AMRO Country Report
ACR/25-04

AMRO
ASEAN +3 MACROECONOMIC RESEARCH OFFICE

AMRO Annual Consultation Report

Korea - 2024

ASEAN+3 Macroeconomic Research Office (AMRO)

March 2025

Acknowledgments

1. This Annual Consultation Report on Korea has been prepared in accordance with the functions of AMRO to monitor, assess and report on its members' macroeconomic status and financial soundness, to identify relevant risks and vulnerabilities, and to assist them in the timely formulation of policy to mitigate such risks (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 November 14-29, 2024 (Article 5 (b) of the AMRO Agreement). The AMRO Mission team was headed by Sumio Ishikawa Group Head and Lead Economist. Members included Jade Vichyanond, Country Economist for Korea; Wanwisa Vorranikulkij, Back-up Economist; Bora Lee, Senior Economist; Byunghoon Nam, Senior Economist; Thanh Trung Vu, Associate Economist; Dac Toan Nguyen, Associate; and Kian Heng Peh, Observer. AMRO Director Kouqing Li and Chief Economist Hoe Ee Khor also participated in key policy meetings with the authorities. This AMRO Annual Consultation Report on Korea for 2024 was peer reviewed by economist group from AMRO's country surveillance, financial surveillance, fiscal surveillance, and policy review teams; endorsed by Jiangyan Yu, 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 December 6, 2024, with the exception of GDP data (up to January 23, 2025) and fiscal data (up to February 10, 2025).

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. 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.

Table of Contents

Executive Summary

1. Growth improved in 2024 on the back of strong exports. The economy expanded by 2.0 percent in 2024, driven by exports benefiting from the upswing in the global semiconductor cycle. Private consumption was relatively tepid in the first half, weighed by debt servicing burden and modest wage growth, but showed signs of recovery in the second half. Construction remained weak amid real estate project finance (PF) distress. Looking ahead, domestic demand is expected to pick up while the export momentum moderates with the downswing in the semiconductor cycle, exacerbated by an expected slowdown in China's import demand reflecting the impact of a major increase in the US tariffs on China. Growth is expected to moderate somewhat to 1.6 percent in 2025, with the impact of US tariffs to be imposed onwards.

2. Inflation has been on a downward trend. CPI declined to 1.5 percent (yoy) in November 2024 from 3.2 percent (yoy) in December 2023, largely due to a decline in energy and food prices. Meanwhile, core inflation has also been decreasing on the back of subdued growth in the costs of services.

3. The BOK reduced the policy rate twice in 2024. After keeping the Base Rate unchanged since early 2023, the BOK cut the rate by 25 basis points in October and another 25 basis points in November amid steadily declining inflation and weak domestic demand. The rate reductions were also prompted by early signs of cooling house prices in Seoul and abatement in exchange rate pressure.

4. The external sector continues to be strong. The trade balance recorded surpluses in the first half of 2024, supported by strong semiconductor exports. Outward direct investment remained stable, while residents' investment in equities drove portfolio outflows. At $415.9 billion as of August 2024, foreign reserves were equivalent to 6.6 months of imports.

5. Credit quality continues to deteriorate, although the financial system remains sound. The debt servicing capacity of listed companies has improved, while the average interest coverage ratio of non-listed companies, especially SMEs, has decreased considerably. That said, CARs of banks and NBFIs are well above regulatory requirements, and banks' liquidity buffers remain ample.

6. Comprehensive measures have been put in place to ensure orderly PF (project finance) resolution in the real estate market. The measures include enhanced standards for evaluating project viability, increased funding for viable projects, and stronger facilitation and funding by financial institutions for the restructuring and liquidation of non-viable projects. The second viability assessment of all PF exposure, conducted at the end of September 2024, showed that around 10.9 percent of PF exposure was risky and could be subject to restructuring. More recently, in November 2024, the government announced a plan to fundamentally enhance the structure of PF financing, particularly with a view to increasing the equity buffer of PF projects.

7. The fiscal position has deteriorated. Tax revenue has continued to decline in 2024, driven by lower corporate income tax. However, total revenue has risen owing to the increase in fund and nontax revenue. Fiscal spending has risen less than expected, largely due to lower

mandatory transfers to local governments and education. The 2024 deficit, excluding social security funds, is estimated at 4.0 percent of GDP, higher than the budgeted deficit in 2024 and the actual deficit of 3.6 percent in 2023. Consequently, the fiscal stance shifted from neutral as intended in the budget to slightly expansionary.

8. Commodity price volatility remains a key inflation risk. Ongoing conflicts in the Middle East may push up energy prices and shipping costs. Meanwhile, extreme weather conditions can disrupt agricultural production and drive up food prices. Lastly, inflationary pressure remains subject to adjustments to fuel tax and electricity prices.

9. Unexpected slowdown in major economies and changes in the US trade policy pose risks for Korea's exports. A sudden growth slowdown in the US, Europe, or China may dampen global demand and affect Korea's exports. The country's export prospects may also be eroded by adjustments to the US trade policy.

10. Interest burden and scarring effects of the pandemic continue to exert pressure on certain borrowers. The debt servicing ability of SMEs, small merchants, self-employed business operators, and low-income households remains weak. Although the banking sector's credit quality has stabilized, non-bank deposit-taking institutions have been experiencing a steady rise in delinquency.

11. There are pockets of risk in savings banks. A fair amount of troubled PF loans is in non-metropolitan areas and financed by savings banks, some of whose financial buffers may be insufficient to absorb a surge in NPL—particularly as the increase in unsold units in regional areas has strained the finances of many developers—although savings banks have significantly increased their capital and loan loss provisions.

12. AMRO welcomes the BOK's recent policy rate reductions to dial back the restrictiveness of its policy stance. As inflation is expected to further moderate in the near term, a continuation of policy easing may be appropriate to support the weak domestic demand. Although the rate reductions may lead to increases in household debt, it can help alleviate households' debt burden for existing borrowers and spur domestic spending. A less restrictive policy setting can also help ease financial conditions for developers, construction companies, and NBFIs involved in troubled PF projects.

13. Stronger buffers and enhanced risk management are necessary for NBFIs. Savings banks and credit cooperatives should actively liquidate non-viable PF projects, develop rehabilitation plans for viable ones, and increase provisions and liquidity buffers. Moreover, NBFIs' risk management and credit assessment frameworks should be strengthened.

14. Macroprudential measures should be further finetuned. The currently tight loan-to-value ratio for borrowers owning multiple homes or properties in speculative zones should be maintained. However, to satisfy real housing demand, easing the ratio for first-time buyers should be considered, with calibrations based on individual buyer characteristics.

15. Continued efforts to rebuild fiscal buffers are warranted, with fiscal policy remaining agile and flexible amid heightened uncertainty. Given the narrowed fiscal space post-pandemic, it is prudent to pursue a medium-term fiscal consolidation path by strengthening fiscal discipline and implementing revenue-enhancing and spending-restructuring measures.

However, the authorities should retain flexibility in fiscal responses to address emerging challenges if downside risks materialize or appear imminent.

16. Increasing the manufacturing sector's resilience and addressing demographic challenges are crucial. Diversification of Korea's productive capacity into key segments of semiconductor supply chain is vital in enhancing the resilience of Korea's supply chains. Lastly, it is critical to continue recalibrating demographic policies with a view to improving the fertility rate and supporting growth in the labor force.

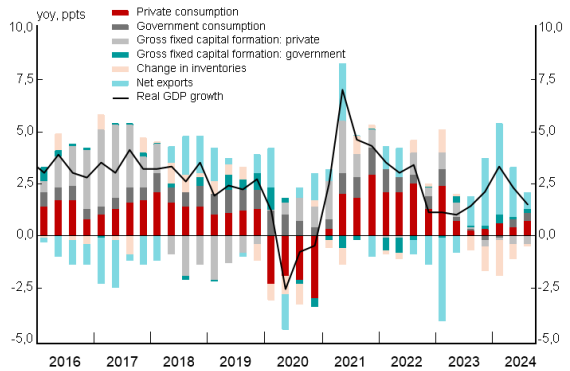
A. Recent Developments and Outlook

A.1 Real Sector Developments and Outlook

1. Output growth improved in 2024 thanks to strong export performance and, more recently, recovering domestic demand. After growing by 1.4 percent in 2023, the economy expanded by 2.0 percent in 2024 (Figure 1). Exports were a major driver, growing by 6.9 percent (yoy), with shipments of semiconductor and other IT products benefiting from the upswing in the global semiconductor cycle. Meanwhile, private consumption was relatively tepid in the first half of the year, weighed by high household debt and modest real wage growth, but showed signs of recovery in the second half, rising from 1.0 percent (yoy) in H1 to 1.3 percent (yoy) in H2, amid the continued moderation in inflationary pressure. Facilities investment contracted in the first half of the year, before expanding by 5.3 percent (yoy) in the second half on the back of investment in semiconductor manufacturing and transportation equipment. Construction investment contracted by 2.7 percent in 2024, mired in the fallout from real estate project finance (PF) distress.

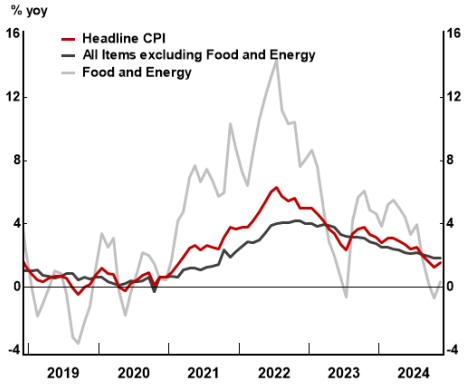
2. In the near term, domestic demand is expected to pick up and play a greater role in driving growth. The upturn in the global semiconductor cycle is expected to peak around mid-2025, after which export growth momentum may start to wane as demand for legacy memory chips moderates, while the ongoing boom in AI-related investment will likely support Korea's shipments of advanced memory chips (i.e. HBM chips) over the coming quarters. Meanwhile, Korea's export performance, particularly for non-tech sectors, will likely be affected by a weakening in China's demand for intermediate goods as a result of the expected ramp-up in US tariffs on Chinese products. Domestic drivers will likely lend greater support to growth, as strong corporate earnings help shore up facilities investment and higher wages support the recovery of the still-weak private consumption. Moreover, subsiding inflation should help increase household purchasing power and bolster household consumption. However, the construction sector will likely pose a drag on growth given the low number of permits issued and construction starts over the past few years, and the ongoing resolution of PF loans, which is likely to put a dent on construction investment sentiment in the near term. Growth is expected to be around 1.6 percent in 2025, taking into consideration the impact of US tariffs onwards.

Figure 1. GDP Growth



Source: Bank of Korea; Haver; AMRO staff calculations

Figure 2. Consumer Price Inflation



Source: Statistics Korea; Haver; AMRO staff calculations

3. Headline inflation has been on a downward trend thanks to moderation in commodity prices and muted core inflation. CPI inflation declined to 1.5 percent (yoy) in

November 2024 from 3.2 percent in December 2023, largely due to a decline in global oil and domestic food prices, notwithstanding spikes in fruit prices in the first half of the year (Figure 2). Similarly, core inflation decreased to 1.9 percent (yoy) in November 2024 from 2.8 percent in December 2023, on the back of subdued growth in the costs of personal services, dining, and accommodation amid sluggish private consumption. Looking ahead, headline inflation is forecast to remain relatively stable around the 2-percent inflation target, averaging 2.3 percent in 2024 and 1.9 percent in 2025.

4. Employment growth remains modest on the back of relatively weak domestic demand. In November 2024, employment expanded by 123,000 jobs (yoy), marking the seventh consecutive month of employment growth below 200,000, with tepid private consumption and anemic construction activity weighing on in-person services, such as wholesale and retail trade and accommodation and food services, and construction employment. The unemployment rate, however, has continued to decline, reaching 2.2 percent in November 2024, compared to the pre-pandemic range of 3-4 percent, in part reflecting the post-pandemic recovery of the labor market. Meanwhile, wage growth has shown some recovery in 2024, supported by higher manufacturing wages.

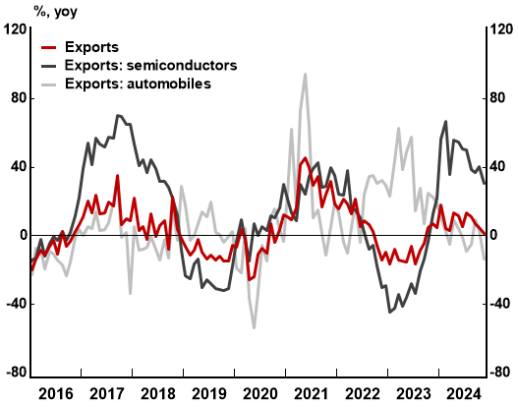
5. The BOK reduced the policy rate twice in light of subsiding inflationary pressure and relatively weak domestic demand. After keeping the Base Rate unchanged since February 2023, the BOK cut the rate by 25 basis points in October and another 25 basis points in November as both core and non-core inflation have been on declining trends—with headline inflation falling below the target—reflecting weak domestic demand, in particular private consumption. The decisions in favor of the policy rate reductions were also supported by early signs of cooling house prices in Seoul in September and stabilization of household debt, as well as abatement in exchange rate pressure compared to the earlier part of the year.

A.2 External Sector and Financial Sector

6. The external sector remains strong, with a higher current account surplus and ample foreign reserves. The trade balance recorded surpluses throughout the first half of 2024; the goods account surplus was supported by the upturn in the global semiconductor cycle and strong demand for AI chips (Figure 3), whereas outbound tourism continued to keep the services account in deficit.[1] As far as the financial account is concerned, outward direct investment remained stable, notwithstanding a slowdown in the latter part of the year, while residents' investment in foreign equities drove portfolio investment outflows (Figure 4). Foreign reserves declined slightly to $415.4 billion in November 2024 from $420.1 billion at end-2023 due to valuation effects as a result of the strengthening US dollar, FX swaps with the National Pension Fund, and some foreign exchange interventions to mitigate market volatility. Despite the decline, foreign reserves remain ample, covering 6.5 months of imports and 2.6 times of short-term external debt.

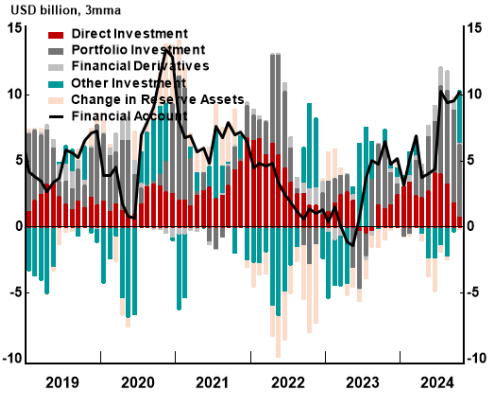
[1] In June 2024, the current account recorded the biggest surplus since 2017, at $12.2 billion.

Figure 3. Exports



Source: Korea Customs Service; MOTI; Haver; AMRO staff calculations

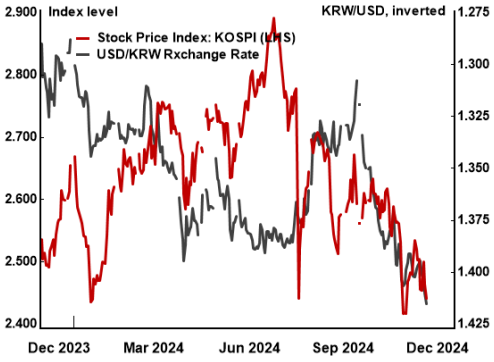
Figure 4. Financial Account



Source: Bank of Korea; Haver; AMRO staff calculations

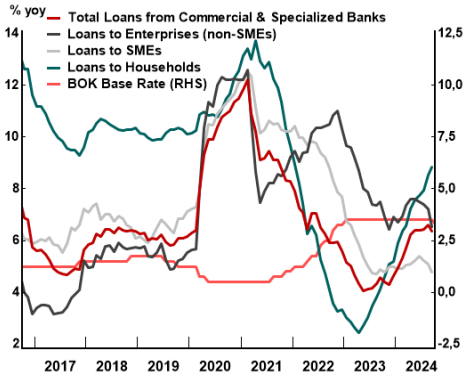
7. The financial market has been relatively volatile in 2024 amid shifting expectations regarding domestic and the US monetary policy stance. Long-term government bond yields rose in the first quarter, reflecting increased upside global inflation risk, before moderating in the second quarter on the back of subsiding price pressure and expectations of an easing in the US monetary policy. The Korea Composite Stock Price Index (KOSPI) rose in the earlier part of the year thanks to robust exports and improved corporate performance before retreating after July due to concerns over a US slowdown and uncertain prospects of AI and semiconductor companies (Figure 5). In the first half of 2024, the won weakened amid concerns about the prolonged high interest rates in the US and increased geopolitical risks. The won briefly strengthened on expectations of a Fed rate cut in September, before returning to a weakening trend around October along with other Asian currencies due to a spike in US long term yields and a strengthening US dollar. The won then further depreciated by around 4.7 percent in the aftermath of the declaration of martial law on December 3, 2024. As of end-2024, the won had weakened by 12.5 percent compared to end-2023.

Figure 5. KOSPI and USD/KRW



Source: Korea Stock Exchange; Bank of Korea; Haver; AMRO staff calculations

Figure 6. Loan Growth



Source: Bank of Korea; Haver; AMRO staff calculations

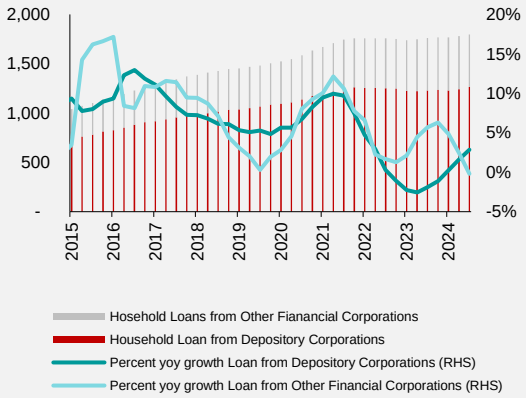
8. Total loans from financial institutions began to accelerate in the first half of 2024. Supported by improving economic conditions, rising expectations of a policy rate cut by the BOK, increasing housing prices in metropolitan areas, and a surge in borrowing ahead of the

second phase of the stressed debt service ratio (DSR) rule implementation,[2] loan growth has started to pick up, recording a 4.1 percent (yoy) increase in July 2024 (Box A. The Use of DSR in Managing Household Debt in Korea). The increase was largely contributed by commercial bank loans, which grew by 6.4 percent (yoy) in September 2024, up from 4.6 percent at end-2023 (Figure 6).[3] In contrast, loans from non-bank financial institutions (NBFIs) increased by only 0.2 percent (yoy) in July 2024, reflecting the ongoing real estate PF restructuring. By loan type, household loan growth rebounded in early 2024 and continued to accelerate, largely driven by mortgages from commercial banks. Loans to small and medium-sized enterprises (SMEs) and self-employed businesses have grown steadily, at around 5.0 percent since Q2 2023, slowing from 10 percent during the pandemic due to high interest burden and uncertainties surrounding business prospects. Meanwhile, large enterprises have reduced corporate bond issuances and increased bank borrowing amid expectations of a BOK rate cut in the second half of the year.

Box A. The Use of DSR in Managing Household Debt in Korea[4]

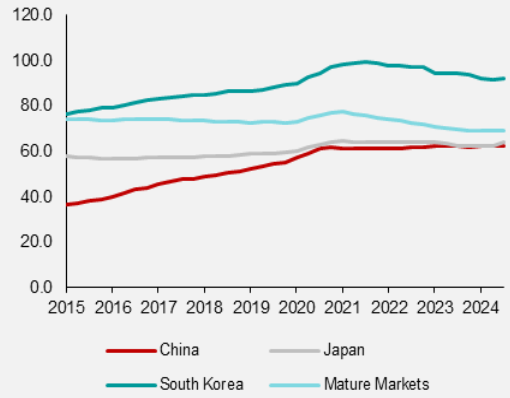
The introduction of the Debt Service Ratio (DSR) in 2018 was a critical step to curb high household debt in Korea (Figures A.1 and A.2).[5] Initially implemented at the institutional level, the DSR framework served as a tool to monitor and limit financial institutions' exposure to risky borrowers without overly restricting borrowers' access to credit. For loans with a DSR between 70 and 90 percent classified as risky and those with a DSR of 90 percent or above considered highly risky, financial institutions had to keep their exposure to these two categories of borrowers within certain limits.[6]

Figure A.1 Household Debt (trillion KRW)



Source: BOK, AMRO staff calculation

Figure A.2 Household Debt to GDP (percent)



Source: IIF, AMRO staff calculation

[2] The authorities introduced the stressed DSR rule in February 2024, which adds an additional stress rate when calculating a borrower's DSR. This stress rate accounts for the likelihood that the borrower may face higher repayment burdens in the future, particularly if interest rates rise. The implementation of the rule is being carried out in three phases: from February to August 2024, it applies to mortgage loans by commercial banks; from September 2024 onwards, its coverage will expand to other consumer loans by commercial banks and mortgages from NBFIs; and by July 2025, it will also cover other retail loans from NBFIs.

[3] Anticipating a base rate cut by the BOK in the second half of 2024, many commercial banks preemptively factored in the expected reduction and thereby lowered lending rates in advance. The majority of household loans in Korea are tied to floating interest rates.

[4] Prepared by Dac Toan Nguyen, Associate.

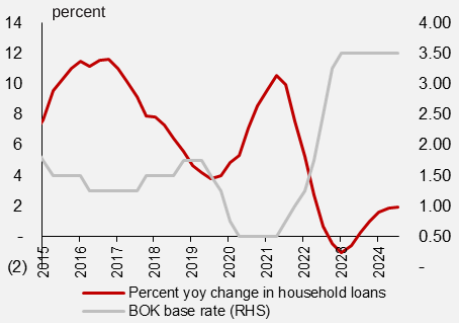
[5] The Debt Service Ratio (DSR) assesses an individual's ability to fulfill their debt obligations based on their annual income. It is calculated as: DSR = (Annual interest and principal payments on all outstanding debts) / (Annual income). A higher DSR indicates a higher proportion of income is needed to service debt, making the borrower riskier in terms of repayment capacity.

[6] For commercial banks, the loan exposure limits for these two categories of borrowers are set at 15 percent and 10 percent, respectively. For local banks, the limits are 30 percent and 25 percent, while specialized banks have limits of 25 percent and 20 percent, respectively. By the end of 2021, commercial banks were required to maintain an average DSR of 40 percent. In contrast, NBFIs were subject to higher thresholds, which varied by institution type: savings banks had a threshold of 90 percent, insurance companies 70 percent, mutual finance companies 160 percent, credit card companies 60 percent, and installment financing companies 90 percent.

Building on the existing institutional-level approach, the DSR framework shifted its focus in 2021 to individual borrowers, reflecting the government's intent to strengthen borrower-specific safeguards. Under the updated regulations, individuals with total loans exceeding KRW 100 million were required to meet DSR thresholds not just for new loans but also for refinancing and top-ups. These changes were intended to close existing loopholes, such as practices whereby borrowers restructured loans or temporarily reduced balances to bypass DSR requirements. Additionally, the maturity assumption for credit loans in DSR calculations was revised—from 10 years to 7 years in 2021 and further to 5 years in 2022—to better reflect actual repayment periods. While these measures were designed to align lending practices with borrowers' repayment capacities, they also safeguarded access to credit for vulnerable groups by providing exemptions for specific types of loans, including government-backed microloans, savings-secured loans, insurance-secured loans and loans for first-time homebuyers.

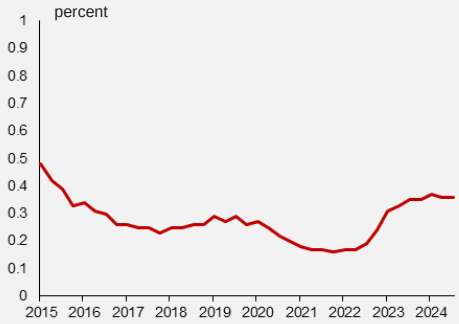
While the original DSR framework was effective in limiting household debt under stable interest rate environments, evolving economic conditions have highlighted opportunities for further enhancement. The rapid rise in household debt during the pandemic that was fueled by expansionary monetary policy in 2021 (Figure A.3), contributed to increased repayment burdens as monetary policy was subsequently tightened in response to rising inflation around 2022. This led to significantly higher debt servicing costs, which, in turn, resulted in a rise in household loan delinquency rates in 2023-2024 (Figure A.4).

Figure A.3. Loan Growth and Policy Rate



Source: BOK, AMRO Staff calculation

Figure A.4. Banking Sector's Household Loan Delinquency



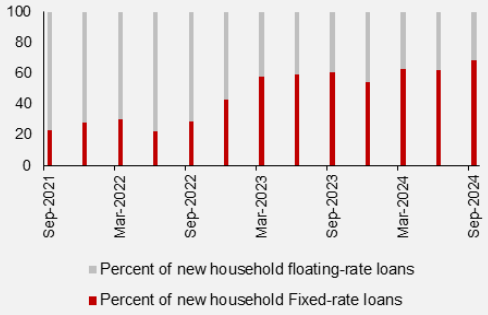
Source: FSS, AMRO Staff calculation

These vulnerabilities highlighted the need for a more forward-looking approach to assessing debt repayment capacity. By incorporating additional stress rates[7] into the DSR calculation, the stressed DSR ensures that borrowers' repayment capacities are evaluated not only under current conditions but also across varying scenarios, whether during periods of rising interest rates or declining monetary pressures. This proactive approach helps mitigate repayment risks, ensuring a more resilient financial system as monetary conditions evolve. The enhanced framework also aims to improve debt sustainability by promoting a shift away from floating-rate loans toward fixed-rate loans, which make borrowers less susceptible to interest rate volatility (Figure A.5).[8]

[7] The additional stress rate is calculated as the difference between the 5-year peak interest rate level and the current level, observed in May and November of each year. It is currently set at 1.5 percent, within a range of 1.5 to 3.0 percent which provides a buffer against the risk of overestimating or underestimating the impact of interest rate fluctuations during periods of both high and low rates.

[8] Even though the stress DSR was introduced in 2024Q1, the proportion of fixed-rate loan already started rising significantly in 2022Q4. This was because during 2022-2023 period, the Bank of Korea raised its policy rates multiple times in 2022 and early 2023 to combat inflation. As interest rates rose, borrowers likely shifted toward fixed-rate loans to lock in repayment stability and shield themselves from further rate hikes.

Figure A.5 Fixed and Floating Household Loans



Source: Haver Analytics, AMRO staff calculation

The phased implementation of the stressed DSR ensures a smooth transition, allowing borrowers and lenders to gradually adjust to the stricter requirements without abrupt market disruptions. Starting with mortgage loans from banks in February 2024, the application expanded to credit loans and non-bank financial institutions in September 2024, and to all household loans by July 2025 (Table A.1).

