AMRO Country Report
ACR/24-06

AMRO Annual Consultation Report

Korea - 2023

ASEAN+3 Macroeconomic Research Office (AMRO)

April 2024

Acknowledgments

1. This Annual Consultation Report on Korea has been prepared in accordance with the functions of AMRO to monitor and assess the macroeconomic status and financial soundness of its members; identify relevant risks and vulnerabilities; report these to member authorities; and if requested, assist them in mitigating these risks through the timely formulation of policy recommendations. This is being done in accordance with Article 3 (a) and (b) of the AMRO Agreement.

2. This Report is drafted on the basis of the Annual Consultation Visit of AMRO to Korea from 7 to 20 December 2023 (Article 5 (b) of the AMRO Agreement). The AMRO Mission team was led by Dr. Kevin Cheng, Group Head and Lead Economist. Members included Mr. Kimi Xu Jiang, Senior Economist (Country desk); Ms. Wanwisa Vorranikulkij, Senior Economist; Dr. Byunghoon Nam, Senior Economist; Dr. Sungtaek Kwon, Senior Economist; Dr. Jade Vichyanond, Economist; and Dr. Trung Thanh Vu, Associate Economist. Dr. Luke Hong and Mr. Dek Joe Sum (Fiscal Surveillance) attended parts of the on-site meetings. AMRO Director Dr. Kouqing Li and Chief Economist Dr. Hoe Ee Khor participated in key policy meetings with the authorities. This AMRO Annual Consultation Report on Korea for 2023 was peer-reviewed by an economist group from AMRO's country surveillance, financial surveillance, and fiscal surveillance teams; endorsed by Mr. Jiangyan Yu, Deputy Group Head and Senior Economist, Policy and Review Group; and approved by Dr. Hoe Ee Khor, AMRO Chief Economist.

3. The analysis in this Report is based on information available up to February 22, 2024[1].

4. By making any designation of or reference to a particular territory or geographical area, or by using the term "member" or "country" in this Report, AMRO does not intend to make any judgments as to the legal or other status of any territory or area.

5. No part of this material may be disclosed unless so approved under the AMRO Agreement.

6. On behalf of AMRO, the Mission team wishes to thank the Korean authorities for their comments on this Report, as well as their excellent meeting arrangements and hospitality during our visit.

[1] Real and nominal GDP are based on preliminary estimates published on March 5, 2024.

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Executive Summary

1. Economic momentum in Korea weakened in H1 2023 and improved in H2 2023. GDP growth declined from 2.6 percent year on year in 2022 to 0.9 percent in H1 2023 (yoy) due to weak private consumption and lackluster exports. Notwithstanding the continued sluggishness in private consumption, the recovery of exports lifted GDP growth to 1.8 percent in H2 2023.

2. The near-term growth outlook is expected to continue improving from previous weakness, mainly supported by further strengthening in goods exports. Private consumption is forecast to remain sluggish considering moderate wage growth, elevated household debt and high borrowing costs. While facility investments are expected to slightly edge up, reflecting increased semiconductor and artificial intelligence investments, construction investment will likely weaken due to a decline in construction orders and a drop in housing starts. Overall, the economy is expected to rebound to an above-potential growth rate of 2.3 percent in 2024 after recording 1.4 percent in 2023.

3. The labor market was tight despite the softening economic momentum. The unemployment rate fell further to 2.7 percent in 2023 from 2.9 percent in 2022 while the labor force participation rate recorded 64.6 percent at the end of 2023, higher than 64.0 percent at the end of 2022 and pre-pandemic levels. Employment growth fell to 327,000 in 2023 from a high pace in 2022, due to lower hiring in manufacturing and services especially in education and public administration services, while employment of senior citizens aged 60 or above continued to rise.

4. Headline inflation declined to 3.6 percent in 2023 from 5.1 percent in 2022, driven by lower energy prices and reduction in government measures to support costs of living, before rebounding to above 3.0 in the last few months of 2023, reflecting increases in food and oil prices. Meanwhile, core inflation, the main driver of overall inflation in 2023, declined steadily. Moderate wage growth despite the tight labor market and declining short-term inflation expectations helped limit second-round effects of inflation.

5. The external sector remains resilient with recovering current account balances and ample reserves. The current account has reverted to a surplus position since May 2023 while the financial account shows reduced net outflows due to a fall in outward investments amid prolonged high interest rates, concerns over global economic slowdown, and high volatility in FX markets. Foreign reserves remain ample at USD415.8 billion at the end of January 2024, covering about 6.6 months' worth of imports and 2.9 times of short-term external debt.

6. Monetary policy remains restrictive given that inflation is still high. The Bank of Korea (BOK) has kept the base rate unchanged at 3.5 percent since February 2023 after delivering consecutive rate hikes from April 2022 to January 2023. Concerns over the strength of the U.S. dollar amid the U.S. Federal Reserve's hawkish stance, high inflation, and a rebound in household debt, have prompted the BOK to maintain its current tight policy stance.

7. The fiscal position in 2023 improved, albeit less than budgeted due to a sizeable revenue shortfall. With an estimated fall of 6.9 percent in revenue and 10.8 percent in spending, the fiscal deficit in 2023, excluding social security funds, is estimated to narrow from 5.4 percent in 2022 to 3.8 percent of GDP, albeit higher than the budgeted 2.6 percent of GDP. Over the medium term, the National Fiscal Management Plan 2023-2027 envisages a slower pace of

fiscal consolidation compared with the previous plan. The fiscal deficit is set to decline below 3 percent of GDP in 2025 and gradually approach mid-2 percent of GDP by 2027.

8. The near-term economic outlook remains highly uncertain. Key near-term risk factors include high inflation leading to interest rates being higher for longer; weaker external demand arising from economic recession in the U.S. and Europe and limited spillover effects from China's economic recovery; and financial distress in the project financing market. Over the medium term, geopolitical tensions could intensify, leading to disruptions in manufacturing activities and weakening investment sentiment. In addition, high household debt continues to pose a vulnerability in the financial system. In the long term, the substantial increase and ongoing upward trend in government debt raise concerns about fiscal sustainability. Rapid population aging will weigh on economic potential, other things being equal.

9. As headwinds remain significant, the authorities need to be flexible and agile in calibrating their monetary and fiscal policy stance to safeguard economic and financial stability, while continuing with efforts to boost growth potential.

- The current restrictive monetary policy stance needs to be maintained until inflation stabilizes durably at the target level of 2.0 percent. As the inflation rate is still expected to exceed the target for a considerable time in the baseline forecasts, the BOK should maintain its prudent stance for the time being. At the same time, the central bank should be ready to recalibrate its monetary policy given the uncertainties in the environment.

- The government should persist with efforts to safeguard financial stability amid high interest rates. Credit support measures for small and medium size enterprises and sole proprietors should be temporary and targeted. In addition, macroprudential measures should be finetuned to be commensurate with the developments of housing market, while additional policies can be considered to contain household indebtedness. Moreover, with short-term money markets stabilized, it becomes essential to unwind temporary regulatory support to strengthen financial institutions' buffers and restore market functioning.

- Continued fiscal consolidation in line with an expected economic recovery in 2024 is appropriate, and ensuring fiscal sustainability over the medium to long term is paramount. Policy efforts that accommodate growing spending needs to foster national priorities through budget restructuring and reallocation are commendable. Should downside risks materialize, fiscal policy could be employed for targeted support without compromising the fiscal consolidation path. The AMRO mission supports the legislation of a fiscal rule as an integral component of the fiscal framework to ensure fiscal sustainability by enhancing the accountability and independence of fiscal authorities.

- The government should continue with structural reforms to galvanize long-term growth. In particular, fostering innovation, boosting human resource development and strengthening supply chain resilience, especially for the semiconductor industry, are pivotal to long-term growth. In addition, given the rapidly aging population, public pension reform is one of the most urgent reform priorities. Lastly, as a fossil-fuel-reliant economy, the government should persist with efforts to achieve carbon neutrality.

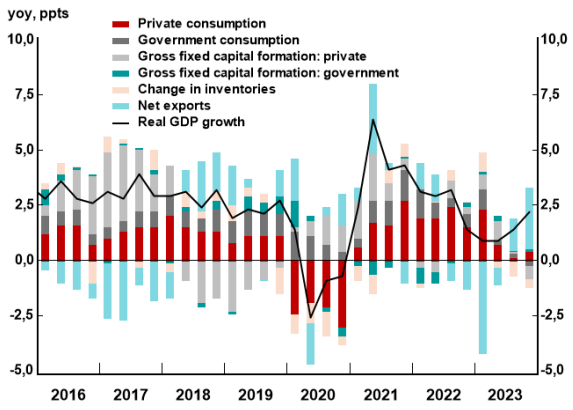
A. Recent Developments and Outlook

A.1 Real Sector Developments and Outlook

1. Korea's economic momentum weakened in H1 2023 and improved in H2 2023. GDP growth declined from 2.6 percent in 2022 to 0.9 percent (yoy) in H1 2023, mainly due to a fall in net exports. Notwithstanding a continual sluggishness in private consumption, the recovery of exports lifted GDP growth to 1.8 percent in H2 2023 (Figure 1).[2] From the production side, with the semiconductor cycle on the upturn from the middle of 2023, manufacturing has been strengthening, while the service sector has weakened amid tight monetary conditions and waning post-pandemic pent-up demand (Figure 2).

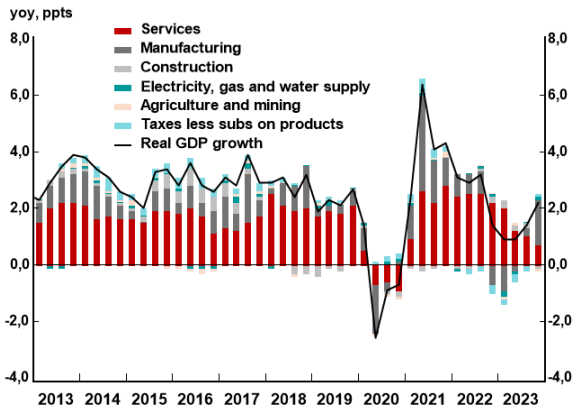
2. The near-term growth outlook for 2024 is expected to continue improving. Manufacturing exports are forecast to be the major contributor to growth in 2024, reflecting a continued pickup in the semiconductor sector on account of stronger demand for electronics and declines in inventories. Service exports are expected to recover with inbound tourism from China normalizing further. Construction investment is forecast to decelerate due to fewer building construction orders and a drop in housing starts in recent quarters, while facility investments are expected to slightly edge up, mainly supported by increased investments in semiconductor and artificial intelligence products. Private consumption will probably remain sluggish considering moderate wage growth, elevated household debt and high borrowing costs *(Selected Issue 3: Assessing the Impact of Interest Rate Changes on Consumption in Korea: The Role of Liquidity Constraints and Indebtedness)*. Overall, the economy is expected to rebound to an above-potential growth rate of 2.3 percent in 2024 from 1.4 percent in 2023. Accordingly, the output gap will turn less negative and narrow to near zero in 2024.

Figure 1. Contribution to Real GDP Growth Demand Side



Source: Bank of Korea; Haver Analytics

Figure 2. Contribution to Real GDP Growth, Supply Side



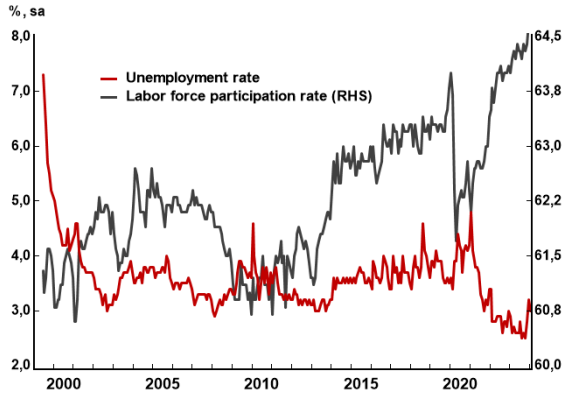
Source: BOK; Haver Analytics

3. The labor market was tight in 2023 despite the softening economic momentum. The annual unemployment rate fell further to 2.7 percent in 2023 from 2.9 percent in 2022 while the labor force participation rate recorded 64.6 percent at the end of 2023, higher than the 64.0

[2] Sequentially, GDP growth was 0.3 percent, quarter over quarter with seasonal adjustments, in the first quarter of 2023 before rising to 0.6 percent in the following three consecutive quarters of the year.

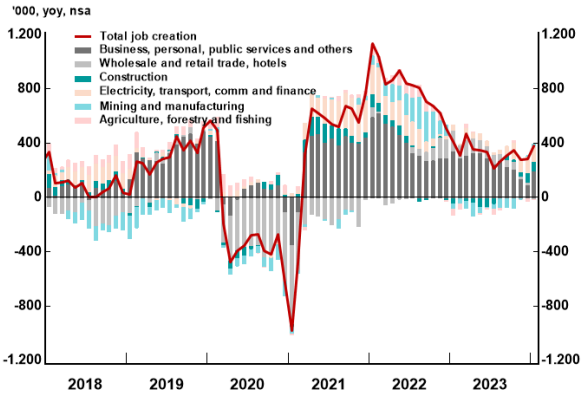
percent at the end of 2022 and pre-pandemic levels (Figure 3). Job growth (yoy) declined to 327,000 in 2023 from a high pace 2022 (816,000), due to lower hiring in manufacturing and services, especially in education and public administration services (Figures 4, 5). In addition, while employment of senior citizens aged 60 or above continued to rise in 2023, youth employment (15-29 years old) dipped and employment of the middle-aged working population (30-50 years old) remained below pre-pandemic levels (Figure 6). Looking ahead, the unemployment rate is expected to edge up slightly and job growth is forecast to gradually slow down from the post-pandemic peak owing to the easing of labor demand.

Figure 3. Unemployment Rate and Labor Force Participation Rate



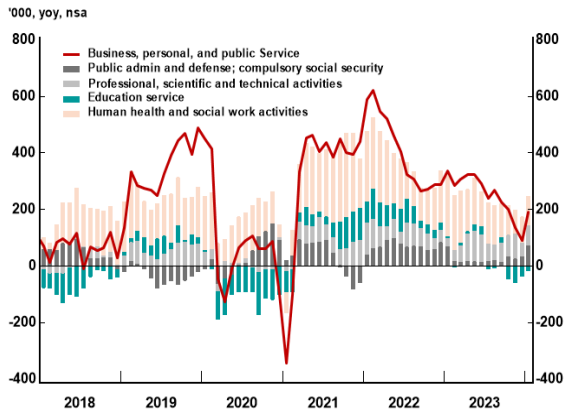
Source: Statistics Korea; Haver Analytics

Figure 4. Job Growth by Sector



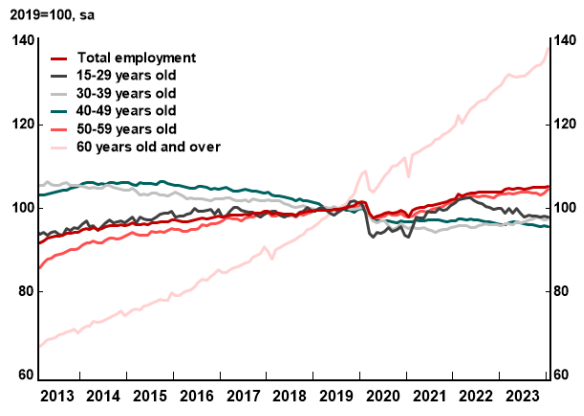
Source: Statistics Korea; Haver Analytics; AMRO staff calculations

Figure 5. Job Growth in Service Sector



Source: Statistics Korea; Haver Analytics; AMRO staff calculations

Figure 6. Employment by Age Group



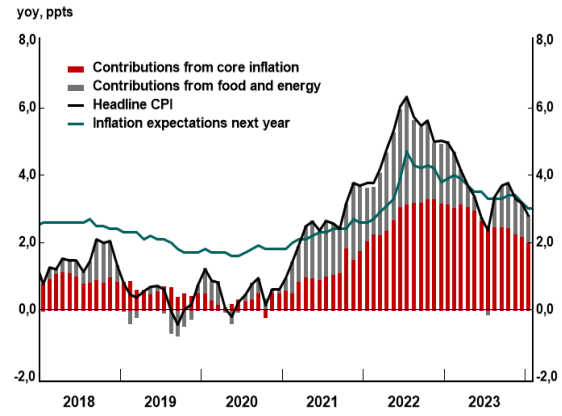
Source: Statistics Korea; Haver Analytics; AMRO staff calculations

4. Headline inflation is expected to resume a downward trend towards the BOK's 2 percent target after the recent rebound. Headline inflation fell to 2.4 percent in July 2023 from 5.2 percent in January 2023, driven by declines in energy prices and government support measures,[3] before rebounding to above 3.0 percent since August 2023 due to increased food and oil prices. Core inflation, excluding food and energy prices, declined steadily from 4.0 percent in January 2023 to 2.5 percent in January 2024, but has been generally stickier than

[3] The government decided in October 2023 to extend tax cuts on fuel consumption expiring in the same month, namely a 25 percent discount on gasoline and a 37 percent discount on diesel, to February 2024. In addition, the government extended supplies of selected agricultural products to contain inflation and support livelihoods.

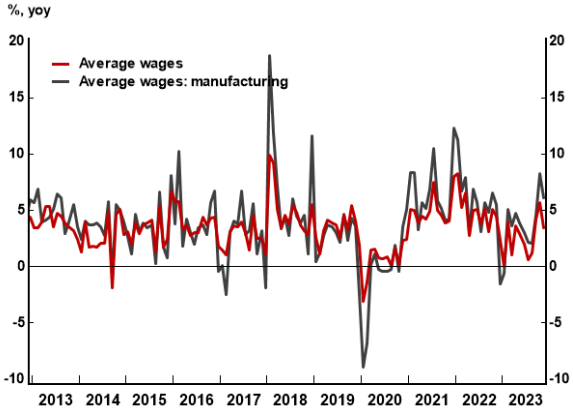
headline inflation (Figure 7). On a positive note, second-round effects have been moderate. Nominal wage growth has been modest (Figure 8), below pre-pandemic trends despite the tight labor market, mainly because the bulk of expanded employment was taken up by senior citizens with lower-paid jobs while bonuses in the manufacturing sector moderated. Short-term inflation expectations continued to decline, albeit at a slower pace than headline inflation. Looking ahead, headline inflation is forecast to moderate from 3.6 percent in 2023 to 2.5 percent in 2024, approaching the central bank's target of 2.0 percent at the end of 2024. Core inflation is forecast to be 2.4 percent and remain lower than headline inflation in 2024.

Figure 7. Inflation and Inflation Expectation



Source: Statistics Korea; Haver Analytics

Figure 8. Average Nominal Wage Growth



Source: Ministry of Employment and Labor; Haver Analytics

A.2 External Sector

5. The external sector remained resilient with recovering current account balances and ample reserves.

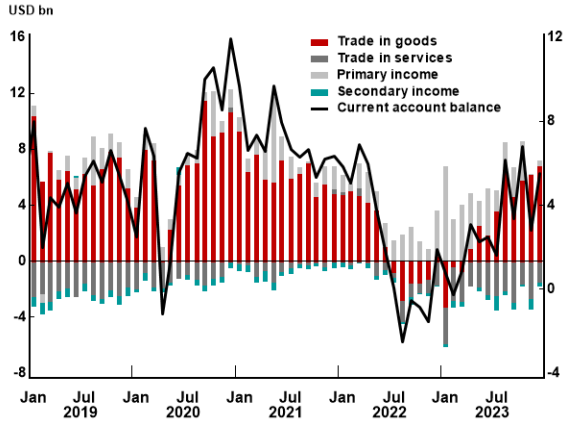
- Despite the underperformance of exports from October 2022 to September 2023 due to the downcycle of the global semiconductor industry and sluggish external demand, the current account recorded a surplus for the eighth straight month in December 2023 (Figure 9), supported by a pickup in the semiconductor sector (Figure 10), and stable interest income from overseas.[4] While the goods account recorded a surplus, the service account continued to post a deficit owing to a deficit in travel services.
- Financial account balances showed a decline in outward direct investment[5] and significant swings in cross-border bank lending. Portfolio investment fluctuated sporadically, with net inflows observed in April, May, and November 2023 due to substantial bond inflows, while recording outflows in other months of 2023, largely driven by equity outflows, reflecting Korean residents' investment in foreign equities (Figure 11).
- Meanwhile, foreign reserves declined slightly to USD415.8 billion at the end of January 2024 from USD423.2 billion at the end of 2022. Despite the recent decline, foreign reserves

[4] The current account surplus recorded an average of USD5.4 billion in May-December 2023, after an average deficit of USD0.8 billion in October 2022-April 2023. In December 2023, the goods account recorded a USD8.0 billion surplus; the service account posted a USD2.5 billion deficit; and the primary income account recorded a USD2.5 billion surplus. On a customs basis, export growth turned positive year on year for the first time in October 2023 after recording 12 consecutive months of negative growth.

[5] Outward direct investment fell sharply to USD19.4 billion in 2023 from USD40.8 billion in 2022.

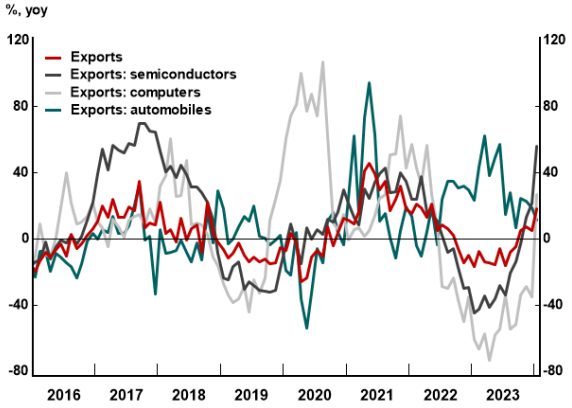
remain ample, covering about 6.6 months' worth of imports and 2.9 times of short-term external debt (Figure 12).

Figure 9. Current Account Balance



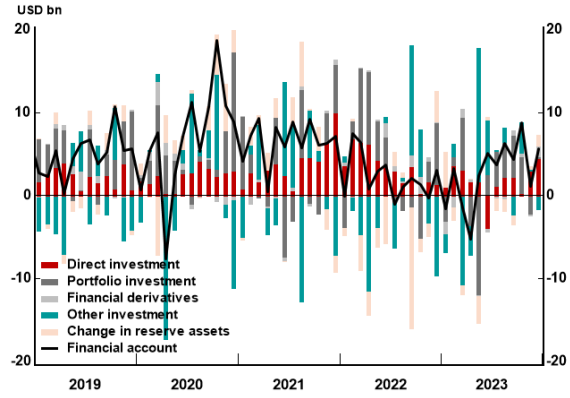
Source: BOK; Haver Analytics

Figure 10. Exports by Product



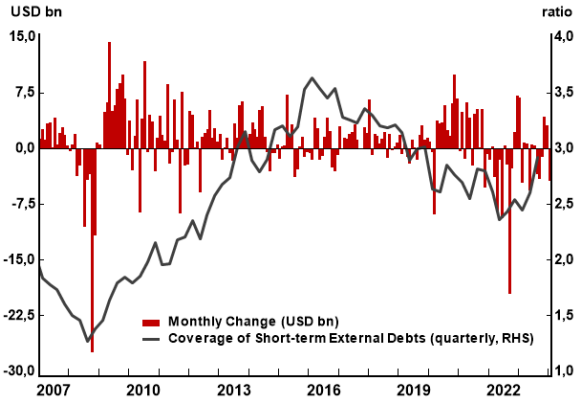
Source: Korea Customs Service; Ministry of Trade, Industry and Energy; Haver Analytics

Figure 11. Financial Account Balance



Source: BOK; Haver Analytics;

Figure 12. Foreign Exchange Reserves and Coverage of Short-term External Debt



Source: BOK; Haver Analytics

A.3 Monetary Conditions and the Financial Sector

6. Financial markets remained volatile in 2023 amid tight financial conditions reflecting both domestic and external factors. Yields of short-term money market instruments and spreads of AA-rated short-term corporate bonds over Treasury bonds broadly returned to normal after a sharp rise in late 2022 (Figure 13).[6] Government bond yield curves shifted downward year to date, but more in the medium and long-term tenors as markets started to price in policy rate cuts in 2024. The Korea Composite Stock Price Index (KOSPI) equity index exhibited large volatilities, reflecting a confluence of factors such as a shift in market expectations over the monetary policy paths of the U.S. Federal Reserve and the BOK, swings in manufacturing exports, and changes in economic developments at home and abroad. The Korean won weakened by 1.7 percent against the U.S. dollar at the end of 2023 compared with one year ago and reached KRW1,288 per USD,[7] mainly reflecting U.S. dollar

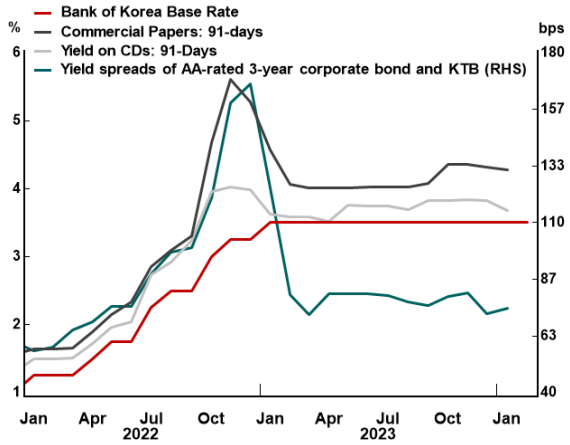
[6] In October and November 2022, the default of the Legoland Korea developer worsened market sentiment and triggered a temporary liquidity shortage. Concerted efforts from the authorities helped contain the risk premium and stabilize the markets.

[7] The real effective exchange rate (REER) depreciated by 0.6 percent in 2023, based on the J.P. Morgan REER index deflated by CPI.

strength following the Fed's interest rate hikes, weaker economic performance, spillovers from the depreciation of key regional currencies, and Korean investment in overseas markets (Figure 14).

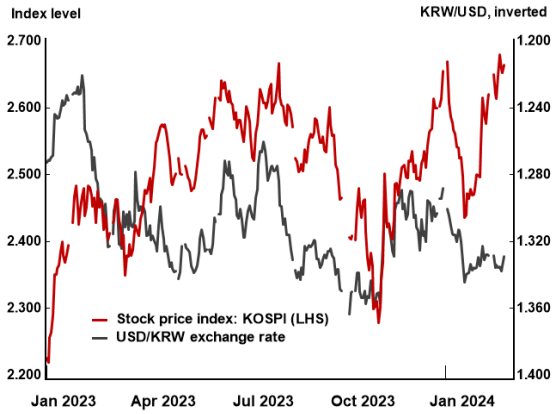
7. The BOK has maintained its restrictive policy stance given that inflation remains high. The central bank has kept the base rate unchanged nine times in a row at 3.5 percent since February 2023 after delivering seven consecutive rate hikes from April 2022 to January 2023. Concerns over U.S. dollar strength amid the Fed's hawkish stance, the still high level of inflation, and a rebound in household debt, prompted the BOK to maintain its current tight policy stance. At the same time, the central bank has remained prudent and data-dependent amid heightened uncertainties over economic conditions and monetary policy in major countries and global geopolitics.

