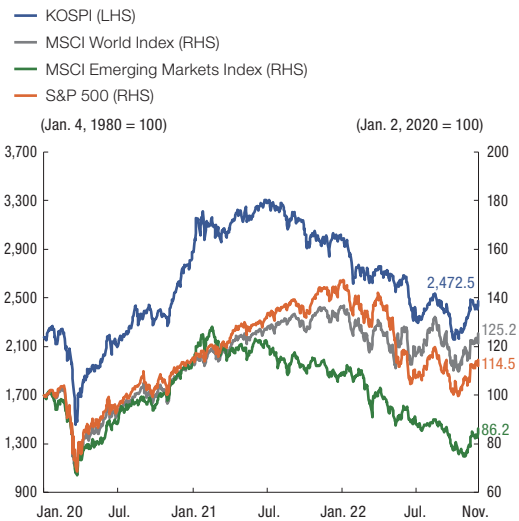
Notes: 1) Participation in book-building for prime bonds amount, expected issuance amount.
2) Public offer basis, excluding issuance by financial companies.
Source: Bank of Korea, Korea Securities Depository.

2. Stock Markets

Large fluctuation in stock prices

Stock prices rose from July due to the inflow of funds to buy at low prices in response to the perception that the fall had been excessive, and have fallen since mid-August amid concern over further tightening at the U.S. Federal Reserve. In September, as financial market jitters heightened amid the announcement of extensive tax cuts by the U.K. government, stock prices dropped to their lowest level of the year (2,155) on September 30. After October, however, stock prices rebounded thanks to the scrapping of the tax cut measure by the U.K. government, to expectations of a slower pace of interest rate hikes by the U.S. Federal Reserve, to a lower-than-expected U.S. CPI for October, and thanks to a favorable growth outlook for secondary battery-related firms (Figure II-7).

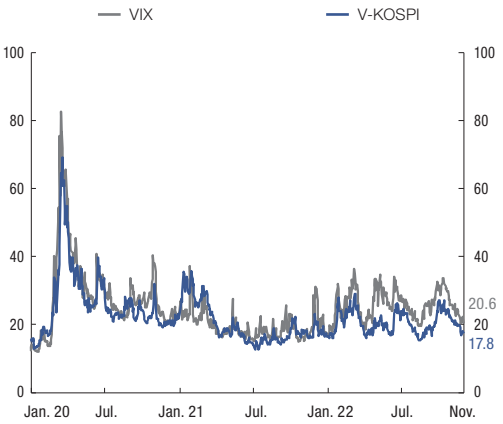
Figure II-7. KOSPI and global stock prices[1)]



Note: 1) U.S. is on an S&P 500 Index. Developed and emerging market counties are based on MSCI.
Sources: KOSCOM, Bloomberg.

The KOSPI 200 Volatility Index (V-KOSPI) rose sharply, largely owing to external factors during September, and declined after October as stock prices rebounded (Figure II-8).

Figure II-8. Stock price volatility indices[1)]

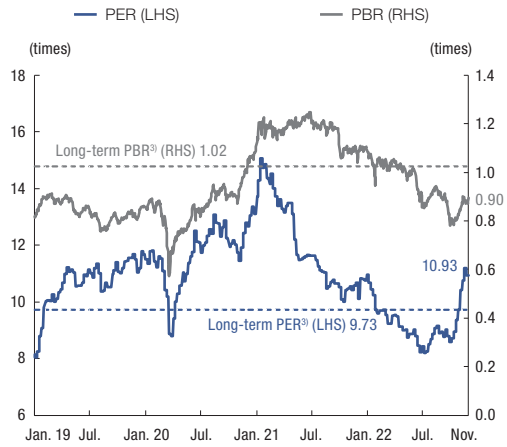


Note: 1) Volatility indices are calculated using prices for options on KOSPI 200 and S&P 500 indices.
Sources: KOSCOM, Bloomberg.

Rising PERs

The average price-to-earnings ratio[3)] (PER) dropped to 8.58x (September 30) amid financial market jitters in September and climbed to 10.93x by November 30, exceeding the long-term average (9.73x, since 2010), due to the stock price rebound and to the downward adjustment of earnings estimates. Meanwhile, the average price-to-book value ratio (PBR) declined to 0.78x at the end of September and jumped back to 0.90x by November 30, similar to the level seen at the end of June (Figure II-9).

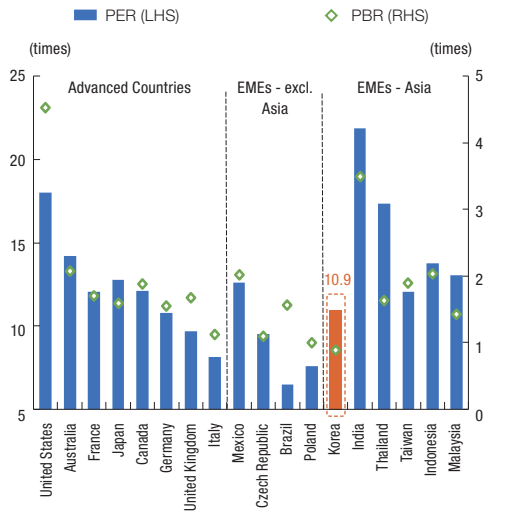
Figure II-9. PER[1] and PBR[2]



Notes: 1) MSCI basis (12-month forward).
2) KOSPI basis.
3) Average of Jan. 2010 to Nov. 2022.
Sources: Bloomberg, Refinitiv.

The domestic market PER and PBR averages remained lower than those in advanced countries and in major emerging markets (Figure II-10).

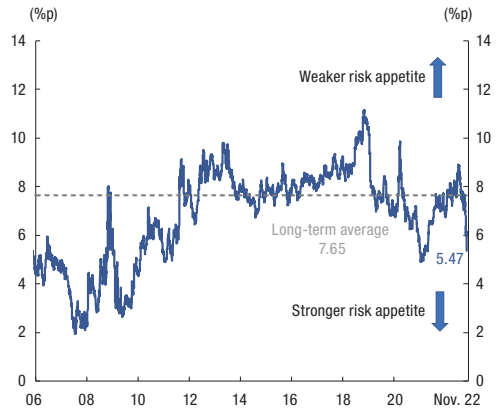
Figure II-10. PERs[1][2] and PBRs[1] of major countries



Notes: 1) End-Nov. 2022 basis.
2) MSCI basis (12-month forward).
Sources: Bloomberg, Refinitiv.

Meanwhile, the stock risk premium[4] remained below the long-term average (7.65%p, since 2010) in November (5.47%p as of November 30), as investor risk appetite improved (Figure II-11).

Figure II-11. Stock risk premium[1]



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

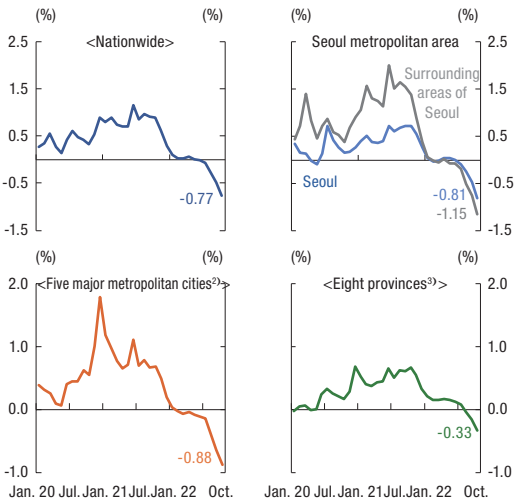
3) Based on the 12-month forward MSCI PER, calculated by dividing the sum of stock market capitalizations of companies included by the MSCI index by the sum of their expected net profits (values forecast by Korean and foreign securities companies) during the following one-year period.
4) The equity risk premium is calculated by subtracting the Treasury (10-year) yield 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

Declining Housing Prices and Sharp Drop in Transactions

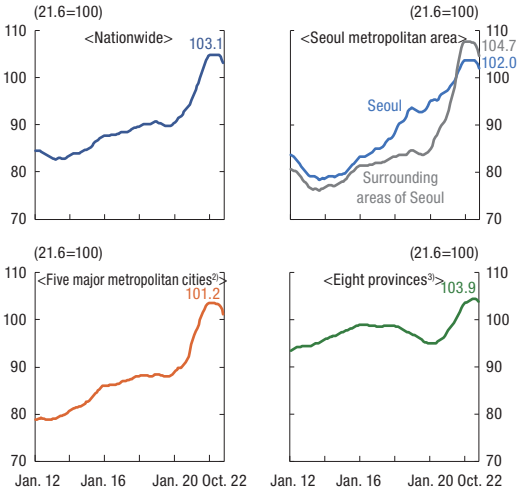
Housing purchase prices shifted to a decline in June amid the steep increase in loan interest rates[5] and concern over an economic downturn and a contraction in housing purchase sentiment. In the Seoul metropolitan area and in the nation's five other major metropolitan cities, where the increase in housing purchase prices had been significant, prices fell at a faster pace, but remained higher than prices seen before COVID (Figure II-12 and II-13).

Figure II-12. Rates of increase[1] in housing sale prices



Notes: 1) 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.

Figure II-13. Trends in housing sale prices[1]



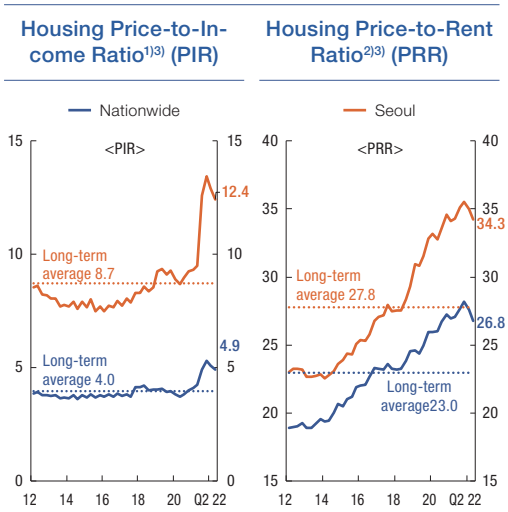
Notes: 1) Total of House Sale Prices Index.
2) Busan, Daegu, Daejeon, Gwangju and Ulsan.
3) Gangwon, Chungbuk, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk, Gyeongnam, and Jeju.
Source: Korea Real Estate Board.

The price-to-income ratio (PIR) and the price-to-rent ratio (PRR) both fell as housing prices declined.

In the second quarter of 2022, the PIR (nationwide, third quintile) was 4.9 (nationwide, Korea Real Estate Board), down by 0.2 from the first quarter (5.1), while the PRR was 26.8, down by 0.8 from the first quarter (27.6) (Figure II-14).

5) The weighted average interest rate for mortgage loans at deposit taking banks (based on newly taken/extended amounts) rose from 2.88% in August 2021 to 4.82% in October 2022.

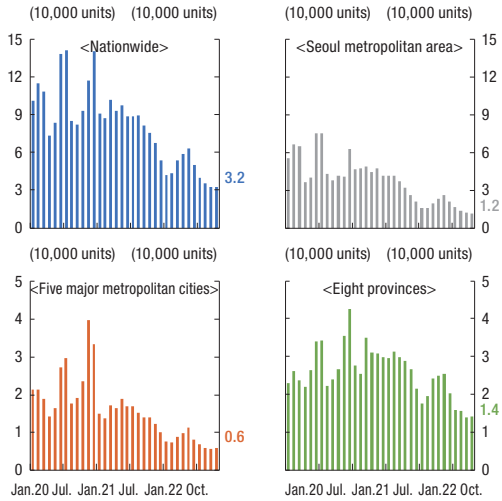
Figure II-14. Price-to-Income Ratio and Price-to-Rent Ratio



Notes: 1) Housing price / Annual household income.
2) Housing price / Annual rent.
3) Long-term average is average for the period between Q1 2012 and Q2 2022.

Sources: Bank of Korea calculations, Korea Real Estate Board.

Figure II-15. Housing sales transaction volumes



Source: Ministry of Land, Infrastructure and Transport.

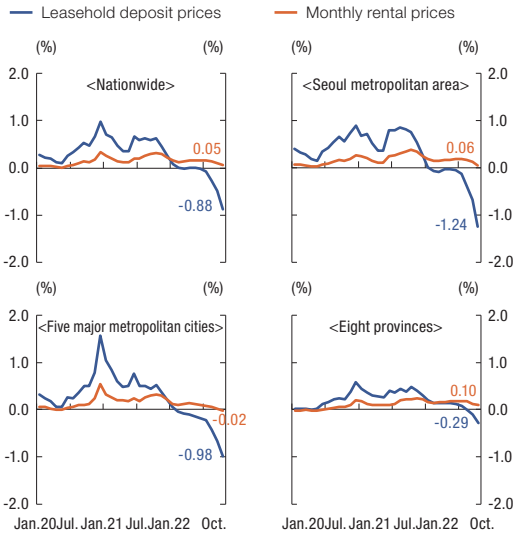
The volume of housing sale transactions from July to October 2022 was 140,000 units, representing a decrease of 58.2% year on year (335,000 units) and showing a decline larger than that recorded in the first half of the year (-44.5%). While transactions increased slightly and temporarily[6] due to the recovery of purchase sentiment in the first half, purchase sentiment shrank[7] and the volume of transactions decreased significantly from June as the decline in housing prices accelerated and as interest rates rose[8] (Figure II-15).

Sharp Decline in Leasehold Deposits and Increase in Monthly Rents

In the housing rental market, the cost of leasehold deposits (jeonse) declined significantly. In particular, in the Seoul metropolitan area and in five other metropolitan cities, the rate of decrease in the cost of leasehold deposits increased in the second half of the year, after having transitioned to a decline in February. On the other hand, monthly rents soared as demand for monthly rental units rose, driven by the burden of increased leasehold deposits amid higher interest rates. In the five other metropolitan cities, however, monthly rents transitioned to a decline in October (Figure II-16).

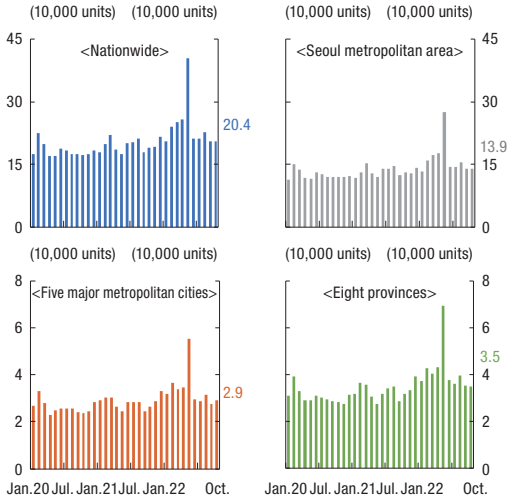
6) The Buyer Superiority Index (KB Kookmin Bank) rebounded from 50.1 in February 2022 to 51.5 in April, and housing sale transactions increased from 42,000 units in January to 63,000 units in May.
7) Buyer Superiority Index (KB Kookmin Bank): April 2022, 51.5 → June, 40.1 → September, 21.9 → October, 19.2.
8) Volume of housing sale transactions: June 2022, 50,000 units → July, 40,000 units → August, 36,000 units → October, 32,000 units.

Figure II-16. Rates of increase[1] in leasehold deposits and monthly rental prices



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

Figure II-17. House leasehold deposits and monthly rental transaction volumes[1)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 volume of leasehold deposit and monthly rent transactions was 848,000 units between July and October 2022, increasing by 8.2% from the same period in the previous year (784,000 units), owing to an increase in monthly rents, but showing significantly slower growth compared to the first half of the year (35.5%).[9)] By type of rental, leasehold deposit transactions decreased to 406,000 units, down 6.2% from the same period of the previous year (433,000 units), while monthly rent transactions increased to 442,000 units, up 25.6% YoY from 352,000 units. As a result, the proportion of monthly rents, out of the total of both leasehold deposit and monthly rent transactions, was 52.1% from July to October 2022, recording an increase of 7.3%p from the same period of the previous year (44.8%) (Figure II-17).

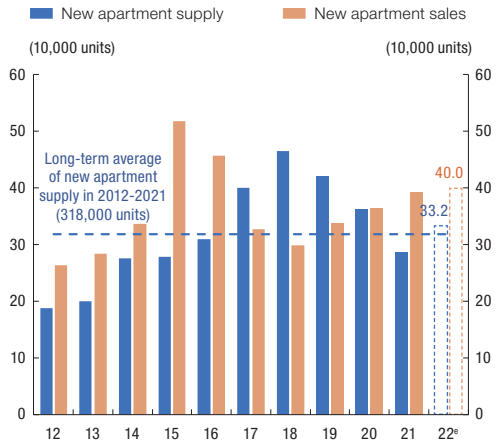
The supply of new apartments[10)] in 2022 is expected to increase to 332,000 units, up from 286,000 units in the previous year, and exceed the annual average of previous years (318,000 units, 2012-2021). In 2022, the volume of new apartment sales is projected to increase slightly from the previous year (391,000 units) to 400,000 units (Figure II-18).

Meanwhile, the inventory of unsold housing units stood at 47,000 units[11)] (7,600 units in the Seoul metropolitan area, and 39,600 units in non-Seoul metropolitan areas) as of the end of October 2022, showing a substantial increase of 67.9% compared to the end of March (28,000

9) During the first half of the year, leasehold deposit transactions increased by 12.9% year on year, while monthly rent transactions rose by 66.8%.
10) In 2022, the supply of new apartments is expected to increase over the previous year in both the Seoul metropolitan area (164,000 units → 180,000 units) and in non-Seoul metropolitan areas (122,000 units → 152,000 units).

units), heightening worry over a housing market slump.

Figure II-18. New apartment supply and new apartment sales[1)]

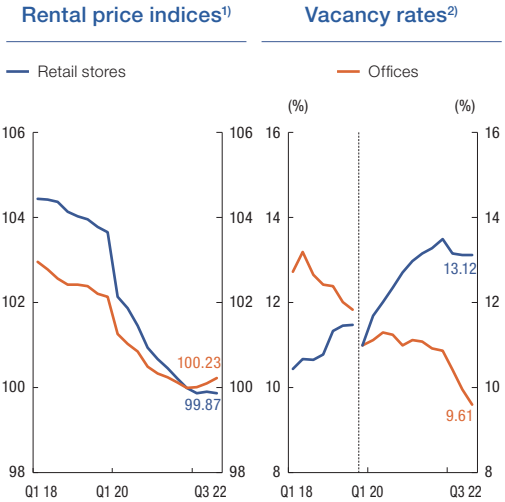


Note: 1) As of Dec. 2, 2022. Based on sum of monthly planned amount for 2022.
Source: Real Estate 114.

Rise in Rent for Office Space and Continued Slump in Rent for Retail Stores

At the end of the third quarter of 2022, rent for office space rose by 0.22% (100.23) compared to the first quarter (100.01) as demand for shared office space rose after the end of working from home coupled with rising demand for office space amid the growth of IT industries such as e-commerce and online services. On the other hand, rent for retail stores stayed at a level seen at the end of the first quarter (99.87), as tourism decreased, concerns over an economic recession persisted, and consumption sentiment contracted. The vacancy rate for office space was 9.61% as of the end of the third quarter of 2022, down 0.81%p from the first quarter (10.42%), while the vacancy rate for retail stores was 13.12%, down slightly by 0.04%p from the end of the first quarter of 2022 (13.16%) (Figure II-19).

Figure II-19. 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.

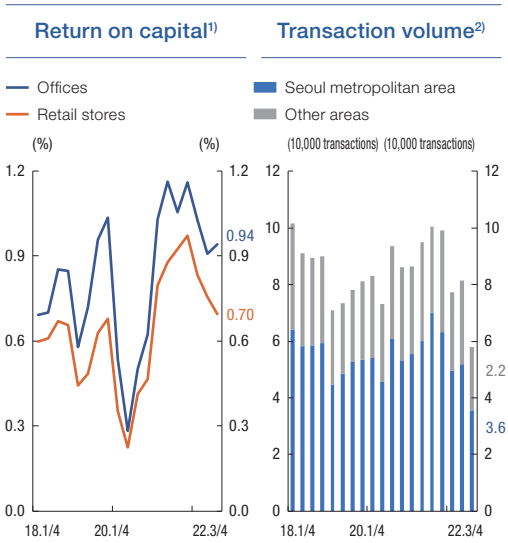
Declining Return on Capital for Office Space and Retail Stores

The return on capital for commercial real estate for both office space and retail stores declined from the end of the previous year. In the third quarter of 2022, the return on capital for offices stood at 0.94%, down by 0.09%p from the first quarter (1.03%), while the return on capital for retail stores was 0.70%, down by 0.13%p from the first quarter (0.83%). The volume of commercial real estate transactions recorded

11) At the end of September 2021, the inventory of unsold housing units was the lowest (14,000 units) since statistics began to be compiled (2001). From October, it returned to an upward trend and is rapidly increasing, mainly in non-Seoul metropolitan areas, such as Daegu and in Gyeongsangbuk-do Province (18,000 units at the end of 2021 → 28,000 units at the end of March 2022 → 47,000 units at the end of October).

58,000 in the third quarter of 2022, showing a decrease of 42.3% from the third quarter of the previous year (100,000) (Figure II-20).

Figure II-20. Return on capital and transaction volume of commercial real estate



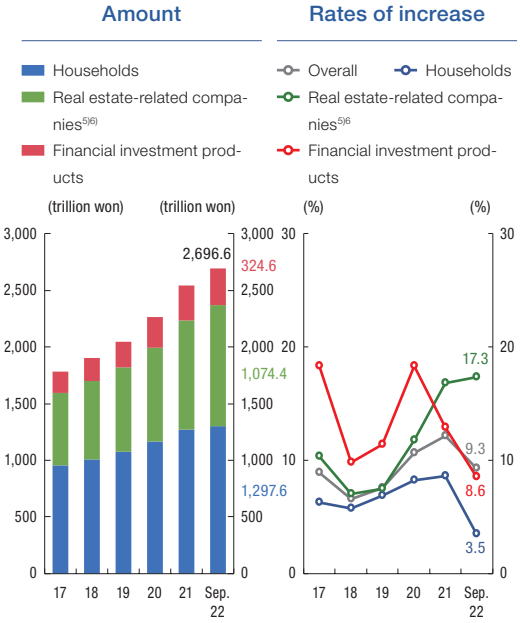
Notes: 1) Quarter-on-quarter rate of increase in asset value reflecting changes in land and building prices. Retail stores are based on medium- to large-sized units.
2) Based on buildings used for commercial purposes, including so-called "officetels," dual-purpose one-room studios used for both commercial and residential purposes. Including transactions other than sales, such as allotments of new apartments, gifts, or exchanges.

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

Increase in Real Estate Finance Exposure

At the end of September 2022, real estate finance exposure[12] stood at KRW 2,696.6 trillion, representing a year on year increase of 9.3%. By type, household loans amounted to KRW 1,297.6 trillion (48.1% of total exposure), showing an increase of 3.5% from the same period of the previous year, led by guarantees related to leasehold deposits and reverse mortgages. Real estate-related corporate loans stood at KRW 1,074.4 trillion (39.8%), up 17.3% year on year as loans from financial institutions, business guarantees, and project financing (PF) loans all increased. Meanwhile, financial investment products amounted to KRW 324.6 trillion (12.0%) at the end of September, recording an increase of 8.6% year on year, as the size of real estate funds and REITs expanded (Figure II-21).

Figure II-21. Amount1) and rate of increase2) of real estate finance exposure3)4)



Notes: 1) The sum of real estate-related household loans, corporate loans issued by financial institutions and credit guarantee institutions, and real estate-related financial investment products.
2) Year-on-year basis.
3) End-period basis.
4) Credit guarantee institutions include only public guarantee institutions (HF, HUG) due to data restrictions.
5) Defined as companies directly related to real estate market conditions (such as real estate rental and supply businesses, and related service businesses) and construction firms.
6) Excluding financial institution debt guaranteed for real estate PF-ABS.

Source: Bank of Korea.

12) Exposure to real estate-based financing is defined as the sum of real estate-related loans to households and corporations by financial institutions and credit guarantee institutions, and real estate-related financial investment products. For more information on real estate finance exposure, refer to Box 3 "Current Status of Real Estate Finance Exposure" in the June 2017 Financial Stability Report.

Box 3.

CP Market Trends since the Legoland PF-ABCP Default and Assessment[1)]

Until September 2022, the money market had been performing its financial intermediation function smoothly overall thanks to the favorable short-term fund supply conditions, despite the rise in market interest rates after the base rate hikes. However, due to the impact of the default on Gangwon-do Province's Legoland PF-ABCP[2)] in October, market vigilance of PF-ABCP and of CP issued by securities companies began to rise, and in mid-October, in the RP market, which is a very short-term money market, the interest rate for RPs that used credit bonds as collateral rose sharply, leading to the rapid deterioration of funding conditions in the money market. In response, the government and the Bank of Korea promptly announced and implemented market stabilization measures, and concern over a crunch in the money market has moderated significantly. Still, a high level of market vigilance for CP issued by securities companies and PF-ABCP persists, and there may be some deterioration in the funds supply and demand conditions toward the end of the year. As a result, the recovery of the CP market remains somewhat delayed.

Hereunder, we examine the trends of the short-term money market after the Legoland PF-ABCP default with a focus on the CP market and assess recent developments.

Trends in Yields

Yields for CP (A1, 91-day, final quotation yield) had risen until September, as had yields of other short-term money market instruments, reflecting the base rate hikes and expectations for additional hikes. However, since the Legoland incident at the end of September, the rollover of PF-ABCP has faced difficulty, and in mid-October, there were cases of PF-ABCP being underwritten by securities companies as the provider of credit enhancement,[3)] sharply raising the yield on CP. As market vigilance in the CP market spread rapidly, the government and the Bank of Korea announced market stabilization measures (October 23), additional support measures for the PF-ABCP and CP markets (November 11), and additional market stabilization measures (November 28). The government decided to resume the purchase of bond market stabilization funds, broaden the scope of targets for the corporate bond and CP purchasing program, and provide additional liquidity to securities com-

1) This article was authored by Song Eun-yeong and Choi Seong-woo (Money Markets Team), and was reviewed by Lee Jeong-heon (head of the Money Markets Team).

2) As the Gangwon-do government decided to apply for corporate rehabilitation of the Gangwon Jungdo Development Corporation (GJDC) on September 28, 2022, the I-One First PF-ABCP (hereafter "Legoland PF-ABCP"), worth KRW 205.0 billion and issued with GJDC loans as an underlying asset, was not paid on September 29, 2022. Legoland PF-ABCP had been assigned an A1 rating, backed by the payment guarantee of Gangwon-do Province, but its credit rating was downgraded due to the missed payment obligation (C on September 29 → D on October 5). Legoland PF-ABCP went bankrupt on October 5, 2022.

3) On October 11, some securities companies performed commitments to buy project financing-asset backed short-term bonds (PF-ABSTB) related to overseas alternative investments, and on October 12 and 14, when the rollover of PF-ABCPs and ABSTBs guaranteed by local governments (Cheonan-si, Gyeongsan-si) encountered difficulty, securities companies, as arrangers, underwrote the rollover.

panies through the Korea Securities Finance Corporation. The Bank of Korea announced the expansion of the range of eligible collateral for BOK loans, the deferment of a plan to raise the ratio of collateral for guaranteeing net settlement, and the temporary purchase of RP issued by securities companies and the Korea Securities Finance Corporation.

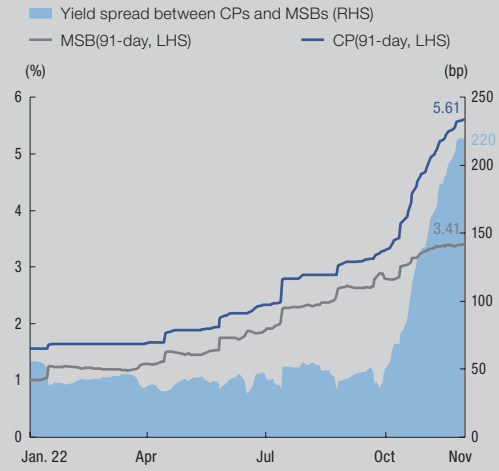
Market stabilization measures in money market

	Measures	Main contents	Total planned value (Trillion won)
Bank of Korea	Broadening of the range of eligible collateral securities	- Broadening of the range of eligible collateral securities for BOK loans, etc	-
	Postponement of the plan to ratchet up the collateral provision ratio for net settlement	- 3 months postponement of the plan(Feb. 2023, 70% → 80%)	
	Temporary purchase of RP	- From securities corporations and securities finance corporations	6.0
	Liquidity support for institutions contributing to the Bond Market Stabilization Fund	- Liquidity support by purchase of RP	2.5
Government	Bond Market Stabilization Fund	- Restarting purchase of corporate bond and CP - Implement additional capital call	20.0
	Corporate bond and CP purchasing programs (KDB·IBK·KODIT)[1]	- Increasing total planned value(8 →16 trillion won) - Including CP issued by securities corporations	16.0
	Liquidity support for securities companies by KSFC[2]	- Providing additional liquidity - Broadening of the range of collateral securities	3.0
	Real estate PF guarantees	-Guarantees for PF loans	15.0
	PF-ABCP purchase program	-(KDB·KODIT)PF-ABCP guaranteed by construction companies	1.0
		- (Financial investment business·KDB·KSFC)PF-ABCP guaranteed by securities corporations	1.8
	Stabilizing bond market	- Reducing issuance of treasury bonds - Reducing issuance of public institution issued bonds and dispersing the timing of bond issuance, etc	
	Improving liquidity of market and company	- Easing the financial regulations(LCR, etc)	

Notes: 1) Korea Development Bank(KDB), Industrial Bank of Korea(IBK), Korea Credit Guarantee Fund(KODIT)
2) Korea Securities Finance Corporation
Source: Bank of Korea, Ministry of Economy and Finance, Financial Services Commission

Although the rise in the CP yield has gradually moderated,[4] it failed to shift to a decline as the elevated market vigilance persisted and funds continued to flow out from specified money trusts, wrap accounts, and MMFs of securities companies, which are the major sources of investment in CP, amid the delayed recovery of investment sentiment. Consequently, the spread on CP over monetary stabilization bonds (91-day, average market yields of four bond rating companies) widened from 50bp at the end of September 2022 to 220bp on November 30, 2022, the highest level since the Global Financial Crisis.[5]

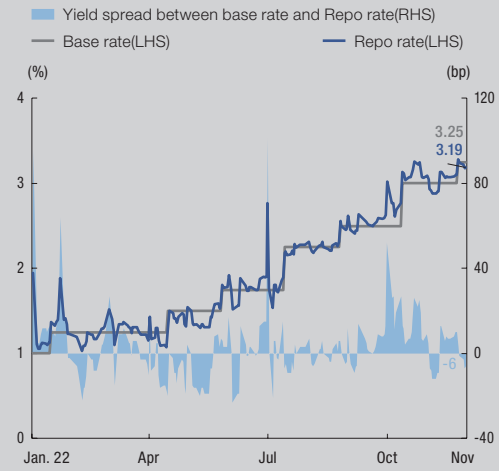
Yields of CPs[1], Monetary stabilization bonds[2]



Notes: 1) A1, 91-day final quotation yields
2) 3-month, Average of four agencies
Sources : Korea financial investment association

Meanwhile, in October, as uncertainty in the CP market spread to the RP market, the RP yield showed a dramatic, temporary increase. In particular, as the RP yield climbed significantly, mostly in RPs with credit bonds as collateral,[6] the spread over the base rate widened to 26bp on October 21, 2022. However, after October 26, the RP yield fell by a large margin thanks to market stabilization measures and to the inflow of surplus funds from the Treasury, and in November, the RP yield did not deviate much from the base rate.

Base rate and Repo rate[1]



Notes: 1) Overnight rate
Sources: Bank of Korea, Korea securities depository

Primary Market

As for the issuance of CP (including short-term bonds), the net issuance of CP continued until September as the money market functioned smoothly overall. However, in October, after the Legoland incident, the CP market shifted to a net redemption, especially for PF-ABCP and for

4) The rise in the CP yield has gradually eased: 8bp to 16bp from October 17 to 21 → 4bp to 12bp from October 24 to 31 → 4bp to 8bp from November 1 to 10 → 3bp to 6bp from November 11 to 18 → 1bp to 3bp from November 21 to 30 (on November 24, rose by 9bp after the base rate hike).

5) The yield spread between CP (91-day) and monetary stabilization bonds (91-day) had widened to 396bp on December 16, 2008, during the Global Financial Crisis, and stood at 220bp on November 30, 2022, the highest level recorded since January 21, 2009 (222bp).

6) The yield spread (base rate) on RP that uses corporate bonds and bonds issued by credit-specialized financial companies as collateral jumped from 15bp on October 17, 2022, to 171bp on October 21, 2022.

CP issued by securities companies.

In November, thanks to the implementation of market stabilization measures, the CP market switched to a net issuance, especially for CP (A1, prime bonds) issued by securities companies. A significant amount of the net issuance of CP issued by non-financial corporations, especially public corporations, was recorded, and the net issuance of CP issued by credit-specialized financial companies, largely credit card companies, was observed. As for ABCPs, a significant amount of net redemption of time-deposit ABCPs was recorded, and the net redemption of PF-ABCP continued due to the difficulty in the rollover.

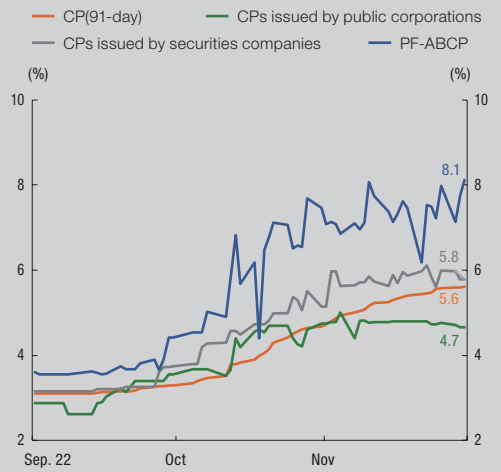
Net issuance of CPs (including short-term bonds)

Classification	22.7	8	9	10	11	Outstanding balances
CPs	2.4	-1.9	4.7	-7.2	-6.0	302.4
General CP	1.2	2.3	0.1	1.1	6.1	145.5
Non-financial corporations	1.2	3.5	-0.5	3.1	3.3	54.8
securities companies	-2.2	-1.7	0.3	-1.1	2.5	38.1
credit-specialized finance companies	2.1	0.2	0.6	-0.5	0.1	49.2
ABCP	1.1	-4.2	4.6	-8.4	-12.1	156.9
(PF-ABCP)	-0.6	-0.1	-0.4	-3.0	-0.5	35.5

Sources : Yonhap Infomax, Bank of Korea

Yields in the primary market rose significantly for all issuers due to the impact of the contraction of investment sentiment after the Legoland incident and the base rate hike in October. However, the rise in yields varied depending on the credit ratings of issuers. Yields for PF-ABCP and CP issued by securities companies jumped to the high 5% range and high 7% range, respectively, in November, putting upward pressure on CP yields (91-day, final quotation yield). Yields for PF-ABCP and CP issued by securities companies climbed at a slower pace from early November, when market stabilization policies were implemented, moderately narrowing the gap with the CP yield (91-day), but did not reach the level seen prior to the Legoland incident. Meanwhile, the yield on CP issued by public corporations with high credit ratings rose by a smaller margin as the impact of the Legoland incident was relatively less severe and the effects of the market stabilization policy materialized promptly.

Yields in the primary market by key issuers[1)2)]



Notes: 1) A1, 91-day final quotation yields
2) A1, weighted average based on 3-month maturity
Sources : Korea financial investment association, Bank of Korea

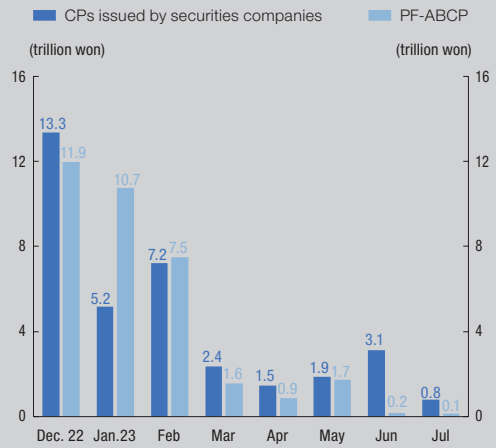
Conditions for Rollover

Through the series of market stabilization measures implemented by the government and the Bank of Korea, the CP market gradually recovered its funding function, and rollover conditions

7) MMFs and specified monetary trusts at securities companies, which are mostly funded by corporations, tend to experience funds outflows at year-end due to financial institutions' observance of regulatory ratios and moves by the government and businesses to secure funds.

for CP appear to have improved somewhat compared to mid-October. However, with respect to CP issued by securities companies and to PF-ABCP that remains subject to heightened market vigilance, the size of CP maturing by the end of 2022 is significant due to the issuance of CP with a shorter maturity, and funds are continuously flowing out of MMFs and specified monetary trusts and wrap accounts at securities companies, which are the principal sources of investment in CP, amid the delayed recovery of investment sentiment for CP. This poses a burden for the rollover of CP. In particular, as it is highly likely[7] that massive seasonal year-end funds will exit MMFs and specified monetary trusts at securities companies, so the rollover risk of CP is likely to surge.

Time to maturity[1)2)]



Notes: 1) November 30, 2022 basis
2) Short-term bonds included
Sources : Yonhap Infomax

Assessment

Concern over a CP market crunch was alleviated significantly thanks to the series of market stabilization measures introduced by the government and the Bank of Korea.

Nonetheless, the CP market has not fully recovered owing to the lingering high level of market vigilance concerning PF-ABCP and CP of securities companies, and due to the rollover risk of CP maturing within the year. Hence, caution is needed concerning the possibility that conditions for the issuance and rollover of PF-ABCP and CP issued by securities companies and vulnerable sectors may deteriorate again in the event of growing concern over real estate PF defaults associated with any deepening downturn in the real estate market.

In addition, securities companies and credit-specialized financial companies had significantly increased the volume of CP issuance in preparation for the expansion of assets after COVID-19 and for any deterioration in the issuance conditions for bonds issued by credit-specialized financial companies.[8] Therefore, the impact of unrest in the CP market on the liquidity of these companies increased. In particular, since securities companies raise funds mostly through short-term wholesale funding instruments, such as RP, CP, and short-term bonds,[9] in the event of the deterioration of issuance conditions in the CP market, demand for funding is likely to shift to the RP market, among others, and adversely

8) The outstanding volume of CP (including short-term bonds) issued by securities companies and credit-specialized financial companies stood at KRW 38.1 trillion and KRW 49.2 trillion, respectively, at the end of November 30, 2022, representing a 1.9-fold and a 3-fold increase from the balance (KRW 20.3 trillion and KRW 16.4 trillion) recorded at the end of December 2019.

9) The size of short-term wholesale funding at securities companies at the end of September 2022, through call money, promissory notes, RP, CP, and short-term bonds, among others, amounted to KRW 196.7 trillion, accounting for 52.5% of total borrowings (KRW 374.9 trillion).

affect the demand and supply conditions of the RP market.

Going forward, close monitoring of the money market, with a focus on the CP market, needs to be carried out. Moreover, to ensure that the money market is sufficiently stabilized, the market stabilization measures already announced should be implemented as planned, and additional measures should be introduced in a timely manner in the event of any further deterioration in market conditions.

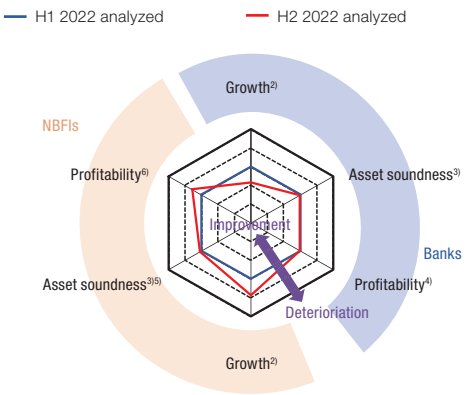
Ⅲ. Financial Institutions

Commercial bank[1] assets expanded significantly, and asset soundness and profitability remained favorable.

Asset growth at non-bank financial institutions (NBFIs) slowed, and their profitability deteriorated moderately. However, asset quality was satisfactory overall.

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

Figure Ⅲ-1. Changes in financial soundness conditions at financial institutions[1]



Notes: 1) Extents of change of growth and asset soundness as of end-Q1 2022 compared to end-Q3 2021 indexed. Extents of change of profitability as of end-Q1 2022 compared to end-Q1 2021 indexed.
2) Rate of increase in total assets.
3) Substandard-or-below loan ratio.
4) Return on Assets (ROA).
5) Excluding securities companies.
6) Average of each NBFI sector's ROA weighted by the amounts of their total assets.

Sources: Bank of Korea, financial institutions' business reports.

1. Banks

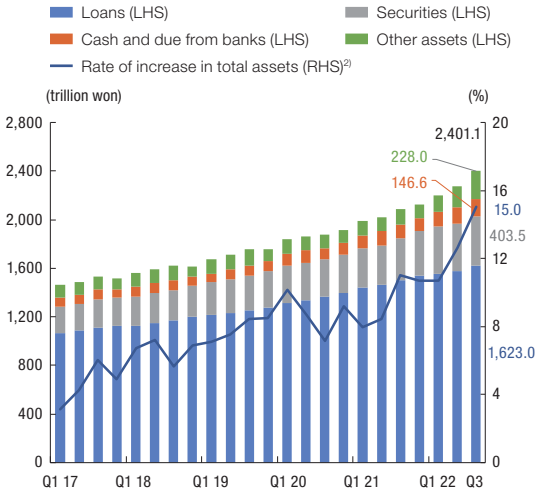
Increasing Pace of Asset Growth

Total assets at commercial banks (banking account basis) stood at KRW 2,401.1 trillion at the end of the third quarter of 2022, up 15.0% YoY, recording the largest increase since the end of the fourth quarter of 2008 (22.0%), as a result of the increase in demand for funds from corporations amid instability in the capital market and thanks to inflows of funds into time deposits at banks.

By asset type, loans rose by 8.1% YoY, led by corporate loans, despite the slow growth of household loans. Securities increased by 17.4% YoY amid a rise in demand[2] for highly liquid assets in tandem with the government's plan to roll back the regulatory LCR.[3] Other assets grew by 82.4% YoY, driven by derivative assets[4] that were boosted by the expansion of derivative transactions to hedge against exchange rate and interest rate risks, showing the largest growth since the end of the fourth quarter of 2008 (101.2%). Cash and cash equivalents climbed by 24.7% YoY (Figure III-2).

1) Commercial banks (nationwide and regional banks) are analyzed in the Financial Stability Report, while specialized banks (KDB, IBK, EXIM Bank, Nonghyup Bank, and Suhyup Bank) with different business models are not.
2) At the end of September 2022, the value of government bonds and financial bonds at commercial banks stood at KRW 109.9 trillion and KRW 106.3 trillion, respectively, up 30.7% and 13.3% YoY.
3) The Financial Services Commission had planned a gradual normalization of the total LCR from July 2022, but announced on October 20 that it would postpone the plan (until the end of June 2023, 92.5%) to improve financial market stability.
4) Derivative assets at commercial banks reached KRW 103.5 trillion at the end of September 2022, up 258.1% compared to the same period of the previous year (KRW 28.9 trillion).

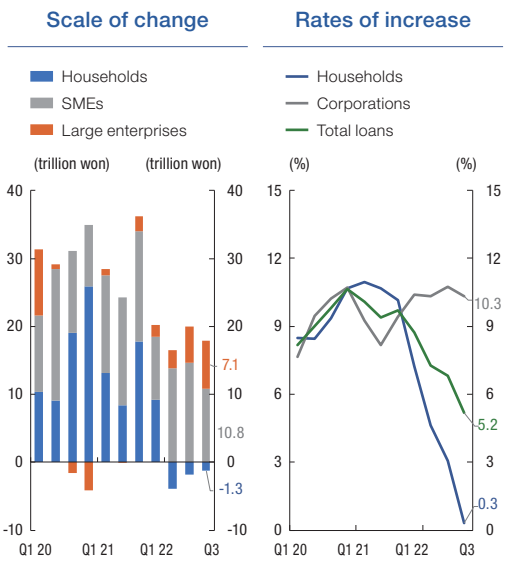
Figure Ⅲ-2. Commercial bank total assets[1)]



Notes: 1) End-period banking account balances.
2) Year-on-year.
Sources: Commercial banks' business reports.

In terms of loans by type of borrower (Korean won-denominated loan basis, cumulative), loans to large enterprises increased by 21.3% in the third quarter of 2022, a significant rise in the rate of growth compared with the first quarter (8.4%). Loans to small and medium-sized enterprises (SMEs) climbed by 8.8%, a slower pace than during the first quarter (10.6%). Loans to large enterprises increased significantly, as such enterprises faced difficulty[5)] in funding through stocks and corporate bonds. Loans to SMEs continued growing thanks to the extension of financial support related to the COVID-19 pandemic and demand for working capital. Meanwhile, household loans decreased during three consecutive quarters of 2022 owing to a slump in housing transactions,[6)] a rise in loan interest rates, and the implementation of the third phase of the individual borrower-level DSR rules[7)] (Figure III-3).

Figure Ⅲ-3. Change[1)] and rate of increase[2)] in commercial bank loans[3)]



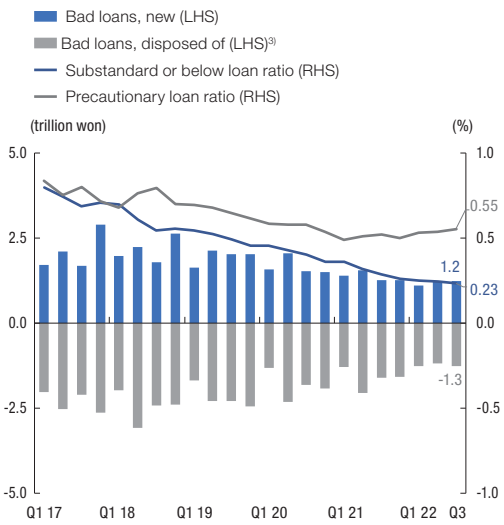
Notes: 1) Compared to previous quarters.
2) Year-on-year.
3) Banking account won-denominated loans.
Sources: Commercial banks' business reports.

Satisfactory Level of Asset Soundness

The substandard-or-below loan ratio, which is an indicator of the asset soundness of commercial banks, stood at 0.23% at the end of the third quarter of 2022, down by 0.02%p from the first quarter (0.25%)[8)] (Figure III-4).

5) From January to September 2022, the issuance of stocks and bonds by large enterprises amounted to KRW 43.9 trillion, down 27.4% from the same period of the previous year (KRW 60.4 trillion).
6) From January to September 2022, the volume of housing sale transactions nationwide was 417,794 cases, down 49.0% from the same period of the previous year (818,948 cases).
7) With the implementation of the third phase of the DSR rules on individual borrowers starting in July 2022, new loans extended to borrowers with cumulative loans in excess of KRW 100 million will be restricted to the extent that the annual repayment of principal and interest does not exceed 40% of their annual income.

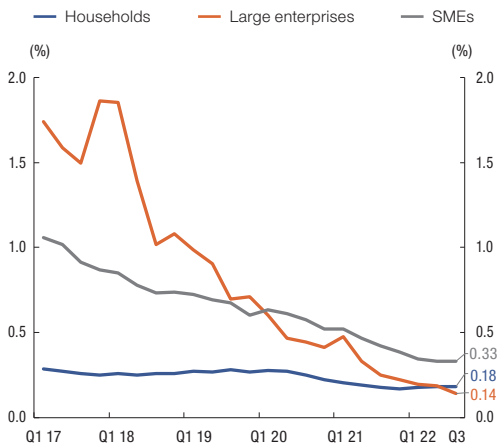
Figure Ⅲ-4. Commercial bank bad loans[1] and substandard-or-below loan ratio[2]



Notes: 1) During the period.
2) End period.
3) Including those disposed of through loan withdrawals, loan loss write-offs, loan sales, soundness reclassifications, debt restructurings, etc.
Sources: Commercial banks' business reports.

By type of borrower, the substandard-or-below loan ratios of SMEs and households remained at levels similar to those of the first quarter, while large enterprises recorded a slight decline compared to the first quarter, with an increase in new loans helping to bring the ratio down (Figure III-5).

