AMRO Annual Consultation Report

Korea - 2019

The ASEAN+3 Macroeconomic Research Office (AMRO)

February 2020

Acknowledgments

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

2. This Report is drafted on the basis of the Annual Consultation Visit of AMRO to Korea from 16-25 September 2019 (Article 5 (b) of AMRO Agreement). The AMRO Mission team was headed by Dr. Sumio Ishikawa, Group Head and Lead Economist. Members included Ms. Wanwisa Vorranikulkij (Country Economist for Korea), Dr. Jinho Choi (Back-up Economist for Korea), Mr. Yang-Hyeon Yang (Senior Economist), Ms. Diana del Rosario (Economist) and Ms. Malichanh Chiemsisoulath (Associate)[1]. AMRO Director Mr. Toshinori Doi and Chief Economist Dr. Hoe Ee Khor also participated in key policy meetings with the authorities. This AMRO Annual Consultation Report on Korea for 2019 was peer reviewed by Dr. Seung Hyun Hong (Group Head and Lead Specialist) and Dr. Xinyi Liu (Economist); and approved by Dr. Hoe Ee Khor.

3. The analysis in this Report is based on information available up to 20 November 2019.

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.

[1] Up to December 2, 2019.

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Executive Summary

1. **Korea's economic growth is expected to moderate in 2019 before picking up in 2020.** The economy is expected to grow at 1.9 percent in 2019 and 2.2 percent in 2020, primarily underpinned by government spending and private consumption. Exports may turn around in 2020 reflecting signs of a bottoming out in the global information and technology (ICT) cycle while weighed down by the U.S.-China trade tensions. Construction investment is expected to remain lukewarm, while facilities investment is expected to bottom out early next year.

2. **Headline inflation remains below the Bank of Korea's (BOK's) 2 percent target.** Headline inflation eased in 2019, driven by oil and food prices, and compounded by policy-induced reduction in healthcare charges. Core inflation and inflation expectations have also softened. Going forward, headline inflation is expected to moderate to 0.4 percent in 2019 before rising to 0.9 percent in 2020.

3. **The external position is strong reflecting continued current account surpluses and ample international reserves.** The current account surplus narrowed on the back of weakening goods exports, with the bulk of the surplus invested overseas in search of higher returns and portfolio diversification towards long-term assets. Reflecting its accumulated investments abroad, Korea's net external asset position is positive and growing.

4. **Amid low interest rates, total loan growth has remained stable at around 6 to 7 percent,** primarily owing to loans given to SMEs and small office/ home office (SOHO) businesses. Loan demand of large corporates is low as they are cash-rich and many of them have switched their financing source from bank loans to bond issuance because of lower funding costs. Household borrowing continues to moderate and is constrained by tighter macroprudential measures.

5. **Fiscal policy is set to be more expansionary in support of the weak economy**. Besides an increase in expenditure, the government has frontloaded spending in 2019 and adopted a supplementary budget equivalent to 0.3 percent of GDP. The proposed budget in 2020 would be about 26.2 percent of GDP, increasing by 1.1 percentage points over 2019. The fiscal deficit, excluding Social Security Fund (SSF), is expected to increase from 0.6 percent of GDP in 2018 to 2.3 percent in 2019 and 4.0 percent in 2020.

6. **In the near term, Korea's economic outlook is weighed down by external downside risks.** Weaker-than-expected growth in China and advanced economies, an escalation of the U.S.-China trade conflict, and a delayed rebound in global chip demand, pose downside risks to Korea's highly open economy. Japan's tightening of export controls have had limited impact on Korean ICT sector so far, while heightening business uncertainty and raising concerns over excessive reliance on a single country for key technological products.

7. **Risks and vulnerabilities from a buildup of financial imbalances are contained.** Macroprudential measures, property taxes and supply management measures have led to a moderation of household debt and house prices in Seoul since Q4 2018. However, risks stemming from indebtedness among low-income households and housing speculations in prime areas, warrant vigilance amid easing monetary policy and an

economic slowdown. On the financial market side, Korea's highly open financial markets are sensitive to volatility in global markets and cross-border capital flows. Heightened geopolitical tensions and trade friction could also heighten volatility in Korea's financial markets.

8. **Over the long term, the Korean economy faces declining potential growth stemming from structural challenges in the labor market and corporate sector.** The labor market is experiencing slower labor force growth, a rapid rise in minimum wage and a reduction in working hours without a proportionate improvement in labor productivity. In addition, the dualism between regular and non-regular workers continues to be a distortion in the labor market. Meanwhile, the economy is heavily dependent on the ICT industry and large conglomerates. The disparity and unfair competition between large and small-and-medium enterprises (SMEs) has discouraged SMEs from investing in R&D and technology to improve their productivity.

9. **Given ample fiscal space, a more expansionary fiscal stance is planned in the next few years to support the economy.** Amid heightened external economic uncertainty, tax incentives for facilities investment, and construction of social overhead capital would support the weak economy. Social welfare should be targeted towards low income households, while job policies should address the dualism in the labor market. Separately, the execution rate of the budget, including that of local governments and SOEs, should be raised. Over the medium term, the fiscal deficit should be reduced to a more sustainable level once the economy has recovered.

10. **In view of moderating economic growth and muted inflation pressure, the current accommodative monetary policy stance should be maintained.** The negative output gap is likely to continue, while inflationary pressure has weakened with declining inflation expectations. The BOK has shifted its stance to an easing bias and has cut the base rate twice since July 2019 in order to support growth. Going forward, a more accommodative monetary policy should be considered, if the economy weakens more than expected.

11. **A series of tighter regulations has largely curbed financial imbalances, but some measures should be reviewed.** The full implementation of the debt service ratio is expected to strengthen households' financial soundness and safeguard financial stability. The government's timely and targeted actions have stabilized the housing market, particularly in the prime areas. Nonetheless, to allow monetary policy to play a more effective role in supporting the economy, it may be prudent to review the macroprudential measures with a view to selective easing of some measures. This will encourage more credit expansion, especially to financially prudent households, without jeopardizing overall financial stability.

12. **The government's efforts to achieve more inclusive growth and promote innovation should continue.** The ongoing amendment of legislation related to fair competition will reduce the market power of large conglomerates or *chaebols*. At the same time, in order to improve SMEs' productivity and competitiveness, the government should provide more support for R&D and human capital development. Structural policies should be employed to diversify export markets and sources of key technology materials and components.