Figure 13. Key Policy and Market Interest Rates



Source: BOK; Haver Analytics

Figure 14. USD/KRW Exchange Rate and Equity



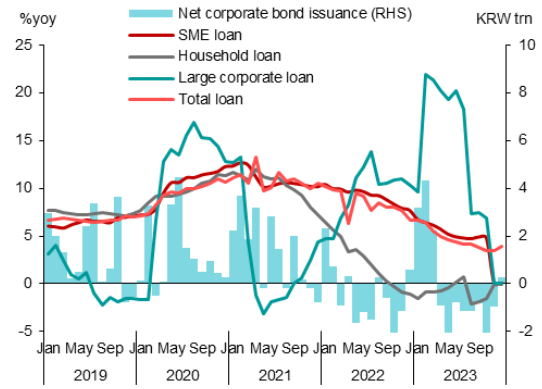
Source: Korea Stock Exchange; BOK; Haver Analytics

8. The BOK reformed its standing lending facilities to provide a stronger liquidity backstop to banks. The reform was undertaken as a lesson from the U.S. regional bank stress in March 2023, which witnessed massive and rapid deposit withdrawals facilitated by financial digitalization and the quick spread of news and rumours through social media. The BOK lowered lending rates for liquidity adjustment loans, a regular lending facility available to banks, from 100 to 50 basis points above the base rate. In addition, the range of collateral eligible for liquidity adjustment loans was expanded to include bank debentures, municipal bonds, prime corporate bonds, and bonds issued by public institutions, with the BOK considering options to accept loan receivables as eligible collateral in the future. Furthermore, the central bank unveiled guidelines for the provision of emergency liquidity that would allow liquidity lines to be extended to non-bank depository institutions in the event of an emergency.

9. Amid weak economic conditions and high interest rates, total loans from financial institutions have grown moderately while household debt has declined. Weakening economic conditions and high interest rates have weighed on loan demand. Total loans grew 3.5 percent (yoy) in October 2023, decelerating from 6.7 percent at the end of 2022 (Figure 15). The slowdown in loan growth was primarily led by loans to small and medium enterprises (SMEs) and self-proprietors, affected by policy rate hikes and uncertain economic conditions. In contrast, loans to large corporations have expanded significantly since the beginning of

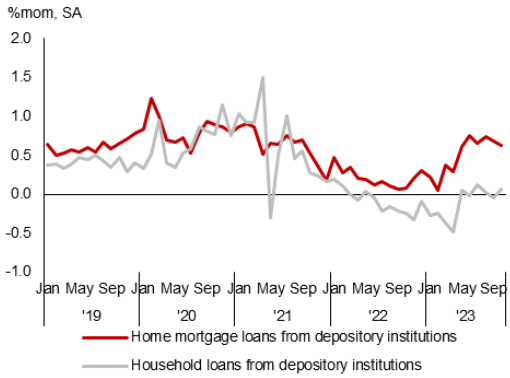
2023, as large companies shifted their fundraising from the markets to bank borrowing in response to a loss of investor confidence in the corporate bond market and rising market rates, especially after the Legoland developer's default in late 2022. Meanwhile, after deleveraging from March 2022 to April 2023, household loans expanded again in May 2023, led by housing loans (Figure 16). The housing market has recovered gradually, as evidenced by a pick-up of housing transactions and housing loan growth, partly owing to swift policy responses[8] to prevent the market plunge. However, the higher debt servicing burden of households has led to a persistent contraction of other consumer loans.

Figure 15. Credit Growth



Source: BOK; AMRO staff calculations

Figure 16. Household Loan Growth



Source: BOK; AMRO staff calculations

10. The debt servicing capability of vulnerable borrowers and the loan quality of non-bank financial institutions have weakened. With the increase in interest burdens, borrowers' debt-servicing capability remained weak in 2023. The share of firms with an interest coverage ratio of less than one remains elevated across all sectors and sizes[9] (Figure 17). Borrowers with weaker creditworthiness and vulnerable households are facing stricter credit standards, compared with the past, and a diminished ability to repay debt. The average delinquency ratio of commercial banks increased slightly to 0.4 percent at the end of October 2023 from 0.2 percent at the same period of last year. The delinquency ratio of loans to SMEs reached 0.6 percent at the end of October 2023, surpassing other loan categories. In particular, mutual savings banks and credit unions, which focus on borrowers with weaker creditworthiness, experienced a rapid increase in the non-performing loan (substandard-and-below loan) ratio to 5.9 percent and 3.9 percent, respectively, as of end-September 2023,

[8] As a part of this policy goal, macroprudential measures were normalized and a new 50-year mortgage loan, called the special Bogeumjari loan, was implemented.

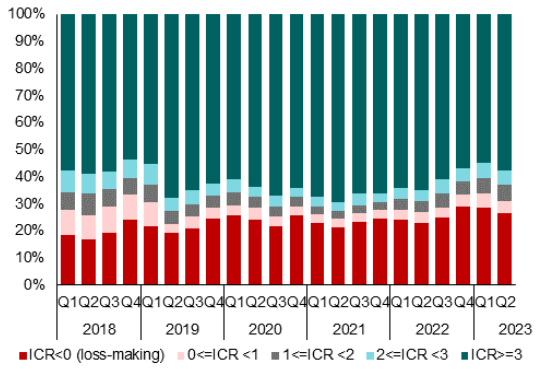
- Regulatory authorities have gradually eased housing-related measures since the last quarter of 2022. In 2023, loan-to-value (LTV) ratios applying to mortgages for home purchases in speculative areas, home purchases by rental business operators and housing brokers, increased to 30 percent from 0 percent. Additionally, the cap of KRW600 million on home mortgages applying to lower-income households and non-speculative homebuyers, was lifted. The cap of KRW200 million per year for using home mortgages to cover other expenses was also removed.
- Tightening monetary policy has increased the interest burdens of low-income and non-speculative homebuyers. In this regard, in January 2023, Korea's Financial Services Commission introduced the new mortgage program known as the Bogeumjari Loan, which provided fixed interest rates lower than market rates, a longer maturity of up to 50 years, an LTV ratio of 70-80 percent, a debt-to-income ratio of up to 60 percent, and an exemption of the debt service ratio. Such loans are offered by large commercial banks only. They were available until the end of January 2024.

[9] Using a more conservative threshold, in the first half of 2023, listed companies with an ICR less than 2 accounted for around 33.5 percent of total listed companies, rising from 26.5 percent in 2021 and 30.3 percent in 2022.

from 3.7 percent and 2.2 percent at end-2022, respectively, higher than other financial institutions.[10]

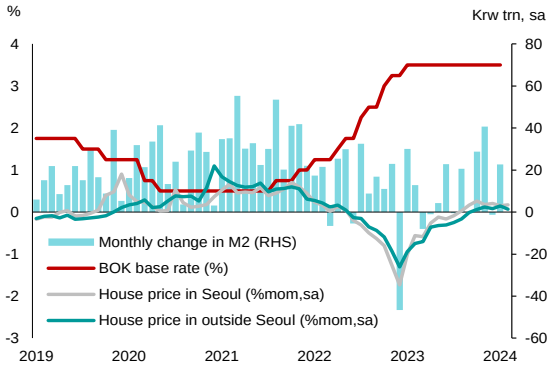
11. Overall, financial institutions have ample financial buffers, with commercial banks' profitability improving; however, non-bank financial intermediaries (NBFIs) are experiencing declining profitability associated with high interest rates. Higher interest rates and securities-related income have contributed to improving the profitability of commercial banks. Average returns on commercial banks' assets rose to 0.7 percent at the end of September 2023 marginally from 0.6 percent in H2 2022. As of the end of Q2 2023, commercial banks maintained a capital adequacy ratio (CAR) of 18.1 percent, with the tier-1 ratio at 16.0 percent.[11] Loan loss provision of commercial banks was also set aside at a high level of 223.8 percent of sub-standard and below loans.[12] Their liquidity buffers also remain adequate to cover sudden deposit withdrawals, with liquidity coverage ratios and net stable funding ratios both exceeding 100 percent. In contrast, increasing loan impairments and declining net interest margins continued to dampen the profitability of NBFIs, given that NBFI borrowers tended to be more vulnerable to high interest rates.[13] That said, despite declining profitability and weakening loan quality, the CARs of NBFIs have in general remained well above statutory minimums, and loan-loss provisions are sufficient to cover expected loan losses.

Figure 17. Interest Coverage Ratio of Listed Companies



Source: Listed companies' financial statements; AMRO staff compilation and estimates

Figure 18. Housing Prices



Source: Korea Real Estate Board; BOK; AMRO staff calculation

[10] The average substandard and below (SBL) loan ratio of domestic commercial banks rose to 0.29 percent in June 2023 from 0.25 percent at end-2022. Meanwhile, the SBL of mutual saving banks increased to 5.6 percent in June 2023 from 4.1 percent at end-2022. The SBL of credit card companies and leasing companies reached 1.1 percent and 2.1 percent in June 2023 from 0.9 percent and 1.5 percent at end-2022, respectively.

[11] Commercial banks in this context comprise national banks, regional banks, and internet-only banks. Average CAR of specialized banks, regional banks, and mutual saving banks were 15.2 percent, 16.1 percent, and 14.1 percent, respectively, as at the end of Q2 2023.

[12] Loan-loss provision of regional banks and specialized banks registered at 193.5 percent and 228.6 percent of sub-standard and below loans, respectively, at the end of Q2 2023.

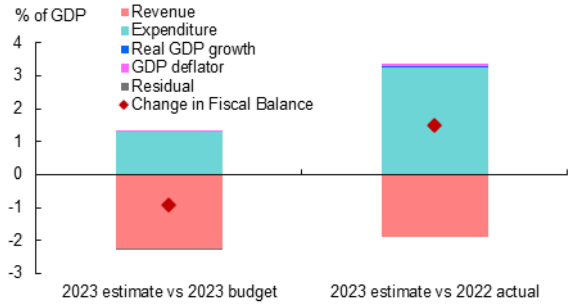
[13] NBFIs are more exposed to vulnerable borrowers who have low creditworthiness and low income and have been hit harder by heavier debt burdens amid higher interest rates. In addition, NBFIs do not have much market power and can therefore suffer shrinking net interest margins amid higher interest rates.

12. The housing market has been recovering, with a diminishing risk of a hard landing. The property market has been in a downturn since mid-2022 (Figure 18), driven by tightening financial conditions and moderation in overall economic activity. More recently, market activity has revived after the reclassification of speculative area zoning, easing macroprudential measures, the introduction of the special Bogeumjari loan, and the relaxation of comprehensive real estate taxation. Homebuyer sentiment and housing demand have gradually improved, leading to higher transaction volumes, especially in Seoul, and smaller declines in housing prices and *Jeonse* (leasehold) rents since January 2023 *(Selected Issue 1: Affordability and Determinants of Korean Housing Prices)*. A decrease in new housing supplies, compounded by the recent increase in housing demand, led to a decline in unsold units during Mach to November 2023. Unlike Seoul, the housing market in other regions will take longer to recover from the downturn.

A.4 Fiscal Sector

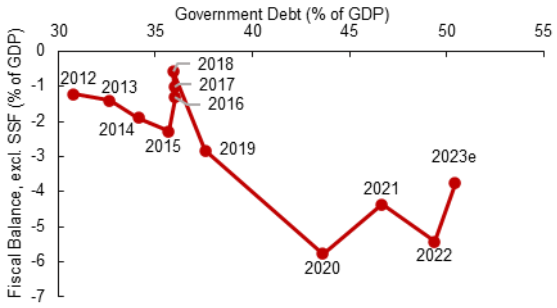
13. The fiscal position in 2023 improved, albeit less than planned due to a sizable revenue shortfall. Fiscal revenue is estimated to have fallen by 6.9 percent in 2023. In particular, income taxes dropped substantially, owing to weak business performance and property market conditions, while value-added tax (VAT) and customs duty also decreased in tandem with the contraction of imports. The revenue shortfall relative to the budget is estimated to be 2.3 percent of GDP. Meanwhile, fiscal spending also declined by 10.8 percent, largely due to the withdrawal of pandemic-related support and a reduction in mandatory transfers to local governments and education.[14] Expenditure in 2023 is estimated to have fallen short of the budget by 1.3 percent of GDP. The fiscal deficit in 2023, excluding social security funds (SSFs), is estimated at 3.8 percent of GDP, higher than the budgeted 2.6 percent but lower than the 5.4 percent in 2022 (Figure 19).[15] Government debt is estimated to have increased to 50.4 percent of GDP in 2023 from 49.4 percent in 2022 (Figure 20).

Figure 19. Decomposition of Change in Fiscal Balance



Source: Ministry of Economy and Finance; AMRO staff estimates

Figure 20. Fiscal Balance and Government Debt



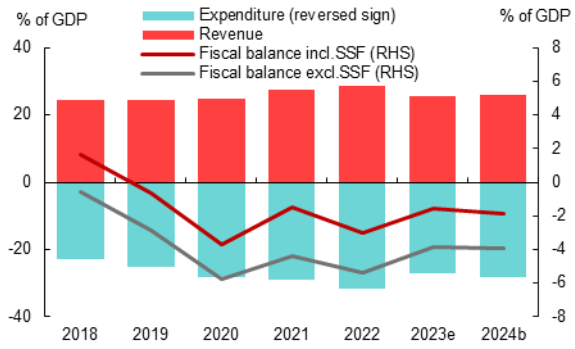
Source: Ministry of Economy and Finance; AMRO staff estimates
Note: "e" stands for AMRO estimates.

[14] The reduction of transfer to local government and education was KRW18.6 trillion, given the domestic tax revenue, which is the basis for determining transfers to local governments and education, fell short of the budget. Budget underutilization in 2023 amounted to KRW10.8 trillion in 2023.

[15] The 2023 fiscal deficit, including SSFs, is estimated at 1.6 percent of GDP, higher than the budgeted 0.6 percent but lower than the 3.0 percent recorded in 2022.

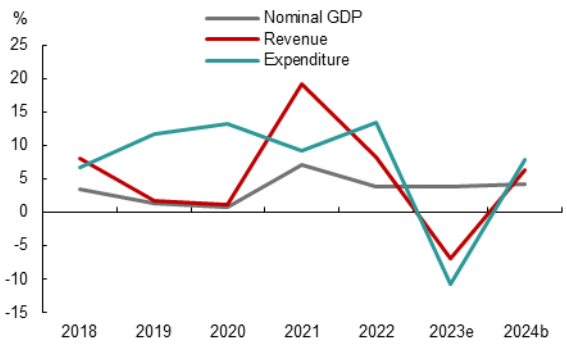
14. The 2024 budget focuses on restructuring existing spending programs and reallocating public resources toward national priorities for prudent fiscal policy while maintaining the broadly neutral fiscal stance. The budgeted fiscal deficit is set at 3.9 percent of GDP in 2024, similar to 2023 (Figure 21).[16] Revenue is expected to grow by 6.6 percent, led by personal income tax (PIT) and VAT revenues, while corporate income tax (CIT) revenue is expected to decline slightly due to lagging business performance in 2023. Expenditure is planned to increase by 7.7 percent in 2024, primarily due to higher mandatory spending (Figure 22). The government conducted a comprehensive restructuring of all existing budget programs and reallocated resources to support key policy priorities – strengthening welfare for the vulnerable, investing in future growth engines, creating high-quality jobs, and supporting the essential roles and functions of the country.[17] The fiscal stance in 2024 is assessed to be broadly neutral.[18]

Figure 21. Fiscal Balance



Source: Ministry of Economy and Finance; AMRO staff estimates
Noted: "e" stands for AMRO estimates and "b" represents the budget.

Figure 22. Revenue and Expenditure Growth



Source: Ministry of Economy and Finance; AMRO staff estimates

15. Over the medium term, the National Fiscal Management Plan (NFMP) 2023–2027 envisages fiscal consolidation, albeit at a slower pace relative to the previous NFMP 2022-2026. The fiscal deficit is set to decrease to below 3 percent of GDP in 2025 and gradually approach the mid-2 percent range of GDP by 2027, adhering to the fiscal deficit ceiling of proposed fiscal rules. However, improvement of the fiscal balance is expected to be delayed compared with the previous NFMP 2022-2026, mainly due to a downward revision of revenue forecast (Figure 23). Consequently, the government debt-to-GDP ratio is projected to shift upward slightly, although it will remain within the mid-50 percent range throughout the projection period (Figure 24).[19]

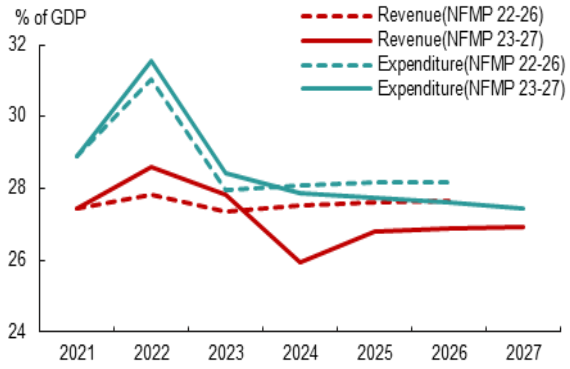
[16] Comparison of the 2024 budget with the 2023 budget provides different aspects of budgetary position due to sizable differences between the budget and the estimated outturn in 2023. Compared with the 2023 budget, the fiscal deficit is expected to increase from 2.6 percent of GDP in 2023 to 3.9 percent in 2024. Revenue is projected to decrease by 2.2 percent, while expenditure is planned to increase only by 2.8 percent.

[17] The government restructured all budget programs on a zero basis and saved KRW24 trillion for the 2023 budget and KRW23 trillion for the 2024 budget, according to MOEF.

[18] AMRO assesses the fiscal stance by fiscal impulse, measured by changes in the structural primary balance.

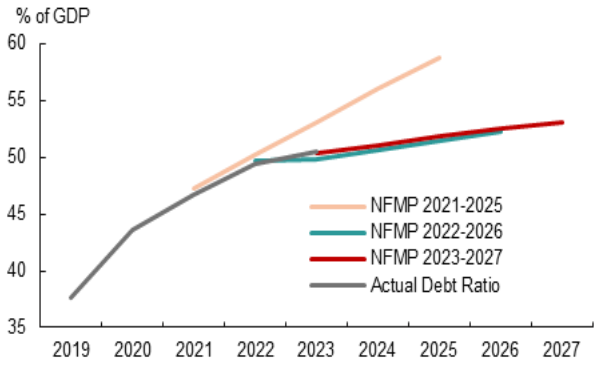
[19] Despite the widened fiscal deficit in the projection period, the increase in debt ratio is relatively moderate because the government utilizes the public fund reserves, including the repayment of the debt outstanding of the Foreign Exchange Stabilization Fund.

Figure 23. Revenue and Expenditure Projections in NFMP



Source: Ministry of Economy and Finance
Note: Revenue and expenditure in 2023 are based on the budget.

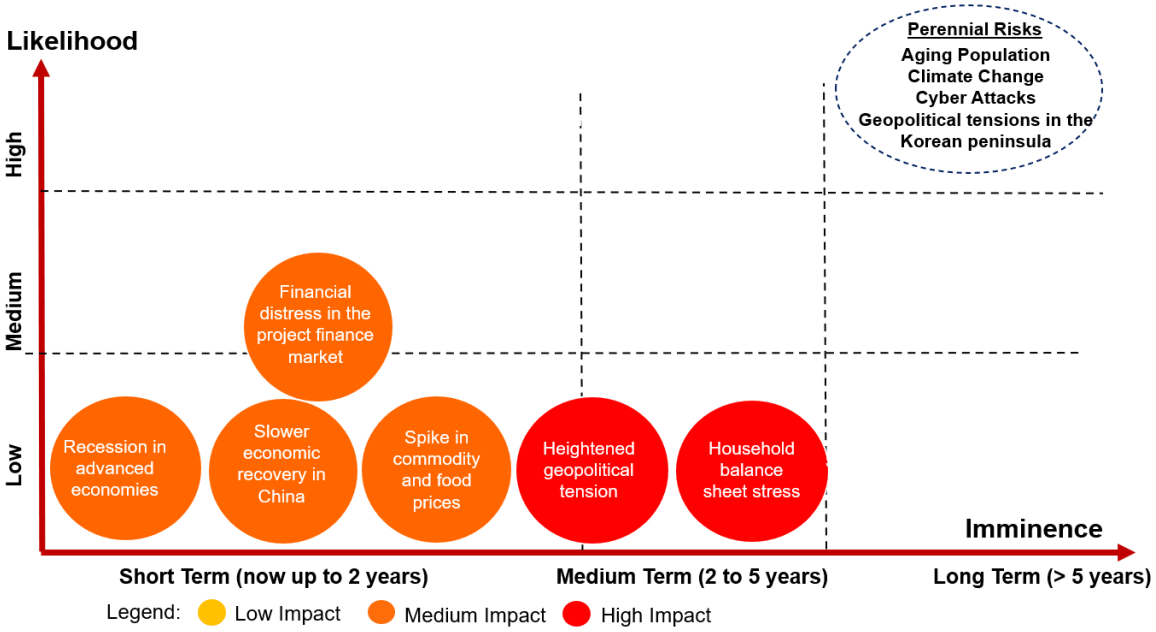
Figure 24. Government Debt Projections in NFMP



Source: Ministry of Economy and Finance

B. Risks, Vulnerabilities and Challenges

Risk Map: Korea



Source: AMRO staff

B.1 Near-term Risks to Economic Outlook

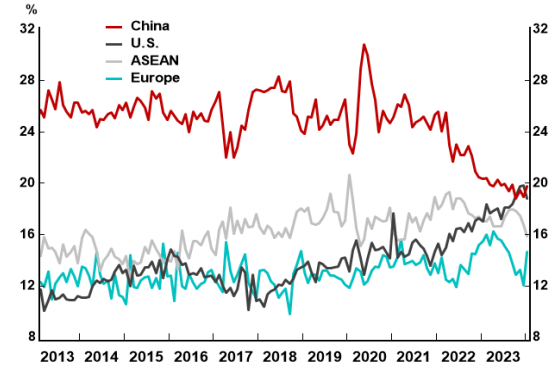
16. The near-term economic outlook remains highly uncertain. Key near-term risk factors include high inflation leading to interest rates being higher for longer; weakening external demand arising from economic recession in the U.S. and Europe and limited spillover effects from China's economic recovery; and financial distress in the project financing market.

17. Inflation could turn out to be more stubborn than expected, leading to policy rates being higher for longer. Global commodity prices could continue to increase due to voluntary supply cuts and escalations in geopolitical tensions, although demand weakness from major

economies and recent global disinflation may be downside factors. Domestically, inflation expectations have not fallen as much as headline inflation, as wage pressure could follow suit with a lag, although such a risk remains low given the modest nominal wage growth in the past quarters. If upside risks to inflation materialize, this could prompt the BOK to either intensify or maintain its restrictive monetary policy stance for an extended period. Externally, the higher-for-longer policy rates of major global central banks, particularly the Fed, could add pressure on the BOK to further tighten its monetary policy.

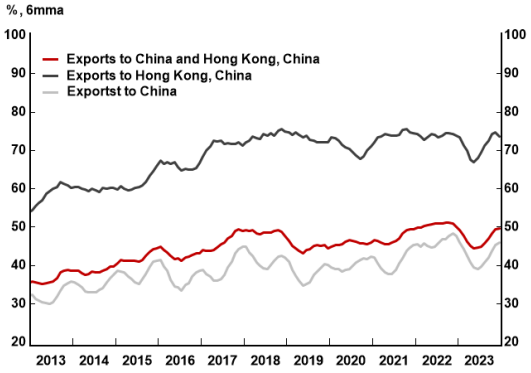
18. Economic recession in major advanced economies and a weaker-than-expected recovery in China could hinder the recovery momentum of semiconductor and information technology (IT) exports in Korea (Figure 25)**.** Korean semiconductor and IT exports are well positioned for a cyclical upturn, however, the recovery is subject to uncertainties arising from the strength of external demand in major advanced economies and China. In particular, the boost from China's economic reopening to Korean exports has been weaker than expected. About half of Korean exports to China (including Hong Kong, China) consist of manufactured semiconductors and other IT goods (Figure 26). China's service-led economic reopening and faltering economic momentum have weakened demand for Korea's intermediate goods.

Figure 25. Share of Korea's Exports by Destination



Source: Korea Customs Service; Haver Analytics

Figure 26. Electrical Machinery and Equipment Exports to China and Hong Kong, China



Source: Korea Customs Service; Haver Analytics

19. Although the housing market has shown signs of stabilization, real estate project financing could remain major pressure points for financial stability and a drag on construction investment.

- The possibility of project finance (PF) distress remains an area of concern due to the continuing housing market correction, uneven recovery of housing demand, and high financial burdens borne by construction firms. While interest rates are no longer rising, they remain elevated, and creditors are encouraged to restructure loans to construction firms to mitigate the risk of real estate PF insolvency. However, some non-bank depository institutions and construction companies still face tight liquidity conditions. A surge in the delinquency ratio associated with PF loans triggered deposit runs at Saemaeul Credit Unions in July 2023, and caused Taeyoung Engineering & Construction to file for debt workout in December 2023.

- Real estate-related PF and structured products could exacerbate vulnerability and heighten risk transmission in the financial system. The sources and use of funds of PF still contain significant maturity mismatch. Asset-backed commercial papers (ABCPs), purchased by institutional investors and NBFIs, may also transmit credit risks from real estate PF distress across the financial system.
- In addition, construction investment has weakened and recorded a negative year-on-year growth in Q4 2023. If distress in project financing intensifies, this would further hinder construction orders and housing starts.

B.2 Medium-term Challenges and Vulnerabilities

20. In the short to medium term, geopolitical tensions could intensify, leading to disruptions in manufacturing activities and weakening investment sentiment. Supply chain disruptions due to geopolitical tensions, including the ongoing conflicts in Ukraine and the Middle East, could disrupt global supply of oil and critical raw material inputs, and hurt Korea's manufacturing sector[20] .[21] Semiconductor-related restrictions between the U.S. and China continue to cloud prospects for Korea's memory chip supply chain, although export restrictions imposed by the U.S. on semiconductor shipments to China were lifted recently.[22] That said, Korea could benefit to some extent from trade diversion amid the U.S.-China trade tensions as Korea remains a key node in the extensive web of global semiconductor industry *(Selected Issue 2: Korea's Semiconductor Industry: Enhancing Resilience and Preparing for the Future)* and as multinational companies search for alternative sources of production and imports. In addition, weakening investor confidence due to geopolitical events could adversely affect the valuations of Korean assets, such as equities and bonds, which have traditionally been more susceptible to shifts in global risk sentiment.

21. Weak economic conditions and high interest rates have raised the debt service burden, thereby exacerbating credit risks in Korea's financial system over the medium term amid high household and growing corporate debt. The debt-servicing ability of borrowers has weakened, particularly among vulnerable groups such as SMEs, small merchants and low-income households. Delinquent loans from both banks and NBFIs have increased steadily across all borrower groups, with housing loans, unsecured household loans and NBFI loans recording the fastest growth. Looking ahead, if the economic situation were to worsen more than expected and interest rates remained high, the loan quality of financial institutions would likely further deteriorate. However, this weakening loan quality is not expected to pose a systemic risk to Korea's financial system, given that banks and NBFIs are

[20] As an example, a potential risk to Korea exists in semiconductor production if imports of critical gases and palladium, mostly from Russia, are disrupted.