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

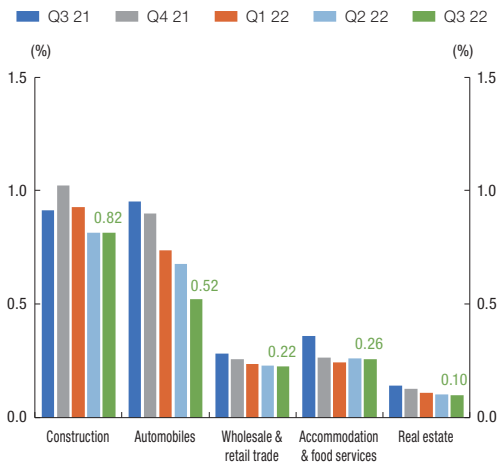


Sources: Commercial banks' business reports.

By industry, the substandard-or-below loan ratio rose slightly in the accommodation and food services industry (0.24% at the end of the Q1 2022 → 0.26% at the end of the Q3 2022), while the ratio declined or remained at a level similar to that of the first quarter in the construction (0.93% → 0.82%), automobile (0.74% → 0.52%), wholesale and retail trade (0.23% → 0.22%), and real estate (0.11% → 0.10%) industries (Figure III-6).

8) Meanwhile, at the end of the third quarter of 2022, the precautionary loan ratio rose by 0.01%p from the previous quarter (0.54% → 0.55%). By borrower type, the precautionary loan ratio for large enterprises fell by 0.06%p from the previous quarter (1.36% → 1.30%), while the ratio for SMEs and households climbed by 0.01%p (0.57% → 0.58%) and 0.02%p (0.27% → 0.29%), respectively.

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



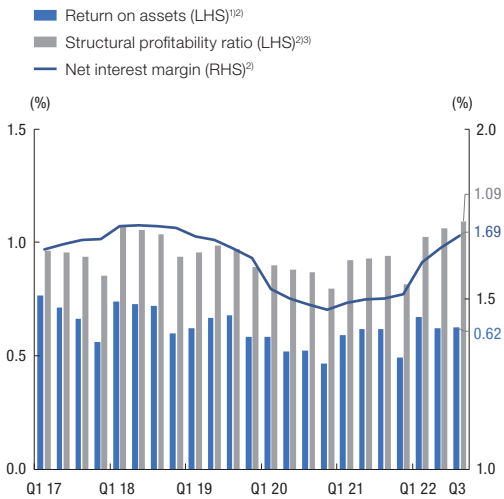
Sources: Commercial banks' business reports.

The favorable asset soundness at commercial banks is likely attributable to the "soft landing" measures taken by the government and financial institutions made to extend the loan maturity and to defer payments for self-employed people and at SMEs.[9] However, defaults on loans[10] may tick up again due to the steep increase in loan interest rates along with policy rate hikes and uncertainty surrounding economic conditions at home and abroad.

Satisfactory Profitability

Profitability at commercial banks continued to improve. Return on assets (ROA) at banks was 0.62% (annualized basis) at the end of the third quarter of 2022, a level similar to that in the same period of the previous year. The structural profitability ratio, which indicates a bank's capacity to generate profits in a sustained manner, was 1.09% (annualized basis) in the third quarter of 2022, up 0.15%p YoY[11] (Figure III-7).

Figure Ⅲ-7. Commercial bank profitability



Notes: 1) Loan loss reserves excluded.
2) Accumulated quarterly incomes annualized.
3) (Interest income + Fee income + Trust account income - Operating expenses) / Total assets.

Sources: Commercial banks' business reports.

The net income of commercial banks from the first to third quarter of 2022 amounted to KRW 10.5 trillion, up KRW 1.2 trillion from the same period of the previous year (KRW 9.3 trillion). This is attributable to a surge in the net interest margin[12] driven by higher loan

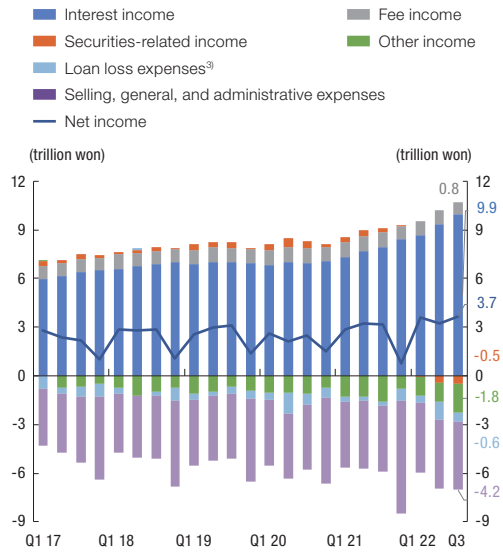
9) Regarding the extension of loan maturity and deferred payments scheduled to end in September 2022, the government and the financial sector decided to extend the loan maturity extension by up to an additional three years and to defer the principal and interest payments by up to one additional year (September 2022).

10) According to the loan officer survey on financial institution lending conducted in the third quarter of 2022, the comprehensive credit risk index at domestic banks for the fourth quarter of 2022 was 39 (forecast), the highest level seen since the second quarter of 2020.

11) The YoY increase in the structural profitability ratio, despite the ROA remaining at a similar level YoY, is attributable to an increase in losses on securities trading and valuation, losses on foreign exchange transactions, and the loan loss reserve, which is excluded from the structural profitability ratio.

interest rates[13] and the expansion of loans despite a substantial decrease in non-interest income, such as profits from service fees and securities[14] (Figure III-8).

Figure III-8. Commercial bank net income composition[1][2]



Notes: 1) Excluding loan loss reserves.
2) During the period.
3) Including bad debt expenses, net provisions transferred.
Sources: Commercial banks' business reports.

Meanwhile, loan interest rates are rising[15] along with an increase in funding costs amid the recent policy rate hikes and competition for deposit-taking.[16] Although this may be positive in terms of a bank's profitability, accompanied by an economic recession, it could also lead to a deterioration in the soundness of loan assets. Hence, the quality of loans, with a focus on debt repayment capacity, needs to be monitored continuously.

12) At the end of the third quarter of 2022, the net interest margin (NIM) stood at 1.69% (annualized rate), the highest level since the fourth quarter of 2018 (1.71%). Domestic commercial banks have a higher proportion of variable interest rate loans in their loan portfolios, and thus interest income has been increasing rapidly amid the rising interest rates, while the increase in interest expenses for deposits is relatively limited, as the share of low-cost deposits among all deposits is high.

13) In the third quarter of 2022, the average loan interest rate reached 3.91%, up by 1.11%p from the same period of the previous year (2.80%), and thus the average net interest spread for the third quarter of 2022 widened by 0.30%p YoY (2.12%p → 2.42%p).

14) From the first to third quarter of 2022, income from accumulated fees amounted to KRW 2.5 trillion, down KRW 0.4 trillion YoY, while securities recorded a loss of KRW 1.0 trillion, down KRW 1.9 trillion YoY.

15) In September 2022, the weighted average loan interest rate at deposit-taking banks (based on new loans) was 4.71%, up 1.75%p from the same period of the previous year (2.96%).

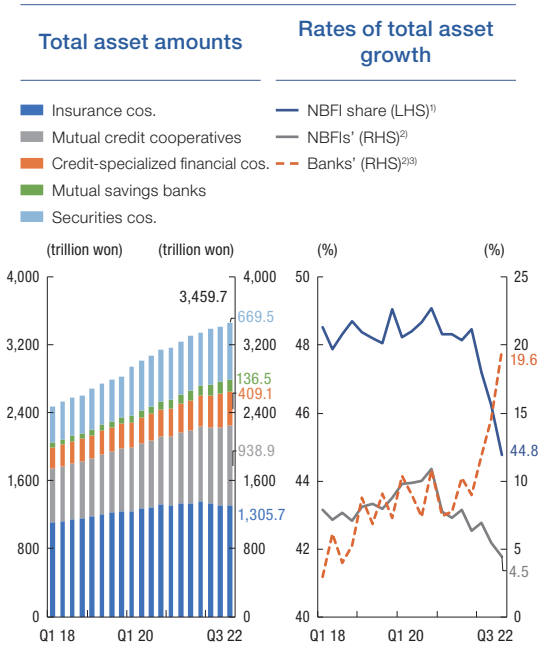
16) On October 27, the Financial Services Commission announced a measure to ease regulations on the loan-to-deposit (LTD) ratio in order to relieve the upward pressure on loan interest rates amid competition among financial institutions to attract deposits to observe the LTD ratio and to create capacity to extend new loans.

2. Non-Bank Financial Institutions

Slowing Asset Growth

Total assets held by NBFIs at the end of the third quarter of 2022 amounted to KRW 3,459.7 trillion, up 4.5% YoY, showing that the rate of growth has slowed rapidly since 2021. As a result, the proportion of total assets held by NBFIs among the overall financial sector[17] (KRW 7,726.1 trillion) declined to 44.8% at the end of the third quarter, reaching the lowest level since the end of the first quarter of 2013 (44.6%) (Figure III-9).

Figure Ⅲ-9. NBFI total assets and its growth rate

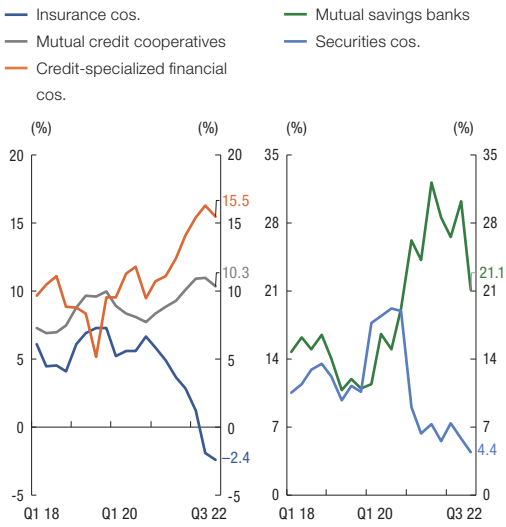


Notes: 1) Total assets of NBFIs / (Total assets of banks + Total assets of NBFIs).
2) Year-on-year basis.
3) Including commercial banks, specialized banks and foreign bank branches.
Sources: Financial institutions' business reports.

By sector, total assets held by insurance companies decreased by 2.4% YoY due to a decline[18] in the value of bonds amid the rise in interest rates. Total assets at securities companies increased by only 4.4% YoY owing to a decrease[19] in investor deposits related to stock investments, which was caused by a slump in the stock market and a decline in bond prices. Total assets at savings banks soared by 21.1% YoY, but with the rate of growth slowing significantly.

On the other hand, total assets at credit-specialized finance companies surged by 15.5% YoY thanks to increases in credit card receivables from credit card companies[20] and corporate loans from capital companies.[21] Total assets at mutual credit cooperatives expanded by 10.3% YoY, led by corporate loans related to real estate (Figure III-10).

Figure Ⅲ-10. NBFI rates of total asset growth by sector[1)2)]



Notes: 1) Year-on-year basis.
2) Excluding accounts receivable for securities companies.
Sources: Financial institutions' business reports.

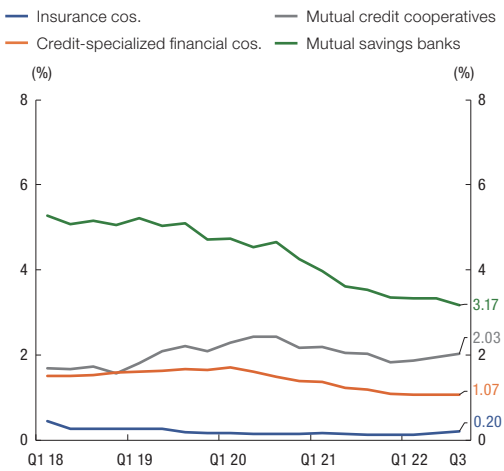
17) This includes banks and NBFIs. Banks include commercial banks, special banks, and Korean branches of foreign banks.
18) At the end of the third quarter of 2022, the balance of securities at insurance companies (including securities held to maturity) decreased by 5.2% YoY because of rising interest rates.

Satisfactory Level of Asset Soundness

Asset soundness at NBFIs was generally good.

The substandard-or-below loan ratio at savings banks at the end of the third quarter of 2022 was 3.17%, showing a continuous decline thanks to loan growth.[22] The ratio at credit-specialized finance companies at the end of the third quarter of 2022 stood at 1.07%, representing a steady decline from the end of the first quarter of 2020. The ratio at insurance companies was 0.20% at the end of the third quarter of 2022, recording a slight increase from the end of the first quarter (0.13%), but still remaining at a low level. Mutual credit cooperatives recorded a ratio of 2.03%, edging up from the end of the first quarter (1.87%) as the amount of substandard-or-below corporate loans climbed[23] (Figure III-11).

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



Sources: Financial institutions' business reports.

This continued overall satisfactory asset soundness at NBFIs is in large measure thanks to the impact of the extension of COVID-19-related financial support measures by the government. Hence, caution is needed concerning the possibility that if the end of financial support measures coincides with a rise in interest rates and a deterioration in the real estate market, it will likely undermine asset soundness.

19) As investor sentiment cooled significantly due to a slump in the stock market amid higher interest rates, investor deposits dropped by 31.2% YoY at the end of the third quarter of 2022.

20) Credit and check card payments in the first half of 2022 (KRW 516.0 trillion) surged by 11.5% YoY due to an increase in travel and dining out with the scrapping of the COVID-19 social distancing guidelines.

21) Capital companies have diversified their business areas, having expanded their corporate loans related to real estate development since 2015 in order to cope with fierce competition in the installment payment and lease sectors, a favorable real estate market, and stricter regulations concerning household loans. As a result, the share of corporate loans out of the total amount of assets at capital companies rose from 27.3% at the end of 2015 to 35.9% at the end of the third quarter of 2022.

22) However, the substandard-or-below loan ratio at savings bank at the end of the third quarter of 2022 reached 13.69%, which is higher than the ratios in other sectors (mutual credit cooperatives 2.16%, insurance companies 0.27%, credit-specialized finance companies 2.55%), and the value of substandard-or-below loans has been on the rise (end of the fourth quarter of 2021, KRW 14.3 trillion → end of the third quarter of 2022, KRW 17.9 trillion). This suggests that asset soundness at savings banks may deteriorate with higher interest rates and a slump in the real estate market.

23) At the end of the third quarter of 2022, the substandard-or-below loan ratio for corporate loans issued by MG community credit cooperatives stood at 3.64%, up 0.35%p YoY.

Declining Profitability

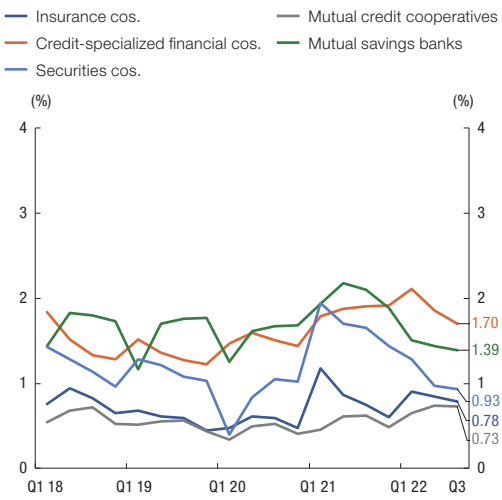
Profitability at NBFIs fell in most sectors, except for mutual credit cooperatives, and especially at securities companies and savings banks.

The ROA at savings banks continued slipping, falling to 1.39% at the end of the third quarter of 2022, from 2.17% in the second quarter of 2021, due to the narrowing interest margin amid an increase in funding interest rates and loan loss reserves.

The ROA at securities companies stood at 0.93%, showing a continuous decline after peaking (1.95%) in the first quarter of 2021, owing to a decrease in fee income associated with declining equity transactions. The ROA at credit-specialized finance companies recorded 1.70%, down by 0.21%p YoY due to rising funding interest rates.[24)]

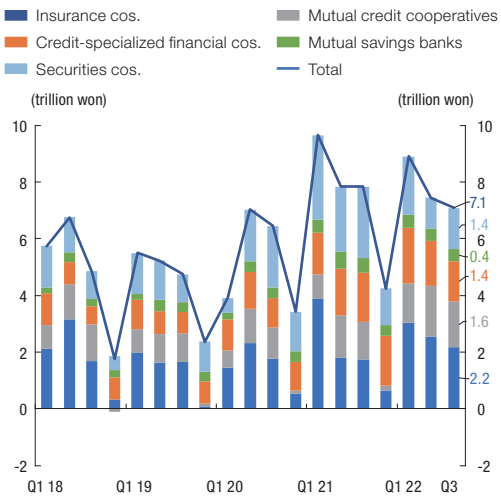
The ROA at mutual credit cooperatives was 0.73% in the third quarter of 2022, up 0.11%p YoY thanks to the increasing interest income driven by interest rate hikes and loan growth. The ROA at insurance companies in the third quarter of 2022 was 0.78%, which is close to that of the same period of the previous year (0.75%) (Figure III-12, Figure III-13).

Figure Ⅲ-12. NBFI ROAs[1)]



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

Figure Ⅲ-13. NBFI net incomes[1)]



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

24) Bonds issued by credit-specialized finance companies (A+ ratings, three-year) jumped from 2.23% in 2021 to 4.29% during the period from January to September 2022.

3. Interconnectedness

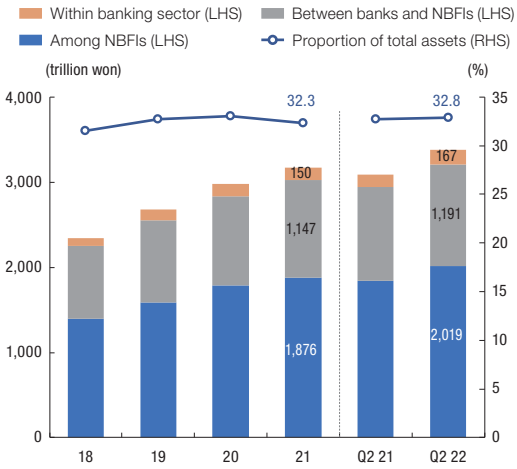
Increased Growth in Mutual Transactions

Mutual transactions between financial institutions[25] reached KRW 3,377 trillion at the end of the second quarter of 2022, up by 9.3% YoY, showing a moderate increase.[26]

This is largely attributed to an increase in incentives for transactions within the financial sector, such as the increase[27] in derivative transactions between banks and foreign bank branches amid the elevated volatility in financial markets. As a result, the share of mutual transactions out of total financial sector assets (KRW 10,281 trillion, based on flow of funds statistics) was 32.8% in the second quarter of 2022, showing a slight rise from the second quarter of 2021 (32.7%).

As for mutual transactions between financial institutions by sector, transactions between banks (KRW 167 trillion) rose by 13.6% 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 2,019 trillion) climbed by 9.6% YoY owing to an increase in investment funds being operated by insurance companies. Mutual transactions between banks and NBFIs (KRW 1,191 trillion) soared by 8.2% as banks increased their funding operations with credit-specialized finance companies (Figure Ⅲ-14).

Figure Ⅲ-14. Mutual transactions among financial institutions and across sectors[1)2)3)]



Notes: 1) Mutual transaction amounts are on an end-period basis (flow of funds statistics).
2) Figures in parentheses are the proportion of the total amount of mutual transactions.
3) Based on end-Q4 of each year.
Source: Bank of Korea.

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 the second quarter of 2022, mutual transactions between banks and trusts were the largest[28] (KRW 269.4 trillion), followed by transactions between insurance

25) 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 Financial Stability Report December 2016 "Analysis of Financial Stability Issues Ⅲ, Analysis of Banking System Interconnectedness, and Measurement of Cross-sectional Systemic Risk."

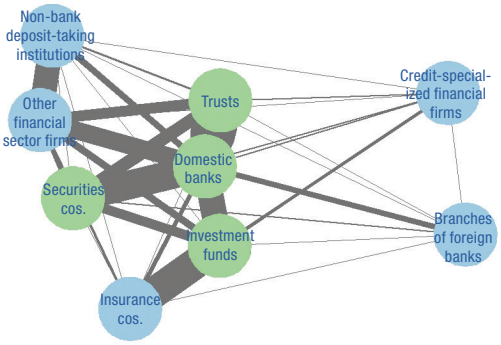
26) The YoY growth rate of mutual transactions between financial institutions was 10.4% at the end of the second quarter of 2020, 6.5% at the end of the second quarter of 2021, and 9.3% at the end of the second quarter of 2022.

27) The size of derivatives transactions between banks and foreign bank branches stood at KRW 42 trillion at the end of the second quarter, up 162.5% YoY (KRW 16 trillion at the end of the second quarter of 2021).

28) Banks raised KRW 254.1 trillion in funds from trusts, while trusts raised KRW 15.3 trillion from banks.

companies and investment funds[29] (KRW 228.2 trillion) and transactions between securities companies and banks[30] (KRW 217.2 trillion) (Figure III-15).

Figure Ⅲ-15. Financial sector interconnectedness map[1)2)]



Notes: 1) ● indicates the four highest-ranked financial sectors in terms of their mutual transaction volumes.
2) Using a network visualization analysis, centrality, concentration, and line thicknesses are all proportional to the mutual transaction volumes.
Source: Bank of Korea.

Looking at mutual transactions by product, transactions in derivatives and stocks increased. In particular, the size of derivative transactions jumped in response to a surge in foreign exchange swaps between banks and foreign bank branches[31] (KRW 57.6 trillion → KRW 133.8 trillion) (Table III-1).

Table Ⅲ-1. Volumes of mutual transactions across financial sectors, by product

(trillion won, %, %p)

Product	End-Q2 2021		End-Q2 2022		B-A
	Amount	Share (A)	Amount	Share (B)	
Deposits	728.3	23.6	767.8	22.7	39.5
Bonds	695.2	22.5	736.1	21.8	40.9
Stocks[1)]	613.2	19.8	664.0	19.7	50.8
Loans	153.0	5.0	170.9	5.1	17.9
Repos	168.5	5.5	154.4	4.6	-14.1
Derivatives	57.6	1.9	133.8	4.0	76.2

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

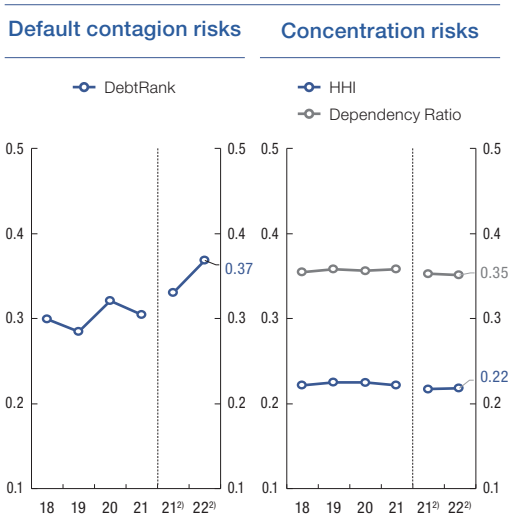
Slight Rise in Default Contagion Risk

DebtRank,[32] an indicator of default contagion risk, rose slightly YoY in transactions between financial sectors, owing to an increase in foreign exchange swap transactions by foreign bank branches. Meanwhile, the Herfindahl-Hirschman Index (HHI),[33] which indicates concentration risk and the dependency ratio[34] of a single counterparty in mutual transactions between financial sectors,

29) Insurance companies raised KRW 5.0 trillion from investment funds, while investment funds raised KRW 223.2 trillion from insurance companies.
30) Securities companies raised KRW 44.0 trillion from banks, while banks raised KRW 173.1 trillion from securities companies.
31) At the end of the second quarter of 2022, the balance of derivatives at deposit-taking institutions amounted to KRW 210 trillion, up 258.8% from 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 rate (end of 2021, KRW 1,185 → end of June 2022, KRW 1,301) and higher market interest rates (three-year Treasury bonds, end of 2021, 1.80% → end of June 2022, 3.55%).
32) 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, Stefano, et al. "DebtRank: Too Central to Fail - Financial Networks, the Fed, and Systemic Risk," 2012).
33) 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 the weight were based on the size of the funding transactions.

remained at a level generally similar to that of the same period last year (Figure III-16).

Figure Ⅲ-16. Default contagion and concentration risks among financial sectors[1)]



Notes: 1) End-period basis.
2) End-Q2 basis.
Source: Bank of Korea.

34)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 the weight were based on the size of the funding transactions.

Ⅳ. Capital Flows

From January to November 2022, domestic portfolio investment by foreigners recorded a net inflow, with stock investment funds showing a net outflow, and bond investment funds a net inflow.

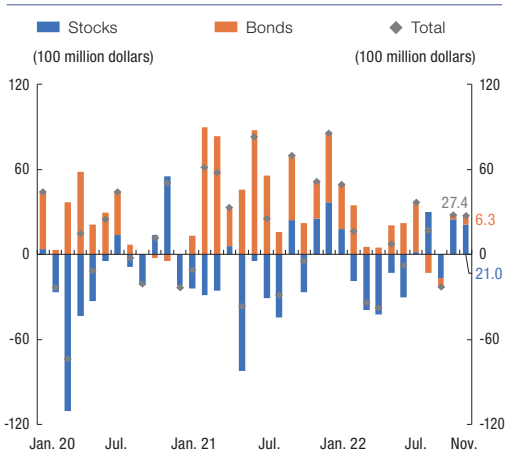
Overseas portfolio investment by residents saw a net investment fall, mostly in stocks, as investment sentiment cooled.[1)]

Net Inflow of Foreign Portfolio Investment into Domestic Securities

From January to November 2022, portfolio investment in domestic securities by foreigners[2)] recorded a net inflow of USD 8.1 billion (stocks USD -6.4 billion, bonds USD 14.5 billion). In the first half of the year, stock investment by foreigners recorded a significant net outflow due to concern over a tighter monetary policy at the U.S. Federal Reserve and escalating geopolitical risks related to Ukraine. During the second half, in July and August, stock investment by foreigners registered a net inflow on the back of expectations for a moderation of global inflationary pressure with a decline in oil prices, but in September, it returned to a net outflow amid worries over stronger tightening in major economies. In October and November, stock investment by foreigners shifted to a net inflow thanks to the inflow of funds to purchase stocks at low prices and to expectations for an improvement in some business sectors.

At the beginning of the year, bond investment by foreigners maintained the level of inflow recorded last year, led by public funds, but they decreased after March when the U.S. Federal Reserve started its interest rate hikes. From May to July, the size of bond investment inflows increased significantly, mostly from private funds, because of the stronger incentive for arbitrage transactions. In August and September, however, bond investment by foreigners shifted to a net outflow due to the reversal of the Korea-U.S. policy rate spread and an increase in amounts reaching maturity. In October and November, with the surging inflow of private funds, a slight net inflow was recorded (Figure Ⅳ-1).

Figure Ⅳ-1. Changes in foreigner domestic portfolio investment[1)]



Note: 1) A plus sign indicates a net inflow, and a minus sign indicates a net outflow.

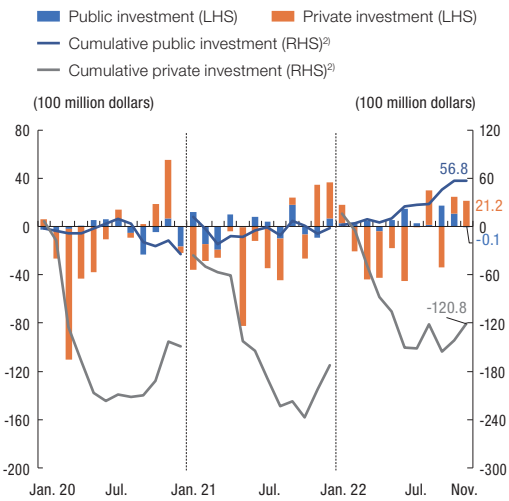
Source: Bank of Korea.

By investor type, stock investment recorded a net outflow, driven by private investors, and bond investment saw a net inflow, also led by private investors (Figures Ⅳ-2 and Ⅳ-3).

1) For details, refer to Box 4 "Characteristics and Implications of Recent Movements of Portfolio Investments by Foreigners and Residents."

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

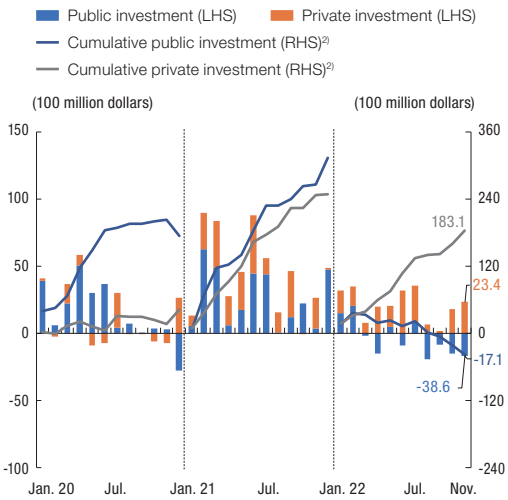
Figure Ⅳ-2. Net foreigner stock investment inflows,[1] by investor type



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

Source: Bank of Korea.

Figure Ⅳ-3. Net foreigner bond investment inflows,[1] by investor type



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

Source: Bank of Korea.

At the end of November 2022, the balance of stock investment by foreigners reached KRW 625 trillion, accounting for 27.6%[3] of stock market capitalization,[4] down by 2.1%p from the end of last year (29.7%). Meanwhile, the balance of bond investment by foreigners amounted to KRW 232 trillion, representing 9.8% of total listed bond value, up by 0.2%p from the end of the previous year (9.6%).

Caution is needed because the volatility of bond and stock investments by foreigners can surge in response to monetary policies in major economies and due to concern over any global economic recession.

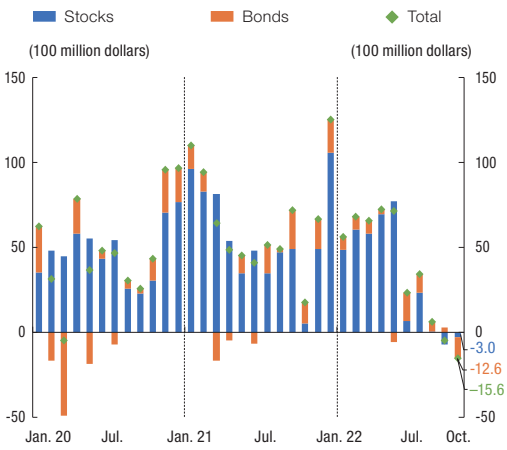
Slowing Growth of Overseas Portfolio Investment by Residents

From January to October 2022, overseas portfolio investment by Korean residents stood at USD 37.6 billion (stocks USD 33.3 billion, bonds USD 4.3 billion), showing slower growth compared to the same period last year (total of USD 59.2 billion, with USD 53.1 billion in stocks and USD 6.1 billion in bonds) (Figure Ⅳ-4). This is largely attributed to the decline in net investment in stocks amid the sluggish investment sentiment, due to the decline in stock prices in major economies.

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

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

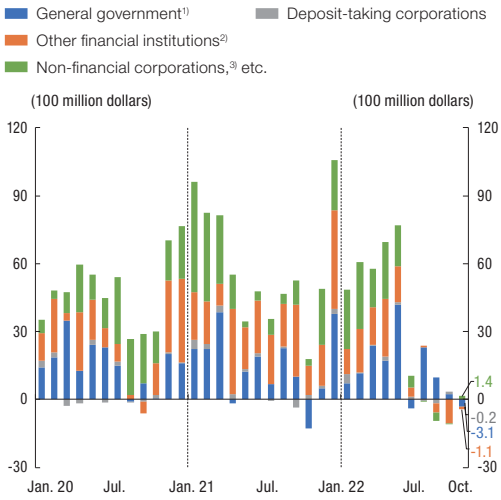
Figure Ⅳ-4. Changes in residents' overseas portfolio investment[1)]



Note: 1) A plus sign indicates a net inflow, and a minus sign indicates a net outflow.
Source: Bank of Korea.

By investor type, net investment in stocks decreased, driven mainly by other financial corporations, such as asset management companies and non-financial corporations, as inflows into overseas investment funds and overseas stock investment by individual investors slowed in response to the decline in global stock prices (Figure Ⅳ-5).

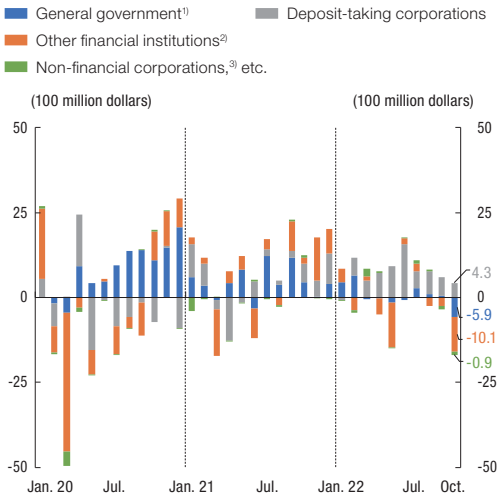
Figure Ⅳ-5. Net residents' overseas stock investment outflows, by investor type



Notes: 1) National Pension Service (NPS), Korea Investment Corporation (KIC), etc.
2) Insurance companies, asset management companies, etc.
3) Including individual investors.
Source: Bank of Korea.

Net investment in bonds shrank among the general government, insurance companies, and other financial corporations, such as asset management companies, amid growing concern of decreasing expected returns with rising global interest rates after the tightening at the U.S. Federal Reserve (Figure Ⅳ-6).

Figure Ⅳ-6. Net residents' overseas bond investment outflows, by investor type



Notes: 1) National Pension Service (NPS), Korea Investment Corporation (KIC), etc.
2) Insurance companies, asset management companies, etc.
3) Including individual investors.
Source: Bank of Korea.

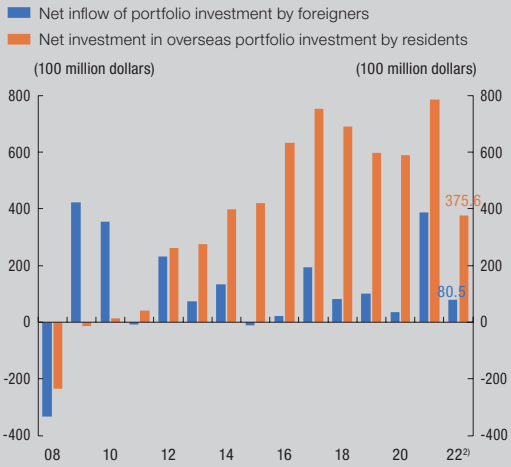
Overseas portfolio investment by Korean residents is expected to maintain a continuous net outflow as pension funds intend to expand their share of overseas portfolio investment. However, the continued monetary policy tightening in major economies, a possible global economic recession, worries over an economic slowdown in China, and growing volatility in international financial markets may act as constraints.

Box 4.

Characteristics and Implications of Recent Movements of Portfolio Investments by Foreigners and Residents[1)]

With the impact of the U.S. Federal Reserve's tighter monetary policy this year, the inflow of foreigners' portfolio investments into domestic securities has decreased significantly, and the outflow of residents' portfolio investments into overseas securities far exceeded the inflow of foreigners' portfolio investments into domestic securities. This has led to concern over the deterioration of the foreign exchange supply and demand conditions. In particular, in the second half of this year, the policy rate of the United States has risen above that of Korea, and the volatility of international financial markets has increased, elevating market vigilance in domestic financial markets.

Inflow and outflow of portfolio investment by residents and foreigners[1)]



Notes:1) (+) is net inflow in the case of foreigner's portfolio investment, and net investment in resident's overseas portfolio investment.
2) Net inflow of foreigner's portfolio investment from January to November, while net investment of resident's overseas portfolio from January to October

Source: Bank of Korea

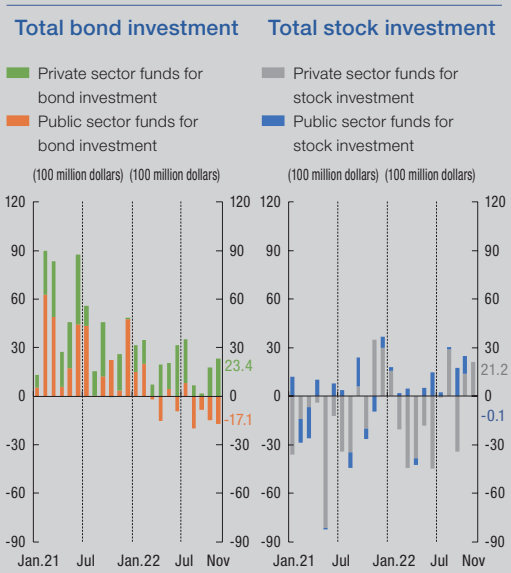
In the following, we examine the characteristics of the movement of portfolio investments by foreigners and residents in response to changes in conditions at home and abroad, and look at the possibility that the outflow of portfolio investments will increase.

Foreigners' Domestic Portfolio Investments

This year, foreigners' domestic portfolio investments recorded a moderate net inflow (USD 8.1 billion) and showed somewhat conflicting flows by type of securities and investor.

1) This article was authored by Park Jin-hyung and Kim Seon-an (Capital Flows Analysis Team), and Ahn Ju-eun and Cho Deun-chan (Foreign Exchange Analysis Enhancement Section). It was reviewed by Shin Jae-hyeok (head of the Capital Flows Analysis Team), and by Park Ki-dok (head of the Foreign Exchange Analysis Enhancement Section).

Changes in foreigners' domestic portfolio investment[1)]

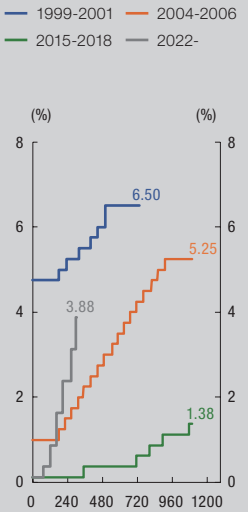


Note: 1) '+' means net inflow and '-' means net outflow.
Source: Bank of Korea.

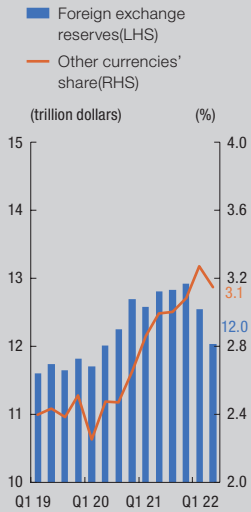
First, regarding the trend of foreigners' domestic bond investments[2)] by investor type, while public sector funds shifted to a net outflow after the policy rate hikes by the U.S. Federal Reserve, private sectors funds maintained a net inflow, showing different trends than before.[3)]

Public sector funds for bond investments (hereafter "public funds in bonds"), which had recorded a massive net inflow last year, showed a substantially reduced inflow after the policy rate hikes by the U.S. Federal Reserve, and shifted to a net outflow in August 2022, which has persisted since then. This shift to a net outflow of public funds in bonds appears to be attributable to the increased intervention of emerging market economies in foreign exchange markets,[4)] the rise of the KRW/USD exchange rate, and foreign interest rates exceeding domestic interest rates.[5)]

U.S. Federal Reserve's policy interest rate trend[1)2)]



Global foreign exchange reserves and other currencies' share[3)]



Note: 1) Based on the median value of the target range of the policy interest rate.
2) The x-axis is the period after the start of interest rate hikes(days)
3) Currencies other than major currencies(USD, EUR, JPY, GBP, CNY, AUD, CAD, CHF), including Korean won
Sources: Bloomberg, IMF.

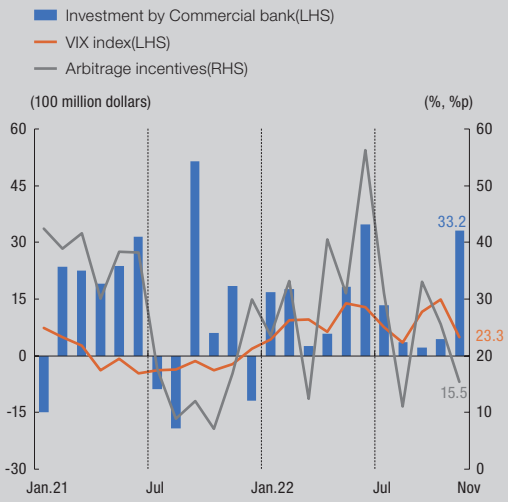
However, only six of 19 large overseas public institutions that invest in domestic bonds[6)] recorded an outflow this year, and only three institutions saw their net outflows exceed the size of matured bonds, making it difficult to claim that the outflow of public funds in bonds was exces-

3) While public sector funds have continuously flowed in since the Global Financial Crisis, private sector funds have shown high volatility in their inflows and outflows, depending on changes in international financial markets.
4) During the period from January through July 2022, the size of emerging market countries' intervention in foreign exchange markets is estimated to be over 6% of their foreign exchange reserves (IMF, October 2022).
5) The reduction of a country's foreign exchange reserves due to increased intervention in foreign exchange markets decreases overseas investment capacity, and as exchange rates rise and as a reversal of domestic and foreign interest rates occurs, it undermines any incentive to invest in domestic bonds.
6) Based on institutional investors whose portfolios in Korea's domestic bonds exceeded USD 500 million at the end of 2021.

sive in any way.

On the other hand, as for private sector investment in domestic bonds, the net inflow continued mostly among commercial banks. Even when the risk aversion sentiment seen in global markets surged significantly with the dramatic increase in the VIX Index this year, the stronger arbitrage incentive resulted in a net inflow of domestic bond investment by commercial banks.

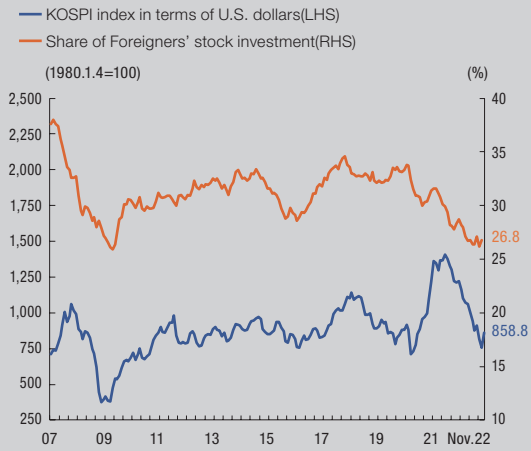
VIX, arbitrage incentives[1] and bond investment by commercial bank



Note: 1) Monetary stabilization bond(3months) - LIBOR(3months) - Swap rate(3months)
Sources: Bank of Korea, Bloomberg.

In the first half of this year, foreigners' investments in domestic stocks recorded a significant outflow on worries over a tightening of the monetary policy at the U.S. Federal Reserve and over Russia's invasion of Ukraine, but in the second half, they recorded a net inflow overall. The shift of foreigners' funds for domestic stock investments to a net inflow in the second half of this year is mainly attributable to the moderate improvement of investment sentiment, which was largely driven by the incentive to buy the dip after a significant decline in domestic stock prices and foreigners' adjustment of domestic stock portfolios, the decline in international oil prices since July, and expectations for the adjustment to the pace of monetary tightening at the U.S. Federal Reserve. In fact, the KOSPI fell nearly 40% in U.S. dollar terms from January through September this year, compared to the end of 2021, and the share of foreigners' stock investments was 26.2% at the end of September 2022, the lowest since the Global Financial Crisis (25.9%, April 2009).

KOSPI index in terms of U.S. dollars and share of foreigners' stock investment[1]



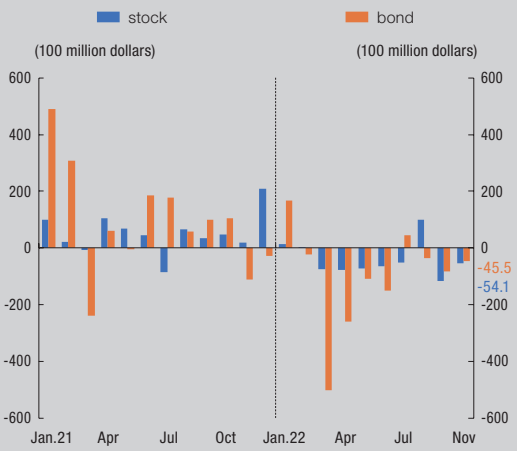
Note: 1) Based on the balance of stock holdings listed on the securities and KOSDAQ markets(ETF included)
Sources: Yonhap Infomax, Financial Supervisory Service.

By investor type, while the public sector's funds for domestic stock investments recorded a net inflow mainly from sovereign wealth funds, the private sector's funds for domestic stock investments saw a net outflow from most investors (commercial banks, securities companies, etc.), except for investment companies.

Meanwhile, although Korea experienced a net inflow this year, most emerging market econo-

mies generally saw a net outflow of foreigners' investments in bonds and stocks after the policy rate hikes at the U.S. Federal Reserve. During March and April, owing to the impact of Russia's invasion of Ukraine, investors withdrew a massive amount of investment in bonds from emerging market economies, especially China, but as the risk-seeking sentiment recovered somewhat in the second half of the year, the net outflow of funds in stocks and bonds moderated.

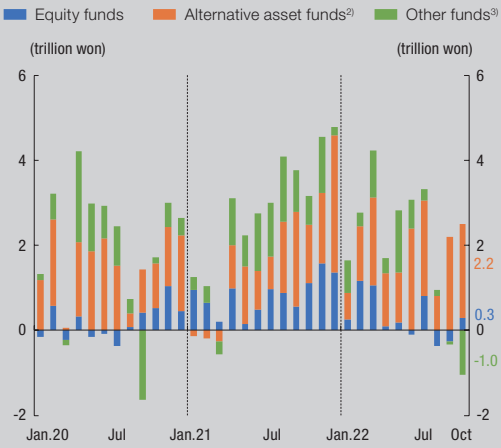
Inflows and outflows of foreign portfolio investment in emerging market countries[1)]



Note: 1) Based on 15 countries including China, India, Brazil, and Mexico.
Sources: IIF, Bloomberg.

By investor type, the growth of investment by asset management companies, especially in overseas equity, has moderated since April 2022. Investment in overseas stock funds has slowed significantly amid the global stock price fall associated with the tighter monetary policy of the U.S. Federal Reserve. On the other hand, investment in real assets overseas, such as real estate, is steadily growing.

Changes in asset management companies' overseas fund by fund type[1)]



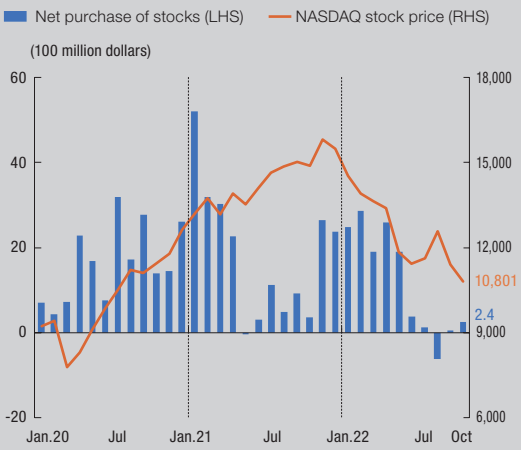
Notes: 1) Based on investor deposits.
2) Based on real estate funds, real asset funds and special asset funds.
3) Based on bond funds, fund of funds, and derivative funds.
Source: Korea Financial Investment Association.

Residents' Overseas Portfolio Investments

While residents' overseas portfolio investments reached USD 78.4 billion, a record high during 2021, investment in overseas stocks, mostly by asset management companies and individual investors, has grown at a slower pace since the start of the policy rate hikes by the U.S. Federal Reserve in March 2022. Meanwhile, it recorded a net withdrawal in September and October this year.

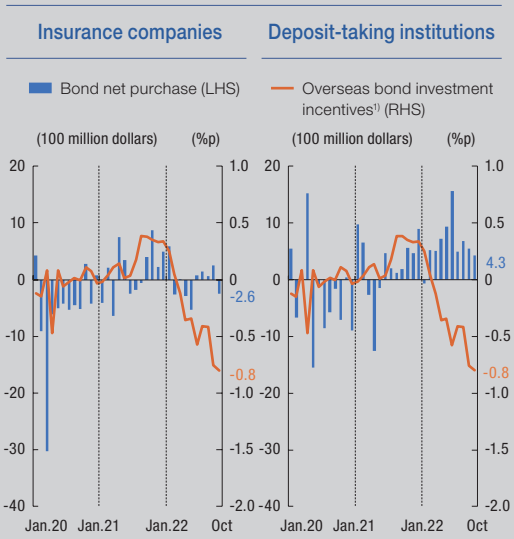
The growth in individual investors' overseas portfolio investments is also moderating. Individual investors continued to increase their investment in overseas stocks in order to buy the dip until May, after the U.S. Federal Reserve started tightening, despite the fall in technology stocks on the NASDAQ. However, as stock prices continued to fall after June, they significantly reduced new investments.