Table A.1 Stressed DSR Implementation Timeline

		1st phase	2nd phase	3rd phase
Enforcement period		Feb 2024 – Aug 2024	Sep 2024 – June 2025	July 2025 onwards
Types of loans	**Banks**	Mortgage loans[9]	Mortgage loans + Credit loans	Mortgage loans + Credit loans + Other types of loans[10]
	NBFIs		Mortgage loans	Mortgage loans + Credit loans + Other types of loans
Additional stress rate[11]		25 percent of the base stress rate	50 percent of the base stress rate	100 percent of the base stress rate

Source: FSC

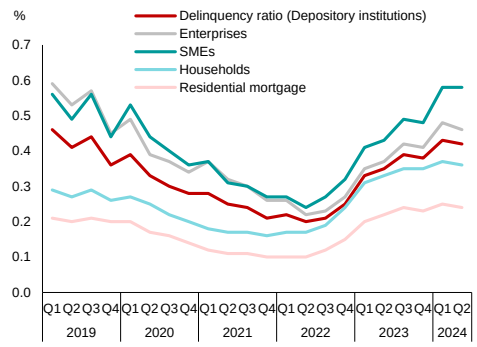
The stressed DSR has been an important enhancement to Korea's macroprudential framework, ensuring a forward-looking assessment of borrowers' repayment capacities and promoting financial stability. By introducing additional stress rates, it addresses long-term risks, such as interest rate volatility, while encouraging a shift toward more sustainable borrowing practices, including fixed-rate and amortizing loans. However, the exemptions for certain loan categories, such as jeonse loans and government-backed microloans, while aimed at protecting vulnerable groups, require careful monitoring to ensure risks do not accumulate in these segments. Regular reviews of the framework's implementation will be essential to maintain its relevance and effectiveness, ensuring that it continues to strengthen household debt sustainability and support financial resilience in a dynamic economic environment.

9. Credit quality continues to deteriorate in 2024, particularly loans to SMEs and self-employed business operators (SEBOs). The debt servicing capacity of listed companies has by and large improved, as reflected in the decline in the share of firms across all sectors and

[9] As of September 2024, mortgage loans constituted approximately 75.1 percent of South Korea's total outstanding household loans, according to data from the Bank of Korea.
[10] Other types of loans do not include loans to vulnerable groups, such as government-backed microloans, savings-secured loans, insurance-secured loans and loans for first-time homebuyers.
[11] The current base stress rate is 1.5 percent; the additional stress rate is 0.375 percent, 0.75 percent, and 1.5 percent for the 1st, 2nd, and 3rd phase, respectively.

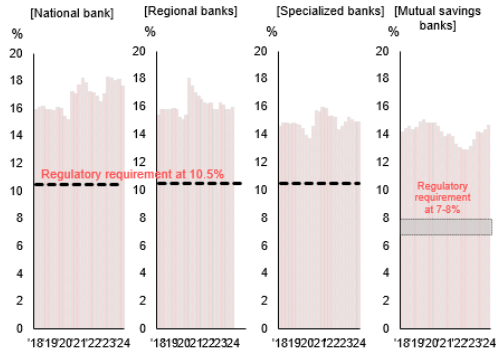
sizes, reporting an interest coverage ratio below 1. However, the average interest coverage ratio of non-listed companies, especially SMEs, dropped drastically to 0.1 at the end of 2023 from 1.0 at the end of 2022, due to weak economic conditions and rising interest expenses. The delinquency ratio of financial institutions held steady at 0.42 percent in Q1 and Q2 2024, with household loan delinquencies at 0.36 percent and SME loan delinquencies at 0.58 percent as of June 2024 (Figure 7). Looking ahead, a further reduction in the BOK's policy rate and the recovering economy could help ease borrowers' debt burden.

Figure 7. Loan Delinquency



Source: Financial Supervisory Services; CEIC; Haver

Figure 8. Capital Adequacy Ratios



Source: Financial Supervisory Services; AMRO staff estimates

10. Large financial institutions remain well-capitalized and have sufficient capital buffers to withstand considerable deterioration of credit quality and other shocks. Capital adequacy ratios (CARs) of commercial banks (15.9 percent as of September 2024) and NBFIs are well above minimum regulatory requirements, although rising bad debt and declining net interest margins continue to dampen the profitability of NBFIs, especially savings banks (Figure 8). [12] Loan loss provisions of commercial banks and specialized banks have increased significantly over the past few years, with the average provision coverage ratio of 188.0 percent for substandard and below loans in Q2 2024. Meanwhile, losses from real estate PF lending have eroded savings banks' loan loss provisions, which declined to 113.8 percent of substandard and below loans in Q2 2024 from 126.2 percent in Q2 2022. As far as liquidity is concerned, commercial banks' buffers are sufficient to cover sudden deposit withdrawal, with liquidity coverage ratios and net stable funding ratios both exceeding 100 percent. All savings banks maintained the liquidity ratio well above the minimum requirement. [13] In addition, the cash reserves to total deposits ratio of savings banks and credit cooperatives are equivalent to 17 percent and 28 percent, respectively.

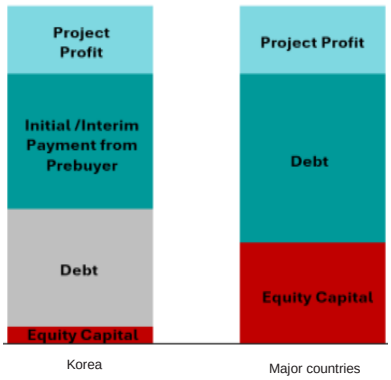
A.3 Real Estate Sector

11. A comprehensive set of measures has been put in place to ensure orderly PF resolution. Introduced in Q2 2024, the measures include enhanced standards for evaluating project viability; increased funding by public entities for viable projects (e.g. guarantee provided by Korea Housing & Urban Guarantee Corporation [HUG] [14] and Korea Housing Finance

[12] The average CAR of domestic commercial banks rose to 15.8 percent in June 2024 from 15.7 percent at end-2023. Meanwhile, the BIS capital ratio of savings banks increased to 15.0 percent in June 2024 from 14.4 percent at end-2023.
[13] The liquidity ratio of Korean savings banks measures their ability to meet short-term obligations by holding sufficient liquid assets. These assets typically include cash, deposits in other banks, and marketable securities. The minimum liquidity ratio requirement for savings banks is set at 100 percent. As of June 2024, the average liquidity ratio (current ratio) of savings banks was 231.7 percent.
[14] As of November 2024, HUG and HF have cumulatively approved KRW29.5 trillion in PF project guarantees.

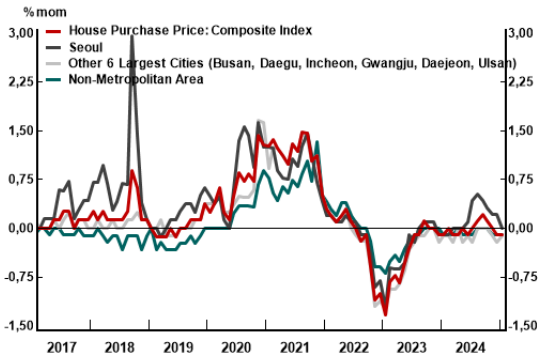
Corporation [HF] to support the transition from bridge loans to main PF loans, conversion of short-term asset-backed commercial papers (ABCPs) to long-term loans by securities companies, and temporary maturity extension and deferments of interest payments); and stronger facilitation and funding by relevant financial institutions (e.g. syndicated loans by commercial banks, insurance companies, Korea Land and Housing Corporation, and Korea Asset Management Corporation [KAMCO][15]) for the restructuring and liquidation of non-viable projects. The second viability assessment of all PF exposure, conducted at the end of September 2024, concluded that 22.9 trillion won, or 10.9 percent of the total 210.4 trillion won in PF exposure, was classified as risky and could be subject to restructuring. More recently, in November 2024 the government announced a plan to fundamentally enhance the structure of PF financing. The plan aims to increase the equity buffer of PF projects from the average of 3-5 percent at present to a mid- to long-term target of 20 percent through a number of measures, such as providing tax incentives for landowners to invest in equity alongside developers and raising loan loss provision requirements for projects with low equity-to-total assets ratios (Figure 9).

Figure 9. PF Funding Structure



Source: Lee Bomi (2023). Issues and Implications of the Real Estate PF Structure in South Korea (KIF), 32(12); AMRO staff illustrations

Figure 10. House Prices



Source: Kookmin Bank; Haver; AMRO staff calculations

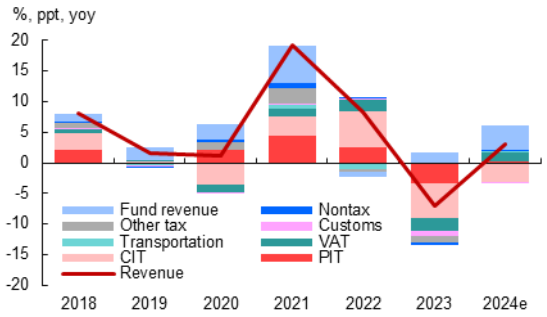
12. While the overall housing market is relatively stable, house prices in the Seoul Metropolitan Area (SMA) rose considerably in Q2 before moderating in Q3 2024. At the national level, house prices have been moderately stable after significant price corrections from around mid-2022 (Figure 10). However, the recent stabilization masks divergent trends within the country. While house prices outside the SMA have been relatively flat amid ample supply conditions, as reflected in the increase in the number of unsold housing units, the SMA has witnessed increases in house prices in Q2 before moderating in Q3 2024. This trend has been mirrored by rises in *Jeonse* (leasehold) rents—on the back of declining bank lending rates and the rush to secure mortgage loans ahead of the scheduled tightening of loan limits (due to the phased implementation of the stressed DSR rule).[16] In response, in August 2024, the government announced measures to expand housing supply in the capital region over the longer term, which include lifting restrictions on greenbelt zones in Seoul and surrounding areas and streamlining lengthy procedures involved in reconstruction and redevelopment.

[15] As of June 2024, only KRW130 billion was deployed by KAMCO, compared to the target of KRW1.1 trillion.
[16] The upcoming phased implementation of the stressed DSR rule has created an incentive for homebuyers to secure mortgages before the stricter lending conditions take full effect. Once the rule is fully applied, homebuyers' borrowing capacity will be reduced, especially for high loan-to-income borrowers. This anticipation has led to frontloaded financing demand, as buyers aim to lock in mortgages under the current less restrictive rules.

A.4 Fiscal Sector

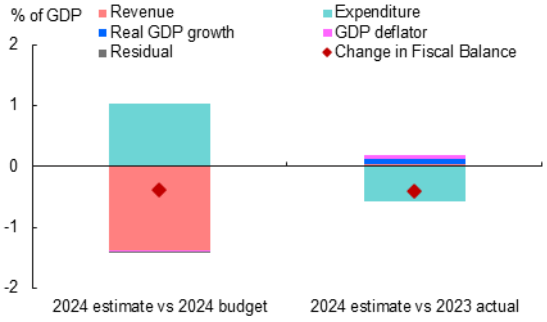
13. The fiscal position in 2024 has deteriorated amid continued underperformance in tax revenue collection. Tax revenue has continued to decline in 2024, albeit at a slower rate than in 2023, primarily due to a sharp reduction in corporate income tax (CIT) on account of weak business performance in 2023. Only value-added tax (VAT) has increased robustly, driven by both the increase in domestic consumption and reduced VAT refund, while other taxes, including personal income tax (PIT) and customs duties, have remained stagnant. However, total revenue has increased slightly, as the increase in fund and nontax revenue has offset the decline in tax revenue (Figure 11). Compared to the budget, the revenue shortfall is estimated at 0.8 percent of GDP.[17] Meanwhile, fiscal spending also has increased less than planned, largely due to reduced mandatory transfers to local governments and education, which are linked to domestic tax revenue.[18] The fiscal deficit in 2024, excluding social security funds (SSFs), is estimated at 4.0 percent of GDP, higher than the budgeted deficit of 3.6 percent in 2024 and the actual deficit of 3.6 percent in 2023 (Figure 12).[19] Consequently, the fiscal stance shifted from neutral as intended in the budget to slightly expansionary. Government debt is estimated to have risen to 48.1 percent of GDP in 2024, from 46.9 percent in 2023.[20]

Figure 11. Contribution to Change in Revenue



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

Figure 12. Decomposition of Change in Fiscal Balance



Source: Ministry of Economy and Finance; AMRO staff estimates
Noted: A positive (negative) change in the fiscal balance implies the actual fiscal balance in 2024 improved (deteriorated) over the budgeted fiscal balance in 2024 or over the actual fiscal balance in 2023. A positive contribution of revenue implies the actual revenue in 2024 was better than the budgeted revenue in 2024 or the actual revenue in 2023, while a positive contribution of expenditure implies the actual expenditure in 2024 was lower than the budgeted expenditure in 2024 or the actual expenditure in 2023.

14. The 2025 budget focuses on supporting livelihoods and fostering a dynamic economy while maintaining fiscal sustainability. The budgeted fiscal deficit in 2025 is set at 2.8 percent of GDP, lower than in 2024 and within the ceiling set by the proposed fiscal rule (Figure 13).[21] Revenue is budgeted to grow by 11.3 percent, reflecting robust business

[17] Total revenue shortfall and tax revenue shortall in 2024 are estimated at KRW21.1 trillion and KRW30.8 trillion, respectively, based on the data release on February 10, 2025.

[18] Mandatory transfers to local government and education (40.03 percent of domestic tax revenue plus other taxes) are assumed to be reduced by KRW6.5 trillion, less proportionately than a decline in domestic tax revenue, as announced by the government.

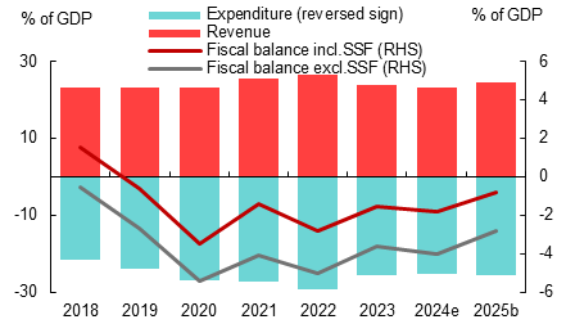
[19] The 2024 fiscal deficit, including SSFs, is estimated at 1.8 percent of GDP, similar to the budgeted 1.8 percent but higher than the 1.5 percent recorded in 2023.

[20] The government debt-to-GDP ratio before GDP rebasing was 50.4 percent in 2023.

[21] According to the fiscal rule proposed by the government and pending at the National Assembly, the ceiling for fiscal deficit excluding SSFs is 3 percent of GDP. If the government debt-to-GDP ratio exceeds 60 percent, the ceiling will be reduced to 2 percent of GDP.

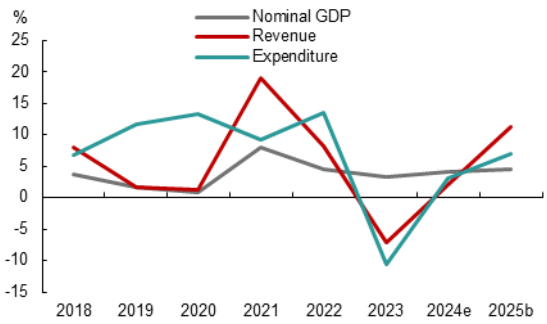
performance in 2024 and the gradual recovery of domestic demand. Expenditure is set to increase by 6.9 percent, with growth in mandatory spending outpacing that of discretionary spending (Figure 14).[22] The government continues to undertake a comprehensive restructuring of existing budget programs, reallocating resources to support key policy priorities, which include strengthening welfare for vulnerable groups, fostering economic recovery and growth, supporting structural reforms, enhancing the social safety net, and strengthening official development assistance (ODA).[23] The fiscal stance in 2025 is assessed to be contractionary under the near-zero output gap.

Figure 13. Fiscal Balance



Source: Ministry of Economy and Finance; AMRO staff estimates
Note: “e” stands for AMRO estimates and “b” represents the budget.

Figure 14. Revenue and Expenditure Growth

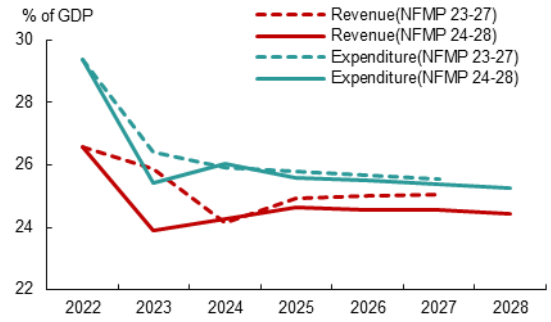


Source: Ministry of Economy and Finance; AMRO staff estimates
Note: “e” stands for AMRO estimates and “b” represents the budget.

15. Over the medium term, the National Fiscal Management Plan (NFMP) 2024–2028 envisages gradual fiscal consolidation. The fiscal deficit is set to gradually decline, approaching the mid-2 percent range of GDP by the end of the period, adhering to the fiscal deficit ceiling of the proposed fiscal rules. While the revenue-to-GDP ratio is expected to remain broadly similar to the 2024 level, the expenditure-to-GDP ratio is set to decline gradually despite high growth in mandatory spending, reflecting the authorities' commitment to continuously restructure and reduce low-priority discretionary spending. Compared to the previous NFMP 2023-2027, fiscal deficits are expected to be slightly higher, primarily due to a downward revision in revenue forecasts (Figure 15). Given that the projected primary deficit remains larger than the debt-stabilizing level, the government debt-to-GDP ratio is expected to continue rising, surpassing 50 percent during the projection period (Figure 16).[24]

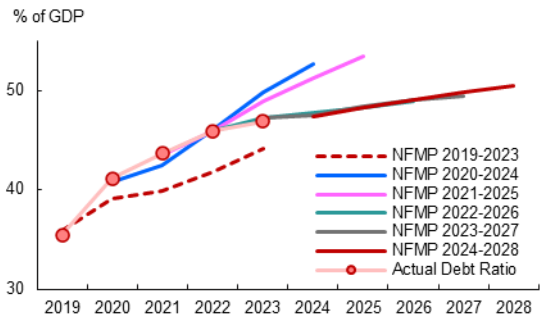
[22] A comparison between the 2025 and 2024 budgets reveals different aspects of the fiscal position due to the significant variance between the 2024 budget and the estimated outturn. Compared to the 2024 budget, revenue in 2025 is projected to increase by 6.4 percent, while expenditure is planned to rise by 2.5 percent, with mandatory spending growing by 5.1 percent and discretionary spending by -0.4 percent.
[23] The government has restructured all budget programs from a zero-base perspective, saving KRW24 trillion for the 2023 budget, KRW23 trillion for the 2024 budget, and KRW24 trillion for the 2025 budget, according to KMOEF.
[24] During 2025 – 2028, the projected primary balances in the NFMP 2024-2028 range from -1.8 to -1.3 percent of GDP, while the debt-stabilizing primary balances are estimated to be between -0.6 and -0.5 percent of GDP, implying that additional fiscal adjustments are required to stabilize the debt ratio at its current level.

Figure 15. Revenue and Expenditure Projections in NFMP



Source: Ministry of Economy and Finance
Note: Revenue and expenditure in 2024 are based on the budget.

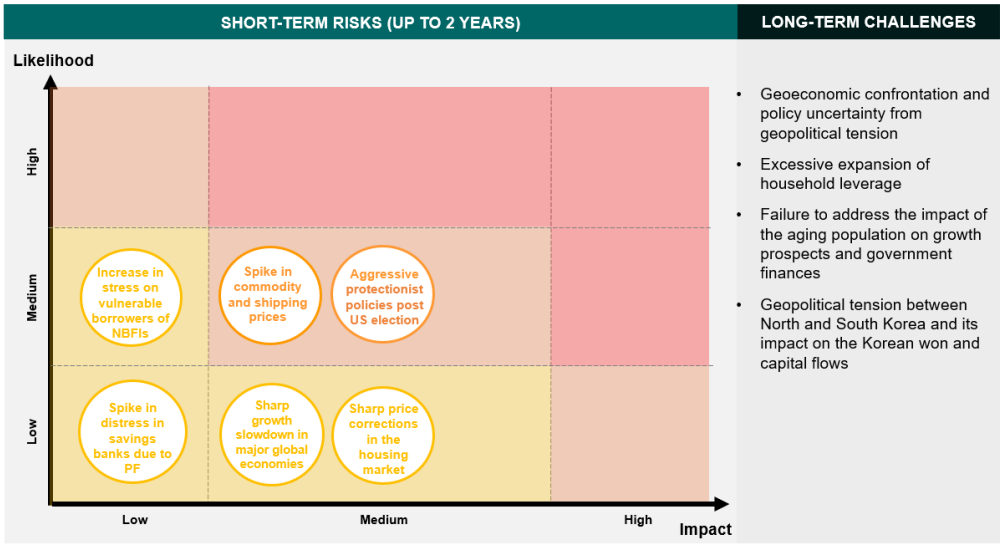
Figure 16. Government Debt Projections in NFMP



Source: Ministry of Economy and Finance
Note: Debt-to-GDP ratio projections in the past NFMPs are recalculated using the rebased GDP.

B. Risks, Vulnerabilities, and Challenges

Figure 17. Country Risk Map: Korea



Source: AMRO staff

B.1 Near-term Risks to the Macro Outlook

16. Although inflationary pressure has been steadily subsiding in recent months, spikes in energy and shipping prices and adverse weather events affecting agricultural prices remain upside risks for inflation. Further escalation of the conflicts in the Middle East could push up energy prices and shipping costs, thwarting the ongoing process of disinflation.[25] Meanwhile, extreme weather conditions in Korea and abroad, exemplified by El Niño and La Niña, can disrupt agricultural production and lead to spikes in food prices, as was the case in the first half of 2024 when fruit prices surged due to poor harvests. Lastly,

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

inflationary pressure in the near term will be subject to the government's adjustments to fuel tax and electricity prices.

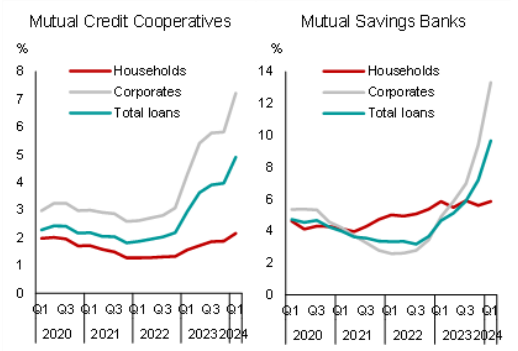
17. Unexpected growth slowdowns in major economies and potential changes in the US trade policy pose risks to Korea's growth outlook. Although the upturn in the global semiconductor cycle is expected to continue to support the economy over the next few quarters, it is conditional on the strength of external demand from the US, Europe, and China. A sudden weakening of private consumption in the US, a sharp growth deceleration in Europe, or anemic growth in China may dampen overall global demand, as well as the magnitude and duration of the semiconductor upturn, which will affect the performance of Korea's semiconductor and other IT exports. Moreover, Korea's export prospects may be directly and indirectly—due to China's lower import demand—eroded by upward adjustments to US import tariffs. Lastly, political uncertainty following the declaration of martial law in December may dent business and consumer sentiment, posing an additional risk to the near-term outlook for domestic demand.

18. High interest burden and scarring effects from the pandemic continue to exert pressure on vulnerable borrowers, primarily of non-bank deposit-taking institutions (NBDIs). The debt servicing ability of certain segments of borrowers, such as SMEs, small merchants, self-employed business operators (SEBOs), and low-income households, remains weak. Although the banking sector's credit quality has generally stabilized, NBDIs have experienced a rise in delinquent loans across all borrower groups due to weak recovery of those borrowers relative to the rest of the economy. The delinquency rate on corporate loans of NBFIs, primarily savings banks and credit cooperatives, surged to 6.0 percent in March 2024, up from 4.1 percent in 2023 and 2.2 percent in 2022. Household loan delinquencies of NBFIs rose to 2.2 percent at the end of Q1 2024, significantly exceeding the home mortgage loans' rate of 1.0 percent.

19. There are pockets of risk in savings banks due to PF distress. The viability assessment done in 2024 suggested that10.9 percent of the PF exposure could be unviable and insolvent, thereby affecting lending institutions.[26] A significant portion of troubled PF loans is in non-metropolitan areas and financed by savings banks, whose substandard and below loan ratio rose to 11.5 percent in Q2 2024 from 3.3 percent in Q2 2022 (Figure 18).[27] Although savings banks significantly increased their capital and loan loss provisions before the onset of the housing market downturn in 2022, the financial buffers of some of them may be insufficient to absorb a surge in NPL, particularly as the revenue shortfall from the large increase in unsold units in regional areas has strained the financial position of many developers (Figure 19).[28] However, the potential distress in savings banks is unlikely to be systemic given that their assets account for only 2 percent of the financial system.

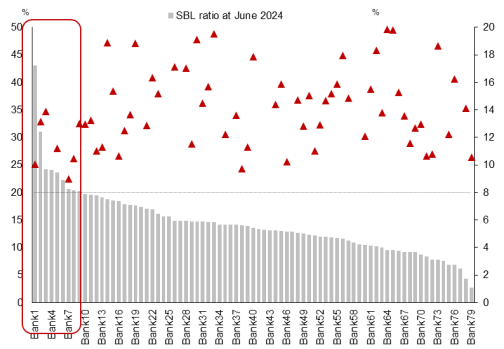
[26] For a construction project, project finance composes of bridge loans (pre-construction loans originating largely from savings banks to developers for land purchases) and main project financing (construction loans financed by bank loans or fund raised through securitization).
[27] Out of 79 savings banks, only eight banks had NPL ratios below the recommended 7 percent, while 21 banks had NPL ratios exceeding 15 percent as of the end of March 2024, prior to the PF-viability assessment. Due to the sharp rise in NPL, the provision coverage ratio—total loan loss reserves divided by substandard and below loans—of around 70 savings banks has fallen below 100 percent, as of Q1 2024.

Figure 18. Substandard and Below Loan Ratios



Source: FSS, AMRO staff compilation and calculation

Figure 19. Capital Adequacy Ratios of Savings Banks



Source: FSS, AMRO staff compilation and calculation

20. Significant price adjustments remain a risk in the housing market, particularly in the SMA. In non-SMA regions, the increase in the number of unsold housing units signals an oversupply situation, which could pressure developers to further lower prices, triggering another round of price corrections and potentially delaying the progress on PF resolution. More importantly, the rapid pace of house price increases in the SMA in 2024 has led to concerns over the extent to which house prices have increased beyond market fundamentals, particularly in high-demand areas.

B.2 Longer-Term Challenges and Vulnerabilities

21. Over the medium term, escalations in US-China trade tensions can lead to disruptions in Korea's manufacturing sector and cloud its export prospects. While the decrease in trade due to tariff and non-tariff barriers between the two giant economies may allow Korea to play the connector role and gain greater market shares in both countries, several challenges can arise from conflict escalation. First, China remains a major source of demand for Korea's exports. To the extent that Korea's exports of critical technology, such as semiconductors and related equipment, to China are hampered by trade measures imposed by the US, Korea may experience a substantial loss in export revenue.[29] Second, the fact that the US government's tax credit for electric vehicle (EV) purchases is conditional on the amount of domestically sourced input adds another layer of complexity for Korean EV manufacturers, which rely heavily on Chinese minerals for batteries. Third, China's curbs on the exports of certain minerals pose a challenge for manufacturers worldwide, particularly of products essential for the green energy transition, advanced digital hardware, and defense-related equipment.[30]

22. Despite some recent moderation, household debt remains relatively high, posing a vulnerability in the financial system. While household debt as a percentage of GDP has decreased from a high of 98.7 percent at end-2021 to 90.6 percent in Q3 2024, the level of household debt has rebounded—after a period of stagnation from late 2022 to mid-2023—supported by the recovery in housing prices and expectations of a policy rate cut by the BOK

[29] China constituted 35.8 percent of Korea's semiconductor industry exports in 2023.
[30] Examples include China's curbs on the exports of gallium and germanium (two metals essential for chip production), imposed in August 2023, and restrictions on the exports on graphite (a critical mineral for batteries used in electric vehicles), imposed in December 2023.

in late 2024. Korean households, especially low-income households, are heavily indebted, with household debt reaching 149.2 percent of disposable income in Q1 2024. The debt-servicing capacity of low-income households and vulnerable SEBOs, notwithstanding recent signs of gradual improvement, remains weak. That said, the ratio of household liabilities to household assets is relatively low at the aggregate level, at 44.5 percent as of Q1 2024, and most household debt are in the form of mortgage loans.