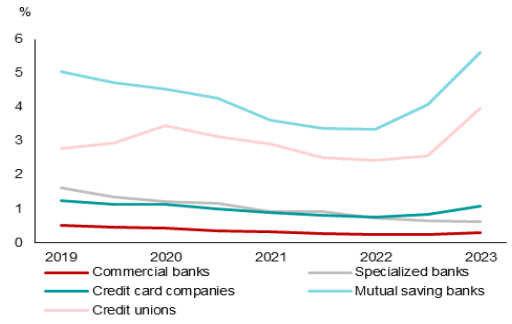
[21] Korea depends on imports to meet most of its energy needs. In particular, about 67 percent of its crude oil and 37 percent of its total gas are imported from the Middle East.

[22] In October 2023, the U.S. government announced to indefinitely suspend restrictions on exporting U.S.-made chip equipment for Samsung Electronics and SK Hynix factories in China after a one-year waiver for such restrictions expired. In October 2022, the U.S government issued a set of export controls to curb China's access to advanced chips and chip-making tools. These measures included adding new license requirements for certain items destined to semiconductor fabrication facilities in China that produce certain advanced chips.

well capitalized and have set aside ample loan-loss provisions.[23] Additionally, most bank borrowers belong to medium-to-high income households with sufficient savings and financial assets. Nonetheless, there remain pockets of risk among low-income households and SMEs, who have lower creditworthiness and are NBFIs' main borrowers (Figure 27).

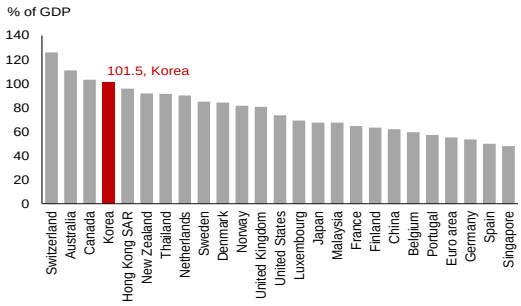
22. The high household debt continues to pose a vulnerability in the financial system. Amid the high interest rate environment, Korean households have been deleveraging, as indicated by household loans which were flat from Q4 2022 to Q2 2023. Household loans picked up again in May 2023, alongside an increase in housing prices and transactions. In terms of indebtedness, the size of household debt remains higher than 100 percent of GDP (Figure 28), although the household debt to GDP ratio is expected to decline to 100.8 percent in 2023 from 104.5 percent in 2022 partly attributed to continually tight macroprudential measures[24] and the government's responses to housing market conditions. Household debt was high at 160. 2 percent of household disposable income in Q3 2023. In addition, despite the government's efforts to promote conversion of housing loans from floating rates to fixed rates, about 58.6 percent of residential mortgage loans[25] are still under floating-rate packages at end-2023. This leaves households vulnerable to higher interest rates.

Figure 27. Sub-standard and Below Loan Ratio of Each Financial Institution Type



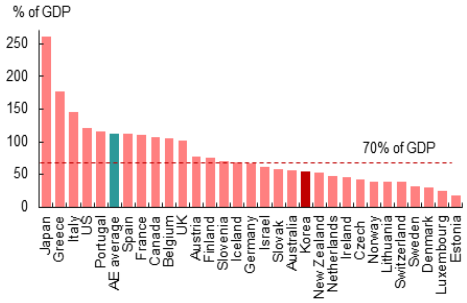
Source: Financial Supervisory Service

Figure 28. Household Debt to GDP Ratio



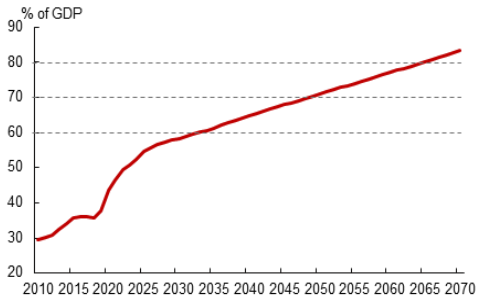
Source: Bank for International Settlements

Figure 29. General Government Debt-to-GDP ratio



Source: International Monetary Fund
Note: General government debt is as of end-2022.

Figure 30. Government Debt Projection



Source: AMRO staff estimates
Note: Fiscal deficit is assumed to remain at 2.5 percent of GDP. Macroeconomic variables are based on AMRO staff's assumptions.

[23] As of the end of Q2 2023, the average CAR of commercial banks was 18.1 percent, with the tier-1 ratio at 16.0 percent. The average CAR of specialized banks, regional banks and mutual saving banks were 15.2 percent, 16.1 percent and 14.1 percent, respectively. Loan-loss provision to SBL ratios of commercial banks, regional banks and specialized banks registered at 223.8 percent, 193.5 percent and 228.6 percent, respectively.

[24] 50 percent loan-to-value limit for new residential mortgages and 40 percent debt service coverage ratio for personal loans.

[25] Based on data from Ministry of Economy and Finance.

23. In the long term, the substantial increase and upward trend in government debt raise concerns about fiscal sustainability. Over the past five years from 2019 to 2023, government debt has surged by 12.8 percentage points of GDP to 50.4 percent of GDP, and is projected to continue rising over the medium term, reaching the mid-50s percent range by 2028. While the debt ratio remains lower than the average of advanced economies and the indicative threshold of 70 percent set by the IMF, its persistent upward trajectory is worrisome (Figure 29). With the fiscal deficit remaining at mid-2 percent of GDP, assuming no further fiscal adjustments after 2028, the debt ratio will continue to rise, eventually surpassing 70 percent within the next 30 years (Figure 30).[26] Moreover, fiscal needs related to social protection and health care amid rapid population aging are likely to impose additional pressure on fiscal sustainability.

24. Rapid population aging will weigh on economic growth potential, other things being equal. Total birth and fertility rates fell to record lows in 2022. Only 249,000 babies were born in 2022, 11,000 fewer than the previous year**.** The fertility rate dropped to 0.78 in 2022, among the world's lowest and much lower than the replacement level of 2.1 that would be needed to keep its population stable. According to Statistics Korea, the population is projected to fall from 51.7 million in 2022 to 50.1 million in 2040 and then further to 36.2 million by 2072 due to its very low birth rates, while those aged 65 and above are set to account for 47.7 percent of the total population by 2072 compared with 17.4 percent in 2022. The aging labor force will continue to be a drag on potential growth.

Authorities' Views

25. Authorities are in broad agreement with the AMRO mission's assessment of the economic outlook and risks. The negative output gap is expected to narrow in 2024 as the economy rebounds. The consumer price inflation will likely continue its slowing trend as demand-side pressure weakens and cost pressure gradually decreases. The drop in manufacturing employment is easing due to global and domestic economic recovery, while labor supply centered on women and the elderly continues to rise. The government plans to foster a soft landing of real estate PF through proactive liquidity injection, orderly restructuring of underperforming projects, and fundamental reforms. In addition, the government aims to keep the household-debt to-GDP ratio within 100 percent.

C. Policy Discussions and Recommendations

C.1 Calibrating Monetary Policy in a Volatile Environment

26. While the current restrictive monetary policy stance should remain until inflation stabilizes durably at the BOK's target of 2.0 percent, the conduct of monetary policy

[26] In order to stabilize the debt ratio at the 2028 level, the fiscal deficit should be reduced by at least 0.5 percent of GDP in 2029, and by another 0.5 percent of GDP by 2039.

should continue to be data dependent, hinging on the pace of disinflation. As the inflation rate is expected to exceed the target for a considerable time in baseline forecasts, the BOK should maintain its tight monetary policy stance for the time being. At the same time, it should exercise more vigilance and stand ready to recalibrate monetary policy given the uncertainties in the environment. In this context, the BOK should closely evaluate the transmission of rate hikes and monitor uncertainties surrounding the policy rate path, including the pace of disinflation, economic downside risks, monetary policy in major countries, and hidden risks in real estate PF and NBFIs. Equally important is the greater role that macroprudential policy measures should play in containing financial risks from housing and household debt to allow monetary policy to focus on its primary inflation objective.

27. The AMRO mission welcomes the revamp of the BOK's lending facilities to further safeguard financial market stability by strengthening the central bank's role as the liquidity backstop for depositary institutions. As financial digitalization gains momentum and credit provisions from non-bank depository institutions increase, it is more crucial than ever to address the risk of temporary liquidity shortages at both bank and non-bank depositary institutions that may be triggered by massive deposit withdrawals over a very short time. In particular, preemptively reinforcing the readiness and accessibility of the liquidity backstop can help calm down market anxiety in the event of an emergency, thereby avoiding spillovers to other financial institutions and maintaining orderly market functioning, even if the lending facilities are not actually tapped into. As for non-bank depository institutions, more careful consideration should be given to striking a balance between having sufficient safety measures and triggering side effects such as moral hazards and excessive risk-taking. To this end, authorities may need to strengthen the regulatory, supervisory and risk management framework for non-bank depository institutions. Moreover, information and data sharing among the central bank and other financial supervisory authorities should be further strengthened, including by holding joint inspection, to ensure that the BOK is sufficiently aware of the status of non-bank depository institutions prior to making any swift decision on liquidity support.

Authorities' Views

28. The authorities are cognizant of moral hazard issues that could arise from extending liquidity lines to non-bank depository institutions, and have sufficient tools to mitigate such concerns. First, the interest rate for the lending facility is set at a higher level than the prevailing market interest rate. Second, collateral held by non-bank depository institutions that is used for borrowing is adequate, given the expanded list of eligible collateral. As the BOK does not have supervisory power over non-bank depository institutions, it will continue to strengthen cooperation with other authorities, particularly financial supervisors, to enhance oversight of non-bank depository institutions and step up information sharing.

C.2 Safeguarding Financial Stability amid High Interest Rates

29. The authorities' credit support measures could help SMEs and sole proprietors weather the economic downturn amid generally tight financial conditions.[27] In January 2023, the government rolled out several measures to be implemented to alleviate the financial burdens of SMEs. These measures include KRW23 trillion in loans with fixed low interest rates for SMEs, KRW52 trillion in loans for innovative and venture companies, a special loan restructuring program worth KRW9 trillion, and microfinance loans with a special employment program to support low-income households and SMEs. It is worth emphasizing that these credit support measures should be temporary and targeted at viable SME borrowers, while focusing on growth-enhancing sectors such as innovative companies and start-ups seeking formal financing during the early stages of their businesses.

30. Macroprudential measures have been adequately tight in recent years and going forward, should be finetuned to be commensurate with the developments of housing market, while additional policies can be considered to contain household indebtedness.

a. The AMRO mission acknowledges the authorities' need to tighten housing market regulations to curb speculation during 2017-2021. However, restrictive measures, including prohibitive LTV ratios in some regions, a low debt-to-income ratio and comprehensive housing taxes, applied simultaneously to homebuying in speculative areas, impeded real home demand and caused speculative behaviors to spread to other areas. The mission supports the ongoing normalization of real estate-related policies and macroprudential measures to stabilize housing market conditions through market mechanisms. Looking ahead, to ensure macroprudential measures would target speculative demand while protecting real housing demand, policymakers should use indicators of underlying demand, such as a buyer's age, the number of properties they own, marital status and even the proximity of their parents 'residence, to calibrate appropriate policy measures, so as not to unintentionally jeopardize the legitimate real demand of housing.

b. In light of the high household debt and the continued rise in its delinquency rate, the AMRO mission commends the authorities for swiftly tightening eligibility for the special Bogeumjari loan and strengthening their monitoring of financial institutions' compliance. While such a long-term mortgage loan can improve eligibility for further financing and help low-income households own a home, its extended maturity may lead to an unsustainable debt burden for households after their retirement. Looking ahead, any additional housing support measures should be strictly targeted at non-speculative and low-income buyers.

c. The AMRO mission supports the authorities' efforts to reduce costs associated with switching between fixed-rate and floating-rate mortgages for an apartment purchase. Decreasing transaction costs will provide households more flexibility in selecting

[27] The measures also aim at fostering new growth engines to strengthen Korea's potential growth in the long term.

borrowing terms, taking into account the prevailing interest rate environment and their debt servicing capacity at that particular moment. It is worth considering extending this scheme to *Jeonse* loans (loans for *Jeonse* deposit) as borrowers are more vulnerable to a change in interest rates.

d. Lump-sum payment known as a *Jeonse* deposit in *Jeonse* contracts is, by nature, a form of household debt and can affect household debt servicing; however, recent financial difficulties among *Jeonse* landlords also highlight the need for strengthening regulatory oversight of the *Jeonse* market and regulations on landlords 'leverage.

31. With the stabilization of money markets, it is essential to unwind the temporary regulatory support to strengthen financial institutions' buffers and restore market functioning. Since the short-term corporate bond and commercial paper markets have stabilized, resulting in a decline in yields, it is appropriate to normalize the temporary relaxation of regulations related to financial institutions' liquidity management, including the liquidity coverage ratio. Furthermore, the AMRO mission commends the authorities for encouraging the conversion of short-term PF-ABCPs into longer-term loans to address maturity mismatches. Looking ahead, in addition to adjusting risk weights that are applied to exposures in real estate PF, it is worth considering stronger regulations regarding the maturity transformation of real estate-related structured products, to prevent a recurrence of excessive reliance on short-term wholesale funding for long-term obligations. The mission acknowledges a need for the authorities to extend the market stabilization programs, including the PF-ABCP purchase program, until February 2024 due to uncertainties in the domestic and international financial markets. These measures should be withdrawn gradually to allow an orderly normalization of money market conditions.

C.3 Ensuring Fiscal Sustainability

32. Continued fiscal consolidation in line with economic recovery is deemed appropriate. The AMRO mission commends the authorities on their policy efforts to prudently address growing spending needs with a view to meeting national priorities through budget restructuring and reallocation. Nevertheless, given the lingering high expenditure as a share of GDP relative to pre-pandemic levels, the authorities should consider further normalization of supportive fiscal programs, coupled with revenue enhancement and mobilization. Meanwhile, should downside risks materialize, fiscal policy could be employed to render targeted support without compromising the fiscal consolidation path.

33. Over the medium to long term, ensuring fiscal sustainability is paramount. Given growing concerns about the persistent increase in debt-to-GDP ratio over the medium term, it is crucial for the government to articulate a comprehensive strategy and plan with a long-term perspective for achieving fiscal sustainability. A strong commitment to the plan, featuring a clear debt-to-GDP ratio target with specific reform measures and within a designated

timeline, will significantly enhance the credibility of fiscal policy, mitigating concerns about fiscal sustainability.

- First, establishing a government debt-to-GDP ratio target is essential as the ultimate anchor to guide overall fiscal policy. The specific target should be rigorously determined, taking into account internationally recognized risk thresholds as well as country-specific factors in Korea.[28] Subsequently, a fiscal consolidation path to attain the debt target should be outlined, accompanied by reform measures in both revenue and expenditure.
- Meeting the growing spending needs for sustainable and inclusive growth amid population aging requires a process of continuous review, restructuring and reallocation of spending programs to control expenditure at a manageable level. Decisions to expand social welfare programs, which are mandatory or difficult to reverse, should be accompanied by adequate revenue-enhancing measures to ensure a balanced fiscal approach. In addition, the rationale and formula for existing mandatory spending programs should be revisited and reformulated to factor in the evolving economic and demographic structure and serve new national priorities.[29]
- Regarding revenue reform measures, efforts to broaden tax bases should be prioritized in the near term. Rationalizing or streamlining tax exemptions and incentives should be accompanied by a strict review of their respective sunset clauses.[30] Tax exemptions and incentives should be made temporary and terminated once they have fulfilled their intended objectives. Efforts to collect taxes in arrears should also be strengthened to prevent tax evasion.[31] Over the medium to long term, new taxes could be discussed, such as a sin tax, carbon tax or virtual asset tax.[32]

34. In particular, the AMRO mission supports legislating a fiscal rule as an integral component of ensuring fiscal sustainability. Establishing a legally binding fiscal rule with steadfast commitment will help ensure fiscal sustainability, enhancing the accountability and independence of fiscal authorities. While the fiscal rule proposed by the government generally satisfies three key principles for an effective fiscal rule – simplicity, flexibility and enforceability

[28] For example, the source of debt has different implications on debt sustainability. As of end-2022, out of the government debt of 49.4 percent of GDP in 2022, deficit-financing debt was 31.6 percent of GDP and asset-related debt was 17.7 percent of GDP. Whether the local currency is reserve or non-reserve currency also has implications on sovereign risk, and debt sustainability risk. As of end-2021, the average general government debt ratio of non-reserve-currency advanced economies was 56.6 percent of GDP, while that of reserve-currency advanced economies was 92.3 percent, according to the National Assembly Budget Office (NABO).

[29] For example, the restructuring of mandatory transfers to local education in primary and secondary schools should be considered in light of the shrinking school-age population. Resources could then be strategically reallocated toward human resource development for advanced technologies and new industries.

[30] Out of 71 tax exemptions and incentives that reached their sunset deadlines at the end of 2023, 58 were extended, seven were redesigned and only six were terminated.

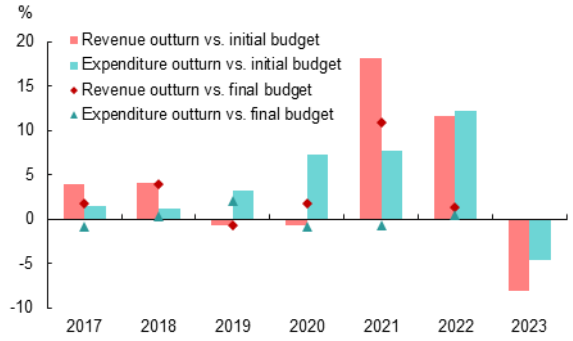
[31] Taxes in arrears amounted to KRW102.5 trillion (4.7 percent of GDP) as of 2022.

[32] Taxation on the transfer of virtual assets, which was set to take effect in January 2023, has been postponed to January 2025. Income tax on the transfer of virtual assets is calculated by deducting the transfer price (i.e., the money received for selling the relevant virtual asset) by the acquisition price (i.e., money spent for buying the relevant virtual asset) and any other incidental expenses, including transaction fees, and then applying the relevant income tax rate.

– it is recommended that the authorities regularly review its design and implementation to ensure effectiveness and responsiveness to changing economic and fiscal conditions. [33,34]

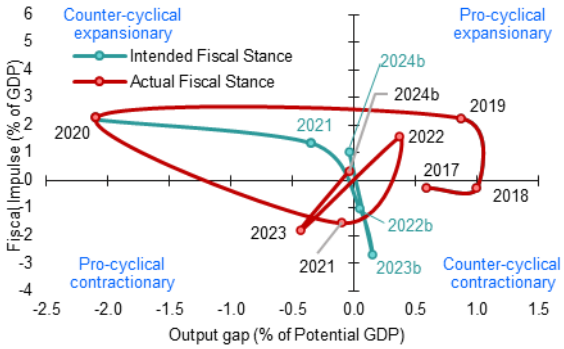
35. Enhancing credibility and predictability of fiscal management is the key to achieving the intended policy outcomes. Notable discrepancies between budgeted and actual revenues have persisted since 2021, leading to a deviation of the actual fiscal stance from the intended countercyclical fiscal stance (Figures 31, 32).[35] Making the fiscal projection as accurate as possible is crucial to ensure the intended policy outcomes in stabilizing the economy and implementing the planned spending programs. Precise fiscal planning, continuous monitoring and transparent communication also serve to enhance the credibility of fiscal policy and the predictability of economic agencies. As such, the government's announcement of revised tax revenue, coupled with policy measures to refine revenue projection, is welcome.[36] In particular, close collaboration with experts, including the NABO, could advance revenue projection models and facilitate the review and approval process at the National Assembly.

Figure 31. Difference between Budgeted and Actual Revenue and Expenditure



Source: Ministry of Economy and Finance; AMRO staff estimates

Figure 32. Fiscal Impulse and Output Gap



Source: Ministry of Economy and Finance; AMRO staff estimates
Note: Intended fiscal impulse and the output gap are computed based on the budgeted indicators, while actual fiscal impulse and the output gap are computed based on the actual outturns and estimates.

[33] The proposed fiscal rule sets the ceiling of the fiscal deficit excluding SSFs at 3 percent of GDP. If the government debt-to-GDP ratio exceeds 60 percent of GDP, the fiscal deficit ceiling is reduced to 2 percent of GDP. The fiscal deficit ceiling and implicit debt ceiling are simple to monitor and easy to communicate to the public. The proposed fiscal rule has escape clauses, with predetermined conditions same as those for the supplementary budget, providing fiscal policy with the flexibility to address economic difficulties. The fiscal rule is enforceable as the NABO, an independent entity from the government, can monitor its compliance during budgetary review. The correction mechanism after escaping from the rule is mandated and the detailed measures are under discussion to further ensure accountability and adherence to the fiscal rule.

[34] For a detailed discussion of the effective fiscal rule, see Eyraud, L., Debrun, M. X., Hodge, A., Lledo, V. D., and Pattillo, M. C. A. 2018. "Second-generation fiscal rules: balancing simplicity, flexibility, and enforceability." IMF Staff Discussion Note. International Monetary Fund, Washington DC.

[35] The initially planned fiscal stances in the budget have been countercyclical, reflecting the rollout of fiscal stimuli during the pandemic and subsequent normalization efforts. However, actual fiscal stances have turned out to be procyclical due to higher-than-expected revenue in 2021-2022 and lower-than-expected revenue in 2023.

[36] The Ministry of Economy and Finance plans to improve tax revenue projection by enhancing tax revenue forecast models for each tax item through a broadening of the participation of tax experts; seeking technical support from international organizations such as the IMF and OECD; and cooperating with the NABO.

Authorities' Views

36. The authorities are keen on maintaining fiscal sustainability, with the 2024 budget aimed at serving that goal. Despite the deteriorated tax revenue, the government will try to minimize increases in the fiscal deficit and debt by setting expenditure growth at 2.8 percent, which is the lowest since 2005, and through extensive fiscal normalization. The government intends to pursue long-term fiscal sustainability by legislating fiscal rules and preparing a pension reform based on national consensus.

C.4 Addressing Structural Issues to Revive Long-term Growth

37. Enhancing productivity, especially for the semiconductor industry, and addressing the shrinking population are pivotal to long-term growth. The AMRO mission welcomes the government's efforts and policy directions in supporting the semiconductor industry and enhancing supply chain resilience through increasing diversification in materials, parts and equipment while enhancing infrastructure development. Furthermore, the government should continue to foster innovation and boost human resource development through tax incentives and facilitating funding. Equally important, the declining population and low birth rates remain a huge challenge in the years ahead. As such, it is critical to continue to evaluate the performance of past and existing demographic policies, and restructure and rationalize fiscal incentives accordingly, to boost fertility.

38. In view of the rapidly aging population, public pension reform is one of the most urgent reform agendas to be completed. The National Pension Fund is expected to be depleted by 2055 following a projected shift to a financial deficit in 2041, driven by a sharp increase in pensioners and a decline in subscribers over time. The financial positions of special occupational pension funds are also expected to continue deteriorating.[37] On the other hand, income support for the elderly remains insufficient despite the expanded benefits of the Basic Pension.[38] To achieve a sustainable public pension system and adequate income support for the elderly, both structural and parametric pension reforms are essential. First, the parametric pension reforms should be completed as early as possible to avoid the need for sharper and more painful adjustments later. Second, the introduction of automatic adjustment mechanisms should be considered to ensure continuous and smooth adjustment of pension parameters in response to demographic and economic changes without repeatedly opening a social debate. Third, the structural reforms of the National Pension and Basic Pension, by clearly defining their respective roles, will enhance the effectiveness of the pension system in smoothing income over a lifetime and addressing old-age poverty *(Selected Issue 4. Policy Considerations for Public Pension Reforms in Korea).*

[37] According to the NABO, the Private Teachers Pension Fund (PTPF) is expected to be depleted in 2043. The deficits of the Government Officials Pension Fund (GOPF) and Military Personnel Pension Fund (MPPF) are also expected to increase over time.

[38] The Basic Pension was introduced in 2008 to support elderly who did not secure national pension entitlement or pay contributions for a sufficient period. Its benefit increased four times from KRW84,000 in 2008 to KRW323,000 in 2023.

39. As an economy reliant on fossil fuels, the government should persist with efforts to achieve carbon neutrality. The AMRO mission commends the government's adjusted plan, announced in April 2023, to maintain the target of carbon emissions at 40 percent below 2018 levels by 2030.[39] While the industrial sector will be required to cut emissions by 11.4 percent compared with the 14.5 percent set in late 2021,[40] the government plans to achieve the overall goal through a shift to nuclear power and renewable energy, as well as expansion of facilities for carbon capture, utilization and storage. Against this backdrop, the mission continues to recommend that the government periodically review its intermediate target, considering the past implementation of carbon emission reduction and technological readiness. Given that the transition to low carbon requires substantial investments in carbon-neutral projects, fiscal policy could catalyze the building of a social consensus and participation of the private sector. It is advisable to prioritize spending programs that support investments in carbon-reducing technologies and reinforce carbon-pricing mechanisms. Moreover, a more active use of environmental, social and governance (ESG) bond financing beyond policy banks is needed. In particular, the government should consider more issuances of green government bonds to provide a benchmark green curve for corporate green bonds, and continue to reduce funding costs and widen the eligible corporate pool for private-sector green bond issuances *(Box A: Further Developing Green Bond Financing*).

Box A. Further Developing Green Bond Financing[41]

Attaining the goal of carbon neutrality is challenging for Korea. The fossil fuel dependence rate in Korea is high at 64 percent as of 2021, while the proportion of renewable energy level is low at only 7.0 percent compared with the range of 20 to 40 percent in the U.S., Germany and Japan[42]. In addition, the share of carbon-intensive sectors, such as oil refining, chemicals and steel, is also higher than in the U.S., Germany and France. Therefore, changing the energy mix would require efforts not only from the government but also from the private sector to build up the funds for adopting lower carbon-intensive production and operations.

A notable feature of Korea's ESG bond financing is the smaller issuance of green bond financing despite rapid increases in issuance volumes since 2021. Korea has the largest social bond issuances in the ASEAN+3 region supported by government agencies, and social bonds make up more than 61 percent of total ESG bond issuances; however, green bonds contributed only 25 percent of the total as of Q3 2023. This contrasts with the rest of the ASEAN+3 economies, where green bonds consisted of more than 60 percent of overall ESG bond financing between Q1 2022 and Q3 2023 (Figures A.1.-A.4.).

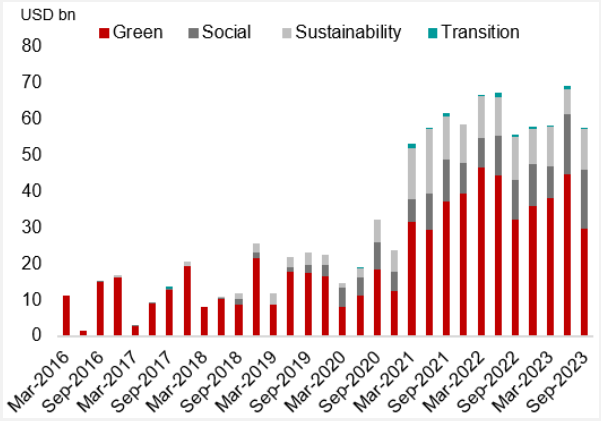
[39] Korea's climate neutrality target is enshrined in law through the Framework Act on Carbon Neutrality and Green Growth. To support the carbon neutrality goal, the Act introduces a climate impact assessment of major national plans and development projects. Emission reduction targets will now be integrated into national budget planning through the climate-responsive budgeting program. The Act also sets up a climate response fund, which will be used to support the structural transformation of carbon-intensive industries.

[40] The Presidential Commission on Carbon Neutrality and Green Growth cited "difficulties in the supply of raw materials and technology prospects" as a reason for relaxing industries' emission reduction targets.