Individual investors'[1)] net purchase of overseas stock investment and trend in NASDAQ



Note: 1) Estimated to consist mostly of individuals, although a few corporations are included.
Sources: Korea Securities Depository, Bloomberg.

Net purchase and investment incentives of insurance companies' and deposit-taking institutions' overseas bond investment[1)]



Note: 1) US corporate bond (AA, 10-year) yield (1-year FX hedged) - Korea Treasury Bond (10-year) yield.
Sources: Bank of Korea, Bloomberg.

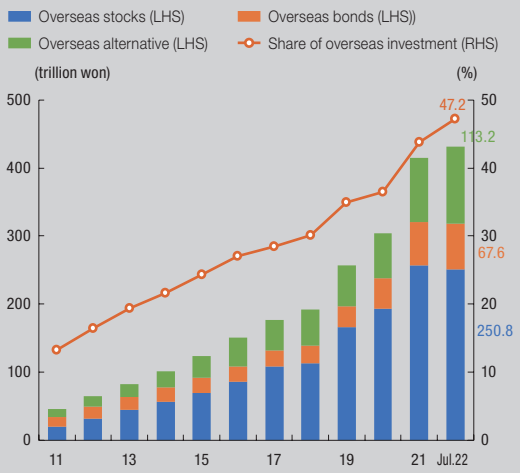
Overseas investment by insurance companies also continued to slow. Insurance companies have invested mostly in bonds, according to the nature of the sector, and amid the rise in global interest rates and tight monetary policy at the U.S. Federal Reserve this year, the incentive to invest in overseas bonds declined due to rising concern over decreasing bond yields.

On the other hand, overseas investment by deposit-taking institutions, largely in bonds, climbed this year. This appears to be a result of the preemptive efforts at mostly banks to secure U.S. dollar liquidity with the termination of the foreign currency LCR deregulatory measures[7)] and to cope with the appreciation of the U.S. dollar associated with the tightening at the U.S. Federal Reserve.

Overseas investment by the National Pension Service grew at a faster pace during the first half of this year, but slowed in the second half. The National Pension Service has maintained an investment strategy to raise the target share of its overseas investments, given the relatively small domestic capital market compared to the size of the assets it has in operation.[8)] However, in the second half, it has been reducing net investments as the share of overseas investments approached the target share of overseas investments for 2022,[9)] as well as to raise profitability in tandem with the sharp depreciation of the Korean won against the U.S. dollar.

7) In accordance with "Gradual Normalization of Temporary Deregulatory Measures" (Financial Services Commission, Financial Supervisory Service, March 30, 2022), the measure to ease banks' LCR regulatory ratio (from 80% to 70%) ended at the end of June 2022.
8) According to the mid-term asset allocation plan of the National Pension Service (Ministry of Health and Welfare, July 31, 2020), the share of overseas investment is planned to rise from 35% in 2019 to 55% in 2025.
9) The share of overseas stocks and bonds out of total financial assets at the end of September 2022 was 27.6% and 7.8%, respectively, falling close to the target share of overseas investment for 2022 (27.8% and 8.0%).

Outstanding amount and share of NPS' overseas investment[1)]



Note: 1) Including outward portfolio investment and direct investment.
Source: NPS.

Assessment and Implications

With the tight monetary policy of the U.S. Federal Reserve, net inflows of foreigners' domestic portfolio investments have contracted drastically this year, and the pace of residents' overseas portfolio investments has been slowing somewhat.

Going forward, it is unlikely that foreigners' domestic portfolio investments will swing to a large net outflow despite the U.S. policy rate exceeding the Korean policy rate. As for investment in bonds, although a net outflow is continuing among some public sector institutions, private sector funds at commercial banks are expected to maintain a net inflow. As for investments in stocks, an increase in outflows is likely to be limited as most foreigners' portfolio adjustments have already been made to a large extent.

Meanwhile, residents' overseas portfolio investments are expected to see new investments (net outflow) given the strategy of domestic pension funds to expand overseas investments and the smaller size of residents' overseas portfolio investments compared with that in advanced economies.[10)]

Nonetheless, if monetary tightening at the U.S. Federal Reserve persists longer than the market expects, there is a possibility that a massive volume of foreigners' portfolio investments will exit emerging market economies, including Korea, as risk aversion sentiment spreads. Regarding residents' overseas portfolio investments, some external investment assets tend to return (a net redemption) during times of global financial unrest, which will offset some of the outflow of foreigners' domestic portfolio investments.

The expansion of the net outflows of foreigners' domestic portfolio investments and residents' overseas portfolio investments, amid the recent decline in surplus on the current account, will likely worsen foreign exchange supply and demand, and increase exchange rate volatility, destabilizing the domestic financial system. In this regard, changes in the flow of funds of portfolio investments need to be monitored closely.

10) Korea's external financial assets related to securities investment accounted for 46% of its GDP in 2021, lower than the share in advanced economies such as Japan (103%) and Australia (76%).

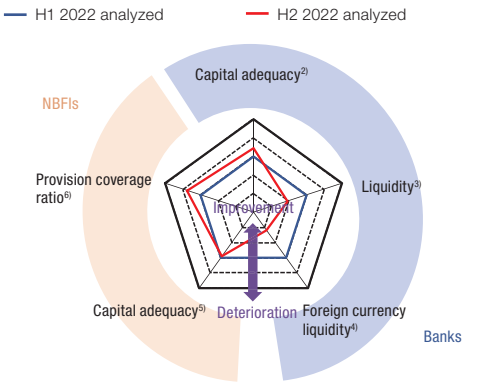
Resilience of Financial System

I. Financial Institutions

Bank resilience has been maintained at a sound level. Capital ratios, measuring their capacity to absorb losses, are well above the regulatory minimums, while the liquidity ratio, a key indicator of the ability to withstand liquidity stresses, has improved as well.

Resilience among NBFIs has also remained at an adequate level, with capital ratios exceeding the regulatory minimums for most types of institutions. However, liquidity risks appear to have increased somewhat at some institutions, including securities companies, specialized credit financial companies, and mutual savings banks[1] (Figure I-1).

Figure I-1. Map of changes in financial institution resilience[1]



Notes: 1) Extent of change as of end-Q3 2022 (end-October 2022 for bank liquidity and foreign currency liquidity) compared to end-Q1 2022.
2) Total capital ratio under Basel III.
3) Liquidity coverage ratio (LCR).
4) Foreign currency LCR.
5) Weighted average of NBFI sector's capital adequacy ratios by their total assets.
6) Excluding securities companies.
Sources: Bank of Korea, financial institutions' business reports.

1. Banks

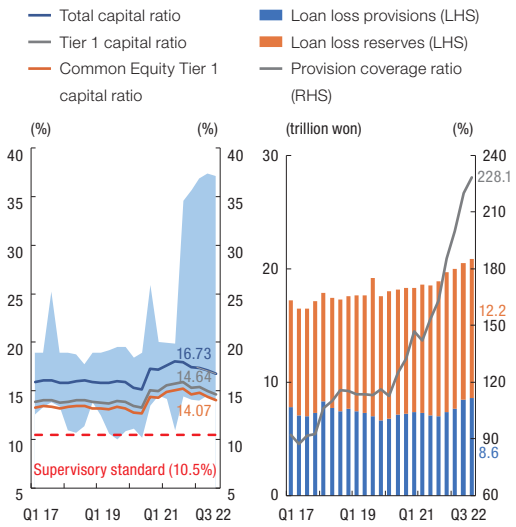
Sound Loss Absorption Capacity

At the end of the third quarter of 2022, 'the capital adequacy ratio (BIS ratio) and the common equity Tier 1 (CET1) ratio at banks fell 0.62%p and 0.71%p from the end of the first quarter (17.35%, 14.78%) to 16.73% and 14.07%, respectively. This change was due to the overall increase in risk-weighted assets, caused by the expanded issuance of corporate loans and rising exchange rates, pushing up the won-converted value of foreign currency-denominated assets.[2] The total capital ratio edged lower from the level in the first quarter of 2022 for most banks (10 banks), although it still largely exceeded the regulatory minimum requirement for 2022 (10.5%, D-SIB[3] 11.5%, internet-only banks 9.875%) for all of them.

The provision coverage ratio, an indicator of a bank's capacity to absorb expected losses, stood at 228.1% at the end of the third quarter of 2022, representing a 28.4%p increase compared to the end of the first quarter (199.7%). In anticipation of a growing debt service burden for borrowers amid rising interest rates, banks ramped up provisions against bad loans (KRW +1.2 trillion) during this period. However, the higher provision coverage ratio had also to do with a sharp increase in new loan originations, coupled with the limited occurrence of new substandard-or-below loans thanks to the extension of forbearance measures by the government (Figure I-2, Figure I-3).

1) For details, refer to Box 5 "Changing External and Domestic Conditions and Their Impact on the Liquidity Risk of Non-bank Financial Institutions."
2) For details, refer to Analysis of Financial Stability Issues III "Transmission Channels of Exchange Rate Risk to the Financial Sector and Its Impacts."

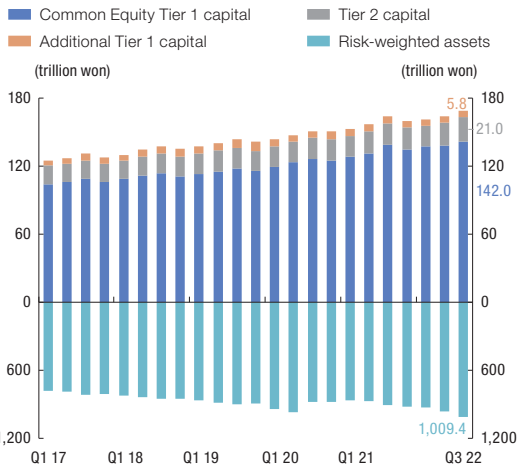
Figure Ⅰ-2. Commercial bank Basel III capital ratios[1)2)3)4)] and provision coverage ratio[1)2)]



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 standards: 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).
4) Shaded area indicates distribution of individual banks' total capital ratios.

Sources: Commercial banks' business reports.

Figure Ⅰ-3. Commercial bank capital ratio decomposition[1)2)]



Notes: 1) End-period basis.
2) From Q4 2016, Common Equity Tier 1 capital includes loan loss reserves.

Sources: Commercial banks' business reports.

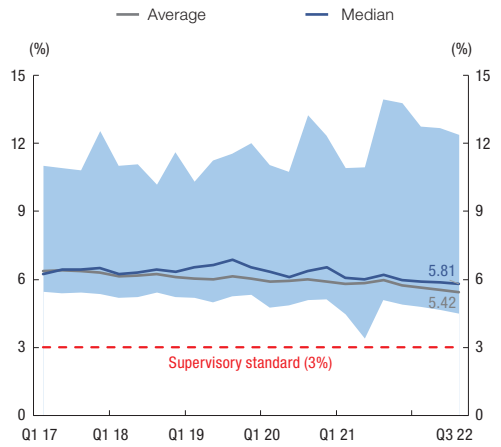
At the end of the third quarter of 2022, 'the average bank leverage ratio[4)] was measured at 5.42%, with the ratio of most institutions significantly exceeding the regulatory minimum (3%). However, this represents a 0.21%p drop from the end of the first quarter, as rising exchange rates caused bank exposure to increase substantially[5)] during this period, even though their capital was buoyed by higher net income (Figure I-4).

3) Domestic systemically important banks (D-SIB) 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 Finance Holdings).

4) The leverage ratio is the same as the simple Tier 1 capital ratio under the Banking Business Supervision Regulations. This regulatory indicator was introduced to limit the build-up of excessive leverage in the banking sector to prevent a sudden deleveraging in times of stress, which can amplify a crisis. As this ratio is calculated based on total exposure, it complements the minimum capital ratio requirement based on risk-weighted assets. In Korea, the leverage ratio was included among supplementary indicators in the first quarter of 2015 and was used as a core indicator starting from 2018. From January 2020, the leverage ratio requirement has also been applied to internet-only banks.

5) Although the Tier 1 capital of commercial banks increased by 3.5%, their risk-weighted assets rose by 7.6%, leading to an overall decline in the leverage ratio.

Figure I-4. Commercial bank leverage ratios[1)2)3)]

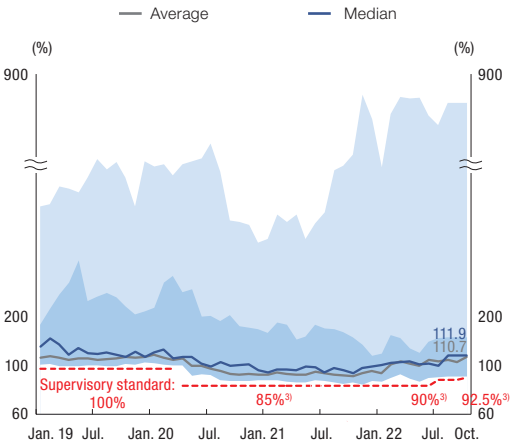


Notes: 1) Tier 1 capital (Common Equity Tier 1 capital + Additional Tier 1 capital) / Total exposure; end-period basis.
2) Auxiliary indicator until 2017, implemented as regulatory standard from 2018.
3) Shaded area indicates distribution of individual banks' leverage ratios.
Sources: Commercial banks' business reports.

Generally Satisfactory Level of Liquidity Response Capacity

In October 2022, 'the liquidity coverage ratio (LCR) at banks stood at 110.7%, up 4.3%p from March (106.4%). This rise is due to an increase in high-quality liquid assets, as banks strove to attract more time deposits[6)] ahead of the restoration of regulatory ratios to their pre-pandemic levels, and in anticipation of stress in capital markets. However, the restoration of the total LCR ratio requirement was postponed in October,[7)] which will likely ease the pressure on banks to acquire additional high-quality liquid assets. Although the liquidity coverage ratio was above the regulatory minimum (90% for July-September 2022, 92.5% for October 2022-June 2023) for all banks, the intra-month LCR value at some institutions hovered near the minimum level. Attention must therefore be paid to potential liquidity risks (Figure I-5).

Figure I-5. Commercial bank LCRs[1)2)]

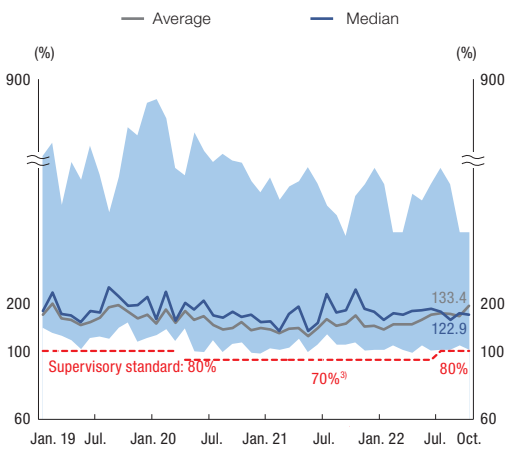


Notes: 1) High-quality liquid assets/Total net cash outflows over next 30 calendar days; monthly average balance basis.
2) Shaded area indicates distribution of individual banks' LCRs, and deep shaded area indicates distribution with internet-only banks excluded.
3) Temporarily applied to 85% from April 2020 to June 2022, 90% from July to September 2022, and 92.5% from October 2022 to June 2023.
Sources: Commercial banks' business reports.

6) Commercial bank time deposit balances increased from KRW 656.0 trillion at the end of March 2022 to KRW 787.9 trillion at the end of October 2022.
7) Financial authorities' plan to progressively raise the total LCR requirement for banks (90% for July-September 2022, 92.5% for October-December, 95% for January-March 2023, 97.5% for April-Jun 2023, 100% from July) was paused amid the turmoil in the bond and short-term money markets that began in October 2022. To stabilize financial markets, it was decided that this regulatory ratio will be held at 92.5% for October 2022 through to June 2023 (October 2022).
8) Although not a Basel III indicator, the foreign currency LCR was adopted as a core indicator in Korea, in January 2017, to ensure the stable supply of foreign currencies in the real economy, even during stress situations. The foreign currency LCR requirement is currently applied to most domestic banks, except export-import banks, internet-only banks, and some small regional banks with negligible foreign currency liabilities (Kwangju Bank, Jeju Bank). The minimum requirement was progressively increased starting in 2017 to reach the current level in 2019 (80% for commercial banks).

In October 2022, the foreign-currency LCR[8] at banks jumped 21.9%p from March (111.5%) to 133.4%. This is largely explained by bank efforts to build up liquidity through foreign currency deposits[9] in anticipation of exchange rate volatility. The foreign currency LCR was above the regulatory minimum (80%) for all banks (Figure I-6).

Figure Ⅰ-6. Commercial bank foreign currency LCRs[1)2)]



Notes: 1) High-quality liquid foreign currency assets/Total net cash outflows in foreign currency over next 30 calendar days; monthly average balance basis.
2) Shaded area indicates distribution of individual banks' foreign currency LCRs.
3) Temporary adjustment in place from April 2020 through Jun 2022.
Sources: Commercial banks' business reports.

The net stable funding ratio (NSFR),[10] gauging the stability of a bank's funding structure over the long-term, stood at 108.2% at the end of the third quarter of 2022, with all individual institutions' ratios exceeding the regulatory threshold (100%). However, this represents a slight drop from the first quarter (109.1%), which was caused by the increase in corporate loans, pushing the amount of required stable funding beyond the amount of available stable funding[11] (Table I-1).

Table Ⅰ-1. Commercial bank net stable funding ratios (NSFRs)[1)2)]

(%)

	2020		2021				2022		
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Average	111.1	112.2	111.2	111.7	110.1	111.2	109.1	108.2	108.2
Median	109.4	110.3	108.2	109.6	106.9	109.2	107.7	107.7	106.6

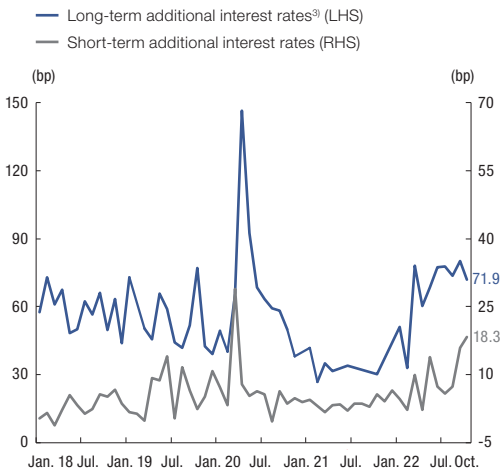
Notes: 1) Available stable funding / Required stable funding; end-period basis.
2) Supervisory standard is 100%.
Source: Commercial banks' business reports.

Significant Worsening in External Foreign Currency Funding Conditions

External foreign currency funding conditions for commercial banks have deteriorated significantly. In 2022, amid rate hikes by the U.S. Federal Reserve, the risk premium on foreign borrowings climbed higher on both short-term and long-term borrowings due to mounting worries about a global dollar liquidity squeeze (Figure I-7). The CDS premium for commercial banks rose at an equally sharp rate, but shifted to a downward trend once into November (Figure I-8).

9) At the end of the third quarter, commercial bank foreign currency deposit balances reached KRW 138.2 trillion, representing a 21.8% increase from the first quarter (KRW 113.5 trillion).
10) The NSFR requires banks to fund a certain portion of their long-term assets with stable liabilities and capital in order to limit any excessively high reliance on short-term wholesale funding. The NSFR requirement was introduced for domestic banks in January 2018 (for internet-only banks, in 2020).
11) Even though the amount of available stable funding, i.e., the numerator, rose by 5.0% from the first quarter (KRW 1,329.3 trillion) to KRW 1,395.2 trillion at the end of the third quarter on the increase in deposits and new bond issues, the NSFR fell overall as this rise was more than offset by that in the required amount of stable funding (5.8%, KRW 1,218.7 trillion at the end of the first quarter → KRW 1,289.8 trillion at the end of the third quarter), i.e., the denominator.

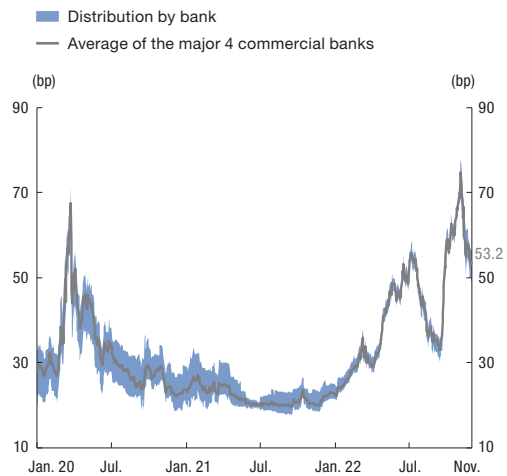
Figure Ⅰ-7. Commercial bank short- and long-term foreign currency borrowing spreads[1)2)]



Notes: 1) Borrowing Spreads based on LIBOR before April 2022, and additional interest rates based on SOFR after May 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 February 2019, December 2020, May 2021, and July-September 2021, and November-December 2021.

Source: Bank of Korea.

Figure Ⅰ-8. Commercial bank[1)] CDS premium[2)]



Notes: 1) Kookmin, Shinhan, Woori, and KEB banks.
2) 5-year maturity basis.

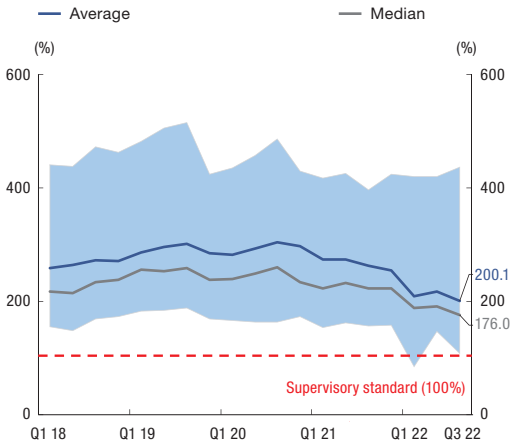
Source: Markit.

2. Non-Bank Financial Institutions

General Decline in Resilience

At the end of the third quarter of 2022, the risk-based capital (RBC) ratio[12] at life insurance companies, measuring their loss absorption capacity, dropped to 200.1%, continuing the downward trend from earlier this year, as rising market interest rates resulted in valuation losses on marketable securities[13] (Figure I-9).

Figure Ⅰ-9. Life insurance company risk-based capital (RBC) ratio[1]

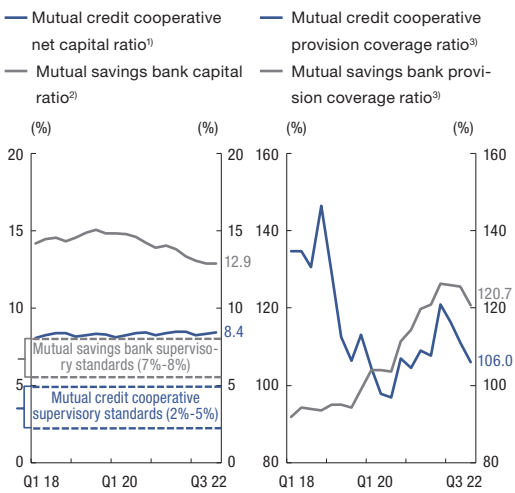


Note: 1) Amount of available capital / Amount of required capital; shaded area indicates highest and lowest value of RBC ratios among companies with assets of more than 1 trillion won.
Sources: Financial institutions' business reports.

The net capital ratio at mutual credit cooperatives, which fluctuated in a narrow range, was measured at 8.4% at the end of the third quarter. The provision coverage ratio continued on a downward trend after peaking at a high of 120.9% at the end of the fourth quarter of 2021 to stand at 106.0% at the end of the third quarter of 2022.[14]

The BIS capital ratio at mutual savings banks has fallen steadily since the end of the third quarter of 2019, dragged down by an increase in loans, to dip to 12.9% at the end of the third quarter of 2022. The provision coverage ratio, on a decline from the fourth quarter of 2021 (126.2%) onward, dropped to 120.7% at the end of the third quarter of 2022 (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.
Sources: Financial institutions' business reports.

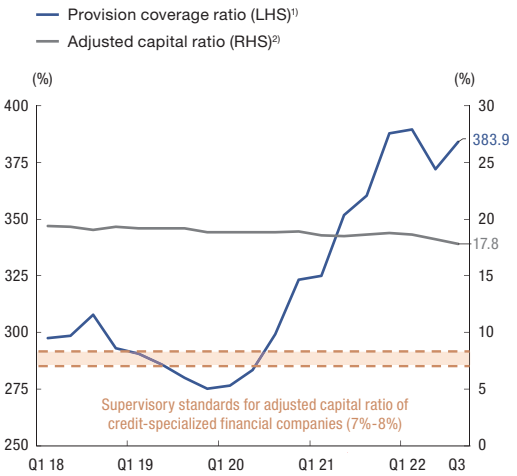
12) The risk-based capital ratio is available capital (capital available to fund liabilities) divided by required capital (capital required to fund liabilities). The amount of required capital is calculated by estimating the amounts of insurance risk, interest rate risk, credit risk, market risk, and operational risk.

13) After the planned introduction of the new reserve standard (K-ICS) in 2023, extending the applicability of mark-to-market accounting to liabilities, the interest rate sensitivity of insurance company capital ratios is expected to be reduced, as rising interest rates will lower the value of their liabilities.

14) At the end of the third quarter of 2022, while provision balances at mutual credit cooperatives increased by 6.7% from the end of the previous year, their substandard-and-below loan balance (KRW 14.0 trillion) jumped 21.6%.

At the end of the third quarter of 2022, the adjusted capital ratio at specialized credit financial companies amounted to 17.8%, which, although slightly down from the level at the end of the first quarter (18.6%), is still more than adequate. The provision coverage ratio was also maintained at a stable level of 383.9% (Figure I-11).

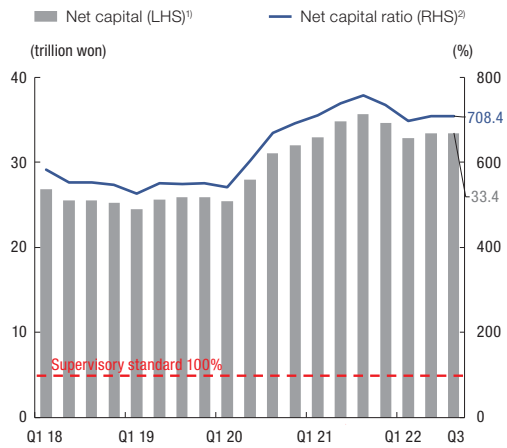
Figure Ⅰ-11. Credit-specialized financial company resilience indicators



Notes: 1) Loan loss provisions / Substandard-or-below loans.
2) Adjusted capital / Adjusted total assets; supervisory standard 7% (credit card companies 8%).
Sources: Financial institutions' business reports.

The net capital ratio at securities companies has stabilized since the first quarter of 2022 to stand at 708.4% at the end of the third quarter (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.
Sources: Financial institutions' business reports.

Although the resilience of NBFIs appears to have declined somewhat across most types of institutions, capital ratios continue to exceed the regulatory minimums for their respective sectors. Nevertheless, changing domestic and external conditions, including continuously rising interest rates and heightened volatility in the financial and foreign exchange markets, are stoking concerns about the worsening of the liquidity status of NBFIs. Securities companies and specialized credit financial companies, which rely heavily on short-term wholesale funding, are highly susceptible to jitters in the short-term money market. Meanwhile, mutual savings banks are facing an increasing risk of deposit outflows due to the narrowing of the deposit interest rate differential with banks and default worries on their real estate PF loans.[15] It is important that financial institutions with a low loss absorption capacity make efforts to build up capital and liquidity so that they may be able to proactively respond to any risks that lie ahead amid changing domestic and external conditions.

15) For details, refer to Box 5 “Changing External and Domestic Conditions and Their Impact on the Liquidity Risk of Non-Bank Financial Institutions.”

Box 5.

Changing External and Domestic Conditions and Their Impact on the Liquidity Risk of Non-Bank Financial Institutions[1)]

Amid heightened economic uncertainty, highlighted by rising global market interest rates, increased volatility in financial and foreign exchange markets, and a cooling off of the real estate market, concerns have been growing over the liquidity risk[2)] of non-bank financial institutions (NBFIs). What follows is a review and assessment of the current liquidity status and key risk factors of securities companies, credit-specialized financial companies (CSFCs), and mutual savings banks (hereafter, "savings banks").[3)]

Liquidity Status[4)]

In March 2020, at the initial outbreak of the COVID-19 pandemic, securities companies and CSFCs saw their liquidity risk increase sharply as stock prices plunged and market interest rates jumped.[5)] In 2022, amid the turmoil in the PF-ABCP market, they faced difficulties in raising funds through the short-term money markets or the bond markets from October onward.[6)] Since then, funding conditions have improved, particularly for high-rated bonds, thanks to the market stabilization measures taken by the financial authorities and the BOK. However, as market vigilance still remain elevated, especially in the CP market, and as asset markets, including stocks and real estate, continue to struggle, these institutions could very well face a new surge in liquidity risk.

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1) This paper was authored by Kim Hye-yeon, Kwon Yoon-jeong, Lee Sang-jin, Kwon Se-han, and Lee Do-hong (Non-Bank Analysis Team), and was reviewed by Lee Jong-han (head of the Non-Bank Analysis Team).

2) Liquidity risk is divided into funding liquidity risk and market liquidity risk. Funding risk refers to the situation in which a financial firm is unable to fund its current or future liabilities, while market liquidity risk is the inability to exit a position without incurring a loss due to low trading volumes or a generalized market disruption, leading to a sharp price decline. In this paper, the analysis focuses on funding liquidity risk.

3) There are also mounting concerns about the liquidity of insurance companies, which are not covered in this paper, due to the recent increase in the cancellations of savings-type insurance policies and the possibility of a massive outflow of funds from retirement accounts towards the year's end. Among the institutions covered in this paper, including securities companies, CSFCs, and savings banks, there exist significant differences in liquidity risk profiles between individual institutions, depending on the size of assets and the business model.

4) For securities companies and savings banks, liquidity was measured by the liquidity ratio (liquid assets maturing within 3 months/liquid liabilities maturing within 3 months) and for CSFCs by the immediately available liquidity ratio ((cash and deposits + immediately marketable securities + unused credit line)/(borrowings maturing within 3 months)). Although the immediately available liquidity ratio used by the financial authorities as a regulatory metric is based on borrowings maturing within a month, in this paper, borrowings maturing within 3 months were used instead to allow comparison with past data.

5) In March 2020, a wave of margin calls on assets held by securities companies as self-hedges against their derivatives risk exposure forced them to quickly come up with large amounts of additional capital (about KRW 10.1 trillion sent to overseas securities exchanges). CSFCs ran into a liquidity crunch as securities companies rushed to raise funds to meet the margin calls, stoking market vigilance in the bond market, and causing demand for their bonds to drop.

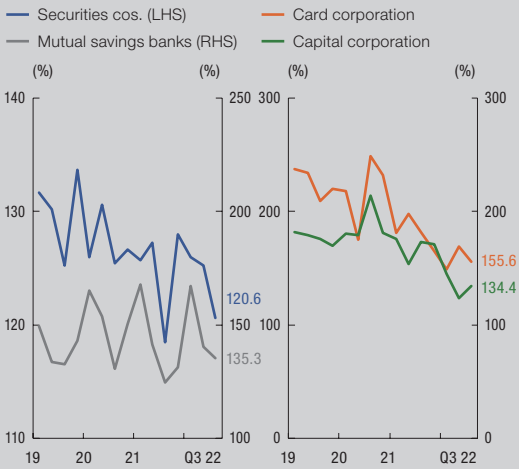
6) Rising market vigilance in the wake of the default on Legoland PF-ABCP sparked turmoil across short-term money markets, including the general CP market. As the turmoil eventually spread to the bond market, CP rates rose sharply and credit spreads widened significantly, putting a funding strain on securities companies and CSFCs and making debt rollover more difficult. For a detailed discussion on this topic, please refer to Box 3 "CP Market Trends since the Legoland PF-ABCP and Assessment."

At the end of the third quarter of 2022, the liquidity ratio, a measure of securities companies' liquidity conditions, stood at 120.6%. Although still well above the supervisory standard (100%), this represents a significant decline from the pre-pandemic level at the end of 2019 (133.7%). This drop is due to the substantial increase in securities companies' current liabilities, including call money and RP sold. The number of securities companies with a liquidity ratio below 120% rose noticeably (7 at the end of 2019 → 20 at the end of September 2022), while the liquidity ratio fell for most companies (40 out of 58 companies) compared to the end of 2019. The immediately available liquidity ratio at CSFCs, a liquidity indicator measuring immediately available liquid assets relative to borrowings maturing within three months, amounted to 155.6% for card companies and 134.4% for capital companies at the end of the third quarter of 2022. Although still significantly above the regulatory minimum of 100%, this is sharply lower than the level at the end of 2019 (220.3% and 169.8%, respectively), dragged down by the increase in borrowings maturing within three months. The number of CSFCs with an immediately available liquidity ratio below 100% increased from 19 at the end of 2019 to 21 at the end of September 2022.[7)]

Deposit inflows to savings banks, which offer higher interest rates than other types of deposit-taking institutions,[8)] grew at a steady and solid pace between 2015 and 2021. However, following the base rate hike during the second half of last year, which reduced savings banks' interest rate differential with the bank rates,[9)] deposit growth has slowed, gradually increasing concerns about their liquidity risk.

At the end of September 2022, savings banks' liquidity ratio was 135.3%, substantially exceeding the supervisory standard of 100%. However, their liquidity ratio fluctuated significantly from quarter to quarter. Some 16 savings banks had liquidity ratios below 120%, only moderately above the regulatory minimum. These institutions are liable to face liquidity problems should there be a massive deposit outflow.

Liquidity ratio by sector[1)]



Note: 1) For securities companies and mutual savings banks, liquidity was measured by the liquidity ratio (liquid assets maturing within 3 months/liquid liabilities maturing within 3 months) and for card·capital corporations by the immediately available liquidity ratio ((cash and deposits + immediately marketable securities + unused credit line)/(borrowings maturing within 3 months))

Sources: Financial institutions' business reports

7) When the immediately available liquidity ratio was calculated based on borrowings maturing within a month according to the method used by the financial authorities, two CSFCs had a ratio below the recommended minimum (100%).

8) Between January 2015 and June 2021, the average deposit interest rate offered by savings banks stood at 2.23%, significantly higher than the rates at banks (1.62%) or at mutual credit cooperatives (1.77%).

9) Savings banks' interest rate differential with the bank rates on time deposits (1-year) has been decreasing. In September 2022, following an increase in deposit interest rates in the banking sector, savings banks' time deposit interest rates fell below the bank rates for the first time since June 1998 (67bp in December 2021 → 44bp in June 2022 →-7bp in September).

Factors Triggering Liquidity Risk

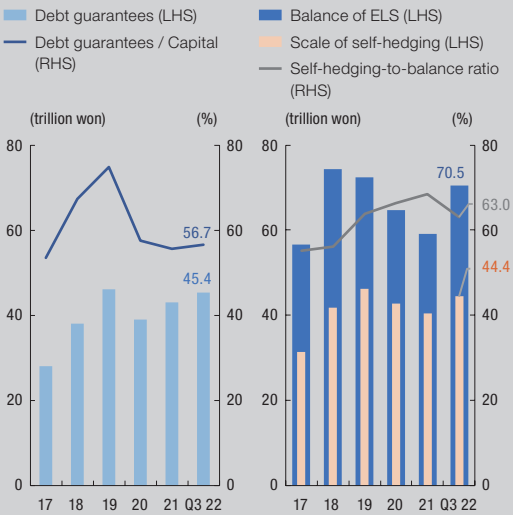
Factors triggering liquidity risk in the non-bank financial sector include common factors affecting the overall sector and factors specific to individual types of institutions. Among the common factors are real estate PF-related risk arising from a slowdown in the real estate market, and funding-related risk in times of turmoil in domestic and global financial markets. As for the institution-specific factors, margin calls on derivative-linked securities (at securities companies) and massive deposit outflows (at savings banks) are two main examples. Below is an assessment of key risk factors that have risen to the fore in recent times.

Securities companies: Debt guarantees related to real estate PF, ELS margin calls, rollover risk associated with short-term marketable borrowings

Debt guarantees create additional liquidity needs for securities companies. This is particularly the case with real estate PF loan guarantees. In times of a real estate market downturn, the performance of a liquidity agreement can sharply increase funding requirements for securities companies.[10] The total value of securities companies' debt guarantees rose from KRW 39.0 trillion at the end of 2020 to KRW 45.4 trillion at the end of September 2022. This rise was mainly due to the increase in real estate PF loan guarantees (KRW 19.3 trillion at the end of 2020 → KRW 23.9 trillion at the end of September 2022), caused by the expanded issuance of PF-backed securities (KRW 27.0 trillion at the end of 2020 → KRW 38.6 trillion at the end of September 2022).

When stock prices fall in Korea and worldwide, this can trigger margin calls on securities companies' self-hedging positions[11] related to their equity-linked securities (ELS) assets, exposing them to liquidity risk. Securities companies' balance of ELS they issued and self-hedging positions have shown a declining trend since the margin call spook in March 2020. However, this trend was reversed this year (KRW 40.4 trillion at the end of 2021 → KRW 44.4 trillion at the end of September 2022) as global stock prices plunged, reducing the volume of early redemptions of ELS.[12]

Debt guarantees, balance of ELS[1] and scale of self-hedging by securities companies



Note : 1) Including ELB
Sources: Financial institutions' business reports

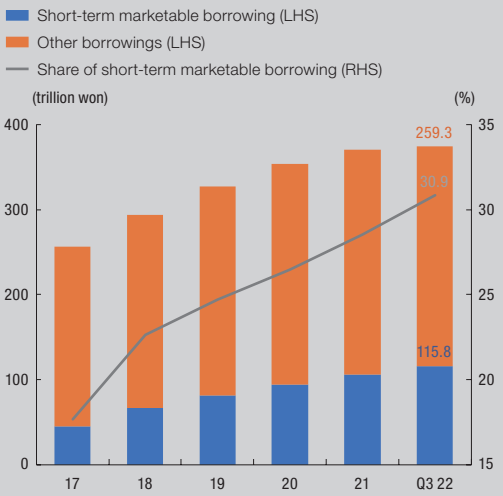
Due to the heavy reliance of securities companies on short-term marketable borrowings, such

10) Although securities companies' real estate PF-related exposure is regulated (PF loans and PF loan guarantees are limited to 30% and 100% of equity capital, respectively) and even though there are currently no securities companies whose PF loans and PF loan guarantees exceed their capital, related liquidity risk warrants attention, especially since the exposure at some companies is close to the recommended limits.

11) Self-hedging refers to put option sales or other types of derivative trades in which securities companies engage, on the exchange, to hedge against stock price-related risks to their ELS positions. A significant decline in the value of derivative products can result in a requirement for securities companies to deposit additional cash in foreign currencies (a margin call).

as repos with extra-short maturities, they are liable to face difficulties in raising funds through repo sales when widespread market vigilance make investors reluctant to accept their corporate bond holdings as collateral. In recent times, the marketable borrowing ratio at securities companies has steadily increased to 30.9% at the end of September 2022.

Short-term marketable borrowing[1] of securities companies



Note : 1) Including ELB
Sources: Financial institutions' business reports

CSFCs: bond issuance conditions, rollover risk on short-term marketable borrowings, real estate PF loan-related risk

Just like securities companies, CSFCs rely mostly on marketable vehicles to meet their funding needs[13] and this makes them vulnerable to financial market conditions. Funding conditions have worsened this year for CSFCs due to the growing credit wariness amid rising domestic and global market interest rates and a stronger preference for liquidity. The recent lowering of the allocation limit for credit specialized financial company bonds,[14] which dampened demand for them, as well as the crowding-out effects in the bond market, as a result of an increased supply of premium-grade bonds, such as bank bonds and KEPCO bonds, has also adversely impacted funding conditions for CSFCs. The yield on bonds issued by CSFCs (AA-, 3-year), their main funding vehicle, jumped to 4.03% in the year to September 2022, from 1.97% in 2021.

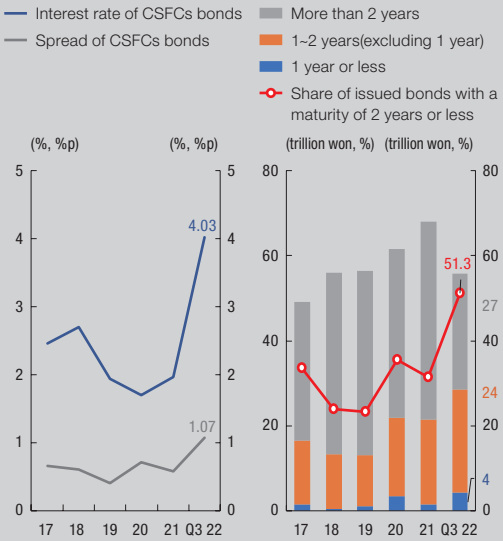
As CSFCs struggled to raise funds through bonds, they increasingly turned to CP and other short-term debt, which caused a shift in their funding structure toward shorter maturity cycles and magnified rollover risk. The share of short-term marketable borrowings, including CP and short-term debt, among CSFCs' total funding has rapidly grown since early this year (12.9% at the end of 2021 → 17.7% at the end of September 2022). The share of bonds with a maturity of two years or less among their total new bond issues has also sharply increased (31.5% at the end of 2021 → 51.3% at the end of September 2022), echoing the overall funding trend toward shorter maturity cycles. Compared to their large peers, the likelihood of facing liquidity risk in times of market turmoil is particularly high for small and medium-sized CSFCs, which tend to have low

12) In the case of a step-down ELS, one of the most popularly traded ELSs, the value of underlying assets are periodically (every 6 months, etc.) re-assessed. If the value of the underlying assets is above a certain level (80%, 90%, etc.), the agreed return is paid to the investor (early redemption). On the other hand, if the value of the underlying assets falls short of this level due to a drop in stock prices, the redemption is deferred stepwise until the end of the maturity period.
13) At the end of September 2022, the share of marketable funding, including CP, short-term bonds, and capital bonds in CSFCs' total funding amounted to 80.1%.
14) Following the surge in ELS margin calls in March 2020 that hit securities companies, financial authorities have gradually lowered the allocation cap of credit specialized financial company bonds in their self-hedge portfolios (up to 15% at the end of 2021 → up to 12% at the end of March 2023 → up to 8% from April 2023).

credit ratings[15] and are less able to raise funds through the issuance of bonds, as well as rely more on short-term borrowings, such as CP.

There is also a significant risk of credit loss on CSFCs' real estate PF loans, which totaled KRW 27.1 trillion at the end of September 2022. Bridge loans[16] and other PF loans maturing within three months can have a negative impact on liquidity conditions at CSFCs. PF loan guarantees issued by CSFCs as of the same date were worth KRW 0.2 trillion in total, suggesting that liquidity risk arising from the performance of PF loan guarantees is likely to be modest.

Interest rate[1], spread[2] and issuance amount(by maturity) of bonds issued by credit-specialized financial companies



Notes: 1) Average during period, average of January to September 2022 for Q3 22
2) CSFCs bond(AA-, 3 years) - Treasury bond(3 years)
Source: Yonhap Infomax

Savings banks: risk of outflows of deposits, including large-value deposits

Amid a considerable increase in bank time deposits following deposit interest rate hikes in the second half of this year, there have been mounting concerns over possible deposit outflows from savings banks, which were further stoked by worries about the solvency of some of the institutions, coupled with a sharp rise in large-value deposits exceeding KRW 50 million since 2018 and the dwindling interest rate differential with bank rates.[17] If deposit outflows are realized, savings banks will not only face liquidity stress, but will also see a deterioration in profitability and capital adequacy, as they will be forced to raise deposit rates as well as reduce the supply of credit to low-income groups.

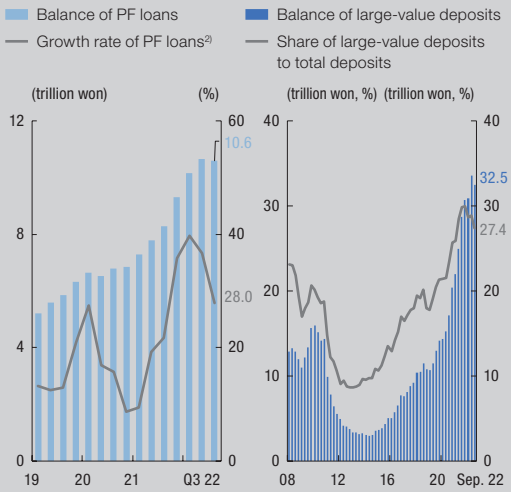
Savings banks' corporate and household loans have increased at an accelerated pace since 2020, helped by solid deposit inflows. This has been accompanied by a rapid build-up of real estate PF loans in spite of tighter regulations,[18] a worrisome development for a sector that was restructured recently due to real estate PF loan-related losses in the recent past. At the end of September 2022, savings banks' real estate PF loan balances stood at KRW 10.6 trillion, corresponding to 75.9% of equity capital. This was far above the real estate PF loans-to-capital ratio among other types of institutions, including banks (KRW 28.3 trillion, 10.5%), securities companies (KRW 28.4 trillion, 35.8%), CSFCs (KRW 26.8 trillion, 39.9%), and insurance companies

15) As of the end of September 2022, while 25 out of 26 large CSFCs (KRW 1 trillion or more in assets) have a credit rating of A- or better, 119 of 121 small and medium-sized companies had a credit rating below A-, or had no rating.
16) Bridge loans are loans issued during the early stages of a real estate development project for land purchases and other initial expenses. Some of them are classified as general corporate loans (land-secured loans) rather than as PF loans, and most have a maturity of 12 months or less.
17) In September 2022, interest rates (3.77%) on savings banks' time deposits (1-year) slipped below those on banks' time deposits (3.84%) for the first time since June 1998, causing saving banks' time deposit balances to decline (from the previous month).

(KRW 43.5 trillion, 46.3%).[19] The share of PF loans to high-risk projects[20] is also significantly more elevated among savings banks than other types of institutions,[21] suggesting a higher level of default risk. The large share of low income borrowers and borrowers with low credit ratings among total borrowers is also a factor contributing to increasing the default risk on savings banks' loans.

Meanwhile, starting in 2018, there have been massive inflows of large-value deposits in excess of KRW 50 million, which are not eligible for depositor protection, to savings banks. Moreover, 18.3% of all the large-value deposits were accounted for by defined benefit (DB) retirement plans (no depositor protection) that were mostly worth more than KRW 500 million in value (for a total of KRW 5.6 trillion between 2018 and 2021). This increase in large-value deposits was due to a change in retirement plan rules (September 2018), making deposits with savings banks eligible for retirement savings, as well as due to sharp growth in deposits by financial institutions following the opening of new savings banks affiliated with financial groups. As large-value deposits are excluded from the deposit protection scheme, they are more liable to be withdrawn when concerns surface over the financial stability of individual savings banks or of the overall sector.[22] Because of this, savings banks need to take appropriate measures in anticipation of any sudden outflow of funds.

Real estate PF loans and large-value deposits of mutual savings banks[1]



Notes: 1) Classified by depositors whose total deposit value is over KRW 50 million
2) Year-on-year basis
Sources: Financial institutions' business reports, reports of deposit trend

Amid deteriorating liquidity conditions across financial markets since early this year, the deposit interest rate differential between savings banks and banks has decreased markedly. Once into the second half, there has been a noticeable increase in funds flowing into the banking sector,

18) The maximum ratio of PF loans to total credit extended was lowered (30% → 20%) and project management companies are required to make a minimum cash contribution (20%) toward project costs.

19) Notwithstanding, the current ratio of real estate PF loans relative to capital is substantially lower than around the time of the savings bank crisis back in 2011 (504.9%) and the capital ratio is also considerably higher (3.2% at the end of 2011, 12.9% at the end of September 2022), suggesting that there has been a measurable improvement in the soundness of these institutions.