23. A shrinking labor force will increasingly be a drag on the country's economic potential and government finances. On the back of a sharp fall in the birthrate over the past few decades—from 10.3 births per 1000 persons in 2002 to only 4.9 births per 1000 persons in 2022—Korea's population is expected to fall by 8.9 percent from 51.7 million in 2022 to 47.1 million in 2050.[31] As a result, the working-age population is projected to decline by 33.5 percent over the same period to 24.4 million, weighing heavily on economic prospects and government finances over the long term.

C. Policy Discussions and Recommendations

C.1 Calibrating Monetary Policy in a Volatile Environment

24. Given subsiding inflationary pressure and the easing of the monetary policy stance in major economies, AMRO welcomes the BOK's recent reductions in the policy rate, which should help support growth and relieve financial distress in the real estate PF market. As inflation is expected to continue moderating in the near term, dialing back the current tight monetary policy stance may be appropriate to support domestic demand, especially as pressure on the won has abated on the back of similar policy moves in major economies, particularly the US.[32] Although reducing the policy rate may lead to faster growth in household debt, it can help alleviate households' debt service burden for existing borrowers and spur still-weak domestic demand. In addition, lower interest rates can help ease financial conditions for developers, construction companies, and NBFIs involved in troubled real estate PF projects, paving the way for a soft landing in the PF market. That said, the BOK should remain vigilant and stand ready to recalibrate the monetary policy stance in the event of unexpected domestic and external shocks. Lastly, it is vital to ensure that macroprudential policy measures play a greater role in containing financial risks in the housing market and household sector, which can then allow monetary policy to focus more on its primary objective of price stability.

25. The recent enhancements to the BOK's liquidity providing facilities are commendable and should remain in place going forward. Implemented in succession since the second half of 2022 in response to the liquidity crunch stemming from the real estate sector, the BOK's efforts to strengthen its liquidity providing facilities—which include, inter alia, expanding the range of collaterals eligible for liquidity loans and widening the coverage of eligible financial institutions for open market operations—are vital in fortifying the BOK's role in providing a liquidity backstop for both banks and NBFIs, with a view to avoiding spillovers to other financial institutions and maintaining the orderly market functioning.[33] Looking ahead,

[31] Statistics Korea.
[32] According to AMRO's Taylor Rule estimation, the policy rate should be around 3.2 percent in Q4 2024 and decrease further to 2.9-3.0 percent in H1 2025.
[33] The range of collaterals eligible for Liquidity Adjustment Loans has been expanded to include bank debentures, municipal bonds, prime corporate bonds, bonds issued by public institutions, and covered bonds.

it is crucial that the enhancements to the lending facilities be in place to complement the measures taken to facilitate a soft landing in the real estate PF market. That said, particularly for NBFIs,[34] it is important that the authorities undertake periodic reviews of the terms and effectiveness of the lending facilities and continue to strike a balance between enhancing accessibility of a liquidity backstop and minimizing moral hazard and excessive risk-taking.

C.2 Safeguarding Financial Stability

26. AMRO commends the authorities' efforts to facilitate a soft landing in the real estate PF market. After the viability evaluation by financial institutions was completed at the end of November, collaborative efforts in handling non-viable projects should reduce the pressure on financial institutions in securing potential buyers.[35] Looking ahead, it is crucial to carefully manage the pace at which financial institutions write off and dispose all non-viable assets. Moreover, the expansion of guarantees by HUG and HF should be closely monitored due to the potential impact of impaired assets on their balance sheets. In the short term, requiring a sharp increase in equity participation by PF developers could make it challenging to proceed with projects that lack sufficient funding. Therefore, a phased and gradual implementation of these measures is recommended.

27. Stronger buffers and enhanced risk management are necessary to bolster the soundness of NBFIs. To facilitate an orderly return to normal operations, savings banks and credit cooperatives should expeditiously execute the disposal of insolvent projects, guided by the government's PF soft-landing measures, and develop rehabilitation plans for viable ones. Considering the rapid deterioration in credit quality, savings banks and credit cooperatives should increase loan loss provisions and liquidity buffers. Recapitalization and resolution plans for NBFIs with significant exposure to non-viable PF projects should be prepared in advance to mitigate the risk of panic runs. Over the longer term, it is critical that non-bank lenders strengthen their risk management and credit assessment frameworks. To the extent that the country's aging population slows down regional economic activity and limits business opportunities for NBFIs, especially in rural areas, business consolidation may be an appropriate course of action.

28. Risk sharing and maturity mismatch of PF funding should be addressed. AMRO supports the authorities' proposal of imposing risk retention obligations on real estate developers and securities companies when raising funds through structured notes.[36] Along with adjustment of risk weights applied to securities companies' exposures to real estate PF, it is also advisable to consider stricter regulations on the tenor of structured notes backed by RE-PF receivables to prevent excessive reliance on short-term funding for long-term investment.

[34] NBFIs are eligible for Special Loans in accordance with Article 80 of the Bank of Korea Act. In July 2023, the BOK announced that it would promptly decide whether to provide liquidity support for NBFIs through Special Loans in the event of an emergency such as massive deposit withdrawals.
[35] Conditions are being created for financial institutions to carry out systematic restructuring and resolution of projects lacking business feasibility. By providing the necessary funds and incentives for real estate PF restructuring and resolution through joint efforts from the private and public sectors, the aim is to prevent the risk of a sharp contraction in the real estate market and to avoid the impact spreading across the construction and financial industries.
[36] One of the key regulatory gaps is the difference in issuance requirements for asset-backed securities (ABS) and asset-backed commercial paper (ABCP). Because the requirements for ABS are considerably stricter, most PF issuers opt for ABCP, which, for example, do not require that the project company secures land ownership before issuance nor that the underlying asset's cashflow matches perfectly with the ABCP's interest payments.

29. Macroprudential measures should be calibrated to be commensurate with risks in the real estate market and household indebtedness without stifling real housing demand. In recent years, macroprudential measures have been appropriately stringent to rein in household debt. For example, the stressed DSR rule, introduced in February 2024, was initially applied to mortgage loans by commercial banks and was gradually extended to other loan categories and NBFIs. The currently tight loan-to-value (LTV) ratio for mortgage borrowers owning multiple homes or properties in speculative zones—designated as regulated areas—should be maintained to curb speculation.

C.3 Maintaining Fiscal Prudence and Enhancing the Effectiveness of Fiscal Policy

30. Continued policy efforts to rebuild fiscal buffers are warranted, with fiscal policy remaining responsive to evolving economic conditions amid heightened uncertainty. Given the weakened fiscal position and reduced fiscal space, a medium-term fiscal consolidation plan is essential to restore fiscal buffers. A contractionary fiscal stance in 2025 is deemed broadly appropriate and in line with this medium-term plan. In the near term, with a near-zero output gap and relatively robust domestic demand, there is no immediate need for a more expansionary fiscal stance. However, the authorities should retain flexibility in managing fiscal policy to address emerging challenges, such as domestic political turmoil, shifts in US trade policy, or geopolitical tensions. If downside risks materialize or appear imminent, appropriate fiscal responses should be promptly implemented. Such responses should be well-targeted to areas with the most significant economic impact, carefully calibrated to the scope and depth of economic disruptions, and unwound as risk factors subside to ensure continuation of the fiscal consolidation path.

31. Effective fiscal consolidation is crucial in ensuring medium- to long-term fiscal sustainability. In particular, the authorities should focus on strengthening fiscal discipline and rules to anchor fiscal targets, identifying fiscal risks comprehensively, and addressing not only near- to medium-term challenges but also long-term structural issues. Additionally, fiscal consolidation efforts should involve both revenue-enhancing and expenditure-optimizing measures.

- **Legislating fiscal rules**. In AMRO's view, it is important to legislate fiscal rules as a key component in ensuring fiscal sustainability. Well-designed fiscal rules, with strong supporting institutions for operationalization and implementation, would enhance the accountability of fiscal authorities and help prevent excessive political pressure on fiscal management.[37] Even before the rules are formally enacted, the government should adhere to its proposed rules to demonstrate a clear commitment to maintaining fiscal soundness, as it would enhance the credibility of fiscal policy and support the legislative process. In this regard, the NFMP 2024-2028, with fiscal deficits below the ceiling set by the proposed fiscal rule, is commendable. Should fiscal aggregates deviate from the proposed fiscal rules, the authorities should transparently explain the reasons for such deviations, grounded in proposed escape clauses, and outline corrective mechanisms to return to fiscal consolidation path over the medium term. Over the longer-term, given the projected rise in debt-to-GDP ratio even with a fiscal rule in place, it is recommended to regularly

[37] Please refer to the 2022 Annual Consultation Report on Korea for detailed policy discussion on fiscal rules.

revisit and review the parameters of fiscal rules to ensure long-term fiscal sustainability is attained.[38]

- **Robust long-term fiscal projections and policy discussions.** Long-term fiscal projection and relevant policy discussions are crucial for identifying fiscal risks. A long-term fiscal projection is scheduled for the second half of 2025.[39] Such projection should be based on realistic assumptions for macroeconomic and demographic indicators, alongside feasible fiscal plans. Conducting various macro-fiscal stress tests with alternative policy options and plausible scenarios will facilitate meaningful discussions among policymakers and the public.

- **Normalization of tax cuts, rationalization of tax incentives, and tax policy reforms**. Fuel tax cuts have contributed to stabilizing headline inflation and alleviating living costs, though at the expense of significant foregone tax revenue (Box B. Impact of the Fuel Tax Cut on Inflation and Tax Revenue).[40] As such, fuel tax should be restored to its normal level, taking into consideration developments of global oil prices, exchange rates, and headline inflation. Meanwhile, tax incentives and exemptions should be continuously reviewed and restructured to ensure that they meet legislative limits, with a strict assessment of sunset clauses.[41] Additionally, there should be a public discussion of the tax policy reforms aimed at fundamentally raising revenue collection, including the introduction of new taxes, such as virtual asset tax, with due consideration on their potential impact and social consensus.

- **Continued restructuring of spending programs, including mandatory spending**. The comprehensive review and reallocation process undertaken over the past three years has helped maintain expenditure at a manageable level, and this practice should be continued. Meanwhile, mandatory spending programs should be reviewed to be aligned with the evolving socioeconomic landscape. In particular, restructuring mandatory transfers to local education, which are exclusively allocated to primary and secondary schools, should be considered, given the shrinking school-age population (Figures 20 and 21).[42] The resources saved could then be reallocated to human resource development in advanced technologies and emerging industries.[43]

[38] Assuming the fiscal deficit of mid-2 percent of GDP, the debt-to-GDP ratio is projected to rise, surpassing 60 percent by 2039. Even after reducing the fiscal deficit to below 2 percent of GDP after 2040, according to the proposed fiscal rule, the debt ratio will continue to rise, albeit at a slower pace.

[39] The government initially planned to establish Fiscal Vision 2050 to address structural problems and ensure medium- to long-term fiscal sustainability.

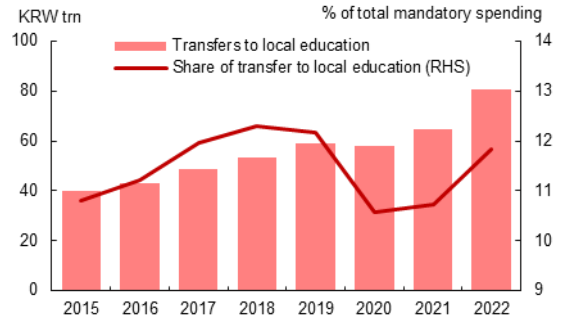
[40] According to AMRO's estimation, fuel tax cuts and partial reversions lowered the headline inflation by 0.1-0.2 ppts in 2021, 1.0-1.9 ppts in 2022, while raising it by 0.3-0.6 ppts in 2023 and 0.1 ppts in 2024. The tax revenue forgone, including transportation tax and VAT, is estimated to have been 0.04 percent of GDP in 2021, 0.3 percent in 2022 and 2023, and 0.2 percent in 2024.

[41] According to the National Finance Act and its Decree, the Minister of Economy and Finance shall endeavor to maintain the ratio of tax reduction (defined as the tax reduction divided by the sum of tax reduction and total tax revenue) at a level that does not exceed the average ratio of the preceding three years. However, this limit has been sometimes exceeded, including in 2023, 2024 and 2025. Of the tax expenditure items that reached their respective sunset clauses in the past five years, 13.3 percent (42 out of 314) were terminated, and 18.5 percent (58 out of 314) were redesigned.

[42] The mandatory transfer to local education entails several issues: (i) it does not reflect the shrinking school-age population, resulting in a significant increase in per capita transfers; (ii) it is restricted to primary and secondary education, distorting resource allocation within education sector; (iii) it hampers overall resource allocation, limiting the fiscal policy in meeting other important spending needs.

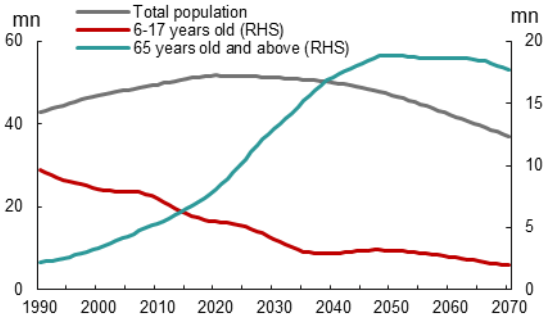
[43] The government has sought to allocate more resources to tertiary education by reducing the funding allocated to primary and secondary education, but in 2024, it was able to reallocate only KRW1.5 trillion from the education tax. This limited reallocation is due to current legislation, which mandates that 20.79 percent of domestic tax revenue (excluding education tax) be assigned to local governments for primary and secondary education. Amendments to the relevant laws are pending in the National Assembly.

Figure 20. Transfers to Local Education



Source: Korea Fiscal Information Service; AMRO staff estimates

Figure 21. Population

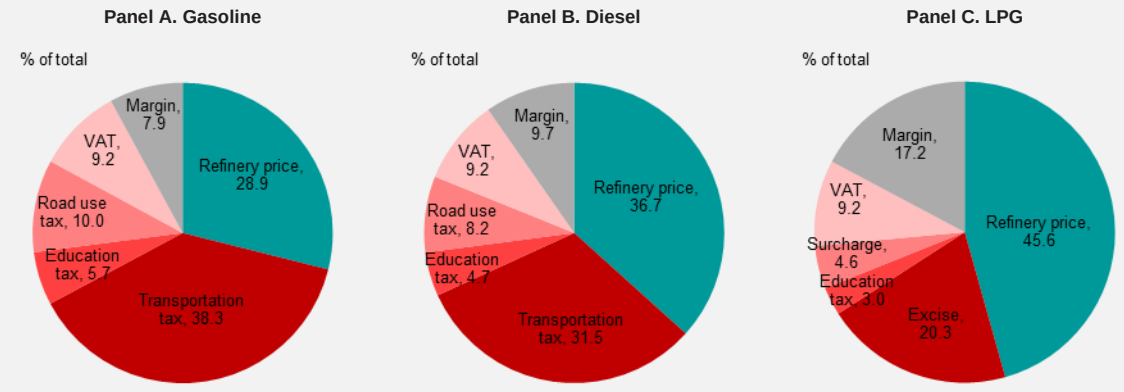


Source: Statistics Korea

Box B: Impact of the Fuel Tax Cut on Inflation and Tax Revenue[44]

In Korea, the fuel tax is a quantity tax levied per liter, with the tax amount varying depending on the type of fuel. For gasoline and diesel, the fuel tax comprises transportation tax (KRW529 per liter for gasoline and KRW375 per liter for diesel), education tax (15 percent of the transportation tax), road use tax (26 percent of the transportation tax), and VAT. For LPG, fuel tax includes excise tax (KRW161 per liter) and education tax (15 percent of the excise tax), and VAT. The proportion of tax within the retail price is therefore significant, accounting for 63, 54, and 37 percent of the retail price for gasoline, diesel, and LPG, respectively, implying considerable potential to influence retail fuel prices by adjusting the tax amount (Figure B.1).

Figure B.1. Composition of Retail Fuel Prices



Source: Opinet; AMRO staff estimates
Note: The charts show the average shares of each component in 2020 when there was no fuel tax cut. Following the implementation of the fuel tax cut since November 2021, the proportion of tax decreased accordingly.

The government has reduced fuel tax since November 2021, with a gradual normalization process beginning in January 2023 (Table B.1). While the global oil price level has been the primary factor in determining the fuel tax cut, other considerations, such as the rate of increase in oil price, exchange rate fluctuations, and overall headline inflation, have also played a role (Figure B.2). The fuel tax cut was first introduced in March 2008, when the global oil price exceeded USD100 per barrel.

[44] Prepare by Byunghoon Nam, Senior Economist.

However, despite global oil prices hovering above USD100 per barrel during 2011-2014, the fuel tax was not reduced, as the exchange rate remained broadly stable and CPI inflation quickly subsided following a brief spike. In contrast, in November 2021, even though the global oil price was below USD100 per barrel, KRW depreciation combined with rising CPI inflation prompted the implementation of the fuel tax cut. Reflecting won depreciation, the global oil price in KRW terms in November 2021 was comparable to that of March 2008 (Figure B.2. Panel B). Since 2023, easing inflation has provided justification for normalizing the fuel tax. However, the elevated level of global oil prices in KRW terms, driven by the continued weakness of the currency, underscored the need for gradual adjustments.

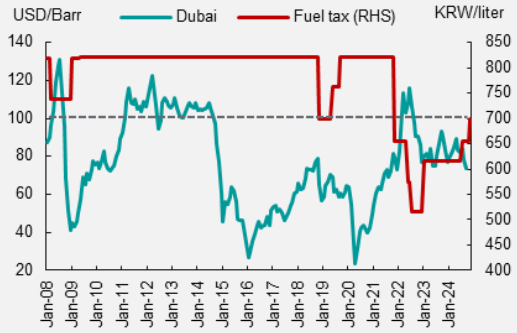
Table B.1. Fuel tax (KRW/Liter)

	Before tax cut	Nov 12, 2021	May 1, 2022	Jul 1, 2022	Jan 1, 2023	Jul 1, 2024	Nov 1, 2024
		-20%	-30%	-37%	Gasoline: -25% Diesel: -37% LPG: -37%	Gasoline: -20% Diesel: -30% LPG: -30%	Gasoline: -15% Diesel: -23% LPG: -23%
Gasoline	820	656	573	516	615	656	698
Diesel	581	465	407	369	369	407	448
LPG	203	163	142	130	130	142	156

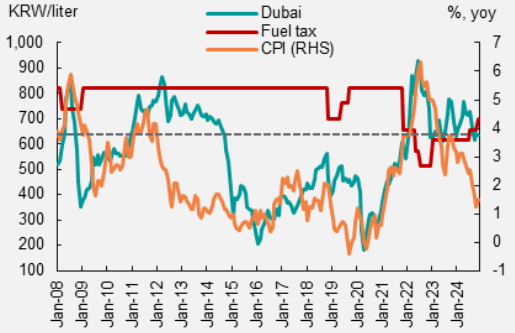
Source: Ministry of Economy and Finance

Figure B.2. Global Oil Price, CPI, and Fuel Tax

Panel A. Global Oil Price in USD and Fuel Tax



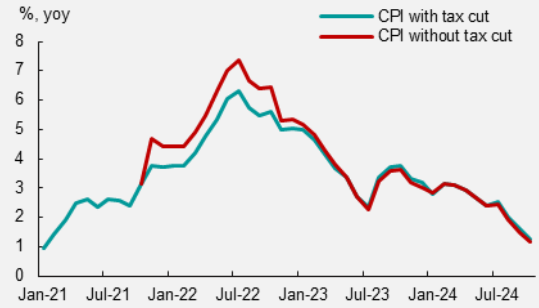
Panel B. Global Oil Price in KRW, CPI, and Fuel Tax



Source: World Bank; Opinet; Bank of Korea; Statistics Korea; AMRO staff estimates
Note: The global oil price in USD per barrel, shown in Panel A, was converted to KRW per liter in Panel B using the average KRW/USD exchange rate and a unit conversion from barrels to liters.

The fuel tax cut has contributed to stabilizing CPI inflation especially during 2022 when inflationary pressure was high (Figure B.3). Fuel tax cut can affect CPI inflation both directly, through components in the CPI basket, and indirectly, by reducing production costs. According to the current CPI weights, gasoline, diesel, and LPG account for 2.41, 1.63, 0.28 percent of the total CPI basket, respectively. However, the actual direct impact also depends on the degree of pass-through of fuel tax cut to retail fuel prices. In practice, the declines in retail gasoline and diesel prices have been delayed and

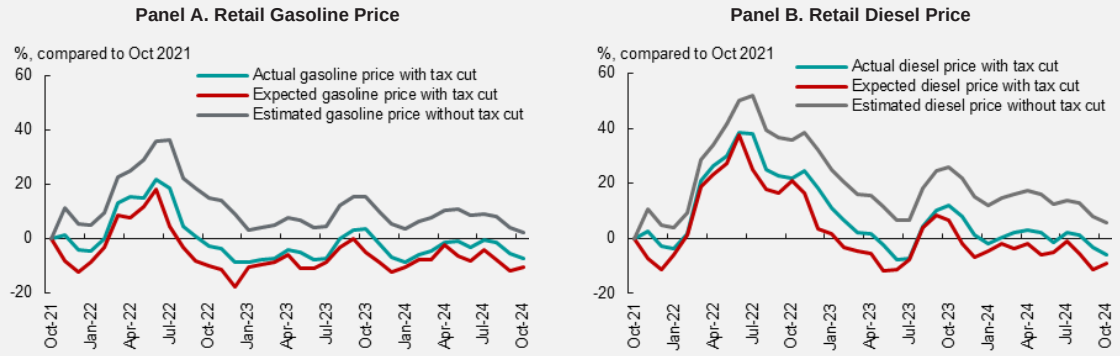
Figure B.3. CPI Inflation with and without Fuel Tax Cut



Source: Statistics Kores; AMRO staff estimates
Note: CPI inflation without the tax cut is estimated by accounting only for the direct impact through components in the CPI basket. See footnote 48 for the methodology.

smaller than anticipated (Figure B.4).[45] Nonetheless, the direct contribution of fuel tax cut to lowering CPI inflation is estimated at 0.1 percentage point in 2021 and 0.8 percentage point in 2022.[46] Meanwhile, the impact of fuel tax normalization since 2023 has been minimal, given its gradual pace. When considering the indirect effects of reduced production costs and anchored inflation expectation, the overall contribution of fuel tax cut to stabilizing inflation is likely to have been larger.

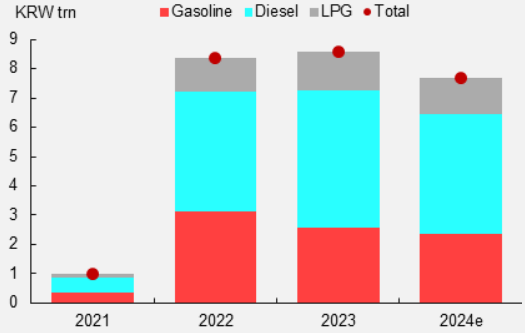
Figure B.4. Retail Fuel Price with and without Fuel Tax Cut



Source: Opinet; AMRO staff estimates
Note: See footnote 47 for the methodologies for calculating the expected retail prices with the tax cut and the estimated retail prices without the tax cut.

The fuel tax cut inevitably led to significant foregone tax revenue. According to the AMRO's estimates, the forgone tax revenue (national tax and local tax combined)—including transportation tax, excise tax, education tax, road use tax, and VAT—is estimated at KRW 25.0–26.5 trillion from November 2021 to December 2024, depending on assumptions regarding the price elasticity of fuel consumption (Figure B.5).[47] [48] Annually, the foregone tax revenue amounted to approximately 0.3-0.4 percent of GDP or 2.0-2.6 percent of total tax revenue for each year from 2022 to 2024. The

Figure B.5. Foregone Tax Revenue



Source: Ministry of Economy and finance; Petronet; AMRO staff estimates
Note: The price elasticities of -0.4 were assumed for this chart. Please see the footnote for the estimation methodology.

[45] Retailer margins have been observed to generally increase for several months after the fuel tax cut, as retailers delayed adjusting retail prices and/or only partially reflected the tax cut in prices. This incomplete pass-through of the fuel tax cut to retail prices has been documented in several empirical studies (e.g., **Jang and Choi, 2023**; **Chang, 2023**; **Kim and Jung, 2024**). Considering this behavior, the expected retail prices with the tax cut are calculated under the assumption that retailer margins remained unchanged from October 2021, while applying the actual refinery prices and the reduced fuel tax. These hypothetical prices assume retailers would have reduced retail prices by the full amount of the tax cut immediately after its implementation. Conversely, the estimated retail prices without the tax cut are derived by maintaining the October 2021 fuel tax levels, while applying the actual refinery prices and retailer margin.

[46] CPI inflation without the tax cut is estimated by accounting only for the direct impact through components in the CPI basket. Specifically, after estimating retail prices without tax cut (see the footnote 47), the contribution of the fuel tax cut to lowering CPI inflation is calculated by multiplying the difference in retail prices (with and without the tax cut) by the CPI weight for each fuel type (gasoline, diesel, and LPG) and summing these contributions.

[47] Fuel demand is found to be price inelastic, as fuel is considered a necessity. According to various empirical studies of the Korean market, the estimated price elasticities of gasoline and diesel range from -0.7 to -0.1. See **Kim, M. and Kim, S. (2011)**, **Cho, Y. et al (2021)**, and **Lim, S. and Ryu, J (2022),** among others.

[48] The forgone tax revenue for each month since November 2021 was estimated as follows: 1) Unit tax reduction (A) was calculated as the difference in fuel tax plus VAT between each month and October 2021; 2) Estimated consumption without tax reduction (B) was derived by adjusting actual consumption levels of gasoline, diesel, and LPG under the tax cut to reflect consumption levels without the tax cut, using the price elasticities of fuel demand. Specifically, estimated consumption without tax cut = actual consumption with tax cut x (1 – price elasticity of fuel demand x percentage difference in retail price with and without tax cut); 3) Share of effective tax base (C) was estimated as the ratio of actual transportation tax collection to statutory transportation tax collection (i.e. transportation tax per unit x actual fuel consumption) for each fuel type in each year. This adjustment accounts for tax exemptions and loopholes; 4) forgone tax revenue was calculated as *A x B x C*.

reduction in fuel tax collection was one of the contributing factors to the substantial tax revenue shortfalls in 2023 and 2024.