[41] Prepared by Kimi Xu Jiang, Senior Economist

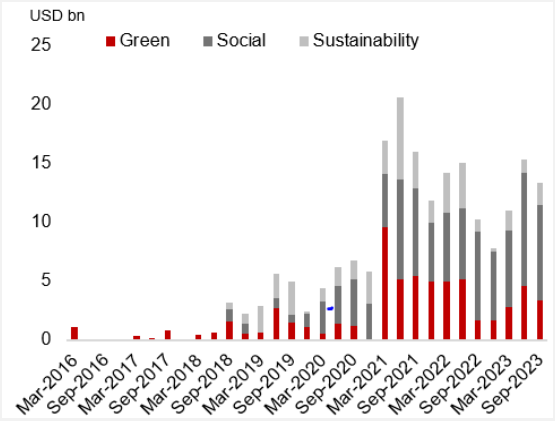
[42] Based on welcoming remarks by Mr Chang Yong Rhee, Governor of the Bank of Korea, at the opening ceremony of the International Conference on Green Finance, co-hosted by the 2050 Presidential Commission on Carbon Neutrality and Green Growth and the Bank of Korea, Seoul, 20 June 2023.

Figure A.1. Green Bond Issuance in Total ESG Bond Financing in ASEAN+3 [43]



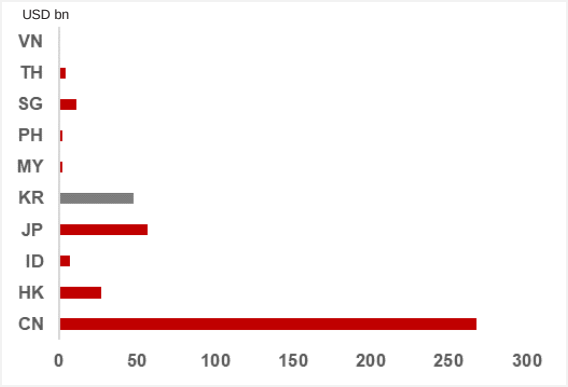
Source: Bloomberg; Asia Bonds Online

Figure A.2. Green Bond Issuance in Total ESG Bond Financing in Korea



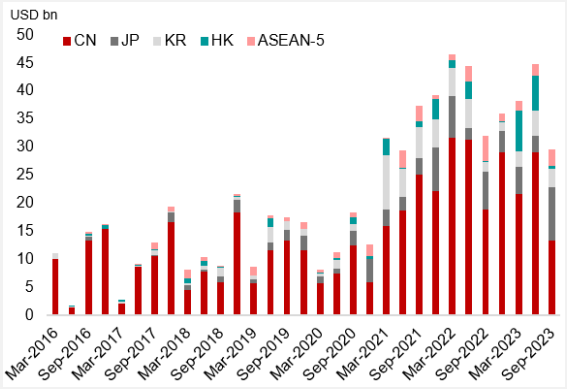
Source: Bloomberg; Asia Bonds Online
Note: Korea does not issue transition bonds.

Figure A.3 Green Bond Outstanding in ASEAN+3



Source: Bloomberg; Asia Bonds Online
Note: VN=Vietnam, TH=Thailand, SG=Singapore, PH= the Philippines, MY=Malaysia, KR=Korea, JP=Japan, ID=Indonesia, HK=Hong Kong, China, CN=China. Data is as of Q3 2023.

Figure A.4 Green Bond Issuance in ASEAN+3



Source: Bloomberg; Asia Bonds Online; AMRO staff calculations
Note: CN=China, JP=Japan, KR=Korea, HK=Hong Kong, China, ASEAN-5 comprises Indonesia, Malaysia, the Philippines, Singapore and Thailand

Korean authorities have been active in promoting green bond markets. The government issued green bond guidelines in 2020 mandating pre-issuance investor reviews, introduced a Korean taxonomy in 2021 ahead of other countries in the region, and promoted the K-Green Bonds issuance in 2023[44]. However, the low share of green bond financing indicates that Korean companies still have ample room to tap into green bonds to support the transition to low-carbon manufacturing and business structures.

Barriers to the growth of green bond markets include the smaller green bond market size, high issuance and transaction costs, as well as a lack of awareness from investors and issuers. In particular, issuing green bonds in Korea could incur higher costs compared with regular corporate bonds. Such a green premium is primarily due to a mismatch between demand and supply rather than an actual reflection of the value of being environmentally friendly.

[43] In this box, ASEAN+3 includes China, Japan, Korea, Indonesia, Thailand, the Philippines, Malaysia, Singapore, and Hong Kong, China, based on data as of Q3 2023.

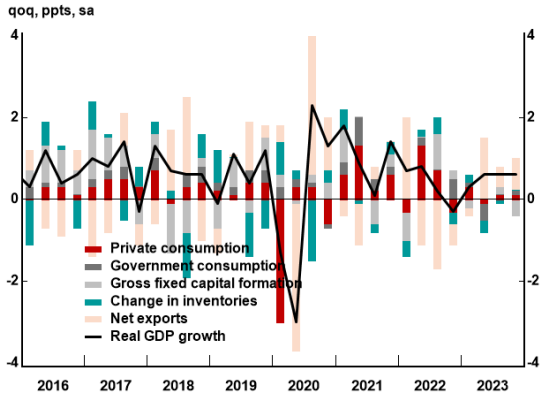
[44] The Ministry of Environment announced a **pilot program** in February 2023 to provide an interest subsidy for issuing green bonds. The pilot project aims to issue green bonds worth KRW 3 trillion, providing an interest subsidy of a maximum of KRW 300 million per company incurred from issuing bonds. The total budget for this project is about KRW 7.7 billion.

Appendices

Appendix 1. Selected Figures for Major Economic Indicators

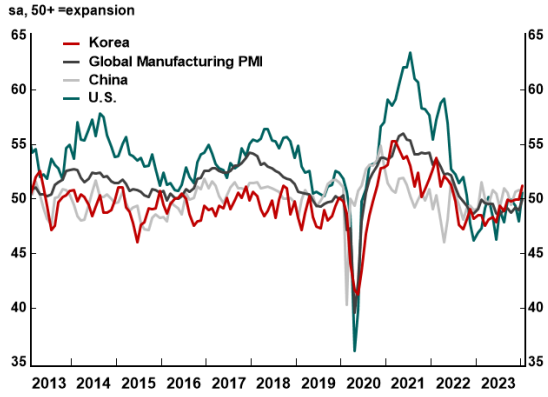
Figure 1.1. Real Sector

GDP growth declined in 2023, mainly due to weak private consumption and exports.



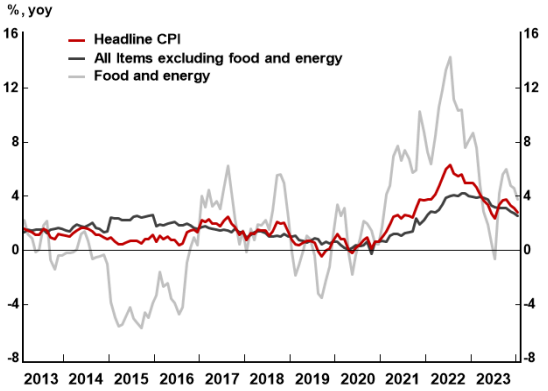
Source: Bank of Korea; Haver Analytics

The near-term outlook for the Korean economy has improved.



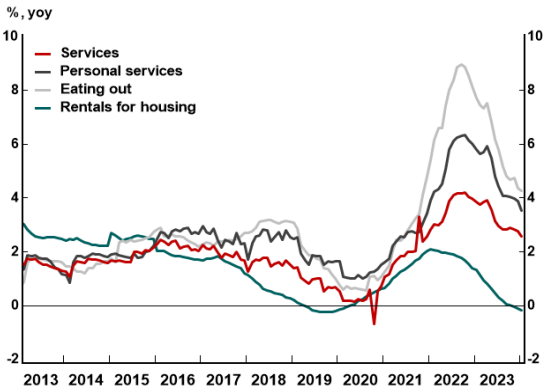
Source: S&P Global Purchasing Managers Survey; JP Morgan; Caixin; Haver Analytics

Headline inflation rebounded above 3.0 percent in August 2023 while core inflation continued to edge down.



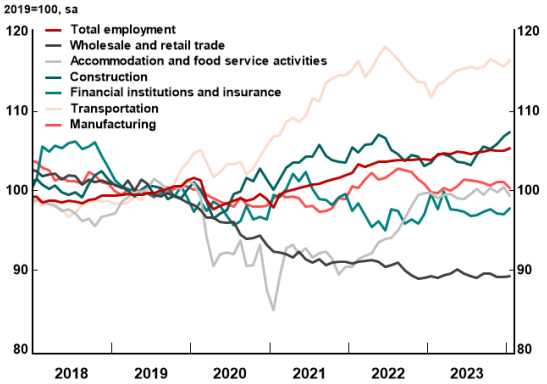
Source: Statistics Korea; Haver Analytics

Service inflation remained high in 2023 despite some declines.



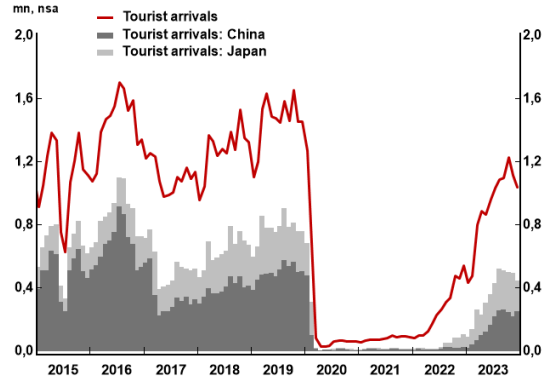
Source: Statistics Korea; Haver Analytics

Total employment continued to increase, but the pace was uneven among sectors.



Source: Statistics Korea; Haver Analytics

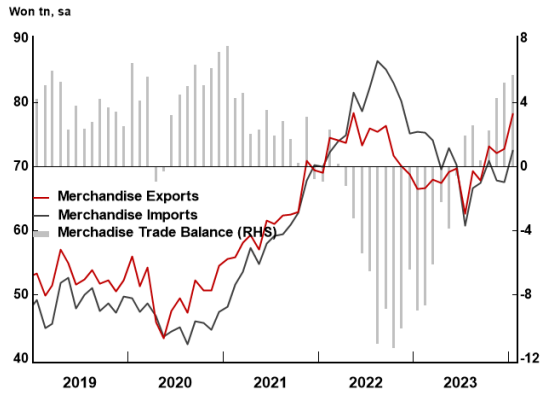
Inbound tourism from China has yet to return to pre-pandemic levels.



Source: Korea National Tourism Organization; Haver Analytics

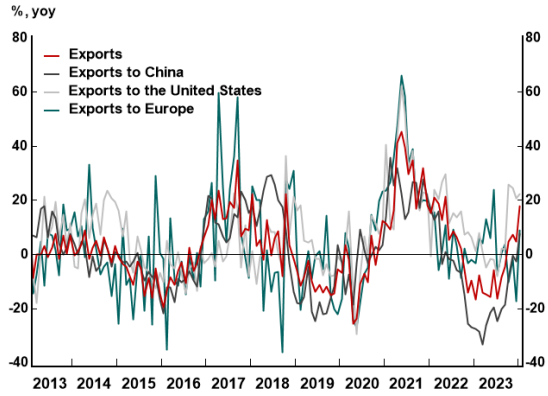
Figure 1.2. External Sector

Customs-based trade balances have improved in recent months.



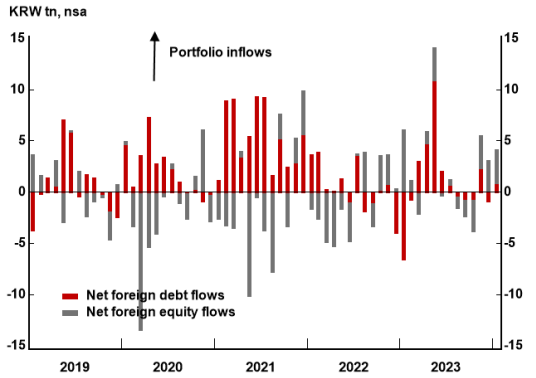
Source: Korea Customs Service; Haver Analytics

Exports to China have picked up while exports to the U.S. and Europe have remained resilient.



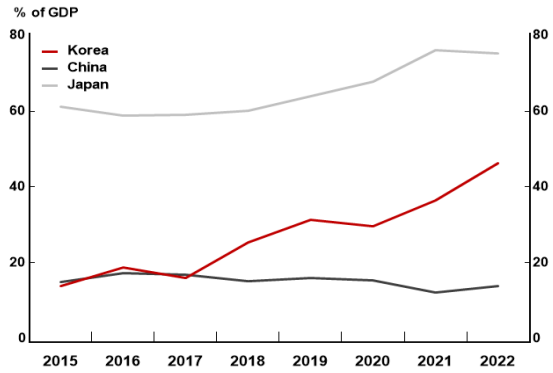
Source: Korea Customs Service; Haver Analytics

Foreign flows in Korean debts dropped in H2 2023 and foreign flows in Korean equities improved in 2023 compared to 2022 and 2021.



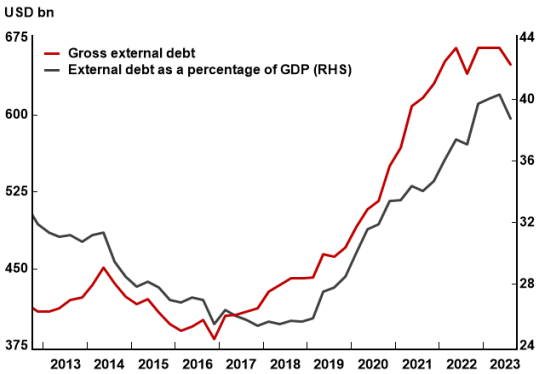
Source: Financial Supervisory Service; Haver Analytics; AMRO calculations

The net international investment position steadily strengthened.



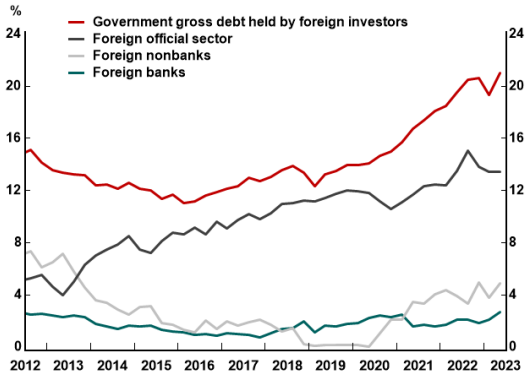
Source: International Monetary Fund; Haver Analytics

External debt has been rising since the pandemic due to an increased issuance of long-term debt.



Source: BOK; Haver Analytics

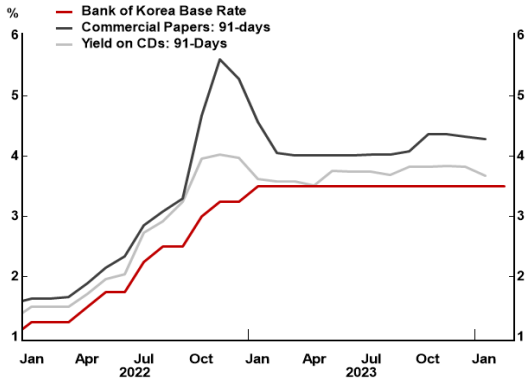
Foreign holdings of Korean gross government debt have steadily increased since the pandemic, led by the foreign official sector.



Source: International Monetary Fund; Haver Analytics
Note: Gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future.

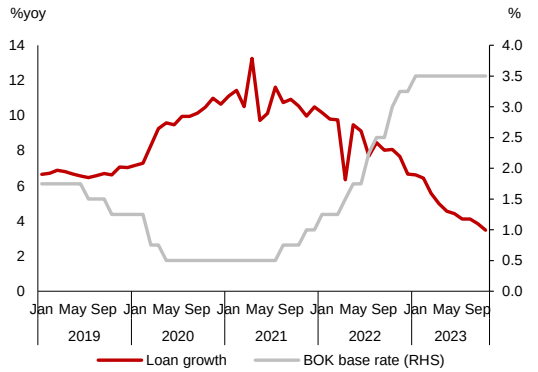
Figure 1.3. Monetary and Financial Sector

Short-term money market rates stabilized after the credit event in late 2022



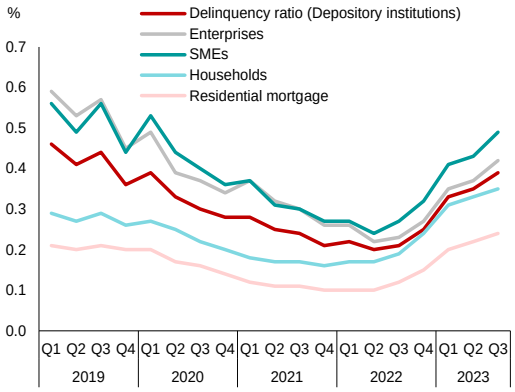
Source: BOK; Haver Analytics

Growth of total loans continues to weaken amid monetary policy tightening



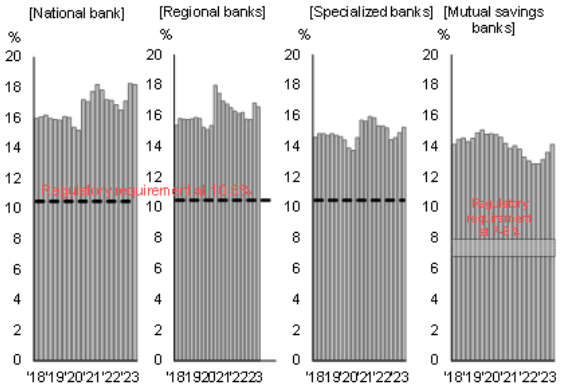
Source: BOK; CEIC; Haver Analytics; AMRO staff calculations

The delinquency ratio increased across all loan categories but remained low.



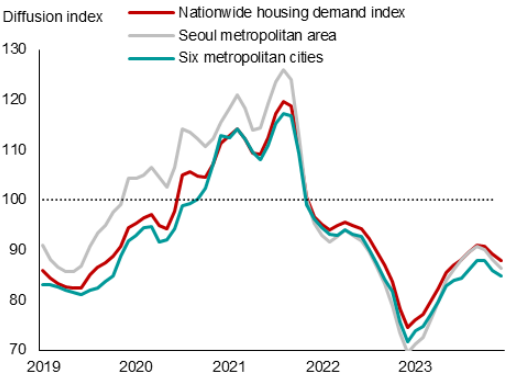
Source: Financial Supervisory Services; CEIC; Haver Analytics

Credit institutions are generally well capitalized.



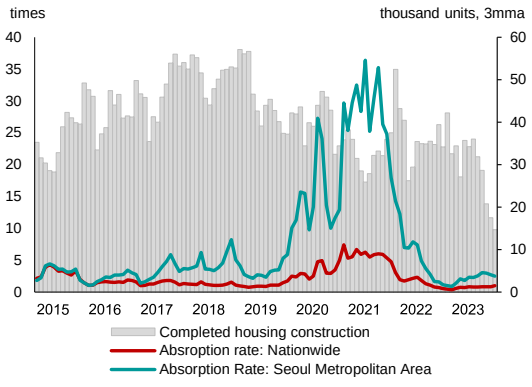
Source: Financial Supervisory Services; AMRO staff estimates

Housing demand recovery remains uncertain.



Source: Korea Real Estate Board; CEIC; AMRO staff calculations

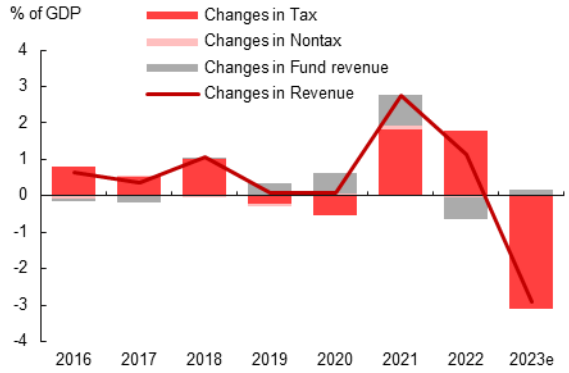
Due to weak demand and tight financial market condition, developers cut down new supplies.



Source: Ministry of Land, Infrastructure and Transport; CEIC; AMRO staff calculations

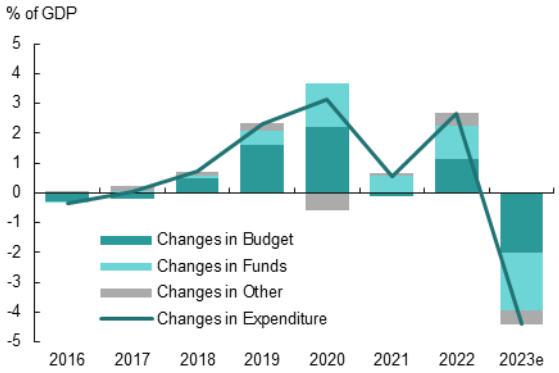
Figure 1.4. Fiscal Sector

In 2023, revenue fell substantially due to weak business performance and property market conditions and an economic slowdown …



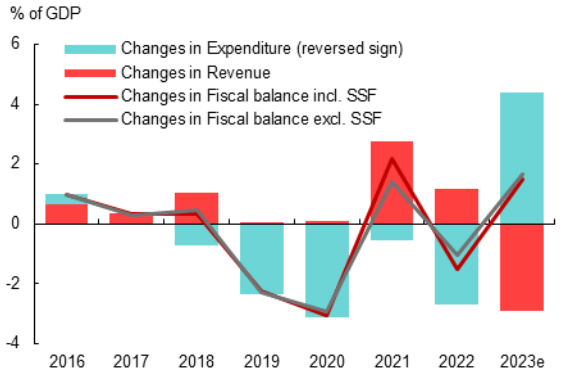
Source: Ministry of Economy and Finance; AMRO staff estimates

… while expenditure also declined, largely due to the withdrawal of pandemic-related support and a reduction in transfers to local governments/education.



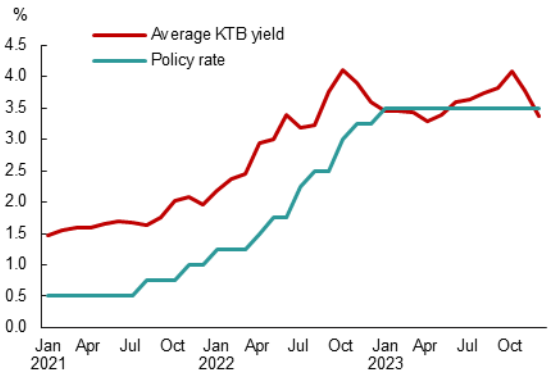
Source: MOEF; AMRO staff estimates

With the reduction of expenditure larger than the contraction of revenue, the fiscal deficit, excluding SSFs, is estimated to decrease from 5.4 percent of GDP in 2022 to 3.8 percent in 2023.



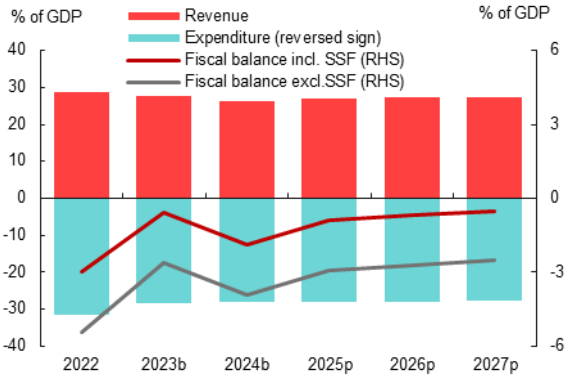
Source: MOEF; AMRO staff estimates

Amid policy rate hikes, the average financing cost of newly issued bonds has risen sharply.



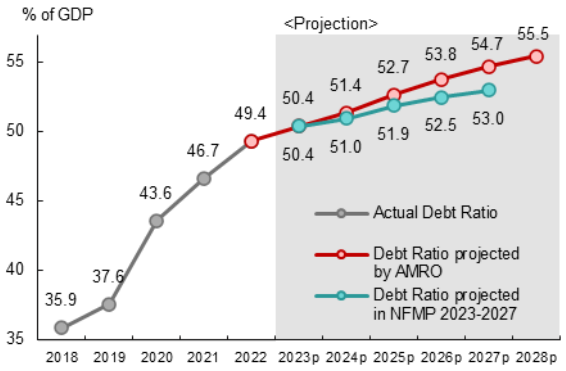
Source: MOEF; AMRO staff estimates

The fiscal deficit, excluding SSFs, is budgeted at 3.9 percent of GDP and expected to continue to fall to mid-2 percent of GDP in the medium term.



Source: MOEF

The government debt-to-GDP ratio is projected to continue to rise, but remain in the mid-50 percentage range.