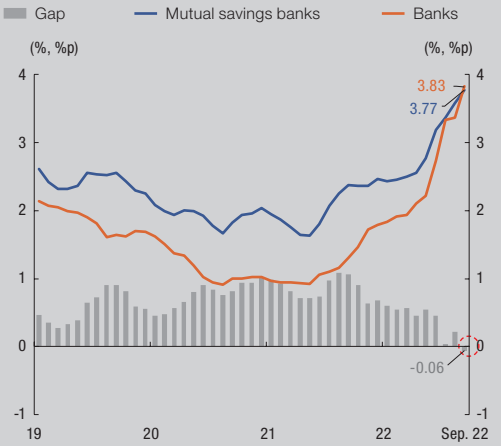
20) For bridge loans, "high-risk project sites" are projects that are located in high-risk areas, while for main PF loans, this term refers to projects with a progress rate of 60% or more, but with a presale rate of 40% or less.

21) At the end of June 2022, PF loans to high-risk project sites accounted for 29.4% of savings banks' total PF loans, well above the corresponding share among securities companies (24.2%), CSFCs (11.0%), insurance companies (17.4%), or banks (7.9%).

22) During the savings bank crisis in 2011, when news broke about the insolvency of some of the institutions, it caused a rapid outflow of deposits, centered on large-value deposits (13.1% over a three-month period).

as banks expanded the issuance of bonds and stepped up efforts to attract deposits, including time deposits. Banks needed to raise high-quality liquid assets to satisfy the regulatory LCR[23] and funds to meet additional margin requirements on their OTC derivatives, triggered by the rising U.S. dollar exchange rate. Even though the financial authorities eased liquidity-related regulations for banks and other institutions in October,[24] given the current monetary stance toward more base rate hikes and growing domestic and global uncertainty, the flight to quality could continue for the foreseeable future. The way savings banks respond to the outflow of funds toward the banking sector is to raise deposit interest rates. However, as they currently have limited room to raise loan interest rates,[25] this leaves them with few options to stem this trend.

Deposit interest rates[1] of mutual savings banks and banks



Note: 1) Time deposits(1 year) interest rate of banks and mutual savings banks
Source: Bank of Korea

Implications

Securities companies and CSFCs are inherently more vulnerable to changes in domestic and global economic conditions than other types of institutions, due to their business structure, making them heavily reliant on financial markets. In the current environment of high global interest rates causing asset price declines and heightened uncertainty in the domestic and international financial markets, these institutions need to be especially wary of liquidity stresses. The same goes for savings banks, which are more vulnerable in terms of the soundness of loans than other lenders[26] and which are liable

23) Financial authorities decided to gradually restore the LCR, which was adjusted downward in April 2020 from 100% to 85%, to its previous level, starting in July 2022 (90% in July-September, 92.5% in October-December).
24) Financial authorities postponed the restoration of the LCR (LCR held at 92.5%, October 20) and raised the maximum loan-to-deposit ratio (banks: 100% → 105%, savings banks: 100% → 110%, October 27).
25) Fixed interest rate loans account for a large share of savings banks' total loans. Moreover, the distribution of loan interest rates is concentrated near 20%, the statutory maximum interest rate. Loans at an interest rate of 15%-20% made up 44.7% of total unsecured individual loans in September 2022.
26) By type of institution, the substandard-or-below loan ratio at the end of the third quarter of 2022 was 3.17% for savings banks, 2.03% for mutual credit cooperatives, 1.07% for CSFCs, 0.20% for insurance companies, and 0.23% for banks.

to be severely impacted by external factors. It is therefore important for savings banks to prepare for possible outflows of large-value deposits.

Financial authorities need to closely monitor NBFIs' liquidity response capabilities through stress tests and other appropriate means.[27] NBFIs' mitigation plans for key risks must also be reviewed periodically for adequacy. The surveillance of liquidity conditions must be strengthened overall[28] by examining individual institutions' emergency funding plans to ensure a timely response to liquidity stresses and broadening the range of indicators for measuring short-horizon liquidity.[29] In the medium- and long-term, it may be necessary to develop more accurate liquidity indicators, similar to the LCR used in the banking sector.[30] Financial authorities must also look for ways to facilitate stable deposit funding at savings banks, such as encouraging banks to refrain from rolling out promotional deposit products or raising deposit interest rates, or adjusting the deposit protection coverage limit upward.[31]

As for individual institutions, they must set aside more reserve funds and build up capital to prevent credit risk from causing funding problems. Special efforts must also be made to increase credit lines for emergency liquidity.

27) The BOK regularly conducts stress tests on NBFIs and shares the results with financial authorities.

28) This could be achieved by requiring NBFIs to file a regular report on their liquidity-generating capacity and funding plans, including funds available from credit lines and associated terms, and the details of marketable securities posted as collateral by type. In tandem, financial administration training and support could be provided to institutions with low liquidity indicators.

29) Under the "Liquidity Risk Management Best Practice Standards," which went into effect in April 2021, the immediately available liquidity ratio was introduced to measure liquidity conditions at CSFCs over a one-month horizon. For securities companies, a 30-day liquidity ratio is currently in use as a liquidity metric only for general investment companies and issuers of derivative-linked securities.

30) The liquidity coverage ratio (LCR) is a Basel III metric first introduced in the banking sector in January 2015. Calculated by dividing high-quality liquid assets by total net cash outflows, the LCR measures a bank's resilience to sudden cash outflows over a 30-day period.

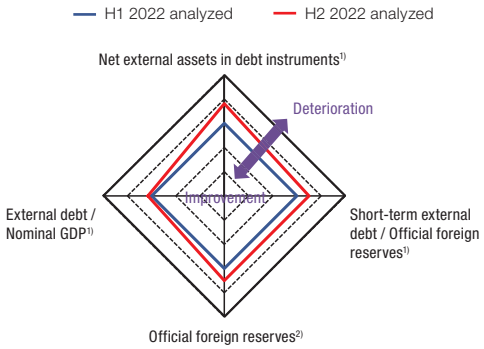
31) The Financial Services Commission and the Korea Deposit Insurance Corporation are currently working on amendments to the deposit protection scheme, which will include a readjustment of the coverage limit and the target fund size (March 2022-August 2023). In terms of the ratio relative to GDP per capita, the current coverage limit in Korea (1.57) is quite low compared to that in major countries (4.20 in the U.S., 2.89 in the U.K., 2.45 in Japan).

Ⅱ. External Payment Capacity

Korea's external payment capacity appears to have declined slightly since the second half of this year.

Net external assets have continuously fallen, while the ratio of external debt to nominal GDP edging up higher. Meanwhile, official foreign reserves declined by FX market stabilization measures and has driven up the ratio of short-term foreign debt to reserves (Figure II-1).

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

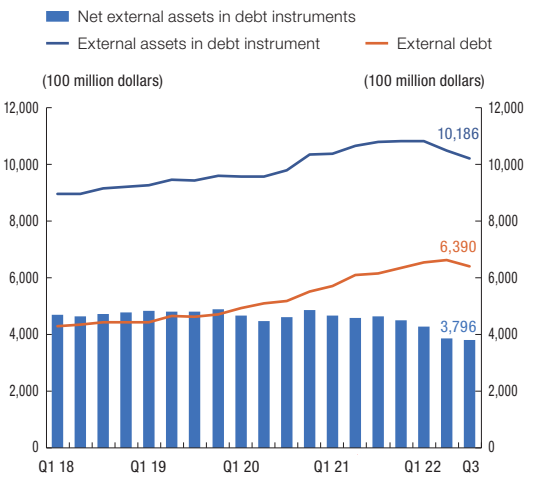


Notes: 1) Extent of change as of end-Q3 2022 compared to end-Q1 2022.
2) Extent of change as of end-November 2022 compared to end-May 2022.
Source: Bank of Korea.

Drop in Net External Assets

At the end of the third quarter of 2022, Korea's net external assets (external assets - external debt) decreased by USD 46.1 billion from the first quarter to USD 379.6 billion (Figure II-2).

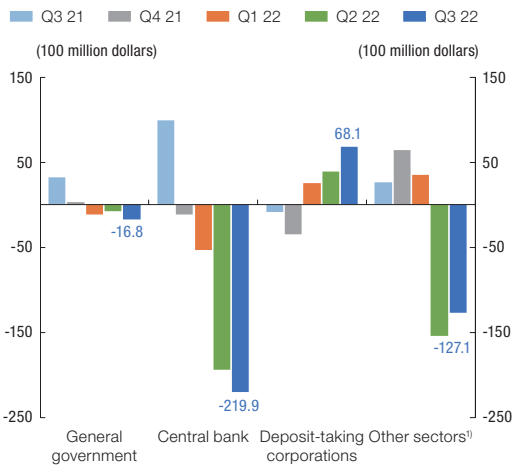
Figure Ⅱ-2. Net external assets in debt instruments1)



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

External assets stood at USD 1.0186 trillion as of the end of the third quarter of this year, representing a decline of USD 61.2 billion from the first quarter. By sector, central bank external assets dropped by USD 41.4 billion on the decline of foreign reserves. External assets in other sectors fell by USD 28.1 billion due to the decreased investment in foreign currency securities by other financial institutions. The external assets of the general government edged lower by USD 2.4 billion and those of deposit taking institutions increased by USD 10.7 billion (Figure II-3).

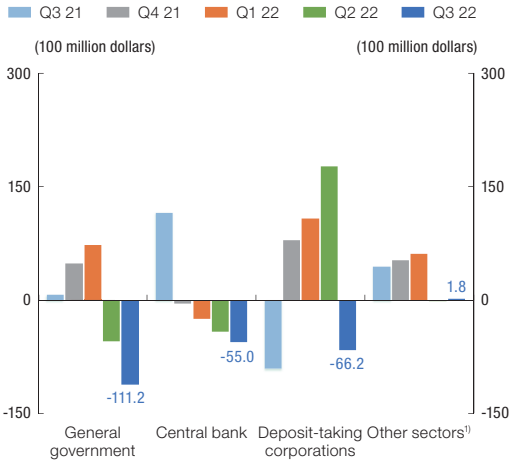
Figure II-3. Changes in external assets in debt instruments, by sector



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

Source: Bank of Korea.

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



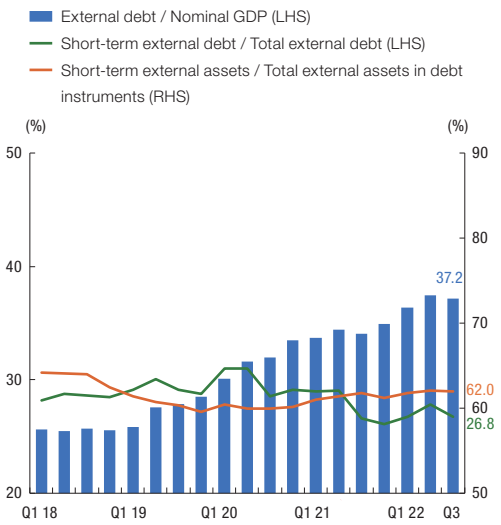
Note: 1) Including other financial corporations (securities companies, asset management companies, insurance companies, etc.) and non-financial corporations.

Source: Bank of Korea.

Korea's external debt totaled USD 639.0 billion at the end of the third quarter of 2022, down by USD 15.1 billion from the first quarter. By sector, external debt at deposit taking institutions and other sectors increased by USD 11.1 billion and USD 10 million, respectively, on the increase in foreign currency borrowings and new foreign currency denominated security issues. On the other hand, external debt of the general government and the central bank fell by USD 16.6 billion and USD 9.7 billion, respectively, due to the reduced investment in won-denominated securities by non-residents (Figure II-4).

At the end of the third quarter of 2022, the external debt-to-nominal GDP ratio rose to 37.2% from the first quarter (36.4%). The share of short-term external debt among total external debt inched up slightly to 26.8% from the level during the first quarter (26.7%). The share of short-term external assets among total external assets also increased marginally to 62.0% from 61.7% during the first quarter (Figure II-5).

Figure Ⅱ-5. Proportions[1] of short-term external debt and assets in debt instruments

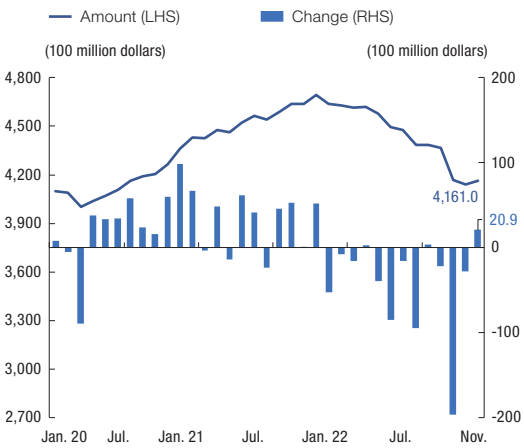


Note: 1) End-quarter basis.
Source: Bank of Korea.

Decline in Official Foreign Reserves

Korea's foreign reserves amounted to USD 416.10 billion at the end of November 2022, a decrease of USD 31.61 billion compared to the end of May 2022. Several factors contributed to this decline, including foreign exchange market stabilization measures to ease volatility and the strength of the U.S. dollar, causing the USD-converted value of non-dollar foreign currency assets to drop. However, during November, as the U.S. dollar started to weaken, Korea's reserves recovered to USD 2.09 billion (Figure II-6).

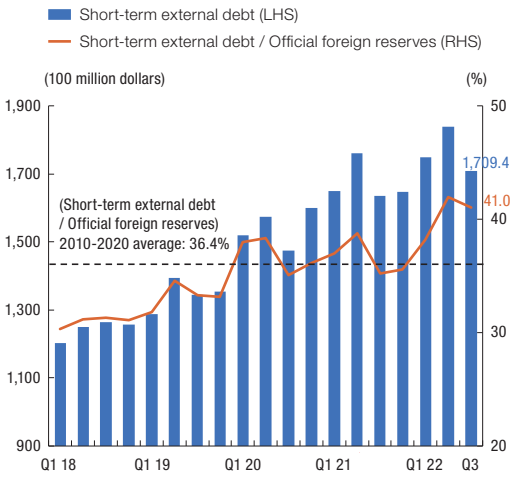
Figure Ⅱ-6. Balance of and changes in official foreign reserves[1]



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

Meanwhile, the ratio of short-term external debt to reserves rose by 2.8%p to 41.0% at the end of the third quarter of 2022 from the first quarter (38.2%) (Figure II-7).

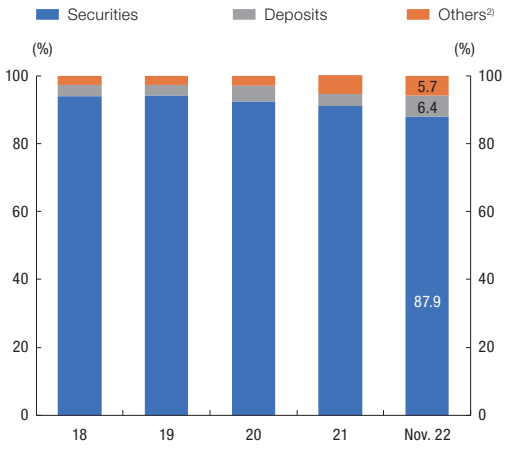
Figure Ⅱ-7. Short-term external debt-to-official foreign reserves ratio[1]



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

Regarding the composition of the foreign reserves, the majority was largely made up of marketable securities (87.9%) and deposits (6.4%) as of the end of November 2022. Most of the marketable securities are highly-liquid safe assets, such as government bonds, government agency bonds, and asset backed securities (Figure II-8).

Figure II-8. Composition[1] of official foreign reserves



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

Ⅲ. Financial Market Infrastructures

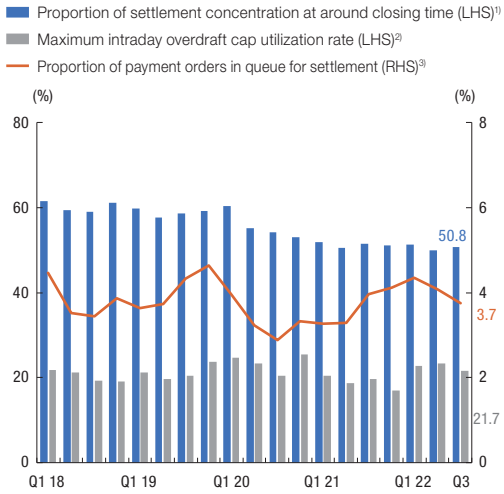
The value of settlement in BOK-Wire+ and other major payment and settlement systems have continuously increased, driven by the steady rise in securities settlements by financial institutions and electronic funds transfers by individuals and companies. Settlement risk was managed appropriately, remaining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

BOK Wire+

During the third quarter of 2022, the average daily value settled over BOK-Wire+, providing final settlement of obligations between financial institutions, reached KRW 511.6 trillion, continuing on the upward trend from the first quarter (KRW 524.4 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 21.7% and 3.7%, respectively, in the third quarter of 2022. Of the total settlement value, the portion that was settled near the closing time (16:00-17:30) decreased from the same period of the previous year (51.5%) to 50.8% (Figure III-1).

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

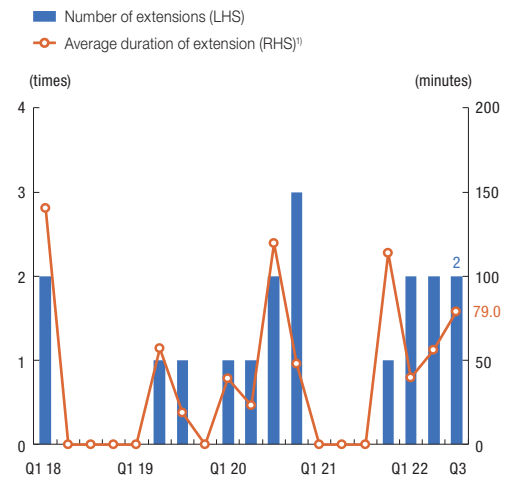


Notes: 1) Amount of settlement processed after 16:00 / Total settlement amount during the period.
2) Average of daily maximum amounts of participating institutions' overdraft cap utilization rate.
3) Participating institutions' payment orders in queue for settlement / Total settlement amount during the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

Source: Bank of Korea.

Meanwhile, the closing time of BOK-Wire+ was extended twice during the third quarter of 2022, once for the settlement from repo purchase auction by the BOK and once due to technical issues at participating institutions. (Figure III-2).

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



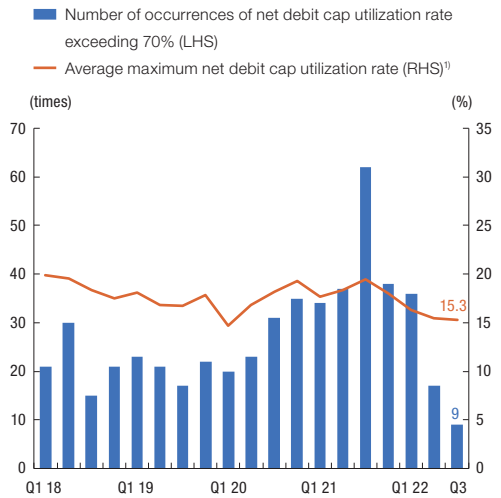
Note: 1) Total duration of extension / Number of extensions during the quarter.
Source: Bank of Korea.

Retail Payment Systems

During the third quarter of 2022, the average daily value settled over the retail payment systems, operated by the Korea Financial Telecommunications and Clearings Institute (KFTC), was lifted by an increase in electronic funds transfers by individuals and companies to 95.4 trillion won, higher than in 2021(94.3 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 cap[1)] utilization rate of net settlement participants exceeded the cautionary level (70%) sharply fell to 9 times during the third quarter of 2022, from 62 times during the same period a year earlier. The average maximum net debit cap utilization rate also decreased from the same period of the previous year (19.5%) to 15.3%, suggesting that settlement risk was managed adequately overall (Figure III-3).

Figure Ⅲ-3. Net debit cap utilization rate



Note: 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 third quarter of 2022. Settlement risk was managed stably during this period. The average daily value settled over these systems was lifted by inter-institutional

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+, which creates the provision of credit between financial institutions. 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.”

repo transactions to KRW 230.8 trillion, extending the upward trend from last year (KRW 221.7 trillion).

In the third quarter of 2022, settlements on transactions in exchange-traded stocks and exchange-traded government bonds, as well as OTC stock transactions by institutional investors, were completed by their respective deadlines (16:00, 17:00, 16:50) (Table III-1).

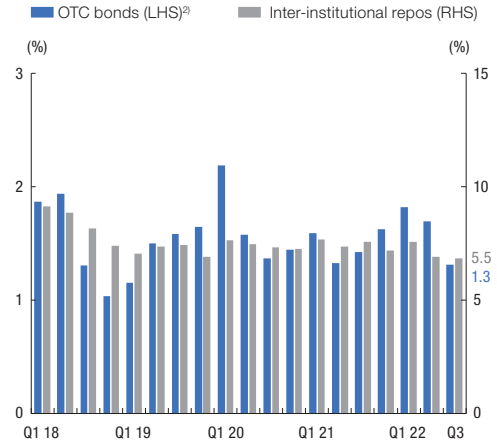
Table Ⅲ-1. Proportion[1] of securities settlements completed after the deadline

	Penalty deadline[2]	Proportion (%)				
		2021		2022		
		Q3	Q4	Q1	Q2	Q3
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 1.3% and 5.5%, respectively, during the third quarter of 2022 (Figure III-4).

Figure Ⅲ-4. Share[1] 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 System[2]

In the third quarter of 2022, the average daily value of settlement in the foreign exchange payment-versus-payment (PvP) system operated by the CLS Bank (CLS System)[3] increased to USD 76.44 billion from USD 65.85 billion a year earlier.

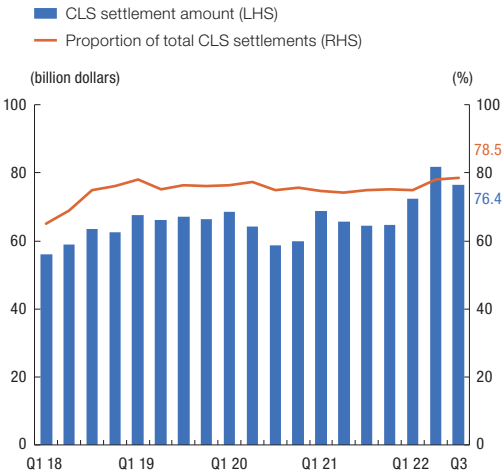
PvP settlement via the CLS system accounted for a continuously high share of 78.5% in total foreign exchange transactions, and any related

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 settelment 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 amount[1] and proportion[2] made through the CLS system



Notes: 1) Daily average amount of transactions made by domestic banks and foreign bank 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 bank branches).

Source: Bank of Korea.

Overall Assessment

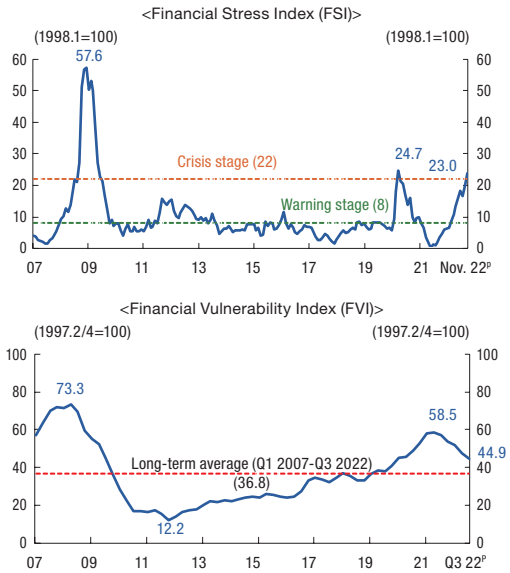
In the second half of 2022, in spite of heightened economic uncertainty at home and around the world, Korea's financial system continued to effectively fulfill its intermediary function thanks to the robust resilience of its financial institutions and external payment capacity. However, this was not completed without some signs of stress in certain pockets of the short-term wholesale funding markets. The acceleration of monetary tightening in major countries and the persistently elevated level of global geopolitical risks increased volatility in markets. An unexpected credit event amid growing concern over credit risk in the corporate bond market hampered the intermediary function of the ABCP and of the other short-term money markets.

As a result, the Financial Stress Index (FSI), measuring the level of short-term instability in the financial system, surged to the crisis stage of 23.6 (threshold = 22) in October, before inching downward (to 23.0) in November following the announcement of market stabilization measures by the government and the BOK.

Meanwhile, the accelerated pace of policy rate hikes to curb the strong inflationary pressure in Korea and around the world contributed to decreasing medium- and long-term vulnerabilities in the financial system by dampening the risk appetite of economic agents and, thus, reducing financial imbalances that had been built up over the past decade, albeit only slightly. Household debt growth continuously slowed and prices of assets, including stocks and real estate, fell at an accelerated rate. At the same time, this process brought to the fore liquidity risk among NBFIs with large exposures to real estate PF loans, whose resilience seems to have taken a hit to some degree. Nevertheless, the overall financial system has remained stable thanks particularly to the banking sector's asset soundness and to its resilience.

This development was reflected in the Financial Vulnerability Index[1] (FVI), gauging the overall level of financial vulnerability on a medium- and long-term horizon, which steadily dropped since the second half of 2021 to stand at 44.9 at the end of the third quarter of 2022.

Financial Stress Index (FSI)[1] and Financial Vulnerability Index (FVI)[2]



Notes: 1) A composite index (0-100) is calculated by standardizing 20 monthly real and financial sector indicators related to financial 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 concerning three criteria for assessment (asset prices, credit accumulation, and financial system resilience).
Source: Bank of Korea.

1) The Financial Vulnerability Index (FVI) is a composite index (on a scale of 0-100) based on 39 standardized indicators related to three evaluation items (asset prices, credit accumulation, and financial system resilience).

Vulnerability Assessment

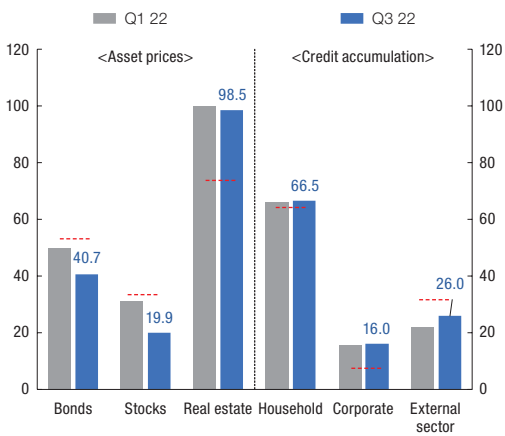
By sector, the persistently high level of private credit leverage was a key vulnerability in the credit markets during the second half of 2022. In the household sector, in spite of a significant slowdown in credit growth, its share relative to GDP still remains high. In the corporate sector, while credit growth has continued at an accelerated rate, driven by loans from financial institutions, borrowing rates are currently significantly higher, and direct funding from the bond or CP market appears to be limited. Although overall financial conditions in the corporate sector, including the profitability of firms, have been generally adequate, soaring interest rates and commodity prices and the slowdown in the real estate market have taken some toll on the debt service capacity of construction and real estate businesses.

There has been pervasive instability across asset markets, with volatile movements in the prices of stocks and bonds. Although conditions in financial markets later improved gradually thanks to market stabilization measures taken by the government and the BOK, as well as market participants' own efforts to restore stability, given the shift in monetary policy stance in major countries and the elevated level of domestic and external uncertainty, volatility in price variables could spike again at any time. Meanwhile, the downswing in housing prices and the rising volume of unsold new homes have also increased the default risk on real estate loans.

Financial institutions have stayed resilient, though, backed with low loan delinquency rates and bank capital ratios well above the regulatory minimums. However, falling asset prices amidst uncertainty in financial markets, the concentration of money in the banking sector, and default worries around real estate PF loans have slightly driven up the liquidity risk at NBFIs that rely heavily on wholesale funding, such as securities companies and specialized credit financial companies.

In the foreign exchange market, heightened uncertainty in global markets and the strong U.S. dollar have led to a slowdown in the inflows of foreign portfolio investment to domestic securities, while also causing external funding conditions for financial institutions to worsen. Moreover, the increase in investment in foreign-currency assets by financial institutions has magnified the ripple effects of exchange rate volatility on the domestic financial system, as well as diversified the pathways of volatility transmission compared to the past. Because of this, increased volatility in exchange rates could put a substantial strain on the risk management of financial institutions.

Financial imbalance-related indices[1)]



Note: 1) Dotted lines are the long-term average (Q1 2007-Q3 2022).
Source: Bank of Korea

Risk Factors

As seen above, stability is gradually being restored in the domestic financial system thanks to concerted efforts by policy authorities and the market. Nevertheless, the Korean financial system could respond sensitively to even small domestic or external shocks that might lie ahead, and it is therefore important to closely monitor all risk factors[2] that might have an impact.

Among the key risk factors that could affect stability in the domestic financial system going forward are the slowdown in the real economy, a sharp correction in asset prices, and a global U.S. dollar squeeze, caused by prolonged monetary tightening in major countries and the escalation of geopolitical risks.

If monetary authorities in major countries continue to tighten monetary policy against a backdrop of stubbornly high inflationary pressure, this could result in a surge in market interest rates, the depreciation of the Korean won, and a steeper decline in asset prices. Moreover, should the economic slowdown worsen even more, causing income and sales to decline, default risks could materialize among vulnerable households and self-employed business owners and marginal firms. In a situation where there has been a rapid expansion of private credit, including real estate finance, should an unexpected credit event set off market fears and cause asset prices to plummet, it could push borrowers into insolvency and deteriorate asset soundness at financial institutions. Furthermore, the possibility of an exacerbation of geopolitical tension, including a further escalation of the Russia-Ukraine War, could lead to global dollar liquidity drying up by amplifying uncertainty in global financial markets, ultimately causing increased volatility in capital flows in domestic financial markets, a worsening in external soundness, and a squeeze on the foreign currency liquidity at financial institutions in Korea.

Finally, the strengthening of the carbon neutrality policy stance in Korea and across the international community and the growing interconnectedness between the cryptoasset market and conventional financial markets are also factors liable to drive up uncertainty and stoke financial instability on a medium- and long-term horizon.

Policy Recommendations

Policy authorities need to take preemptive and active measures to mitigate market liquidity risks. They need to respond actively with microscopic market stabilization measures to prevent a liquidity crunch in some financial markets from spreading throughout the whole financial system, while remaining in tune to the monetary policy stance. This will contribute to preventing financial unrest from developing into systemic risk and to lowering overall economic costs in a timely manner by relieving market fears which could trigger a cascade of losses. In tandem, financial institutions should also make their own efforts to ensure smooth fund flows and continuous credit provision within the financial system. They need to refrain from a race to withdraw

2) Concerning recent changes in systemic risk factors, refer to Box 6 "Recent Major Challenges to Financial Stability: Survey Results and Implications."

funds, if necessary, by entering into agreements with peer institutions to this effect, and large institutions in comparatively stronger liquidity conditions should help facilitate funds flows through the financial system, particularly in short-term money markets. Meanwhile, in a situation where it is difficult to expect a recovery in the real estate market in the near-term, policy authorities need to find medium- and long-term policy solutions to prevent potential risk surrounding real estate-related corporate finances from materializing. In this process, authorities must, however, be mindful of possible moral hazard.

In preparation for ongoing interest rate hikes and an economic slowdown, continuous efforts to manage private debt risks should be maintained, as well. It is necessary to be wary of excessive credit provision to a specific sector, such as the real estate rental business. Moreover, policy authorities need to encourage existing non-vulnerable borrowers to pay off their loans through an increase in the share of amortization in existing loans, while continuing to provide selective support, such as debt restructuring for vulnerable borrowers, which could present a risk to the financial system.

It is necessary to improve resilience at financial institutions. In particular, NBFIs, currently facing increased liquidity and credit risks, need to expand their emergency liquidity funding channels and strengthen their loss absorption capacity by building additional loan-loss provisions and by increasing capital levels. Although banks are currently resilient, they should reexamine their credit risk assessments and their levels of loan-loss provisions, given the possible underestimation of credit risks.[3] Banks also need to pay attention to the management of foreign-currency liquidity in order to prevent risks caused by exchange rate volatility from being transmitted to liquidity stresses in financial markets by way of them.

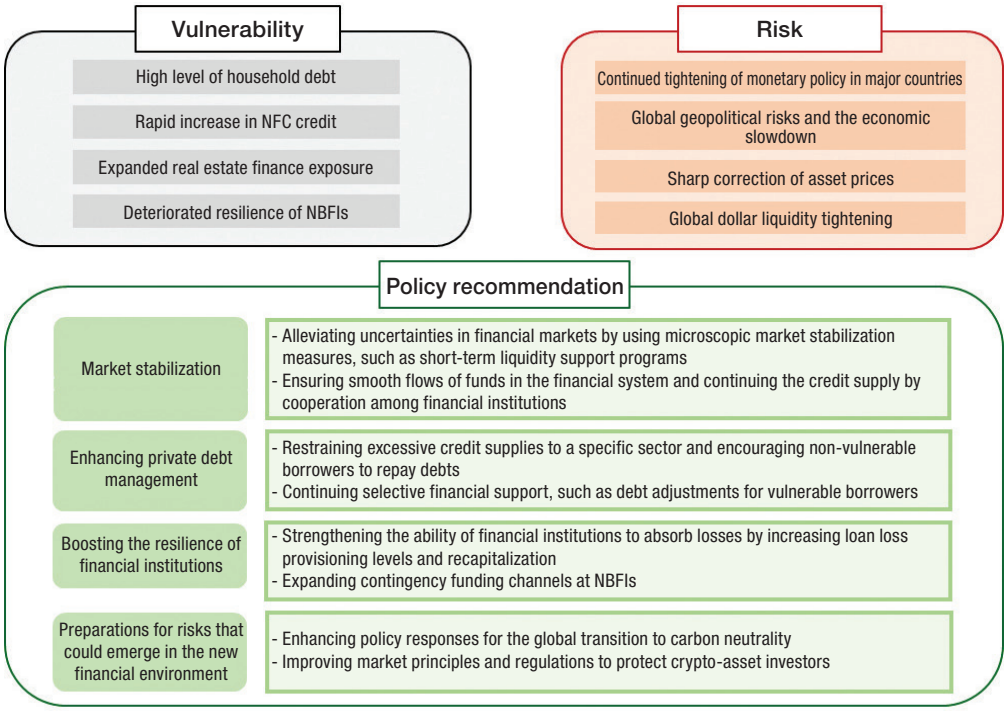
It is also necessary to prepare against medium- and long-term risks to financial stability that could arise from changes in the new financial environment. As the strengthening of the carbon neutrality policy stance across the international community, exemplified by the introduction of carbon border taxes, could place a significant burden on domestic firms, it is required to make proactive response efforts[4] on the part of both policy authorities and firms.

Lastly, as was made clear by the bankruptcy of FTX, the cryptoasset market could be a new source of instability for traditional financial markets. It is therefore urgent to improve the regulatory system in the cryptoasset market to ensure stability in financial markets and to protect investors.[5]

3) Concerning the possibility of domestic bank credit losses being underestimated, refer to Box 3 “Estimation of Potential Corporate Credit Losses at the Expiration of COVID-19 Loan Forbearance and Assessment” in the June 2022 Financial Stability Report.

4) For details, refer to Box 7 “Comparison of Greenhouse Gas Emissions Across Countries and Assessment of Domestic Firms' Vulnerabilities to Climate Risks.”

5) For details, refer to Box 8 “Introduction of Crypto Regulation - Recent Status and Implications.”


Vulnerability
High level of household debt
Rapid increase in NFC credit
Expanded real estate finance exposure
Deteriorated resilience of NBFIs
Risk
Continued tightening of monetary policy in major countries
Global geopolitical risks and the economic slowdown
Sharp correction of asset prices
Global dollar liquidity tightening
Policy recommendation
Market stabilization
- Alleviating uncertainties in financial markets by using microscopic market stabilization measures, such as short-term liquidity support programs
- Ensuring smooth flows of funds in the financial system and continuing the credit supply by cooperation among financial institutions
Enhancing private debt management
- Restraining excessive credit supplies to a specific sector and encouraging non-vulnerable borrowers to repay debts
- Continuing selective financial support, such as debt adjustments for vulnerable borrowers
Boosting the resilience of financial institutions
- Strengthening the ability of financial institutions to absorb losses by increasing loan loss provisioning levels and recapitalization
- Expanding contingency funding channels at NBFIs
Preparations for risks that could emerge in the new financial environment
- Enhancing policy responses for the global transition to carbon neutrality
- Improving market principles and regulations to protect crypto-asset investors

Box 6.

Recent Major Challenges to Financial Stability: Survey Results and Implications[1)]

The BOK and other major central banks conduct systemic risk surveys of domestic and international financial and economic experts to identify key challenges to financial stability and to assess the likelihood of risks to the financial system and to its stability.[2)] What follows is an analysis of potential risks to the domestic financial system, identified through the latest systemic risk survey. The survey results are furthermore compared with results of systemic risk surveys in major countries to develop a better understanding of the level of risk in the domestic and global financial systems, as well as major risk factors.

Assessment of Risks to the Domestic Financial System

Sharp increase in the likelihood of systemic risks

The results of recent systemic risk surveys have shown that the probability of the occurrence of risks that could morph into a crisis for the financial system has increased commensurately with the rise in interest rates. In the latest survey conducted in the second half of 2022,[3)] 58.3% of respondents answered that there was a high probability that a systemic risk will occur over a short-term horizon (within a year),[4)] which is the highest level recorded since 2012 when a systemic risk survey was first conducted.[5)6)] This is significantly higher than the corresponding result in past periods where a major macro-economic shock was anticipated, such as the height of the U.S.-China trade war during the second half of 2018 (29.1%), as well as during the peak of fears about COVID-19 becoming a prolonged crisis in the first half of 2020 (38.0%).

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1) This article was authored by Baek Yoon-ah and Hong Jun-eui (International Financial Regulation Team), and was reviewed by Seo Pyoung-seok (head of the International Financial Regulation Team).

2) Systemic risk surveys are conducted on a regular basis (semiannually or annually) in major countries, including the U.S., the U.K., Canada, Brazil, and India. The BOK has conducted a biannual systemic risk survey since the second half of 2012. Foreign surveys cited in this article include the “Survey of Salient Risks to Financial Stability” (conducted between late August and mid-October 2022), published in the U.S. Federal Reserve Board’s Financial Stability Report, “Systemic Risk Survey Results” (conducted between July 27 and August 26, 2022) reported by the Bank of England, and “Financial System Survey Highlights” by the Bank of Canada (based on a survey conducted between February 22 and March 18, 2022).

3) Of 84 total experts solicited, 72 participated in the survey. The results of this survey can also be found in the BOK press release “Systemic Risk Survey Results - 2nd Half 2022” (November 28, 2022).

4) Based on respondents who rated the probability of a systemic crisis in the domestic financial system as “high” or “very high” out of five possible choices, ranging across “very high,” “high,” “moderate,” “low,” and “very low.” Likewise, both “low” and “very low” were considered as responses indicating a low probability of a systemic crisis. The same rules apply to the results for confidence in the stability of the financial system.

5) Between the second half of 2012 and the first half of 2022, the average percentage of respondents who believed that there was a high probability of a systemic shock stood at 16.6%.

6) The percentage of respondents who saw a significant probability of a risk to the financial system over the medium-term (within the next 1-3 years) also increased from 32.9% in the first half of 2022 to 40.3% in the second half of 2022, which, however, is still below the all-time high (52.7%) seen in the second half of 2012.

Meanwhile, only 5.6% of the surveyed experts felt that the probability of a systemic risk was low, an answer chosen by more than 30% of respondents in most other surveys conducted in recent periods. These results seem to suggest that concerns about systemic risks have grown overall compared to the past.

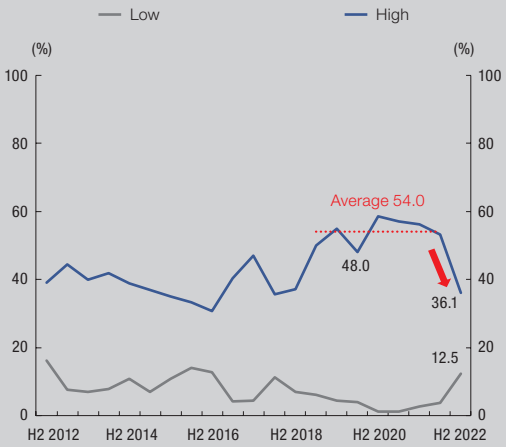
Probability of the financial system risks being realized in the short-term

Source: Bank of Korea

Weakened confidence in the stability of the financial system

As concerns mount about systemic risks, the level of confidence in the stability of the financial system declined among the surveyed experts. The percentage of respondents who felt highly confident in the stability of the Korean financial system over the next three years fell from 53.2% in the first half of 2022 to 36.1% in the second half, which is the lowest level since 2019 (54.0% on average between 2019 and the first half of 2022) and lower than during the first half of 2020 (48.0%) when fears of a broader spread of COVID-19 swept across financial markets and the overall economy.

Confidence in the stability of the financial system



Source: Bank of Korea

Domestic vulnerabilities brought to the surface by rising market interest rates

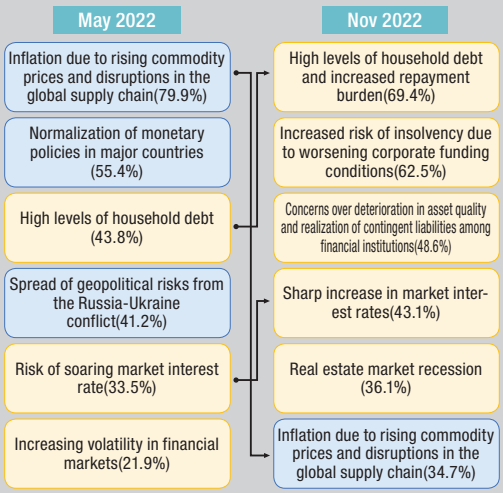
In the second half of 2022, domestic and international financial and economic experts pointed out that internal factors, such as insolvency risk among households and companies caused by rising market interest rates, were key vulnerabilities, rather than external factors.[7)]

Moreover, most experts viewed mutual savings banks, securities companies, and capital companies as the institutions most vulnerable to financial stresses. For mutual savings banks, they cited loans to vulnerable borrowers and real estate PF loans as the chief risk factors. As for securities companies, which also have high

7) Fewer respondents saw external factors as being among the top picks for key risk factors in the survey conducted during the first half of 2022, such as inflationary pressure from rising commodity prices and global supply chain disruptions (79.9% in H1 2022 → 34.7% in H2 2022), the normalization of monetary policies in major countries (55.4% → 16.7%), or the spread of geopolitical risks from the Russia-Ukraine war (41.2% → 18.1%).

exposure to real estate PF loans, the experts felt that they were susceptible to credit and liquidity risks associated with the realization of PF loan-related contingent liabilities. On the other hand, some experts viewed households as the most vulnerable sector, citing the fact that falling asset prices and declining real incomes will drive up their debt service burden.

Changes in major domestic financial vulnerabilities[1)2)]

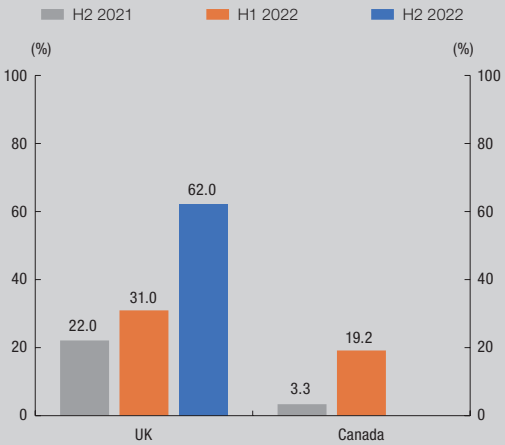


Notes: 1) Top 6 factors(Each respondent selected 5 most risky factors). ( ) indicates the proportion of responses.
2) Blue boxes correspond to external factors and yellow boxes correspond to internal factors.
Source: Bank of Korea

Assessment of Risks in the Financial Systems of Major Countries

The U.K. and Canadian surveys also found that the probability of risks to the financial system has sharply risen in recent times. The results of the latest U.K. survey showed that the percentage of respondents who saw a probability of a high-impact event in the financial system[8)] increased both on a medium-term horizon (46% in the first half of 2022 → 72% in the second half of 2022, an all-time high) and on the short-term horizon (31% → 62%). In the Canadian survey (first half of 2022), the percentage of respondents who felt that there was a high probability[9)] of a shock sufficient to impair the financial system in the short term (within a year) rose sharply (3.3% in the second half of 2021 → 19.2% in the first half of 2022).

Probability of the financial system risks being realized in the short-term in the UK and Canada[1)2)]



Notes: 1) The proportion of respondents who responded that there is a high possibility of a shock that could impair the financial system within a year.
2) Bank of Canada did not conduct Financial System Survey in the second half of 2022.
Source: Bank of England, Bank of Canada

In the U.K. survey, the percentage of respondents who answered that they had high confidence in the financial system[10)] dropped slightly

8) Based on respondents who rated the probability of a major shock to the U.K. financial system as “high” or “very high” out of five possible choices.
9) Based on respondents who rated the probability of a shock sufficient to damage the Canadian financial system as “moderately likely” or “extremely likely” out of five possible choices.
10) Based on respondents who rated their level of confidence in the U.K. financial system over the next three years as “very confident” or “complete confidence” out of five possible choices.

(46% in H1 2022 → 42% in H2 2022), while the percentage of those who answered that they were less confident in the financial system than six months earlier rose sharply from the previous period (10% in H1 2022 → 29% in H2 2022). In the Canadian survey, in spite of the increased likelihood of a shock in the short-term, 68% of respondents said that they had high confidence in the resilience of the financial system,[11] which is the highest level since the first survey in 2018. Respondents cited the sound capital ratios in the banking sector, the adequate level of financial regulation, and policy support by the fiscal and monetary authorities in response to the pandemic as reasons for their confidence.

Meanwhile, respondents to the U.K., U.S., and Canadian surveys believed that inflation, geopolitical risks from the Russia-Ukraine war and cyber risks were key stress factors affecting financial stability. In the U.K. surveys, cyber attacks, geopolitical risks, and inflation risks were among the top picks for two consecutive periods. Other risk factors according to the surveyed experts included domestic political risks, pandemic risks, and climate risks, in that order. The respondents to the U.S. survey selected stubborn inflation and the tightening of monetary policy, the continuation of the Russia-Ukraine war, and a contraction in market liquidity and increased volatility as key risks that were likely to occur over the next 12-18 months. The respondents to the Canadian survey chose external cyber risks, including retaliatory cyberattacks by Russia, as the single-most important risk factor, while also mentioning geopolitical risks, high inflation and low growth, asset price corrections, and domestic fiscal and monetary policy risks as other major stress factors for the financial system.

Key risks to the financial system for major countries[1)]

U.K.	U.S.	Canada
Cyber attack	Persistent inflation; monetary tightening	External risks (Cyber risks)
Geopolitical risk/ Inflation risk	Russia's invasion of Ukraine	International economic and political risks (Geopolitical tensions)
U.K. political risk	Market liquidity strains/volatility	Domestic macroeconomic risks (High inflation and low economic growth)
Pandemic risk	Higher energy prices	Asset pricing risks
Climate risk	China-Taiwan conflict	Domestic fiscal and monetary policy risks

Notes: 1) The most cited key risks in the 2022 H2 surveys. (2022 H1 for Canada)
Sources: Bank of England, Federal Reserve Board, Bank of Canada

Compared to the Korean results, factors that received comparatively little attention in Korea, such as geopolitical risks, including the continuation of the Russia-Ukraine war, cyber risks, and climate risks,[12] emerged as major risk factors in these three countries' surveys. Notably, cyber risks were selected as the No. 1 risk factor in the U.K. surveys, both in the first and second halves of 2022, while they were among the major risk factors in the U.S. and Canadian surveys from the first half of 2022, suggesting that concerns have been growing about potential retaliatory cyber attacks by Russia amid the ongoing war between Russia and Ukraine.

11) Based on respondents who rated their level of confidence in the resilience of the Canadian financial system as "very confident" or "completely confident" out of five possible choices.
12) In the Korean survey, 18.1% of respondents viewed geopolitical risks from the Russia-Ukraine war as a stress factor for the financial system, sharply lower than the corresponding level in the previous survey (41.2%). Meanwhile, only 2.8% and 1.4% of the surveyed experts picked climate risks and cyber risks, respectively.

Implications

The results of the recent systemic risk surveys in Korea and major countries appear to indicate that worries about systemic risks to the financial system have sharply risen. In Korea, in particular, the level of confidence in the stability of the financial system was found to have fallen considerably since the second half of 2022. These results suggest a significant likelihood that the build-up of household and corporate debt and high real estate prices might become destabilizing factors for the financial system, as rising interest rates reduce liquidity in the economy.