The fuel tax cut should be gradually normalized, considering key influencing factors and its fiscal implications. The fuel tax cut has contributed to mitigating inflationary pressures during 2022 and 2023, but at the costs of tax revenue losses. Furthermore, the fundamental role of fuel taxes in addressing environmental externalities, such as air pollution and climate change, underscores the need for normalization. With global oil prices stabilizing and CPI inflation staying below the target, the authorities should continue normalizing the fuel tax cut, while remaining vigilant to potential risks stemming from exchange rate fluctuations and geopolitical tensions.

References

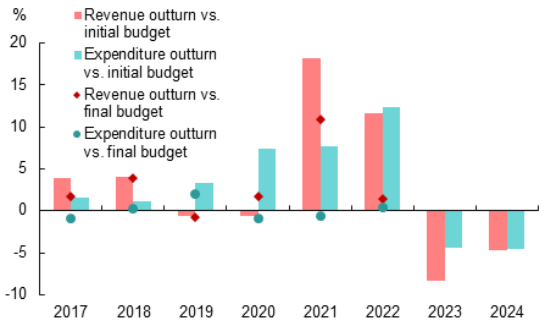
Chang, H., and Choi, B. 2023. "Effects of fuel tax cut on retail prices and its implications". *Korean Energy Economic Review, 22-1.*
Chang, Y. 2023. "Heterogeneous Tax-Cut Pass-through and Market Structure". *Korea Energy Economics Institute.*
Cho, Y., Kim, W., and Je, S. 2021. "Estimation of the Elasticity of Gasoline and Diesel Using the QUAIDS Model". *Journal of The Korean Data Analysis Society, 23-3.*
Kim, M. and Kim, S. 2011. "Estimation of the Price and Income Elasticity of Demand for Transportation Gasoline and Diesel." *Journal of Environmental Studies 50*.
Kim, T., and Jung, J. 2024. "An Economic Analysis of a Temporary Tax Reduction for Transportation Fuel and its Policy Improvement." *Korea Energy Economics Institute*.
Lim, S. and Ryu, J. 2022. "Changes in Price Elasticities of Diesel Demand by Relative Prices between Motor Fuels: Penal Analysis of 23 European Countries" *Journal of Environmental Policies 30-2*.

32. While improving the accuracy of fiscal projections, the authorities should address deviations from the plan with more transparent and accountable frameworks. Given the persistent discrepancies between budgeted and actual tax revenue since 2021, it is crucial to improve tax revenue forecasting models to account for the evolution of key industries and sectors (Figure 22).[49] Accurate fiscal planning is also vital in ensuring that fiscal policy achieves its intended objectives, particularly in the context of macroeconomic stabilization.[50] Meanwhile, in response to the significant revenue shortfall in 2023, the government implemented several measures, including reducing transfers to local governments and education, withholding interest payments to the Public Capital Management Fund, and drawing on resources from the Foreign Exchange Stabilization Fund (Figure 23).[51,52]Although these measures were legally permissible, they led to unintended consequences, including funding pressure for local governments, a reduction in the government's financial assets, and an additional interest cost in the general account due to delayed payments. Moreover, such ad-hoc measures may risk undermining public trust in fiscal policy. To enhance transparency and accountability, policy measures addressing a revenue shortfall should be grounded in pre-

[49] The discrepancies between budgeted and actual tax revenues since 2021 have been driven mainly by CIT and PIT, largely due to fluctuations in the business performance of the semiconductor industry and asset markets. The government announced the policy measures to enhance the tax revenue forecast by (i) reforming the tax revenue forecasting process to include the participation of NABO, KIPF, and KDI throughout the macroeconomic forecast and revenue budget formulation; and (ii) advancing the tax revenue forecasting models by developing big-data and AI models and by utilizing the micro-level taxation information to reflect the socioeconomic changes and behavioral changes of taxpayers. Also, the government plans to re-forecast revenue in September every year to enhance the transparency regarding tax revenue performance.
[50] The initially planned fiscal stances in the budget were countercyclical, reflecting the implementation of fiscal stimuli during the pandemic and subsequent efforts to normalize economic activity. However, actual fiscal stances have turned out to be procyclical, with higher-than-expected revenue in 2021-2022 and lower-than-expected revenue in 2023.
[51] Public Capital Management Fund was established (i) to manage the reserves of public funds in an integrated manner and utilize them for public purposes, such as loans, and (ii) to efficiently manage the issuance and repayment of treasury bonds.
[52] Foreign Exchange Stabilization Fund was established to facilitate foreign exchange transactions and stabilize foreign exchange rates through smoothing operations.

determined guidelines.[53] This would help build credibility in fiscal policy and ensure that necessary adjustments are clearly communicated and effectively managed.

Figure 22. Deviations from the Budget



Source: Ministry of Economy and Finance; AMRO staff estimates

Figure 23. Revenue Shortfall and Policy Responses in 2023

	KRW trn
Tax revenue shortfall	56.4
Reduction in spending	41.2
Transfers to local government/education	18.6
Interest payments to Public Capital Fund	8.6
Transfers to special accounts and public funds	6.2
Budget underutilization (e.g., contingency)	7.8
Additional Borrowing from Public Capital Mgt Fund	9.6
Other	5.6

Source: National Assembly Budget Office

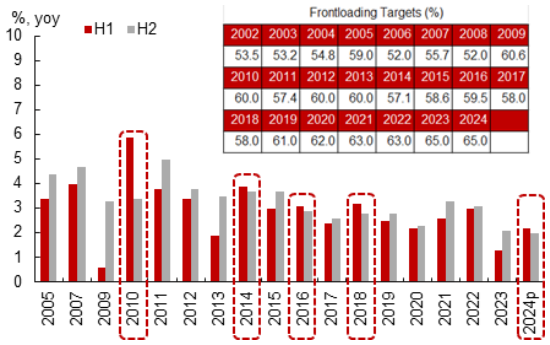
33. The current practice of frontloading of fiscal spending within a fiscal year should be revisited to enhance the effectiveness of fiscal policy. Since 2019, the government has set the frontloading targets (i.e., execution rate targets for the first half) for key spending programs at above 60 percent, aiming to strengthen the role of fiscal policy in stabilizing the economy and improving budget execution efficiency. While the frontloading of fiscal spending has naturally increased overall execution rates and reduced budget underutilization, its effectiveness in achieving economic stabilization is questionable. In some years, projected economic growth was higher in the first half (H1) than in the second half (H2) (ex-ante procyclicality), and in other years, actual growth followed the same pattern (ex-post procyclicality) (Figures 24 and 25). Moreover, a large amount of frontloading, coupled with lower-than-expected revenue performance in 2023 and 2024, has led to substantial short-term borrowing, which is costly.[54] Given the procyclicality of frontloading and its potential adverse impact, the planning and implementation of frontloading should be reviewed with the following considerations:

- **Setting frontloading targets based on the growth forecasts for H1 and H2.** For a more effective countercyclical fiscal policy, frontloading targets should be aligned with growth projections. If H1 growth is projected to be lower than H2 growth, higher frontloading targets could support domestic demand. Otherwise, targets should be set only with a view to minimizing budget underutilization.

- **Flexibility in disbursement throughout the year**. Since actual growth may deviate from forecasts due to unforeseen factors, rigid adherence to original frontloading targets could exacerbate economic fluctuations. The government should consider flexibly adjusting disbursements during the year, based on close monitoring of high-frequency data for real-time economic assessment (now-casting).

[53] If a revenue shortfall results from conditions allowing a supplementary budget (e.g. disaster, economic recession), it can be addressed through an explicit budget revision. In other cases, the government is advised to establish guidelines, with an appropriate form of legislation, that clearly define policy options and priorities (e.g. reduction in local transfers, mobilization of public funds), through extensive discussions among various stakeholders, including the National Assembly.
[54] The short-term borrowing from the BOK peaked at higher than KRW30 trillion in March 2023 and 2024.

Figure 24. Projected Real GDP Growth and Frontloading Targets

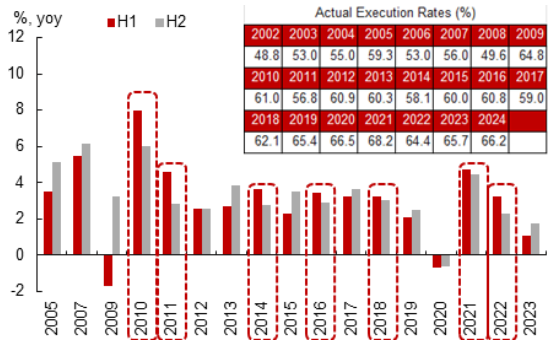


Frontloading Targets (%)

2002	2003	2004	2005	2006	2007	2008	2009
53.5	53.2	54.8	59.0	52.0	55.7	52.0	60.6
2010	2011	2012	2013	2014	2015	2016	2017
60.0	57.4	60.0	60.0	57.1	58.6	59.5	58.0
2018	2019	2020	2021	2022	2023	2024	
58.0	61.0	62.0	63.0	63.0	65.0	65.0	

Source: Bank of Korea; Ministry of Economy and Finance
Noted: 1) The growth forecasts are based on the forecasts made in December (November after 2020) of the previous year by BOK; 2) The dotted lines indicate the years when the frontloading targets were higher than 55 percent while H1 growth was higher than H2 growth.

Figure 25. Actual Real GDP Growth and Actual Execution Rates



Actual Execution Rates (%)

2002	2003	2004	2005	2006	2007	2008	2009
48.8	53.0	55.0	59.3	53.0	56.0	49.6	64.8
2010	2011	2012	2013	2014	2015	2016	2017
61.0	56.8	60.9	60.3	58.1	60.0	60.8	59.0
2018	2019	2020	2021	2022	2023	2024	
62.1	65.4	66.5	68.2	64.4	65.7	66.2	

Source: Ministry of Economy and Finance; AMRO staff estimates
Noted: The dotted lines indicate the years when the actual execution rates were higher than 55 percent while H1 growth was higher than H2 growth.

C.4 Addressing Structural Issues to Safeguard Long-Term Prospects

33. Increasing the resilience and dynamism of the manufacturing sector and continued policy focus on overcoming demographic challenges are crucial. In light of protectionist trade measures stemming from the US-China tension, efforts to diversify sources of supply—ranging from raw material to parts and equipment—for key manufacturing industries, such as semiconductors, automobiles, and green energy products, are vital in enhancing the resilience of the country's manufacturing exports as well as Korean manufacturers' overseas production. Amid growing global competition in advanced technologies, particularly semiconductors, AMRO commends the government's attempts to boost the resilience of the supply chains of the manufacturing sector, such as the 26-trillion-won comprehensive support program for the semiconductor industry—announced in May 2024—which covers the financial, infrastructure, and research and development aspects of the semiconductor ecosystem, particularly in segments in which the country has yet to become a major global player, such as equipment production and system semiconductors. AMRO also welcomes the authorities' efforts to strengthen other sectors of the economy that are less vulnerable to geopolitical risks, such as tourism and the green economy.[55] As far as demographics is concerned, given the shrinking labor force's increasing drag on the economy, it is critical that the authorities continue to evaluate and recalibrate existing demographic policies, such as fiscal incentives for childcare, lifelong learning, and productive ageing, with a view to enhancing their effectiveness in supporting a productive labor force in the long term.[56] Furthermore, relaxation of immigration and foreign worker policy may be considered to address the projected decline in the country's workforce.

34. AMRO welcomes the authorities' continued efforts to develop financial markets, such as the Corporate Value-up Program, and several measures to deepen the foreign exchange market. In response to the undervaluation of Korean stocks compared to other

[55] For example, the government announced the "Strategies to Boost Inbound Tourism" initiative in June 2024, which include simplification of tourist arrival procedures, introduction of special visas such as the K-Culture Training Visa and the Regional Specialized Digital Nomad Visa, and expansion in the number of flight connections between Korea's regional cities and foreign countries, among others.
[56] Some examples of these fiscal incentives include *Bogeumjari* loans (subsidized mortgage loans for certain groups of borrowers such as lower-income households, non-speculative homebuyers, newly married couples, and households with multiple children) and cash support for newborns (e.g. Starting in 2025, the Seoul government will provide 300,000 won/newborn/month for a maximum of two years for low-income married couples that do not own homes.).

advanced economies, the authorities launched the Corporate Value-up Program, which aims to enhance valuation through measures such as improving capital efficiency, increasing shareholder returns, and enhancing corporate governance.[57] To further develop and deepen the foreign exchange market, the authorities have started to allow foreign financial institutions based overseas to participate in the domestic interbank forex market, extended foreign exchange market trading hours, and enhanced the electronic trading infrastructure, efforts that have resulted in the inclusion of Korea in the FTSE Russell's World Government Bond Index (WGBI).[58]

35. Long-term fiscal challenges arising from population aging should be addressed proactively, striking a balance between ensuring fiscal sustainability and providing sufficient support. Regarding pension reforms, the government announced the Pension Reform Implementation Plan in September 2024, which encompasses measures to strengthen fiscal sustainability, improve inter-generational equity, and secure old-age income through a multi-layered pension system (Table 1).[59] AMRO welcomes this reform plan, which is in line with recommendations in the Annual Consultation Report 2023, and urges timely discussions and legislation.[60] As for health insurance, expenditures are projected to rise significantly in tandem with population aging, leading to a deterioration in the financial position of the National Health Insurance Service (NHIS).[61] Additionally, the overuse and low costs of medical services regulated by the NHIS have emerged as critical concerns. As such, a comprehensive reform of the NHIS is needed to ensure its financial sustainability while maintaining support for essential and urgent medical services.

Table 1. The Pension Reform Implementation Plan

Vision	**Securing Old-age Income with Mutually Beneficial Pension Reforms**
Objectives	**Designing a sustainable National Pension for all generations**
	Building trust from future generations through intergenerational equity
	Establishing a multi-layered system to strengthen old-age income security

[57] Under the guidelines, companies are advised to select key indicators critical to enhancing their corporate value; set mid-to long-term goals; draw up and disclose concrete plans to achieve the goal, including investments in each business sector, expanding R&D investment, reshuffling business portfolio, treasury stock cancellation and dividend payout, disposal of ineffective assets, etc.

[58] Announced in October 2024, the inclusion will take place in November 2025, phased in over a one-year period. Korean government bonds are expected to comprise 2.2 percent of the index.

[59] Specifically, the pension reform plan includes (i) strengthening long-term financial sustainability of the National Pension Fund (NPF) by raising contribution rates from 9 to 13 percent, improving investment returns by 1 percentage point, and introducing an automatic adjustment mechanism (AAM), which adjusts the pension benefits, reflecting demographic changes (e.g., number of subscriber, life expectancy); (ii) improving inter-generational equity by differentiating the pace of raising contribution rates across generations (e.g., 50s in 4 years vs 20s in 16 years), and stipulating the guarantee for benefit payments; and (iii) securing the old-age income through multi-layered pension systems, including the National Pension, Basic Pension Benefits, retirement and personal pensions. Raising the contribution rate to 13 percent with improving investment returns will extend the NPF life from the currently projected 2056 to 2072. The introduction of AAM will further extend its life to 2088, 2079, or 2077, if introduced in 2036, 2049, and 2054, respectively.

[60] In the Annual Consultation Report Korea 2023, the mission conveyed three key messages: (i) the parametric pension reforms should be completed as early as possible to avoid the need for sharper and more painful adjustments later; (ii) 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; (iii) the relationship between the National Pension Service and the Basic Pension should be well defined, and the role of private pensions should be strengthened to supplement the public pension system's provision of income support.

[61] The NHIS expenditure is expected to increase from 3.9 percent of GDP in 2022 to 6.4-13.0 percent of GDP by 2060, depending on the projection models. According to NABO, the NHIS deficit is expected to increase after 2024, with accumulated reserves expected to be depleted by 2028.

3 Sectors	16 Measures	
Strengthening Financial Sustainability	• Raise contribution rate: 9 → 13% • Raise income coverage ratio: 40 → 42% • Enhance investment returns: 4.5 → 5.5% or above • Discuss introducing automatic adjustment mechanism, linked to fiscal and demographic changes • (e.g., subscriber growth, life expectancy).	
Enhancing intergenerational equity	• Differentiate the pace of raising contribution rates across generations (i.e., 50s: 4 years, 40s: 8 years, 30s: 12 years, 20s: 16 years) • Stipulate guarantee for benefit payments in the law	
Securing old-age income[62]	• Strengthen credits for childbirth • Expand credits for military service • Strengthen the support of insurance premium for low-income groups • Raise the mandatory subscription age	• Raise the Basic Pension Benefits • Strengthen the support for the poor from the Basic Pension Benefits • Make the retirement pension mandatory • Incentivize shifting lump-sum payment to annuity • Raise investment returns of the retirement pension • Encourage/incentivize the personal pension

Sources: Ministry of Health and Welfare

36. Steadfast commitment is essential in order to achieve the authorities' carbon emission reduction goals. AMRO commends the authorities' efforts to promote carbon neutrality following the establishment of the National Framework Plan for Carbon Neutrality and Green Growth—announced in April 2023—according to which a goal has been set to reduce carbon emissions by 40 percent of the 2018 level by 2030.[63] In the first year following the plan's establishment, efforts were focused on laying the groundwork for a carbon-neutral society, which involves shifting towards carbon-free energy, reducing coal power operations, and promoting eco-friendly mobility.

- Despite the strengthening of greenhouse gas reduction targets, emission allowance prices have declined and remained low. This has raised concerns that the market functions of the emissions trading system, which should incentivize greenhouse gas reductions, are not operating effectively.[64] In response, the government has prepared measures to expand the market base of the emissions trading system and improve market stabilization actions.[65] In addition to these efforts, AMRO recommends strengthening policy efforts to ensure an orderly transition, as the rapid tightening of greenhouse gas reduction targets set for after 2026 could lead to a sharp increase in the carbon reduction

[62] Korea has a multilayered pension system: (i) Basic pension for all citizens below an income threshold (about 70 percent of the elderly population) (non-contributory); (ii) National Pension for all citizens (contributory, mandatory); (iii) Retirement pension for employee (mandatory only for the large companies); (iv) Personal pension (voluntary). See Annual Consultation Report on Korea 2023-Annex 4 for the overview of a pension system in Korea.
[63] According to the "Framework Act on Carbon Neutrality and Green Growth" and its enforcement decree, the 2030 greenhouse gas reduction target (Nationally Determined Contribution, NDC) requires a 40% reduction in national greenhouse gas emissions by 2030 compared to 2018 levels (approximately 730 million tons). The 2030 NDC was initially established in 2015 to reduce emissions by 37% compared to the Business As Usual (BAU) scenario for 2030. However, in 2021, it was revised to a more ambitious target of reducing emissions by 40% from the total emissions of the base year 2018. The NDC sets annual sector-specific targets, including energy transition, industry, transportation, buildings, and waste, from 2023 (approximately 630 million tons) to 2030 (approximately 440 million tons).
[64] The continued low level of emission allowance prices has been attributed to the pandemic, natural disasters, and the restriction on the banking of emission allowances. It has been consistently pointed out that limiting the amount of allowances that can be carried over to the following year (The amount of emission allowances that can be carried over to the following year is limited to 1x the amount sold. In contrast, the EU has no restrictions on the banking of allowances) has led companies with excess allowances (actual emissions < allocated allowances) to sell large quantities of surplus allowances in the market each year, resulting in a chronic oversupply.
[65] In November 2024, restrictions on the banking of emission allowances—which had distorted market functions and hindered companies' allowance management—were eased, increasing the carryover limit for companies with surplus allowances from 3 to 5 times their net sales. Additionally, efforts are being made to expand the range of market participants and revitalize the market.

burden over a short period, with potentially adverse effects on the real economy and financial markets.[66]

- After the full implementation of the Carbon Border Adjustment Mechanism (CBAM) in 2026, higher financial burden will weigh on carbon-intensive export manufacturers due to the need to purchase CBAM certificates.[67] In preparation for this, the government is promoting the development of carbon reduction technologies to enhance the competitiveness of companies exporting to the EU and expanding the infrastructure for measuring product carbon emissions, and further strengthening administrative support for small exporting businesses.[68]

- During the transition to a low-carbon economy, inclusive support is essential to mitigate the impact on vulnerable groups—such as low-income households and carbon-intensive industries and their labor force—which may be more exposed to transition risk shocks.

37. As far as transition financing is concerned, greater use of sustainability-linked bonds (SLBs) can help expand Korea's green financing market. Despite a raft of measures rolled out by the Korean government to promote green financing, the green bond market in Korea remains small, accounting for only 10 percent of total ESG bonds as of Q3 2023, compared to the average of around 60 percent for the other ASEAN+3 economies.[69] Some of the key barriers to the growth of Korea's green bond market are high issuance and transaction costs, as well as the nature of Korean businesses, the major ones of which are in the manufacturing sector and hence may not meet eligibility criteria for the issuance of conventional ESG bonds. Moreover, the low share of green bonds in the ESG market can be attributed to the high issuance volume of Korea Housing Finance Corporation's mortgage-backed securities, which are classified as social bonds. Given such challenges, SLBs can serve as an alternative, as they can be issued by non-environmentally friendly companies and only require issuers to predetermine environmental or social goals, along with financing terms and conditions.

[66] Reduction target (compared to the previous year, million tons CO2e): 8.8 in 2024, 7.5 in 2025, 14.7 in 2026, 17.9 in 2027, 24.1 in 2028, 31.1 in 2029, and 92.9 in 2030

[67] Starting in October 2023, the European Union (EU) will implement the Carbon Border Adjustment Mechanism (CBAM), which regulates carbon emissions generated during the production processes of imported goods. Until the end of 2025, CBAM will be in a pilot phase, during which companies exporting to the EU must submit CBAM reports, including the calculation and verification of the embedded carbon emissions in their export products, to the governments of EU member states through importers. From January 2026, when CBAM is fully implemented, exporters will be required to purchase CBAM certificates issued by the EU for any excess emissions above the set threshold for the embedded carbon content of their export products.

[68] The government has published reports titled the "EU Carbon Border Adjustment Mechanism (CBAM): Current Status and Response Measures" (2022), "EU CBAM Preparation Status and Future Response Directions" (2023), and "EU CBAM Trends and Measures to Enhance Corporate Response Capacity" (2024).

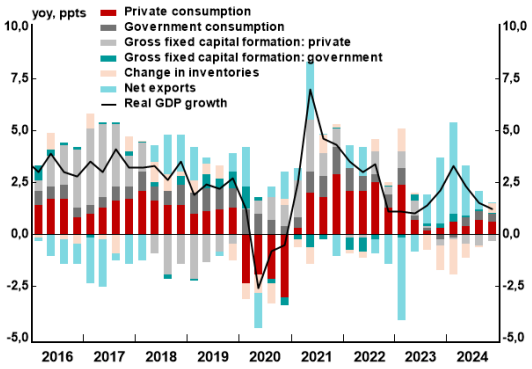
[69] The measures include the introduction of the Korean taxonomy in 2019, the issuance of the green bond guideline in 2020, and interest rate subsidies to local SMEs for issuing green bonds in 2023, among others.

Appendices

Appendix 1. Selected Figures for Major Economic Indicators

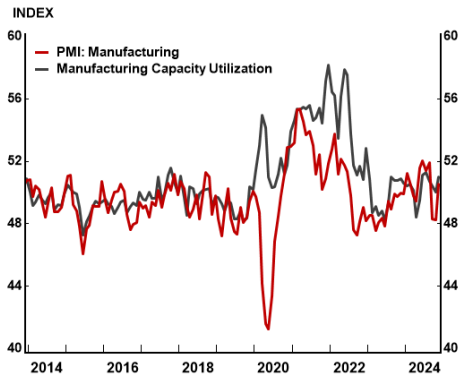
Figure 1.1. Real Sector

Output growth improved in 2024 thanks to strong export performance and, more recently, recovering domestic demand.



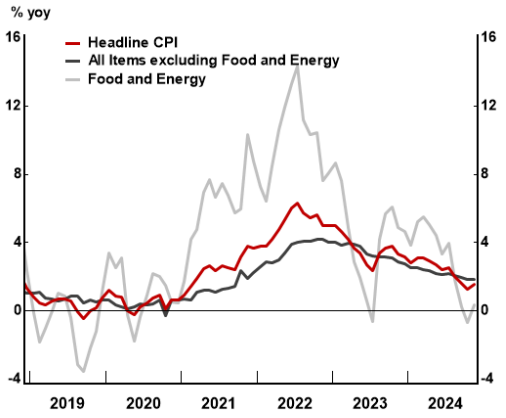
Source: Bank of Korea; Haver; AMRO staff calculations

The near-term outlook for the economy appears positive, with continued growth in manufacturing.



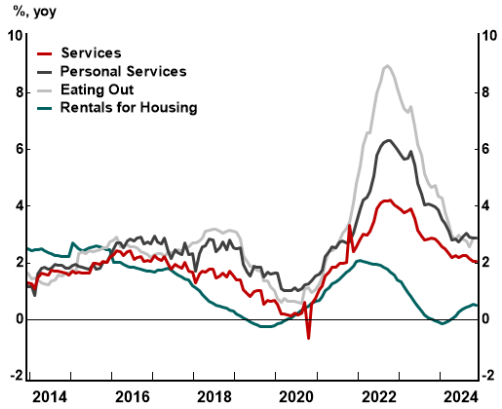
Source: S&P; Haver; AMRO staff calculations

CPI has been declining, thanks to subsiding food and energy price pressure and muted core inflation…



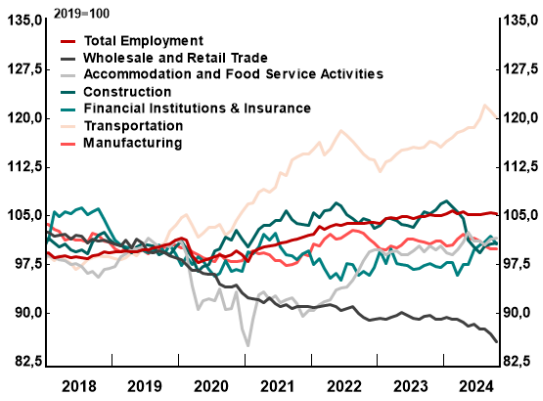
Source: Statistics Korea; Haver; AMRO staff calculations

…as reflected in relatively low service.



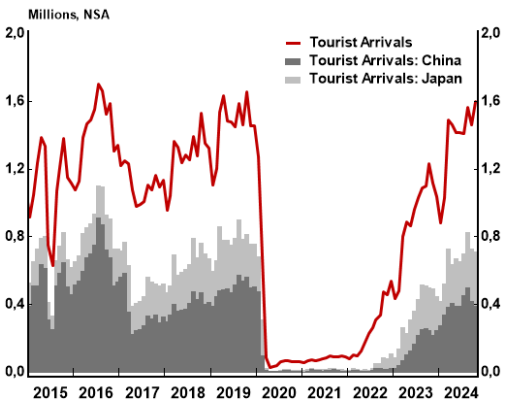
Source: Statistics Korea; Haver; AMRO staff calculations

Total employment growth is relatively stable, although growth is uneven across sectors.