Source: MOEF; AMRO staff estimates

Appendix 2. Selected Economic Indicators for Korea

	2019	2020	2021	2022	2023e	2024p
National income and prices	(In percent change unless specified)					
Real GDP	2.2	-0.7	4.3	2.6	1.4	2.3
Final consumption	3.2	-2.2	4.1	4.1	1.6	1.6
Private sector	2.1	-4.8	3.6	4.1	1.8	1.6
Public sector	6.4	5.1	5.5	4.0	1.3	1.8
Gross capital formation	-1.9	0.9	2.9	-0.2	0.6	0.7
Construction	-1.7	1.5	-1.6	-2.8	1.3	-1.3
Facilities investment	-6.6	7.2	9.3	-0.9	0.5	2.6
Intellectual property products	3.1	3.4	6.1	5.0	1.6	2.8
Exports	0.2	-1.7	11.1	3.4	3.1	4.3
Exports of goods	-1.1	-0.2	10.7	3.6	3.1	4.2
Exports of services	9.7	-11.1	13.9	2.4	2.4	5.6
Imports	-1.9	-3.1	10.1	3.5	3.1	3.0
Imports of goods	-2.5	0.3	12.6	4.3	-0.6	2.8
Imports of services	0.5	-16.3	-0.6	-0.2	21.5	3.8
Labor Market						
Unemployment rate (in percent, period average)	3.8	4.0	3.7	2.9	2.7	2.8
Labor force participation rate (in percent, period average)	63.3	62.6	62.8	63.9	64.3	63.8
Prices						
Consumer price inflation (period average)	0.4	0.5	2.5	5.1	3.6	2.5
Core inflation, excluding food and energy (period average)	0.7	0.4	1.4	3.6	3.4	2.4
External sector	(In billions of US dollars unless specified)					
Current account balance	59.7	75.9	85.2	25.8	35.5	44.0
(In percent of GDP)	3.6	4.6	4.7	1.5	2.1	2.4
Trade balance	79.8	80.6	75.7	15.6	34.1	35.0
(In percent of GDP)	4.8	4.9	4.2	0.9	2.0	1.9
Services, net	-26.8	-14.7	-5.3	-7.3	-25.7	-22.0
Primary income, net	12.9	13.5	19.4	20.3	31.6	35.0
Secondary income, net	-6.1	-3.5	-4.7	-2.9	-4.5	-4.0
Financial account balance	57.6	64.0	63.6	54.9	36.0	36.0
(In percent of GDP)	3.5	3.9	3.5	3.3	2.1	1.9
Overall balance	1.5	17.4	14.8	-27.9	-3.6	8.0
(In percent of GDP)	0.1	1.1	0.8	-1.7	-0.2	0.4
Gross official reserves	408.8	443.1	463.1	423.2	420.1	428.1
(In months of imports of goods & services)	8.1	9.8	8.0	6.3	6.5	6.2
Total external debt (USD bn)	470.7	550.6	630.7	665.2	663.6	456.0
Short-term external debt (% of international reserves)	33.1	36.1	35.7	39.3	32.4	31.4
Fiscal Sector	(In percent of GDP)					
Total Revenue	24.6	24.7	27.7	28.6	25.6	26.1
Total Expenditure	25.2	28.3	29.2	31.6	27.1	28.1
Fiscal balance including Social Security Funds	-0.6	-3.7	-1.5	-3.0	-1.5	-1.9
Fiscal balance excluding Social Security Funds	-2.8	-5.8	-4.4	-5.4	-3.8	-3.8
Central and local government debt	37.6	43.6	46.7	49.4	50.4	51.4
Monetary and financial sector	(In percent unless specified)					
Domestic credit (BIS, in percentage change) 2/	6.6	10.2	10.4	5.8	4.0	…
(In percent of GDP) 2/	236	257	265	270	273	…
Broad money (KRW trillion) 2/	2,914	3,200	3,614	3,758	3,905	…
Substandard-and-below loan ratio (BIS, in percent) 1/ 2/	0.5	0.4	0.3	0.2	0.3	…
Capital adequacy ratio (BIS, in percent) 1/ 2/	15.3	16.5	16.5	16.0	16.6	…
Memorandum items:						
Exchange rate (KRW per US$, average) 3/	1,165	1,180	1,144	1,291	1,306	1,260
Exchange rate (KRW per US$, end of period) 3/	1,158	1,088	1,186	1,267	1,289	1,220
10-year government bond yield (in percent, end of period)	1.7	1.7	2.2	3.5	3.4	2.9
3-month Koribor yield (in percent, end of period) 3/	1.3	0.7	1.4	3.8	3.4	3.0
Nominal GDP (in KRW trillion)	1,924	1,941	2,080	2,162	2,236	2,328
Nominal GDP (in US$ billion)	1,651	1,644	1,818	1,674	1,713	1,848

Source: Korean authorities; Bank for International Settlements; CEIC; AMRO staff estimates (e) and projections (p)
Note: Numbers in dark grey denote AMRO estimates or projections. Real and nominal GDP are based on preliminary estimates published on March 5, 2024.
1/ Commercial banks only; 2/ Latest value; 3/ Market consensus based on Bloomberg

Appendix 3. Balance of Payments

	2019	2020	2021	2022	2023
	(in billions of U.S. dollars unless specified)				
Current account balance (I)	**59.7**	**75.9**	**85.2**	**25.8**	**35.5**
Trade balance	79.8	80.6	75.7	15.6	34.1
Exports, f.o.b.	556.7	517.9	649.5	694.3	645.0
Imports, f.o.b.	476.9	437.3	573.7	678.7	611.0
Services, net	-26.8	-14.7	-5.3	-7.3	-25.7
Receipts	103.8	89.6	119.9	131.6	124.5
Payments	130.7	104.3	125.2	138.9	150.1
Primary income, net	12.9	13.5	19.4	20.3	31.6
Secondary income, net	-6.1	-3.5	-4.7	-2.9	-4.5
Capital account (II)	-0.2	-0.4	-0.2	0.0	0.0
Financial account (III) (+ indicates net outflows) 1/	**57.6**	**64.0**	**63.6**	**54.9**	**36.0**
Direct investment (net)	25.6	26.1	43.9	40.8	19.4
Portfolio investment (net)	42.4	41.7	19.4	25.8	7.4
Financial derivatives (net)	6.2	4.9	-0.1	7.4	-0.5
Other investment (net)	-16.7	-8.7	0.4	-19.1	9.6
Errors and omissions (IV)	-0.5	5.9	-6.6	1.2	-3.1
Overall balance (=I + II - III + IV)	**1.5**	**17.4**	**14.8**	**-27.9**	**-3.6**
Reserve assets (+ indicates increases)	**1.5**	**17.4**	**14.8**	**-27.9**	**-3.6**
Memorandum items:					
Current account balance (In percent of GDP)	3.6	4.6	4.7	1.5	2.1
Gross reserves (USD billion)	408.8	443.1	463.1	423.2	420.1
(In months of imports of goods and services)	8.1	9.8	8.0	6.3	6.5
Changes in gross reserves (USD billion)	5.1	34.3	20.0	-40.0	-3.0
Nominal GDP (USD billion) 2/	1,651	1,644	1,818	1,674	1,713

Source: Korean authorities
Note: 1/ Excludes changes in reserve assets.
2/ Based on AMRO staff calculations using the yearly averages of USD/KRW exchange rates sourced from the BOK.
3/ Nominal GDP is based on preliminary estimates published on March 5, 2024.

Appendix 4. Statement of Government Operations

	2019	2020	2021	2022	2023e
	(In percent of GDP unless specified)				
Revenue	24.6	24.7	27.7	28.6	25.6
Tax	15.3	14.7	16.5	18.3	15.2
Personal Income Tax	4.3	4.8	5.5	6.0	5.1
Corporate Income Tax	3.8	2.9	3.4	4.8	3.5
Value-added Tax	3.7	3.3	3.4	3.8	3.3
Transportation Tax	0.8	0.7	0.8	0.5	0.5
Customs Duty	0.4	0.4	0.4	0.5	0.3
Other tax	2.3	2.6	3.1	2.8	2.5
Nontax	1.3	1.4	1.5	1.4	1.4
Fund revenue	8.0	8.6	9.4	8.8	9.0
Expenditure	25.2	28.3	29.2	31.6	27.1
Mandatory spending (excl. Interest)	11.7	12.3	12.7	14.4	13.1
Interest payments	0.7	0.7	0.8	0.9	1.0
Domestic	0.7	0.7	0.8	0.9	1.0
External	0.0	0.0	0.0	0.0	0.0
Discretionary spending	12.2	15.4	15.5	16.3	13.0
Fiscal Balance					
Fiscal Balance incl. SSF	-0.6	-3.7	-1.5	-3.0	-1.5
Primary Balance incl. SSF	0.1	-2.9	-0.7	-2.1	-0.5
Fiscal Balance excl. SSF	-2.8	-5.8	-4.4	-5.4	-3.8
Primary Balance excl. SSF	-2.1	-5.0	-3.6	-4.6	-2.7
Public debt	37.6	43.6	46.7	49.4	50.4
Domestic debt	37.1	43.1	46.1	48.8	49.9
External debt	0.4	0.5	0.5	0.5	0.5

Source: Korea Ministry of Economy and Finance; AMRO staff estimates
Note: Numbers in dark grey denote AMRO estimates. Nominal GDP is based on preliminary estimates published on March 5, 2024.

Appendix 5. Debt Sustainability Analysis[45,46]

Korea's public debt-to-GDP ratio is projected to continue to rise modestly, while gross financing needs (GFNs) are expected to remain high (Table 5.1). The projected average economic growth rate during 2024-2028 stands at 2.1 percent, aligning with the potential growth path. The effective interest rate is expected to gradually rise, reflecting policy rate hikes since 2021. The fiscal deficit excluding social security funds (SSFs) is forecast to stabilize at mid-2 percent by the end of the projection period. The primary deficit and real interest rate will continue to raise the debt ratio, offsetting the negative contribution from real growth (Figure 5.1). Despite a sizable reduction in the primary balance, GFNs will remain higher than pre-pandemic levels due to the maturing of Treasury bonds issued in significant quantities during the pandemic (Figure 5.1).

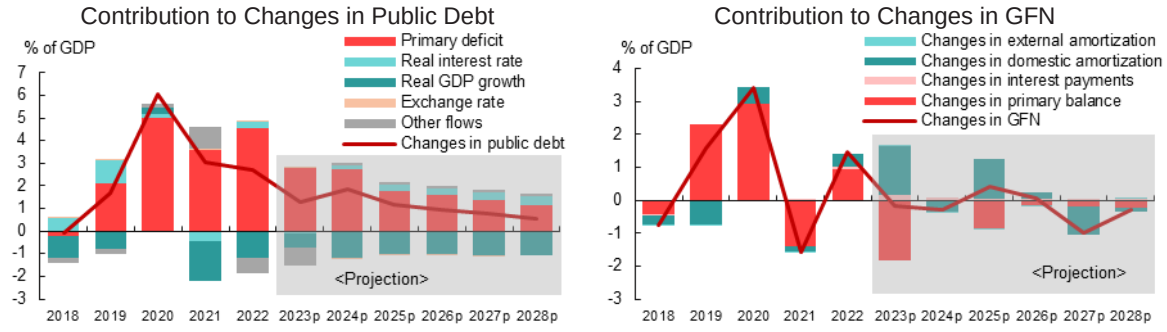
The standard Debt Sustainability Analysis (DSA) results indicate a low overall risk to public debt sustainability (Figure 5.4). Both the public debt-to-GDP ratio and the GFN as a percentage of GDP have remained below their corresponding thresholds in the past five years and are projected to stay lower than the thresholds in the baseline and all stress test scenarios throughout the projection period (Figure 5.2). Even under a combined macro-fiscal shock, the debt ratio will likely remain below 60 percent, and the GFN will rise at most to 8.8 percent of GDP. Moreover, market perception of sovereign risk continues to be low, as evidenced by the bond yield spread, while the public debt structure, including external and short-term shares, remains sound (Figure 5.3).

Table 5.1. Macroeconomic and Fiscal Indicators

	2018	2019	2020	2021	2022	2023p	2024p	2025p	2026p	2027p	2028p
Macroeconomic indicators (Percent)											
Real GDP growth	2.9	2.2	-0.7	4.3	2.6	1.4	2.4	2.0	2.0	2.0	2.0
GDP deflator	0.5	-0.8	1.6	2.8	1.3	2.4	1.9	1.7	1.7	1.7	1.7
Effective interest rate	2.2	2.0	2.0	1.8	1.9	2.2	2.3	2.3	2.3	2.4	2.4
Fiscal indicators (Percent of GDP)											
Revenue	24.5	24.6	24.7	27.7	28.6	25.6	26.1	27.0	27.1	27.1	27.3
Expenditure	22.9	25.2	28.3	29.2	31.6	27.1	28.1	28.2	28.3	28.3	28.3
Fiscal balance excluding SSF	-0.6	-2.8	-5.8	-4.4	-5.4	-3.8	-3.8	-3.0	-2.9	-2.8	-2.6
Primary balance excluding SSF	0.2	-2.1	-5.0	-3.6	-4.6	-2.7	-2.7	-1.9	-1.7	-1.5	-1.3
Public debt	35.9	37.6	43.6	46.7	49.4	50.4	51.4	52.7	53.8	54.7	55.5
Gross financing needs	3.1	4.7	8.1	6.5	8.0	7.8	7.6	8.0	8.1	7.1	6.8

Source: Ministry of Economy and Finance; AMRO staff projections (p)

Figure 5.1. Public Debt and GFN Dynamics

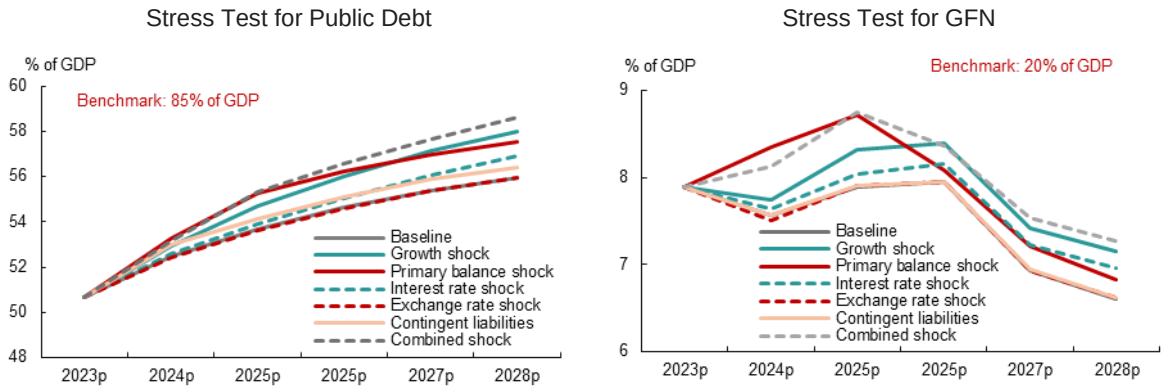


Source: Ministry of Economy and Finance; AMRO staff projections (p)

[45] Prepared by Byunghoon Nam, Senior Economist.

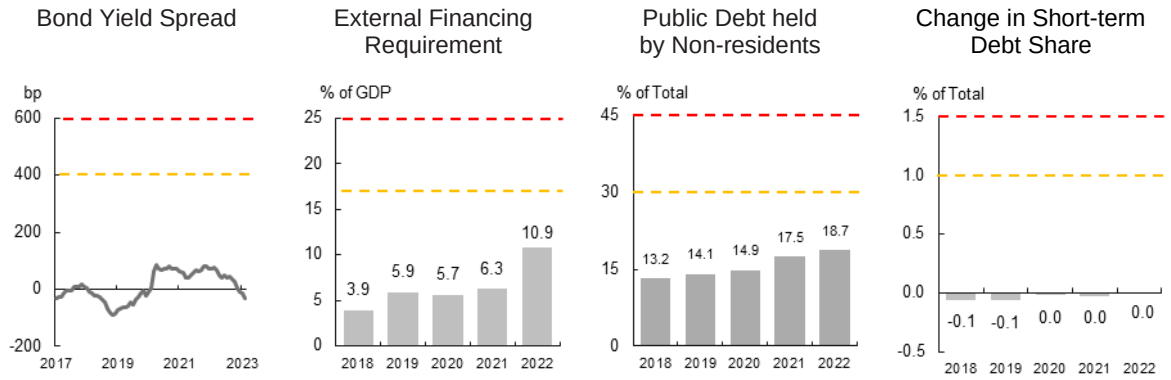
[46] Public DSA for Korea covers national government debt (central and local governments) excluding SSFs. As of end-2022, general government debt was at 53.8 percent of GDP on an accrual basis, while national government debt amounted to 49.4 percent of GDP on a cash basis.

Figure 5.2. Macro-fiscal Stress Test



Source: Ministry of Economy and Finance; AMRO staff projections (p)
Note: The scenarios for the stress test are as follows: 1) Real GDP growth shock: one standard deviation, or a -0.4 percentage point shock to 2024 and 2025; 2) Primary balance shock: one standard deviation, or a -0.8 percent of GDP shock to 2024 and 2025; 3) Interest rate shock: a +1 percentage point shock from 2024; 4) Exchange rate shock: a one-time +5 percentage point shock in 2024; 5) Contingent liability shock: a one-time 0.5 percent of GDP shock in 2024, by recognizing government guaranteed debt as of end-2022; 6) Combined shock: a combination of growth (half size), primary balance (half size), interest rate and exchange rate shocks.

Figure 5.3. Debt Profile Vulnerabilities



Source: Ministry of Economy and Finance, AMRO staff estimates
Note: 1) – – – Lower early warning (50 percent of benchmark), – – – upper early warning (75 percent of benchmark); 2) Bond yield spreads are computed using the difference between Korean treasury bonds (KTBs) and U.S. Treasury notes at 10-year maturities; 3) External financing requirements = current account deficit + amortization of public external debt + amortization of private external debt; 4) Public debt held by nonresidents is approximated by the share of KTBs held by non-residents out of total central government debt; 4) Short-term debt is based on the original maturity.

Figure 5.4. Heatmap of Public Debt Sustainability

		2018	2019	2020	2021	2022	2023p	2024p	2025p	2026p	2027p	2028p
Public Debt												
Gross Financing Needs												
Debt Profile	Market Perception of Sovereign Risk											
	External Financing Requirement											
	Public Debt Held by Non-residents											
	Change in Short-term Debt Share											

Source: AMRO staff estimates
Note: For Public Debt and Gross Financing Needs, the cell is highlighted in green if the benchmark is not exceeded under any shock or the baseline, yellow if exceeded under a specific shock but not the baseline, and red if exceeded under the baseline; 2) For Debt Profile, the cell is highlighted in green if the country value is less than the lower early warning benchmark, red if it exceeds the upper early warning benchmark, and yellow if it lies between the lower and upper early warning benchmarks.

Appendix 6. Data Adequacy for Surveillance Purposes: Preliminary Assessment

Criteria/Key Indicators for Surveillance	Data Availability[(i)]	Reporting Frequency/Timeliness[(ii)]	Data Quality[(iii)]	Consistency[(iv)]	Others, if Any[(v)]
National Account	Yearly data for the income approach and quarterly data for the expenditure and production approach are available.	Quarterly data is released within one month after the reference quarter ends (for the first preliminary estimate).	-	-	-
Balance of Payments (BOP) and External Position	Monthly BOP data is available in detail.	Monthly BOP data is released about two months after the reference period, while quarterly International Investment Positiondata is released within two months after the reference period.	-	-	-
Central Government Budget/External Debt	Monthly data on central government public finance is available, while quarterly external debt data is available in detail.	Monthly data on central government public finance is released within four months after the reference period, while quarterly data on external debt is released within two months after the reference period.	-	-	-
Inflation, Money Supply and Credit Growth	Data on monthly inflation, money supply and credit growth is available.	Monthly inflation data is released within one month after the reference period, while data on money supply and credit growth is released within two months of the end of the reference period.	-	-	-
Financial Sector Soundness Indicators	Available	Monthly data is released within one to two months after the reference period, while quarterly data is available three months after the reference period.	-	-	-
Housing Market Indicators	Available	Monthly data is released within one month after the reference period.	-	-	-

Source: AMRO staff compilation. This preliminary assessment will form the “Supplementary Data Adequacy Assessment" in the EPRD Matrix.

Note:
(i) Data availability refers to whether the official data is available for public access by any means.
(ii) Reporting frequency refers to the periodicity with which the available data is published. Timeliness refers to how up to date the published data is relative to the publication date.
(iii) Data quality refers to the accuracy and reliability of the available data, taking into account the data methodologies.
(iv) Consistency refers to both internal consistency within the data series itself and its horizontal consistency with other data series of either the same or different categories.
(v) Other criteria might also apply, if relevant. Examples include but are not limited to potential areas of improvement for data adequacy.

Annexes: Selected Issues

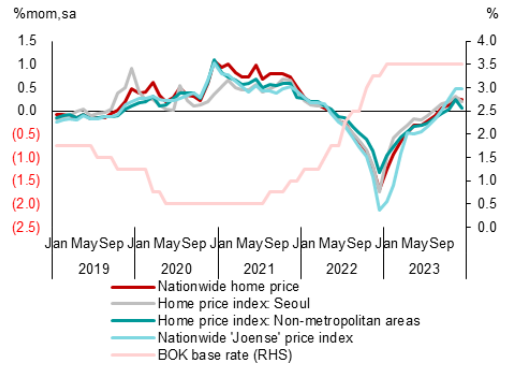
1. Affordability and Determinants of Korean Housing Prices[47]

Home prices in Korea have been steadily declining since the Bank of Korea (BOK) commenced a tightening cycle in mid-2021. The median apartment price plummeted by around 19.9 percent by December 2023 from its peak in June 2021, according to data from the Korea Real Estate Board. This decline is notably influenced by tightened financial conditions, which are a primary contributor to the recent slowdown in the housing market, among other factors. Additional factors, such as construction costs, household wealth, shifts in the Korean lifestyle, and the pace of housing supply adjustments, also significantly influence market conditions and pricing. Despite the considerable nationwide drop in home prices, housing affordability remains below pre-pandemic levels.

1. A surge in liquidity amid stimulus measures following the COVID-19 outbreak and persistently low interest rates stemming from prolonged monetary easing had spurred housing demand and prices by early 2022. Despite efforts by authorities to rein in the overheated market through tighter housing measures and macroprudential regulations, these actions inadvertently propelled housing prices to new heights as prospective homebuyers hurried to make purchases before a potential further tightening of the measures. Concurrently, additional measures, such as heightened requirements for housing redevelopment and *Jeonse* (leasehold deposit) transactions, constrained the availability of supply. The market surge began in metropolitan areas before spreading to other regions across the country, resulting in a boom in housing prices, with average apartments soaring by 20.4 percent in 2021.

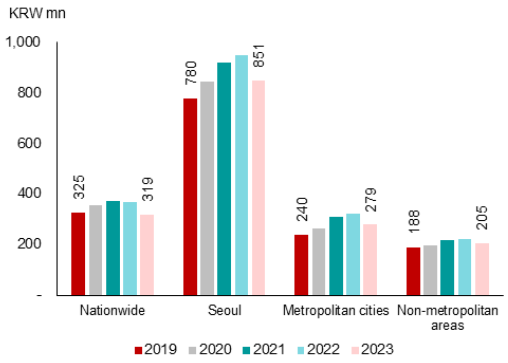
2. During the tightening cycle of monetary policy beginning in mid-2021, the housing market underwent a correction. Mortgage rates saw a significant rise in tandem with the policy rate. Transaction volumes across the country exhibited persistent weakness from then on. As a result, nationwide housing prices continued their downward trajectory and, by July 2023, had decreased by 8.7 percent (yoy). Due to the authorities' efforts to normalize macroprudential measures and introduce a special mortgage program to shore up the housing market, there has been an uptick in prices since September 2023, as evidenced by positive monthly changes. Despite these positive developments, the prices remain lower than their levels in the same period of the previous year (Figure A1.1).

Figure A1.1. Changes in Korean Home Prices



Source: Korea Real Estate Board; AMRO staff calculations

Figure A1.2. Annual Average of Median Apartment Prices



Source: Korea Real Estate Board; AMRO staff calculations

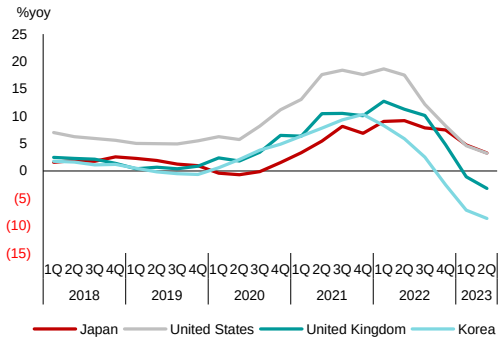
[47] Prepared by Wanwisa May Vorranikulkij, Senior Economist

Housing Affordability

3. Despite its persistent decline, current home prices may still be unaffordable. The current price level remains higher than pre-pandemic levels (Figure A1.2). Meanwhile, Korean household income has increased while macroeconomic conditions, the housing market and financing costs have changed significantly from the pre-pandemic period. Considering such changes, this section aims to assess whether houses in Korea have become more affordable.

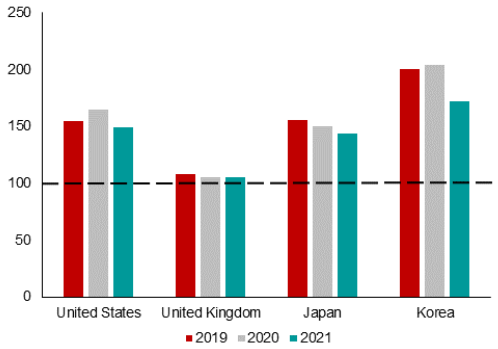
4. Housing affordability worsened in many advanced economies during the COVID-19 pandemic, due to soaring prices and weakened household incomes. Pandemic-induced sluggish economic activity dampened household incomes even as home prices in these economies surged from the second half of 2020 to the first half of 2022 (Figure A1.3). Among advanced economies, the deterioration of the Korean housing affordability index was notably more pronounced in 2021 (Figure A1.4). The average housing price escalated to more than double the average annual household income, compared with an average of around 1.3 times in other advanced economies. Housing prices in Korea became more stable after the central bank tightened monetary policy.

Figure A1.3. Home Price Inflation in Selected Advanced Economies



Source: National authorities

Figure A1.4. Housing Affordability Index (HAI)



Source: Biljanovska and others, 2023
Note: The HAI measures a household's capacity to make the regular mortgage payments required for buying a home while ensuring the ability to meet other essential needs and maintain an income buffer. The higher the index, the more affordable housing is in that country.

5. Housing affordability improved after hitting its lowest point in Q3 2022, but was still worse than the affordability levels observed in 2019. This section uses the Housing Affordability Index (HAI) methodology employed by the US National Association of Realtors and Biljanovska, Fu, and Igan (2023), which evaluates housing affordability across different regions of Korea: Seoul, six major cities, and non-metropolitan areas.[48] A higher index indicates improved affordability. The main findings are summarized as follows (Figure A1.5).

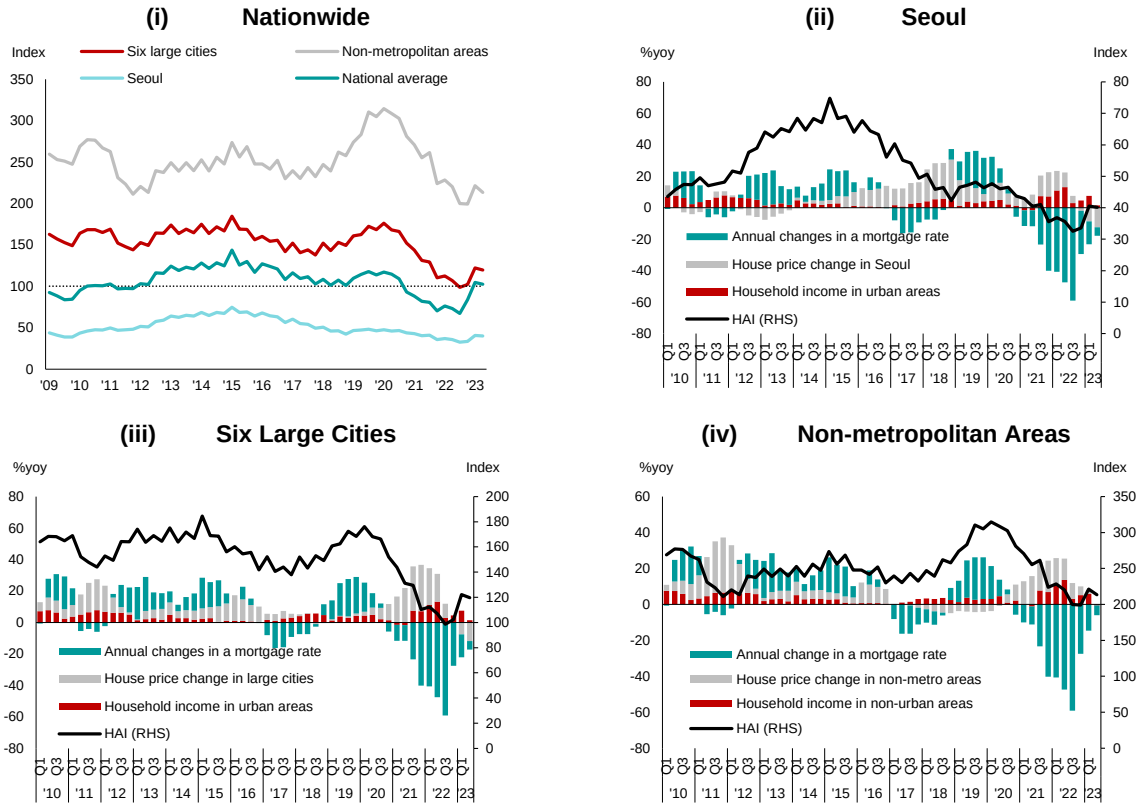
a. Housing affordability steadily declined nationwide from the start of the pandemic, hitting a trough in Q3 2022. This decline primarily stemmed from a rapid upswing in prices. Specifically, in Seoul and six other metropolitan regions, homes became unaffordable, resulting in the HAI dropping below 100 in 2022. This pattern persisted as housing prices continued their surge while mortgage rates also climbed. Consequently, households in these areas grappled with elevated housing expenses and amplified financing costs.