Finally, the policy directions needed to increase the stability of the domestic financial system, as chosen by the domestic and international financial and economic experts participating in the latest systemic risk survey, were the following: ① aggressive liquidity injection by financial authorities to prevent any contraction in capital markets and closer communication with markets, ② managing the soundness of financial institution assets and increasing stress tests to identify potential risks, and ③ adjusting the pace of interest rate hikes by taking into account household debt and the recessionary effects on the economy. These latest systemic risk survey results must be taken into due consideration by the authorities as they step up efforts to safeguard the stability of the financial system.

Box 7.

Comparison of Greenhouse Gas Emissions across Countries and Assessment of Domestic Firms' Vulnerabilities to Climate Risks[1)]

Despite continued difficulties in macroeconomic conditions in recent days, Korea, as well as many other countries in the world, such as the U.S. and the EU, are moving forward with their climate action plans. In particular, the Korean government will set sectoral strategies for emissions mitigations by March 2023 to achieve carbon neutrality by 2050.[2)] In August 2022, the U.S. passed the Inflation Reduction Act (IRA), which includes a substantial amount of public investment in renewable energy. Meanwhile, the EU will begin the pilot phase of the Carbon Border Adjustment Mechanism (CBAM) in 2023, a tariff on carbon-intensive imported goods, such as steel and iron. The CBAM is scheduled to come into force in 2026.[3)] Moreover, the International Maritime Organization (IMO) plans to regulate carbon emissions on international shipping.[4)]

These domestic and global climate policies are expected to put considerable pressure on firms in Korea to reduce their greenhouse gas emissions. For instance, the EU's CBAM could place a considerable burden on Korea's exporting industries, including the steel sector. This article investigates the domestic sector's capabilities to adhere to climate policies worldwide and discusses policy implications.

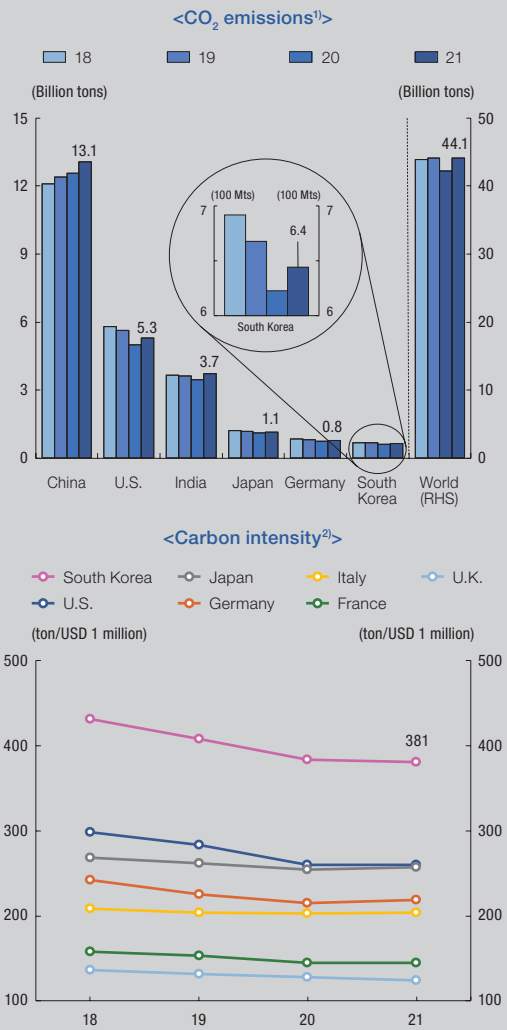
Comparison of Greenhouse Gas Emissions Across Countries[5)]

In 2021, total global carbon dioxide emissions rose to 44.1 billion tons, a 4.3% increase from 2020 (42.2 billion tons), during which their level dropped temporarily due to COVID-19.[6)] CO_2 emissions in Korea amounted to 640 million tons in 2021, a 3.4% increase from 620 million tons in 2020. Over the past four years, while global CO_2 emissions have gradually risen, emissions in Korea have continuously fallen, after reaching a peak in 2018 (690 million tons).

1) This article was authored by Kim Jea-yoon, Lee Ji-won, and Lee Young-jae (Climate Risk Research Section), and was reviewed by Song Kil-sung (head of the Climate Risk Research Section).
2) The government will finalize the sectoral strategies for greenhouse gas reduction by March 2023 and then incorporate them into the First National Master Plan for Carbon Neutrality and Green Growth .
3) The Carbon Border Adjustment Mechanism (CBAM) will impose new tariffs on imported cement, electricity, fertilizers, iron and steel, and aluminum at a rate proportional to the amount of embodied carbon emissions. The European Parliament proposed to officially introduce the CBAM in 2026 after a three-year pilot phase between 2023 and 2025. As proposed, the pilot phase of the CBAM is expected to begin in 2023, while there could be changes regarding the timing of the official introduction of the instrument and the range of products on which the carbon tariff will be levied.
4) Ships with a GWT (Gross Weight Tonnage) of 400 tons and above must meet or exceed the Energy Efficiency eXisting ship Index (EEXI) and the Carbon Intensity Indicator (CII) thresholds set by the IMO. The EEXI is a pre-estimate of a vessel's CO_2 emissions per ton of cargo carried and nautical mile. For 2023, the EEXI threshold is set to 80% of the EEXI of ships built between 1999 and 2009. The CII is an ex-post estimate of a vessel's CO_2 emissions per ton of cargo carried and nautical mile. For 2023, the threshold is set to 95% of the 2019 CII.
5) To reflect the latest data up to 2021, the international comparison of emissions in this article will focus only on CO_2, one of the six major greenhouse gases. The others are methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). CO_2 accounts for the largest share of 91.4% (as of 2020) of total greenhouse gas emissions in Korea.
6) Calculated using data from the European Commission's Emissions Database for Global Atmospheric Research (EDGAR). EDGAR published national CO_2 emissions estimates for 2021 based on data from the International Energy Agency (IEA).

Carbon intensity, which is measured as a ratio of CO_2 emissions to GDP, has been on a decline since 2018 in Korea, as well as in other countries, including the U.S. and Japan. In 2021, Korea's carbon intensity stood at 381.3 (ton/USD 1 million), representing a small downtick of 0.6% from 2020 (383.5 ton/USD 1 million). However, this is still quite high when compared to other countries where the corresponding figure is well below 300 (ton/USD 1 million).

Global CO_2 emissions[1] and carbon intensity[2]



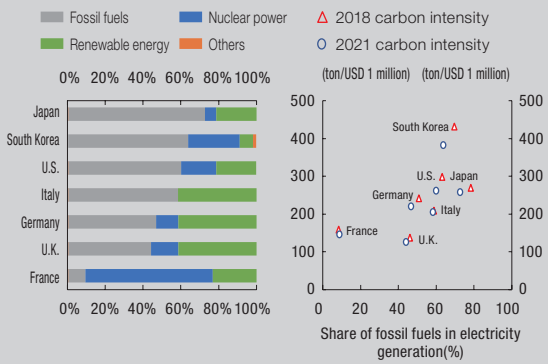
Notes: 1) CO_2 emissions without LULUCF(Land Use, Land Use Change, and Forestry).
2) CO_2 emissions divided by real GDP(2015 USD basis).
Sources: European Commission Emissions Database for Global Atmospheric Research, World Bank World Development Indicators.

The high levels of Korea's carbon intensity are due to its heavy reliance on fossil fuels in its energy production structure. Compared to other countries, Korea's reliance on fossil fuels (e.g., coal, LNG, oil), standing at 64% as of 2021, is slightly lower or similar to the level in Japan (73%) and the U.S. (60%), but is significantly higher than the level in Germany (47%), the U.K. (44%), or France (9%). Meanwhile, the share of renewable energy in the power generation mix in Korea is only 7%, drastically lower than the corresponding figure in other countries (U.S. 21%, Japan 21%, U.K. 42%, Germany 42%, France 23%).

A country's carbon intensity is in general positively (+) correlated with its level of fossil fuel reliance. What this means for Korea is that without a radical change to its energy structure, reducing greenhouse gas emissions will be particularly difficult.[7] Moreover, given the difficulties in the development of renewable energy sources over the short-term, Korea's fossil fuel reliance could continue to be high for a while.[8]

Share of fossil fuels in electricity generation[1]

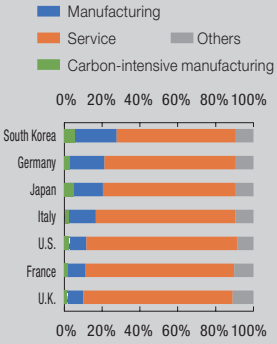
Relationship between share of fossil fuels in electricity generation and carbon intensity



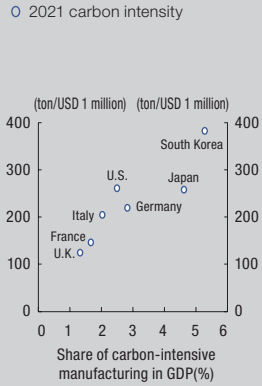
Notes: 1) Electricity generation from coal, LNG, and oil in 2021.
2) The ratio of CO_2 emissions to GDP.
Sources: Statistics of Electric Power in Korea, U.S. Energy Information Administration International Energy Statistics, European Commission Emissions Database for Global Atmospheric Research, World Bank World Development Indicators.

In addition to fossil fuel reliance, the high level of carbon intensity in Korea is also driven largely by its manufacturing-oriented industrial structure. The manufacturing sector accounts for 28% of total industry (as of 2019, based on GDP contribution) in Korea, which is substantially higher than in the U.S. (12%), Japan (20%), Germany (21%), France (11%), or the U.K. (10%). In particular, carbon-intensive manufacturing sectors, including oil refining, chemicals, cement, and iron and steel,[9] account for 5.3% of Korea's GDP, again markedly higher than the corresponding share in other countries (U.S. 2.5%, Japan 4.6%, Germany 2.8%, France 1.7%, U.K. 1.3%). On the other hand, carbon intensity tends to have a positive (+) correlation with the share of carbon-intensive manufacturing sectors in GDP. Korea is located in the upper right of the scatter plot of the distribution.

Share of manufacturing sectors in GDP[1]



Relationship between share of carbon-intensive manufacturing[2] in GDP and carbon intensity[3]



Notes: 1) Value-added by manufacturing sector as percent of GDP in 2019.
2) Carbon-intensive manufacturing includes (i) coke, briquettes and refined petroleum products manufacturing (e.g., oil refining), (ii) chemicals and chemical products manufacturing, (iii) non-metallic mineral products manufacturing (e.g., cement), and (iv) basic metals manufacturing (e.g., steel).
3) The ratio of CO2 emissions to GDP in 2021.
Sources: BOK Input-Output Tables, OECD Structural Analysis Database, European Commission Emissions Database for Global Atmospheric Research, World Bank World Development Indicators.

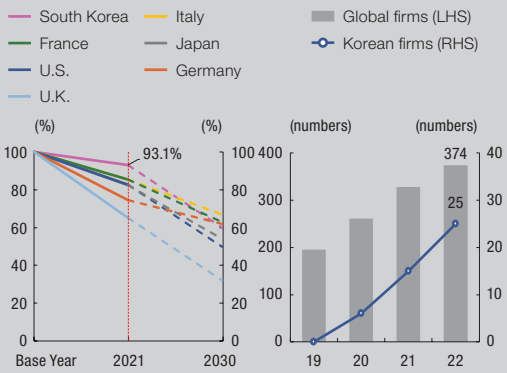
Domestic and Global Pressure for Greenhouse Gas Reduction and Firms' Responses

Pressure to reduce greenhouse gas emissions is mounting at both the domestic and global levels. This becomes a particular challenge for Korean industry due to its high reliance on fossil fuels and manufacturing industries.

7) The share of renewables in a country's energy mix was found to be negatively (-) correlated with a country's carbon intensity during the same period, suggesting that it may be easier for countries with a high share of renewable energy to reduce their greenhouse gas emissions.
8) Given the difficulty of developing environmentally friendly energy sources in the short-term, many countries around the world, including European countries, are increasing investment in natural gas, which emits a relatively less amount of greenhouse gases than coal.
9) Defined as coke and refined petroleum product manufacturing (e.g., oil refining), chemical products manufacturing, non-metallic mineral product manufacturing (e.g., cement), and basic metal manufacturing (e.g., steel) in accordance with the U.N.'s International Standard Industrial Classification of All Economic Activities (ISIC).

In November 2021, the Korean government pledged a 2030 Nationally Determined Contributions (NDC) of 40% reduction from emissions levels in 2018 (base year). Korea has cut its greenhouse gas emissions by 7% from the base year until 2021. In order to achieve the emission reduction target by 2030, Korea needs to further reduce emissions by 4.8% annually over the remaining period (2022-2030).[10] Korea's required rate of annual reduction (4.8%) is significantly above those of European countries, such as Germany (2.0%) and France (3.3%), which have continuously cut their emissions since the Kyoto Protocol (1997). To achieve the NDC target, each sector in Korea should considerably bring down its emissions by 2030.

Nationally Determined Contribution(NDC) targets and implementation plans[1)]



Number of firms joined RE100

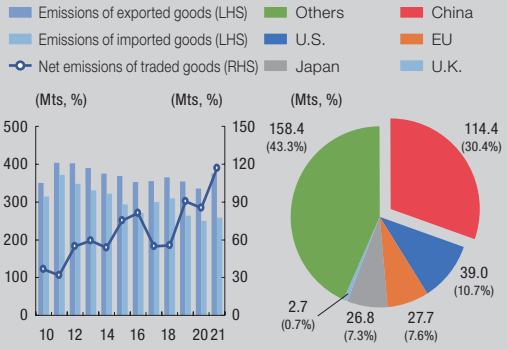
Notes: 1) Implementation plans are estimated based on European Commission's forecasts on CO_2 emissions in 2021.
Sources: European Commission Emissions Database for Global Atmospheric Research, The Climate Group.

In the private sector, an increasing number of companies are joining RE100 (Renewable Energy 100), a global campaign for 100% of their electricity consumption to come from renewable energy. Global firms, such as Apple, Google, and Tesla, have joined RE100, and they have further motivated their supply chains to join in the campaign. This has put pressure on Korean firms in those supply chains to increase their use of renewable energy. As of November 2022, 25 companies in Korea are participating in RE100.[11)]

Moreover, the EU will implement the CBAM and regulate emissions embodied in the products exported by Korea. Total CO_2 emissions embedded in Korean exported products to the world amounted to 375.8 million tons (as of 2021), far surpassing the emissions embedded in Korean imported goods from the world (258.9 million tons). In particular, the embedded emissions of products exported to the EU represent 7.6% (27.7 million tons) of total embedded emissions for all exported goods, suggesting that a substantial number of products will be hit by the tariffs.[12)]

10) The calculation is based on CO_2 emissions in Korea during 2021, using the European Commission Emissions Database for Global Atmospheric Research.
11) Korean firms that are members of RE100 include Samsung Electronics, SK Hynix, LG Energy Solution, and Hyundai Motor Company. Among financial institutions, KB Financial Group and Mirae Asset Securities participate in RE100.
12) Between 2023 and 2025, the CBAM will only require importers to report the amount of embodied carbon emissions and carbon prices paid at the origin, without imposing tariffs. A levy will be imposed starting in 2026. The tariff amount could vary depending on the tax rate, the product type, the import volume, and the carbon price in the country of origin of the goods. If the EU charges USD 50 per ton of emissions, this is estimated to lead to a drop of 0.3%-0.8% in Korean exports to Europe and of 0.07%-0.18% in GDP (Kim Seonjin, An Heejung, and Lee Yunjeong, "Effects of Major Countries' Climate Change Responses on Korea's Exports: Centering on Carbon Border Tax," BOK Quarterly Bulletin, September 2021).

CO_2 emissions of Korean traded goods



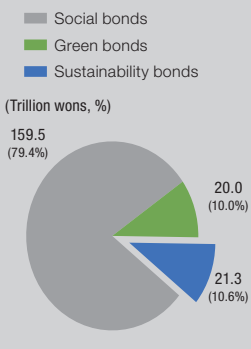
CO_2 emissions of Korean exported goods across trade partner countries[1)]

Notes: 1) OECD estimates as of 2018.
Sources: IMF Climate Change Indicators dashboard, OECD Carbon dioxide emissions embodied in international trade

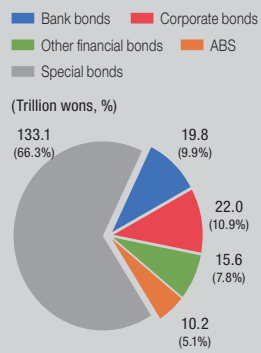
Even during the pilot phase of the CBAM (2023-2025), the EU will request companies in its trade partner countries to submit data about greenhouse gas emissions embedded in the products exported to the EU. This will result in additional administrative costs for firms in Korea. In particular, the CBAM and the associated administrative costs could cause a serious burden, particularly on SMEs (small and medium-sized enterprises), as very few of these companies are prepared to respond to such changes. Korean exports to Europe amount to USD 89.4 billion (as of 2021), representing about 13.9% of total exports (USD 644.4 billion). The share of SMEs among exports to Europe stood at 35.5% during the same period.

In response to domestic and global climate policies, several firms in Korea are raising funds and investing in emission reduction projects. However, the current level of efforts appears to be insufficient to meet the heightened emission mitigation targets. The outstanding balance of ESG bonds[13)] in Korea stood at KRW 200.8 trillion in November 2022. Even though the volume of ESG bonds has continuously grown since the first issuance of won-denominated bonds in 2018, the issuance of green bonds, which aim to reduce greenhouse gases, remains low. Of total ESG bonds outstanding, 79.4% (KRW 159.5 trillion) are accounted for by social bonds, with green bonds representing only 10.0% (KRW 20.0 trillion).

The outstanding balance of ESG bonds[1)]



The outstanding balance of ESG bonds across issuers[1)]



Notes: 1) Data as of November 2022.
Source: Korea Exchange.

Regarding the type of issuer, the vast majority of ESG bonds are bonds issued by public institutions, including public corporations and government-owned banks, making up 66.3% (KRW 133.1 trillion) of all issues. Only 10.9% of ESG bonds are issued by private firms. This low level of ESG bond issuance by private firms appears to be due, on the one hand, to the low incentives to make a long-term investment in environ-

13) ESG bonds are divided into green bonds, which are used to fund environmentally friendly projects (e.g., renewable energy), social bonds used to finance projects to address social issues (e.g., support for underprivileged groups), sustainability bonds used to fund both environmentally friendly and social projects, and sustainability-linked bonds where bond characteristics (e.g., the coupon rate) can change depending on the issuer's ESG performance. In Korea, ESG bonds were first issued and listed on the Korea Exchange in May 2018 by the Korea Development Bank.

mentally friendly technologies and, on the other, to the lack of a framework that ensures investor confidence, such as clear guidelines on green economic activities and the post-bond issuance monitoring processes.

Policy Implications

Domestic and global pressure to reduce greenhouse gas emissions, including the Korean government's emissions reduction target for 2030 and the introduction of the CBAM by the EU, could create a heavy burden for companies in Korea. This is expected to be particularly the case for SMEs with a limited ability to cut greenhouse gas emissions and limited access to green finance.

To effectively respond to climate policies around the world, the government and financial authorities should focus on improving firm capabilities to lower emissions. In the short-term, micro measures, such as assessing the status of greenhouse gas emissions at SMEs, would be necessary to respond to the EU's CBAM.[14] In the medium- and long-term, financial support, including tax credits, will be needed to encourage companies to invest in greenhouse gas reduction technologies.

Meanwhile, to increase companies' access to green financing and to promote money inflows into the green finance market, the government needs to provide clear guidelines on green bonds. In particular, the guidelines should include a pre-screening system aligning with the green taxonomy to determine the eligibility of the use of proceeds, as well as a post-bond issuance monitoring system.[15] Moreover, financial authorities should establish lending rules for green loans to enhance access to green finance for SMEs, which, in general, face greater challenges in raising funds through capital markets.

The BOK is currently carrying out the tasks set out in its "The BOK's Response to Climate Change," an action plan established in October 2021, to encourage the sustainable growth of the Korean economy.[16] Going forward, the BOK will seek ways to utilize policy tools, including its lending system, to increase the inflow of funds into environmentally friendly sectors.

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14) For example, the Ministry of Environment's consulting program for firms, which provides funding assistance for measuring greenhouse gas emissions, should be promoted.

15) In September 2022, the Ministry of Environment provide a draft of Korean taxonomy, which offers guidance on green economic activities. The Ministry of Environment plans to incorporate the taxonomy into the Green Bond Guidelines established in December 2020 in order to set out a clear standard for the use of proceeds of green bonds.

16) This action plan outlines the strategies for climate change responses across four areas: research, monetary policy, internal operations, and external communications. Please see the BOK press release "The BOK's Response to Climate Change" (October 2021).

Box 8.

Introduction of Crypto Regulation — Recent Status and Implications[1)]

Investor confidence in crypto assets was severely hit this year by incidents such as the collapse of Terra-Luna and the bankruptcy filing of FTX. This, combined with the U.S. Fed's rate hikes, which worsened market participants' risk aversion, plunged the cryptocurrency market into a prolonged downturn, known as the "crypto winter."

As it has become apparent from the recent crisis that the crypto asset market is no different from traditional financial markets in terms of vulnerabilities, this has brought new urgency to the discussion of creating a regulatory framework for crypto assets in countries including the U.S. and the EU.

This article examines the current status of the introduction of crypto asset-related regulations in major countries and identifies implications for Korea as it prepares to regulate its crypto industry.

Recent Trends in the Crypto Asset Market

Global market

At the end of November 2022, the total capitalization of the global crypto currency market stood at USD 872.0 billion, which represents a decrease of 63.0% from the end of 2021. In May to June this year, amid the meltdown of Terra-Luna, followed by the suspension of services by Celsius and Three Arrows Capital, global crypto currency market cap took a steep dive. In November, concerns over the liquidity risk of the crypto exchange FTX and its subsequent bankruptcy filing[2)] caused the market cap to fall by an additional 18.8%.

The fallout from the bankruptcy filing of FTX appears to be ricocheting through the crypto space. Blockfi and Genesis Global Trading, which had large exposure to FTX, faced a massive influx of withdrawal requests and were forced to temporarily suspended new loan originations and redemptions. At the end of November, Blockfi filed for bankruptcy. Amid deteriorating confidence in crypto assets, suspicions have emerged that crypto exchanges were inflating their numbers by lending and borrowing crypto assets to and from each other,[3)] which caused the value of native coins issued by exchanges to plummet.

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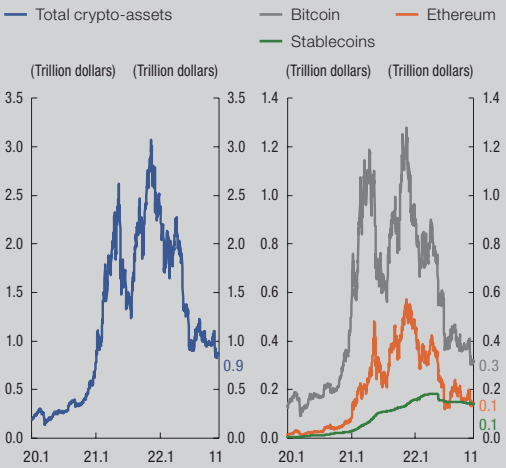
1) This article was authored by Oh Ji-yoon and Shin Ha-neul (Financial Stability Research Team), and was reviewed by Lee Jung-yeoun (head of the Financial Stability Research Team).

2) Concerns swirled over the financial health of FTX when it came to the public's knowledge that Alameda Research, a hedge fund linked to the crypto exchange, held 80% of all FTT (FTX's native token) and had engaged in leveraged trading by taking loans against FTT as collateral. On November 6, when Binance, the world's largest crypto exchange, announced its decision to liquidate all its FTT holdings, this triggered a wave of customer withdrawals, pushing FTX into a liquidity crisis and forcing it to seek bankruptcy protection (November 11).

3) When it was revealed to the public that USD 400 million worth of Ethereum was transferred from the crypto exchange Crypto.com to Gate.io, another crypto exchange (October 21), suspicions arose that exchanges were inflating their numbers by lending assets to each other.

Trends of Global Crypto-assets markets[1)]



Notes: 1) Stablecoins are the sum of USDT, USDC, BUSD, DAI, FRAX, TUSD, USDP, USTC
Sources: Coingecko

Meanwhile, the market cap of stablecoins[4)] declined by only 12.4% at the end of November, compared to the end of the previous year, in spite of the short seller attack on Tether from hedge funds[5)] in June and the drop in confidence in crypto assets as a whole. This decline is significantly smaller than the drop in the market cap for most other cryptocurrencies, including Bitcoin (-64.6%) and Ethereum (-66.8%).

Domestic market

Based on data published by the Korea Financial Intelligence Unit[6)] and on changes in the overall value of global crypto assets under management, the total capitalization of the domestic crypto market was estimated at KRW 22-23 trillion[7)] at the end of November, which is roughly equivalent to a 60% decrease from the end of 2021.

In the domestic market, small coins with low trading volumes in the global market made up a relatively high share (based on market cap) and stablecoins accounted for a rather negligible share. Although stablecoins, such as Tether USD (8%) and USD Coin (7%), represented the third largest share after Bitcoin (44%) and Ethereum (15%) in the global market as of the end of 2022, none of them were among the top 10 crypto assets[8)] in the domestic market, based on market cap. This is because U.S. dollar or other foreign currency-based stablecoins were not traded on domestic exchanges and there was little to no trading activity in won-based stablecoins.[9)]

The FTX bankruptcy had some impact on the domestic crypto market, causing service disruptions at several crypto exchanges.[10)] However,

4) Based on the combined market cap of the top eight stablecoins as of early 2022.
5) Although backed by reserves of which 79.6% are cash and cash equivalents (as of the end of June 2022), Tether became a target of short selling when some hedge funds started to doubt the stability of the corporate bonds in its reserve portfolio and as investor sentiment toward digital assets turned negative.
6) According to data released by the Korea Financial Intelligence Unit, at the end of June 2022, the total capitalization of the domestic crypto asset market decreased by 58% from the end of the previous year to KRW 23 trillion.
7) Domestic market capitalization was estimated by multiplying the domestic holdings of Bitcoin (KRW 3.8 trillion), Ripple (KRW 2.9 trillion), Ethereum (KRW 2.1 trillion), and other cryptocurrencies (KRW 14.2 trillion), reported by the Korea Financial Intelligence Unit, by the rate of change in the global market cap of the corresponding cryptocurrency in July-October 2022.
8) The top 10 cryptocurrencies in Korea during this period included Bitcoin (16.6%), Ripple (12.5%), Ethereum (9.3%), ADA (2.9%), Dogecoin (2.9%), and Solana (1.2%). The names of the four other cryptocurrencies with low global trading volumes were not disclosed.
9) TerraKRW (KRT), a won-based stablecoin, was traded on Gopax, but was delisted in May this year.

due to the modest size of domestic investors' FTX-related exposures (investment in FTT, etc.), any losses directly caused by this incident are likely to be limited. Moreover, domestic crypto exchanges are not legally permitted to issue native coins, such as FTX's FTT. They are furthermore believed to have internal rules in place to hold customer-deposited crypto assets separately from their own assets, which lowers the risk of a crisis like the FTX collapse.

Current Status of Introduction of Crypto Regulation in Major Countries

EU

In June 2022, the European Parliament and EU member states agreed on the MiCA (Markets in Crypto Assets) bill, which was reviewed and approved by the Council of the European Union in October. This landmark EU bill is the first standalone legislation on crypto currency assets in the world[11] and is focused on regulating crypto asset service providers (CASP) to protect users.

The MiCA bill defines crypto assets as, "a digital representation of value and rights that may be electronically transferred and stored, using distributed ledger technology or similar technology," and classifies them according to the characteristics into utility tokens, asset-referenced tokens, and e-money tokens. Crypto assets with unspecific issuers, such as securities-type tokens and Bitcoin, and irreplaceable tokens (non-fungible tokens (NFTs)), are excluded from the scope of the MiCA regulations. In anticipation of the future issuance of a CBDC, the bill furthermore states that distributed ledger-based digital currencies issued by central banks are also excluded from its scope.

EU MiCA's classification of crypto-assets

Classification	Definition
Crypto-Asset	Digital representation of value or rights which may be transferred and stored electronically, using DLT (or similar technology)
E-money tokens	A type of crypto-asset which is meant to be a means of exchange and maintains a stable value by referring to the value of a fiat currency that is legal tender
Asset-referenced tokens	A type of crypto-asset which is meant to maintain a stable value by referring to the value of several currenciesthat are legal tender (fiat currencies), one or several commodities, or one or several crypto-assets, or a combination of such assets
Others	Crypto-assets which are not e-money tokens or asset-referenced tokens
utility tokens	A type of crypto-asset intended to provide digital access to a good or service, available on DLT, and is only accepted by the issuer of that token

Source : European Commission

Stricter rules are applied to asset-referenced tokens and e-money tokens, which are stablecoins,[12), 13)] than other crypto assets, as these tokens are more likely to be broadly used due to the fact that they are designed to preserve the

10) When Genesis Global Trading, a crypto lending platform, suspended its services in the wake of the FTX bankruptcy, this caused delays in the payment of interest on and withdrawals of principal from internal crypto savings accounts offered by GOPAX (GOFi).

11) However, in a blog post signed by the Director General of Market Infrastructure and Payments (https://www.ecb.europa.eu/press/blog/date/2022/html/ecb.blog221130~5301eecd19.en.html), the ECB warned against misconstruing regulations as a recognition of the legitimacy or legality of crypto currencies.

12) Notwithstanding, e-money tokens that are pegged to the EU's nominal currency (the euro) and maintain a stable value are considered electronic money pursuant to Directive 2009/110/EC (Article 2(2)).

13) Algorithmic stablecoins such as TerraUSD that seek to maintain a stable value by pegging to a single currency or other assets are also subject to the rules applied to e-money tokens or asset-referenced tokens, depending on the type of reference assets.

stability of their value.[14] As a mechanism to prevent coin runs and other similar types of market turmoil, issuers of asset-referenced tokens are required to maintain reserves in safe assets with a market value equal to at least 100% of the outstanding value of the tokens to assure users.

In addition to issuers, MiCA moreover applies to crypto asset service[15] providers and articulates rules related to the licensing procedures, book keeping, financial soundness, and governance structure standards. Furthermore, for the protection of users, crypto asset service providers have a duty to verify the identity of each customer, and insider trading and market manipulation are categorically banned.

The bill also imposes the duty of cooperation with the European Banking Authority, the European Central Bank, and all EU member states, requiring them to assist in the staffing of a supervisory body and to share information and provide feedback. To prevent stablecoins from undermining the stability of the payment and settlement system, the bill confers upon the European Central Bank and the central banks of the member states the right to weigh in on the issuance of asset-referenced tokens, as well as the right to deny or revoke a license.

MiCA is expected to enter into effect at the beginning of 2024 at the earliest. MiCA, being a piece of EU-wide legislation, is applicable in all member states, and its introduction is likely to reduce regulatory arbitrage and improve efficiency in the issuance and management of licenses for crypto asset service providers. Moreover, the increased level of user protection provided by it could help bring into the crypto space new users who have so far shunned these assets due to concerns related to unfair practices, hacking, or fraud.

U.S.

In the U.S., where discussions about a regulatory framework are still in progress, crypto assets that are currently traded are regulated for the time being by applying existing laws mutatis mutandis. For example, crypto assets that are close in characteristics to securities[16] are deemed to fall under the jurisdiction of the Securities and Exchange Commission (SEC) and the Securities Act of 1993. Other crypto assets are considered commodities and the Commodity Futures Trading Commission (CFTC) has the authority to intervene when necessary to prevent fraud and enforce the rules against market manipulation.[17] The level of crypto regulation also varies from state to state.[18]

14) Issuers of asset-referenced tokens must be licensed by the appropriate authorities in the concerned member state and are required to have their own funds of at least EUR 350,000 or 2% of the newly created reserve assets.

15) Examples include cryptocurrency custody services, transaction platforms, cryptocurrency exchange and withdrawal services, and investment consulting.

16) Digital assets are deemed to be securities if they satisfy the following criteria under the Howey Test, the 1946 U.S. Supreme Court case for determining whether a transaction is an investment contract: ① an investment of money including checks and marketable securities that have cash value or are cash equivalents, ② expectations of a profit, ③ investment in a common enterprise, and ④ profits are to be derived from the efforts of others.

17) Bitcoin, the cryptocurrency with the largest market cap, is classified as a commodity and is regulated by the CFTC, as it was deemed not to be a security due to its decentralized nature.

18) In the state of New York, a BitLicense was introduced in 2015, making it mandatory for cryptocurrency companies to obtain a license. In states like Arkansas, rules applying to money transmitters are used to regulate senders in a cryptocurrency transaction. On the other hand, in Virginia, its law explicitly states that a transfer of crypto assets is not a transfer of money.

In March this year, President Biden issued the Executive Order (EO) on Ensuring Responsible Development of Digital Assets,[19] aimed at clearly dividing related responsibilities between relevant government institutions and building a consistent regulatory system. Over the ensuing months, federal agencies including the Financial Stability Oversight Council (FSOC), the Department of the Treasury, and the Department of Justice each developed policy recommendations and submitted a report to the president. These reports articulated a clear framework for the responsible development of digital assets, which leaves no room for illicit or illegal activities, and called for action to promote innovation, including helping U.S. firms find footholds in global markets.

In a report released in October 2022,[20] the FSOC recommended following the principle of "same activity, same risk, same regulatory outcome," hinting that issuers of digital assets and related businesses will be regulated using the standards currently applied to similar traditional financial institutions. The FSOC stated in this report that much of the digital asset ecosystem can be regulated through existing laws and regulations, while proposing filling regulatory gaps, mitigating risks arising from a retail transaction-centered market structure, and building a cooperation system to collect data as key policy tasks.

Meanwhile, the growing urgency to protect crypto asset users and the increasing intersection between the crypto market and traditional financial markets prompted the U.S. Congress to call for a piece of standalone legislation to regulate this class of asset. Several bills for crypto asset regulation are already pending, of which a prime example is the Responsible Financial Innovation Act proposed by senators Cynthia Lummis and Kirsten Gillibrand in June this year.

U.K.

In the U.K., as part of the fight against money laundering, digital asset businesses are required to register with the Financial Conduct Authority (FCA) starting from January 2020. However, the U.K. currently has no separate legislation for the regulation of the overall crypto asset market.

Notwithstanding, in October this year, the Financial Services and Markets Bill was passed by the House of Commons. When this legislation enters into force, crypto assets will be subject to a similar type of regulation as the EU's MiCA, and this is expected to reduce any regulatory arbitrage between traditional financial markets and the crypto market.

Japan

In Japan, the Fund Settlement Act and the Financial Instruments and Exchange Act were amended in 2019 to allow the regulation of crypto assets. The amended Fund Settlement Act defines crypto assets as, "payment instruments that are not denominated in legal tender, which may be used by unspecified persons." Under this law, crypto exchanges must register with the Financial Services Agency and have a duty to inform users about the nature and risks of their assets.

19) As part of this executive order, the secretary of the treasury is required to produce a report on the, "future of money and payment systems," assessing the impact of digital assets on economic growth, financial growth and inclusion, and national security. Meanwhile, the Federal Reserve was ordered to continue its CBDC research.

20) Please refer to "Digital Asset Financial Stability Risks and Regulation," presented at the sixth FSOC meeting on October 3, 2022.

Introduction of Crypto Regulation in Korea

Domestic legislation related to digital assets that is currently in place include an anti-money laundering law. In March 2021, the Act on Reporting and Using Specified Financial Transaction Information was amended to impose on crypto asset businesses[21] a duty to report to the Korea Financial Intelligence Unit, as well as to prevent money laundering. As a result of this amendment, a travel rule went into effect on March 25, 2022, requiring crypto companies to verify the identity of both the sender and recipient of any crypto transaction exceeding KRW 1 million in value.

In tandem, discussions are ongoing on the details of a new law that comprehensively regulates digital assets. Several digital asset-related bills have already been introduced and are currently pending at the National Assembly. Most of them are focused on regulating market entry by establishing licensing and registration rules for crypto companies or protecting digital asset users by banning illegal or unfair practices, as well as the use of insider information and price manipulation.

The Financial Services Commission has also set out to work on a legislative proposal for the regulation of crypto assets, notably through the Digital Assets Market Initiatives, launched in August this year. This working group, composed of experts from relevant government institutions, including the BOK and the Financial Services Commission, academia, and research institutions, and legal practitioners, is holding discussions on the legal nature and rights relations of digital assets and on the regulatory framework needed in primary and secondary markets. Meanwhile, concerning crypto assets that fall into the category of securities-type tokens, the group will explore ways to improve existing regulations, based on the principle that their issuance and distribution must be regulated using the current rules applied to capital markets.

Implications

Korea and other major countries are building a regulatory framework for crypto assets according to the common principle that the crypto market must be subject to the same level of regulation as traditional financial markets, even if the precise details may vary between countries.

However, given how the various types of crypto asset markets that have sprung into existence and rapidly grown in recent years have long evolved outside the regulatory perimeter, it will likely take some time before a comprehensive regulatory system can be put into place to consistently regulate all of them. Meanwhile, in order to build a forward-looking regulatory framework, which takes into consideration not only crypto assets that are currently traded and associated financial services, but also the direction of their future development, collecting opinions from a variety of stakeholders, including crypto industry

21) The Act on Reporting and Using Specified Financial Transaction Information defines cryptocurrency businesses as persons or entities engaged in the trading of cryptocurrencies, including buying, selling, exchanging, transferring, providing custody for, and managing crypto assets, and arranging or conducting transactions for clients.

22) In Korea, the Financial Services Commission conveyed the government's decision to support the responsible development of the digital asset industry by establishing a policy framework, strengthening security and developing skilled human resources (August 17, 2022, opening statement at the first Digital Assets Market Initiatives meeting).

insiders, is a prerequisite.

Also, an important policy consideration in most countries is finding a balance so that strict regulation to protect users does not hinder the development of crypto asset-related technologies.[22] To achieve this goal, policy authorities need to add more staff with related knowledge to better understand the crypto industry.

Moreover, crypto assets are cross-border assets presenting significant regulatory arbitrage opportunities between countries. In order to reduce such arbitrage, it may be necessary to keep pace with other countries, both in terms of speed and intensity of regulation. Active participation in discussions by international organizations[23] is therefore essential, as are efforts to broaden the channels of cooperation with supervisory authorities in major countries, to ensure that international principles are consistently maintained when legislating new crypto asset laws.

Domestically, relevant institutions must cooperate on designing an efficient regulatory system where roles and responsibilities related to the monitoring of crypto markets, collecting data, and supervision and surveillance, are clearly divided and defined. As for the BOK, it must conduct an in-depth analysis of the impact of the growing circulation of crypto assets and, more particularly, stablecoins on the central bank's future monetary policy and currency issuance policy, as well as on the overall financial system, including the payment and settlement systems, and seek out policy solutions to respond to risks to financial stability that may arise from the crypto currency market.[24]

23) As a member of the FSB's Financial Innovation Network (FIN), of the Regulatory Issues of Stablecoins (RIS), and of the Basel Committee on Banking Supervision (BCBS), the BOK participates in crypto currency regulation-related discussions at these organizations.

24) The Framework Act on Digital Assets, the umbrella legislation for the regulation of crypto currencies in Korea, which is currently under discussion, could follow the example of the EU's MiCA to expressly exclude CBDCs from its scope and confer upon the BOK the authority to supervise and maintain surveillance over the issuance and management of stablecoins that may have a potential impact on the payment and settlement systems.

Analysis of Financial Stability Issues

I. Impact of Base Rate Hikes on Financial Stability[1)]

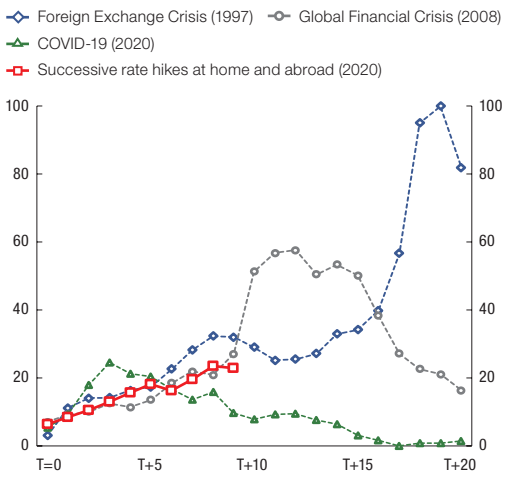
1. Background

To curb the growing inflationary pressure and to tackle the problem of an excessive credit accumulation, the BOK has gradually raised the base interest rate between the second half of 2021 and the first half of 2022, by an increment of 0.25%p. As the base rate hikes have reduced financial imbalances by lowering the risk appetite among economic agents, this has had the effect of mitigating the vulnerabilities in the Korean financial system.

However, once into the second half of 2022, amid the accelerated pace of rate hikes by the BOK, volatility and market vigilance appear to have increased in financial markets as the Legoland default coincided with year-end funding needs among financial institutions. This caused the financial stress index (FSI) to rapidly climb at a rate comparable to that during major crises in the past, including during the global financial crisis, even if it has not quite reached the same level (Figure I-1). This development calls for an examination of whether the current pace of rate hikes is putting excessive stress on the financial system, to such an extent to convert potential risks into actual risks.[2)]

Here, we analyze the impact of base rate hikes on financial stability by focusing, on the one hand, on the reduction of financial imbalances and, on the other, on the expansion of short-term financial instability, and explore policy implirations to respond to potential risks.

Figure I-1. Trends[1)] of Financial Stress Index(FSI) by major times



Note: 1) T=0 means the previous month of the point such that FSI enters the caution stage(8) by time

Source: Bank of Korea

1) This article was authored by Noh Yoo-cheol, Yoo Hyun-joo, and Hong Joon-sun (Financial Stability Planning & Coordination Team), Yeom Ki-ju, Park Ji-soo, Lee Byung-ho, and Lee Dong-jae (Systemic Risk Team) and Pyoun Do-hoon and Kim Jae-young (Stability Analysis Team), and was reviewed by Lim Kwang-kyu (head of the Financial Stability Planning & Coordination Team) and Bahng Hong-kee (head of the Policy Monetary Analysis Team).

2) In a staff report published in September this year, the Federal Reserve Bank of New York presented an analysis that found that a continuous tightening of monetary policy to address macroeconomic concerns, focused on the real economy, could increase liquidity risk in financial markets and severely undermine the stability of the financial system.

2. Effects on Long-term Financial Imbalance and Short-term Financial Instability

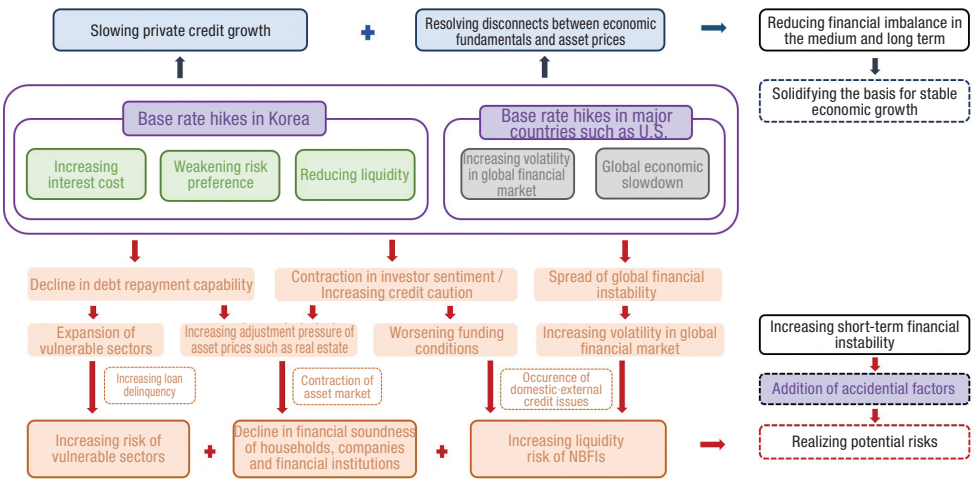
A. Transmission Channels of the Impact of Base Rate Hikes

Base Rate hikes produce both positive and negative impacts on financial stability through different channels of transmission (Figure I-2).

In the medium- and long-term, base rate hikes contribute to mitigating risks arising from financial imbalances, such as accelerated credit growth or sharp rises in asset prices, and reducing the transfer of domestic and external shocks to the real economy by way of vulnerabilities in the financial sector, thereby helping the economy achieve stable growth. At the same time, rate hikes can increase default risks among households and businesses by driving up interest expenses. Higher interest rates put a particular strain on vulnerable borrowers. This, coupled with the worsening of investor sentiment and the heightening of credit fears, can lead to a localized deterioration in funding conditions in financial markets. Furthermore, the increased pressure for the correction of asset prices, including on the prices of real estate and stocks, can have a negative impact on the financial soundness of households, corporations, as well as of financial institutions.

Moreover, if the problem is compounded by unforeseen events that erode trust between market participants, as was the case in the second half of 2022, it can also lead to liquidity stresses among non-bank financial institutions (NBFIs), which heavily rely on wholesale funding. In tandem, if policy rate hikes in the U.S. and major countries result in global financial instability and increased pressure for outflows of foreign capital causes the value of the won to drop, this can further worsen the adverse impact of base rate hikes on financial stability.[3)]

Figure Ⅰ-2. The ripple path of base rate hikes' effects on financial stability



3) For more on this topic, refer to "Analysis of Financial Stability Issues Ⅲ, Transmission Channels of Exchange Rate Risk to the Financial Sector and Its Impact."

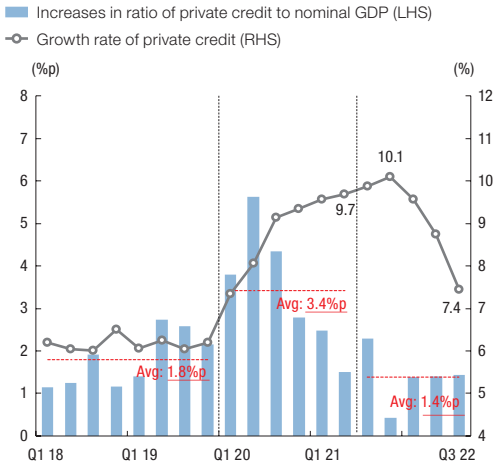
In what follows, the impact of base rate hikes is discussed at two perspectives: their effects on the reduction of financial imbalances, and their effects on short-term financial instability.

B. Reduction of Financial Imbalances

Slowing private credit growth

The base rate hikes, begun in the second half of 2021 in parallel with the lowering of the debt service ratio (DSR) cap, have contributed to slowing private credit growth by curving household credit accumulation.[4] The growth of private credit (the flow of funds statistics), which increased by 10.1% (year-on-year) during the fourth quarter of 2021, has tapered off since early this year. As a result, the increases in the ratio of private credit to nominal GDP (compared to the previous period) also fell from 3.4%p on average between the first quarter of 2020 and the second quarter of 2021 to 1.4%p on average between the third quarter of 2021 and the third quarter of 2022 (Figure I-3).

Figure Ⅰ-3. Growth rate[1] of private credit[2] and increases[3] in ratio of private credit to nominal GDP



Notes: 1) Year-on-year basis.
2) Based on flow of funds statistics(Sum of bonds, loans and government financing held by households, non-profit organizations and non-financing firms).
3) Quarter-on-quarter basis.
Source: Bank of Korea.

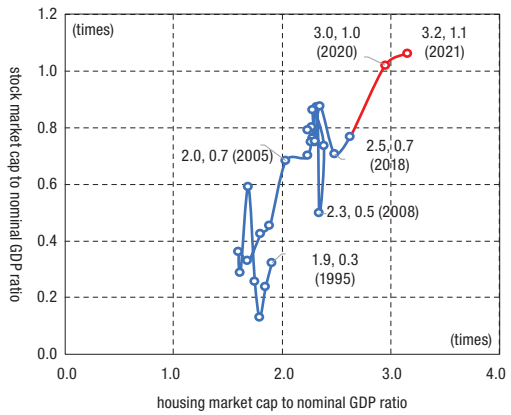
Resolving the gap between economic fundamentals and asset prices

The increase in the leverage of economic agents under a continuously low interest rate environment since the global financial crisis has played a role in the excessive rise in asset prices to levels that are for from economic fundamentals. The ratio of the total capitalization of the housing and stock markets to nominal GDP, which stood at 2.3 and 0.5, respectively, at the end of 2008, inched up to 2.5 and 0.7 at the end of 2018. After the start of the COVID-19 pandemic, fund flows into the housing and stock markets expanded rapidly in spite of the slowing real economy, it causes

4) Unlike household credit growth, which has recently slowed, corporate credit growth has accelerated, driven by a rapid increase in loans. While the loans help companies meet their funding needs amid the cooling of the bond and CP markets, an excessive accumulation of credit can weigh on the financial system over the medium- and long-term.

asset prices to skyrocket and lifting their sizes relative to nominal GDP to 3.2 and 1.1 at the end of 2021 (Figure I-4).