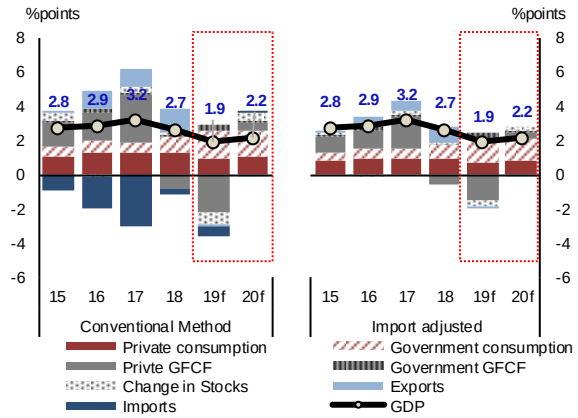
A. Recent Developments and Outlook

A.1 Real Sector Developments and Outlook

1. **Korea's economic growth has moderated in 2019.** Real GDP grew by 1.9 percent in H1 2019, down from 2.5 percent in H2 2018. Growth was mainly supported by expansionary fiscal spending and private consumption. Meanwhile, goods exports have contracted since the beginning of the year due to a downturn in the global semiconductor industry, a moderation of China's economy and spillovers from the U.S.-China trade conflict. Private investment continued to be subdued with a decline in facilities investment and construction. On the production side, the services sector continued to grow robustly, while manufacturing production slowed down as exports contracted. In particular, production of manufacturing SMEs witnessed a sharp drop after declining steadily since early 2017 (Figure 2). Business sentiment fell on the back of Japan's tightening of export controls and a deterioration in the external demand outlook.

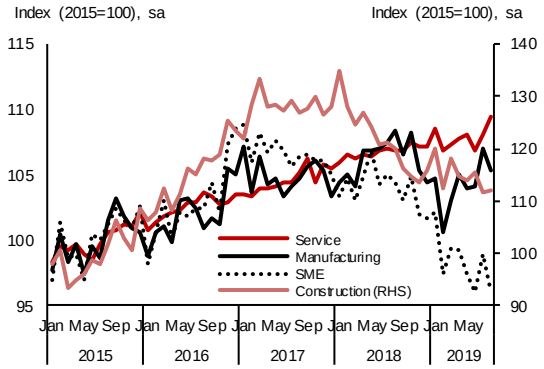
2. **Going forward, the economy is expected to grow by 1.9 percent in 2019 before recovering to 2.2 percent in 2020 (Figure 1)**. Growth will be primarily underpinned by increased government spending. Private consumption would likely grow at a moderate pace supported by the government's welfare-enhancing measures and continued increase in household income. The outlook for goods exports is mixed. Supported by 5G infrastructure installation in many countries and the ongoing inventory normalization of semiconductor producers, the global semiconductor cycle is expected to bottom out at the end of 2019 and recover in 2020 providing a boost to the Korean ICT industry (Box A. Global Semiconductor Industry and its Impact on Korea). Despite the turnaround in the semiconductor industry, overall exports will continue to be weighed down by uncertainties over the U.S.-China trade tension. In addition, China, the U.S. and other advanced economies are likely to slow further next year. Construction investment is expected to remain lukewarm, while facilities investment is expected to rebound in 2020 on the back of higher capital investment by semiconductor firms.

Figure 1. Real GDP Growth: Conventional and Import-adjusted Methods



Note: Growth projection for 2019 and 2020 was done in September 2019.
Source: BOK; AMRO staff estimations

Figure 2. Production

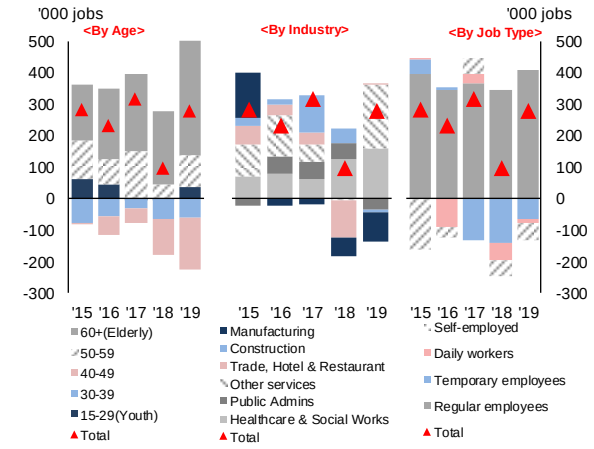


Source: Statistics Korea

3. **In the labor market, the improvement in employment, especially for the elderly, has been led by the services sector on the back of robust tourism and public sector hiring programs.** During January-October 2019, the number of employed persons increased on average to 276,100 workers per month, up from 97,300 workers per month in 2018 (Figure 3). By age group, the improvement in overall employment levels was mainly attributed to job creation for the elderly population and a rebound in youth employment. Meanwhile, the retrenchment of adults aged between 30-49 years has continued over the past three years. By sector, employment in healthcare and social work activities was led by the government's expansion of job positions in public services. Employment in hotels, restaurants and recreational activities has increased since March 2019, driven by the double-digit expansion in tourist arrivals. Furthermore, job retrenchment in manufacturing continued amid improvement in the shipbuilding and automotive industries despite the slowdown in electronics. By status, the employment of regular workers held up well, while the employment of temporary and daily workers contracted, reflecting the government's efforts towards in hiring more permanent workers.

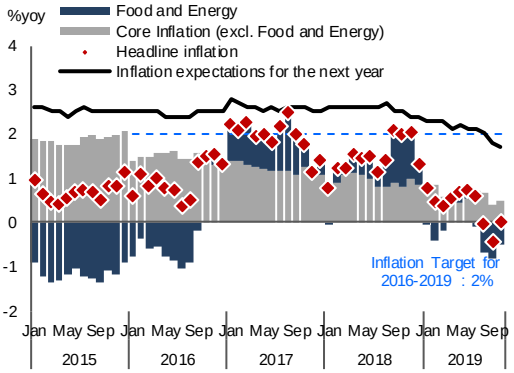
4. **Headline inflation remains below the BOK's 2 percent target.** Headline inflation eased to 0.4 percent in the first ten months of 2019, from 1.4 percent in the same period of 2018 (Figure 4). The easing of inflation was driven primarily by food and energy prices, and compounded by policy-induced reduction in the cost of healthcare. Demand-side pressure was dampened by a weakening economy, as indicated by softening retail sales, weaker consumer sentiment and subdued investment. Core inflation softened, and inflation expectations for the next one year declined to 1.7 percent in October 2019 from 2.5 percent in October 2018. Going forward, headline inflation is expected to moderate to 0.4 percent in 2019 before rising to 0.9 percent in 2020. Negative supply shocks are expected to dissipate, while the demand is likely to improve in 2020.