Source: Statistics Korea; Haver; AMRO staff calculations

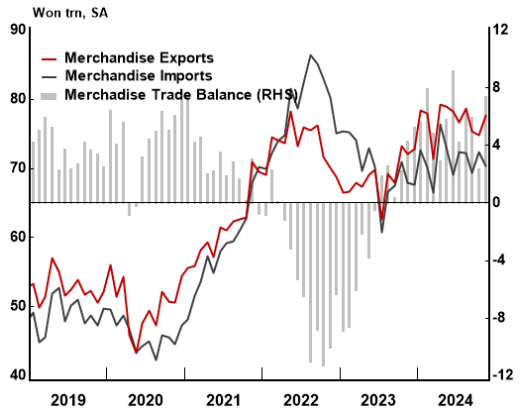
Inbound tourism from China has yet to return to pre-pandemic levels.



Source: KNTO; Haver; AMRO staff calculations

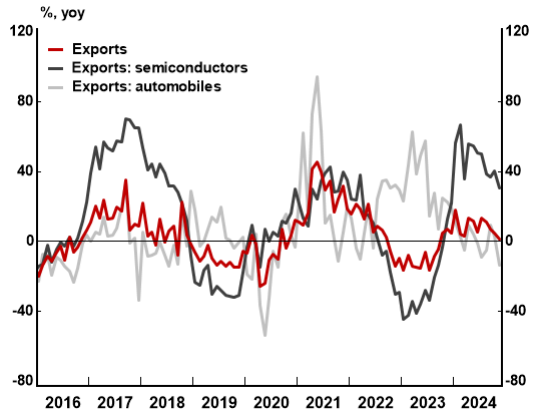
Figure 1.2. External Sector

Trade surpluses in months have benefited from robust growth in exports…



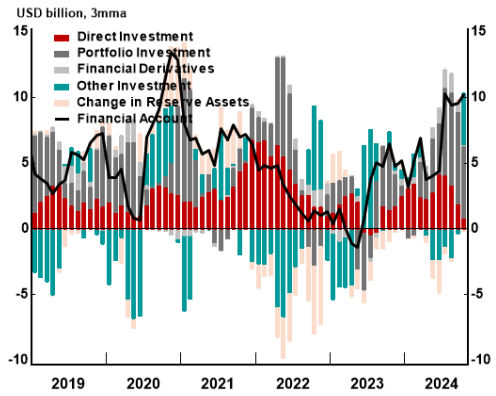
Source: Korea Customs Service; Haver; AMRO staff calculations

…particularly of semiconductors, thanks to the upswing in the global semiconductor cycle.



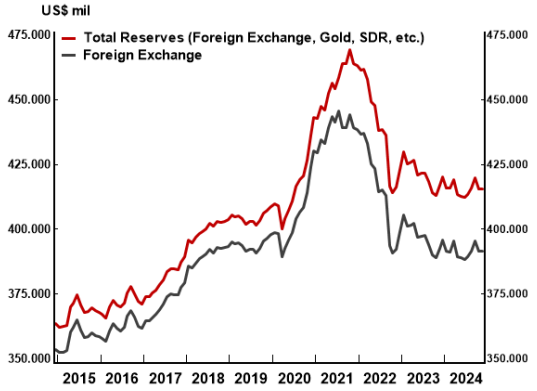
Source: Korea Customs Service; MOTI; Haver; AMRO staff calculations

Financial outflows have been largely driven by portfolio investment in recent months.



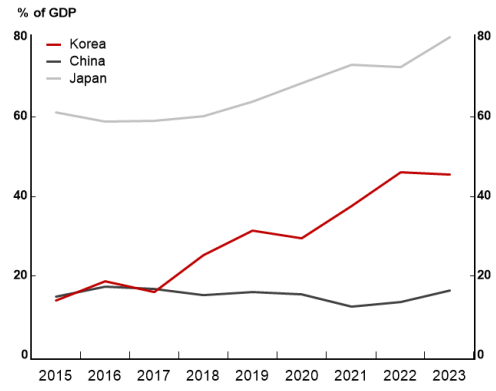
Source: Bank of Korea; Haver; AMRO staff calculations

With capital outflows roughly offsetting current account surpluses, foreign reserve movements have been relatively small.



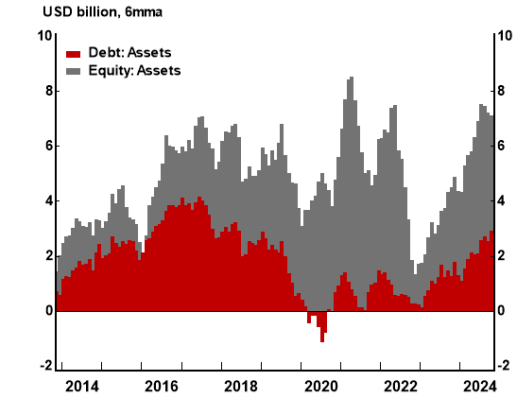
Source: Bank of Korea; Haver; AMRO staff calculations

The net international investment position has been strengthening over the years.



Source: IMF; Haver; AMRO staff calculations

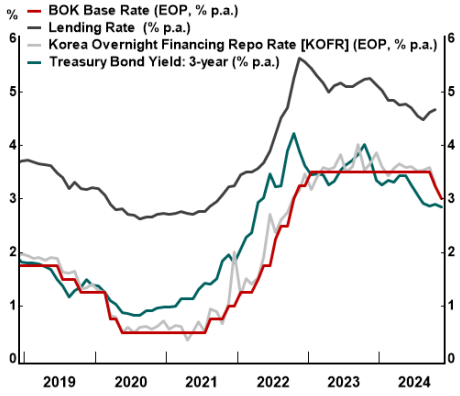
The sharp increase in residents' outflows was due to equity investment, particularly in the US stock market.



Source: FSS; Haver; AMRO staff calculations

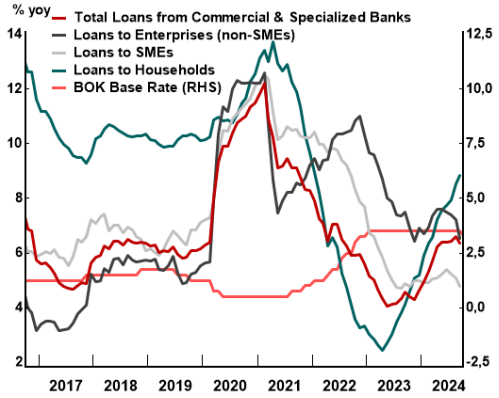
Figure 1.3. Monetary and Financial Sector

The BOK reduced the policy rate as inflationary pressure continued to subside.



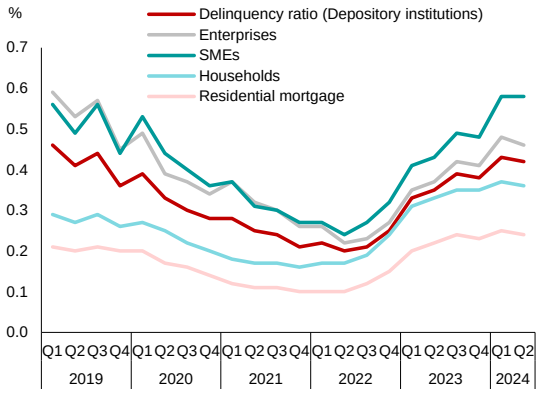
Source: BOK; Korea Securities Depository; Haver; AMRO staff calculations

Loan growth has been picking up, driven by household and enterprise (non-SME) loans.



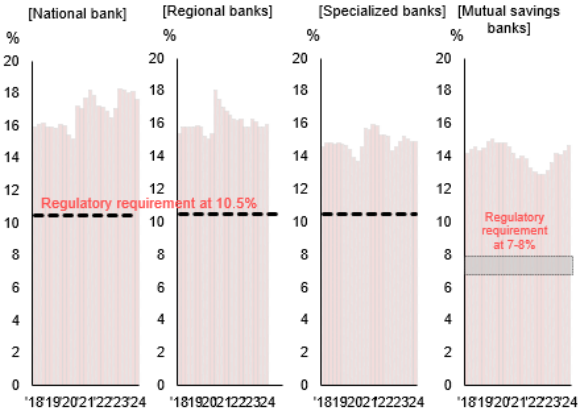
Source: BOK; Haver; AMRO staff calculations

The delinquency ratio stabilized across all loan categories.



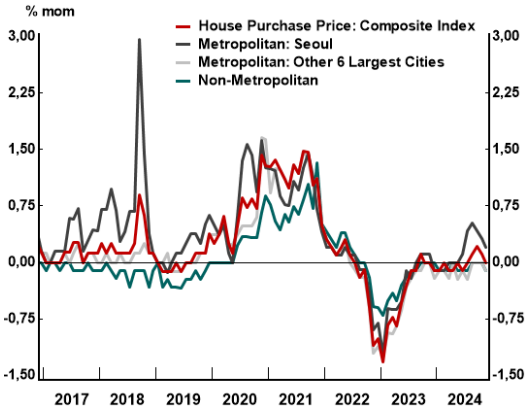
Source: Financial Supervisory Services; CEIC; Haver Analytics

Credit institutions are generally well capitalized.



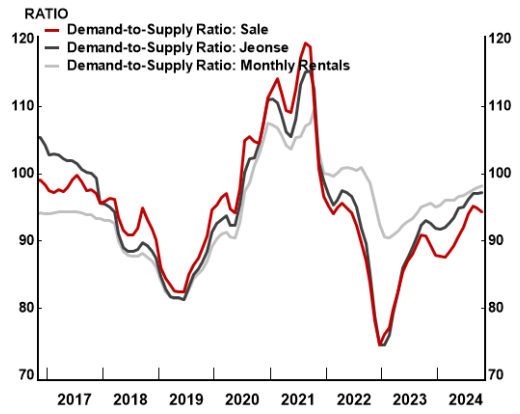
Source: Financial Supervisory Services; AMRO staff estimates

Unlike elsewhere in the country, house prices in Seoul were on a substantial rise in 2024.



Source: Kookmin Bank; Haver; AMRO staff calculations

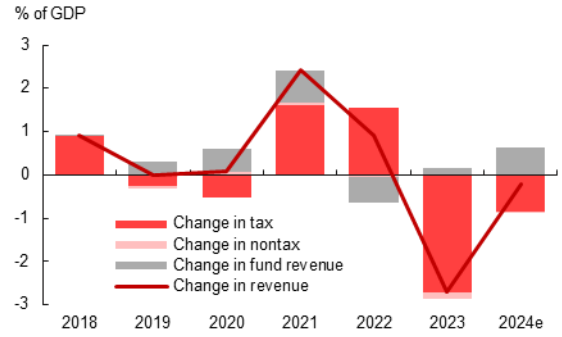
At the national level, supply is still ample relative to demand for all segments.



Source: Korea Real Estate Board; Haver; AMRO staff calculations
Note: <100 indicates oversupply; >100 indicates undersupply

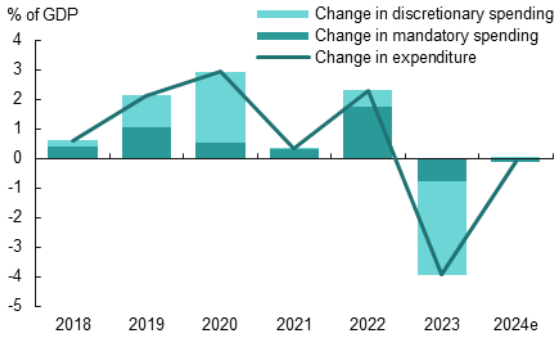
Figure 1.4. Fiscal Sector

In 2024, revenue as a percentage of GDP decreased with a fall in tax revenue due to weak business performance in 2023 …



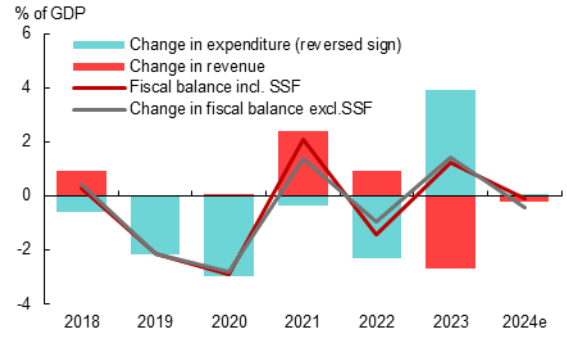
Source: Ministry of Economy and Finance; AMRO staff estimates

… while expenditure as a percentage of GDP also decreased, largely due to a reduction in transfers to local governments and education.



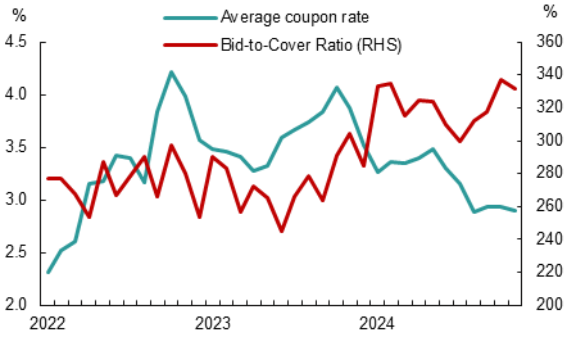
Source: Ministry of Economy and Finance; AMRO staff estimates

The fiscal deficit, excluding SSFs, is estimated to rise from 3.6 percent of GDP in 2023 to 4.0 percent in 2024.



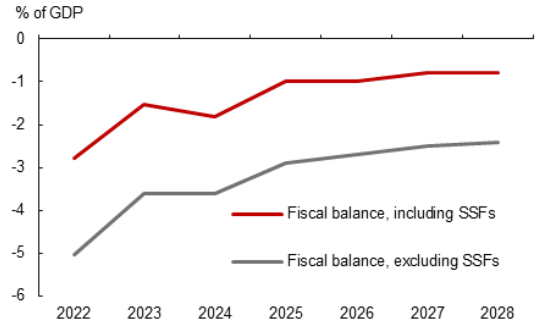
Source: Ministry of Economy and Finance; AMRO staff estimates

Average borrowing costs of KTB have been stable in 2024, and the demand for KTB remained high.



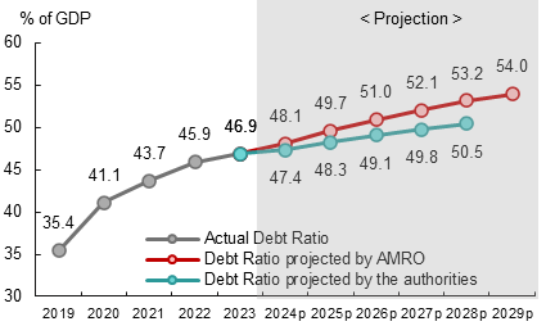
Source: Ministry of Economy and Finance

The fiscal deficit, excluding SSFs, is budgeted at 2.8 percent of GDP and expected to continue to fall to mid-2 percent of GDP in the medium term.



Source: Ministry of Economy and Finance; AMRO staff estimates

The government debt-to-GDP ratio is projected to continue rising, surpassing 50 percent during the projection period.



Source: Ministry of Economy and Finance; AMRO staff estimates

Appendix 2. Selected Economic Indicators for Korea

	2020	2021	2022	2023	2024e	2025p
National income and prices	(in percent change unless specified)					
Real GDP	-0.7	4.6	2.7	1.4	2.0	1.6
Final consumption	-2.2	4.2	4.2	1.6	1.3	1.6
Private sector	-4.6	3.7	4.2	1.8	1.1	1.6
Public sector	5.2	5.6	4.0	1.3	1.7	1.4
Gross capital formation	0.8	4.1	0.1	0.8	-2.1	2.0
Construction	1.7	-0.2	-3.5	1.5	-2.7	-1.2
Facilities investment	4.3	10.2	-0.3	1.1	1.8	2.8
Intellectual property products	3.0	6.5	7.8	1.7	0.7	2.0
Exports	-1.7	10.8	3.9	3.6	6.9	0.8
Exports of goods	0.1	10.9	3.9	2.9	6.3	0.7
Exports of services	-12.3	10.4	3.8	7.7	10.3	1.5
Imports	-3.3	10.2	4.2	3.5	2.4	1.5
Imports of goods	0.2	12.5	4.7	-0.3	1.2	1.5
Imports of services	-16.6	0.3	1.5	22.3	7.6	1.7
Labor Market						
Unemployment rate (in percent, period average)	4.0	3.7	2.9	2.7	2.5	2.5
Labor force participation rate (in percent, period average)	62.6	62.8	63.9	64.3	64.6	64.7
Prices						
Consumer price inflation (period average)	0.5	2.5	5.1	3.6	2.3	1.9
Core inflation, excluding food and energy (period average)	0.4	1.4	3.6	3.4	2.2	2.0
External sector	(in billions of US dollars unless specified)					
Current account balance	75.9	85.2	25.8	35.5	87.4	80.6
(in percent of GDP)	4.4	4.4	1.4	1.9	5.2	4.7
Trade balance	80.6	75.7	15.6	34.1	86.0	80.7
(in percent of GDP)	4.6	3.9	0.9	1.9	5.1	4.7
Services, net	-14.7	-5.3	-7.3	-25.7	-25.4	-27.1
Primary income, net	13.5	19.4	20.3	31.6	31.3	31.5
Secondary income, net	-3.5	-4.7	-2.9	-4.5	-4.5	-4.5
Financial account balance	64.0	63.6	54.9	36.0	81.6	60.0
(in percent of GDP)	3.7	3.3	3.1	2.0	4.8	3.5
Direct investment (net)	26.1	43.9	40.8	19.4	30.4	32.1
Portfolio investment (net)	41.7	19.4	25.8	7.4	53.0	29.5
Other investment (net)	-8.7	0.4	-19.1	9.6	-6.9	-4.9
Overall balance	17.4	14.8	-27.9	-3.6	5.8	20.6
(in percent of GDP)	1.0	0.8	-1.6	-0.2	0.3	1.2
Gross official reserves	443.1	463.1	423.2	420.1	426.0	446.6
(in months of imports of goods & services)	9.8	8.0	6.3	6.5	6.7	6.9
Short-term external debt (in percent of international reserve	36.1	35.7	41.1	33.5	33.2	33.2
Fiscal Sector	(In percent of GDP)					
Total revenue	23.3	25.7	26.6	23.9	23.7	25.1
Total expenditure	26.7	27.0	29.4	25.4	25.3	26.1
Fiscal balance including Social Security Funds	-3.5	-1.4	-2.8	-1.5	-1.6	-1.0
Fiscal balance excluding Social Security Funds	-5.4	-4.1	-5.0	-3.6	-4.0	-3.0
Public debt	41.1	43.7	45.9	46.9	48.0	49.7
Monetary and financial sector	(In percent unless specified)					
Domestic credit (BIS, in percentage change)	10.2	10.4	5.5	3.4	1.4	…
(in percent of GDP)	257	248	250	251	250	…
Broad money (KRW trillion)	3,200	3,614	3,758	3,905	4,158	…
Substandard-and-below loan ratio (BIS) 1/	0.4	0.3	0.3	0.3	0.4	…
Capital adequacy ratio (BIS) 1/	16.5	16.5	16.0	16.6	16.6	…
Memorandum items:						
Exchange rate (KRW per US$, average)	1,180	1,144	1,291	1,306	1,380	…
Exchange rate (KRW per US$, end of period)	1,088	1,186	1,267	1,289	1,470	…
Nominal GDP (in KRW trillion)	2,058	2,222	2,324	2,401	2,334	…
Nominal GDP (in US$ billion)	1,744	1,942	1,799	1,839	1,692	…

Source: Korean authorities; Bank for International Settlements; CEIC; and AMRO staff projections (p)
Note: Dark grey denotes AMRO projections. Exchange rate data as of December 31, 2024.
Latest domestic credit data as of end-March 2024, latest broad money data as of end-August 2024, and substandard-and-below loan ratio and capital adequacy ratio data as of end-June 2024.
1/ Commercial banks only.

Appendix 3. Balance of Payments

	2020	2021	2022	2023	2024p	2025p
	(in billions of U.S. dollars unless specified)					
Current account balance (I)	75.9	85.2	25.8	35.5	87.4	80.6
Trade balance	80.6	75.7	15.6	34.1	86.0	80.7
Exports, f.o.b.	517.9	649.5	694.3	645.0	703.1	710.1
Imports, f.o.b.	437.3	573.7	678.7	611.0	617.1	629.4
Services, net	-14.7	-5.3	-7.3	-25.7	-25.4	-27.1
Receipts	89.6	119.9	131.6	124.5	123.1	124.0
Payments	104.3	125.2	138.9	150.1	148.5	151.1
Primary income, net	13.5	19.4	20.3	31.6	31.3	31.5
Secondary income, net	-3.5	-4.7	-2.9	-4.5	-4.5	-4.5
Capital account (II)	-0.4	-0.2	0.0	0.0	0.0	0.0
Financial account (III) (+ indicates net outflows)	64.0	63.6	54.9	36.0	81.6	60.0
Direct investment (net)	26.1	43.9	40.8	19.4	30.4	32.1
Portfolio investment (net)	41.7	19.4	25.8	7.4	53.0	29.5
Financial derivatives (net)	4.9	-0.1	7.4	-0.5	5.0	3.4
Other investment (net)	-8.7	0.4	-19.1	9.6	-6.9	-4.9
Errors and omissions (IV)	5.9	-6.6	1.2	-3.1	0.0	0.0
Overall balance (=I + II - III + IV)	17.4	14.8	-27.9	-3.6	5.8	20.6
Reserve assets (+ indicates increases)	17.4	14.8	-27.9	-3.6	5.8	20.6
Memorandum items:						
Current account balance (In percent of GDP)	4.4	4.4	1.4	1.9	5.2	…
Gross reserves (USD billion)	443.1	463.1	423.2	420.1	426.0	…
(In months of imports of goods and services)	9.8	8.0	6.3	6.5	6.7	…
Changes in gross reserves (USD billion)	34.3	20.0	-40.0	-3.0	5.8	…
Nominal GDP (USD billion)	1,644	1,818	1,674	1,713	1,694	…

Source: Korean authorities; Bank for International Settlements; CEIC; and AMRO staff projections (p)
Note: Dark gray denotes AMRO projections.

Appendix 4. Statement of General Government Operations

	2019	2020	2021	2022	2023	2024p
Revenue	23.2	23.3	25.7	26.6	23.9	23.7
Tax	14.4	13.9	15.5	17.0	14.3	13.5
Personal Income Tax	4.1	4.5	5.1	5.5	4.8	4.7
Corporate Income Tax	3.5	2.7	3.2	4.5	3.3	2.5
Value-added Tax	3.5	3.2	3.2	3.5	3.1	3.3
Transportation Tax	0.7	0.7	0.7	0.5	0.4	0.5
Customs Duty	0.4	0.3	0.4	0.4	0.3	0.3
Other tax	2.2	2.5	2.9	2.6	2.3	2.2
Nontax	1.2	1.3	1.4	1.3	1.2	1.2
Fund revenue	7.5	8.1	8.8	8.2	8.4	9.0
Expenditure	23.8	26.7	27.0	29.4	25.4	25.3
Mandatory spending (excl. Interest)	11.1	11.6	11.9	13.5	12.6	12.4
Interest payments	0.7	0.7	0.7	0.8	0.9	1.0
Domestic	0.7	0.7	0.7	0.8	0.9	1.0
External	0.0	0.0	0.0	0.0	0.0	0.0
Discretionary spending	12.0	14.4	14.5	15.0	11.9	11.9
Fiscal Balance						
Fiscal Balance incl. SSF	-0.6	-3.5	-1.4	-2.8	-1.5	-1.6
Primary Balance incl. SSF	0.1	-2.8	-0.7	-2.0	-0.6	-0.6
Fiscal Balance excl. SSF	-2.7	-5.4	-4.1	-5.0	-3.6	-4.0
Primary Balance excl. SSF	-2.0	-4.7	-3.4	-4.2	-2.7	-3.0
Public debt	35.4	41.1	43.7	45.9	46.9	48.1
Domestic debt	35.0	40.7	43.2	45.4	46.4	47.6
External debt	0.4	0.5	0.5	0.5	0.5	0.5

Source: Korea Ministry of Economy and Finance; AMRO staff estimates
Note: Numbers in gray denote AMRO estimates.
.

Appendix 5. Debt Sustainability Analysis[70,71]

1. Korea's public debt-to-GDP ratio is projected to continue to rise modestly, with gross financing needs (GFNs) remaining broadly stable (Table 5.1). The projected average economic growth rate for 2025-2029 stands at 1.8 percent, aligning with the potential growth path. The effective interest rate is expected to gradually fall after 2027, reflecting policy rate changes with a lag. The fiscal deficit excluding social security funds (SSFs) is forecast to remain in the high-2 percent range by the end of the projection period.[72] The primary deficit and real interest rate will 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 KTBs issued in significant quantities during the pandemic (Figure 5.1).

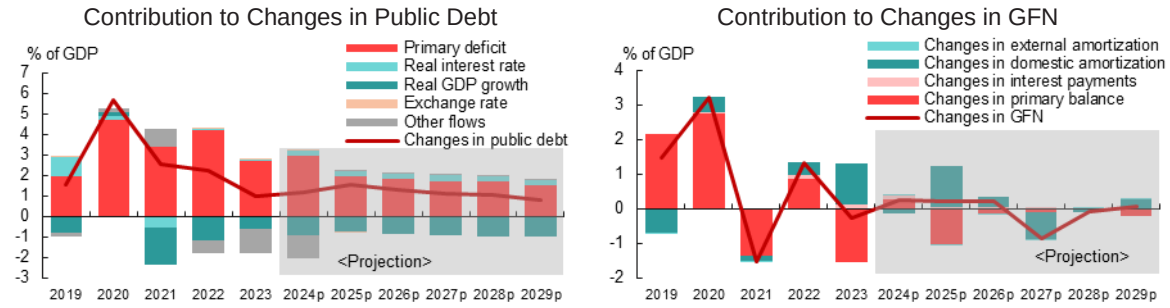
2. While the standard Debt Sustainability Analysis (DSA) results indicate a low overall risk to public debt sustainability, the continuously rising debt ratio is concerning (Figure 5.4). Both the public debt-to-GDP ratio and the GFN as a percentage of GDP have remained below their corresponding thresholds, suggested by the IMF, 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 reach at most 62 percent, and the GFN will rise at most to 10 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). However, the persistent rise in the debt ratio is a concern, warranting ongoing monitoring and policy discussions to ensure long-term fiscal sustainability.