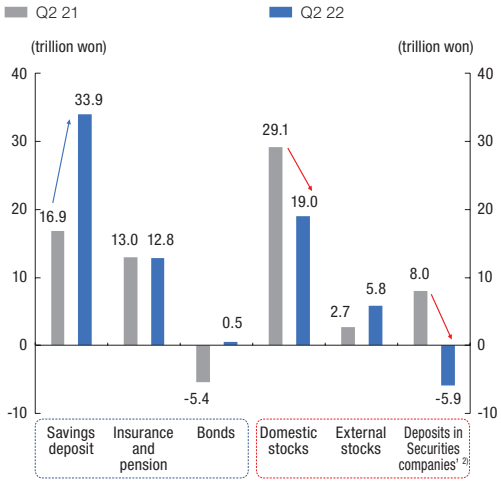
Figure Ⅰ-4. Trends of housing[1]·stocks[2] market cap to nominal GDP ratio



Notes: 1) Sum of market price of residential buildings and land attached to residential buildings based on national balance sheet, at the end of year
2) KOSPI market cap, at the end of year
Source: Bank of Korea staff calculation

The successive base rate hikes in recent periods has pushed up the yield on safe assets (bank deposits, bonds, etc.), there has been a move of money into safe assets away from risky assets.[5] Household funds in savings-type bank deposit accounts nearly doubled in value, from KRW 16.9 trillion during the second quarter of 2021 to KRW 33.9 trillion during the second quarter of 2022. On the other hand, household stock investment fell from KRW 29.1 trillion to KRW 19.0 trillion during the same period (Figure I-5). As stock prices, which were on a sharp upward trend since 2020, during periods of low deposit interest rates, reversed the course starting in the second half of 2021, this reduced the concentration of money in the stock market (Figure I-6).

Figure Ⅰ-5. Changes in households' fund management[1]

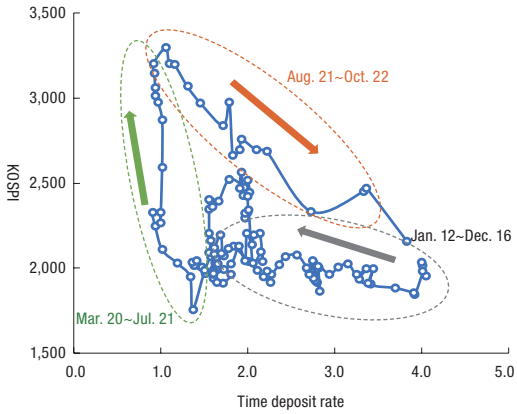


Notes: 1) Based on flow of funds statistics(households and non-profit organization).
2) Other deposits(such as deposits in securities companies).
Source: Bank of Korea

5) Moving from risky assets to safe assets helps keep return on assets stable during periods of rising interest rates. However, it should also be noted that starting in October this year, there has been a growing concentration of liquidity in high interest rate bank deposits, sparking concern about liquidity risks among mutual savings banks and at some NBFIs with limited room to further raise deposit rates.

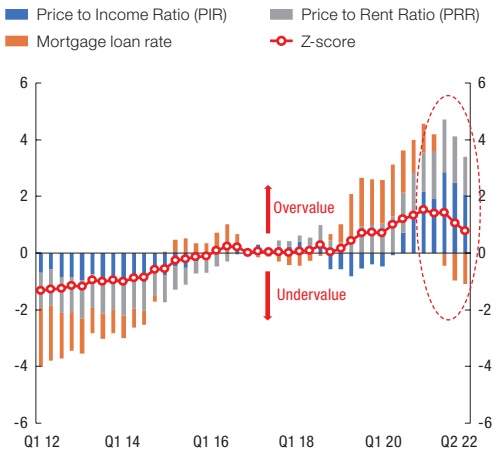
6) This index, used by the IMF (Global Financial Stability Report, October 2018) and other international organizations as a measure of housing affordability, assumes that the higher the PIR and the PRR, and the lower the housing-related loan rate, the more likely that housing prices are overvalued. The index is calculated by standardizing the three indicators (period average=0, standard deviation=1) and deriving their average value for each period. In this article, the Z score was calculated using the same method, based on the PIR and PRR data of nationwide households (households in the third income quintile), published by KB Real Estate, and the mortgage loan rate at banks (reciprocal) during the period between the first quarter of 2012 and the second quarter of 2022.

Figure Ⅰ-6. Trends in deposit rate[1] and stock price[2]



Notes: 1) Time deposit(1 year) rate of deposit-taking banks(Based on new deposits, monthly average).
2) KOSPI(monthly, closing price basis).
Sources: Bank of Korea, KOSKOM

Figure Ⅰ-7. Trends of housing price Z-score index[1] and details



Note: 1) Standardizing(Mean 0, Standard deviation 1) price to income ratio(PIR), price to rent ratio(PRR), and mortgage loan rates(reciprocal number) respectively between Q1 2012 ~ Q2 2022, and calculating Z-score using average value(by time) of three standardized indice
Source: Bank of Korea staff calculation

Meanwhile, the rise in mortgage rates and general loan interest rates caused by the base rate hikes has made households more cautious about taking on leverage to expand assets using debt. This appears to have had the effect of gradually reducing financial imbalances created by excessively high housing prices. As the price-to-income ratio (PIR) and the price-to-rent ratio (PRR) have fallen progressively, the Z-score index,[6] which measures the degree to which housing prices are overvalued, has also slowly dropped since the fourth quarter of 2021 (Figure I-7).

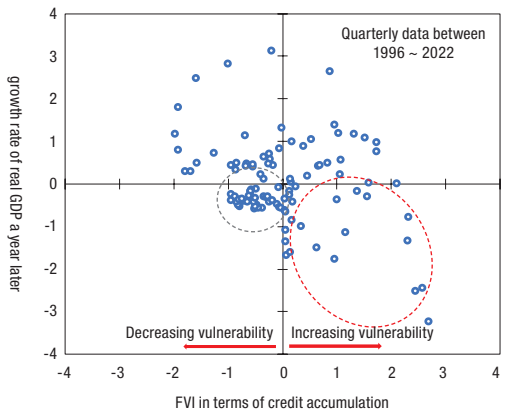
Solidifying the basis for stable economic growth

Such a reduction in financial vulnerabilities, including credit accumulation and an asset price bubble, combined with the sound level of resilience among financial institutions, has resulted in a gradual decline of the financial vulnerability index (FVI).[7] Reduced financial vulnerabilities help lower the downside risks to the real economy in the event of a shock by preventing a sudden decrease in investment.[8] The examination of the relationship between the FVI, measured in terms of credit accumulation (household and corporate credit), and economic growth from the first quarter of

7) The financial vulnerability index (FVI) measures the vulnerability of the financial system to domestic and external shocks by considering both financial imbalances in terms of credit accumulation and asset prices and the resilience of financial institutions.
8) In a study analyzing data from 14 developed countries over a period spanning 1870 to 2008, Jorda et al. (2013) found that the higher the level of credit build-up, the severer the extent of contraction in the real economy was following a financial crisis, including a reduction in investment and a drop in economic growth.

1996 to the third quarter of 2022, shows that during periods when financial vulnerabilities exceeded their long-term average due to a steep increase in credit, the rate of economic growth has frequently been below its long-term average one year (four quarters) later. In contrast, during periods where credit growth has been contained and financial vulnerabilities were reduced as a result, economic growth remained near the long-term average one year later, even if slower than before (Figure I-8).

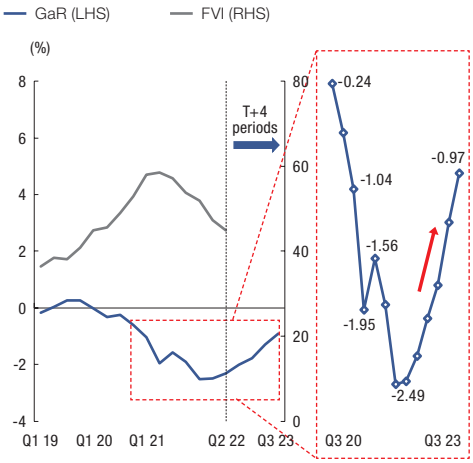
Figure Ⅰ-8. Relations[1] with future economic growth rates and Financial Vulnerability Index (FVI) in terms of credit accumulation



Note: 1) Standardizing(Mean 0, Standard deviation 1, during periods) of year-to-year growth rate of credit accumulation FVI and real GDP(sum of four quarters) between Q1 1996 ~ Q3 2022, and apprehending the relationship between FVI(T=0) and growth rate of real GDP four quarters later(T=+4) by time
Source: Bank of Korea staff calculation

An analysis performed using the growth-at-risk (GaR, maximum expected loss in GDP) approach[9] found that the reduction of financial vulnerabilities from the recent round of base rate hikes decreased the downside risk for economic growth. When the expected distribution of real GDP growth a year later was estimated by period and the distributions before and after the base rate hikes were compared, the GaR fell to -2.49% a year later, in the second quarter of 2021, but rose to -0.97% after the base rate hikes in the third quarter of 2022 (Figure I-9).

Figure Ⅰ-9. Trends of FVI and GaR[1]



Note: 1) Growth rate of real GDP(annual rate) after four quarters estimated by lower GaR(5% quantile value) for each time
Source: Bank of Korea staff calculation

C. Increased Short-Term Financial Instability

Localized contraction of the capital markets amid credit fears

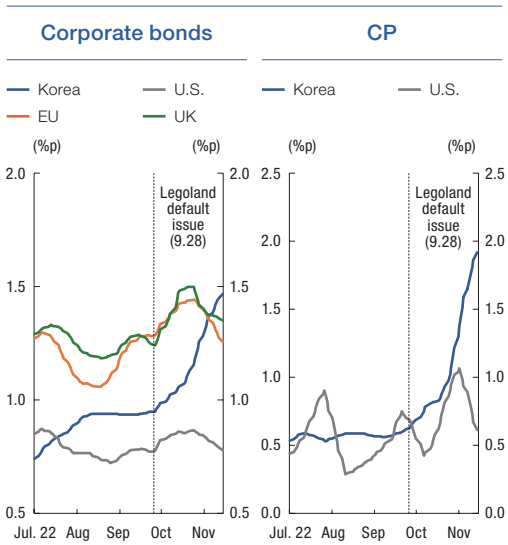
As corporate bond spreads widened starting in August 2021 amid heightened credit fears, spreads on corporate commercial paper (CP) also increased sharply from October onward in the aftermath of adverse credit events, such as the Legoland default. Meanwhile, the rising rollover demand on maturing corporate bonds and CP in the lead-up to the year-end, combined with the large volume of new bond issues by public energy corporations and banks, created added difficulties for issuers of

9) For a detailed discussion of this topic, refer to Box 1 in the June 2019 Financial Stability Report, "Assessment of Financial Vulnerability of Korea Using Growth-at-Risk Approach."

subprime bonds, making it overall more challenging for companies to raise funds through debt markets.

If one considers the fact that in countries like the U.S., the EU, and the U.K., where policy rates have risen more steeply, credit spreads on corporate bonds and CP have mostly fluctuated in a range-bound manner, the severity of contraction in the domestic corporate capital markets seems excessive, going beyond the extent that can be expected from the rate hikes carried out so far, and appears to be largely due to the credit incidents mentioned earlier (Figure I-10).

Figure I-10. Credit spread[1] of corporate bonds[2] and CP[3] in major countries



Notes: 1) Based on moving average of 10 business days.
2) For each countries, Corporate bond rates(3 years, AA rating) - government bonds(3 years).
3) For each countries, CP rate(91 days) - central bank policy rate.

Source: Korea Financial Investment Association

Moreover, mounting worries over the soundness of securities companies and credit-specialized financial companies (hereafter, "specialized credit companies") have stoked credit fears about NBFIs, as well. In particular, concerns about the liquidity risk at specialized credit companies, which realy heavily on wholesale funding,[10] caused credit spreads on bonds issued by specialized credit companies to rapidly widen starting in August 2021.[11]

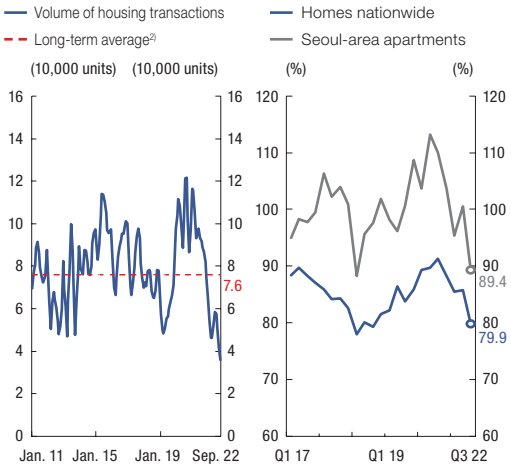
The slowdown in the housing market and funding constraints on related firms

Amid rising interest rates in Korea and around the world, home buyer sentiment worsened, causing the housing market to sharply contract. In January to September 2022, the volume of housing transactions amounted to 46,000 units, corresponding to only 60% of the long-term average (January to September average of 76,000 units between 2011 and 2021). During the third quarter of 2022, the housing auction price ratio (price / appraised value) for homes nationwide and for Seoul-area apartments stood at 79.9% and 89.4%, respectively, hovering near the lowest levels in the past five years (Figure I-11).

10) At the end of September 2022, the ratio of borrowings to total wholesale funding at specialized credit companies was as much as 80.1%.

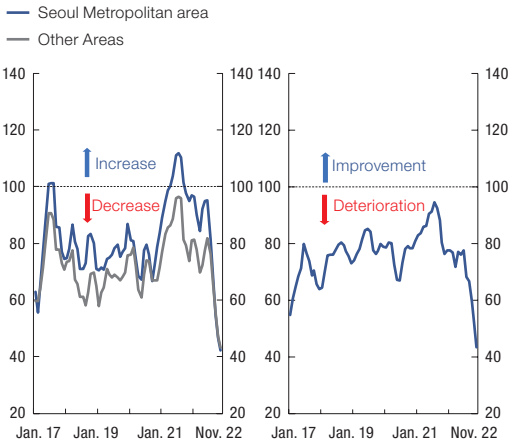
11) Credit spreads on bank bonds have also widened since the second half of 2022. This, however, appears to be due to a sharp rise in new bond issues at banks, which are facing greater funding needs amid the increase in loans to companies caused by the difficulty of raising funds through the corporate bond market, and the restoration of the liquidity coverage ratio (LCR) to pre-pandemic levels, rather than having to do with any newly-unveiled credit risk.

Figure Ⅰ-11. Volume of housing transactions and housing auction price ratio



Notes: 1) 3-month moving average basis.
2) From 2011 to 2021, respecitvely from January to September.
Sources: Korea Real Estate Board, Court auction information

Figure Ⅰ-12. Housing business survey index and the housing project funding index



Notes: 1) For each investigated items, (percentage of those who answered "good" - percentage of those who answered "bad").
2) 3-month moving average basis.
Source: Korea Housing Institute.

As the housing market is increasingly forecast to cool off, this is having a negative effect on funding conditions for real estate related companies. The housing business survey index (compiled by the Korea Housing Institute) has sharply fallen nationwide since the second half of 2022. The housing project funding index has also rapidly fallen due to the reluctance at financial institutions to issue real estate PF loans (Figure I-12).[12)]

Transmission of volatility from global to domestic financial markets

Concerns about global financial instability amid policy rate hikes in the U.S. and other major countries can also affect the domestic financial system by increasing volatility in stock prices and in the exchange rate, putting growing pressure on the foreign exchange market, and by triggering outflows of foreigners' securities investments.

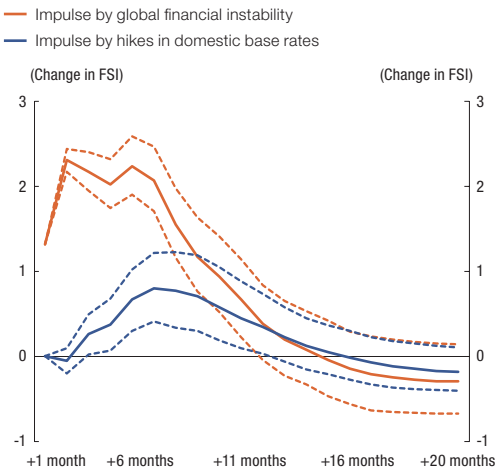
When the impact of a change in the U.S. National Financial Conditions Index (NFCI), a proxy for uncertainty in the global financial markets, on Korea's financial stress index (FSI) was estimated through an impulse response analysis,[13)] a rise in the NFCI (one standard

12) The Korea Housing Institute surveys members of the Korea Housing Association and the Korea Housing Builders Association (firms engaged in housing development) on a monthly basis to evaluate market conditions and outlooks. A downtick in the housing business survey index means that the percentage of companies with a negative outlook has increased, while a downtick in the housing project funding index means a rise in the percentage of companies that feel that funding conditions have worsened for housing development projects.

deviation impulse) not only led to an immediate rise in the FSI, but the response was also more sensitive than when the base rate was increased (one standard deviation impulse) in Korea (Figure I-13).

This result, considered together with the fact that the U.S. NFCI has rapidly climbed since early 2022,[14] suggests that the current turmoil in domestic financial markets is not solely caused by domestic factors, but is also due to the increased level of volatility in global markets.

Figure Ⅰ-13. Changes in FSI responding to hikes[1] in domestic base rates and increase[2] of finanacial instability in global financial markets[3]



Notes: 1) QoQ changes.
2) U.S. NFCI used as a proxy for the global financial instability.
3) Dotted lines are 90% confidence interval.
Source: Bank of Korea staff calculation.

3. Potential Risks

A. Increased Default Risk in Vulnerable Sectors

If base rate hikes continue due to domestic and external factors, this could lead to a worsening household debt service burden, particularly for excessively indebted borrowers, and increase the share of vulnerable borrowers, as well as the default risk.

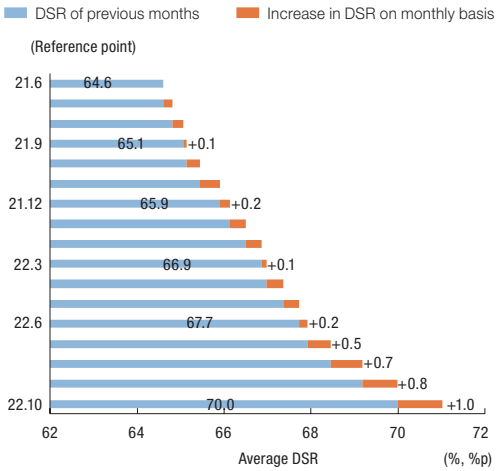
The accumulated rate hikes have driven up interest expenses for most households and magnified the debt service burden especially among borrowers carrying unsecured loans in addition to a housing mortgage. These borrowers' DSR (debt service ratio = principal and interest payment / annual income), which stood at 64.6% at the end of June 2021, is estimated to have risen above 70% by the end of October 2022[15] (Figure I-14).

13) Studies by the IMF and other existing literature have reported that the NFCI can accurately reflect global financial conditions. Here, the impulse response analysis was performed using a five-variable VAR model constructed by drawing on Arregui et al. (2018), made up of the NFCI, industrial activity (year-on-year % change), the inflation rate (year-on-year), the FSI, and changes in the base rate between January 2021 and October 2022.

14) The U.S. NFCI has risen successively from -0.58 at the end of 2021, to -0.35 at the end of April 2022, to -0.14 at the end of July, and to -0.04 at the end of October, which significantly exceeds the long-term average (-0.34 between 1971 and October 2022).

15) The DSR was estimated under the assumption that household loan balances, principal and interest payments, and income remain stable at the level of the end of June 2021 by taking into consideration changes in loan interest rates for different types of lenders and loans, and the percentage share of variable-rate loans (based on the outstanding balance). Therefore, if changes that have occurred in the outstanding loan balance and income during the period of rate hikes, as well as early payoffs, are considered, the actual DSR at the end of October 2022 may be lower than 70%.

Figure Ⅰ-14. Changes[1] in DSR of borrowers carrying unsecured loans and a housing mortgage according to hikes in base rates

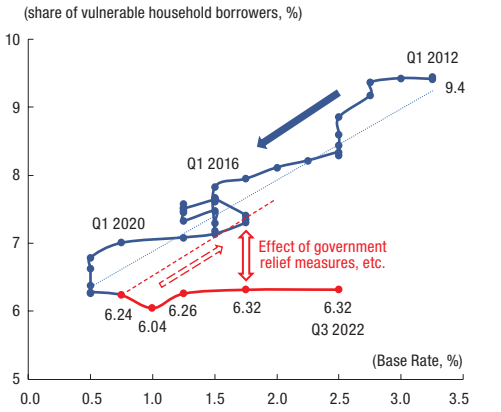


Notes: 1) Estimated by considering the increase in interest expenses due to the rise in loan interest rate.

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

Moreover, in such an environment, the advent of an adverse shock to the income or credit of non-vulnerable borrowers could significantly an increase in the share of vulnerable household borrowers.[16] Thanks to the government's continued support for vulnerable sectors after Corona19, it seems that the proportion of vulnerable borrowers will remain in the low 6% range until the third quarter of 2022 despite the interest rate hike. However, if internal and external conditions deteriorate in the future, this share could exceed 8%[17] as in the past (Figure I-15).

Figure Ⅰ-15. Trends of base rates and share of vulnerable household borrowers[1]



Notes: 1) Borrowers with low income (bottom 30%) or low credit ratings (credit score of 664 or below), who also hold multiple household loans (carrying loans from 3 or more financial institutions).

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

In the corporate sector, rising interest rates and costs could push up the share of marginal firms (firms whose interest coverage ratio has been below 1 for three consecutive years) among total firms (based on firms subject to the external audit requirement) from 14.9% in 2021 to an estimated 18.6% in 2022. Meanwhile, the share of firms at risk of insolvency (firms for which the probability of becoming insolvent within a year is higher than 5%) is estimated to have increased from 9.3% to 10.3% over the same period.[18]

In consideration of the fact that continuously rising interest rates amplify the risk of default, especially in vulnerable segments, changes

16) As of the end of September 2022, 16.8% of all borrowers were potentially vulnerable borrowers (middle-income borrowers or borrowers with medium credit ratings carrying multiple loans and low-income borrowers or borrowers with low credit ratings carrying two loans).

17) During past periods with a similar rise in interest rates and comparable real economic conditions (between the second quarter and the fourth quarter of 2016, and between the second quarter and the fourth quarter of 2017), about 1.8% of non-vulnerable borrowers transitioned to the vulnerable borrower category. When this rate of transition was applied without taking account of new relief and forbearance measures by the government, the resulting share of vulnerable borrowers among the total number of household borrowers was estimated to have risen to somewhere around 8%.

18) The estimation took into consideration worsening business conditions, such as rising borrowing costs and high prices of raw materials. For further details, refer to "Financial Soundness of Marginal Firms - Recent Status and Outlook" in the Key Sectoral Issues 3 section of the press release "Financial Stability Situation(September 2022)."

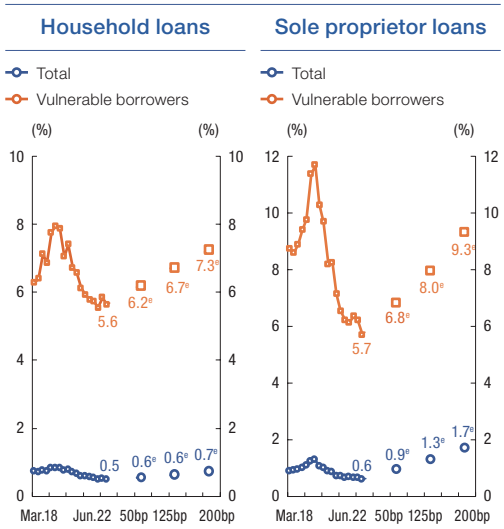
in the loan delinquency rate of vulnerable households, sole proprietors, and firms were estimated under three different base rate hike scenarios (50bp, 125bp, and 200bp).

The results showed that a rate hike by 200bp is likely to lead to an increase of only 0.2%p in the overall delinquency rate on household loans, from 0.5% (at the end of June 2022, baseline) to 0.7%, which is still within a healthy range. On the other hand, default risk among vulnerable borrowers is expected to gradually rise unless this can be prevented through policy support with the delinquency rate jumping 1.7%p from 5.6% to 7.3%.[19)]

Among self-employed business owners, a 200bp rate hike is estimated to drive up the overall delinquency rate by 1.1%p, from 0.6% (at the end of June 2022, baseline) to 1.7%. However, the delinquency rate on loans to vulnerable self-employed[20)] is likely to increase sharply (3.6%p) from 5.7% to 9.3%, unless this is reduced through other policy measures (Figure I-16).

Meanwhile, when the base rate is raised by 200bp from the level at the end of June 2022, the default risk of marginal firms (probability of transition into insolvency within a year) was estimated to climb from 3.52% (median value) at the end of 2021 to 3.75% at the end of 2022.

Figure I-16. Change in delinquency rate on household loans and sole proprietor loans by scenarios for hikes in base rates[1)]



Notes: 1) Caculated by considering LTI by borrowers, inflation rate, credit risk variants, etc.

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

B. Deterioration in Financial Soundness of Households, Firms, and Financial Institutions due to Falling Real Estate Prices[21)]

At the end of June 2022, real assets accounted

19) The estimation was based on loan amounts, delinquent amounts, and income data by borrower type during the period between the first quarter of 2012 and the second quarter of 2022, obtained from the Household Debt DB, and it used the following panel regression model, constructed by drawing on the study by Jeong Ho-seong (2017).

$$Delinquent\ amount_{i,t} = \beta_0 + \beta_1 LTI_{i,t-1} + \beta_2 R_{t-1} + \beta_3 C_{t-1} + \mu_i + \epsilon_{i,t}$$

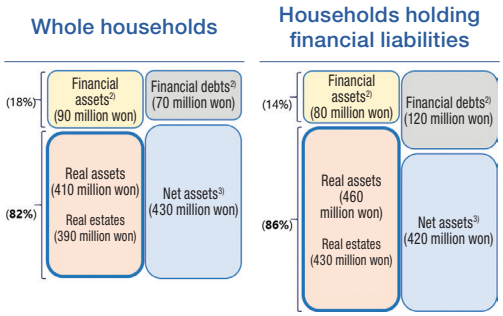
LTI: loan amount / income per borrower (i), R: base rate (loan interest rate),
C: control variables including the consumer price index and coincident composite index
μ_i : unobserved time-invariant heterogeneity, $\epsilon_{i,t}$: error term

20) Low-income borrowers or borrowers with low credit ratings carrying multiple loans were classified as vulnerable borrowers. However, due to the limited availability of data, here a borrower was considered to be carrying multiple loans when the combined number of issuers of household loans and sole proprietor loan products is three or more.

21) Here, the analysis was focused on the deterioration of the financial soundness among households. For the effects on companies and financial institutions, refer to "Analysis of Financial Stability Issues Ⅱ" in "Evaluation of Potential Risks of Real Estate Corporate Finance in Korea."

for 82% of Korean households' total assets. In particular among households with financial liabilities the share of real assets was as high as 86% (Figure I-17). Because of this, a sudden fall in real estate prices could sharply reduce a household's net assets while their debt size remains unchanged, causing a marked deterioration in financial soundness.

Figure Ⅰ-17. Composition[1] of in household balance sheet



Notes: 1) Based on average value of each household at the end of June 2022(Estimated by data based at the end of March 2021, reflecting changes in asset price and debt balance, etc)
2) Lease deposit excluded from financial assets, rental deposit excluded from financial debts
3) Net assets = (Financial assets + real assets) - financial debts
Source: Bank of Korea Staff calculation (Household Financial Welfare Survey)

Considering this, we estimated how the proportion of high-risk households, whose debt service burden is large (DSR > 40%) and are unlikely to be able to pay back their debt through the liquidation of assets (DTA[22] > 100%), will change if housing prices fall significantly. The results show that a 20% drop in housing asset prices from the level at the end of June 2022, induced by rising loan interest rates, cause the share of high-risk households to increase from 3.3% (at the end of June 2022, baseline) to 4.9%. The results also suggest that the share of households with a DSR and DTA close to those of high-risk households will increase gradually,[23] as well (Figure I-18).

Moreover, a sharp drop in real estate prices could lead to a sharp deterioration in financial soundness, including the profitability, of real estate and construction companies. As falling prices will erode profitability in the real estate PF business, this could have an adverse impact on the soundness of financial institutions that are large issuers of PF loans.

Figure Ⅰ-18. Changes in the share of high risk households[1] under 20% housing price drop scenario

End of June 2022(baseline)[2]

DSR (%) \ DTA (%)	0~25	25~50	50~75	75~100	100~	sum
0~10	17.3	6.6	3.0	1.7	3.7	32.3
10~20	8.3	6.0	3.3	1.4	2.3	21.4
20~30	4.7	4.0	2.8	1.0	1.5	14.0
30~40	2.3	2.6	1.6	0.8	1.1	8.4
40~	6.1	6.8	5.0	2.7	**3.3**	23.9
sum	38.7	26.0	15.7	7.6	12.0	100.0

20% housing price drop scenario

DSR (%) \ DTA (%)	0~25	25~50	50~75	75~100	100~	sum
0~10	15.2	5.3	2.6	1.5	3.4	28.1
10~20	7.3	5.6	3.4	1.7	2.4	20.4
20~30	4.4	4.3	3.0	1.6	1.9	15.1
30~40	2.2	2.6	2.1	1.1	1.6	9.7
40~	5.6	6.4	6.1	3.6	**4.9**	26.7
sum	34.8	24.3	17.2	9.5	14.2	100.0

Notes: 1) Households with a large debt service burden(DSR>40%) that are unlikely to be able to pay back their debt through the liquidation of assets (DTA>100%)
2) Estimated by data based at the end of March 2021, reflecting changes in asset price·debt balance·interest rate, etc.
3) Supposing interest rate hike by 200bp from the end of June 2022 baseline
Source: Bank of Korea Staff calculation (Household Financial Welfare Survey)

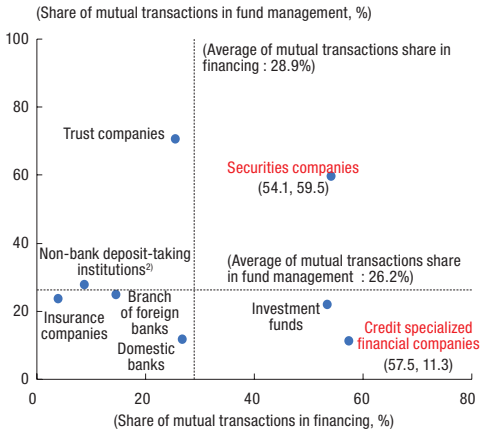
22) Debt-to-assets ratio.
23) Rising interest rates drive up the DSR by increasing the interest payment burden and reducing the disposable income of borrowers, while falling housing prices lift the DTA ratio by decreasing the value of real assets. The DSR and DTA were estimated using household assets and liabilities, and by considering the effects of rising interest rates and falling housing prices.

C. Expansion of Liquidity Risk and Deterioration of Resilience of NBFIs

In an environment of rising market interest rates, if an unanticipated and sudden credit event causes capital flows within financial markets to contract, this can amplify the liquidity risk at institutions that rely heavily on wholesale borrowings, such as securities companies and specialized credit companies,[24] which can eventually spread across the overall non-banking financial sector.

As of the end of June 2022, looking at the share of mutual transactions between business in the financial sector, securities companies and credit-specialized financial companies raise 54.1% and 57.5% of their funds, respectively, within the financial sector. In particular, securities companies are managing 59.5% of their funds in other industries within the financial sector (Figure I-19). Because of this, an abrupt spike in funding demand at the same time from both securities companies and specialized credit companies can worsen liquidity conditions in the overall financial sector, causing substantial funding strains on other NBFIs, too, such as mutual credit cooperatives, mutual savings banks, and insurance companies.[25] However, the likelihood of liquidity stresses among NBFIs spreading to the banking sector is limited, as domestic banks tend to meet much of their funding needs through deposits, and transactions with peer institutions represent only a modest share of 11.7% in their total asset management operations, which is well below the financial industry-wide average (26.2%).

Figure I-19. Share[1] of mutual transactions among financial institutions, by financial sector



Notes: 1) As of end of June 2022, dotted lines for average of whole financial sector.
2) Mutual credit cooperatives, Mutual savings banks, and post office deposits.

Source: Bank of Korea.

On the other hand, NBFIs, which are subject to somewhat lax regulations compared to banks, have accumulated more risk. As a result, the insolvency risk of NBFIs could sharply increase if interest rates rise in the future, accompanied by a massive drop in asset prices and a slowdown in the economy. To assess the change in financial institution resilience in the face of such a complex shock, a stress test was performed using the BOK's Systemic Risk Assessment model for Macroprudential poli-

24) For more on the likelihood of the liquidity risk of securities companies and credit-specialized financial companies morphing into an actual liquidity crisis, refer to Box 5 in "Changing External and Domestic Conditions and Their Impact on the Liquidity Risk of Non-Bank Financial Institutions."

25) For a detailed discussion of the current level of interconnectedness in the Korean financial sector and liquidity risks arising from contagion between institutions, refer to Analysis of Financial Stability IV in "Recent Trends in Interconnectedness in the Financial Sector and Risk Assessment" in the December 2021 Financial Stability Report.

cy (SAMP) under two different scenarios, an "adverse" scenario and a "severe" scenario[26] (Tables I-1, I-2).

Table I-1. Baseline scenario[1)2)]

(%)

	First half of 2022	Second half of 2022	2023
Economic growth rate	3.0	2.3	1.7
Consumer price inflation	4.6	5.6	3.6

Notes: 1) Using forecast value of Research Department(Bank of Korea, November 2022) after the second half of 2022
2) Year-on-year basis, average during the period

Table I-2. Scenarios of key variables[1)]

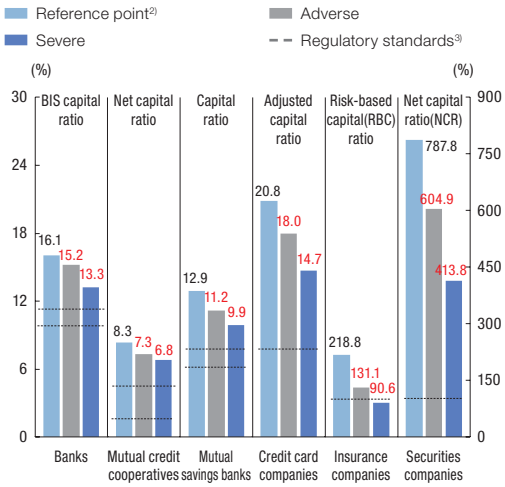
(%)

	Average og the first half of 2022	Shock Scanario	
		Adverse (Average of 2023)	Severe (Average of 2023)
Economic growth rate[2)]	3.0	1.5	-0.3
Consumer price inflation[2)]	4.6	4.6	5.2
Yield rate of treasury bonds[3)]	2.7	4.7	5.4
Stock price[4)]	2,682	1,942	1,599
Housing price growht rate[2)5)]	7.1	-8.0	-16.9

Notes: 1) Estimated by using scenario generation module(Bayesian VAR).
2) Year-on-year basis.
3) Based on treasury bonds(3-years).
4) KOSPI basis.
5) Based on housing sales price index from Korea Real Estate Board.

The results of the stress test indicated that under the adverse scenario, which assumes that key macroeconomic variables follow a rather slow downward trajectory, the capital ratios at financial institutions across all sectors of the industry will exceed the regulatory minimum requirements. On the other hand, under the severe scenario, in which asset prices plummet and the real economy contracts sharply, the results suggested that capital ratios could slip below the regulatory minimums at some securities companies and mutual savings banks (Figure I-20).[27]

Figure I-20. Results[1)] of solvency stress test



Notes: 1) LHS for banks, mutual credit cooperatives, mutual savings banks and credit card companies, RHS for insurance companies and securities companies.
2) End of June 2022.
3) 10.5% for banks(11.5% for D-SIBs), 2~5% for mutual credit cooperatives, 7% for mutual savings banks(8% for companies whose asset value is 1 trillion or more), 8% for credit card companies, 100% for insurance companies and securities companies.

Source: Bank of Korea staff calculation.

26) The adverse scenario assumes a situation where stock prices tumble by 40% from their recent high (second quarter of 2021) and housing prices decline by 10% from their recent high (second quarter of 2022). The severe scenario assumes a more dire situation where stock and housing prices drop 50% and 20% from their respective highs and where the rate of economic growth falls below the rate forecasted by the BOK's Research Department by 2.0%p. For housing prices, which were based on the housing sale prices index put out by the Korea Real Estate Board, the assumed decline of 20% in the severe scenario is on the extreme side, given that the housing sale price index fell only 13.3% from its previous high during the foreign currency crisis of 1997.

27) However, the sector wide average capital ratios of securities companies and mutual savings banks were found to exceed the regulatory minimums, even under the severe scenario.

The capital ratios of insurance companies were also found to dip below the regulatory minimum requirements in the severe scenario. However, the current method of evaluating the capital adequacy of insurance companies (RBC ratio) is set to be replaced by a new reserve standard (K-ICS) in 2023, in which mark-to-market accounting is used for both assets and liabilities, instead of assets only. Under the new method, as higher interest rates lower the value of insurance company liabilities, this is also likely to somewhat lower the interest rate sensitivity of their capital ratios.[28)]

4. Policy Implications

As has been shown in the above discussion, base rate hikes appear to be having the effect of gradually reducing risks from financial imbalances that have been accumulated during a low interest rate environment. At the same time, there remains a strong possibility that the resulting increase in stress in the financial sector, coupled with domestic and external factors magnifying uncertainty, will cause potential risks within the financial system to morph into an actual crisis.

If the inflationary pressure continues unabated, further base rate hikes may be inevitable. More instability in exchange rates may also lie ahead if the differential between global and domestic interest rates widens. A buffer mechanism is, therefore, needed to mitigate the strains caused by the base rate hikes, including uncertainty in financial markets, any decline in the resilience of financial institutions, and an increased debt service burden for vulnerable borrowers.

First and foremost, a rapid response is necessary to prevent the recent localized contraction in capital markets from spreading to the overall financial market. Micro measures, such as fiscal and financial support measures, could be used within the limit of not hampering the effects of the monetary policy.[29)] By easing the uncertainty of market participants in a timely manner, this can help stop self-fulfilling prophecies from amplifying losses and

28) This change is expected to have a positive effect on insurance company capital ratios in cases where the duration of liabilities is longer than the duration of assets.

29) On October 23, 2022, the BOK and the Korean government announced a financial market stabilization package worth KRW 50 trillion plus alpha (+α), and are actively coordinating with relevant institutions to prepare follow-up measures that may be necessary depending on market conditions.

thereby ensure that short-term or localized crises in the market do not develop into a full-blown systemic crisis for the financial system.

In tandem, the monitoring of the soundness of financial institutions must be strengthened, particularly for NBFIs, which are especially susceptible to becoming exposed to high interest rate and asset price decline - induced credit and liquidity risks, and whose resilience could sharply decrease as a result.[30] Meanwhile, for early detection of risks, which is essential to prevent liquidity risk among a small number of financial institutions from propagating into a systemic risk through interconnected institutions, a coordinated response is needed between policy authorities and relevant government institutions. This should be, moreover, combined with measures to encourage financial institutions to build capital buffers by themselves.[31]

Finally, the increase in the debt service burden caused by the rate hikes not only poses strains on vulnerable borrowers, but can also lead to a drop in the soundness of NBFIs, which have large exposure to this segment of borrowers. Therefore, it may be necessary to continue to provide vulnerable borrowers with financial assistance through targeted measures. However, any policy action should involve mechanisms that limit problems such as moral hazard and should be implemented in a way that minimizes the deferral of restructuring of insolvent companies. Its ultimate goal should be to induce the private sector to autonomously respond to changes in the financial environment, such as rising interest rates, through its own means.[32]

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30) Among the major structural vulnerabilities that caused the global financial crisis of 2008 were the disproportionate reliance of U.S. NBFIs, including securities firms and money market funds (MMF), on short-term products, investment in overly complex structured products, excessive leverage, and monitoring failure by the regulatory authorities. By drawing lessons from past crises, Korean policy authorities must increase their monitoring capabilities to prevent structural vulnerabilities of NBFIs from becoming vulnerabilities affecting the overall financial system.

31) Brunnermeier (2016) stated that financial institutions have ex-ante incentives to be undercapitalized, in other words, to neglect any building of capital buffers necessary to absorb economic shocks, such as rising interest rates.

32) The expectation that, upon an economic shock, policy authorities will intervene ex-post and share the losses gives financial institutions, as well as companies and households, incentives to neglect any effort at improving their financial position by increasing capital buffers. If such an expectation leads to a poor level of financial soundness in the private sector, this could interfere with the effectiveness of monetary policy during periods of policy rate hikes. It is, therefore, important that government programs be designed with built-in incentives for the private sector to strive to maintain financial soundness.

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II. Evaluation of Potential Risks of Real Estate Corporate Finance in Korea[1)]

1. Background

Korea's real estate finance exposure[2)] has grown rapidly, driven by corporate finance related to real estate (hereinafter "real estate corporate finance") after COVID-19. With the recent rise in loan interest rates, the slowdown in the real estate market, and credit incidents related to some real estate project financing (PF) loans raised concern that the default risk of real estate corporate finance could undermine the stability of the financial system.

Here, we assess key features and potential risks of recent real estate corporate finance in Korea, and examines the capacity of Korea's financial system to respond to shocks, such as a contraction in real estate markets.

2. Recent Developments and Key Features of Real Estate Corporate Finance

At the end of September 2022, real estate finance exposure stood at KRW 2,696.6 trillion, rising to 125.9% of nominal GDP.[3)] In particular, real estate corporate finance (KRW 1,074.4 trillion) has, until recently, shown a steep upward trend (17.3%, YoY), unlike real estate household finance, driving the growth of real estate finance (Figure II-1).[4)]

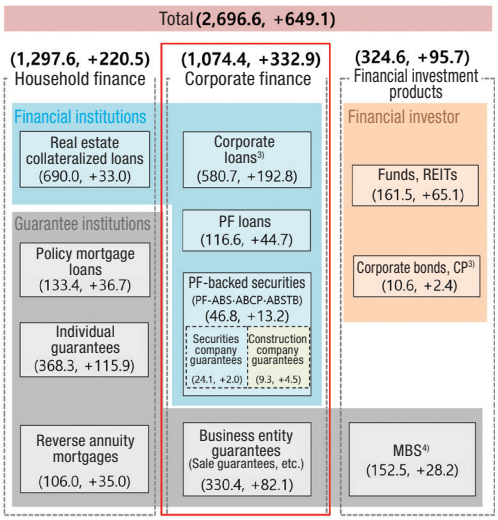
1) This article was authored by Pyoun Do-hoon, Park Jae-hyun, Hur Jung and Jeong Kyung-yeon (Financial Stability Analysis Team), and was reviewed by Lee Dae-keon (head of the Financial Stability Analysis Team) and Kim Jeong-hoon (head of the Financial Market Affairs Team).

2) Here we define real estate finance exposure as the sum of: ① household finances, ② corporate finances, and ③ real estate-related financial investment products handled by financial institutions and guarantee corporations. Real estate household finance includes private real estate mortgage loans, public mortgage loans (leasehold deposit loans and conforming loans), individual guarantees (guarantees for a refund of the leasehold deposit, guarantees for installment payment loans, etc.), and home pensions (reverse annuity mortgages). Corporate finance includes corporate loans for the construction and real estate industries, real estate PF loans (bridge loans and PF loans) and PF backed securities (PF-ABCPs, PF-ABSTBs, etc.), as well as business entity guarantees (sale guarantees, guarantees for housing completion, leasehold deposit guarantees, etc.). Real estate-related financial investment products include mortgage-backed securities (MBS), real estate investment funds & real estate investment trusts (REITs), and corporate bonds and CP issued by construction and real estate companies.

3) The sum of nominal GDP for the third quarter of 2022 and the immediately preceding three quarters (KRW 2,142.6 trillion) was used to calculate the ratio.

4) Among real estate finance, household finance rose sharply until 2021, but has slowed significantly in 2022, while corporate finance has increased by 17.3% YoY as of the end of September 2022, continuing its rapid growth.
As of the end of 2019, end of 2020, end of 2021, and end of September 2022, respectively:
- Total real estate finance exposure growth rate (YoY): 7.6% → 10.7% → 12.1% → 9.3%
- Real estate corporate finance growth rate (YoY): 7.5% → 11.8% → 16.8% → 17.3%
- Real estate household finance growth rate (YoY): 6.9% → 8.3% → 8.6% → 3.5%

Figure Ⅱ-1. Current status of & changes in real estate financial exposure[1)2)]



Notes: 1) The dotted line shows to the classification of real estate financial exposure by type, the shaded area shows the classification of the risk-bearing entities in case of default by borrowers, and the solid red line shows the comprehensive scope of real estate corporate finance.

2) The numbers in parentheses indicate the balance as of the end of September 2022, and any change since the end of 2019; the unit is 1 trillion won.

3) Loans to construction and real estate companies and bonds and CPs incurred by them.

4) The holding entity is a financial investor, but the Korea Housing Finance Corporation bears final credit risk through payment guarantees.

Source: Bank of Korea.

Real estate corporate finance can be divided, according to the characteristics of the funds and risk-taking entities, among other factors, into: ① real estate-related corporate loans (loans to construction and real estate companies), ② real estate PF[5)] (PF loans and PF-backed securities), and ③ business entity guarantees by guarantee institutions[6)] (guarantees for sale, guarantees for leasehold deposits, etc.). Hereunder, we examine recent developments and key features of real estate corporate finance by sector.

A. Sharp Increase in Real Estate-Related Corporate Loans Issued by the Non-Banking Sector

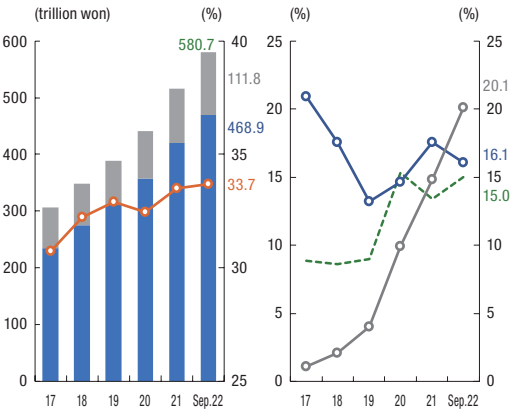
Corporate loans related to real estate rose significantly to KRW 580.7 trillion[7)] (YoY, 15.0%) at the end of September 2022, driven by the upward trend of real estate prices since 2017 and the expansion of the supply of housing. The growth rate of loans to the construction and real estate industries far outstripped the growth rate of all corporate loans, with the share of loans to the two industries out of total corporate loans rising from 30.7% at the end of 2017 to 33.7% at the end of September 2022 (Figure II-2).

5) A real estate PF loan is used to fund a real estate development project, using the business value of the project as collateral, with cash flows generated from the project being used to repay the loan. Depending on the project's phase, a real estate PF loan is divided into a bridge loan, which is necessary to raise funds to purchase land before obtaining a business licens, and PF loans to repay the bridge loan and fund the cost of the construction phase from the acquisition of business licenses until construction is complete. In addition, funding markets for real estate PF loans are divided into a primary market, where real estate development companies raise funds by taking PF loans from financial institutions, and a secondary market, where funds are raised by issuing asset-backed securities, such as asset-backed short-term bonds (PF-ABSTBs) and asset-backed commercial papers (PF-ABCPs), using the PF loans as underlying assets.

6) "Business entity guarantee" refers to guarantees issued by the Korea Housing & Urban Guarantee Corporation (HUG) or the Korea Housing Finance Corporation to business entities that need to take on housing loans from financial institutions to build housing for sale or lease.