Figure 3. Annual Change of Employment (Monthly Average)



Source: Statistics Korea; AMRO staff calculations

Figure 4. Inflation[2]



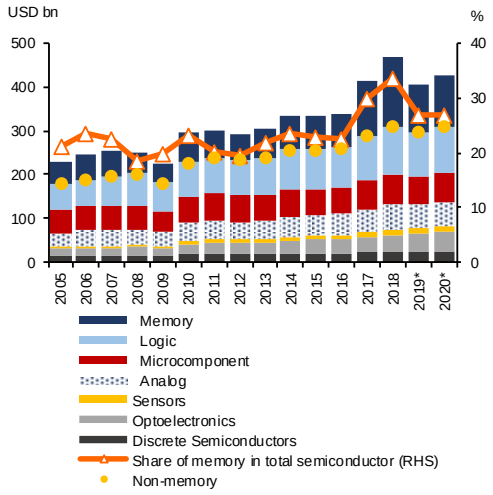
Source: Statistics Korea; AMRO staff calculations

[2] Headline inflation increased to 2.0 percent in September-November 2018, mainly driven by a jump in food prices, as the summer was unprecedentedly long and hot.

Box A. Global Semiconductor Industry and Its Impact on Korea[3]

Semiconductors are classified into two broad categories, non-memory chips and memory chips. In 2018, global sales revenue of semiconductors totaled USD468.8 billion, a 13 percent increase from 2017. Among semiconductor subcategories, memory chips accounted for the largest share of sales revenue at 34 percent of total semiconductor sales revenue in 2018. Meanwhile, non-memory chips[4] took up about 66 percent (Figure A1 and Table A1).

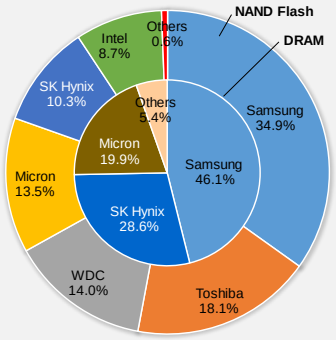
Figure A1. Sales Revenue of Global Semiconductor



Source: WSTS (2019)

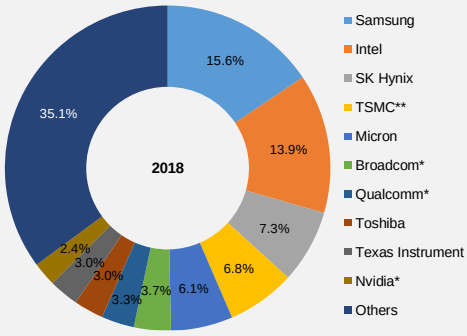
Korea commands a large share of the global memory market. In 2018, Korea took up about 60 percent[5] of the global memory market. The country is home to a few leading semiconductor manufacturers, such as Samsung Electronics [6] and SK Hynix [7], which produce NAND flash memory[8] and DRAM[9] (Figure A2). In terms of total semiconductor sales, in both memory and non-memory chips, Korea dominates with a 23 percent market share. Meanwhile, other countries – including the U.S., Taiwan, China and Japan – also play important roles in the supply chains of the global semiconductor industry. The U.S. specializes in system semiconductors and is home to companies such as Intel and Qualcomm. Taiwan is the global foundry manufacturing hub[10] for semiconductors, while Japan is a crucial supplier of core semiconductor materials and special semiconductors. China aims to be self-sufficient in semiconductors, specializing in both non-memory and memory chips, and to become a global powerhouse (Figure A3).

Figure A2. Global NAND Flash/DRAM Makers (2019)



Source: IHS Markit, TrendForce

Figure A3. Global Semiconductor Sales Leaders (2018)



Note: *Fabless, **Pure-play foundry
Source: IC Insight (2019)

[3] Prepared by Malichanh Chiemsisoulath
[4] Non-memory chips comprises of analog chips, micro-components, logic chips, discrete semiconductors, optoelectronics and sensors.
[5] IHS Markit, 2018
[6] Samsung's semiconductor products include DRAM, NAND flash memory, multichip packages, processors, security solution chips, image sensors, display integrated circuits (ICs) and power ICs.
[7] SK Hynix's semiconductor products include DRAM, NAND flash memory, multichip packages, and image sensors.
[8] NAND flash memory is a type of non-volatile storage technology that does not require power to retain data. MP3 players, digital cameras and USB flash drives use NAND technology.
[9] DRAM is a specific type of random access memory that allows for higher storage densities at a lower cost. The memory modules found in personal computers and servers use DRAM.
[10] Semiconductor manufacturers are divided into integrated device manufacturers, fabless firms and pure-play foundries. IDM is a semiconductor company which designs, tests, manufactures and sells IC products. Fabless firms only design and sell semiconductor chips while outsourcing their fabrication. Pure-play foundries only manufacture devices under contract for other fabless companies, such as Intel, Qualcomm and Nvidia, without designing the devices.

Nascent signs of a turnaround in the global semiconductor cycle have emerged since the middle of 2019. During 2016-2018, demand for semiconductor memory expanded rapidly with its high price, driven by increased demand for large servers in social media platforms such as Facebook, and in cloud storage. Following the initial surge, semiconductor demand and prices started to decline due to market saturation and a slowdown in global capex. However, Korea launched 5G commercialization in April 2019, and nascent signs of a turnaround have appeared since the middle of 2019, such as rising sales in data-center processors, a pickup in the prices of some chip segments, and improved operating profits at top semiconductor makers such as Samsung Electronics. Memory chip inventories are also diminishing at Samsung Electronics and SK Hynix, reaching normal levels in recent months. Amid such a positive outlook, Samsung has recently announced a plan to expand its production facility in China, to be operational in H1 2020, to produce state-of-the-art NAND flash memory. The company also unveiled plans to expand a site in Pyeongtaek and to start ordering facilities equipment from Q2 2020.

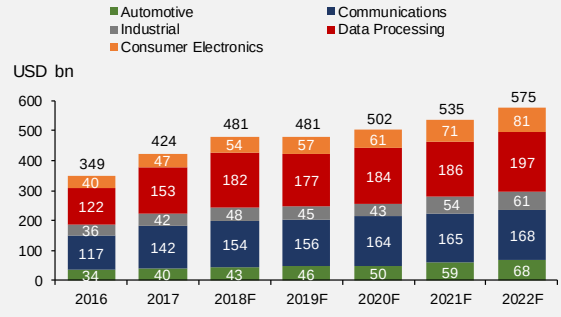
The up-cycle of the global semiconductor market may be expected in 2020, underpinned by the beginning of 5G commercialization in the region[11], which may in turn have a large impact on the Korean economy. With Korea and many other countries fiercely developing their own 5G network infrastructure and ecosystem, the demand for electronic equipment such as smartphones, PCs, servers, displays and IoT will increase significantly. As electronic equipment contains semiconductors, 5G commercialization would drive demand for semiconductors. The global semiconductor market is expected to grow by 19.5 percent from 2018-2022, mainly driven by consumer electronics (5.6 percentage points), automotive industry (5.2 percentage points), and data processing (3.1 percentage points), while communications equipment will probably contribute only 2.9 percentage points. The growth of the global semiconductor market is expected to boost Korea's GDP by about 0.28 percentage points[12] on average from 2018-2022; the impact will be larger if spillover effects to other sectors are included (Figure A4).