Table 5.1. Macroeconomic and Fiscal Indicators

	2019	2020	2021	2022	2023	2024p	2025p	2026p	2027p	2028p	2029p
Macroeconomic indicators (Percent)											
Real GDP growth	2.3	-0.7	4.6	2.7	1.4	2.0	1.6	1.8	1.9	1.9	1.9
GDP deflator	-0.6	1.6	3.2	1.8	1.9	1.8	1.7	1.7	1.7	1.7	1.7
Effective interest rate	2.0	2.0	1.8	1.9	2.1	2.3	2.3	2.4	2.3	2.3	2.2
Fiscal indicators (Percent of GDP)											
Revenue	23.2	23.3	25.7	26.6	23.9	23.7	25.1	25.1	25.2	25.0	25.1
Expenditure	23.8	26.7	27.0	29.4	25.4	25.3	26.1	26.2	26.2	26.2	26.2
Fiscal balance excluding SSF	-2.7	-5.4	-4.1	-5.0	-3.6	-4.0	-3.0	-3.0	-2.9	-2.8	-2.6
Primary balance excluding SSF	-2.0	-4.7	-3.4	-4.2	-2.7	-3.0	-2.0	-1.8	-1.7	-1.7	-1.5
Public debt	35.4	41.1	43.7	45.9	46.9	48.1	49.7	51.0	52.1	53.2	54.0
Gross financing needs	4.4	7.6	6.1	7.5	7.2	7.5	7.7	7.9	7.0	6.9	7.0

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

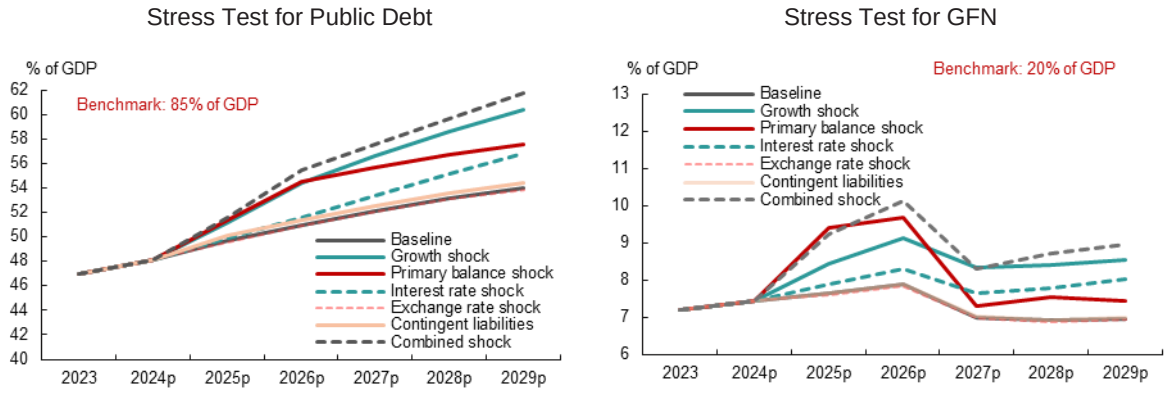
Figure 5.1. Public Debt and GFN Dynamics



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

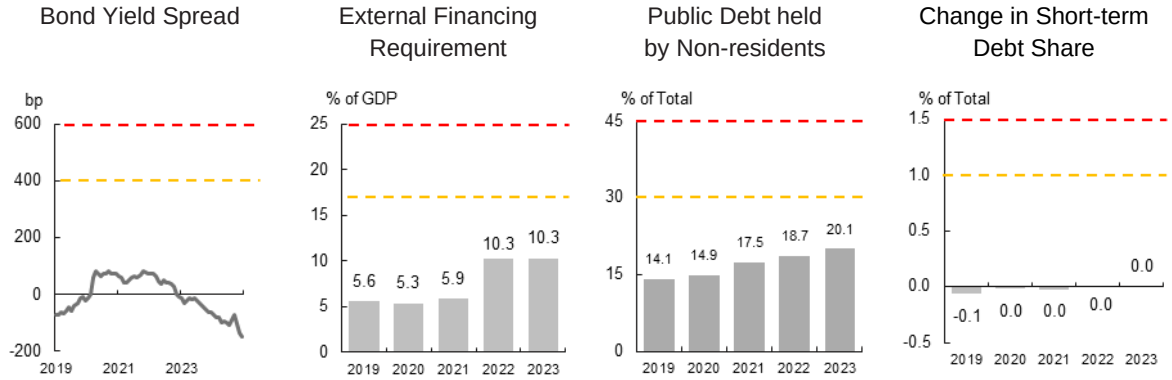
[70] Prepared by Byunghoon Nam, Senior Economist.
[71] Public DSA for Korea covers national government debt (central and local governments). As of end-2023, general government debt was at 50.7 percent of GDP on an accrual basis, while national government debt amounted to 46.9 percent of GDP on a cash basis.
[72] Social security funds are National Pension Fund, Private School Teachers' Pension Fund, Employment Insurance Fund, and Industrial Accident Compensation Insurance Fund.

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 -1.4 percentage point shock to 2025 and 2026; 2) Primary balance shock: one standard deviation, or a -1.7 percent of GDP shock to 2025 and 2026; 3) Interest rate shock: a +3 percentage point shock from 2025; 4) Exchange rate shock: a one-time +5 percentage point shock in 2025; 5) Contingent liability shock: a one-time 0.4 percent of GDP shock in 2024, by recognizing government guaranteed debt as of end-2023; 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

		2019	2020	2021	2022	2023p	2024p	2025p	2026p	2027p	2028p	2029p
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. Climate Change Policy Fact Sheet[73]

1. For Korea, the potential macro-financial impacts of climate-related hazards such as heatwaves and flooding are projected to intensify in the coming decades. Given the rapidly evolving climate policy landscape, it is essential to monitor Korea's implementation of both adaptation and mitigation strategies, along with the enablers that will ensure effective and feasible execution of these responses. AMRO's Climate Clipboard provides a systematic framework to track these key developments, which will continue to evolve as policymakers strengthen efforts to build long-term climate resilience (see the Table).

2. Korea has made notable progress thus far in enhancing its ability to respond to climate change. The National Framework Plan for Carbon Neutrality and Green Growth, adopted in March 2023, and the expansion of Korea's Emissions Trading Scheme represent critical milestones in mobilizing climate-related investments to meet substantial financing needs. Moving forward, the successful implementation of these frameworks and the effective rollout of initiatives such as the Climate Risk Stress Test will be pivotal in Korea's journey toward a low-carbon and climate-resilient future. Notwithstanding the risks associated with climate change, the adaptation and mitigation response offers significant new investment and business opportunities for Korean financial and non-financial corporates.

Table 6.1.

A. Environmental risks	
Sources of risk	**Potential macro-financial impacts**
• Heatwave • Flooding	• Compared to the past 30 years, it is projected that by the late 21st century, summers in Korea may last 19 days longer and winters 18 days shorter. Heatwave days may rise from 10.1 to 35.5 annually with over 30% of summer classified as heatwaves. (**The Third National Climate Change Adaptation Plan (2021-2025)**, Dec 2020). A 1°C rise in average temperature is estimated to lead a decline in long-term real value-added growth by 1.73% to 9.84%across industries such as construction, finance, and real estate. (BOK (2023), "**Analysis of Korea's Climate Change Physical Risks on the Real Economy**") • By the end of the 21st century, overall precipitation in Korea is projected to increase (+5.5~13.1%) leading to potentially severe flooding. Over the past decade ('09~'18), economic losses due to property damage from natural disasters amounted to 3.4 trillion won, with recovery costs estimated to be 2 to 3 times higher. Typhoons and heavy rainfall accounted for 87.7% of total damage, making weather-related disasters the primary cause of economic losses. (**The Third National Climate Change Adaptation Plan (2021-2025)**, Dec 2020). Long term real GRDP growth is projected to fall by 2.54% for every 1-meter increase in annual precipitation (BOK (2023), "**Analysis of Korea's Climate Change Physical Risks on the Real Economy**")
B. Transition risks	
Sources of risk	**Potential macro-financial impacts**
• Accelerated transition to renewable energy • Structural adjustment of carbon-intensive industries • Strengthened climate regulations • Introduction and expansion of carbon pricing	• The regulation of greenhouse gas emissions can increase corporate production costs, resulting in inflationary pressures and higher prices for carbon-intensive products such as energy and steel, which reduces household purchasing power. (BOK (2021), "**BOK's Response to Climate Change**") • Carbon-intensive industries like oil refining and steel manufacturing can face declining profitability, leading to stranded assets and reduced investment, which decreases productivity. (BOK (2021), "**BOK's Response to Climate Change**") • The high-carbon manufacturing sector accounts for a significant share of financial exposure in Korea, posing risks to the financial system. Transition risks could lower domestic banks' capital adequacy ratio by 2.6–5.8 percentage points by 2050 compared to 2020 levels. (BOK (2021), "**Transition Risks and Financial Stability**")
C. Adaptation framework and strategies	

[73] Prepared by Bora Lee, Senior Economist.

Adaptation framework	Key initiatives/strategies	Estimated financing needs
• National Framework Plan for Carbon Neutrality and Green Growth (Mar 2023) • The Third National Climate Change Adaptation Plan (2021-2025) (Dec 2020)	Implementation of climate change adaptation in Korea focuses on the following areas: • Strengthen monitoring and forecasting systems for climate crises. • Enhance water security and establish rapid disaster response systems. • Develop technologies for infectious diseases and climate-resilient living spaces. • Promote sustainable agriculture and fisheries environments. • Build a protection framework for populations vulnerable to climate change.	• 19.4 trillion KRW over the period 2023-2027 (0.8 percentage of GDP in 2023) **Financing sources** • Annual budgets

Mitigation response framework and strategies

Nationally Determined Contribution (NDC)	National framework/strategies	Estimated financing needs
• Reducing GHG emissions by 40% from the 2018 levels to 436.6 million tons in 2030 • The 2030 Nationally Determined Contribution (NDC), initially set in 2015 to reduce emissions by 37% from the BAU scenario, was revised in 2021 to target a 40% reduction from 2018 levels.	NDC Roadmap on Mitigation 2023-27: • Energy Transition: Reduce coal power, expand nuclear and renewable energy. • Industry: Develop low-emission technologies and support companies with funding and subsidies. • Buildings: Mandate zero-energy buildings and promote green remodeling. • Transportation: Expand electric/hydrogen vehicles, decarbonize transport, and enhance public transit. • Agriculture: Advance smart farms, low-carbon technologies, and low-methane livestock feed. • Waste: Minimize waste and boost recycling, including solar panel waste. • Hydrogen: Advance green hydrogen technology and infrastructure, diversify hydrogen mobility.	• 54.6 trillion KRW over the period 2023-2027 (as a 2.3 percentage of GDP) **Financing sources** • Annual budgets • Revenue from the emissions trading system • Issuance of green bonds/ private ESG bonds

E. Enabling regulations for climate resilience

E.1. Legal frameworks

- Presidential Commission on Carbon Neutrality and Green Growth was established in 2021 as the 2050 Carbon Neutrality Commission, restructured in 2022 to coordinate Korea's climate strategies and achieve carbon neutrality
- The framework Act on Carbon Neutrality and Green Growth for Coping with Climate Crisis was enacted in 2021 to provide legal support for achieving carbon neutrality by 2050.

E.2. Fiscal framework

- From 2023 to 2027, Korea's budget for carbon neutrality and green growth is estimated to grow by 11.5% annually, outpacing the government's average budget growth of 8% over the past five years. (National Framework Plan for Carbon Neutrality and Green Growth, Mar 2023)

E.3. Carbon pricing frameworks

- Emissions Trading Scheme, launched in 2015, reduces carbon emissions by dividing companies into free and paid permit allocations. Initially 100% free (first phase, 2015-2017), paid allocations began in 2018, (second phase, 2018-2020) expanding to 10% by 2021 (third phase, 2021-2025). Companies can buy permits through daily trading markets and monthly auctions since 2019

E.4. Sustainable finance frameworks

Green Finance to Support 2050 Zero Carbon Goals (Jan 2021)

- Public sector: doubling investments (from current 6.5% to about 13%) in green sectors by state-backed institutions, forming green financing teams, and establishing a consultative body for collaboration.
- Private sector: developing a K-taxonomy for green industries, introducing uniform guidelines, and piloting green bonds.
- A climate risk management plan will assess the impact of carbon-intensive industries on financial institutions.
- Improved corporate environmental disclosures; revised stewardship codes; formulation of an environmental impact evaluation model; and building a networking platform for green enterprises and investors.

E.5. Financial system

Initiatives	Guidelines	Status
1. Taxonomy	• Korea Taxonomy guideline (Dec 2021)	• The Korean Green Taxonomy defines green activities supporting environmental goals, provides criteria to attract capital while preventing greenwashing, and aids in verifying projects for green finance.
2. Risk management assessments	• Financial Supervisory Service's Climate Risk Amendment (Dec 2022) • BOK's Climate Risk Analysis • FSS, BOK, and domestic financial institutions are	• Climate Risk Guidelines: Updated to international standards, with regular implementation assessments for domestic financial institutions. • Stress Tests: The FSS and BOK will conduct climate stress tests with 15 institutions, using emissions data to assess impacts and guide green finance and low-carbon transition plans.

	preparing to conduct climate stress tests (Mar 2024)	
3. Climate-related disclosures	• Korea Exchange ESG Disclosure Guidelines (Jan 2021) • Promotion of ESG Information Disclosure (Jan 2021)	• The FSC promotes voluntary ESG disclosure by all companies listed in the Korea Exchange with plans for phased mandatory implementation. • The activation of sustainability reporting: (after 2026) voluntary disclosure activation → mandatory for companies of a certain size → mandatory for all KOSPI-listed companies.
4. Data availability	• Ministry of Trade, Industry, and Energy's Sustainable Management Support Center • Electronic Disclosure System (DART)	• The Sustainable Management Support Center under the MTIE publishes sustainability reports that include major achievements and plans related to ESG management activities of company. • The FSS requires listed companies to disclose ESG and climate data via the DART (Data Analysis, Retrieval and Transfer) system.
5. Capacity building	• Korea Financial Training Institute • Global cooperation	• The Korea Financial Training Institute provides training to financial institutions on climate change response strategies, ESG investment principles, and climate risk management. • The government and BOK collaborate with international organizations and private entities in sharing experiences with the aim of developing climate policies tailored to Korea.
F. Potential opportunities from the low-carbon transition		
• **Attract large-scale investments and develop technologies** in renewable energy sectors such as solar, wind, and hydrogen. • **Reduce energy consumption across industries** by improving energy efficiency. • **Promote eco-friendly agriculture** such as smart farming and reduce carbon emissions in the agricultural sector through low-carbon agricultural systems.		

Source: AMRO staff compilations.
Note: Information sourced and compiled from BOK (2021a, 2021b, 2023a, 2023b); FSC (2021a, 2021b), FSS (2022, 2024), KRX (2021); MOE (2020, 2021); Presidential Commission on Carbon Neutrality and Green Growth (2023)

References

Bank of Korea (BOK). 2021a, “BOK's Response to Climate Change”, Seoul, Korea, October.
———. 2021b, “Transition Risks and Financial Stability”, Seoul, Korea, December.
———. 2023a. “Current Status of Carbon Emissions in Export Industries and Vulnerability of Export Companies”, Seoul, Korea, June.
———. 2023b. “Analysis of Korea’s Climate Change Physical Risks on the Real Economy”, Seoul, Korea, December.
Financial Services Commission (FSC). 2021a, “Green Finance to Support 2050 Zero Carbon Goals”, Seoul, Korea, January.
———. 2021b, “Promotion of ESG Information Disclosure”, Seoul, Korea, January.
Financial Supervisory Service (FSS). 2022, “Financial Supervisory Service's Climate Risk Amendment” Seoul, Korea, December.
———. 2024. “Financial Supervisory Service, Bank of Korea, and domestic financial institutions are preparing to conduct climate stress tests”. Seoul, Korea, March.
Korea Exchange (KRX). 2021. “Korea Exchange ESG Disclosure Guidelines”. Seoul, Korea, January.
Ministry of Environment (MOE). 2020. “The Third National Climate Change Adaptation Plan (2021-2025)”. Sejong, Korea, December.
———. 2021. “Korea Taxonomy guideline”. Sejong, Korea, December.
Presidential Commission on Carbon Neutrality and Green Growth. 2023 “National Framework Plan for Carbon Neutrality and Green Growth”, . Sejong, Korea, March.

Appendix 7. 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

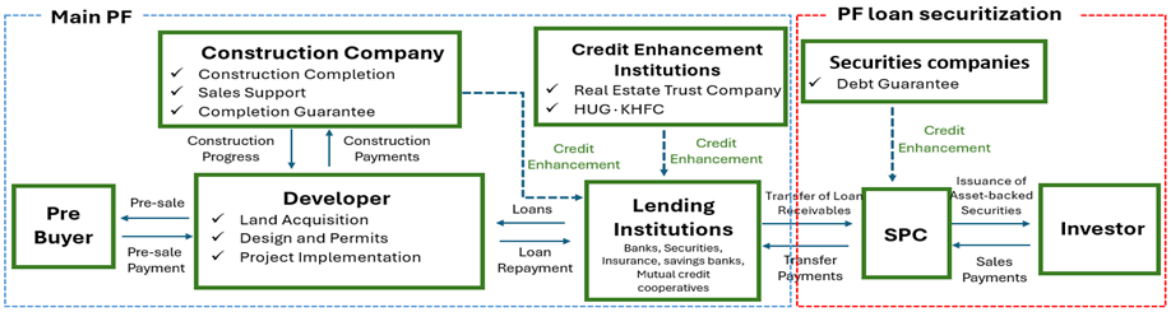
1. Orderly Resolution of Real Estate Project Finance (PF) Distress[74]

1. **After the Legoland developer's default in October 2022, the Korea authorities have implemented a series of measures to ensure a soft-landing of the real estate PF distress.** Following the drastic increase in interest rates in the second half of 2021, coupled with the tepid real estate demand and the surge in construction material prices, Gangwon Jungdo Development Corporation, the developer of Legoland Korea, defaulted on an asset-backed commercial paper (PF-ABCP) worth KRW205 billion in October 2022. In late 2023, Taeyoung Construction, ranked 16th among Korean construction companies, entered a debt workout program, further highlighting ongoing liquidity challenges of real estate developers and construction firms in Korea. Since late 2022, the Korean government has introduced various measures to mitigate potential systemic risks to the broader financial system arising from the real estate PF distress. This selected issue summarizes the evolution of the real estate PF crisis and the corresponding policy responses.

Complex Funding Structure of Real Estate-PF in Korea

2. **Real estate development projects in Korea have a complicated funding structure.** Financing of real estate development projects composes two stages: bridge loans (for land acquisition, contractor selection, securing of construction permits) and main project financing loans (for building construction). A bridge loan aims to finance land purchases and related expenses before receiving a construction permit. After the construction permit is granted, a developer will borrow a main PF loan to repay a bridge loan and fund construction costs until the project is completed. A developer uses proceeds from property sales to repay the main real estate PF loan. Korean developers often operate the projects with limited capital, relying heavily on financing from financial institutions or the money market. This funding is usually in the form of loans and/or shorter-term instruments, such as structured notes, asset-backed short-term bonds (ABSTBs), or asset-backed commercial papers (ABCPs), which are secured by real estate PF loan receivables (Figure A1.1).

Figure A1.1. Real Estate PF Structure



Source: Construction Economy Research Institute Of Korea (**CERIK, 2022**); AMRO staff illustrations

3. **Given the limited capital of developers[75], it is common for construction companies to offer credit enhancements (i.e. credit guarantees) in the real estate PF loan process.** While real estate projects inherently carry uncertainties and risks regarding their success, the

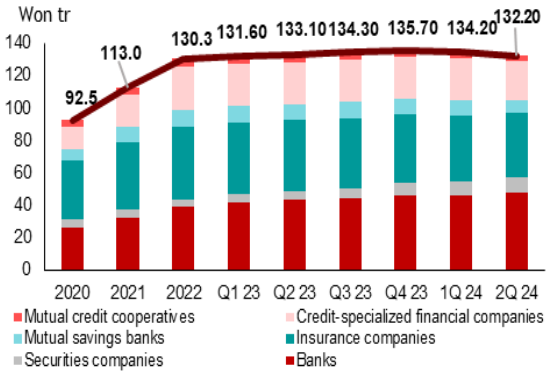
[74] Prepared by Bora Lee, Senior Economist, and Wanwisa May Vorranikulkij, Senior Economist.
[75] According to a recent analysis by KDI of the financial structures of approximately 300 real estate PF projects with a total investment of 100 trillion KRW implemented in the last three years (2021-2023), the average project cost required for each project was about 374.9 billion KRW. However, it was found that the developers contributed only 11.8 billion KRW (3.2% of the project cost) in equity, while the remaining 363.1 billion KRW (96.8%) was funded through borrowing (source; Hwang Soon-joo, KDI Focus 2024 Vol.134).

relatively low equity input from the developers makes it challenging for financial institutions to provide PF loans. Consequently, construction companies often bear a considerable portion of the project's risk through credit enhancements[76], such as payment guarantees and construction completion guarantee. Following the 2011 savings bank crisis, the burden of PF guarantees on construction companies was reduced through a greater diversification of credit enhancement institutions. Nevertheless, financial institutions tend to prioritize the credit enhancement provided by the construction company over other factors in the granting of PF loans. As a result, construction companies continue to bear a significant burden of providing credit enhancement.

3. Although these credit guarantees, through credit enhancements, are off-balance-sheet contingent liabilities, they can become actual liabilities in the event of real estate PF project default. Construction companies serve as both the main contractors for real estate PF projects and as credit providers by offering guarantees for PF loans. They can act as a key conduit in the process of spreading risks related to real estate PF. Excessive debt guarantees and deteriorating financial soundness of construction companies may thus lead to defaults, which could escalate to construction suspensions of other PF project sites in which these companies are involved. This, in turn, can undermine the overall soundness of real estate PF financial exposure.

4. Banks and NBFI provide real estate PF loans, with savings banks and credit cooperatives focusing on riskier segments. Amid a low-interest rate environment and the real estate market boom, high occupancy rates and substantial profits of real estate developers attracted Korean financial institutions to expand their lending to real estate activities. Out of total KRW132.2 trillion PF loans as at Q2 2024, PF loans by banks and NBFIs accounted for 36.5 percent and 63.5 percent, respectively (Figure A1.2). In particular, the share of loans allocated to real estate and construction by NBFIs more than doubled from 19.4 percent of total loans in 2013 to 41.0 percent in 2023, resulting from double-digit loan growth in some years. As the real estate PF market is very competitive and attractive to financial institutions, small NBFIs like savings banks and credit cooperatives are drawn into taking relatively riskier exposure than other types of NBFIs. Although savings banks and credit cooperatives' share in the total real estate PF loan balance is relatively limited, savings banks' involvement in bridge loans is critical and often constitute the riskiest phase of PF due to the high uncertainty in obtaining construction permits. Moreover, savings banks tend to focus on borrowers with lower creditworthiness (Figures A1.3 and A1.4).

Figure A1.2. Breakdown of PF Loans by Financial Institutions



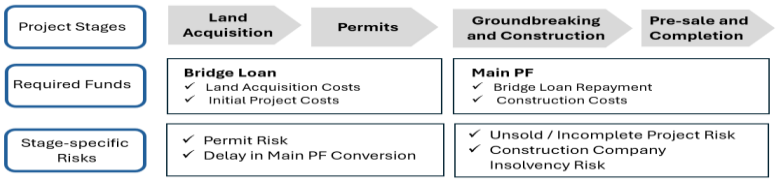
Source: BOK

5. Securities companies offer securitization services to Special Purpose Companies (SPCs) and invest in PF-backed securitized products, while providing

[76] **Payment guarantees** involve construction companies (the guarantors) sharing the responsibility with the developer (the principal debtor) to ensure that debt obligations are met. As for **construction completion guarantees**, the construction company is obligated to complete the project within the scheduled construction period, regardless of any circumstances, such as low sales rates or unpaid construction fees, unless caused by natural disasters or civil unrest.

modest amounts of direct PF loans. First, securities companies typically underwrite asset-backed short-term bonds (ABSTBs) and asset-backed commercial papers (ABCPs), which have maturities of around 3 to 6 months, even though construction projects often span 3 to 5 years. Under normal market conditions, these short-term securities are rolled over until the project is completed. Securities companies generate fees from issuing and refinancing these instruments, while also providing issuance guarantees and credit guarantees associated with the underlying assets. In addition, in some cases, securities companies also hold a stake in a SPC established by real estate developers. Small securities companies also invest in ABSTBs and ABCPs in search for a higher return amid the low-interest rate environment (Figure A1.1).

Figure A1.3. Stage-Specific Risks in PF

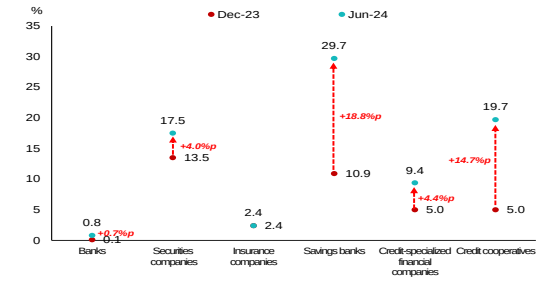


Source: AMRO staff illustrations

The Most Vulnerable Segment in the Ongoing PF Distress

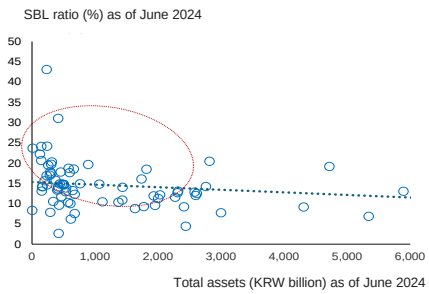
6. Shifts in macroeconomic conditions around mid-2021 led to distress among developers and affected savings banks' financial positions. During mid-2021, the combination of the BOK's drastic rate hike and a surge in construction material prices led to tight financial conditions among developers and subdued presale, precipitating the suspension of many construction projects, particularly non-residential real estate such as commercial and knowledge industrial estates in rural areas. As a result, the non-performing loan (NPL) ratio for savings banks surged from 3.4 percent at the end of 2021 to 11.5 percent in June 2024, significantly outpacing the NPL ratio of other financial institutions. In particular, small savings banks with total assets below KRW 1 trillion witnessed the NPL ratio rising above 15 percent of total loans (Figures A1.4 and A1.5). Savings banks' NPL ratio for RE-PF loans increased significantly from 10.9 percent in December 2023 to 29.7 percent in June 2024. Additionally, savings banks have recorded net losses since early 2023 as borrowers' weaker debt servicing capacity and the more stringent viability assessment for PF business, drove up credit expenses.

Figure A1.4. The NPL Ratio of PF Loans by Financial Institutions



Source: FSS; AMRO staff calculation

Figure A1.5. The NPL Ratio and Asset Size of Individual Savings Banks

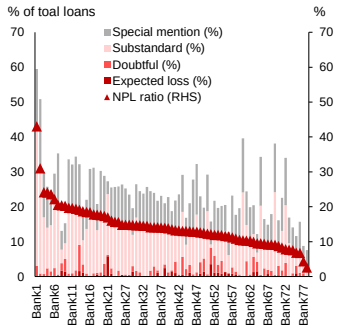


Source: FSS; AMRO staff calculation
Note: The SBL ratio, or Substandard and Below Loan ratio, represents the proportion of loans classified as substandard or worse relative to total loans. Although Korean regulatory authorities use the term "SBL", it is conceptually equivalent to the non-performing loan (NPL) ratio.

7. Financial buffers of some savings banks could be insufficient to cushion a surge in bad debt. Financial regulatory authorities have strongly urged NBFIs to set aside additional provisions for PF lending, since the onset of the PF distress in the second half of 2022. As of June 2024, ahead of the improved PF viability assessment, several savings banks with NPL ratios that exceeded the 8-percent level recommended by regulatory authorities maintained capital and loan loss allowances just above regulatory thresholds (Figure A1.6).[77] The stricter PF viability assessment was conducted in September 2024. Out of the total KRW210.4 trillion in RE-PF loans by all financial institutions, the NPL ratio rose to 11.3 percent in September 2024 from 5.2 percent in December 2023. The reclassification of these overdue loans from precautionary or substandard to lower classification would necessitate continued restructuring efforts and a significant increase in loan loss provisions in some small saving banks.[78] Given their initially low capital buffers, this bad debt reclassification could potentially deplete the financial buffers of some savings banks.