7) At the end of September 2022, corporate loans related to real estate (KRW 580.7 trillion) consisted of loans to the construction industry (KRW 111.8 trillion) and loans to the real estate industry (KRW 468.9 trillion).

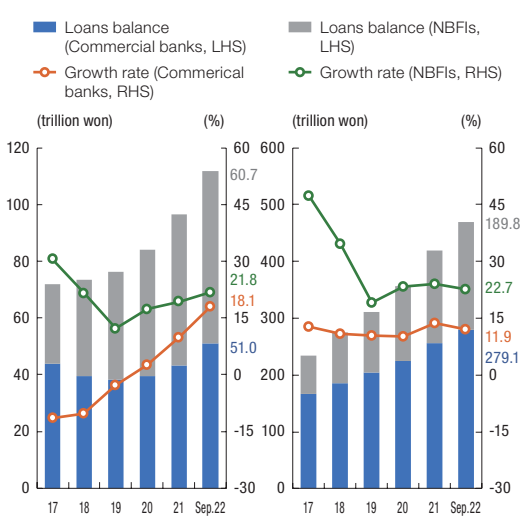
Figure Ⅱ-2. Trends[1] in loans to construction and real estate companies



Notes: 1) The balance is based on the end of the year, and the growth rate is based on the same period of last year.
2) Compare to total corporate loans by year.
Sources: Financial institutions' business reports.

By financial sector, non-bank financial institutions (NBFIs) expanded their corporate loans related to real estate by a larger margin than banks. At the end of September 2022, the growth rate of loans issued to the construction and real estate industries by NBFIs[8] was 21.8% and 22.7% YoY, respectively, significantly exceeding the growth rate of loans to the two industries by banks (18.1% and 11.9%, respectively). This seems to be the result of the non-banking sector's efforts to enhance profitability in order to cope with the continued low interest rates, coupled with banks' stable operation of funds with a focus on the risk management of the real estate sector amid the increasingly stringent regulations in the banking sector (Figure II-3).

Figure Ⅱ-3. Trends[1] in loans to construction and real estate companies, by financial sector



Note: 1) The balance is based on the end of the year, and the growth rate is based on the same period of last year.
Sources: Financial institutions' business reports.

8) At the end of September 2022, the contribution of NBFIs to the growth rate of corporate loans to the construction and real estate industries from the financial sector was estimated as follows.

Each NBFI's contribution to the growth rate of construction and real estate corporate loans (as of the end of September 2022)

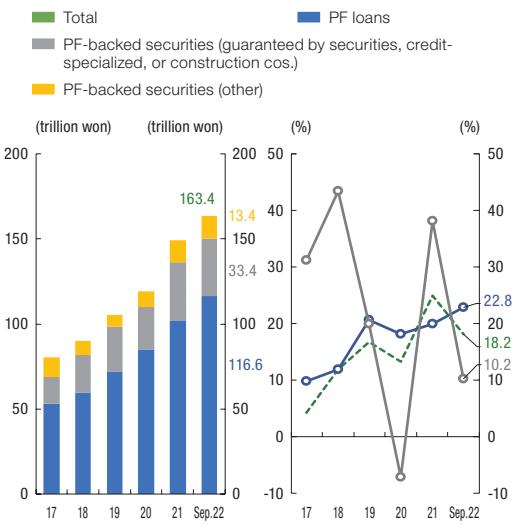
(%, %p)

	NBFI loans, growth rate	(Mutual credit cooperatives)	(Mutual savings banks)	(Credit-specialized financial cos.)	(Insurance cos.)
Construction industry loans	21.8	14.2	4.2	2.8	0.6
Real estate industry loans	22.7	9.9	4.3	5.4	3.2

B. Sharp Increase in Real Estate PF Loans Issued Mostly by the Non-Banking Sector and Expansion of the Securitization Portion of PF Loans

Real estate PF exposure (PF loans[9] and PF-backed securities) reached KRW 163.4 trillion at the end of September 2022 after having increased continuously (18.2%, YoY), driven by the greater demand for real estate development. In terms of real estate PF exposure, the balance of PF loans and PF-backed securities was KRW 116.6 trillion and KRW 46.8 trillion, respectively, rising by 22.8% and 8.1% YoY. In particular, debt guarantees for these PF-backed securities, provided by securities companies, credit-specialized financial companies, and construction companies, amounted to KRW 33.4 trillion, accounting for 71.3% of the total balance of all PF-backed securities (Figure II-4).

Figure II-4. Trends[1] in real estate PF exposure



Notes: 1)The balance is based on the end of the year, and the growth rate is based on the same period of last year.
2) Real estate PF loans and PF-backed securities combined basis

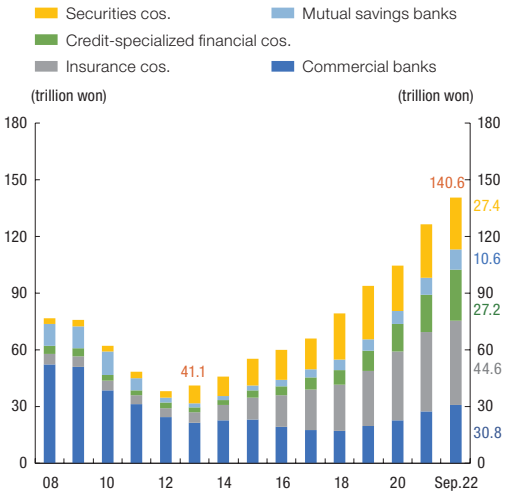
Sources: Financial institutions' business reports, Infomax.

In terms of real estate PF exposure, PF loans and debt guarantees for PF-backed securities, the risks of which are ultimately taken on by financial institutions, are classified by financial sector. While banks have been less active in extending PF loans after the PF loan defaults that occurred in the past (from 2011 to 2013), the non-banking sector has dramatically increased its issuance of PF loans to diversify its business and to enhance profitability. While the balance of PF loans extended by banks at the end of September 2022 amounted to KRW 30.8 trillion, up 43.6% from the end of 2013 (KRW 21.5 trillion), the balance of PF loans provided by NBFIs, including credit-specialized financial companies, insurance

9) This section analyzes PF loans extended by banks, insurance companies, securities companies, credit-specialized financial companies, and savings banks, and excludes any PF exposure at mutual credit cooperatives due to a lack of micro data.

companies, savings banks, and securities companies, reached KRW 85.8 trillion, up 522.4% from the end of 2013 (KRW 13.8 trillion).[10] Furthermore, debt guarantees for PF-backed securities provided by NBFIs[11] stood at KRW 24.1 trillion, up 310.9% from the end of 2013 (KRW 5.9 trillion) (Figure II-5).

Figure II-5. Trends in real estate PF loans,[1] by financial sector



Note: 1) Securities companies and credit-specialized financial companies include debt guarantees for PF-backed securities.
Sources: Financial institutions' business reports, Infomax.

In terms of the purpose of PF loans (excluding debt guarantees), banks and insurance companies extended PF loans related to the construction of apartment buildings, and other NBFIs provided PF loans mainly for the building of non-apartment housing and commercial facilities. At the end of June 2022, while the share of PF loans related to apartment buildings provided by banks and insurance companies was 66.6% and 57.2%, respectively, representing over half of their total PF loans, the share of PF loans related to apartment buildings was below 40% at credit-specialized financial companies (34.5%), securities companies (21.6%), and savings banks (15.1%).

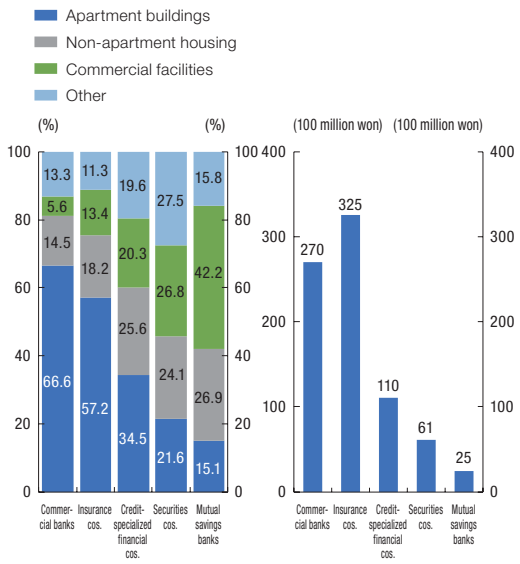
By size of loan, while banks and insurance companies focused on large PF business sites, other NBFIs extended loans mostly to relatively small PF business sites. While the average value of PF loans issued by banks and insurance companies was KRW 27 billion and KRW 32.5 billion, respectively, with both exceeding KRW 25 billion, the average value of PF loans provided by credit-specialized financial companies, securities companies, or savings banks[12] was KRW 11.0 billion, 6.1 billion, and 2.5 billion, respectively (Figure II-6).

10) Looking at the trend of change in the balance of PF loans issued by NBFIs at the end of September 2022, compared with the balance at the end of 2013: credit-specialized financial companies saw their PF loans rise from KRW 2.7 trillion to KRW 27.1 trillion (by 901.0%) (from KRW 2.7 trillion to KRW 27.2 trillion if debt guarantees are included); insurance companies from KRW 5.7 trillion to KRW 44.6 trillion (684.9%); savings banks from KRW 2.1 trillion to KRW 10.6 trillion (399.5%); and, securities companies from 3.3 trillion to KRW 3.5 trillion (7.8%) (KRW 9.1 trillion to KRW 27.4 trillion if debt guarantees are included).

11) Debt guarantees for real estate PF-backed securities are provided by construction companies and local governments, as well as by securities companies and credit-specialized financial companies. In this section, debt guarantees provided by construction companies are excluded from the analysis of risks taken by the financial sector. At the end of September 2022, of the balance of total debt guarantees for PF-backed securities (KRW 46.8 trillion), construction companies provided debt guarantees worth KRW 9.3 trillion, while securities companies and credit-specialized financial companies provided KRW 23.9 trillion and KRW 0.2 trillion, respectively.

12) Savings banks limit PF loans to 20% of their total credit, securities companies to 30% of their capital, and credit-specialized financial companies to 30% of their credit assets, but insurance companies have no such regulations limiting total PF loans.

Figure II-6. Amount of PF loans[1] by purpose and the average loan amount per case, by financial sector

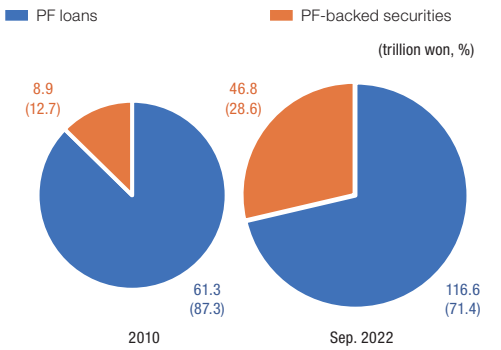


Notes: 1) As of the end of June 2022.
2) Compared to PF loan balances by financial sector.
3) "Other" includes industrial, accommodation, and leisure facilities.

Sources: Financial institutions' business reports.

As securities companies expanded their participation in the PF loan market,[13] PF-backed securities also increased substantially. The outstanding balance of PF-backed securities, such as PF-ABSs, PF-ABCPs, and PF-ABSTBs, at the end of September 2022 (KRW 46.8 trillion), surged to 5.3 times the balance (KRW 8.9 trillion) recorded at the end of 2010, before the recent real estate PF defaults. As a result, the share of PF-backed securities[14] out of total real estate PF exposure soared from 12.7% at the end of 2010 to 28.6% at the end of September 2022. Such growth of the issuance of PF-backed securities increases the interconnectedness among real estate PF projects and capital markets, consequently acting as a channel that could boost the impact of any shock in the bond and money markets on the PF loan market (Figure II-7).

Figure II-7. Changes in proportion of real estate PF exposure[1][2]



Notes: 1) Includes PF-backed securities guaranteed by non-financial corporations, such as construction companies.
2) Numbers in parentheses indicate the proportion of each balance to the total PF exposure that year.

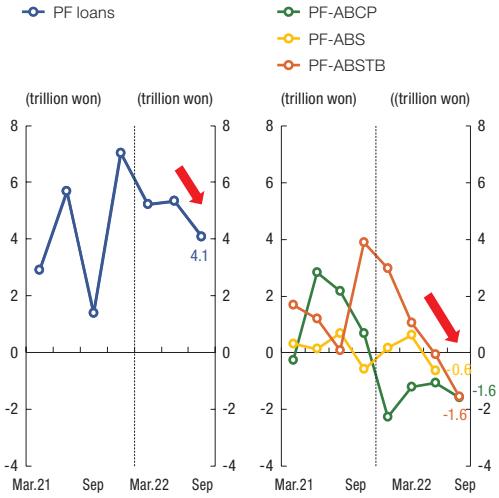
Sources: Financial institutions' business reports, Infomax.

However, as market vigilance of the PF-ABCP market spread to the PF loan market amid higher loan interest rates and worries over the slowing of the real estate market in the second half of 2022, the growth of PF loans moderated, and the issuance of PF-backed securities contracted dramatically (Figure II-8).

13) Securities companies significantly expanded their PF-related exposure after being granted permission to issue promissory notes and after an easing of regulations concerning leverage and the net capital ratio (NCR), part of the government's plan to promote investment banks (August 2016).

14) This is the sum of the balance of PF-ABCPs, PF-ABSTBs, and other securities with PF loans as underlying assets, which are issued by securities companies.

Figure Ⅱ-8. Recent changes[1] in real estate PF exposure



Note: 1) Compared to previous quarter (November 2022 is compared to September 2022).

Sources: Financial institution business reports, Infomax.

C. Significant Increase in Business Entity Guarantees for Housing Completion and Rental Deposits

Business entity guarantees provided by credit guarantee institutions increased significantly and at a faster pace[15] after COVID-19. At the end of September 2022, the balance of business entity guarantees stood at KRW 330.4 trillion,[16] rising by 33.1% (KRW 82.1 trillion) from the end of 2019 (KRW 248.2 trillion).

By type of guarantee, sales guarantees[17] (KRW 225.6 trillion, end of September 2022) shifted to an increase,[18] as the sales volume of new apartment units[19] increased since 2020, and as leasehold deposit guarantees[20] (KRW 58.0 trillion) rose rapidly after August 2020, as it became mandatory[21] for rental business entities to purchase guarantee insurance[22] (Figure II-9).

15) Growth rate of business entity guarantees (YoY): end of 2019 -1.1% → end of 2020 8.1% → end of 2021 12.9% → end of September 2022 17.8%.

16) At the end of September 2022, business entity guarantees issued by the HUG and the Korea Housing Finance Corporation stood at KRW 321.4 trillion and KRW 9.0 trillion, respectively.

17) A sales guarantee is a guarantee of the completion of apartment housing construction (guarantee for sales) or refund of a down payment and intermediate payments, among others (guarantee for refunds), in the event of bankruptcy or other business difficulties at new apartment sales business entities.

18) Rate of increase in sales guarantees (YoY): 2019 -5.9% → 2020 6.6% → 2021 9.0% → end of September 2022 12.6%.

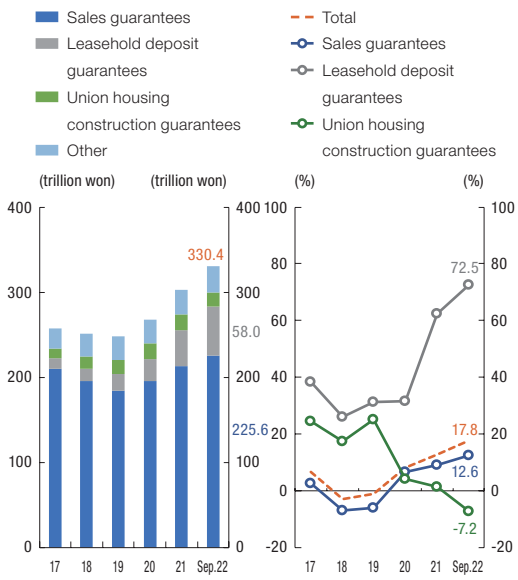
19) Volume of new apartment unit sales (10,000 units): 2019 33.8 → 2020 36.3 → 2021 39.1 → 2022 (planned) 40.0.

20) A leasehold deposit guarantee guarantees the payment of the leasehold deposit to the lessee in the event that the rental business entity cannot return the leasehold deposit. It is a business entity guarantee product purchased by rental business entities and differs from a leasehold deposit (jeonse) return guarantee, which is an individual guarantee product purchased by the lessee.

21) Purchasing guarantee insurance for leasehold deposits became mandatory for newly-registered rental business entities in August 2020 and for existing rental business entities in August 2021.

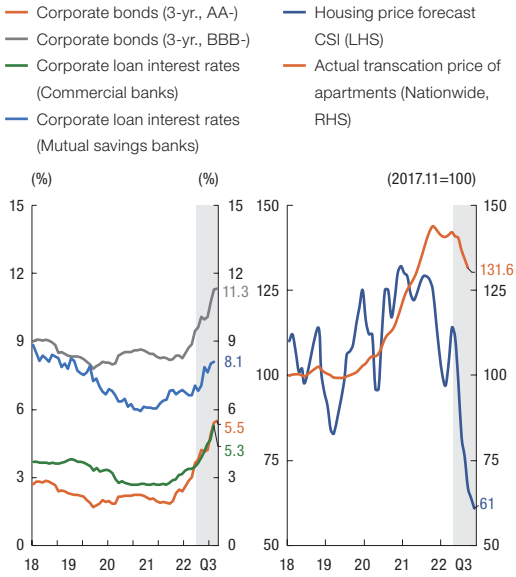
22) Rate of increase in leasehold deposit guarantees (YoY): end of 2019 31.3% → end of 2020 31.7% → end of 2021 62.3% → end of September 2022 72.5%.

Figure Ⅱ-9. Trends[1] in business entity guarantees



Note: 1) The balance is based on the end of the year, and the growth rate is based on the same period of the prior year.
Sources: Korea Housing & Urban Guarantee Corporation (HUG), Korea Housing Finance Corporation (HF).

Figure Ⅱ-10. Market trends related to real estate corporate finance



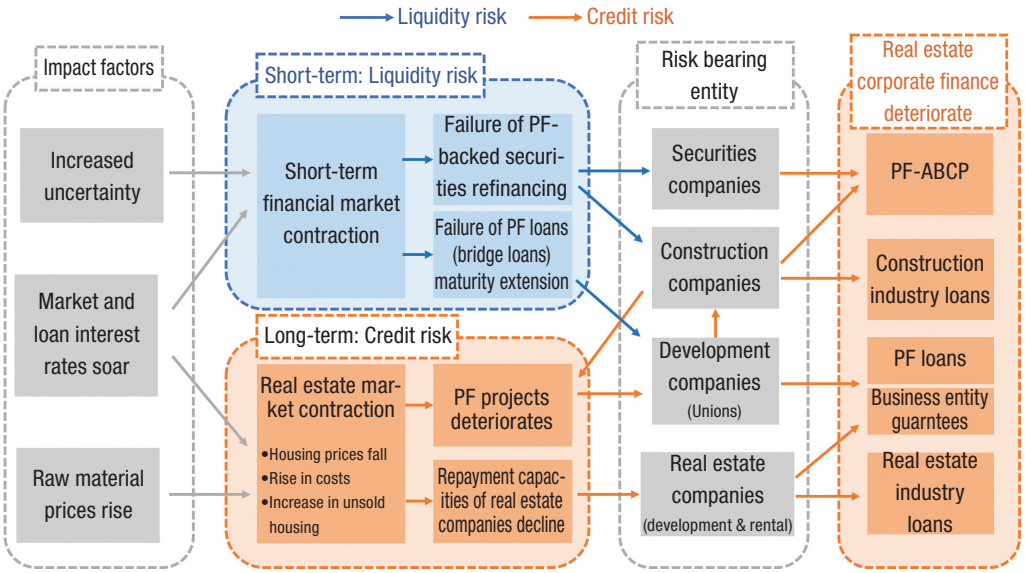
Notes: 1) On a monthly average.
2) Consumer perceptions of housing prices one year later compared to the present.
Sources: Bank of Korea, Korea Real Estate Board.

3. Evaluation of Potential Risk of Real Estate Corporate Finance

With rapidly-rising market interest rates and loan interest rates of financial institutions and growing concern over the slowing of the real estate market since the second half of this year, credit incidents related to PF-ABCPs greatly heightened uncertainty in the real estate corporate finance market (Figure II-10).

Worries over the slowing of the real estate market accompanied by rising market interest rates damaged the prospects for profitability at various real estate PF projects and increased liquidity risks at securities and construction companies. Moreover, the deterioration of profitability associated with the rise in raw material prices and the buildup of inventory of unsold housing units weakens the debt repayment capacities of construction and real estate companies, which could, in turn, significantly affect the asset quality of financial institutions with significant exposure to these sectors (Figure II-11).

Figure II-11. Ripple-spreading path of real estate corporate finance risks



A. Liquidity Risk

Since the second half of 2022, liquidity risk in the PF loan and PF-backed securities markets has increased significantly.

With financial institutions tightening their risk management and market vigilance growing, cases where bridge loans with relatively high business uncertainty[23] could not be converted into PF loans increased, and related loan interest rates also rose rapidly.[24]

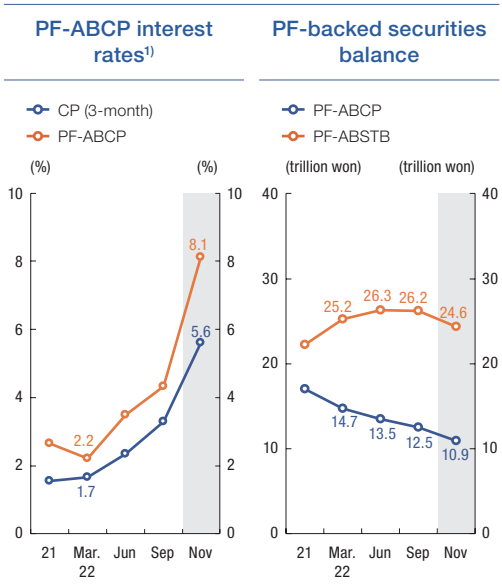
Furthermore, after the Legoland incident in September 2022,[25] market vigilance of PF loan-backed securities escalated, the interest rate on PF-ABCP soared sharply, and the new issuance and rollover of short-term PF-backed securities suddenly contracted. The interest rate on newly issued PF-ABCP skyrocketed from 2.2% at the end of March 2022 to 8.1% at the end of November 2022, and, as a result, the outstanding balance of short-term asset-backed securities, such as PF-ABCP and PF-ABSTBs, fell from KRW 39.9 trillion at the end of March 2022 to KRW 35.5 trillion (PF-ABCP KRW 14.7 trillion → KRW 10.9 trillion, PF-ABSTBs KRW 25.2 trillion → KRW 24.6 trillion) (Figure II-12).

23) Due to inherent risks, such as obtaining construction permits, in addition to real estate market conditions, bridge loans involve relatively higher uncertainty than PF loans.

24) According to the Construction & Economy Research Institute of Korea (November 2022), related industries expected the interest rates on bridge and PF loans to jump by about 5%p from current levels (10%-14% and 5%-10%, respectively) amid the heightened market vigilance in 2023.

25) When the Gangwon-do provincial government refused to perform a payment guarantee obligation for certain PF-backed securities issued by its agent, the Gangwon Jungdo Development Corporation, market concern over PF-backed securities intensified.

Figure Ⅱ-12. Recent trends in PF-ABCP interest rates and short-term PF-backed securities balance



Note: 1) CP's final bid yield and PF-ABCP's weighted average interests rate of market rates and issuance rates (based on A1 grade for three months at the end of the period).

Sources: Korea Financal Investment Association, Infomax.

Consequently, the liquidity risks that securities and construction companies must underwrite concerning unsold PF-backed securities also shot up substantially, as they had provided guarantees for the purchase of PF-backed securities.[26)]

With market stabilization measures taken by the government[27)] and the Bank of Korea,[28)] and with self-imposed relief measures at financial institutions[29)] since October 2022, the market crunch in the PF loan and PF-backed securities market is gradually moderating. However, liquidity risk in these markets can be triggered again in the event of shocks at home or abroad. In particular, most PF-ABCP and PF-ABSTBs will be maturing in the first half of 2023, and if they are not rolled over smoothly, the liquidity burden at securities and construction companies will likely surge once again (Figure II-13).

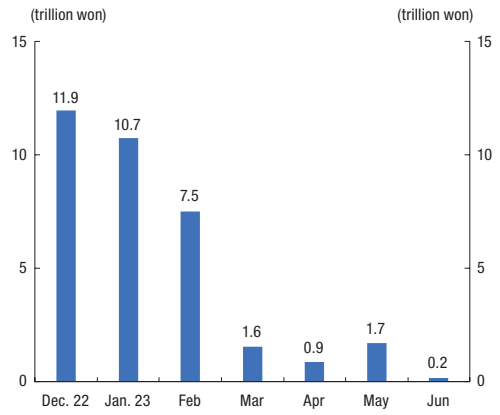
26) Securities and construction companies are offering guarantees for the purchase of issues of PF-backed securities that failed to sell on the market.

27) To stem the spread of uneasiness in the bond and money markets and to prevent the contraction of liquidity, on October 23, the government unveiled market stabilization measures to, among other things, reactivate the bond market stabilization fund, expand the purchase of corporate bonds and CP by policy finance institutions, provide liquidity support for securities companies through the Korea Securities Finance Corporation, and offer stronger guarantees of support for real estate PF business sites. The government also relieved the burden on financial institutions in raising and operating funds through various measures, such as the postponement of the normalization of the liquidity coverage ratio (LCR) regulations on banks (92.5% to be applied until the end of June 2023, announced on October 20), a relaxation of the loan-deposit ratio for banks and savings banks (banks 100% → 105%, savings banks 100% → 110%, announced on October 27), and an easing of the liquidity ratio for insurance companies (October 28).

28) The Bank of Korea implemented various measures to prevent liquidity contraction through a resolution of the Monetary Policy Board (October 27), covering the expansion of the range of securities eligible for BOK loans, target securities of open market operations, and eligible collateral for guaranteeing net settlements. It deferred the plan to raise the ratio of collateral for guaranteeing net settlements and temporary purchases of RPs issued by securities companies, among others, until January 2023, and it announced liquidity support (up to KRW 2.5 trillion) for financial institutions that invested in the bond market stabilization fund (November 28).

29) On November 1, five financial holding companies unveiled a funds support plan designed to: expand the funds supply to public corporations, small business owners, small and medium-sized enterprises, and large enterprises; purchase credit bonds, CP, ABCP, and RPs; maintain credit lines for non-bank financial institutions; and, participate in the bond market stabilization fund. Large securities companies announced measures to establish a second bond market stabilization fund and increase the purchase of ABCP with low-credit ratings (A2- or higher) guaranteed by small and medium-sized securities companies (October 27 and November 11).

Figure Ⅱ-13. Status[1] of PF-backed securities[2] maturities



Notes: 1) As of the end of November 2022.
2) Balances of PF-ABCP and PF-ABSTB.
Source: Infomax.

Moreover, as depressed housing markets cannot be revitalized quickly, if the practice of refusing to take on the risks of real estate PF intensifies among financial institutions, even PF business sites that are operating normally or construction companies that are in good condition may be subject to defaults due to tighter liquidity.

B. Credit Risk

Although indicators of the soundness of real estate corporate finance remain favorable, credit risk is gradually increasing, with a decline in housing prices and an increase in the number of unsold homes.

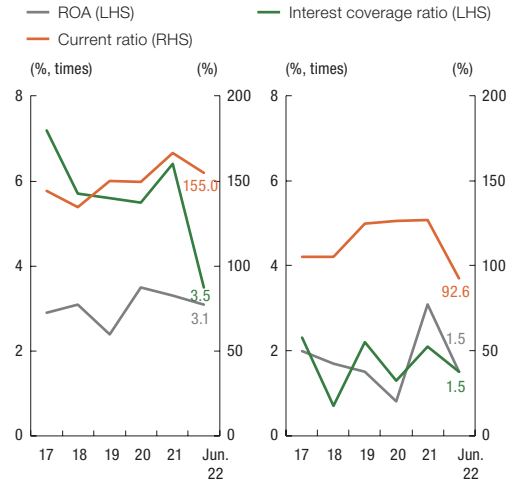
Real estate-related corporate loans (construction and real estate industries)

The overall financial soundness of firms in the construction and real estate industries, including their profitability, liquidity, and debt servicing capacities, has generally improved compared to the past. This year, however, these financial indicators[30] have been slipping compared with 2021 (Figure II-14).

30) The return on assets at construction companies (listed companies) (hereafter, "median value") edged down from 3.3% in 2021 to 3.1% (annualized) in the first half of 2022. In addition, the liquidity ratio fell from 166.5% to 155.0%, and the interest coverage ratio declined from 6.4 times to 3.5 times. Meanwhile, the return on assets at real estate companies (listed companies) fell moderately from 3.1% in 2021 to 1.5% in the first half of 2022 (annualized), with the liquidity ratio decreasing from 126.9% to 92.6%, and the interest coverage ratio declining from 2.1 times to 1.5 times.

31) Around the time of the savings bank PF loan defaults (2011 to 2013), the delinquency rate on loans extended by banks to the construction industry was, at most, 3.19% (end of March 2011), and the delinquency rate on loans issued by banks to the real estate industry was 2.63% (end of September 2010). Meanwhile, during the same period, the delinquency rate on loans extended by savings banks to construction companies jumped to 35.75% (end of September 2013), and the delinquency rate on loans issued by savings banks to the real estate industry increased to 40.68% (end of 2011).

Figure II-14. Overall financial soundess of firms in construction and real estate industries[1)2)3)]

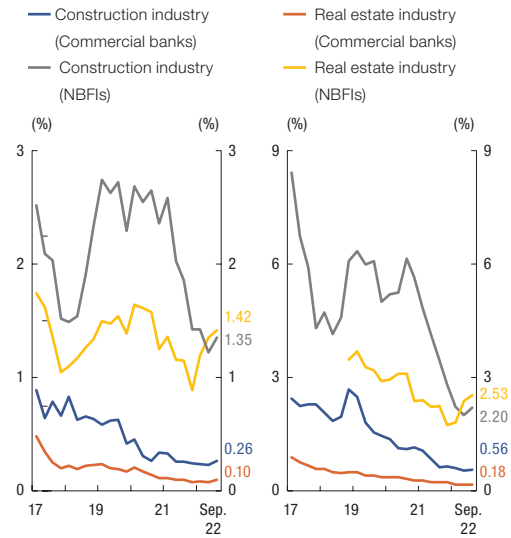


Notes: 1) Based on listed companies (including some unlisted companies).
2) Based on the median value of listed companies in the industry.
3) As of the end of June 2022, financial indicators are based on annual rates.

Sources: Bank of Korea, KIS-value.

As a result, although the delinquency rate and non-performing loan ratio (substandard-or-below loan ratio) of loans issued to the construction and real estate industries had been much lower than the rates seen during the PF loan defaults of savings banks,[31)] in the second half of this year, indicators related to the loan quality, especially in the non-bank sector, such as savings banks, turned upward, showing signs of deterioration going forward. While the delinquency rate at banks on loans to the construction and real estate industries remained low at 0.26% and 0.10%, respectively, at the end of September 2022, the delinquency rate at non-banking sector institutions on loans to the construction and real estate industries stood at 1.35% and 1.42%, respectively, showing a transition to an increasing trend from the second half of this year (Figure II-15).

Figure II-15. Real estate corporate loan quality indicators



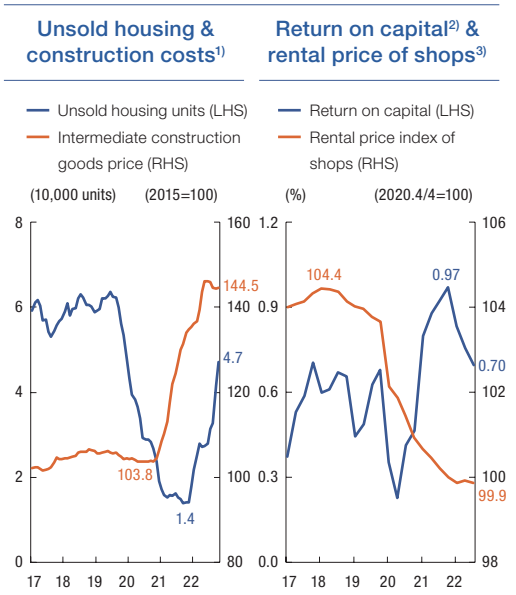
Notes: 1) NBFI delinquency rates are based on the simple average of the delinquency rates of mutual credit cooperatives, insurance companies, credit-specialized financial companies, and mutual savings banks.
2) The NBFI substandard-or-below loan ratio is based on mutual savings banks.

Source: Financial institutions' business reports.

Recently, risk factors related to the soundness of corporate loans to construction and real estate firms are materializing. The inventory of unsold homes nationwide was 47,000 units at the end of October 2022, which is 3.4 times the 14,000 units recorded at the end of September 2021, and the producer price index of intermediate materials for construction (prices in 2015 = 100) was 144.5 at the end of October 2022, up 39.2% from the 103.8 recorded at the end of October 2020. The rental price index for medium-sized and large stores, which is an indicator of the profitability of the real estate leasing industry (fourth quarter 2020 = 100)

and which had been declining since 2018, stood at 99.9 at the end of September 2022, down by 4.4% from the previous peak (104.4 at the end of March 2018), and the average return on capital at commercial properties (stores) was 0.70% at the end of September 2022, down 0.27%p from the end of 2021 (0.97%) (Figure II-16).

Figure II-16. Risk factors for real estate corporate loans



Notes: 1) Intermediate construction goods price index.
2) Return on capital refers to the growth rate of shops value (QoQ).
3) On a medium- to large-sized basis.
Sources: Bank of Korea, Ministry of Land, Infrastructure and Transport, Korea Real Estate Board.

Moreover, for the construction and real estate industries, the proportion of marginal firms, whose interest coverage ratio has been less than 1 for three consecutive years, is on the rise, and their debt ratios have also maintained a higher level than other industries. Therefore, if the real estate market continues to contract, the default risk of these firms will likely increase significantly. In 2021, the share of marginal firms across all industries was 14.9%, slightly down from 15.3% in 2020. However the share of marginal firms in the construction and real estate industries rose to 10.0% and 28.0%, respectively, in 2021, up from 9.8% and 26.9% in 2020. At the end of June 2022, the median debt ratio of the construction and real estate industries stood at 105.0% and 114.8%, respectively, far exceeding the debt ratio of all industries (60.6%) (Figure II-17).

Figure II-17. Number of marginal firms and debt ratio in the construction & real estate industries

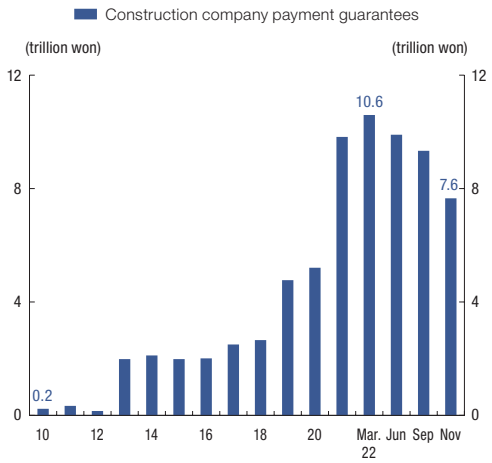
Notes: 1) Compared to external audit companies subjected to analysis by industry in each year.
2) Based on the median debt ratio of listed companies by industry in each year.
Sources: Bank of Korea, KIS-VALUE.

In particular, construction companies have significantly increased their payment guarantees for PF-backed securities,[32] and given the channel of risk transmission of real estate

32 However, as the issuance of PF-backed securities decreased after March 2022, the balance of payment guarantees fell to KRW 7.6 trillion at the end of November 2022.

corporate finance, such payment guarantees could serve as a point of connection where liquidity risk in the money market transfers to credit risk concerning PF loans and real estate corporate loans. Hence, funding conditions and changes in the debt servicing capacities of these firms need to be monitored more closely (Figure II-18).

Figure II-18. Trends in construction company payment guarantees[1] for PF-backed securities

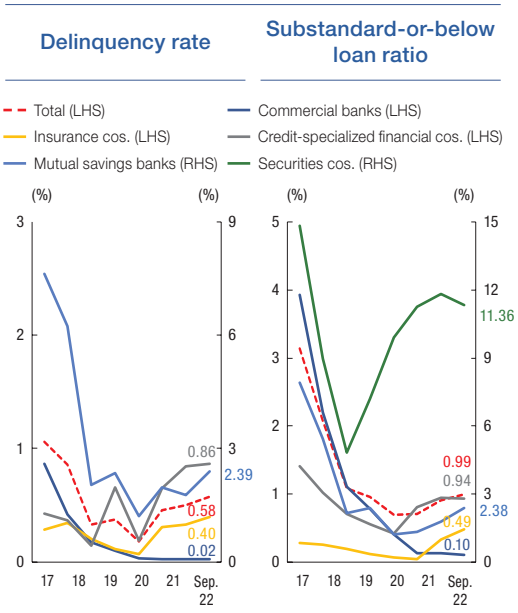


Note: 1) Based on capital supplementation.
Source: Infomax.

PF loans

At the end of September 2022, the average delinquency rate and non-performing loan ratio of PF loans stood at 0.58% and 0.99%, respectively, well below the levels seen during the PF defaults at savings banks, but have been climbing steadily since the end of 2021 (Figure II-19).

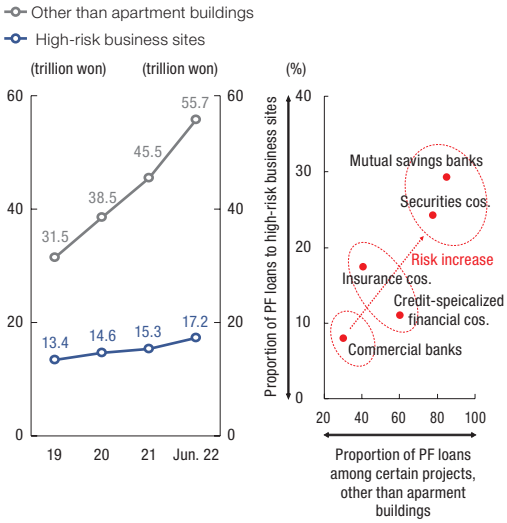
Figure II-19. PF loan quality indicators



Sources: Financial institutions' business reports.

The balance of PF loans for high-risk business sites with concerns over unsold units and for non-apartment business sites whose collateral is relatively less liquid at KRW 17.2 trillion and KRW 55.7 trillion, respectively, at the end of June 2022, showing a steady increase from 2019. Notably, as the share of PF loans issued to vulnerable business sites by NBFIs, such as savings banks and securities companies, is higher, their default risk is higher, as well (Figure II-20).

Figure Ⅱ-20. Status[1] of PF loans related to vulnerable business sites



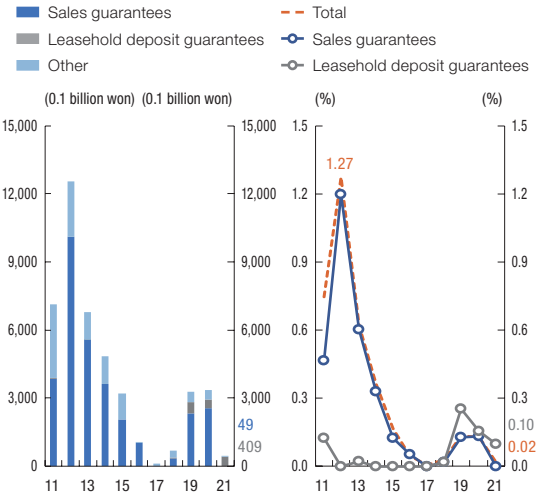
Notes: 1) As of the end of June 2022.
2) Business sites located in high-risk provinces, defined as "high-risk business sites" in the case of bridge loans, and business sites with a process rate of more than 60% and a pre-sales rate less than 40%, are defined as "high-risk business sites" in the case of PF loans.

Source: Bank of Korea.

Business entity guarantees

At the end of 2021, the claim rate of business entity guarantees (based on the HUG) was 0.02%, much lower than the level seen during prior PF loan defaults at savings banks (1.27% in 2012). By type of guarantee, claims against sales guarantees increased significantly[33] due to an increase in unsold homes in non-metropolitan areas during 2019 and 2020, and no claims were reported in 2021. On the other hand, the value of claims against leasehold deposit guarantees was KRW 40.9 billion in 2021, accounting for the majority of claims against all business entity guarantees (KRW 45.8 billion) (Figure II-21).

Figure Ⅱ-21. Trends in claims[1] of business entity guarantees



Notes: 1) Based on business entity guarantees at HUG.
2) Proportion of claims value to guarantees balance by guarantee type.

Source: Korea Housing & Urban Guarantee Corporation (HUG).

In addition, after August 2020, of all homes insured under the leasehold deposit guarantee insurance of the HUG, homes whose lessors' (rental business entities) debt ratio[34] exceeded 80% accounted for 47.7% of total homes insured by guarantee insurance.[35] This means

33) In 2019 and 2020, all claims against sales guarantees offered by the HUG occurred in metropolitan cities and regions, rather than in the Seoul metropolitan area. The value of sales guarantee claims processed by the HUG was KRW 234.3 billion in 2019 (metropolitan cities KRW 14.7 billion, regions 219.6 billion) and KRW 256.3 billion in 2020 (metropolitan cities KRW 84.2 billion, regions KRW 172.1 billion).

34) The debt ratio of lessors is the percentage of the sum of the security right established for home mortgage loans and leasehold deposits of lessees in relation to the housing price.

35) The share of homes with a debt ratio of over 80% was higher among rental business corporations (40.8%) than among individual rental business operators (6.9%), as well as higher in non-Seoul metropolitan areas (37.0%) than in the Seoul metropolitan area (10.7%).

that, in the event that the rental business entities face difficulty in repaying loans and returning leasehold deposits to lessees amid the steep decline in housing prices, the losses to be borne by public guarantee institutions owing to a rise in guarantee claims could increase.

Since the credit risk of business entity guarantees is borne by public guarantee institutions that provide the guarantees, such as the HUG and the Korea Housing Finance Corporation, such risks will not be transmitted to the financial system through corporate borrowers (credit consumers) or through financial institutions (credit providers). However, if claims against business entity guarantees rise on the back of a downturn in the real estate market, and if settlements by guarantee institutions surge, the burden on the government, which is responsible for making up for the losses incurred by public guarantee institutions, will likely increase.

C. Stress Test[36]

If the downturn in the real estate market deepens or protracts, insolvency of real estate-related corporate loans and PF loans may increase rapidly. To assess the impact of this situation on the financial system, the magnitude of the decline in the resilience of financial institutions was measured under various stress scenarios.

We set two scenarios with different extents of real estate market contraction, based on the housing price decline[37] (15% and 30%) and period of contraction[38] (one year and over three years), and added another scenario in which construction companies and PF business sites in normal operation become insolvent due to a failure to stem the spread of liquidity risk in the early phases of the real estate market downturn[39] (Table II-1).

Table II-1. Stress test scenario design

	S1	S2	S3
Housing price decline[1]	-15%		-30%
Period of contraction	1-year (short term)		More than 3-years (long term)
Further spread[2] of insovlency	×	○	-

Notes: 1) Based on actual transcation price of apartments (Nationwide).
2) Assumed that parts of construction companies and PF business sites in normal operation become insolvent due to the spread of liquidity risk related to PF-backed securities.

36) The stress test in this section calculated capital ratios by estimating credit losses from real estate-related corporate loans and PF loans by financial sector and PF business sites, based on micro data. As this is different from the stress test that used the Systemic Risk Assessment Model for Macroprudential Policy (SAMP), the Bank of Korea's integrated stress test model as discussed in "Analysis of Financial Stability Issues Ⅰ," caution is needed in interpreting these test results.

37) The housing price decline scenarios were set based on actual transaction prices of apartment units nationwide (provided by the Korea Real Estate Board), and a decline of 15% from the baseline means that prices would return to the upward trend seen before the pandemic.

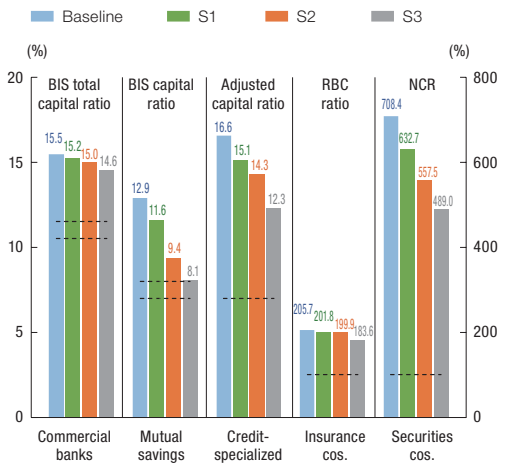
38) It was assumed that if the housing market downturn persisted (one to three years), 50% of bridge loans and 10% to 40% of PF loans would become insolvent, depending on the duration of the downturn, remaining time to construction completion, and sales ratio, among other factors. In addition, different rates of losses according to the magnitude of the housing price decline were applied.

39) We assumed a situation where PF-related liquidity risk seriously undermines the debt servicing capacities (interest coverage ratio) and liquidity (liquidity ratio) of construction companies and defaults on loans issued to construction companies soar, triggering additional defaults on other PF loans.

Stress test results showed that if the real estate market downturn, such as falling home prices, persisted, real estate corporate finance would become insolvent, and the capital ratios in sectors with insufficient capital buffers, such as savings banks, credit-specialized financial companies (except for credit card companies), and securities companies, could drop significantly.

If the downturn in the real estate market were relatively slow and if it ended in a short period of time (S1), some NBFIs with vulnerable financial conditions would see their capital ratios dip below the regulatory standard, but capital ratios across all financial institutions would remain favorable. However, even if the downturn in the real estate market disappeared after a short period of time, if the PF-related liquidity risk spreads (S2), capital ratios in most sectors would fall, and the number of financial institutions with capital ratios slipping below the regulatory standard would rise. In addition, if the real estate market downturn persisted for a longer period than in the past (S3), capital ratios in most sectors would drop significantly, and the number of financial institutions with capital ratios falling below the regulatory standard would increase dramatically (Figure II-22).

Figure II-22. Results of stress test[1)2)3)4)]



Notes: 1) As of the end of Sept. 2022.
2) Commercial banks, mutual savings banks and credit-specialized financial companies are on the left-hand side, insurance companies and securities companies are on the right-hand side.
3) The dotted line refers to the supervisory standard capital ratio for each financial sector.
4) Excluded are internet-only banks from commercial banks, and also exlcuded are credit card companies from credit-speicalized financial companies.

Source: Bank of Korea calculation.

4. Implications

The current status of real estate corporate finance is not serious in terms of the level of defaults, and the resilience of financial institutions is strong in comparison to earlier periods of PF defaults. However, with the volume of real estate corporate finance having expanded significantly, the higher interest rates and the steep decline in housing prices will contribute to raising the default risk of real estate corporate finance. In addition, the stronger risk averse behavior of financial institutions, which learned from real estate PF loan defaults in the past, a greater connectivity between the capital market and real estate PF loans, and

increased exposure of the non-banking sector, which has relatively insufficient capital, are all risk factors to be noted (Table II-2). Given these, the possibility of the default risk of real estate corporate finance having a significant adverse impact on the stability of the financial system cannot be ruled out.

Table II-2. Comparison[1] of current conditions and past PF deteriorate period

		2011 ~ 13	2022
Severity of deteriorate	Size of deteriorate loans	Large	Small
	Resilience(capital ratio)	Commercial banks : solid Mutual savings banks : weaken	Above regulatory standard(All sectors)
Conditions of housing market	Market interest rate	Downward trend	Upward trend
	Housing price	Moderate decline trend	Steep decline trend
	Volume of unsold housing	Large	Small
Market structure	Loan provider	Commercial banks & Mutual savings banks	All financial sectors
	Capital market connectivity	Low	High (PF-ABCP increased)
	Actual maturity	mostly 1 to 3 years	Short-term(about 3 months) proportion increased(PF-ABCP)
	Main risks	Credit risk	Liquidity risk Credit risk

Note: 1) Shading means market conditions are relatively worse.