Korean semiconductor companies aim to be the leader in non-memory semiconductors and the semiconductor foundry business by 2030. Korean semiconductor producers take up only 4 percent of the non-memory market while the U.S. dominates with about 70 percent, followed by Taiwan and China. With the support of 5G commercialization, demand for advanced system semiconductors will be fast-growing, underpinned by autonomous vehicles as well as AI and IoT related devices. Against this background, Samsung announced a plan to invest KRW133 trillion in its non-memory and foundry businesses over the next 10 years to reduce reliance on the memory business and diversify its revenue. Of this amount, KRW73 trillion will be invested in R&D, and KRW60 trillion will be allocated to production facilities for the manufacture of non-memory semiconductors, such as logic chips. Korea is expected to expand its foundry market share from the current 19 percent to 35 percent, and its fabless market share from the current 1.6 percent to 10 percent, by 2030 (Figure A5).

Semiconductor industry produces various types of chips for different end-products. This means that different end-products require various types of chips in their production. As each type of chips is produced by different suppliers located in different countries, granular knowledge on each type of chips, including demand of end-products as well as major suppliers of chips, is important to understand the total value chain structure and the spillover effect of technological advancement of semiconductor industry (Appendix 6. Subcategory of Semiconductor Products). Chip types are classified into two categories, memory and non-memory (analog chip, micro-component, logic ship, discrete semiconductors, optoelectronics and sensors). While Samsung and SK Hynix are major suppliers of memory chips, its demand comes from different end-products, including communication (smartphones), consumer electronics, data processing, automotive, and industry (Appendix 6). 5G commercialization is expected to increase not only the demand of smartphones but also that of PCs, servers, displays and IoT. Therefore, the semiconductor industry in the region may also be boosted even if they specialize in the production of different types of chips.

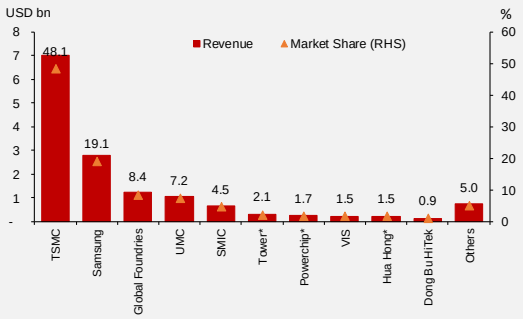
[11] See Box A2 of Annex 2. Korean Firms' Technology Adoption and the Implications for SMEs.
[12] The semiconductor industry accounts for about 5.9 percent of Korea's nominal GDP.

Figure A4. Global Semiconductor Market Growth by Type (2019)



Source: PWC (2019)

Figure A5. Global Semiconductor Foundries (2019)



Source: TrendForce (2019)

Authorities' Views

5. Korea will see moderate economic growth in 2019, but AMRO's projections could be on the low side. Based on the authorities' projections, the Korean economy's growth will be weighed-down by the ongoing U.S.-China trade dispute and heightened geopolitical risks. However, in 2020, there will be an upside risk to growth stemming from a rebound in the semiconductor industry. Growth is projected at 2.0 percent in 2019 and 2.3 percent in 2020. On the inflation front, BOK is of the view that the 2019 outlook is leaning towards downside risks while the 2020 outlook is towards upside risks. The headline inflation will show signs of a significant slowdown this year owing to higher downward pressures exerted by government policies and supply-side factors. Headline inflation was 0.4 percent in 2019 and was forecast to rise to 1.0 percent in 2020 as the downward pressure exerted by the supply-side factors diminish.

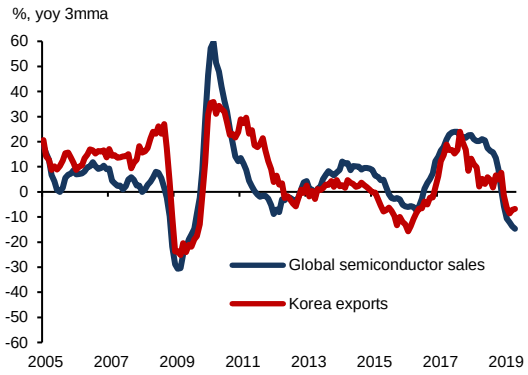
A.2 External Sector and the Balance of Payments

6. **Despite the contraction of exports, the current account has remained in surplus.** Goods exports has declined since December 2018, led mainly by semiconductor as a result of saturated global demand for servers (Figure 5). The correction in the global memory chip industry is expected to continue before bottoming out at the end of 2019 to early 2020, supported by installation of 5G technology in many countries. Meanwhile, goods imports have also slowed as a result of a decline in exports and facilities investment. For the whole of 2019, the current account surplus is expected to narrow to 3.8 percent of GDP on the back of weak merchandise exports. However, a strong increase in tourist arrivals, in tandem with a rise in spending, is expected to shore up the negative service balance (Figure 6).

7. **The external position of the economy is strong, supported by a positive net external asset position and ample international reserves.** International reserves are expected to hover at above USD400 billion, equivalent to 7.5 months of goods and services imports. Meanwhile, the bulk of the current account surplus continues to be invested overseas in the form of direct investment by Korean corporates and portfolio investments (Box B. Where Next for Korea's Robust Trade Balance?). Given low interest rates and the limited supply of longer-term bonds domestically, local institutional investors led by the National Pension Service (NPS) and asset management companies have increased their overseas portfolio

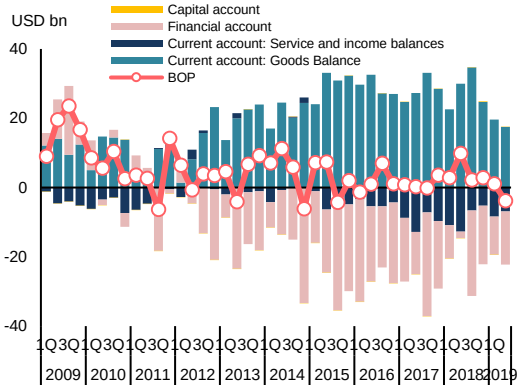
investments, including alternative investments. They are seeking higher returns and are prioritizing portfolio diversification towards long-term assets. Insurance companies are also investing in overseas long-term bonds in order to prepare for the adoption of the IFRS17 in 2022, which requires insurers to match asset duration with their long liability duration.