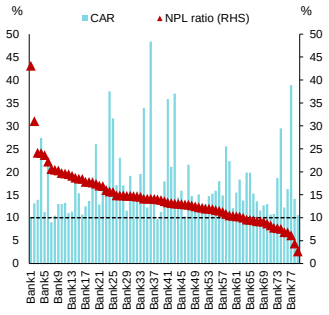
Figure A1.6. Overdue Loan and Financial Buffers in June 2024

(a) Breakdown of Overdue Loans



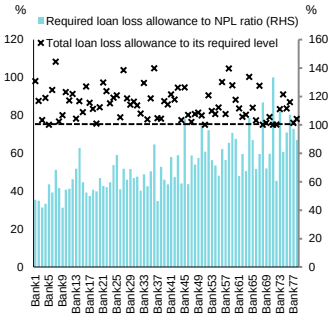
Source: FSS; AMRO staff calculation

(b) Capital Adequacy Ratio



Source: FSS; AMRO staff calculation
Note: The recommended minimum CAR for savings banks with total asset below KRW1 trillion is 10 percent. The minimum CAR for savings banks with total asset at KRW1 trillion or above is 11 percent.

(c) Loan Loss Allowance



Source: FSS; AMRO staff calculation
Note: The **required loan loss allowance** refers to the provisions that financial institutions must establish for each classification of loans. According to regulatory guidelines, the minimum loan loss allowances for savings bank credit losses are as follows: 1 percent for normal loans; 10 percent for precautionary loans; 20 percent for substandard loans; 55 percent for doubtful loans; and 100 percent for presumed losses. The **total loan loss allowance** represents the cumulative amount that financial institutions proactively reserve to cover anticipated credit losses.

Swift Policy Responses to Stabilize the Market and Limit Spillover

8. In response to real estate PF distress, the government has rolled out a number of policy measures since the second half of 2022. The Legoland default on 4 October 2022, led to the weakening of investor confidence and heightened volatility in the Korean money market. The authorities, through Korea Securities Finance Corporation and Korea

[77] Article 18(1)2 of the Mutual Savings Banks Supervision Regulations: The non-performing loan (NPL) ratio (referring to the ratio of the total amount classified as "substandard," "doubtful," or "estimated loss" under the asset quality classification criteria outlined in Article 36, excluding securities and other accounts receivable, from the total classified assets) must not exceed 8 percent.
[78] According to the regulation, the minimum loan loss allowances for savings bank credit losses are 1 percent for normal loan, 10 percent for precautionary loan, 20 percent for substandard loan, 55 percent for doubtful loan, and 100 percent for presumed loss.

Development Bank, stepped into the money market and purchased corporate bonds and commercial papers issued by securities companies from the onset of the distress until the end of February 2024. In addition, the authorities and large securities companies jointly bought PF-ABCP guaranteed by small securities firms. With the spike in refinancing risks of ABCPs caused by the Legoland default, authorities encouraged securities companies to convert their ABCP investment into long-term loans. NBFIs were also encouraged to temporarily extend maturities and defer interest payments of some PF borrowers in 2023 (Financial Services Commission, 2023).

9. To bring an end to this ongoing PF distress, soft-landing policy package was introduced in May 2024. The measures aimed to enhance the feasibility evaluation of real estate PF projects (i.e. distinguishing viable projects from non-viable ones). For "viable and sound PF projects," measures were introduced to ensure an adequate supply of finance to facilitate project execution. Meanwhile, for "less viable PF projects," developers, contractors, and financial institutions participating in those PF projects are guided to independently restructure or liquidate the projects. Additionally, in November 2024, the government introduced remedial measures to address structural issues in real estate PF, such as low-capital, high-leverage financing structures (Table A1.1).

Table A1.1. Real Estate PF Improvement Measures

Measure	Category	Content
Soft-landing measures in the real estate PF (as of May 2024)	**Improving the standards for evaluating viability of development projects**	• Expand the evaluation scope to include land-collateralized loans and debt guarantee agreements with similar risk characteristics • Refine the evaluation grading system from 3 levels (satisfactory, average, and deterioration risk) to 4 levels (satisfactory, average, attention, and insolvency risk) • Establish new evaluation criteria for bridge loans.
	Ensuring adequate supply of funds to sound and viable projects	• Expansion of PF business guarantees by HUG and KHF (25 → 30 trillion won) • Guarantee for non-housing projects by Construction Guarantee Cooperative (4 trillion won) • Additional PF guarantees for increased construction costs • New fund loans from KAMCO • Improvement of excessive fees and customs
	Encouraging systematic restructuring and liquidation of unviable projects	• Amend the agreement to strengthen the conditions for maturity extensions and interest deferments at projects • Presentation of auction and public sale criteria for PF project sites • Creation of financial institution syndicates loan • Purchase of LH PF business (land) • KAMCO purchase of private non-performing loans
	Working to minimize impact on market, financial and construction companies	• Temporary regulatory relief for financial institutions • Guidance for adequate provisioning in the NBFIs • Encourage NBFIs to strengthen their own capital buffers
Real Estate PF System Improvement	**Establishing a Stable Basis for Strengthening Equity Capital (Increasing the Equity Ratio to 20%)**	• Encourage landowners to contribute land as in-kind investments and participate as shareholders in PF projects. • Provide incentives, such as easing floor area ratios and offering discounts on PF guarantee fees, for developers with high equity ratios.

Measures (as of Nov 2024)		• Strengthen risk management by differentiating risk weights and provisioning requirements based on the equity ratio of PF developers.
	Establishing Fair Practices in the Real Estate PF Market	• Improve the process to ensure loans are granted based on an objective evaluation of the profitability and stability of the PF project itself, rather than relying on the collateral or creditworthiness of the developer or contractor. • Address and improve unreasonable practices such as completion guarantees and excessive fees. • Build an integrated PF information system capable of real-time monitoring of PF project progress by type, region, and phase, as well as financial status.
	Fostering Competent Korean-Style Developers	• Grant stable equity-backed REITs priority access to acquire public land, enabling them to manage development and subsequent operations. • Introduce a developer competency evaluation system based on project performance verification to establish a certification framework for outstanding developers.

Source: FSC, FSS

10. The resolution and restructuring of the distressed PF loans are underway. The improved viability assessment framework reevaluates the feasibility of real estate PF projects, categorizing them into four grades, with distressed projects classified as C (attention) or D (insolvency risk). The first phase of the assessment, done in August 2024, focused on KRW33.7 trillion of RE-PF loans which are deemed higher-risk PF, of which KRW 21trillion (9.7 percent of total PF loans) were categorized as distressed. The assessment of the remaining RE-PF loans was finished in December 2024. The total amount of outstanding RE-PF was KRW210.4 trillion in December 2024, with KRW8.2 trillion and KRW14.7 trillion classified as C and D, respectively. Going forward, financial institutions are required to write off D-graded projects by selling them through public auctions. For C-graded projects, financial institutions can choose between public auctions or loan restructuring. Of the KRW21 trillion in distressed projects identified in the first phase, KRW12.5 trillion would be under resolution mechanisms, while KRW8.4 trillion would be restructured. As at the end of October 2024, KRW2.8 trillion was resolved and KRW1.7 trillion was restructured through the provision of new funding. The resolution of all distressed loans is expected to be completed by June 2025.

11. As far as savings banks are concerned, mechanisms are in place to resolve the PF distress in an orderly manner and guide savings banks' operations smoothly back to normal. In addition to regular annual examination by the Financial Supervisory Service (FSS), the FSS and Korea Deposit Insurance Corporation conducted a joint inspection, focusing on PF resolution, of major savings banks in the Seoul Metropolitan Area (SMA) in October 2024. Since the revised viability assessment could significantly increase in insolvent RE-PF and drastically weaken some savings banks' capital position, regulatory authorities in early 2024 strongly encouraged saving banks to raise their CAR to over 10 percent for banks with total asset below KRW1 trillion, and to 11 percent for larger banks. Financial regulators request some savings banks with low capital buffers to submit a recapitalization plan. For savings banks that are a part of financial conglomerates, their parent companies are required to inject additional capital to raise their capital buffers. The regulation on mergers and acquisitions (M&A) of savings banks was eased in July 2023 to facilitate the private sector's resolution of weak savings banks.

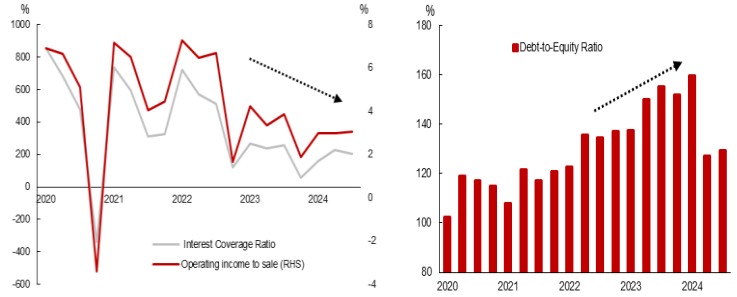
12. Liquidity assistance for non-bank depository institutions is available in the event of sudden deposit runs. Small depository financial institutions, such as savings banks and

credit cooperatives, maintain a certain level of liquid assets as self-insurance against sudden withdrawals. As of September 2024, the cash reserves of savings banks and credit cooperatives stood at 17 percent and 28 percent of total deposits, respectively. Their federations have set up liquidity funds, contributed by members, to provide emergency liquidity support when needed. In July 2024, the BOK temporarily included these federations in the repurchase agreements so that they can have access to BOK liquidity, until the PF-related distress is resolved. Additionally, savings banks and credit cooperatives have credit lines with large commercial banks which they can tap on if they suddenly face liquidity shortages.

Vulnerabilities of the PF Structure and the Way Forward

13. Prolonged financial distress in the real estate and construction markets could lead to the materialization of contingent liabilities and imperil construction companies' financial positions. The recent soft-landing measures encourage the swift resolution of non-viable projects, expand guarantees for viable projects through HUG and KHF, and provide funding support to projects through the PF normalization fund to ensure smooth project execution.The total amount of credit enhancements (excluding construction completion) and construction completion held by major construction companies [79] in Korea remained significant, currently standing at KRW34.5 trillion and KRW95.0 trillion respectively. Risks to the construction companies will increase if the construction industry slump persists and the financial soundness of construction companies deteriorates (Figure A1.7), The average credit enhancements and construction completion amount for these firms are KRW1.5 trillion and KRW4.1 trillion, accounting for 23.5 percent and 64.7 percent of their average equity amount of KRW6.4 trillion, respectively (Figure A1.8).

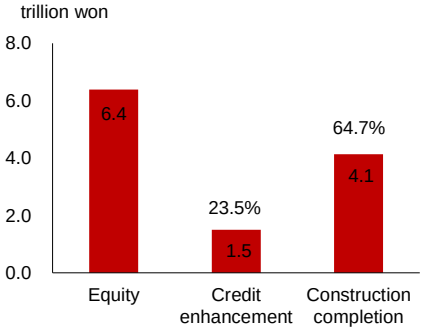
Figure A1.7 Construction Companies' Financial Ratios



Source: Bank of Korea

Note: 1) As of the end of 2023, among the corporations subject to external audit, companies with a fiscal year-end between January and November, companies that received a "disclaimer of opinion" from their auditors, and companies with errors or omissions in disclosed financial statements, are excluded from the scope 2) Since Q2 2024, a financially stable large corporation has been reclassified from the wholesale and retail sector to the construction sector, resulting in a significant decrease in the debt-to-equity ratio.

Figure A1.8. Average Equity, Credit Enhancements and Construction Completion of Major Construction Companies



Source: Semi Annual report; AMRO Staff calculations

Note: Data based on 23 companies among the top 30 construction firms in terms of construction capacity, which have disclosed according to the Financial Supervisory Service's "Best Practice for Notes on Contingent Liabilities for Responsible Completion"

[79] Based on the 23 construction companies among the top 30 in terms of construction capability rankings that have disclosed according to the "Best Practice for Notes on Contingent Liabilities for Completion Guarantees," which was established by the Financial Supervisory Service. The companies analyzed in the Bank of Korea's Financial Statement Analysis, which are among all 123,312 construction companies subject to corporate tax reporting by the National Tax Service, account for 53% of total sales by revenue.

14. Regulations on securities companies have been reviewed to address the significant liquidity squeeze in real estate PF. In the wake of the Legoland default, the authorities attempted to stabilize the money market by encouraging securities companies to convert their debt guarantee exposure into long-term loans by temporarily reducing the risk weight for these loans under the net capital ratio (NCR) calculation from 100 percent to 32 percent. Additionally, the securities companies were also allowed to hold self-guaranteed ABCPs with the risk weight of 32 percent. However, since these adjustments to risk weights are intended to be temporary, it would be prudent to address structural issues by preventing excessive reliance on short-term funding for long-term investments.

15. Risk weights for the NCR calculation, misaligned with underlying risks, have incentivized securities companies to engage in riskier transactions. Originally, the risk weight for debt guarantees on real estate loans is 18 percent while the risk weight for real estate loans is 100 percent[80], respectively, regardless of the actual risk profiles of the real estate projects and debt seniority. Since most debt guarantees by securities companies assume credit risk of the loans, loans and debt guarantees hold the same risk profile. This gap in risk weights has encouraged securities companies to favor providing debt guarantees over loans, putting them in a vulnerable position in times of a market liquidity squeeze and elevated credit risk in the real estate sector.

16. The government's recent policy to increase developers' equity and enhance standards for PF loan approval is commendable, although it may slow down real estate development. To raise the equity ratio of real estate PF projects from the current low level of 3-5 percent to over 20 percent, which aligns with advanced economies, the government plans to provide incentives through tax benefits and strengthen risk management practices of developers. Additionally, loans will be assessed based on objective evaluations of the viability and stability of PF projects rather than relying solely on collateral or creditworthiness of developers and builders. The government also aims to nurture professional developers who can handle both development and operations through REITs (Table A1.1). However, with the ongoing downturn in the real estate market and auctions triggered by PF soft-landing measures, raising developers' equity requirements at this time could hinder development projects, potentially further depressing the real estate market. Therefore, it is crucial to proceed cautiously with the implementation, monitor market conditions closely, and consider feedback from relevant industries to ensure the policy does not exacerbate the current challenges.

References

Bank of Korea. 2022. *Financial Stability Report.*

Bank of Korea. 2024. *Financial Stability Report.*

Financial Services Commission (FSC) and Financial Supervisory Service (FSS). 2024. "Policy Directions for the 'Orderly Soft Landing' of Real Estate PF."

Financial Supervisory Service (FSS). 2024. "Best Practices for Contingent Liability Notes Related to Construction Contracts."

[80] Risk weights for loans to a residential project for large securities companies ("Comprehensive Financial Investment Businesses") is temporarily eased from 100 percent to 60 percent until December 2024. (The risk weight for medium and small-sized securities companies remains the same at 100 percent.)

Hwang, Soon-joo. 2024. “The Galapagos Syndrome of Real Estate PF and the Need for Fundamental Structural Reform.” *KDI Focus,* Volume 134.

Joint Task Force of Relevant Ministries (Ministry of Land, Infrastructure and Transport, Ministry of Economy and Finance, Financial Services Commission). 2024. “Reform Plans for the Real Estate PF System.”

Kim, Jung-joo. 2022. “Diagnosis of the Causes of the Real Estate PF Crisis and Policy Responses.” *Construction Issue Focus.*

Lee, Bo-mi. 2023. “Problems and Implications of Korea's Real Estate PF Structure.” *Korean Institute of Finance,* Volume 32, Issue 12.

Lee, Bo-mi. 2024. “A Study on the Risks and Implications of Korea's Real Estate PF.” *Korean Institute of Finance,* Volume 33, Issue 02.

Samjong KPMG Economic Research Institute. 2024. “Key Issues and Future Outlook of Real Estate PF.”

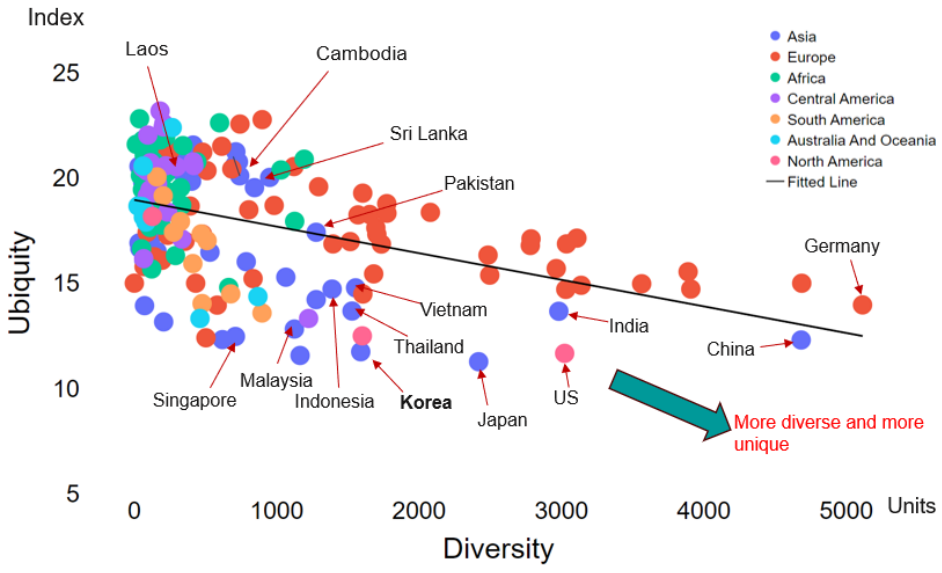
2. Assessing Korea's Trade Vulnerabilities to US Tariffs[81]

The re-election of Donald Trump as US President in 2024 and concerns over the new administration's trade policies, including tariff impositions, have heightened uncertainties in global trade. Korea's trade, deeply integrated into global value chains (GVCs), is significantly influenced by disruptions between the US and China. This selected issue leverages on the Export Decomposition Framework to draw key implications on the potential impacts of US tariff on Korea's exports of semiconductors, automobiles, and machinery.

Introduction

1. Korea's unique specialization in producing high-complexity, specialized goods—such as semiconductors and machinery—drives its competitive edge in global trade, but also underscores vulnerabilities that require deeper examination. In the ubiquity-diversity chart, Korea falls in the middle range of moderate diversity, indicating it exports a reasonably broad set of products, though not as many as countries such as China or India (Figure A2.1). Its lower ubiquity reflects Korea's specialization in producing unique, high-complexity specialized goods (e.g., semiconductors, machinery) that are not widely produced by other countries. This aligns with its role in high-tech global value chains, particularly in electronics and semiconductors. China is positioned as more diverse and slightly less unique, reflecting its role as a global manufacturing hub producing a wide range of goods, including both low- and high-complexity items. However, Korea's reliance on unique but limited export products exposes it to risks from demand fluctuations or disruptions in key industries or markets, particularly the US-China tensions affecting semiconductor and automobile demand. Furthermore, Korea's lower diversity compared to China highlights its reliance on a narrower industrial base, emphasizing the importance of innovation and differentiation to maintain competitiveness.

Figure A2.1. Ubiquity vs Diversity



Source: Global Trade Atlas and AMRO staff estimate
Note: Data are as of December 2023. Diversity refers to the variety of products a country exports, with higher diversity reflecting a broader export base and lower dependence on specific goods or sectors. In contrast, ubiquity measures how widely a product is produced across countries—high-ubiquity goods are common and exported by many nations, while low-ubiquity goods are specialized and produced by fewer countries (Appendix).

[81] Prepared by Trung Thanh Vu, Associate Economist.

2. This Selected Issue adopts the Export Decomposition Framework to examine the potential impact of US tariffs on Korea's trade. Given Korea's vulnerabilities stemming from its specialization on high-complexity products, the decomposition analysis provides deeper insights into how intermediate and final goods trade flows are structured. The decomposition methodology (Wang et al. 2018) is used to break down gross exports into domestic value-added (DVA), foreign value-added (FVA), and pure double counting (PDC) components, offering deeper insights into trade flows. DVA refers to the portion of a product's value that is created within a country's borders, while FVA represents how much of the product's value comes from foreign countries rather than its own country. DVA can be further decomposed into DVA in final goods exports (DVA_FIN), DVA in intermediate exports absorbed directly by importers (DVA_INT), and DVA in intermediates re-exported to third countries (DVA_INTrex) (Table A2.1 and Appendix). Examining DVA_INT and DVA_INTrex can provide implications for potential impacts on Korea's trade due to the US tariff imposition. Data is sourced from the ADB Multi-Regional Input-Output Database, using electrical and optical equipment as a representative proxy for the semiconductor industry, alongside machinery and transport equipment as a proxy for automobiles and machinery. The analysis covers three consecutive periods of US presidential terms, namely 2013–2016 (Obama), 2017–2020 (Trump), and 2020–2023 (Biden), allowing for a comparative assessment of trade impacts under differing trade policies.

Table A2.1. Decomposition of DVA

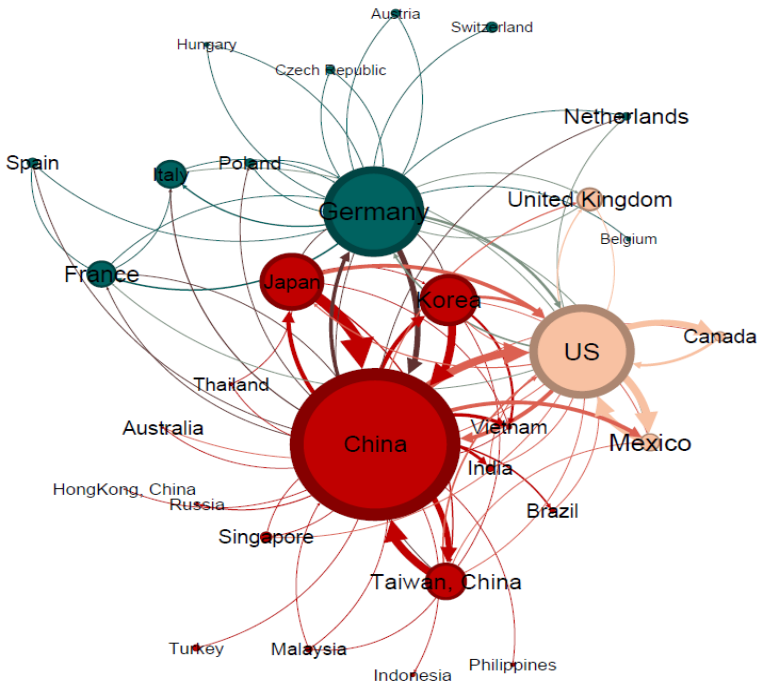
Category	Code	Description
Domestic Value-Added (DVA)	DVA_FIN	DVA in final goods exports
	DVA_INT	DVA in intermediate exports absorbed by direct importers
	DVA_INTrex	DVA in intermediates re-exported to third countries

Source: Wang et.al. (2018)

Export Decomposition

3. The re-election of Donald Trump and the continuation of US-China trade tensions pose significant challenges to Korea's trade dynamics, particularly in key sectors such as semiconductors, automobiles, and machinery. The network chart (Figure A2.2) highlights Korea's significant role as a key intermediary in the global trade network of those sectors. Korea's strong connections with China, reflected in thick red edges, underscore its reliance on Chinese production networks to either process or re-export Korean intermediate goods to global markets, including the US. This reliance highlights Korea's vulnerability to any trade disruption of intermediate goods caused either by an escalation of US-China trade tensions in general or US imposition of tariffs against China. Furthermore, Korea may experience reduced demand for its domestic value-added (DVA) exports to China and the growing US-China trade friction may encourage supply chain diversification, shifting production hubs away from Korea to other regions such as ASEAN or Mexico, thereby reducing Korea's centrality in global value chains. As Korea serves as a supplier of high-value-added intermediate and final products, increasing US protectionism may also limit market access and further intensify competition from other global players.

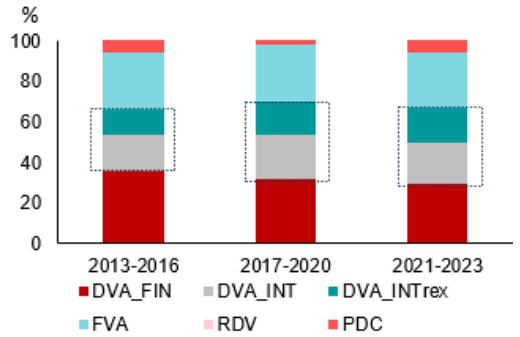
Figure A2.2. Global Trade Network of Semiconductor, Automobiles, and Machinery



Source: Asian Development Bank Multiregional Input Output (ADB MRIO) Tables and AMRO staff estimate
Note: Data are from 2021 to 2023 covers three key sectors: machinery, electrical and optical equipment, and transport equipment. Edge weights reflect trade in intermediate goods, specifically capturing two key components—domestic value-added in intermediate goods absorbed by direct importers (DVA_INT) and domestic value-added intermediates re-exported to third countries). These weights measure the intensity of trade flows between countries, with thicker edges indicating stronger trade ties and greater reliance on intermediate goods trade. Node size reflects each country's global share of intermediate goods exports, with larger nodes signifying a more prominent role in the trade network. The proximity of two nodes indicates a strong trade relationship or frequent interactions, driven by high connectivity (multiple direct connections), shared community (belonging to the same network cluster), and weighted importance (stronger trade flows along the edges pulling nodes closer together).

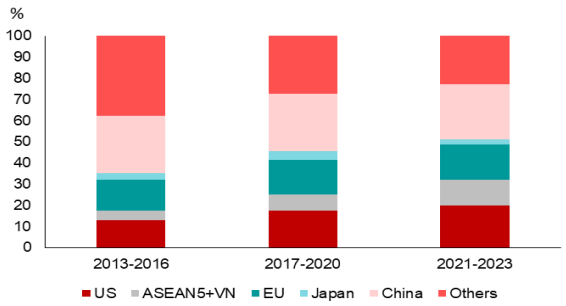
4. Korea's role as a critical supplier in global production networks of semiconductors, automobiles, and machinery is largely driven by its reliance on intermediate goods exports, particularly in China. A significant portion (38 percent out of total exports in 2021-2023) of Korea's DVA comes from intermediate goods (DVA_INT and DVA_INTrex), reflecting its position as a provider of essential components for global value chains (Figure A2.3). DVA_INT refers to intermediate goods that are directly absorbed by the importing country for its production processes, such as Korea's inputs used in China's domestic manufacturing sectors. DVA_INTrex represents Korean intermediate goods that are initially exported to China but are further processed and re-exported by China to third markets, such as the US. Notably, the share of DVA from re-exported intermediate goods (DVA_INTrex) has steadily grown from 2013–2016 to 2021–2023, underlining Korea's deeper integration into global value chains. Much of these intermediate goods are exported to China, where they undergo further processing and are subsequently re-exported to third markets such as the US, amplifying Korea's exposure to disruptions in US-China trade. China's significant role in absorbing Korea's DVA further highlights Korea's trade vulnerability. As one of Korea's largest export markets for value-added goods (Figure A2.4), any slowdown in China's manufacturing sector due to escalating US-China trade tensions could disrupt Korea's trade flow. While ASEAN countries provide a stable regional trade base, Korea's heavy reliance on China underscores the need to diversify its trading partners.