To avoid this, above all, policy authorities and market participants need to continue cooperating in order to reduce market uncertainty through the supply of short-term liquidity to prevent a temporary liquidity crunch from spilling over to the credit risk of normal firms and financial institutions. Furthermore, demand for housing should be stabilized through the provision of support to reduce unsold housing units and the relaxation of regulations,[40] and guarantees for related projects[41] need to be bolstered, while also ensuring that projects can proceed smoothly by securing liquidity supply channels.

In addition, financial institutions need to refrain from competitively withdrawing loans, and need to preemptively mitigate possible default risks by increasing loan loss provisions and capital.

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40) The government raised the loan-to-value (LTV) ratio for borrowers with one home in regulation zones to induce a soft landing of the housing market and allowed home mortgage loans for expensive apartment units in over-speculation zones on December 1, 2022.

41) The HUG increased the size of the PF loan guarantee for construction projects experiencing unsold units to ensure the normal operation of PF projects (November 10, 2022).

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Ⅲ. Transmission Channels of Exchange Rate Risk to the Financial Sector and Its Impacts[1)]

1. Background

While upward pressure on the KRW/USD exchange rate continued this year, unlike in the past, the global supply chain disruptions[2)] and the rise in international raw material prices have limited the positive effects of the higher exchange rate, such as increased exports.[3)]

Since the second half of this year, the increase in the exchange rate has been accompanied by a sharp rise in interest rates and a global liquidity crunch amid the accelerated tightening of monetary policy at home and abroad. This has heightened uncertainty in financial markets and undermined the liquidity and soundness of financial institutions.[4)]

The upward trend of the exchange rate this year and the resulting high exchange rate have placed a significant burden on the management of liquidity and capital adequacy at financial institutions, and thus the instability being spread to the financial system is greater than that generated by exchange rate increases in the past. The KRW/USD exchange rate had been rising faster amid the outbreak of Russia's invasion of Ukraine in February 2022 and a tightening at the U.S. Federal Reserve, and from September to November it stayed[5)] somewhere in the top 5% range of its historical distribution since the introduction of a flexible exchange rate system in December 1997[6)] (Figure Ⅲ-1).

1) This article was authored by Kim Kyung-sup, Kim Young-ju, and Lee Byung-ho (Systemic Risk Team), You Jae-weon, Park Seo-jung (Bank Analysis Team), and Jun Jae-whan (Foreign Exchange Soundness Investigation Team) and was reviewed by Lim Ho-sung (head of Systemic Risk Team), Park Jang-ho (head of Bank Analysis Team), and Yoo Jae-hyun (head of Foreign Exchange Soundness Investigation).

2) The Global Supply Chain Pressure Index (GSCPI, FRB NY) has moderated this year (3.0, average of 2021 → 2.3 from January through October 2022) but remains higher than during the period from 2017 to 2019 (average: 0.2), meaning that the global supply chain disruptions, which have intensified since 2020, have not completely eased. Moreover, the global supply chain is being fragmented amid the U.S./China conflict, constraining exports. The GSCPI is a measure of the extent of global supply chain disruptions that uses the cross-border transportation costs and Purchasing Managers' Index (zero mean normalization). A positive GSCPI value indicates deepening global supply chain disruptions.

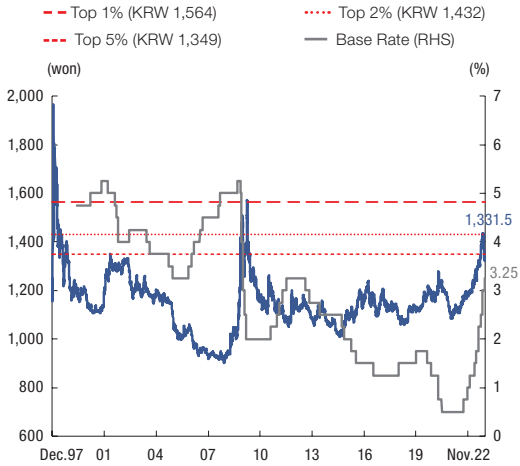
3) In the past, the strong U.S. dollar had positive effects, such as a decline in international raw material prices and overall improvement of the price competitiveness of domestic exporters. During the recent rise in the exchange rate, however, high raw material prices have limited such positive effects.

4) A sharp increase in the exchange rate may create demand for additional margin payments for OTC derivatives contracts and significantly increases the demand for Korean won funds, destabilizing supply and demand in the domestic funds market and boosting market volatility.

5) During the global financial crisis, the exchange rate stayed at around the high 5% level for about four months.

6) The top 5% of the daily KRW/USD exchange rate distribution from December 1997 to November 2022 starts at KRW 1,349.

Figure Ⅲ-1. Trends in KRW/USD exchange rate[1)2)]



Notes: 1) Daily KRW/USD exchange rate from December 1997 to November 2022.
2) Each dotted line indicates the top 1%, 2%, and 5% of the KRW/USD exchange rate distribution during the period.
Source: Bank of Korea.

As the recent sharp increase in exchange rate volatility is combined with instability in financial markets, mutual volatility spillovers between the exchange rate and other financial markets have been strengthened. From February to October 2022, when the exchange rate rose sharply, the volatility spillover effect of the exchange rate into the volatility of other market variables, and vice versa,[7)] soared (during the same period, +17.9%p) compared to the preceding period (December 2020 to January 2022, -14.6%p)[8)] (Figure III-2).

7) To examine the volatility spillover between the exchange rate and price variables in financial markets, based on the interconnectedness among financial markets, we estimated a measure for volatility spillover using the generalized VAR-based forecast error variance decompositions of Diebold and Yilmaz (2012). As price variables of financial markets, we used the KRW/USD exchange rate (foreign exchange market), the KOSPI index (for the stock market), the swap rate (one-year, foreign currency funds market), CP rates (91-day, money market), treasury bond rates (three-year, bond market), and the CDS premium (FX stabilization bond, five-year) to measure the volatility spillover among price variables of financial markets. With a focus on the exchange rate, here we estimated the: ① volatility spillover from the exchange rate to other price variables of financial markets, and ② the volatility spillover from other price variables into the exchange rate, and ③ with the total volatility spillover index of the exchange rate being the average of these two spillover effects.

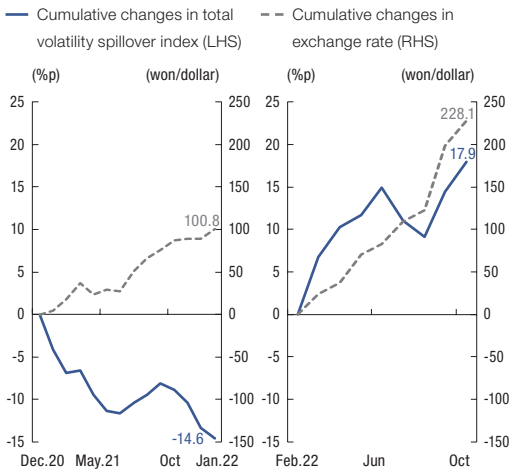
8) This is attributed to a significant increase in the volatility spillover of exchange rate shocks to other variables (preceding period 8.3% → recent period 41.6%) while the impact of other price variables of stocks, bonds, and money markets on the exchange rate also increased (34.9% → 62.8%).

Volatility spillover index[1)] between exchange rates and other financial price variables[2)] for major periods[3)]

	Global Financial Crisis	Previous Period of Rise in Exchange Rate	Recent Period of Rise in Exchange Rate
Exchange rate → Price variables of financial markets	21.6	8.3	41.6
Price variables of financial markets → Exchange rate	54.1	34.9	62.8

Notes: 1) Mutual volatility spillovers between the exchange rate and other price variables in financial markets (i.e., if the volatility spillover index of other variables to the exchange rate is 20, then it means that the volatility impact of the other price variables explains 20% of the volatility shown in the exchange rate).
2) Price variables in financial markets include treasury bonds, the CP rate, KOSPI, the CDS premium, and the swap rate.
3) The Global Financial Crisis indicates the period from December 2007 to June 2009, the Previous Rise in Exchange Rate indicates the period from December 2020 to January 2022, and the Recent Rise in Exchange Rate indicates the period February to October 2022.
Source: Bank of Korea.

Figure Ⅲ-2. Volatility spillover effect of the exchange rate[1)2)]



Notes: 1) Each graph shows the cumulative changes during the period from December 2020 to January 2022, and from February 2022 to October 2022.
2) The total volatility spillover index is the average of the volatility spillover index mutually transferred between the exchange rate and other price variables in financial markets.

Source: Bank of Korea.

Hereunder, we examine the path where an increasing exchange rate triggers liquidity and soundness risks in the financial sector through financial markets and the balance sheets of financial institutions (or off-balance sheet transactions) and present policy implications.

2. Risk Spillover Channel of a Rising Exchange Rate to Domestic Banks

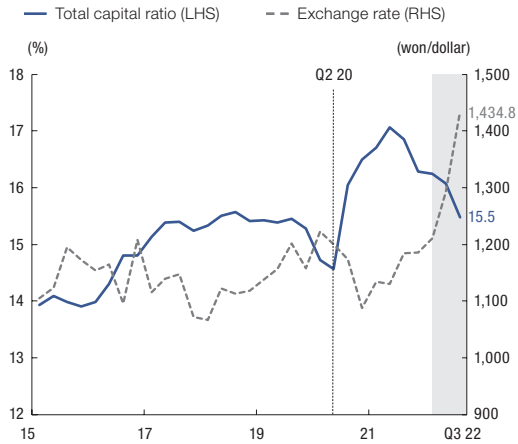
Liquidity and capital adequacy at domestic banks,[9)] which play a role as foreign currency liquidity providers, are directly affected by a rising exchange rate[10)] due to fluctuations in a bank's foreign currency exposure.

A. Spillover Channel of Declining Capital Adequacy at Domestic Banks

Recent status of the total capital ratio at domestic banks

With the rising exchange rates in 2022, the regulatory total capital ratio at domestic banks (equity over risk-weighted assets) stood at 15.5% at the end of the third quarter of 2022, down 0.6%p from the previous quarter and down 1.4%p over the past one year (Figure Ⅲ-3).

Figure Ⅲ-3. Trends in total capital ratios of domestic banks and exchage rates[1)2)3)]



Notes: 1) End-period basis.
2) From the second quarter of 2020, the early implementation of the Basel Ⅲ reforms (mainly about the method of credit risk calculation) improved the total capital ratio of domestic banks.
3) Shaded area indicates the recent period of rise in exchange rate (Q1 2022 to Q3 2022).

Sources: Financial institutions' business reports.

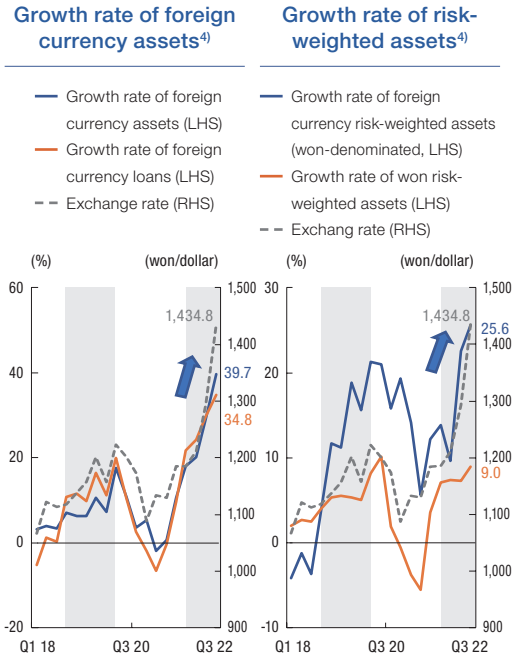
9) Nationwide banks, regional banks, and special banks were included, but internet-only banks were excluded.
10) In the event of a sharp rise in the exchange rate, the Korean won denominated value of foreign currency risk exposure increases significantly, and demand for contingent funds is prompted by the performance of credit enhancement agreements for OTC derivative transactions.

Spillover channel of a high exchange rate to the total capital ratio

An increase in the exchange rate reduces the total capital ratio by increasing the Korean won denominated amount of foreign currency risk weighted assets (RWAs). Recently, the negative impact of the sharp rise in the exchange rate on the total capital ratio has grown markedly.[11)]

Since the second half of 2021, foreign currency exposure, such as foreign currency loans, at domestic banks has climbed steadily along with the rise in the exchange rate, helping foreign currency RWAs[12)] grow faster than Korean won denominated RWAs[13)] (Figure III-4).

Figure Ⅲ-4. Trends in foreign currency exposure,[1)] exchange rate[2)3)]



Notes: 1) Domestic bank basis.
2) End-period basis.
3) Shaded areas indicate the period of rise in exchange rate.
4) Year-on-year basis.
Sources: Financial institutions' business reports.

As the exchange rate rose more than expected, over-the-counter (OTC) foreign exchange derivative (currency forwards, currency swaps, FX swaps, etc.) exposure put downward pressure on the total capital ratio at domestic banks. In addition, with the rapid increase in the exchange rate since the second quarter of

11) A steep ascent in the exchange rate significantly expands foreign currency exposure (foreign currency assets and OTC foreign currency derivatives), further exacerbating any negative effect of the exchange rate on the total capital ratio.

12) At the end of the third quarter of 2022, foreign currency RWAs accounted for 28.7% of total RWAs.

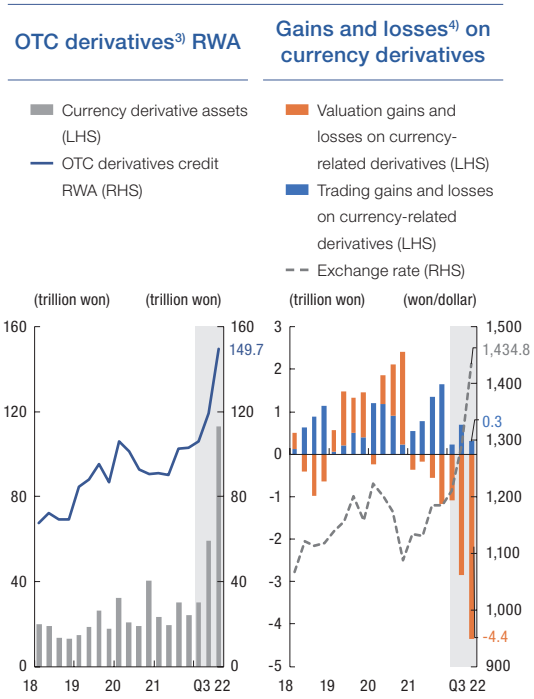
13) From the first to third quarter of 2022, the balance of foreign currency RWAs jumped by 23.9%, driven by foreign currency loans and foreign currency derivatives exposure, far outpacing the growth rate of Korean won denominated RWAs (3.4%).

14) As the balance of OTC foreign exchange derivatives bought (based on unsettled forwards) is the amount to be received from the counterparty upon the expiry of a contract, it is the counterparty credit risk exposure, and the regulatory capital is calculated using the standardized approach for counterparty credit risk (SA-CCR). Banks that estimate their exposure using this method estimate their counterparty credit risk exposure against a single counterparty, caused by derivative transactions within a single netting set.

2022, the Korean won denominated balance of credit RWAs[14] among the OTC foreign exchange derivative exposure increased. As a result, at the end of the third quarter of 2022, OTC derivative RWAs[15] rose by 46.1% (+KRW 47.0 trillion) year on year. This suggests that the OTC foreign exchange derivative exposure, which surged on the back of increased overseas alternative investments made by the non-banking sector, could help raise the sensitivity[16] of RWAs in the event of an exchange rate spike.

Furthermore, due to the sharp spike in the exchange rate, the valuation loss on currency derivatives[17] increased (second quarter of 2022 KRW 2.8 trillion → third quarter of 2022 KRW 4.4 trillion), but its impact on the decline in the total capital ratio was not large and is assessed as being limited overall (Figure III-5).

Figure III-5. OTC derivatives risk-weighted assets and Valuation gains and losses on currency derivatives[1)2)]



Notes: 1) Domestic bank basis.
2) Shaded areas indicate the period of recent rise in exchange rate.
3) Due to data restrictions, stock and interest rate derivatives other than currency derivatives are included.
4) Valuation and trading gains and losses on currency-related derivatives.

Sources: Financial institutions' business reports.

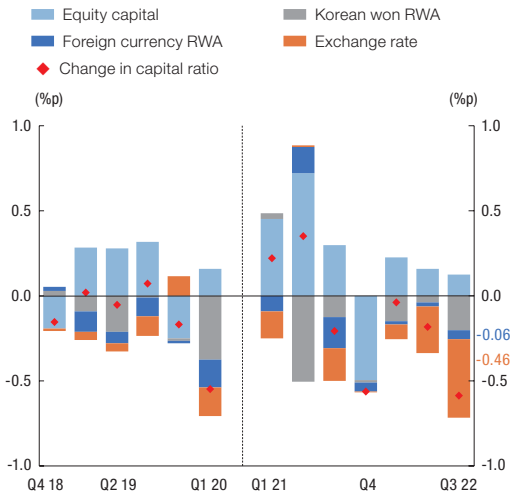
Decomposition of factors of variation in the total capital ratio[18)]

As for the decomposition of factors of change among the total capital ratios at domestic banks, the decline in the total capital ratio (-0.59%p, from the previous quarter) recorded in the third

15) Due to data constraints, interest rate derivatives besides currency derivatives were included.
16) When the exchange rate rises sharply, the mark-to-market appraisal of OTC derivative exposure leads to a significant increase in foreign currency RWAs.
17) If foreign exchange derivatives are at a net sold position, a higher exchange rate results in a valuation loss, reducing other comprehensive incomes in capital.
18) Change in the total capital ratio (from the end of the previous quarter) was decomposed into the respective contributions of equity, of Korean won denominated RWAs, of foreign currency RWAs, and of the exchange rate. The exchange rate could affect equity, but due to data constraints, the effect of change in the exchange rate on equity was not considered in this section.

quarter of 2022 consisted of the price effect of the high exchange rate (+KRW 142) (-0.46%p)[19] and the effect of the increase in foreign currency RWAs[20] (-0.06%p) (Figure III-6).

Figure Ⅲ-6. Decomposition of factors of variation in the total capital ratio[1]

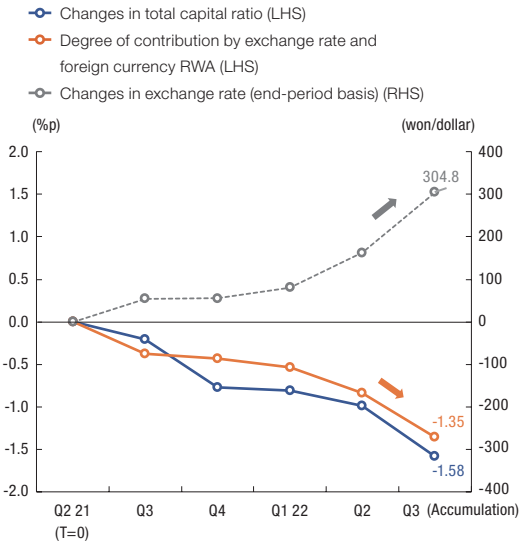


Note: 1) Decomposition of the degree of contribution by each component of the change in the total capital ratio of domestic banks (year-on-year basis).

Sources: Bank of Korea, financial institutions' business reports.

From the third quarter of 2021 to the third quarter of 2022, when the total capital ratio was on a downward path, the decline in the total capital ratio, attributable to the higher exchange rate and increase in foreign currency RWAs, was 1.35%p (1.01%p and 0.34%p, respectively). The exchange rate and foreign currency RWAs accounted for the majority of the total decline (1.58%p) in the total capital ratio observed during the same period (Figure III-7). If the exchange rate remains elevated going forward, it could put downward pressure on the total capital ratio of banks with a higher percentage of foreign currency RWAs. Hence, the size of foreign currency RWAs needs to be adjusted, and the soundness of the credit risk of foreign currency credit exposure[21] needs to be managed appropriately.

Figure Ⅲ-7. Exchange rate and foreign currency risk-weighted asset effects[1] on changes[2] in total capital ratio



Notes: 1) Cumulative sum of contributions to changes in total capital ratio of exchange rate and foreign currency RWA compared to the base point (end of the second quarter of 2021).
2) Cumulative change from the base point (end of the second quarter of 2021).

Sources: Bank of Korea, financial institutions' business reports.

B. Spillover Channel of the Liquidity Risk at Domestic Banks

Recent status of the liquidity ratio at domestic banks

The liquidity coverage ratio (LCR) at domestic banks, which represents their ability to cope

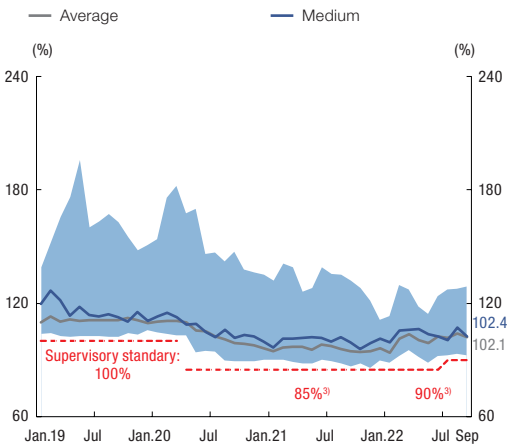
19) An increase of KRW 100 in the exchange rate caused a decrease of 0.32%p in the total capital ratio (at the end of the third quarter of 2022).

20) The balance of RWAs in foreign currencies at the end of the third quarter of 2022 rose by 1.3% from the end of the previous quarter.

21) Foreign currency credit RWAs accounted for 89.7% of total foreign currency RWAs at the end of 2021 and 91.6% at the end of September 2022, showing an increase of 1.9%p.

with a rapid outflow of liquidity for a period of 30 days, was 102.1%[22] in September 2022, well above the supervisory standard for banks, of 90.0%.[23] However, due to the recent rise in interest and exchange rates, the LCRs of some banks are moving closer to the supervisory standard (Figure III-8).

Figure Ⅲ-8. Liquidity coverage ratio (LCR) at domestic banks[1)2)]



Notes: 1) Highly-liquid asset/net cash outflow for a period of 30 days.
2) Shaded area indicates LCR distribution by bank.
3) 85% from April 2020 to June 2022, 90% from July to September 2022, 92.5% from October 2022 to June 2023.
Sources: Financial institutions' business reports.

In addition to the withdrawal[24] of transferable deposits after the rise in interest rates[25] and the increase in the valuation loss on highly-liquid bonds, the dramatic increase in the exchange rate contributed to a decline in the LCR at domestic banks. Due to the sharp rise in the exchange rate,[26] the size of payments at domestic banks for additional margin on OTC foreign exchange derivatives to foreign banks surged, shrinking their amounts of high-quality liquid assets.[27] This decline in the LCR may lead to a reduction in domestic banks' ability to cope with liquidity risk in the event of a shock at home or abroad.

Impact of additional margin for OTC derivatives on LCR

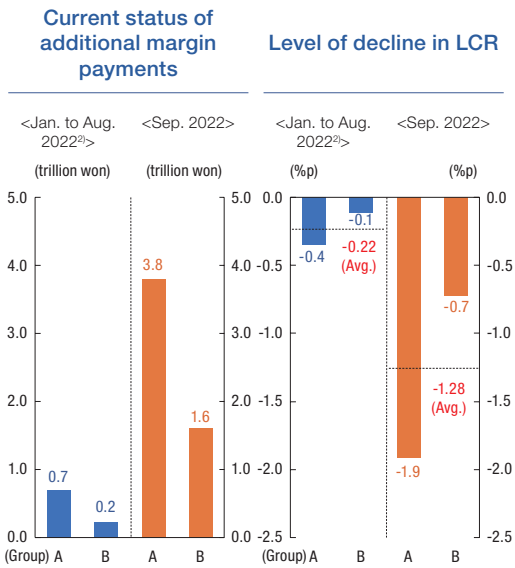
The impact of exchange rate fluctuations on the liquidity of domestic banks is examined with a focus on margin calls on OTC foreign exchange derivative positions. In September 2022, due to the sharp increase in the exchange rate, eight domestic banks[28] made additional margin deposits of KRW 5.4 trillion with foreign banks (average of KRW 0.7 trillion per bank). This is more than five times the monthly average additional margin (total of KRW 0.9 trillion, average of KRW 0.1

22) This ratio excludes internet-only banks.
23) The Financial Services Commission decided to keep the current LCR regulatory ratio, which was 92.5% as of October 2022, until the end of June 2023 by postponing the LCR ratio normalization measures for domestic banks in order to increase the liquidity supply in the banking sector.
24) At the end of the third quarter of 2022, the balance of transferable deposits at domestic banks (KRW 984.7 trillion) decreased by KRW 77.6 trillion from the end of the preceding quarter.
25) The interest rate on new time deposits at deposit taking banks was 3.35% as of September 2022, up 1.03%p from June 2022 (2.32%).
26) The KRW/USD exchange rate at the end of September 2022 was KRW 1,434.8, having increased by KRW 87.3 from the KRW 1,347.5 seen at the end of August 2022.
27) Due to restrictions on the sale of Korean won denominated bonds, such as Treasury bonds and monetary stabilization bonds that are provided as additional margin, such bonds are excluded from high quality liquid assets, which make up the numerator in the formula for calculating the LCR at domestic banks.
28) The analysis was conducted for eight banks (six commercial banks, two special banks) that are actively engaged in OTC derivative transactions. However, for some banks, whose data on margin for OTC foreign exchange derivatives were difficult to obtain, the size of their additional margin for OTC foreign exchange derivatives was estimated based on their share of foreign exchange related OTC derivatives (39.1%, end of 2021) out of the total additional margin for OTC derivative transactions.

trillion per bank) for OTC foreign exchange derivatives provided during the period from January to August 2022.

If high quality liquid assets decrease after the payment of these additional margin calls, the LCRs at the banks concerned are estimated to have dropped by 1.28%p[29] on average.[30] Banks (Group A) that paid for their share of the additional margin on OTC foreign exchange derivatives out of their net cash outflows saw their LCRs fall by a larger margin[31] (Figure III-9).

Figure Ⅲ-9. Current status of additional margin paid for OTC derivatives and level of decline in LCR[1]



Notes: 1) The top four banks with the largest amount of additional margin payment for OTC foreign exchange derivatives between January and August 2022 are classified as Group A and the bottom 4 banks as Group B.
2) Monthly average during the period.

Sources: Survey of financial institutions.

3. Risk Spillover Channel of a Rising Exchange Rate on the Non-Banking Sector

For non-bank financial institutions (NBFIs), the impact of a higher exchange rate is transmitted along with shocks of other market variables, such as stock prices and interest rates, through foreign exchange rate hedge transactions against foreign currency assets and through the funding and liquidity management structures.[32] Hereunder, we analyze the impact of a rise in the exchange rate with a focus on securities and insurance companies.[33]

A. Spillover Channel of Deterioration of Non-Banking Sector's Capital Adequacy

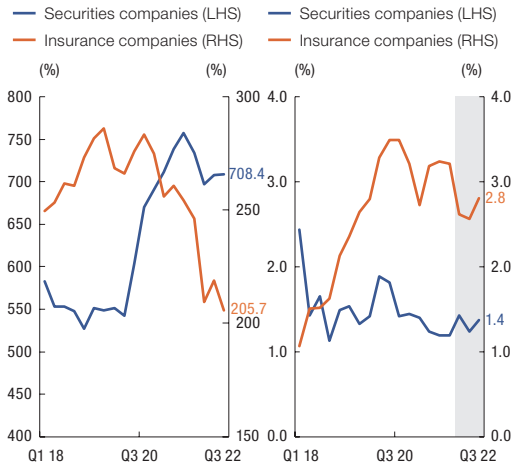
Securities and insurance companies have less foreign currency credit risk exposure, such as foreign currency loans, than banks, and they hedge against foreign exchange market risks of their foreign currency assets, and thus the decline in their capital ratio in response to a rise in the exchange rate is limited. At the end of September 2022, the share of foreign exchange risk out of total risk (denominator of the capital ratio)[34] was very low, standing at 1.4% for securities companies and 2.8% for insurance companies (Figure III-10).

29) Such a decline is significantly larger than the 0.22%p decline in the LCRs of the same banks, on average, due to additional margin payments for OTC foreign exchange derivatives after the rise in the exchange rate from January to August of 2022.

30) This was estimated by considering the monthly average net cash outflow by banks from January to August of 2022, with the net cash outflow in September 2022 and increases in the margin paid for OTC foreign exchange derivatives during the respective periods.

31) As a result, in early October 2022, some banks temporarily suspended OTC foreign exchange derivatives for risk management purposes to prevent any increase in margin payments from affecting their liquidity in the event of a further rise in the exchange rate.

Figure Ⅲ-10. Trends in capital ratio and share of foreign exchange risk at securities and insurance companies



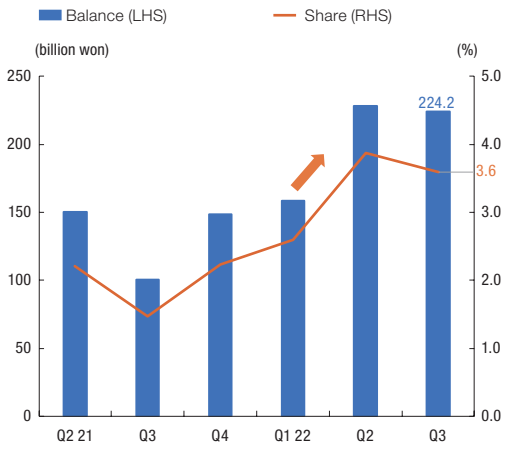
Notes: 1) Net capital ratio (NCR) for securities companies, risk-based capital (RBC) for insurance companies.
2) Share of foreign exchange risk out of total risk.
3) Foreign exchange risk is included in market risk.
Sources: Financial institutions' business reports.

For insurance companies, in the event of an increase in the exchange rate, foreign exchange risk (the solvency capital requirement) increases slightly, but as the risks of most foreign currency assets are hedged,[35] the impact on their risk based capital (RBC) (available capital / solvency capital requirement) is not significant.[36] At the end of the third quarter of 2022, despite a sharp rise in the exchange rate (up KRW 250 from the same quarter of the previous year), foreign exchange risk at insurance companies decreased by KRW 0.2 trillion (-9.3%). However, as the recent reversal of the spread between domestic and international interest rates, and a higher exchange rate, have caused conditions for long-term foreign exchange hedges to deteriorate, the share of short-term foreign exchange hedges has risen.[37] This may have a somewhat adverse impact on the RBC of insurance companies[38] (Figure III-11).

Moreover, under the K-ICS to be implemented starting in 2023, a risk coefficient (2%) higher than the current one is planned to be applied to short-term FX hedges with a remaining maturity of less than one year, which will help raise the market risk associated with the increase in short-term FX hedge transactions.[39]

32) The contingent demand for foreign currency funds and losses on foreign exchange hedging transactions, driven by margin calls related to a sharp decline in stock prices, are major paths of risk transmission.
33) Foreign currency assets and liabilities at securities and insurance companies accounted for 96.6% and 81.3% of the total foreign currency assets and liabilities of NBFIs, respectively (end of September 2022).
34) Total risk at insurance companies consists of insurance, interest rate, credit, and market risks, while the total risk at securities companies comprises of market and credit risks. Foreign exchange risks are market risks.
35) Insurance companies hedge against exchange rate risks of their foreign currency assets using currency and FX swaps and currency options.
36) However, in the event of a sharp rise in the exchange rate, valuation loss on existing hedged FX positions may occur, reducing part of the available capital.
37) For insurance companies, the share of swaps (currency and FX swaps) with a remaining maturity of less than one year climbed from 43.1% at the end of the second quarter of 2021 to 47.5% at the end of the third quarter of 2022, raising market risk.
38) Recently, amid tighter liquidity in global markets, the Heungkuk Life Insurance incident put greater pressure on insurance companies to manage their RBC ratio through the issuance and rollover of hybrid securities.
39) Under the K-ICS, for foreign exchange hedges with a remaining maturity of less than one year, the price fluctuation risk will be reflected in the solvency capital requirement, with the price fluctuation risk being calculated as 1% (contractual maturity of one year or longer) or 2% (contractual maturity of less than one year) of the nominal amount (derivative contract amount to mitigate FX risks), depending on the contractual maturity.

Figure Ⅲ-11. Balance[1] and Share[2] of short-term FX hedge risk of insurance companies



Notes: 1) Since the end of June 2021, the short-term FX hedge risk of less than one year was reflected when calculating the solvency capital requirement for RBC.
2) Share of short-term FX hedge risk out of market risk.
Sources: Financial institutions' business reports.

For securities companies, as they take a net long position in swaps (USD 8.4 billion in the third quarter of 2022, FX and currency swaps), a rise in the exchange rate leads to valuation gains. As the size of swaps (USD 79.9 billion) is smaller than that of insurance companies (USD 115.0 billion), the direct impact of the higher exchange rate on the capital ratio is not significant.

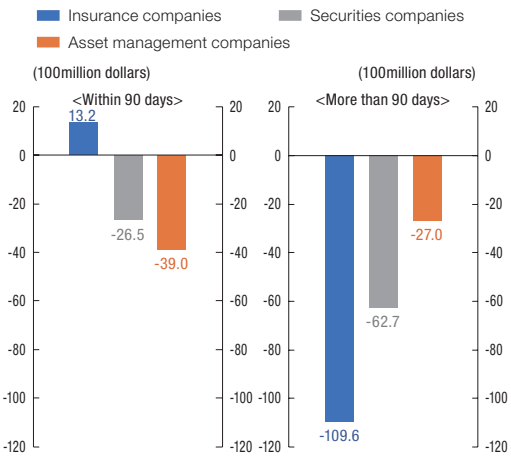
B. Spillover Channel of Liquidity Risk at Domestic Banks

Spillover channel of liquidity risk through the foreign currency funds market

While swap transactions to hedge against FX risks related to the foreign currency assets of the non-banking sector have steadily increased, foreign currency liquidity risk in the non-banking sector may be triggered, depending on how banks operate their foreign currency funds and on changes in conditions in foreign currency funds markets. A rapid increase in the exchange rate causes a decline in a domestic bank's currency and foreign exchange swap transactions, reduces the maturity of such transactions,[40] and depletes the credit limits for a bank's FX derivatives transactions with the non-banking sector, leading to higher rollover risk of swap transactions.

During the rise in the exchange rate in the second half of this year, the size of banks' net swap funds supplied to the non-banking sector (securities companies, insurance companies, and asset management companies) decreased by USD 19.9 billion by the end of September 2022 (more than 90 days) year on year (Figure III-12).

Figure Ⅲ-12. Changes[1] in the size of banks' net swap funds[2] supplied to NBFIs

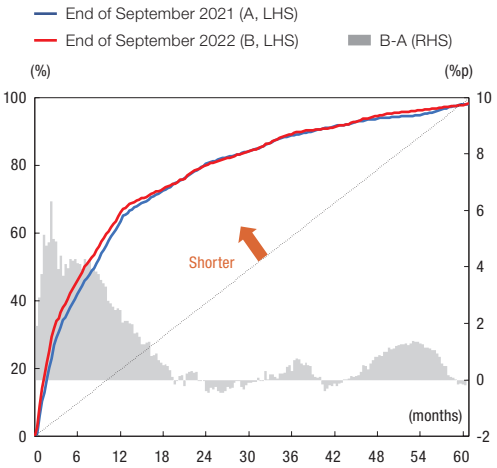


Notes: 1) Changes in the end of September 2022 compared to the end of September 2021.
2) Foreign exchange and currency swap balances net supplied by domestic banks and foreign bank branches to securities companies, insurance companies, and asset management companies.
Source: Bank of Korea.

40) As the credit risk of the swap counterparty increases, domestic banks have a stronger incentive to shorten the maturity of their swaps.

In addition, while the exchange rate was soaring, the shorter maturity of swap funds supplied by banks to the non-banking sector increased the liquidity risk in the non-banking sector. With the shorter maturity of swap funds, the share of swap funds with a remaining maturity of less than six months at the end of the third quarter of 2022[41] rose by 4.1%p from the end of the third quarter of 2021, showing that the maturity of swap funds declined further amid the sharp increase in the exchange rate. As a result, the curvature of the term structure of swaps rose slightly in the short maturity section (Figure III-13).

Figure Ⅲ-13. Maturity structure[1] of swap fund[2] supply from banking sector to NBFIs



Notes: 1) Cumulative share of swap balances by remaining maturity.
2) Foreign exchange and currency swap balance basis.
Source: Bank of Korea.

Spillover channel of the Korean won denominated liquidity risk of insurance companies through FX derivatives

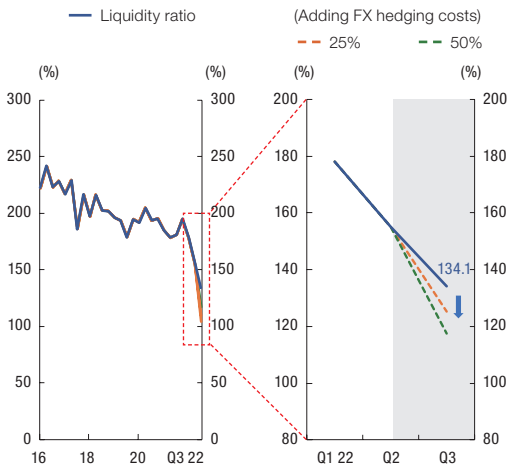
Meanwhile, a rise in the exchange rate may increase the Korean won denominated liquidity risk at insurance companies through higher costs of FX hedging[42] and additional provision of collateral securities for FX derivative transactions.

Based on the liquidity ratio at insurance companies at the end of the third quarter of 2022 (134.1%), if 25% or 50% of foreign exchange hedge costs (remaining maturity of less than three months) were added to the payment obligations (denominator) as additional liquidity requirements, the liquidity ratio would fall by 8.8%p or 16.6%p, respectively, raising the burden of Korean won denominated liquidity (Figure III-14).

41) As for the share of the balance of swaps according to remaining maturity, the share of them with a remaining maturity of less than six months accounted for 46.0% of the total (at the end of the third quarter of 2022).

42) In the case of a higher exchange rate, the cost of FX swaps rises due to the decline in the swap rate, while the cost of currency swaps increases owing to the decline in the swap basis (difference between CRS interest rate and IRS interest rate) and a reversal (or narrowing) of the domestic/international interest rate spread. Meanwhile, for insurance companies, the share of FX swaps whose maturity is shorter than currency swaps, has climbed recently (43.1% at the end of the second quarter of 2021 → 47.5% at the end of the third quarter of 2022).

Figure Ⅲ-14. Estimation[1] of insurance company liquidity ratio reflecting FX hedging costs[2]

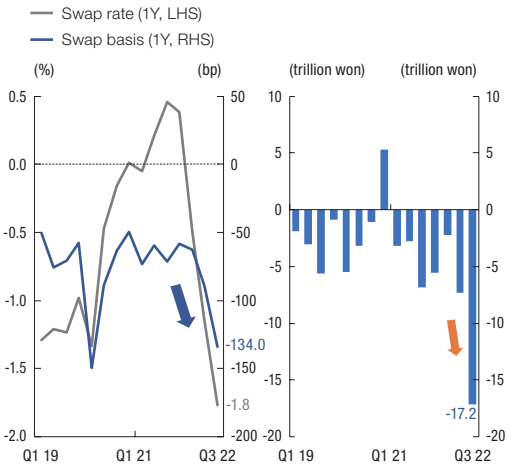


Notes: 1) Evaluate the liquidity situation at the insurance company by adding some of the FX hedging costs (25%, 50%) to the payment amount (denominator).
2) Calculated by multiplying the insurance company's net selling balance of currency swaps and foreign exchange swaps (within 3 months to maturity) by the swap basis (3Y) and swap points (3M) at the end of September 2022.

Sources: Bank of Korea, financial institutions business reports.

In addition, in the event that a valuation loss from an FX derivative position is incurred due to the higher exchange rate,[43] the provision of additional collateral securities according to the credit enhancement provisions in OTC derivative contracts may increase the burden of Korean won denominated liquidity (Figure III-15).

Figure Ⅲ-15. Trend of swap[1] costs[2] and valuation gains, losses on currency-related derivatives at insurance company



Notes: 1) Currency swaps and foreign exchange swaps.
2) End of quarter.

Sources: Financial institutions' business reports.

Risk spillover channel of securities company payment of additional margin and collateral

As for securities companies, foreign currency and Korean won denominated liquidity risk may be amplified in relation to their hedge against derivative-linked securities[44] or to foreign currency RP transactions.

While hedging their positions related to derivative-linked securities,[45] Korean won currency and foreign currency liquidity risks may emerge while fulfilling requests for additional

43) A valuation loss may occur in the short positions of FX swaps (buy/sell) and currency swaps (CRS receive). Insurance companies with net short positions of currency derivatives to hedge against FX risks stood at USD 107.8 billion (end of September 2022), representing 94.3% of on-balance-sheet foreign currency assets.

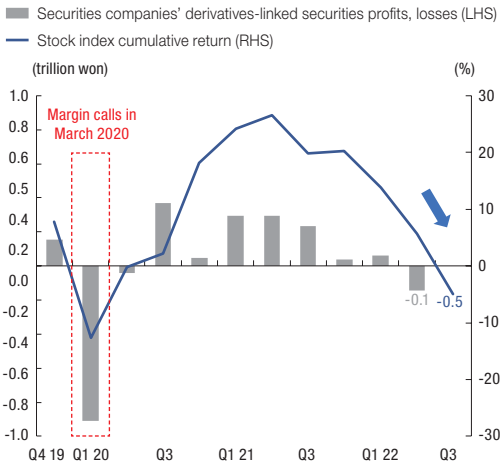
44) In the event of a market shock, securities companies with higher exposure to derivative-linked securities are easily exposed to liquidity risk associated with losses on hedges and a rise in derivative margins, sending the shock from global financial markets into domestic financial markets.

45) At the end of June 2022, the share of hedges in their positions related to derivative-linked securities was 57.5% (end of March 2020, 58.6%).

margin (margin calls) amid a sharp decline in a stock prices, which are underlying assets. The increase in demand for Korean won denominated funds to pay for foreign currency margins (foreign currency deposits, etc.) amid a sharp rise in the exchange rate may elevate volatility in the domestic money market, pushing the exchange rate higher.

With sluggish stock markets at home and abroad and a higher exchange rate since the second quarter of 2022, losses associated with the hedging of positions related to derivative-linked securities[46] soared, adding to the liquidity burden at securities companies[47] (Figure III-16).

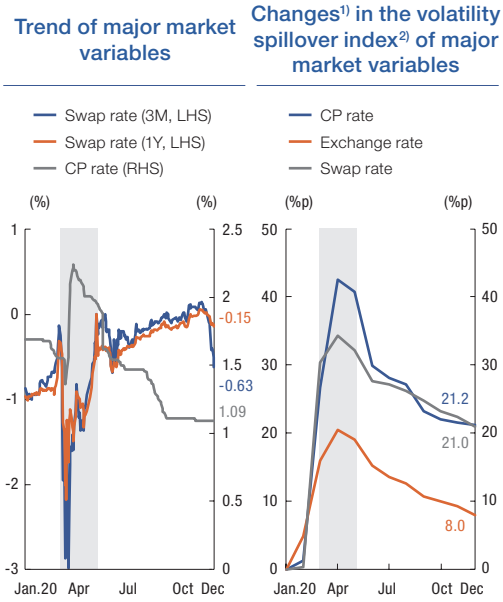
Figure III-16. Securities company derivatives-linked securities profits, losses[1], and stock index rate of return[2]



Notes: 1) Derivative-linked securities (ELS, DLS)-related gains and losses (including self-hedging operation gains and losses), third quarter of 2022 omitted due to data limitations.
2) Domestic banks basis.
3) Mutual credit cooperatives basis.
Sources: Bank of Korea, financial institutions' business reports.

During margin calls at securities companies in March 2020, CP yields rose sharply in the money market and swap rates plunged in the foreign currency funds market, raising inter-market uncertainty. Looking at the volatility between markets during that period, the volatility spillover index of the swap rate, the CP rate, and the exchange rate increased significantly compared to the preceding period (Figure III-17).

Figure III-17. Market situation at time of margin calls to securities companies



Notes: 1) Cumulative change compared to January 2020.
2) The effect of CP rate, exchange rate, and swap rate mutually transferring volatility to other financial market price variables (the total volatility spillover index).
Sources: Financial institutions' business reports.

46) As the early redemption of ELS due to the decline in stock prices is delayed, the burden at securities companies to secure liquidity necessary to hedge their positions (long position on stock index futures, etc.) persists.

47) After the implementation of measures to improve the soundness of derivative-linked securities (2020), however, the liquidity risk management at securities companies improved (through the maintenance of liquid assets in foreign currencies corresponding to a certain portion of their hedge positions), and overseas stock indices did not drop too sharply, which differs from the situation seen during the margin call incident in 2020.

Meanwhile, if the exchange rate rises, the foreign currency RP(repo)s[48] for borrowing gives rise to additional margin calls due to the decline in the foreign currency converted amount of collateral securities denominated in Korean-won and then this leads to increase the demand for Korean won liquidity at securities companies. This could work to amplify the volatility of domestic financial markets.

Amid the financial instability prompted by a sharp rise in the exchange rate, liquidity risk at securities companies can spread rapidly to the financial system through the recently increasing volatility spillover channel between the financial market and foreign exchange market. Hence, careful management of the liquidity and leverage ratios at securities companies is important.

4. Assessment and Implications

Domestic financial institutions are assessed as having been able to deal with the decline in the capital ratio and liquidity ratio associated with the increase in the exchange rate that has occurred so far.

However, considering that the spillover channel of the rising exchange rate risk to the financial system has been diversified and that its impact has strengthened, a high exchange rate is still likely to put significant pressure on liquidity and soundness management of financial institutions for the time being. If the U.S. Federal Reserve continues its policy rate hikes and if the liquidity tightening in major economies further intensifies, the negative impact of the higher exchange rate will likely become increasingly serious.

Moreover, as the Korean economy is highly dependent on the global economy, a sharp rise in the exchange rate coinciding with uncertainty in financial markets will likely undermine the liquidity and soundness of financial institutions and boost volatility among financial markets. Therefore, it is important that preemptive efforts be made to prevent this eventuality.

Going forward, financial institutions need to take caution to ensure that the maturity and liquidity mismatch between foreign currency assets and liabilities[49] does not widen. Furthermore, to ensure that the temporary liquidity crunch does not evolve into a crisis, policy authorities need to implement flexible liquidity regulations in a temporary manner rather than engage in the rigid management of regulatory capital and liquidity ratios.[50]

As the non-banking sector is vulnerable to external shocks, which could evolve into systematic risks, policy authorities need to improve the liquidity regulation system in consideration of past crises[51] and the characteristics of transactions, so that NBFIs can secure sufficient capacity to manage liquidity situations. Furthermore, to prevent the maturity of foreign currency funding in the non-banking

48) The balance of RPs sold by securities companies stood at USD 16.03 billion at the end of September 2022.

49) Insurance companies use short-term foreign currency funds raised with hedges for long-term investments, and thus, in the event of a sharp rise in the exchange rate, their roll-over risk tends to increase.

50) The IMF (2022) stressed the importance of introducing a policy aimed at mitigating market liquidity risks in order to prevent external shocks from being transferred to the financial system.

sector from becoming shorter, related regulations need to be revised continuously.

While banks supply liquidity[52] to the real economy and to other financial sectors in the event of market liquidity shocks caused by market unrest, if their total capital ratio and liquidity ratio decline amid a sharp rise in the exchange rate, such bank functions could be strained. Therefore, banks need to be particularly careful to prevent negative shocks caused by dramatic exchange rate increases.

Furthermore, when domestic banks put up additional margin related to OTC FX derivatives starting in September this year, they had a negative impact on bond markets.[53] To alleviate the burden of having to provide additional margin in the case of a sudden increase in the exchange rate, ways to promote the reuse of collateral securities received as margin need to be devised.

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51) In March 2020, the liquidity ratio at securities companies before the margin call incident (133.7%, end of 2019, ratio of liquid assets with remaining maturity within three months divided by liquid liabilities with remaining maturity within three months) far exceeded the regulatory ratio (over 100%), but many securities companies nonetheless suffered a liquidity shortage.

52) Gatev and Strahan (2006) explained that, if funding market liquidity is depleted and if CP spreads widen, funds flow into banks, and banks play the role of hedging liquidity risk by using these funds to cope with the demand for funds (loans, etc.).

53) Banks issued bank debentures to supplement high quality liquid assets that had decreased after their payment of additional margin.

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