Figure 5. Merchandise Exports



Source: World Semiconductor Trade Statistics; Korea Customs; AMRO staff calculations

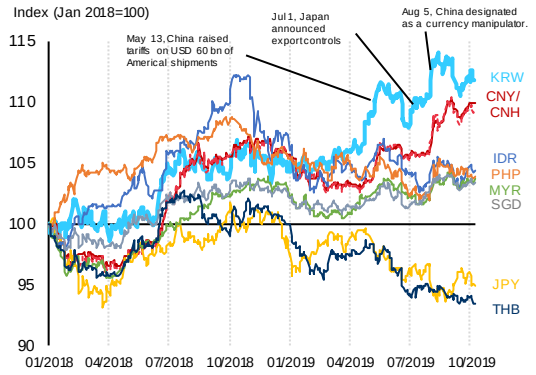
Figure 6. Balance of Payments



Source: BOK; AMRO staff calculations

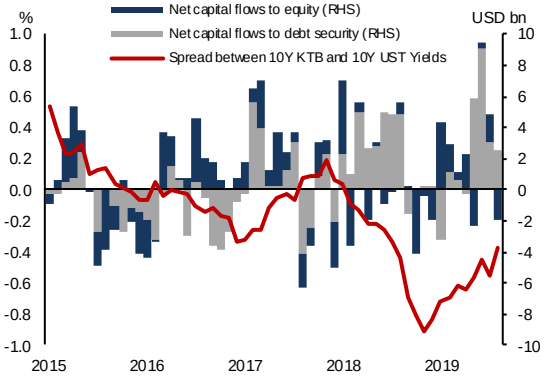
8. **Financial markets in Korea have been volatile since the beginning of 2019, owing to heightened uncertainty over the global economic outlook and amplified by concerns over the Korean economy.** A rise in volatility in Korea's equity and FX markets was initially triggered by a marked decline in exports and a slowdown in GDP growth, and intensified by market concerns over further escalations in the U.S.-China trade conflict, and an increase in Korea-Japan trade tensions. As a result, the Korean won depreciated (Figure 7), while the stock market has underperformed relative to several regional peers in 2019. Reflecting its strong external and fiscal position, Korea has attracted strong inflows into its bond market, which has caused a decline in Korea Treasury Bond (KTB) yields – to below that of U.S. Treasury bonds, thereby giving rise to a negative yield spread (Figure 8). The inflows were also reinforced by expectations of lower policy rate as well as arbitrage opportunities in the swap market in the first half of 2019 (Selected Issue 1. Development of Portfolio Investment and Foreign Exchange Swap Market). Additionally, the deterioration in the growth and inflation outlook has led to a flattening of the KTB yield curve.

Figure 7. Regional Currencies



Source: Thompson Reuters; AMRO staff calculations

Figure 8. Non-resident Portfolio Flows

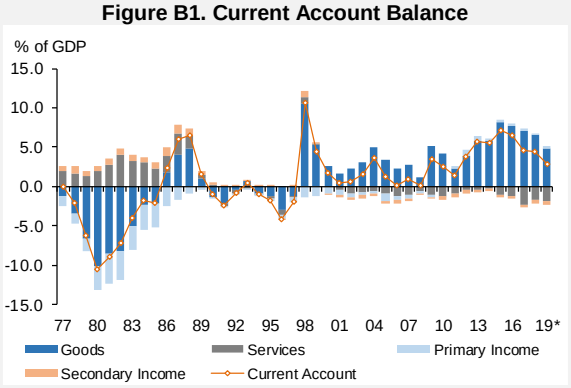


Source: BOK; AMRO staff calculations

Box B. Prospects for Korea's Robust Current Account Surplus[13]

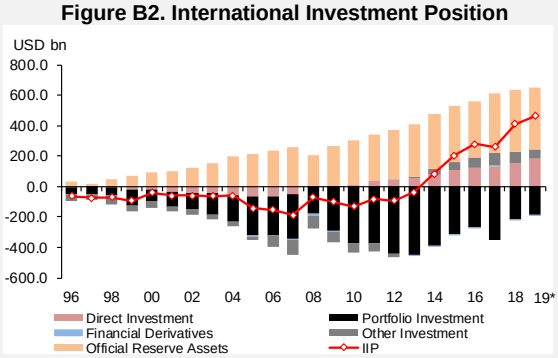
Korea has maintained a surplus in the current account (CA) for over two decades now, enabling the country to become a net creditor (Figure B.1). As a result of the CA surplus, the steady inflow of foreign currency has facilitated the accumulation of substantial reserve assets. And as the CA surplus expanded further in the 2010s, overseas investment likewise picked up pace. Following these developments, Korea has turned into a net creditor since 2014. As of end-June 2019, Korea recorded a net international investment position of about USD460 billion—equivalent to 27.5 percent of its GDP (Figure B.2).

Figure B1. Current Account Balance



Note: * refers to 2019 Q2 data
Source: BOK

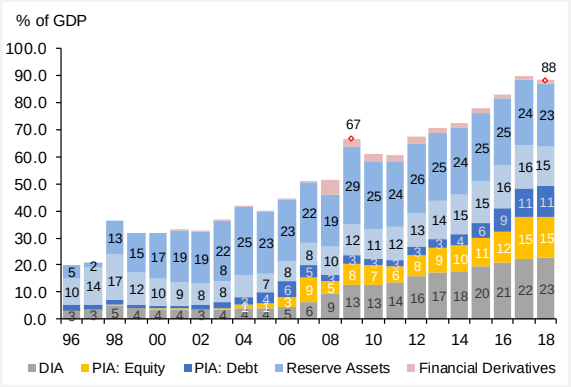
Figure B2. International Investment Position