Figure A2.3. Korea's DVA Share of Total Exports



Source: ADB MRIO and AMRO staff estimate

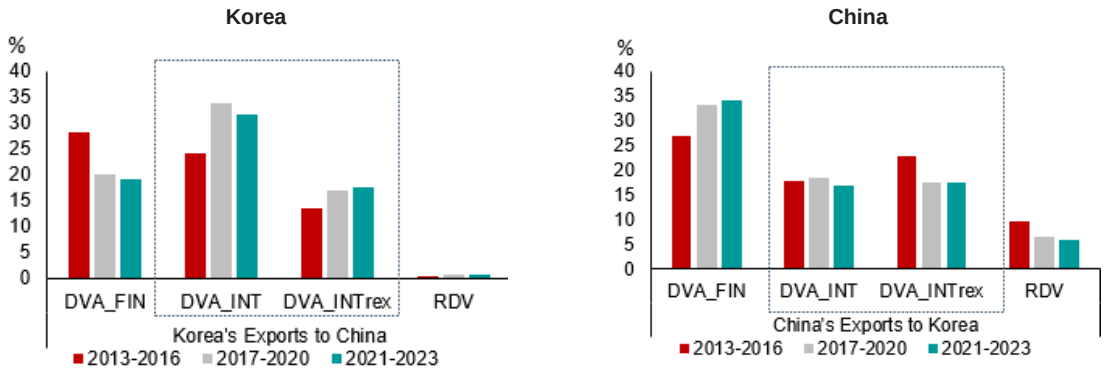
Figure A2.4. Korea's DVA by Exports Market



Source: ADB MRIO and AMRO staff estimate

5. Intermediate goods remain the backbone of Korea-China trade relationships, underscoring their deep interdependence, difficulties of decoupling, and potential impacts. Over time, DVA from intermediate goods exports (DVA_INT and DVA_INTrex) has consistently dominated the Korea's exports to China (Figure A2.5). Despite disruptions caused by trade tensions during Trump (2017–2020) and the post-COVID recovery period under Biden (2021–2023), the stabilization of DVA_INT highlights a continued mutual reliance of both countries on intermediate inputs for manufacturing exports. Furthermore, notwithstanding the protectionist trade policy under the Trump's first administration (2017-2020), Korea's exports to China saw an increase in DVA_INTrex. This signals increasing incorporation of Korean components into Chinese production networks for exports to third markets such as the US and thereby exposing Korea's intermediate exports to significant risks of trade disruptions. Should US-China trade tensions escalate, Korean intermediates processed and re-exported by China could face reduced demand or higher US tariffs, diminishing Korea's role in global value chains. This would have notable consequences for Korea's key industries, particularly machinery, automobiles, and electronics, where intermediate exports play a central role. Lastly, the minimal role of returning domestic value-added (RDV) also suggests that Korean inputs embedded in Chinese goods are predominantly consumed or exported, with limited circular trade flow back to Korea.

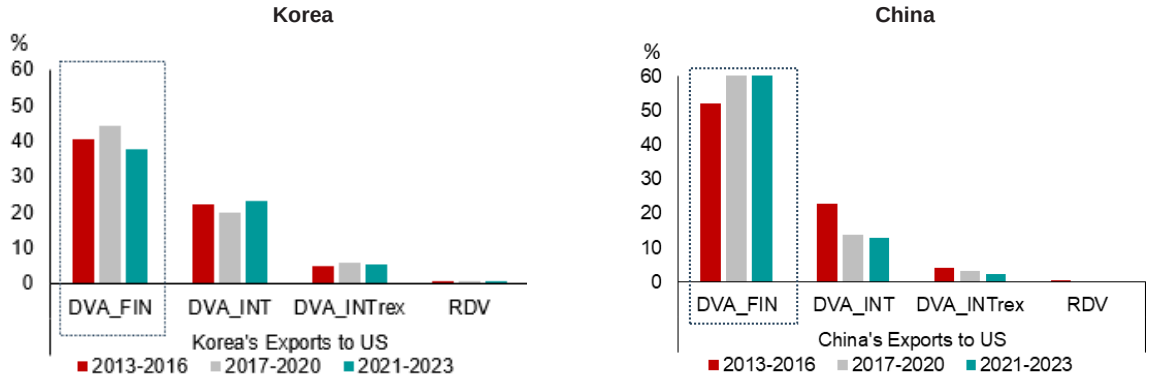
Figure A2.5. Domestic Value-Added Components (% of Exports)



Source: ADB MRIO and AMRO staff calculation
Note: DVA_FIN refers to domestic value added (DVA) embodied 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 third economies 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 embodied in other products. RDV refers to DVA that returns to the home country.

6. At the same time, Korea may have an opportunity to increase its final goods exports directly to the US, potentially substituting for Chinese products in those key industries. The increasing share of DVA gained from final goods (DVA_FIN) in China's exports to the US underscores China's significant role in delivering consumer goods to the US market (Figure A2.5). This reliance exposes China to risks from US tariffs, allowing Korea to step in as an alternative supplier of high-value final goods, particularly in industries such as computers, automobiles, and electronics. By leveraging on its strong production capabilities and technological advancements, Korea can position itself as a reliable trade partner for the US, especially amid rising trade tensions with China. Notably, Korea had an increase in DVA_FIN to the US during the first Trump administration (2017–2020) (Figure A2.6), suggesting a trend that could be further amplified if Korea focuses on strengthening its export networks and enhancing competitiveness in key sectors. Additionally, Korea's well-established intermediate goods supply chains can be realigned to prioritize direct exports of final goods to the US, reducing its reliance on China for re-export processing. This shift would not only mitigate risks from geopolitical disruptions but also allow Korea to capture a greater share of value-added trade, securing its place in global value chains as a leading supplier of final goods.

Figure A2.6. Domestic Value-Added Components (% of Exports)



Source: ADB MRIO and AMRO staff calculation
Note: DVA_FIN refers to domestic value added (DVA) embodied 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 third economies 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 embodied in other products. RDV refers to DVA that returns to the home country.

7. Uncertainties caused by the escalation of US-China tensions may accelerate Korea's efforts to diversify its foreign input sources. Foreign value-added (FVA) in Korean exports has remained relatively consistent, with a slight increase in recent years (2021–2023), reflecting its continued dependence on imported components (Figure A2.7). A significant share of Korea's FVA is in intermediate goods (FVA_INT), underlining the critical role of foreign-sourced inputs, particularly for Korea's export-oriented industries. However, it does appear that Korea has made progress in diversifying its supply chain amid shifting global trade dynamics. A notable shift has occurred in the geographic composition of Korea's FVA: while China remains a primary supplier, its share has declined since Trump (2017–2020) and continued under Biden (2021–2023). In contrast, contributions from the US, ASEAN countries and Vietnam have increased, signaling a diversification of Korea's supply chain away from China amid persistent US-China trade tensions (Figure A2.8).

Figure A2.7. Korea's FVA Share of Total Exports

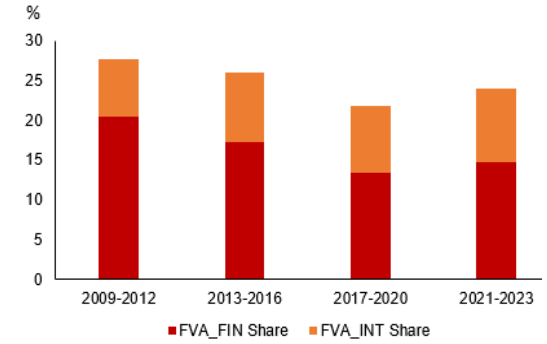
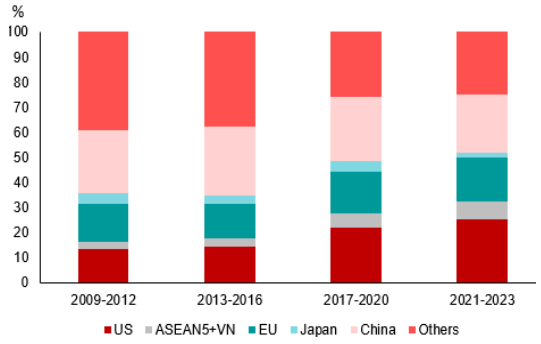


Figure A2.8. Korea's FVA Component



Source: ADB and AMRO staff calculation

Implications and Strategy Ahead

8. Korea needs to adopt strategies to mitigate risks by diversifying its trading partners and strengthening domestic value-added capabilities. Key findings (Table A2.2) suggest that Korea's significant vulnerability to US tariffs on Chinese goods mainly due to its heavy reliance on China as a market for intermediate exports, particularly those re-exported to third markets (DVA_INTrex components). This dependency creates concentration risks, both in terms of export destinations and product specialization, exposing Korea to heightened volatility. The narrow range of export items limits Korea's ability to cushion against trade shocks. To mitigate these risks, Korea needs to diversify its export markets, strengthen trade relations with other partners such as ASEAN and the EU, and broaden its export portfolio across industries like high-value final goods. Furthermore, Korea's role as a key intermediary in global value chains highlights the broader risks of over-reliance on a single trading partner, including but not limited to China, for both intermediate inputs and export markets. Reducing this concentration is crucial for enhancing Korea's trade resilience and competitiveness. Leveraging on regional trade agreements and fostering resilience in key industries such as semiconductors and electronics will be critical to sustaining Korea's position in global trade networks amidst escalating protectionism.

Table A2.2. A Summary of Key Findings

Key Findings	Inferences
Korea relies on China for DVA_INTrex.	US tariffs on Chinese goods disrupt Korea's intermediate exports, leading to trade volatility.
Narrow export items and concentrated markets.	High concentration risks increase export performance volatility.
Declining China share but rising ASEAN and Vietnam contributions to Korea's FVA.	Korea has opportunities to diversify its trade and reduce reliance on China as both a market for intermediate exports and a supplier of intermediate goods.
Potential for Korea to increase final goods exports to the US.	Korea can position itself as an alternative supplier for key sectors such as electronic devices.

Source: AMRO staff analysis

9. Importantly, Korea needs to continuously enhance its competitiveness and invest in supply chain resilience. Korea's competitiveness in global trade lies in its ability to integrate advanced industries and value-added production within global value chains. High Bandwidth Memory (HBM) serves as a prime example of Korea's strengths. As a global leader

in HBM technology, Korea dominates the production of high-performance semiconductors used in artificial intelligence, cloud computing, and advanced data centers. This technological edge has positioned Korea as a key player in the global tech supply chain. It stands to benefit from the virtuous cycle of innovation, economic growth and technological leadership. However, to sustain its competitive edge, Korea must continue to focus on innovation, increasing domestic production capabilities. In this regard, the Korean government is devoting resources to further strengthen Korean chip infrastructure and ecosystem. Lastly, to bolster supply chain resilience, Korea should continue to diversify its foreign input sources and relocating Korean manufacturers to other countries.

Appendix

A.1. Ubiquity and Diversity

The theoretical framework of economic complexity is based on “The Atlas of Economic Complexity” introduced by Hausman, Hidalgo, and others in 2013.

Revealed Comparative Advantage (RCA) is a measure of whether a country is a competitive exporter of a product. The RCA for country c and product p is measured as

$$\mathrm{RCA}_{\mathrm{cp}}=\frac{\mathrm{X}_{\mathrm{cp}}/\Sigma_{\mathrm{c}}\mathrm{X}_{\mathrm{cp}}}{\Sigma_{\mathrm{p}}\mathrm{X}_{\mathrm{cp}}/\Sigma_{\mathrm{c}}\Sigma_{\mathrm{p}}\mathrm{X}_{\mathrm{cp}}}$$

where X_{CP} represents the exports of country c of product p in terms of export values.

The M_{cp} matrix is defined as

$$M_{cp}=\begin{cases}1 & if\ \ RCA_{cp}\geq 1\\ 0 & otherwise\end{cases}$$

Diversity refers to the number of products that a country exports. It is defined as

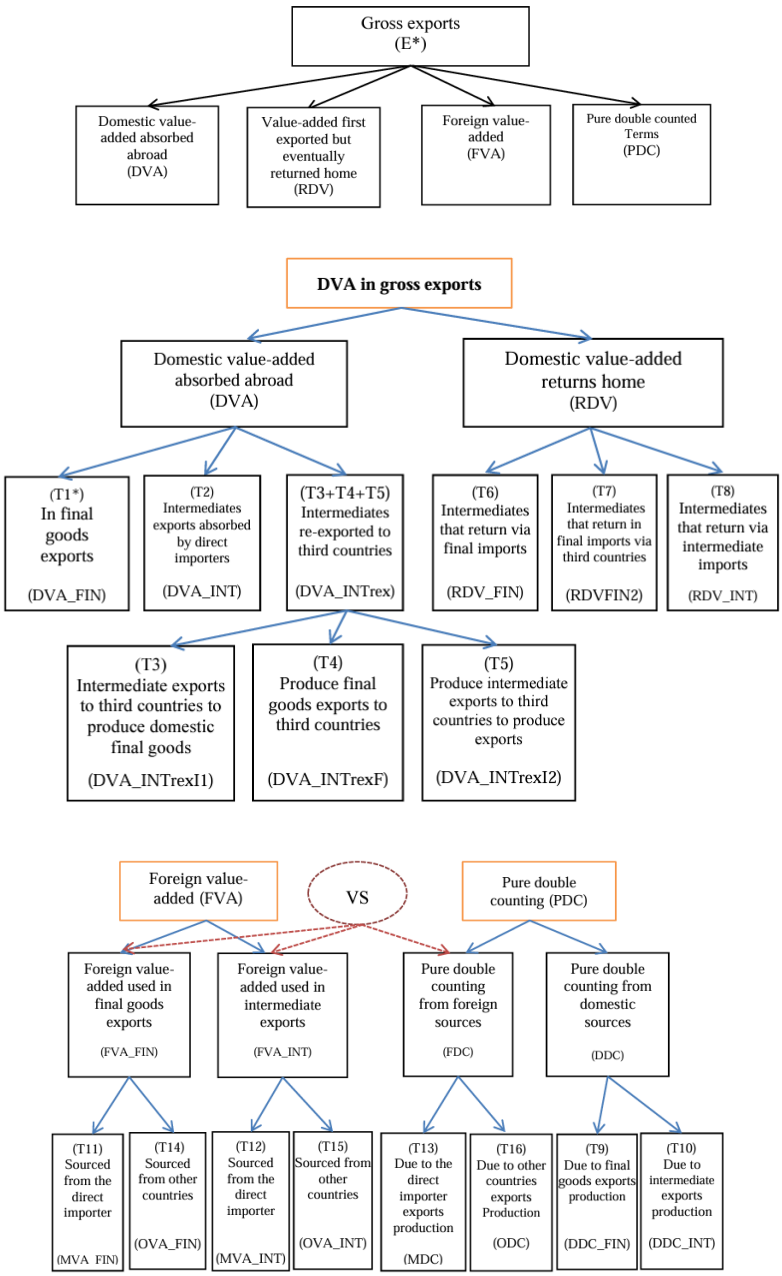
$$Diversity=k_{c,0}=\sum_{p}M_{cp}$$

Ubiquity refers to the number of countries that export a product. It is defined as

$$Ubiquity=k_{p,0}=\sum_{c}M_{cp}$$

A.2. Slicing Up the GVC

Wang et.al. (2018) used an accounting framework to decompose gross exports into several components including domestic value added, foreign value added embodied in final and intermediate exports, and pure double counting. The detailed components can be seen below.



Source: Wang et.al. (2018)

References

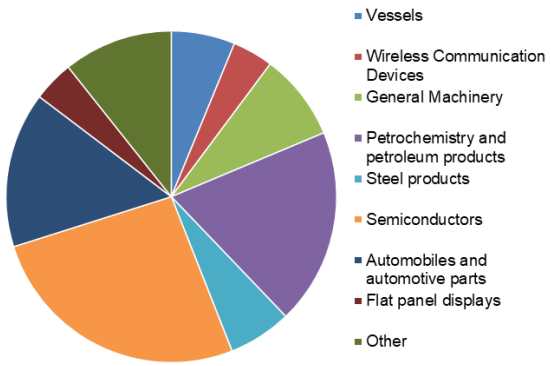
Hausman Ricardo, Cesar A. Hidalgo, Sebastian Bustos, Michele Coscia, Alexander Simoes, and Muhammed A. Yildirim (2013), “The Atlas of Economic Complexity: Mapping Paths to Prosperity”, Center for International Development, Harvard University.

Wang Zhi, Shang-Jin Wei, Kunfu Zhu (2018), “Quantifying International Production Sharing at the Bilateral and Sector Levels,” *NBER Working Paper 19677, November 2013, Revised February 2018*.

3. Automobile Exports: Recent Developments and Challenges[82]

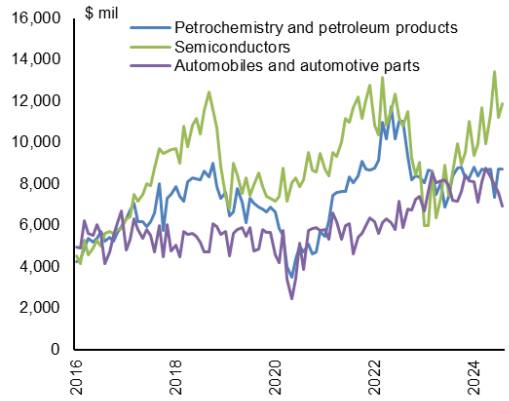
1. The automobile industry accounts for a considerable share of Korea's exports. As of August 2024, automobiles and automotive parts constituted around 15 percent of the country's total exports, placing the industry as the third largest export sector after the semiconductor and petrochemical/petroleum industries (Figure A3.1). Exports of the automobile industry have been growing steadily over the past several years, contributing significantly to the resilience of Korea's exports, particularly given the greater cyclicality of semiconductor and petrochemical/petroleum exports (Figure A3.2).

Figure A3.1. Major Export Items



Source: MTIE; CEIC; AMRO staff calculations.
Note: Data as of August 2024.

Figure A3.2. Top Export Items

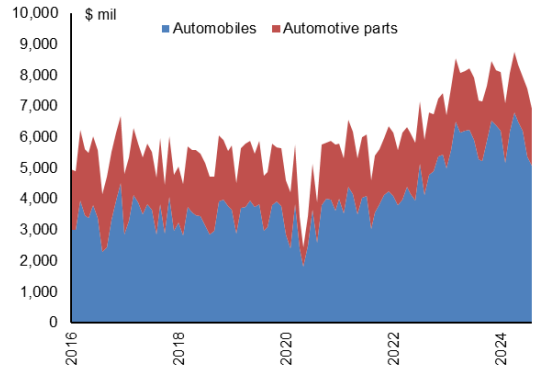


Source: WTO and IFC (2024), AMRO staff calculations.

2. While exports of automotive parts have remained relatively flat, those of automobiles have been rising consistently over the past few years, driven by passenger cars. While automobiles used to command only a slightly higher share of the automobile industry's exports in the years prior to 2020 than automotive parts, the following period witnessed a rapid increase in automobile exports, in part owing to Korea's ability to meet growing demand for hybrid vehicles and sport utility vehicles (SUVs) (Figure A3.3). In contrast, automotive parts exports have been relatively flat, as parts producers experience challenges in adopting technologies needed for the transition away from internal combustion engine (ICE, i.e. conventional) vehicles to more eco-friendly counterparts. While Korea exports a variety of automobiles, ranging from passenger cars and buses to trucks and special vehicles, passenger cars constitute the lion's share of automobile exports, at 97 percent of total automobiles exported in 2023.

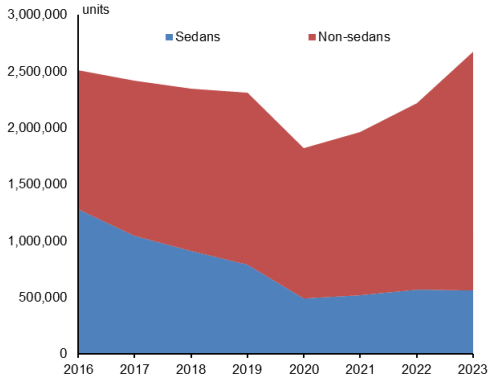
[82] Prepared by Jade Vichyanond, Senior Economist.

Figure A3.3. Exports of Automobiles and Automotive Parts



Source: MTIE; CEIC, AMRO staff calculations.

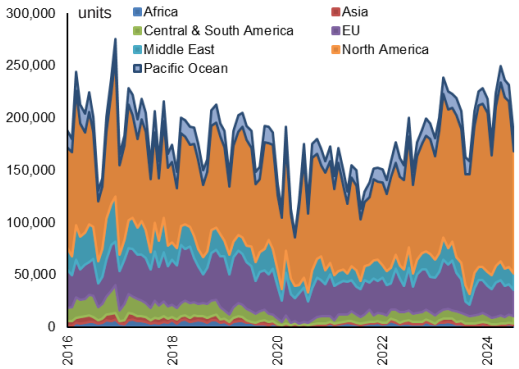
Figure A3.4. Passenger Car Exports



Source: Korea Automobile Manufacturers Association; CEIC; AMRO staff calculations.

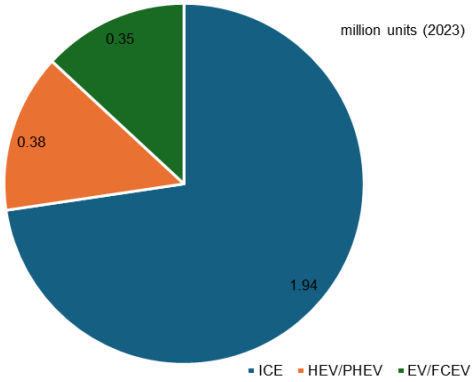
3. Non-sedans have been a major driver of growth in recent years, with North America being the most important market. While total passenger car exports were split roughly equally between sedans and non-sedans (such as SUVs and multi-purpose vehicles [MPVs]) in the mid-2010s, non-sedans have captured increasingly greater shares since then, thanks to rising demand from North America, which at present commands around two thirds of total passenger car exports (Figures A3.4 and A3.5).

Figure A3.5. Passenger Car Exports by Market



Source: Korea Automobile Manufacturers Association; CEIC; AMRO staff calculations.

Figure A3.6. Passenger Car Exports by Engine Type



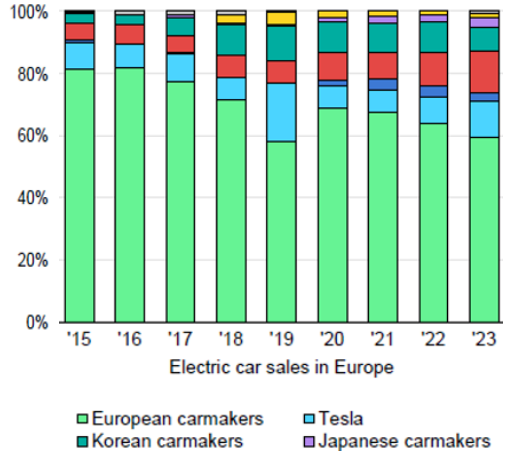
Source: Korea Automobile Manufacturers Association; AMRO staff calculations.

4. In terms of engine types, Korea's eco-friendly passenger cars have yet to catch up with conventional counterparts. In 2023, exports of eco-friendly passenger cars—which, according to Korea's classification, are divided into 4 categories: hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), electric vehicles (EVs), and fuel-cell electric vehicles (FCEVs)—grew by 30.7 percent yoy, compared to 20.3 percent yoy for conventional passenger cars.[83] Despite such rapid growth of the eco-friendly segment, Korea's passenger car exports are still dominated by ICE cars. Out of around 2.67 million passenger cars exported, eco-friendly cars accounted for only 0.73 million (of which 0.38 million were HEVs/PHEVs and 0.35 million were EVs/FCEVs) (Figure A3.6).

[83] In value terms, the export value of eco-friendly vehicles grew by as much as 51% year-on-year, accounting for 34% of total vehicle exports, compared to 19% in 2020.

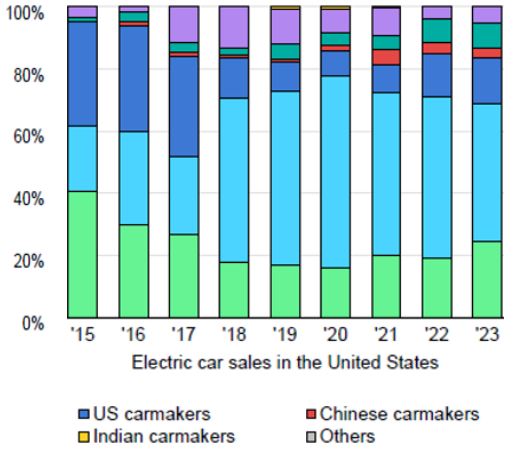
5. Looking ahead, with the global market heading towards eco-friendly vehicles, it is vital that Korea's automobile industry evolve in such direction with a view to remaining a major global player. According to the International Energy Agency (IEA), electric cars accounted for 18 percent of all cars sold globally in 2023—up from 14 percent in 2022 and only 2 percent in 2018—and are projected to rise to 50 percent by 2035.[84,85] As such, and given that Korean manufacturers' shares in the US and European electric car markets are relatively small, it is imperative that Korea continue to enhance the country's capabilities in electric car technology and production in light of with growing competition with other countries, in particular China, in major markets such as the US and Europe (Figures A3.7 and A3.8).[86]

Figure A3.7. Electric Car Sales in Europe by Carmaker



Source: IEA

Figure A3.8. Electric Car Sales in the US by Carmaker



Source: IEA
Note: "US carmarkers" denote those other than Tesla.

6. At present, however, there are several challenges for the prospects of Korea's automobile exports, especially of electric cars. First, the heightening of US protectionist trade policy will likely have some negative impact on the price competitiveness of Korean automobiles in the US market. Second, to the extent that China tightens restrictions on the exports of critical minerals, it may become more challenging and costly for Korean automobile manufacturers that rely on such mineral inputs—this consideration is particularly relevant for EV production, which requires critical minerals such as lithium, nickel, cobalt, and graphite. Third, the global electric car industry at the moment appears to be in a chasm (known as the *EV Chasm*)—the barrier along the product adoption curve between the early market and the mainstream market—which has been attributed to a number of reasons (e.g. lack of charging infrastructure and excessive charging time) and appears to be a major dampening factor for both external and domestic demand for electric cars in the near term.[87] Lastly, compounding the *EV Chasm* is the rise in concerns over electric car safety among Koreans following a string of recent high-profile fires due to multifunctioning batteries, incidents that have diminished the

[84] IEA (2024). *Global EV Outlook*.
[85] According to the IEA, electric cars refer to electric vehicles (EVs) and plug-in hybrid electric vehicles (PHEVs).
[86] In July 2024, Korea's Hyundai Motor Group and LG Energy Solution opened Indonesia's first electric car battery production plant. Their initial investment of $1 billion is set to produce 10 GWh of battery cells annually (sufficient for around 150,000 electric cars).
[87] In chronological order, consumers in the early market are consist of *innovators* and *early adopters*, while those in the mainstream market consist of *early majority*, *late majority*, and *laggards*.

prospects of Korea's development of the domestic electric car market, especially as a foundation for export expansion.[88]

[88] A strong local consumer base is widely seen as a crucial strategy behind the rise of Korean automakers, which have relied significantly on domestic sales to achieve economies of scale to generate sufficient profits with which to invest in product development.

Address: 10 Shenton Way, #15-08
MAS Building, Singapore 079117
Website: www.amro-asia.org
Tel: +65 6323 9844
Email: enquiry@amro-asia.org

LinkedIn | **Twitter** | **Facebook**