[48] The six large cities were Busan, Daegu, Incheon, Gwangju, Daejon and Ulsan. The non-metropolitan areas were Gyeonggi, Gangwon, Chungbuk, Chungnam, Jeonbuk, Jeonnam, Gyeongbuk and Gyeongnam.

b. From Q4 2022 onwards, housing affordability has improved throughout the nation, attributed to a decline in prices amid a slower pace of monetary tightening. The HAI has ascended to above 100 throughout the country, barring the capital city. Nevertheless, due to the persistently high current price levels, coupled with escalating mortgage rates, homes in Korea remain less affordable compared with 2019.

c. For most Koreans, buying an apartment in Seoul has proven to be unaffordable. This study employs median household income in urban areas to compute the HAI within the Seoul region. Despite fluctuations in housing prices and mortgage rates, the index has consistently lingered well below 100. This outcome suggests that a family with a median income of KRW6.3 million per month in an urban area lacks sufficient earnings to afford a mortgage for a home priced at the median level within the capital area.

Figure A1.5. HAI[1] and Its Time-varying Components[2] in Different Regions of Korea



Source: AMRO staff calculations

Note: 1. The HAI gauges a household's capability to consistently cover mortgage payments for buying a home while also securing the capacity to meet other crucial needs and maintain a financial safety net. When the HAI equals 100, it indicates that households possess sufficient income to afford a house in their residential area. A higher index signifies greater housing affordability. Conversely, an HAI below 100 indicates that housing prices in the area surpass the incomes of households residing there, signifying unaffordability.

2. Time-varying components show the annual growth of each factor in the HAI formula – nominal income of residents, median home price, and the average mortgage rate. The stacked bars do not represent the contribution of each components on HAI in the corresponding period.

Drivers of Korean Housing Market and Price Changes

6. Korea's home prices. The vector error correction model (VECM) developed by Igan and Loungani (2012) is modified to fit Korea's context (Table 1.1). The original model's explanatory variables (Model 1) consist of demand factors such as changes in household income and the labor force, housing affordability, and financing conditions including interest rates and periodic

changes in mortgage loans. To examine the impact of costs on changes in home prices, this study incorporates an annual change in construction costs (Model 2). The findings highlight that Korea's housing market entered a down cycle in Q3 2022, with prices declining faster than what is underpinned by housing market fundamentals (Figures A1.6, 1.7). Interest rates, mortgage loans, household wealth as measured by fluctuations in the stock price index, and construction costs significantly influence the movement of Korean home prices.

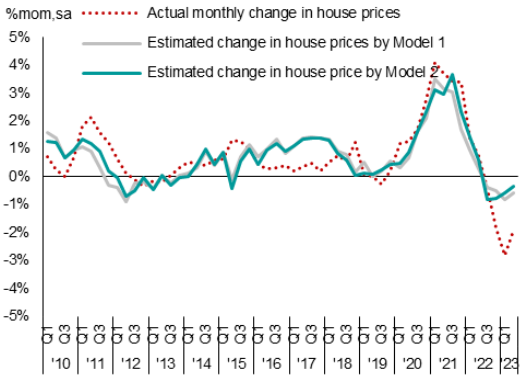
Table 1.1. Housing Price Change Model: Regression Results

Dependent variable: House price index, period change (%qoqsa)		
	1	2
Affordability, lagged	-0.0287**	-0.1679
	(0.0132)	(0.1503)
Median household income, annual growth	0.0775	0.0448
	(0.059)	(0.0632)
Labour force, annual growth	-0.0138	-0.1679
	(0.1194)	(0.1503)
Stock prices, period change	0.0396***	0.0400***
	(0.0095)	(0.0079)
Mortgage loan, period change	0.3539*	0.3962***
	(0.1933)	(0.2054)
Interest rate on loan to households	-0.5812**	-0.3139
	(0.2231)	(0.1946)
Construction costs, annual growth		0.1204*
		(0.0630)
Constant	0.1563**	0.0238
	(0.0697)	(0.1197)
Period	2009Q2 - 2023Q3	2009Q2 - 2023Q3
R-squared	0.5916	0.6200
Adjusted R-squared	0.5426	0.5657

Source: AMRO staff calculations

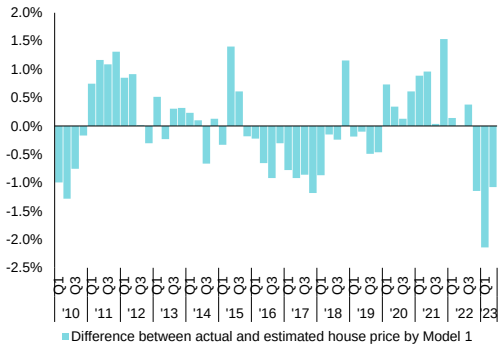
Note: The VECM by Igan and Loungani (2012) is a cross-country analysis of global housing price changes. This selected issue adjusts explanatory variables to align with Korea's specific fundamentals. In this context, housing affordability is defined using the housing affordability index published by Kookmin Bank. Instead of GDP per capita used in the original model, we use median household income surveyed by Statistics Korea. Moreover, in measuring housing demand, this study opts for the size of the labor force, available on a monthly basis, as opposed to annually published data on the working-age population. While the original model factors in short-term and long-term interest rates to indicate financing costs, this paper employs the average interest rate on household loans. Standard errors are indicated in parentheses. The notations ***, ** and * denote significance at the 1, 5 and 10 percent levels, respectively.

Figure A1.6. Periodic Changes in House Prices Estimated by Models



Source: AMRO staff

Figure A1.7. Estimation Gap Estimated by Model 2



Source: AMRO staff
Note: The gap represents the difference between an actual quarter-on-quarter change in home prices and the change suggested by housing market conditions.

7. Financial conditions stand out as a primary determinant of affordability, among other factors. The VECM analysis underscores the observation that changes in interest rates and mortgage loans hold substantial influence over housing price fluctuations. This finding

aligns with the reality during the pandemic, that the housing market surge was propelled by low interest rates and ample liquidity. Within a span of three months, the central bank had slashed the base rate by 100 basis points. Despite rigorous measures by financial regulatory authorities to rein in speculative demand – such as through stringent lending regulations, taxes and housing regulations – home loans expanded by about 10 percent during 2020-2021. Following the BOK's aggressive rate hike, conditions within the housing market reversed course from the second half of 2022, significantly weakening in demand.

8. In addition, speculative demand has been a catalyst for surging home prices. The low interest rates observed in 2020-2021 drove both Korea's housing and equity markets, drawing in retail investors, some leveraging their investments. Despite stricter lending regulations and increased property taxes, the number of multiple homeownerships increased in 2020, driven by promising rental income. The *Jeonse* market experienced a significant surge, promoting speculative investments. However, this trend reversed course following the BOK's rate hikes. Since Q4 2021, *Jeonse* deposits have declined at a faster pace than housing prices as rising interest rates make monthly rental more attractive over a *Jeonse* contract (BOK 2022).

9. Going forward, structural factors are expected to play a prominent role in the balance between housing demand and supply:

- **The recent shift toward solo living in Korea has underlined stronger housing demand.** While the working-age population in Korea has plateaued, housing demand has remained strong, mainly due to a structural change in the lifestyle of Koreans. A growing number of Koreans prefer to stay single or marry without having children. Demand for single-person homes has surged alongside the rise of one to two-person households from 35 percent of total households in 2000 to 48 percent in 2022. This trend is most pronounced in Seoul, where the housing stock cannot satisfy the strong demand from single-households.

- **Sluggishness in housing supply adjustments exacerbates price volatility.** Due to delays in land transfers and construction, housing supplies are not able to respond to shifts in demand promptly. Despite periods of heightened demand, Korea's housing supply has managed to grow by only 2 percent annually. Regulatory constraints on housing redevelopment between 2017 and 2021, alongside restrictions imposed on the renewal of *Jeonse* contracts, further constricted the available supply. However, the situation improved in 2022, marked by an uptick in the release of new supplies and the relaxation of housing measures.

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2. Korea's Semiconductor Industry: Enhancing Resilience and Preparing for the Future[49]

The semiconductor industry plays a vital role in the Korean economy. Korea is also an important node in the highly fragmented semiconductor global value chain (GVC). This selected issue focuses on how the Korean semiconductor industry could remain resilient and maintain its leading role in the semiconductor GVC. Multi-regional input-output tables are used to gain insights into the current participation of Korea's semiconductor industry in the GVC, followed by a discussion on the outlook and policy implications.

Korea's Participation in Global Semiconductor Supply Chain

1. **Korea is an important node in the large web of global semiconductor industry**. Most semiconductors, also known as integrated circuits or chips,[50] are a critical input for many industries, ranging from electronic devices to automobiles. For Korea, the semiconductor industry plays an important role in the country's exports and Korea's semiconductor exports often mirror global semiconductor sales, highlighting the interconnected nature of the industry. (Figure A2.1). Korea is an important player in the global semiconductor industry. According to SEMI 2023, as of 2022, Korea is the third largest semiconductor manufacturing country following China and Taiwan Province of China, accounting for 17.9% of the world's total semiconductor manufacturing capacity. In a large web of global semiconductor exports, Korea's key trading partners include China, the U.S., Japan, and Taiwan Province of China (Figure A2.2).

Figure A2.1. Exports and Semiconductor Sales

Source: World Semiconductor Trade Statistics; Korea Customs Service; S&P Global via CEIC.

Figure A2.2. Major Semiconductor Trade Corridors

Source: Asian Development Bank Multiregional Input-Output (ADB MRIO); AMRO staff estimates
Note: Underlying data is the domestic value added (DVA) embedded in an economy's gross exports which are ultimately absorbed abroad. The size of each bubble represents the share of a country's DVA exports to total global DVA exports in electrical and optical equipment in 2020. The thickness of the line linking country i to its corresponding trading partner represents the percentage share of value-added exports from country i to its corresponding trading partner with regard to country i's total value-added exports.

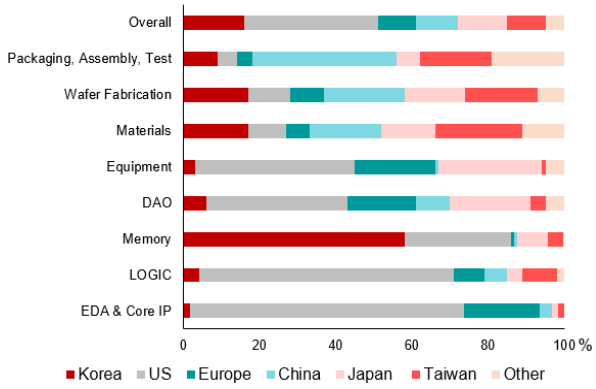
2. **Korea plays a leading role in memory chips and is expanding rapidly in non-memory chips.** The semiconductor industry is geographically concentrated, with the top five economies including China, Korea, Japan, Taiwan Province of China, and the U.S. accounting for around 85 percent of global value added (Figure A2.3). Korea accounted for nearly 60

[49] Prepared by Trung Thanh Vu, Associate Economist

[50] A chip consists of miniaturized electronic circuits that are made up of active discrete devices (transistors, diodes), passive devices (capacitors, resistors), and the interconnection between them, layered on a thin wafer of semiconductor material, typically silicon (Haramboure et al. 2023).

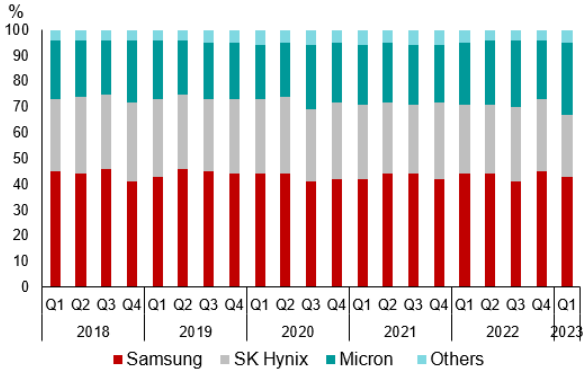
percent of global memory chip value added as of 2021. In the non-memory segment, each country specializes in a specific segment of semiconductors. In particular, the U.S. has strong advantages in chip design, Japan in chip-related machinery, China in materials, discrete, analog and others (DAO),[51] and Taiwan Province of China in foundry and chip processing. Samsung and SK Hynix are two companies dominating the global memory market (Figure A2.4). Moreover, it is not easy for other countries to enter the memory chip segment, especially high-end categories such as dynamic random access memory (DRAM), thanks to the competitive advantage in technological advancements owned by Korean companies. For example, Samsung has a long-standing leading position in memory chips. It was an early adopter of extreme ultraviolet lithography in DRAM production.

Figure A2.3. Semiconductor Industry Value Added by Activity and Country in 2021



Source: Semiconductor Industry Association 2022
Note: The electronic design and automation (EDA) tools and intellectual property (IP) necessary to design processor architecture are both critical inputs for the design of semiconductors. DAO refers to Discrete, Analog and Other. Logic chips are integrated circuits functioning on binary codes that serve as the brains of computing.

Figure A2.4. Share of Global DRAM by Revenue



Source: DRAMeXchange
Note: DRAM stands for dynamic random access memory.

3. **Semiconductor supply chains involve numerous stages and are characterized by cross-country dependencies.** This selected issue uses multiregional input-output tables to slice the GVC to understand Korea's participation in the network to gain more insight into trade patterns related to the Korean semiconductor industry. The methodology employed to decompose gross exports was developed by Wang et.al. (2018), who used an accounting framework to decompose gross exports into several components, including domestic value added (DVA), foreign value added (FVA) embodied in final and intermediate exports, and pure double counting (PDC) (Appendix A2.1). The data source is from the Asian Development Bank Multiregional Input-Output Database, using electrical and optical equipment as a proxy for the semiconductor industry.[52]

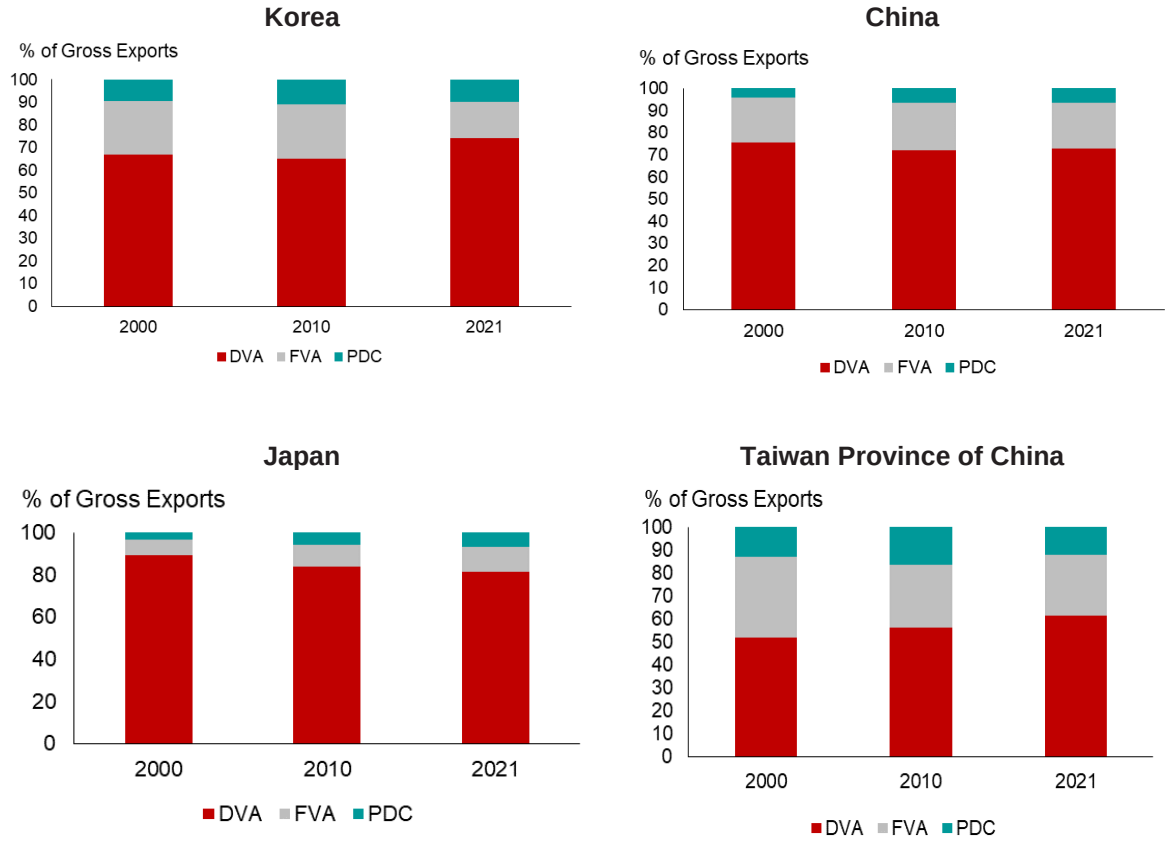
4. **Korea gains significant domestic value added (DVA) from its semiconductor exports.** The share of DVA to Korean gross semiconductor exports has increased over two decades (Figure A2.5), suggesting that this country is creating more value added from its exports thanks to the technological advantages of big companies. Furthermore, Korea has different DVA shares to gross exports compared with those of other major players. For

[51] Semiconductors can be broadly classified into three groups. First, logic chips, which process binary information, include microprocessors, microcontrollers, and connectivity chips. Second, memory chips store data such as dynamic random access memory chips (DRAM) and flash memory. Third, DAO chips, referring as discrete, analog, and others, process non-binary information (SIA 2021; Haramboure et al. 2023).

[52] HS codes 8541 and 8542 under electrical and optical equipment are often used to study semiconductor exports. However, due to the nature of the input-output table, which uses aggregation numbers and does not have a further detailed trade category classification, this selected issue uses electrical and optical equipment as a proxy for the semiconductor industry.

example, the decline in DVA share in Japanese exports suggests a reconfiguration of the supply chain toward other countries such as Korea and Taiwan Province of China. At the same time, Japanese companies have shifted their manufacturing facilities to other countries during 2000-2021. Taiwan Province of China is a connecting node that links key players in the GVC, represented by a lower share of DVA and a higher share of PDC) and FVA in its exports, indicating the presence of multiple back-and-forth trading of intermediate products between Taiwan Province of China and other countries. China has a stable share of DVA components in its exports, and the next paragraph will provide a deeper insight into the DVA structure of Korea and China, indicating the two countries are taking up different positions in the GVC. Lastly, all the analyzed countries have a higher weight of PDC in their exports, reflecting that intermediate goods have to cross the borders of those countries multiple times before being used in final goods production. This finding also suggests a deepening and more complicated pattern of cross-country production sharing in the value chain.

Figure A2.5. Value-added Components in Gross Exports of Semiconductors



Source: ADB MRIO; AMRO staff calculations

5. **Korea continues to occupy upstream positions in the semiconductor GVC.** Korea and China, for example, have a similar share of DVA in their gross exports, of about 70 percent. However, the two countries participate in the GVC in different ways. The DVA embodied in Korea's final exports (DVA_FIN) has decreased over the two decades, while its DVA in intermediate exports (DVA_INT) and DVA sent to third economies (DVA_INTrex) have increased during the same period (Figure A2.6). In contrast, China's DVA_FIN accounts for a large proportion of China's exports, while the shares of DVA_INT and DVA_INTrex have been stable over time (Figure A2.7). The difference in DVA structure between Korea and China suggests that these two countries occupy different positions in the GVC; specifically, Korea is positioned more toward forward GVC participation, producing inputs that are further re-

exported to third countries, while China engages in backward GVC participation, using imported inputs to produce final goods that are shipped abroad.

Figure A2.6. DVA Components of Korea's Semiconductor Exports

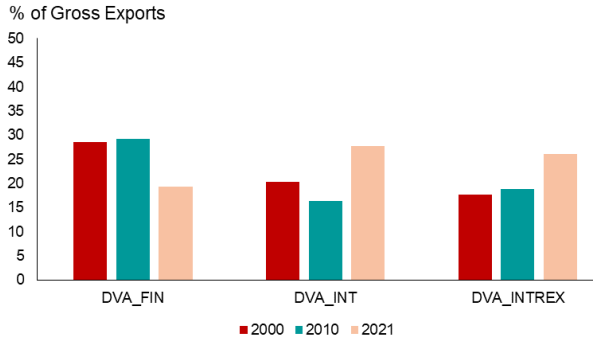
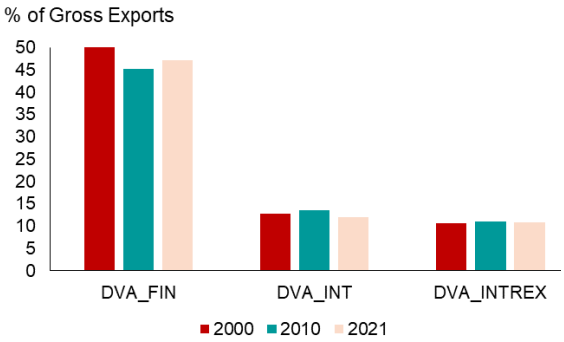


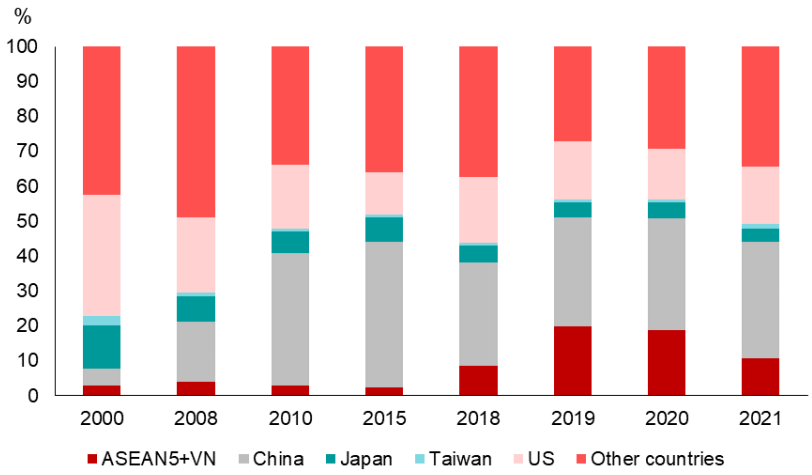
Figure A2.7. DVA Components of China's Semiconductor Exports



Source: ADB MRIO; AMRO staff calculations
Note: DVA_FIN refers to domestic value added (DVA) embedded in final exports. DVA_INT refers to DVA in intermediate exports used by direct importers to produce local final goods. DVA_INTrex refers to DVA sent to a third economy representing the domestic value added contained in intermediates (goods or services) exported to a partner economy that re-exports them to a third economy as embedded in other products

6. **The fragmentation of Korean semiconductor exports is mainly taking place within the region.** The increasing share of DVA and decreasing share of FVA components in Korea's semiconductor exports may suggest that the country is starting to internalize its production process to enhance its resilience to post-pandemic shocks. Furthermore, a further look into its FVA components indicates the use of a diversification strategy that semiconductor companies are adopting to deal with disruptions. In particular, the share of FVA components from countries of the Association of Southeast Asian Nations (ASEAN) coming to Korea after 2018 has increased significantly (Figure A2.8), implying that the production of more standardized parts and components might generally shift to ASEAN members, not only because of geographical closeness, substantial returns to scale and lower labor costs in ASEAN members, but also because of the US-China trade tensions since 2018. Another striking feature is the rapid rise of China and the corresponding decline of the U.S. over the two decades. This suggests China might overtake the U.S. as the leading foreign supplier of value added to Korea's electrical and optical equipment industries. These shifts in FVA components also imply that cross-country dependencies in the semiconductor GVC are inevitable for Korea and any other country.

Figure A2.8. Korea's Foreign Value-added Components



Source: ADB MRIO; AMRO staff calculations
Note: ASEAN5+VN comprises Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam.

7. **Korea has competitive advantages in memory chips and is in the upstream position in the GVC, but other major players are catching up.**

- China is an example. Decomposition of Korean-Chinese bilateral trade shows that the DVA in Chinese exports to Korea is dominated by DVA in final goods, whereas the DVA in Korean exports to China is dominated by DVA in intermediate goods that are absorbed directly by China (DVA_INT) or re-exported to a third country (DVA_INTrex) (Figures A2.9, A2.10). These findings again confirm the multiple value-added exchanges taking place between the two countries, the forward GVC participation of Korea and the backward GVC participation of China.
- However, the DVA first exported and eventually returned home (RDV) is almost negligible for Korea, but has increased for Chinese exports to Korea. This suggests that China has started producing and exporting parts and components, thus moving up the GVC ladder as part of its value added in its exports return home in the form of being embedded in imports from other countries. When entering the value chain in 2000, China tended to specialize in assembly. It assembled components and exported final goods. This trend illustrates how Korean firms—such as Samsung—strategically place their production chains in China to leverage the country's competitive advantages, thus underscoring the interlinked nature of supply chain networks
- Furthermore, the FVA structure of the bilateral trade suggests mutual dependencies across the two countries. The FVA exports from Korea to China mainly come from third countries, reflected by the fact that the FVA of Korean exports sourced from other countries (OVA_INT) is almost two times higher than that of Chinese exports. This also implies that Korea relies more on materials from other countries when exporting to China. By contrast, China relies directly on Korean materials in its exports to Korea.

Figure A2.9. Semiconductor Exports from Korea to China

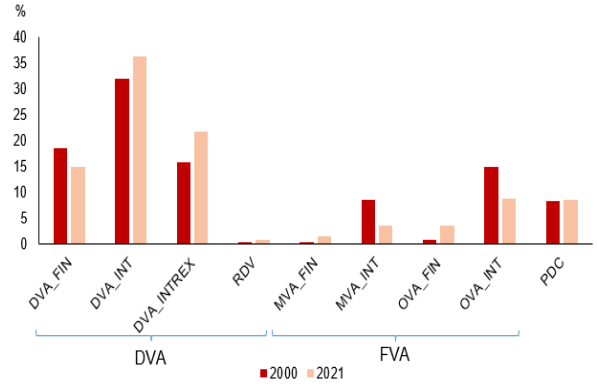
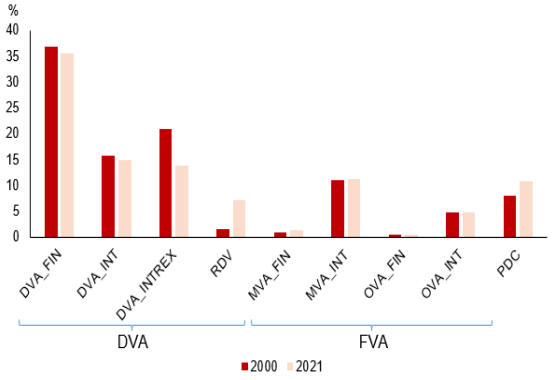


Figure A2.10. Semiconductor Exports from China to Korea



Source: ADB MRIO; AMRO staff calculations

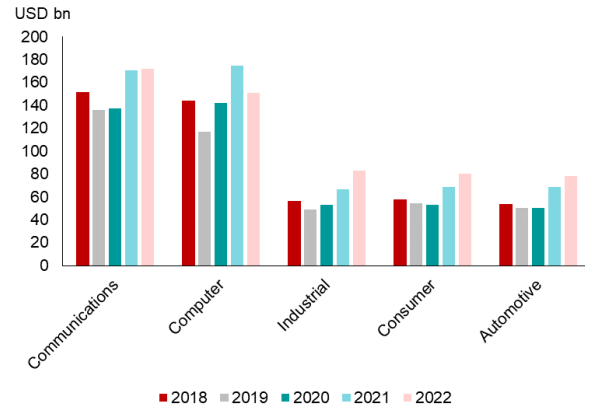
Note: DVA_FIN refers to domestic value added (DVA) embedded in final exports. DVA_INT refers to DVA in intermediate exports used by direct importers to produce local final goods. DVA_INTrex refers to DVA sent to a third economy representing the domestic value added contained in intermediates (goods or services) exported to a partner economy that re-exports them to a third economy as being embedded in other products. RDV refers to DVA first exported and then returned home. MVA_FIN and MVA_INT refer to foreign value added (FVA) used in final and intermediate exports sourced from direct importers. OVA_FIN and OVA_INT refer to foreign value added (FVA) used in final and intermediate exports sourced from other countries. PDC refers to pure double counting.