Note: * refers to 2019 Q2 data
Source: BOK

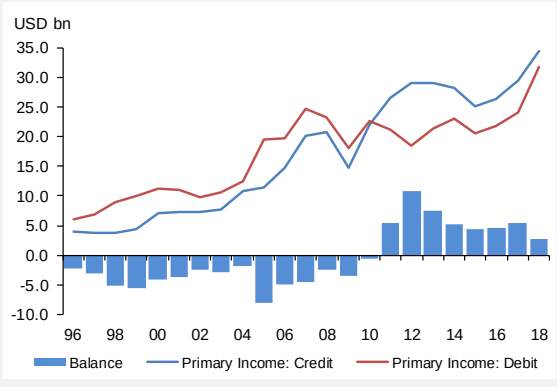
In line with Korea's net creditor status, overseas investments have grown rapidly over the last decade. External assets have increased from 67 percent of GDP in 2009 to 88 percent in 2018 (Figure B.3). Korean corporates have steadily built up on overseas direct investment assets (DIA), motivated by market expansion as well as the acquisition of strategic assets, particularly in advanced economies, and lower production costs in developing economies.[14] More recently, portfolio investment assets (PIA) have also picked up pace, particularly over the past two to three years. Overseas PIA is largely driven by the National Pension Service's (NPS) increasing its overseas equity allocation as well as insurance and asset management companies' investing in foreign long-term debt securities.[15] Meanwhile, other investment assets (OIA), which used to dominate external assets in the late 1990s to early 2000s, have expanded at a more modest pace in the past 10 years. These external assets are largely in the form of bank loans and other accounts receivable. Overall, external assets have returned an average of 3 percent per annum since 2000, generating a steady increase in investment income and eventually guiding the primary income balance into a modest surplus starting in 2011 (Figure B.4).

Figure B3. Stock of Direct, Portfolio, Reserve and Other Investment Asset



Source: BOK

Figure B4. Primary Income Receipts and Payments

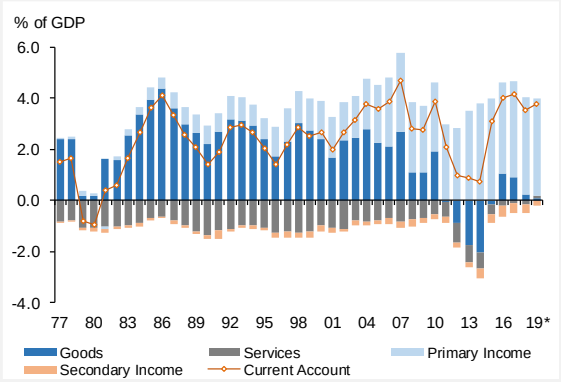


Source: BOK

[13] Prepared by Diana del Rosario (Economist).
[14] See *Box A. Developments in Korean Overseas Direct Investment*, of the 2018 Korea Consultation Report.
[15] See *Box A3. Resident and Non-resident Portfolio Investments – A Detailed Look*, of the 2018 Korea Consultation Report.

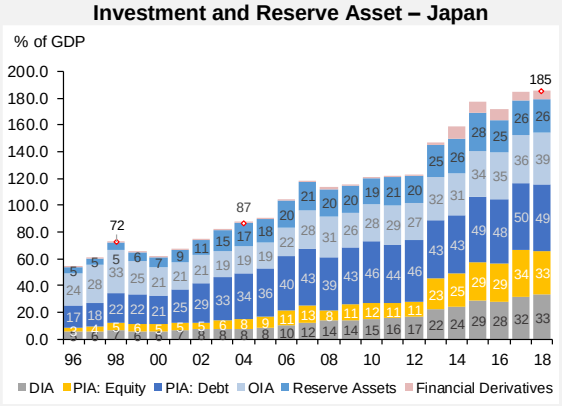
In the medium to long term, Korea is likely to continue to build up its external assets. This is especially the case for its overseas PIA, where further expansion would be driven by portfolio diversification and the search for higher returns. For example, with the aging population, the assets and liabilities of pension funds and insurance companies will only build up further, likely prompting greater outbound investments, as both the supply and returns from domestic assets become more limited.[16] At the same time, subdued growth prospects domestically could possibly help sustain Korean corporates' outbound direct investments. However, they could also be held back to some extent by the heightened uncertainty in the global economic outlook. With the further build-up in PIA and DIA, domestic banks' foreign claims are expected to increase as well, leading to a further expansion in OIA. As such, it may be inevitable for resident outflows to figure more prominently in the coming years, with important implications for the KRW and other asset market prices, as well as on non-resident capital flows. The growth of these external assets over time could also lead to an expansion in the primary balance surplus.

Figure B5. Current Account Balance – Japan



Note: * refers to 2019 Q2 data
Source: BOJ

Figure B6. Stock of Direct, Portfolio and Other Investment and Reserve Asset – Japan



Source: BOJ

Given the growing trend in overseas investments, Korea can look to Japan's experience as to how its external balance could evolve in the coming years. Having sustained CA surpluses since 1981, 17 years earlier than Korea, Japan has seen its CA surplus evolve from one that was previously driven by robust goods trade surpluses to one supported by substantial primary income surpluses since the late 2000s (Figure B5). This shift has been the result of decades of steady accumulation of overseas assets, which have grown from 72 percent of Japan's GDP in 1998 and 87 percent in 2004—equivalent to the value of Korea's external assets today—to 179 percent as of end-2018 (Figure B6). With income receipts from the substantial external assets having become a major source of the CA surplus, Japan can be considered to have transitioned from a young to a mature creditor nation, according to the BOP stages hypothesis.[17] While the transition will not be exactly the same for Korea, Japan's case nevertheless provides a plausible scenario of how Korea's external balance could evolve in the years to come.

[16] For one, the NPS—the world's third largest pension fund with USD595 billion under management as of July 2019—intends to gradually increase the share of its overseas assets from 30 to 50 percent by 2024. This would entail more than doubling its foreign investment assets from about USD200 billion or 12 percent of GDP currently, based on NPS' asset size projection by 2024. Likewise, Korean insurance companies' assets have tripled over the past decade to USD1 trillion and only about 12 percent is currently invested overseas, leaving substantial scope for an increase in outbound investments. Moreover, pension and insurance funds already hold close to half of outstanding Korean treasury bonds, leaving little room for greater investment opportunities domestically.

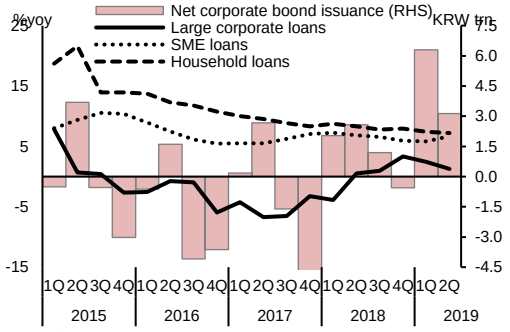
[17] The BOP stages hypothesis was presented by Crowther and Kindleberger in the 1950s. According to the hypothesis, a country's BOP exhibits specific patterns in line with the level of economic development, with the country potentially transitioning from being a "young" to "mature" debtor, before going through a period of "debt repayment", then evolving into a "young creditor", and before long, into a 'mature creditor' that then moves into "credit disposing". Kindly refer to the explanation in Miura, Yuji. 2019. "Global Value Chains and the Current Status of Japanese Manufacturing Industries." Pacific Business and Industries, 19(73).

A.3 Monetary Condition and Financial Sector

9. **In a low interest rate environment, loan growth of financial institutions has been relatively stable at around 6-7 percent since 2017, led mainly by lending to SMEs and small businesses.** SMEs have continued to show sustained demand for loans to finance their working capital, while the booming property rental and leasing businesses has led to a significant increase in loans to the SOHO segment. Conversely, loan demand from large corporates was low since many of them were cash-rich. In addition, many large corporates switched their financing source from bank loans to corporate bonds in order to lower their funding costs. Household borrowing has also continued to moderate, underpinned by tightened macroprudential measures, including the full implementation of the debt service ratio rule (Figure 9).

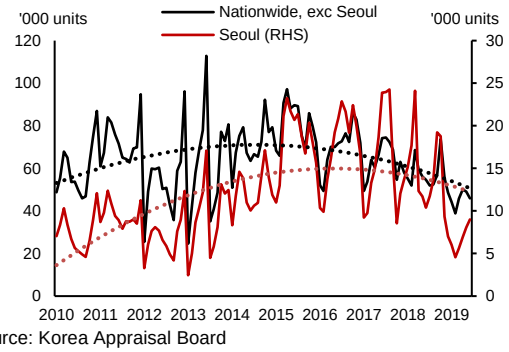
10. **Financial institutions are sound generally, although loan quality of certain non-banking financial institutions has deteriorated slightly.** Financial institutions' capital adequacy ratio and liquidity coverage ratio are well above regulatory requirements. Financial conditions of corporate borrowers have improved, as indicated by a declining debt-to-equity ratio and still high interest coverage ratio. Despite an increase in household borrowers' debt-to-income ratio, the structure of financial institutions' household loan portfolio has improved, as reflected in the increased proportion of fixed rate and amortizing mortgage loans, and the generally low delinquency rate of less than 1 percent. Although credit risk to financial institutions remains largely contained, the delinquency rate and the substandard and below loan ratio of some non-banks increased somewhat in Q1 2019.

Figure 9. Loans and Corporate Bond Issuance



Source: BOK

Figure 10. House Sale Transactions



Source: Korea Appraisal Board

11. **House prices in Seoul have moderated after the government tightened property market regulations in late 2018.** The government introduced additional macroprudential measures on mortgage loans to homeowners with multiple mortgages. These measures also cover the purchase of high-end properties and housing rent in prime areas, which were designated as speculative or overheated zones, on 13 September 2018. The measures, together with supply management policies and comprehensive real estate tax, successfully stabilized house prices and led to a slowdown of sales transactions in Seoul during November 2018–May 2019 (Figure 10). However, the housing prices in prime zones surged again in June, triggering the government to consider imposing a price cap on private apartments. [18]

[18] Caps on pre-sale prices of newly-built apartments in Seoul were instated in November 2019.

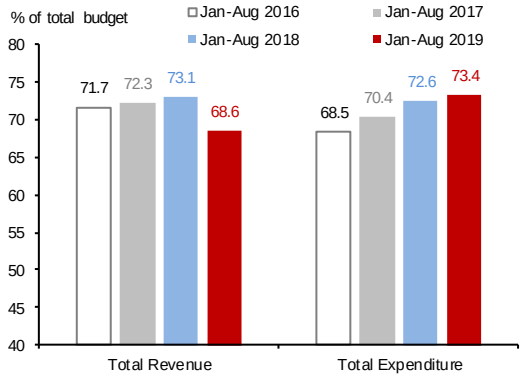
Meanwhile, the housing market in non-metropolitan areas continues to be soft with declining prices and a high inventory of unsold units.

A.4 Fiscal Sector

12. **The government has boosted spending in response to the slowdown in the economy, while tax revenue is expected to decline due to deteriorating corporate performance.** The government has frontloaded spending in 2019. In particular, it has increased the number of public service jobs and implemented several measures such as a temporary reduction of an excise tax rate for car purchases, or a refund for home electrical appliance purchase. The supplementary budget of KRW5.8 trillion, equivalent to 0.3 percent of GDP, was announced in August 2019 with the aims of shoring up exports and investment, strengthening social safety net, and supporting mitigation measures that would ensure public safety against fine dust pollution. On the revenue side, a decline in real estate market transactions and weakening profitability of large conglomerates resulted in lower revenue collection (Figure 11). The fiscal deficit (excluding Social Security Fund) is expected to widen considerably from 0.6 percent of GDP to 2.3 percent[19] of GDP in 2019 (Figure 12).

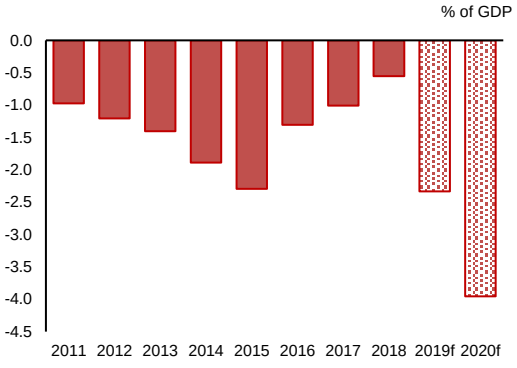
13. **The fiscal stance in 2020 is set to be more expansionary.** According to the 2020 budget proposal, fiscal expenditure will be raised by 1.1 percentage points to 26.2 percent of GDP. The proposed budget still focuses on social welfare and employment in line with the current government's intention to pursue an inclusive economic growth strategy. The government has also expanded budgeted spending for social overhead capital (SOC) to boost the local economy and domestic investment. Moreover, the budget for innovation and research and development was increased by double digits, with the aim of building local supply chains of high-tech materials, parts and manufacturing equipment. Meanwhile, weakening profitability of corporates in 2019 is expected to continue dampening revenue collection in 2020. Reflecting the expansion of total expenditure amid declining revenue collection, the fiscal deficit, excluding SSF, is expected to widen further to 4 percent of GDP in 2020.