Outlook and Policy Implications

8. **Going forward, the global semiconductor industry is expected to recover in the near term, which will in turn have positive impacts on the Korean semiconductor industry**. World semiconductor sales started to pick up in late 2023, while Korea's semiconductor exports also gained positive momentum, growing by 19.2 percent year on year in December 2023. At the same time, Korean automobile and electronic appliances exports

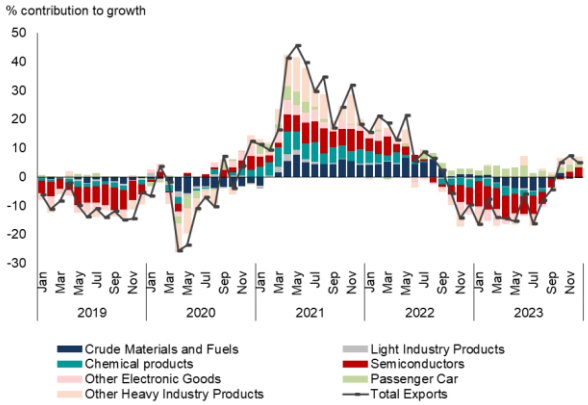
continued to gain momentum in late 2023 (Figure A2.12). Furthermore, global memory chip demand is expected to stay on an upward trend, supported by factors such as growth in artificial intelligence (AI), cloud data services, migration to 5G smartphones, increasingly connected devices, increasing memory content per device, and the gradual alleviation of supply chain disruptions. Semiconductor prices are also starting to rebound thanks to resurgent demand for smartphones, AI and other technologies. Thus, the earnings of big semiconductor companies are expected to resume growth in 2024 after significant weakening in 2023. Shifts in end-use market share also suggest growing innovation and demand for semiconductors in the automotive, industrial and consumer markets (Figure A2.11).

Figure A2.11. Demand for Semiconductors by End Users



Source: Semiconductor Industry Association 2018-2022

Figure A2.12. Exports by Sector



Source: Korea Customs Service via CEIC.

9. **However, vulnerabilities remain in the medium term**. Previous analyses also suggest that the semiconductor GVC can be vulnerable to shocks.

- First, cross-country dependencies are inevitable in the semiconductor GVC. Over the last two decades, Korea had relied more on Asian countries for semiconductor production, while the U.S. has remained one of its key partners in semiconductor exports. Furthermore, no country can take full control of the semiconductor production chain. Thus, a disruption of semiconductor production in a single economy can potentially trigger a broad range of negative impacts on other countries in the chain. Trade tension, for example, is one factor. The waiver of U.S. restrictions in 2023 has created a positive impact by removing near-term uncertainties, but it does not necessarily imply a resolution of longer-term structural issues. Furthermore, other geopolitical risks pose medium-term uncertainty by causing further supply disruptions and cost increases.
- Second, it may take 10 to 20 years for countries to climb up the semiconductor GVC ladder of GVC and reconfigure the GVC. It is also costly for countries to develop their technological advancements, infrastructure, and related ecosystems. However, technological advancements and innovations such as AI can be game changers, and countries that invent new technologies will continue to occupy a leading position in the GVC. The competition across countries will also be more severe.

10. **Given those vulnerabilities, Korea needs a strategic vision to prepare for any future shocks.** Strengthening resilience, maintaining technology leadership, investing in long-term research and development, developing infrastructure and nurturing talent are crucial for Korea to maintain its leading role in the semiconductor GVC.

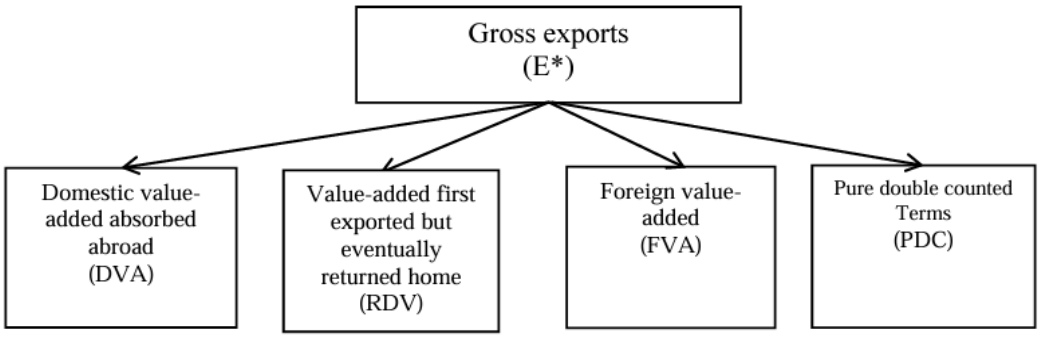
- First, strengthening resilience can be done by diversifying material sources and relocating factories. Korean companies can choose to keep some of their factory

plants in key partners, such as China, while relocating other factories either back to Korea or to other countries, especially ASEAN countries and the U.S. In addition, moving from "just-in-time" inventory management to a "just-in-case" approach can be an option to deal with increasing uncertainty in the chain, while setting up supply chain resilience departments inside companies and at the national level will be necessary to assess and identify vulnerabilities in the supply of materials.

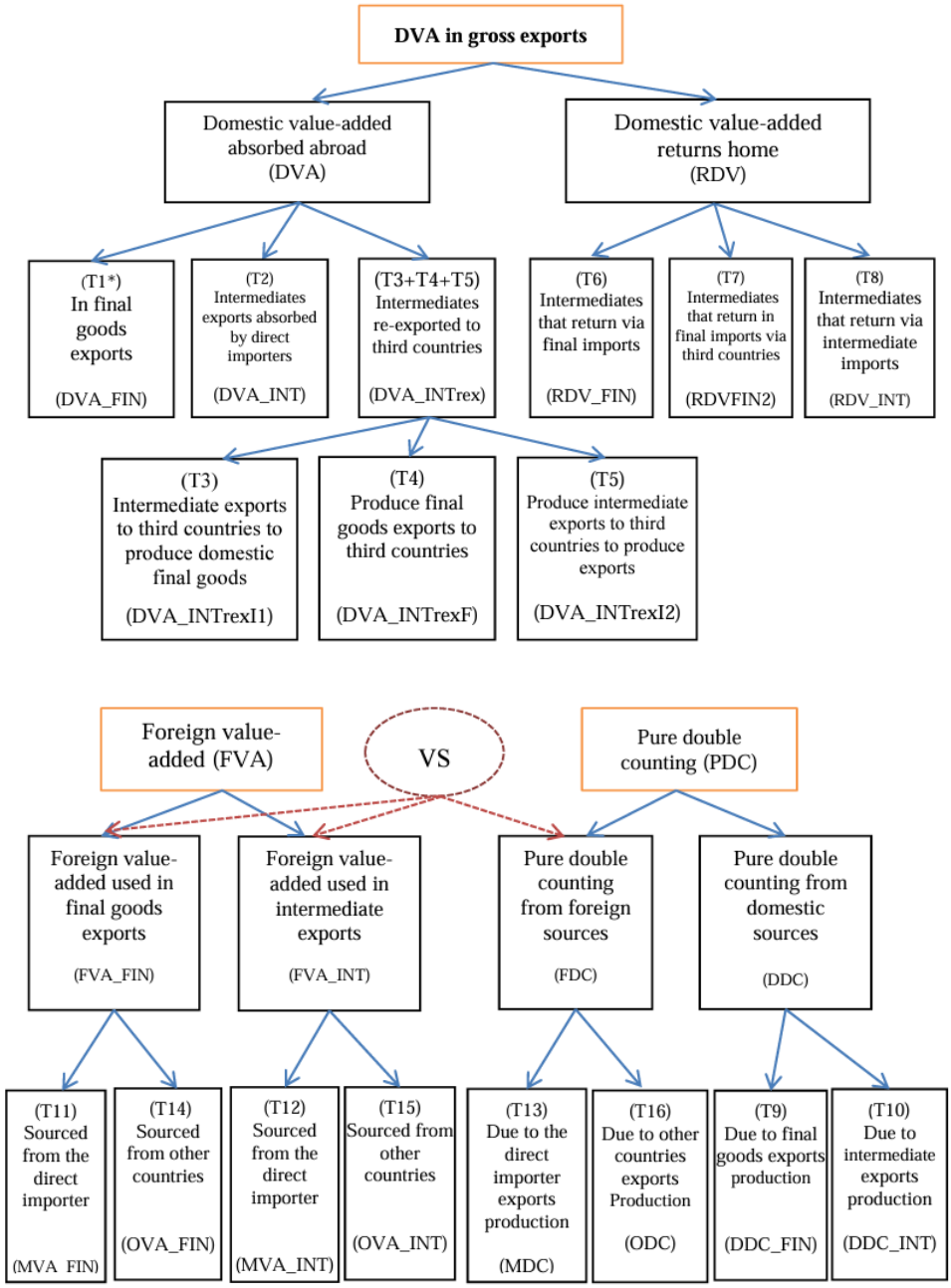
- Second, as Korea has competitive advantages in memory chips, holding the leading role in the segment will allow the Korean semiconductor industry to benefit from a virtuous cycle of innovation of higher R&D investment, higher revenue and profit, and technological leadership. According to the Semiconductor Industry Association (SIA), Korea ranked after the U.S. and Taiwan Province of China in terms of R&D expenditure as a percentage of sales in 2022. The Korean government is also encouraging more R&D investment in the semiconductor industry, such as the "K-Chip Act"[53] passed in 2023 to increase tax credits for companies.
- Third, the government is on the right track to strengthening Korean chip infrastructure. The SK Hynix Yongin Cluster and the Samsung Electronics Pyeongtaek campus will be important infrastructure developments. It is also necessary to speed up government-funded projects, such as projects related to high-energy efficiency and environment-friendly semiconductors, auto semiconductor projects, and AI semiconductor development under a 2024-2030 road map[54].
- Fourth, given that the aging population and low fertility will reduce the labor force, it is crucial for the government to secure funding to strengthen the semiconductor workforce at all levels such as by promoting collaboration among universities, research institutes, and businesses, expanding public-private innovation partnerships, and investing in science parks within networking institutions.

Appendix A2.1: Slicing the GVC

Wang, Wei, and Zhu (2018) used an accounting framework to decompose gross exports into several components including domestic value added, foreign value added embedded in final and intermediate exports, and pure double counting. The detailed components are presented below. Charts are adopted from Wang, Wei, and Zhu (2018).



[53] The Special Tax Treatment Control Law was amended in April 2023 (namely, the "K-Chips Act") with provisions to increase the tax deduction rate for national strategic technologies, including those related to semiconductors.
[54] The "Semiconductor Future Technology Roadmap" was announced by the Ministry of Science and ICT in May 2023. The roadmap was developed with the participation of industry, academia, research institutes, and government organizations to outline strategic plans aimed at securing and reinforcing Korea's leading position in the chip industry over the next decade.



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3. Assessing the Impact of Interest Rate Changes on Consumption in Korea: The Role of Liquidity Constraints and Indebtedness[55]

This selected issue aims to empirically estimate the impact of interest rate changes on consumption by using a Korean household-level panel dataset. The econometric results indicate that a 1 percentage point change in the deposit or loan interest rate is estimated to change private consumption by about 0.2 percent within a year. Special emphasis is placed on the role of liquidity constraints and indebtedness in amplifying the transmission of income shocks to consumption growth. The current study implies that improving the quality of household balance sheets is critical to the stable growth of private consumption in the longer term.

Background

1. **Interest rate fluctuations in Korea[56] since H2 2021 are expected to have a significant impact on private consumption by affecting disposable income.** In the broad strands of literature on consumption, the magnitude of this impact may depend on the extent to which households can insure their consumption against transitory earnings shocks, such as interest rate changes. In particular, one group of consumers – namely hand-to-mouth (HtM) consumers – exhibit a large sensitivity of consumption to temporary income changes because they are highly liquidity constrained and spend most of their available financial resources in every pay period, hence displaying a high marginal propensity to consume (MPC).[57]

2. **Korea is a good economy for the investigation of the sensitivity of consumption due to existence of HtM consumers, considering the high degree of liquidity constraints and indebtedness in the household sector**. First, Korean households have an unbalanced portfolio which assigns excessive weight to illiquid assets, such as real estate, that are too costly for consumption insurance against temporary disposable income changes. According to OECD indicators in Figure A3.1, Korean households record the lowest share of financial net worth in total net worth, at 23.7 percent in 2022, for example, far below the 70.9 percent of the U.S. and Japan's 2021 figure of 57.2 percent. Second, the ratio of household debt to disposable income has risen sharply in Korea,[58] being the highest among OECD countries (Figure A3.2). These features of the Korean household economy may imply the existence of a large proportion of HtM households in Korea, based on the conclusion of Kaplan, Violante and Weidner (KVW, 2014) that the degree of liquidity constraints and indebtedness is a strong predictor of HtM status.

[55] Prepared by Sungtaek Kwon, Senior Economist.

[56] Deposit rates of banks on average (percent, based on newly extended deposits): 0.83 in May 2021 → 4.29 in Nov 2022 → 3.43 in Apr 2023 → 3.99 in Nov 2023. Household loan rates of banks on average (percent, based on newly extended loans): 2.92 in June 2021 → 5.64 in Dec 2022 → 4.80 in Jul 2023 → 5.04 in Nov 2023.

[57] Theoretical and empirical advances by Kaplan and Violante (2010) and Kaplan, Violante and Weidner (2014) have revealed a sizable existence of HtM consumers in major advanced economies and their high MPC.

[58] Household debt in Korea started expanding dramatically after the Asian currency crisis in 1997. This rising indebtedness has continued even after the global financial crisis, during which major OECD economies had experienced the opposite, a declining trend in debt.

Figure A3.1 Share of Financial Net Worth in Total Net Worth, 2022 [1) 2)]

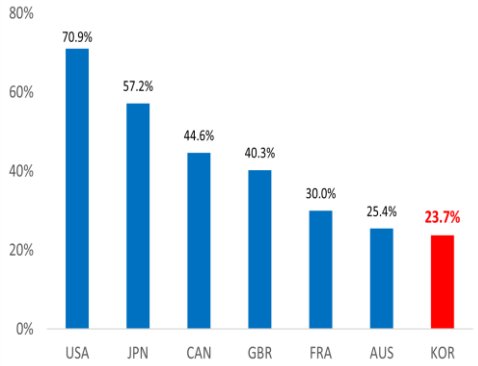
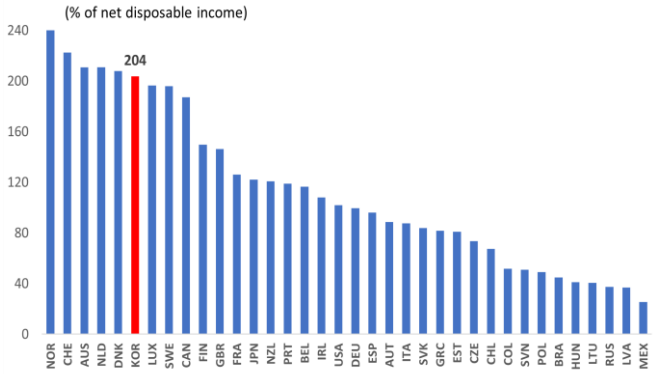


Figure A3.2 Household Debt to Net Disposable Income of OECD Countries, 2022 or Latest Available



Source: OECD; Fed
Note: 1) Japan's data is from 2021; 2) For the U.S., (1 - real estate assets / total net worth) *100

3. **The availability of a Korean household-level panel dataset allows an empirical assessment of the transmission of earnings shocks to consumption.** Estimation of the average MPC across households requires a longitudinal dataset with information on consumption, income, wealth and various control variables, such as demographics at the household level. Korea has longitudinal microdata for the period 1998-2022, compiled by the Korean Labor & Income Panel Study (KLIPS).

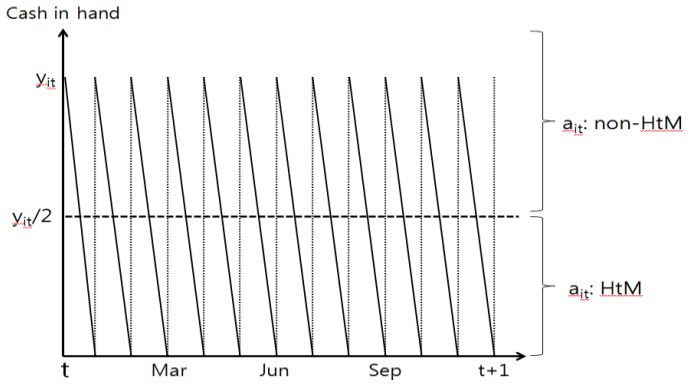
4. **This selected issue aims to empirically estimate the average MPC out of transitory earnings shocks for Korean households, and the impacts of deposit and loan interest rate changes on their consumption, by using household-level panel data.** In particular, it will explore the role of liquidity constraints and debt in amplifying the transmission of temporary income changes on consumption. The selected issue then summarizes the key findings and provides a policy discussion.

Identification of HtM Households and Estimation of MPC: KVW Methodology

5. **This section describes the identification strategy of liquidity-constrained HtM consumers in the household-level panel dataset, built upon the KVW methodology.** Let y_{it} and a_{it} denote the average monthly income and the stock of liquid assets of household i in year t, respectively (Appendix Box 3.1 gives the variable definitions). The pay frequency is set to one month and a_{it} is supposed to be equal to the average balance of liquid savings over the pay period. Monthly income y_{it} of an HtM consumer, that is, cash in hand at the beginning of the pay period, is assumed to be spent at a constant rate over the pay period. As a result, the average balance of cash in hand from the monthly income is equal to half of y_{it}. A household whose liquid assets a_{it} are less than half of y_{it} is defined as HtM since such a small amount of liquid savings would not help to absorb transitory income shocks.

Figure A3.3 Illustration of HtM Status Based on Monthly Income

HtM Consumer:
$0 \leq a_{it} \leq y_{it} / 2$



6. **The regression model for MPC estimation also follows the methodology proposed by KVW.** This is equivalent to the coefficient from an instrumental variable (IV) regression of Δc_{it} on Δy_{it}, instrumented by $\Delta y_{i,t+1}$, where Δc_{it} and Δy_{it} are the first-differenced residuals of log consumption and log income, respectively (Appendix Box 3.1 gives details of the KVW methodology). In an intuitive interpretation, transmission coefficient MPC_t is the fraction of the variance of transitory earnings shocks that becomes part of consumption within a year.

$$MPC_t = Cov\ (\Delta c_{it}\ \Delta y_{i,t+1}) / Cov\ (\Delta y_{it}\ \Delta y_{i,t+1})$$

7. **This selected issue uses household-level panel data from KLIPS.** The KLIPS survey was conducted annually from 1998-2022 on its original sample of 5,000 households. The final sample for regression analysis consists of 66,651 observations over the pooled years of 2001-2022[59] (Appendix Box 3.1 gives details of the sample selection), covering 26,154 HtM (39.2 percent) and 40,497 non-HtM (60.8 percent) households.

Estimation Results of MPC and Impact of Interest Rate Change on Consumption

8. **The average MPC of Korean households is estimated to be 0.082,[60] suggesting that a 1 percentage point revision in the deposit or loan interest rate is estimated to change private consumption by about 0.2 percent.** Specifically, according to the BOK's Flows of Fund as of Q3 2023, deposit assets (including bonds) and loan balances of households and non-profit organizations totaled KRW2,442 trillion and KRW2,281 trillion, respectively. As a result, a 1 percentage point change in the average deposit or loan interest rate throughout the year is estimated to result in a change in consumption worth KRW2.0 trillion and KRW1.9 trillion within a year, respectively, when applying the estimated average MPC of 0.082 to the full sample. Considering that nominal private consumption was KRW1,039 trillion in 2022, this is equivalent to about 0.2 percent of private consumption in Korea.

[59] The first three rounds of the survey, from 1998-2000, are dropped because of the data unavailability of some key variables and noisy information from the Asian currency crisis of 1997. In addition, the analysis is restricted to households in which the head is between 22 and 55 years old and has yet to retire, as suggested by KVW.

[60] This means that Korean households tend to adjust their consumption by 8.2 percent of temporary income changes within a year.

Table A3.1 Estimates of MPC out of Transitory Earnings Shocks by HtM Status

	HtM	Non-HtM	Total
Age of 22-55	0.128***	0.054***	**0.082*** **
DSR ≤ 0.1	0.108***	0.051***	0.072***
DSR > 0.1	0.203***	0.083***	0.124***

Source: KLIPS; AMRO staff estimates
Note: Pooled 2001-2022. Significance levels are indicated by *** p < 0:01, ** p < 0:05, and * p < 0:1.

9. **Households with few or no liquid savings exhibit a larger sensitivity of consumption in response to temporary income changes, in line with economic intuition as discussed previously.** The first row of Table A3.1 shows HtM households display a larger average MPC, of 0.128, indicating that they tend to adjust consumption by 12.8 percent of temporary disposable income changes within a year, significantly higher than the 0.054 of the non-HtM group, concurring with our hypothesis. Households who are potentially constrained in liquidity, with less liquid savings, display a stronger transmission of transitory income shocks to consumption, consistent with a large body of literature.[61]

10. **In addition, debt plays a key role in amplifying consumption sensitivity.** Debt service ratio (DSR) can be the most direct measure of indebtedness to assess a household's economic hardship from debt servicing and ability to insulate consumption against transitory shocks. Table A3.1 shows strong evidence of the crucial role of debt burden on consumption for both HtM and non-HtM groups. Indeed, as expected, households with a DSR greater than 0.1 exhibit a significantly higher average MPC, of 0.124, than those with a lower DSR. Moreover, the HtM group records a much wider MPC variation with respect to the DSR than the non-HtM group, as shown in the third row of Table A3.1. This implies that highly indebted consumers, who must allocate a large portion of their budget to repay debt and cannot borrow easily due to a poor credit history, are very likely to live HtM and respond more strongly to transient fluctuations in income.

Key Findings and Policy Implications

11. **MPC heterogeneity across households reflects the importance of liquidity constraints in amplifying the transmission of income shocks to consumption.** Most importantly, a key intuition underlying this finding may be that the aging population in Korea could have a negative effect on the growth of private consumption in the longer term. Old retirees, whose reliance on income from social insurance benefits and transfer income from government or family members sharply increases with age, are more likely to become HtM consumers and adjust their spending more strongly in response to temporary income changes. This is mainly because the vast majority of their assets are disproportionately tied up in housing or lump-sum tenancy deposits, forcing them to stay liquidity constrained and to live HtM after retirement. Against this backdrop, economic stimulus programs should be

[61] Furthermore, the estimates of MPC for Korea are placed within the range of credible values, as extensive empirical evidence shows. Examples of studies are Blundell et al. (2008): 0.05, Kaplan and Violante (2010): 0.06-0.18, Broda and Parker (2014): 0.084-0.172, Christelis et al. (2016): 0.14-0.24, KVW: 0.158-0.288, Cui and Feng (2017): 0.097-0.3, Carroll et al. (2017): 0.2-0.4.

targeted in favor of the higher MPC group facing liquidity constraints, not simply in terms of income or total net worth.

12. **In particular, a separate examination of the role of debt reveals that debt service payment stands out as a key determinant of consumption sensitivity.** In the short term, an increase in household debt could contribute positively to rising consumption. However, when excessive household debt relative to disposable income or the size of the economy persists for a longer time, households risk being further forced to reduce consumption as their debt payment burden increases. In other words, as the average DSR of the economy rises or the number of borrowers whose DSR exceeds the consumption threshold[62] increases, borrowers' incentive to consume may diminish, thereby dampening the growth of private consumption and hindering economic growth over the longer term.

13. **Against this backdrop, the authorities and financial institutions should commit to gradually improving the qualitative structure of household balance sheets.** More attention should be paid to the adjustment of the household sector's unbalanced portfolio, in which a high share is in the form of illiquid assets such as real estate. In addition, it is necessary to manage the increase in household loans and bring it to an appropriate level by continuously developing the stress DSR system based on the borrower's repayment ability, while considering unexpected internal and external shocks when calibrating debt repayment schedules. Furthermore, it is important to facilitate borrowers' adjustment of the proportion of floating-rate and fixed-rate loans in line with interest rate movements.

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[62] According to the BOK's Financial Stability Report in December 2023 this DSR threshold to limit consumption is estimated to be around 46 percent.

Technical Appendix 3.1. Variable Definitions and Sample Selection from KLIPS

Variable Definition

Total income in the KLIPS dataset includes after-tax labor earnings, interests, dividends, rents, other capital gains, social welfare benefits, and transfer incomes from government or family members. For consumption expenditure, the KLIPS reports food (at home and away), education (public and private), housing costs, money gifts for family events such as weddings and funerals, car maintenance, public transport, health, entertainment, durable goods, communication, allowances for parents or children, clothes and other living necessities. Liquid assets consist of cash, bank deposits, stocks, bonds, private mutual funds and private lending.

Sample Selection

The KLIPS survey was conducted annually from 1998-2022. Its original sample of 5,000 households and their spin-offs, meaning children of the original households forming their own families, live in the top seven metropolitan cities and urban areas of nine provinces in Korea. The current study excludes the first three rounds of KLIPS, spanning 1998-2000, because of the data unavailability of some key variables and noisy information from the Asian currency crisis of 1997. The sample is restricted to households in which the head is between 22 and 55 years old and has yet to retire, as suggested by KVW. Outliers are removed by winsorizing assets and debt variables at 1 percent and 99 percent over the whole period. Households whose saving rates and debt service ratio (DSR) are larger than 1 are also dropped. To estimate MPC out of transitory income shocks, households who answer the survey fewer than three consecutive times are also excluded because identifying coefficients in related regressions requires a minimum of three years. The final sample for regression analysis consists of 66,651 observations over the pooled years of 2001-2022, including 26,154 HtM (39.2 percent) and 40,497 non-HtM (60.8 percent) households.

Technical Appendix 3.2. MPC Estimation Methodology

KVW Methodology

This appendix outlines key steps of the MPC estimation procedure, the methodology of KVW which is proposed by Blundell et al. (2008) and further examined in Kaplan and Violante (2010). They suppose that the log of real income, $\log Y_{it}$, can be decomposed into predictable individual components X_{it}, a permanent component P_{it}, and a mean-reverting transitory component ε_{it}.

$$\log Y_{it} = X'_{it}\psi_t + P_{it} + \varepsilon_{it}$$

where X is a set of year and birth-cohort dummies and observable household characteristics, including gender, education, marital status, job status, family size, number of children and residence area. As a result, income process $y_{it} = \log Y_{it} - X'_{it}\psi_t$ (the log of real income net of its predictable components) is represented as an error component model that comprises an orthogonal permanent component P_{it}, and an independently and identically distributed (i.i.d.) transitory income shock ε_{it} with variance σ_ε. P_{it} follows a unit root process with variance σ_η, and permanent income shock η_{it} with variance σ_η is serially uncorrelated. This characterization of income process has been widely adopted in the empirical labor literature.

$$y_{it} = \log Y_{it} - X'_{it}\psi_t = P_{it} + \varepsilon_{it}$$

$$P_{it} = P_{i,t-1} + \eta_{it}$$

It follows that unexplained income growth is defined as

$$\Delta y_{it} = \eta_{it} + \Delta \varepsilon_{it}$$

Next, the analysis is based on the following consumption growth allocation, as proposed by Blundell et al. (2008), where π^{η}_{it} and π^{ε}_{it} translate into the MPC out of permanent and transitory income shocks, respectively, and ξ_{it} is a residual component. The equation (1) below is based on the fact that it approximates well the solution of a life cycle optimization problem where agents have the Constant Relative Risk Aversion (CRRA) utility. The implicit assumption is that (π^{η}_{it}, π^{ε}_{it}, ξ_{it}) are all independent of income innovations at every relevant lead and lag. The true MPC out of transitory income shocks is defined as equation (2).

$$\Delta c_{it} = \pi^{\eta}_{it}\, \eta_{it} + \pi^{\varepsilon}_{it}\, \varepsilon_{it} + \xi_{it} \qquad (1)$$

$$MPC_t = Cov(\Delta c_{it}\ \varepsilon_{it}) \,/\, Var(\varepsilon_{it}) \qquad (2)$$

In intuitive interpretation, transmission coefficient MPC_t is the fraction of the variance of transitory shocks that melts into consumption growth. However, it is an inevitable obstacle that the realizations of individual income shocks cannot be disentangled in panel data. To identify and estimate the MPC from the data, the KVW methodology exploits the following orthogonality condition between consumption growth and future income shocks. This assumption implies no foresight or advanced information on future earnings shocks.

$$Cov(\Delta c_{it}\ \eta_{i,t+1}) = Cov(\Delta c_{it}\ \varepsilon_{i,t+1}) = 0$$

Under the above assumption, Blundell et al. (2008) proposed a strategy to identify and estimate the MPC. For transitory shocks ε_{it}, they set as below:

$$Cov(\Delta y_{it}\ \Delta y_{i,t+1}) = Var(\varepsilon_{it})$$

$$Cov(\Delta c_{it}\ \Delta y_{i,t+1}) = Cov(\Delta c_{it}\ \Delta \varepsilon_{it}) \qquad (3)$$

Combining (2) and (3) results in the following point estimate of the transmission coefficient of transitory income shocks to consumption, π^{ε}_{it} in the equation (1), given by

$$MPC^{e}_t = Cov(\Delta c_{it}\ \Delta y_{i,t+1}) \,/\, Cov(\Delta y_{it}\ \Delta y_{i,t+1}) \qquad (4)$$

This specification (4) is a consistent estimate of the true MPC in the absence of foresight about future earnings realizations. It is equivalent to the coefficient from an IV regression of Δc_{it} on Δy_{it}, instrumented by $\Delta y_{i,t+1}$. First, it needs to regress log income and log consumption on control variables, including age, education, household composition, job status, residence area, and year and cohort dummies. Next, it is necessary to construct the first-differenced residuals of log consumption Δc_{it} and log income Δy_{it}.

4. Policy Considerations for Public Pension Reforms in Korea[63]

Public pension reform is one of the most urgent reform agendas in Korea as the financial sustainability of public pension funds is concerning, and old-age poverty remains high. This selected issue presents an overview of the pension system in Korea, and provides policy recommendations for both parametric and structural reforms.

Background

1. Despite a multilayered pension system, the old-age poverty rate remains high (Table A4.1). The National Pension serves as a mandatory pension system with contributions from workers.[64] It operates on a defined benefit scheme, where the pension benefits are determined by a combination of (i) income-proportional benefits, calculated by the average individual earnings over the subscription period, and (ii) income-redistributive benefits, computed by the three-year average earnings of total subscribers. The Basic Pension, funded by the government budget, provides benefits to the elderly over 65 below an income threshold.[65] The retirement pension scheme offers employers an option to convert mandatory lump-sum retirement payments to pension annuities with the consent of their employees.[66] The personal pension is a voluntary pension scheme. Additionally, mandatory special occupational pension systems are in place for government officials, private teachers and military personnel. Notwithstanding the various public and private, mandatory and voluntary pension schemes, the old-age poverty rate in Korea remains the highest among OECD countries (Figure A4.1) because the benefits of the National Pension are insufficient due to a short contributory period,[67] Basic Pension benefits are low,[68] both employees and employers prefer lump-sum retirement payments over pension annuities,[69] and participation in the personal pension scheme is low.

Table A4.1. Multilayered Old-age Income Support System in Korea

<table>
<tr><th></th><th>Self-employed</th><th>Employee</th><th>Special Occupational Workers</th></tr>
<tr><td>Tier 3</td><td colspan="2">Personal Pension (7.6%)</td><td rowspan="3">Special Occupational Pension
(Government Official Pension,
Private Teachers Pension,
Military Personnel Pension)
(5.9%)</td></tr>
<tr><td>Tier 2</td><td>Retirement Pension (22.3%)</td></tr>
<tr><td>Tier 1</td><td colspan="2">National Pension (73.3%)</td></tr>
<tr><td>Tier 0</td><td colspan="2">Basic Pension</td></tr>
</table>

Source: MOHW (2023)
Note: Numbers in parentheses represent the ratio of subscribers over the population aged 18-59, as of end-2022 for the National Pension and special occupational pensions, and as of end-2021 for the retirement pension and personal pension.

[63] Prepared by Byunghoon Nam, Senior Economist.

[64] The National Pension Service was introduced in 1988 and expanded to a mandatory pension system for the public in 1999. The contribution rate is 9 percent, and the income-coverage ratio is 40 percent if subscribed for 40 years.

[65] The Basic Pension was introduced in 2008 to support elderly Koreans who did not secure national pension entitlement or pay contributions for a sufficient period. Its benefits increased four times from KRW84,000 in 2008 to KRW323,000 in 2023.

[66] The retirement pension was introduced in 2005. Employers are required to pay one month of wages for each year of employment to departing employees.

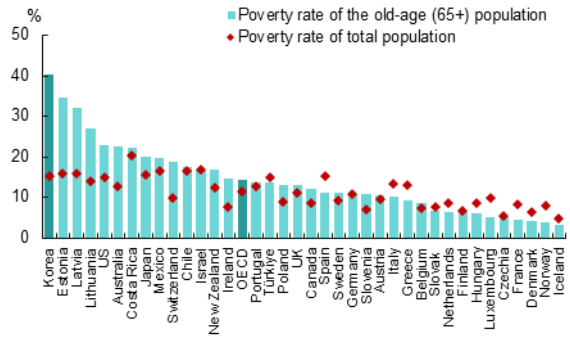
[67] The average subscription period in 2022 was 19.3 years, according to MOHW (2023).

[68] According to OECD (2022), the benefit level of the Basic Pension is among the lowest of non-contributory benefits in OECD countries.

[69] In 2021, 53.3 percent of eligible employees subscribed to the retirement pension scheme, but only 4.3 percent of retirees opted for pension annuities while 95.7 percent received lump-sum payments. Employers prefer the lump-sum payment partly because the pension annuities require them to entrust the funds outside their firms. Employees prefer the lump-sum payment partly due to the low rate of fund returns and other financial needs, such as children's education and weddings.

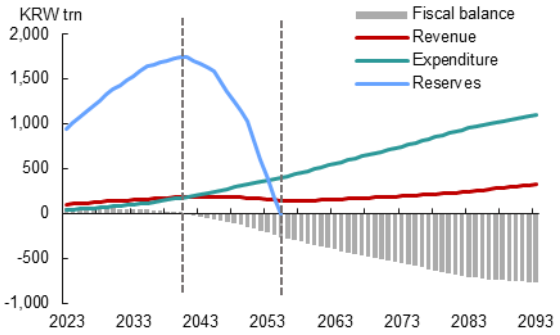
2. The financial sustainability of public pension funds is concerning. According to the 5th financial accounting of the National Pension Fund (NPF), conducted in 2023, the NPF is expected to be depleted in 2055 following a shift to a deficit in the fiscal balance in 2041, driven by a sharp increase in pensioners and a decline in subscribers over time (Figure A4.2).[70] The projected depletion of the NPF and the potential need for higher contribution rates to sustain the pension system led to low trust among the younger generation and raised intergenerational equity concerns. [71] Concurrently, the financial positions of special occupational pension funds are also expected to continue deteriorating.[72] In addition, the number of recipients and fiscal costs of the Basic Pension will significantly increase over time with rapid population aging.[73]

Figure A4.1. Old-age Poverty Rate



Source: OECD (2023)
Note: 1) Poverty rate = population with income below 50 percent of the medium income / total population; 2) The most recent data is for 2020, except for the following countries: Costa Rica, Finland, Latvia, the Netherlands, Norway, Sweden and the US (2021), Denmark, France, Germany, Hungary, the Slovak Republic, Switzerland and Türkiye (2019), Japan (2018) and Chile and Iceland (2017).

Figure A4.2. NPF Fiscal Balance and Reserves



Source: National Pension Fund Financial Accounting Committee (2023)

3. The Korean government, acknowledging the challenges facing the pension system, proposed a public pension reform plan. Drawing from discussions in the NPF Financial Accounting Committee and the National Assembly Special Committee on Pension Reforms, the government outlined the NPF Comprehensive Management Plan in October 2023.[74] The plan aims to make the NPF sustainable for future generations through both parametric and structural reforms based on social consensus (Table A4.2). While generally supportive of the overall direction of the proposed public pension reforms by the government, this note emphasizes three key considerations for public pension reforms in Korea: (i) expediting parametric pension reforms; (ii) discussing the introduction of an automatic adjustment mechanisms; and (iii) organizing an effective multilayered pension system.

[70] According to the National Pension Act, the Minister of Health and Welfare shall conduct a financial accounting of the NPF every five years and formulate an NPF Comprehensive Management Plan that will provide the financial outlook, an adjustment of pension premiums and an operational plan for the Fund. The government shall then submit the plan to the National Assembly by the end of October.

[71] According to a survey conducted by Korean Research in 2022, less than 30 percent of people in their 20s and 30s believed that they will be able to receive pension benefits, while 55 percent of those in their 30s and 40s said that they would not subscribe to the National Pension if it were not mandatory.

[72] According to NABO (2023), the Private Teachers Pension Fund (PTPF) is expected to be depleted in 2043. The deficits of the Government Officials Pension Fund (GOPF) and Military Personnel Pension Fund (MPPF) are also expected to increase over time.

[73] According to MOHW (2023), fiscal costs of the Basic Pension increased tenfold from KRW2.2 trillion in 2008 to KRW22.5 trillion in 2023. With the aging population and inflation, its fiscal spending is projected to reach KRW238 trillion by 2070.

[74] The NPF Financial Accounting Committee presented 18 scenarios of parametric reform options for the NPF by providing combinations of raising contribution rates (from the current 9 percent to 12, 15 or 18 percent), extending the pensioner age (from the current 65 to 68 years old), and enhancing the rate of investment returns (from the current 4.5 percent to 5 or 5.5 percent). See NPF Financial Accounting Committee (2023) for the full report.

Table A4.2. NPF Comprehensive Management Plan

Objective	Sustainable National Pension Fund for the Future Generation

5 Sectors	15 Measures
1. Securing old-age income	1. Adjusting the income-coverage ratio 2. Expanding contribution payment support for low-income groups and contract workers, and matching the subscriber age limit with the pensioner age 3. Improving the pension benefit structure for old-age workers, the bereaved family's pension and the dependent pension
2. Enhancing intergenerational equity and public trust	1. Stipulating a pension benefit payment guarantee in the law 2. Expanding the subscription period extension and the contribution payment support for childbirth and military service 3. Introducing automatic adjustment mechanisms or switching from the defined benefits to the defined contribution scheme
3. Stabilizing NPF financial position	1. Raising the contribution rate 2. Extending the pensioner age 3. Expanding budgetary support for the NPF
4. Improving fund management	1. Enhancing the investment rate of return 2. Diversifying the investment portfolio and strengthening investment capacity 3. Improving the strategic asset management system
5. Establishing multilayered old-age income support system	1. Increasing the monthly payment of the Basic Pension 2. Supporting the use of private pensions (retirement pension, personal pension) 3. Analyzing and improving the multilayered old-age income support system

Source: MOHW (2023)

Expediting Parametric Reforms of the NPF

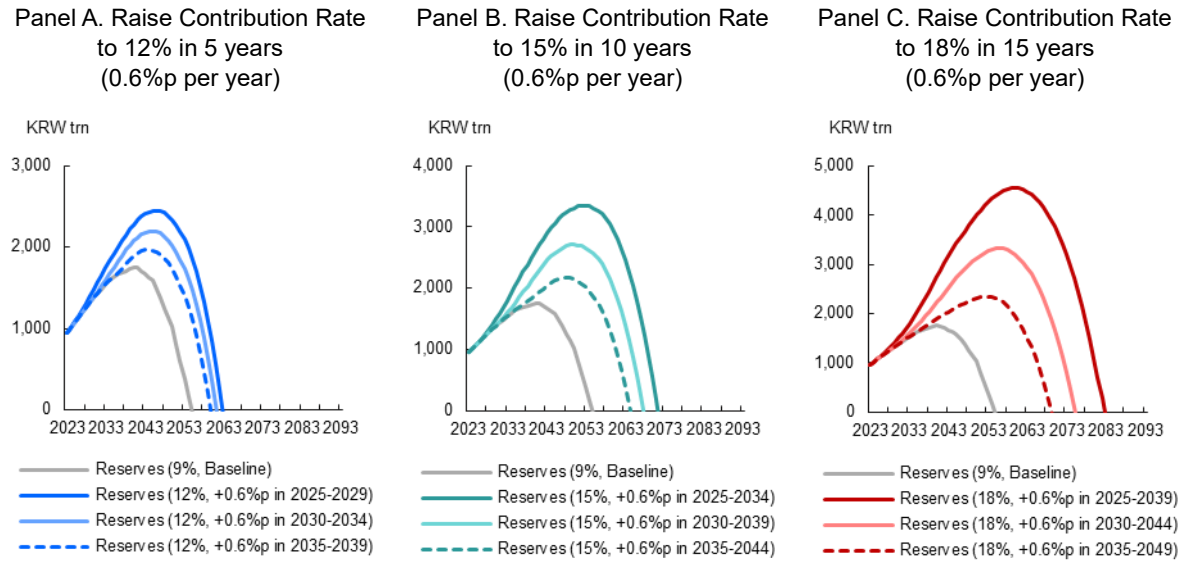
4. The consequences of procrastination in parametric reforms are detrimental.[75] Given the rapid aging of the population, postponing adjustments to the parameters of the NPF will exacerbate the financial imbalance between pension contributions and benefit payments, leading to more challenging corrections for future generations.[76] The consequences of deferring adjustment in contribution rates are demonstrated by conducting two simulations.

- **The postponement of parametric reform will diminish its positive impact on improving the financial position**. Raising the contribution rate from the current 9 percent to 12, 15, or 18 percent will delay the depletion of NPF reserves from 2055 to 2063 (+8 years), 2071 (+16 years), 2082 (+27 years), respectively, according to the NPF Financial Accounting Committee, which assumes that the adjustment in contribution rate starts from 2025, with an annual adjustment of 0.6 percentage points. AMRO's simulation, assuming the same scenarios but with different starting years of adjustment, suggests that the positive impact of raising contribution rates on improving the financial position of NPF diminishes as the implementation year is postponed (Figure A4.3). For example, raising the contribution rate to 18 percent starting from 2035 will delay the depletion of NPF reserves by only 15 years, whereas the same adjustment starting from 2025 is supposed to delay it by 27 years.

[75] Parametric reform refers to adjustments to NPF parameters, such as contribution rate, pensioner age and income-coverage ratio.

[76] See Chun (2020) for the results detailing the necessary increase in contribution rates depending on the adjustment year, employing the Generational Account method.

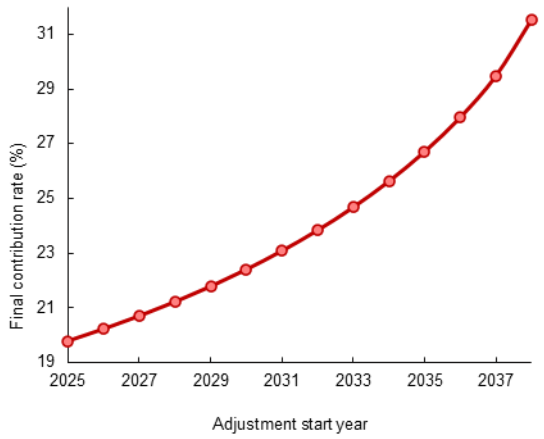
Figure A4.3. NPF Reserves with Adjustment in Contribution Rates



Source: National Pension Fund Financial Accounting Committee (2023); AMRO staff estimates
Note: The figure in each panel shows the trajectories of NPF reserves under different assumptions on the adjustment start year; (i) the dark line shows the reserves if the adjustment starts in 2025; (ii) the light line shows the reserves if the adjustment starts in 2030; and (iii) the dotted line shows the reserves if the adjustment starts in 2035.

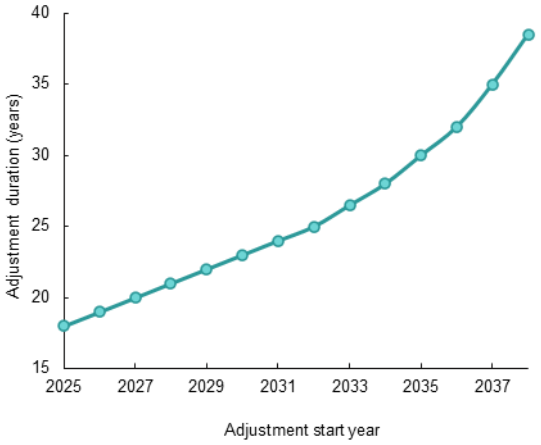
- **The postponement of parametric reform will result in a more painful and longer adjustment process.** Another simulation, estimating the final contribution rates needed to maintain positive NPF reserves until 2093 with varying starting years of adjustments, suggests that the required increases in contribution rates will become more burdensome and the duration of adjustments will be protracted as the implementation year is postponed (Figures A4.4, A4.5). For example, maintaining the positive reserves requires a final contribution rate of 26.7 percent with 30 years of adjustment if the implementation starts in 2035, compared with the final contribution rate of 19.8 percent with 18 years of adjustment if the implementation starts in 2025.

Figure A4.4. Final Contribution Rates Required to Maintain NPF Reserves Until 2093



Source: NPF Financial Accounting Committee (2023); AMRO staff estimates
Note: The figure shows the final contribution rates required to maintain the NPF reserves until 2093, assuming the same annual adjustment of 0.6 percentage points.

Figure A4.5. Adjustment Period Required to Maintain NPF Reserves Until 2093



Source: NPF Financial Accounting Committee (2023); AMRO staff estimates
Note: The figure shows the adjustment period required to maintain the NPF reserves until 2093, assuming the same annual adjustment of 0.6 percentage points.

5. Completing parametric pension reforms as early as possible is crucial for financial sustainability and social acceptance. The simulation was conducted only for raising the contribution rate, but the same implications can be drawn for other parametric reforms suggested by the government, including extending the pensioner age and increasing the investment rate of return. For any type or combination of parametric reforms, the later they are implemented, the less effective they will be in improving the financial sustainability of the fund. In addition, implementing parametric reforms to improve the fund's financial sustainability later will be more costly, making the reform less acceptable to the public.

Discussing the Introduction of Automatic Adjustment Mechanisms

6. Automatic adjustment mechanisms (AAMs) protect pension systems from demographic and economic uncertainties affecting pension adequacy and/or financial sustainability. [77] AAMs refer to predefined rules that automatically change pension parameters or pension benefits based on the development of a demographic, economic or financial indicator. Compared to ad-hoc and discretionary changes, AAMs enhance transparency, credibility and intergenerational equity; reduce the political cost of pension reforms; and reduce the risk of under- or over-shooting adjustments. About two-thirds of OECD countries employ some form of AAM in their pension schemes (Table A4.2). Leaving aside defined contribution schemes, nine countries with defined benefit schemes[78] utilize AAMs by linking the statutory retirement age to life expectancy; adjusting benefits to changes in life expectancy, demographic ratios or the wage bill; and operating balancing mechanism.

Table A4.2. Automatic Adjustment Mechanism of Pension System in OECD Countries

Funded/Notional Defined Contribution[1)]	Retirement Age Linked to Life Expectancy[2)]	Benefits Linked to Life Expectancy[3)]	Benefits Linked to Demographic Ratios, Wage Bill or GDP[4)]	Balancing Mechanism[5)]
Australia, Chile, Colombia, Costa Rica, Denmark, Estonia, Greece, Iceland, Italy, Latvia, Mexico, Norway, Poland, Sweden, UK	Denmark[S)], Estonia, Finland, Greece, Italy, Netherlands, Portugal	Finland, Portugal	Estonia, Greece, Japan, Lithuania, Portugal	Canada, Finland, Germany, Luxembourg[S)], Netherlands, Sweden, US

Source: de Tavernier and Boulhol (2021)
Note: 1) Defined contribution schemes, whether funded or notional, adjust pension benefits automatically to life expectancy, as lump sums or annuities are priced by taking into account expected mortality rates; 2) Denmark, Estonia, Greece and Italy link their statutory retirement age one-to-one to life expectancy, meaning that a one-year increase in life expectancy leads to a one-year increase in the statutory retirement age. In Finland, the Netherlands and Portugal, the statutory retirement age is increased by two-thirds of the increase in life expectancy; 3) The Finnish Life Expectancy Coefficient and the Portuguese Sustainable Factor adjust pension benefits based on changes in mortality rates or life expectancy; 4) Estonia and Lithuania adjust pension benefits based on changes in the total wage bill (or total contributions). The Japanese Macroeconomic Slide adjusts pension benefits based on the change in the number of contributors and the growth rate of life expectancy. Greece and Portugal adjust pension benefits, reflecting nominal and real GDP growth, respectively; 5) Canada and Finland adjust the contribution rates if the minimum contribution rate required to finance pension benefits over the following 75 years exceeds the legislated contribution rate. Finland and Luxembourg adjust the contribution rates if reserve funds fall short of covering expected expenditure. Germany's Sustainable Factor affects both pension benefits and contribution rates based on the demographic ratio of contributors over pensioners. Netherlands, Sweden and the US adjust pension benefits, reflecting the ratio of assets (or fund value) over liabilities (or scheduled benefits); s) = semi-automatic adjustment, which requires political approval each time in order to be activated.

7. The public pension system in Korea needs to consider introducing AAMs to ensure financial sustainability while reducing political and social costs. Public pension reforms in Korea have proven to be extremely politically challenging over the past 25 years due to

[77] This paragraph summarizes the findings from de Tavernier and Boulhol (2021).

[78] Nine OECD countries under the defined benefit scheme which employed AAMs are Canada, Finland, Germany, Japan, Lithuania, Luxembourg, Netherlands, Portugal, and the US.

many stakeholders.[79] Although ad-hoc and discretionary parametric reform initiatives may reach a social consensus and improve the financial position of the fund, at least in the short to medium term, continuous adjustments of parameters over the long term in response to demographic and economic changes are not guaranteed and are subject to repeated disputes. AAMs, on the other hand, once agreed upon and put in place, will reduce political and social frictions in the long run by linking the necessary adjustments to predefined rules and conditions. A specific form of AAM could be discussed by analyzing and comparing the actuarial effects of potential options, and by transparently communicating with the public about the expected benefits of introducing AAMs as well as the consequences of inaction amid rapid population aging.[80] AAMs could also be applied to special occupational pension funds in a way to enhance equity across different pension systems.

Organizing Effective Multilayered Pension System

8. The relationship between the National Pension Service and the Basic Pension should be well defined to enhance effectiveness in securing old-age income. As discussed earlier, National Pension benefits consist of two parts: income-proportional and income-redistributive benefits, the latter of which overlaps with the function of the Basic Pension falling into the category of public aid.[81] Although the Basic Pension is means-tested, its generous income threshold means the benefit is provided to 70 percent of the elderly over 65, implying very broad coverage. Moreover, a continuous increase in the benefit level of the Basic Pension reduces the benefit gap between the contributory National Pension and the non-contributory Basic Pension, which may discourage long-term and voluntary subscription to the National Pension. For a more effective Basic Pension as a form of public aid in addressing poverty at a given fiscal cost, it is advisable to target it better by narrowing the scope of beneficiaries and raising the benefit level for low-income elderly.[82] At the same time, the National Pension benefits should remove, or at least reduce, the income-redistributive part and give more weightage to the income-proportional part to prevent inefficiency arising from the overlap.

9. The role of private pensions should be strengthened to supplement the public pension system's provision of income support. The authorities should encourage subscription to retirement pensions, particularly for small enterprises, by providing necessary support. Given the preference for lump-sum retirement payments over pension annuities, despite the latter's advantage as an additional stable source of old-age income, it is advisable to consider expanding tax benefits for pension income and raising the rate of fund returns. In addition to public and retirement pension schemes, voluntary personal pension schemes, including reverse mortgage, could be encouraged through proper incentive provisions.

[79] Since the NPF was introduced in 1988, two parametric reforms have been undertaken. In 1998, the income-coverage ratio was reduced from 70 to 60 percent and the pensioner age was scheduled to increase from 60 to 65 by 2033, with a rise of one year every five years. In 2008, the income-coverage ratio was further reduced to 50 percent, while the Basic Pension was introduced. The income-coverage ratio is scheduled to decrease to 40 percent in 2028. The government has continued to propose parametric reform measures based on periodic financing accounting every five years since 2003, but it has yet to reach a social consensus.

[80] Andrews (2016) suggested some characteristics for AAMs to be effective: (i) gradual: the adjustments should take place over a period of time without any sudden significant changes; (ii) equitable: the adjustments should be borne by cohorts of participants in a manner that each cohort would consider fair, and negative adjustments should not be viewed as being distributed unevenly among cohorts; (iii) sustainable: the adjustments should be sufficient to address the stress in the long term, and not simply delaying the stress; and (iv) transparent: the nature of the adjustments should be open and understandable by all cohorts.

[81] According to the Framework Act on Social Security, the public aid programs refer to the National Basic Livelihood Security System, Basic Pension and the pension for Persons with Disabilities.

[82] OECD (2022) also recommended targeting the Basic Pension to tackle old-age poverty.

Conclusion

10. Both structural and parametric pension reforms are essential to achieve a sustainable public pension system and adequate income support for the elderly. Given the projected deterioration and depletion of public pension funds and the rising cost of inaction amid rapid population aging, parametric pension reforms should be completed as early as possible. To ensure the continuous adjustment of pension parameters in response to demographic and economic changes in a more systematic way, the introduction of AAMs should be discussed. Structural reforms of the National Pension and Basic Pension, by clearly defining their respective roles as social insurance and public aid, will enhance the effectiveness of the pension system in smoothing income over a lifetime and addressing old-age poverty.

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