Figure 11. Fiscal Performance



Note: Total budget includes the supplementary budget.
Source: Ministry of Economy and Finance; AMRO staff calculations

Figure 12. Managed Fiscal Balance Excluding Social Security Fund



Source: Ministry of Economy and Finance; AMRO staff estimations

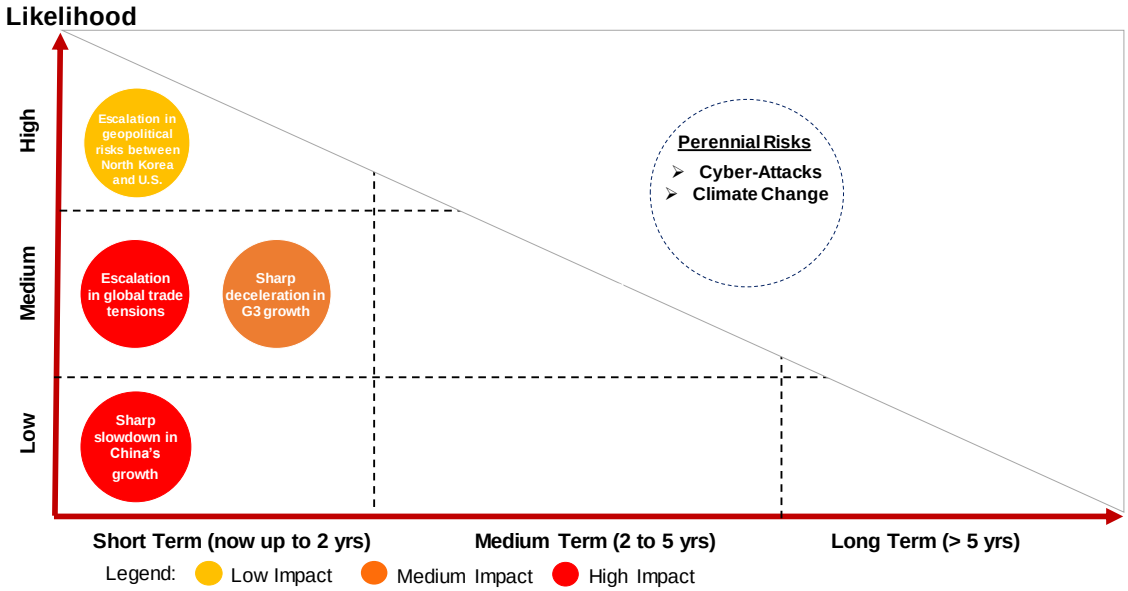
[19] Fiscal balance projection for 2019 include the supplementary budget.

B. Risks, Vulnerabilities and Challenges

14. **In the near term, our baseline projection is weighed down mainly by external downside risks.** Headwinds to the growth outlook can come from a more-severe-than-expected global economic slowdown and spillovers of intensified U.S.-China trade conflicts. Meanwhile, the risks to financial stability stem mainly from the high household debt levels and a surge in metropolitan area housing prices.

B.1 Near-term Risks to the Macroeconomic Outlook

Figure 13. External Risks Faced by Korea



Source: AMRO

15. **Weaker-than-expected growth in China and the advanced economies, an escalation of the U.S.-China trade conflict, as well as a delayed rebound in global chip demand, can pose downside risks to Korea's highly open economy.** Korea's exports are susceptible to a slowdown in China, the U.S. and other advanced economies as Korea's exports to these countries account for more than half of total exports. The intensification of the U.S.-China trade conflict has dampened Korea's exports through the impact on supply chains between China and Korea. In addition, exports have been affected by a downturn in the global semiconductor cycle. If the rebound in global semiconductor demand takes longer than expected, the prolonged slowdown of the ICT industry would have negative spillover effects on domestic demand.

16. **While the tightening of Japan's export controls have had limited impact on the Korean ICT industry so far, they have heightened business uncertainty and concern over excessive reliance on a single country for key technological products.** The controls have led to longer and more complicated customs procedures in Japan. However, an adverse direct impact on Korea has not been witnessed, especially in terms of supply chain disruption in the ICT industry. Certain Korean firms have also prepared in advance by frontloading purchases of the affected products before the measures came into effect. Despite limited direct impact observed recently, the measures have worsened consumer and business

sentiments in Korea significantly and have created greater business uncertainty for Korean firms (Box C. Japan-Korea Trade Tensions). In addition, the restrictions have given rise to concerns over the excessive reliance of Korea's manufacturing industry on Japanese technology and core materials. Later in mid-December 2019, the Korean government and the Japanese government resumed the policy dialogue on this issue. The result of the future discussion, including modification of export controls, would continue to be monitored.

Box C. Japan-Korea Trade Tensions[20]

Japan's Ministry of Economy, Trade and Industry (METI) announced the change of its implementation practices for export or transfer of controlled items and their relevant technologies to Korea in early July 2019. The change is aimed at preventing transfer of items and technologies from being diverted to the manufacture of weapons or for military use, and ensuring appropriate implementation of Japan's own export control and regulation. The conditions for granting export licenses (EL) to Japanese companies for Korea-bound exports have been made more stringent. Two actions have been implemented so far.

(i) Three chemical products (fluorinated polyimide, resist and hydrogen fluoride) alongside relevant technologies have been re-categorized as goods that require individual ELs, from being goods that were eligible for bulk EL. As a result of this action, Japanese exporters have to apply for an individual EL for each batch of Korea-bound exports, with effect from 4 July 2019. Each export transaction is subject to a transaction-based examination of METI that screens the end user of the goods, use purposes (not for impeding international peace and security), and the user's controls over the goods.

(ii) Korea was moved from Group A (white list) export destination to Group B (Figure C1). Japanese exporters can no longer utilize a general bulk EL for exports and transfer of controlled items and their relevant technologies to Korea; however, they still can utilize a special bulk EL as before. In doing so, exporting firms must set up their own internal compliance programs to ensure that their goods will not be used for the development, manufacture, use or storage of a weapon of mass destruction (WMD) or war-related activities. METI will also perform inspections in the process of granting a special bulk EL.

Notwithstanding the actual intention of Japan's export controls, they have unfortunately triggered retaliation measures by Korea and have amplified tensions between the two countries. In response to Japan's export controls, Korea announced countermeasures on 18 September by dropping Japan from Korea's white list of preferred trading partners. This action requires domestic companies exporting goods to Japan to receive an individual approval instead of a blanket approval for 1,138 goods. The validity of the blanket approval was shortened from three to two years, and the approval process was also extended from 5 to 15 days.

The direct impact of Japan-Korea trade tensions on bilateral trade flows has not been pronounced. Japan's exports to Korea inched up in July 2019 before declining slightly in August (Figure C2). However, such development is most likely related to the decline in Korea's exports due to weakening global demand. More specifically, during the first three months of the control implementation, the direct impact of the measure on Korea-bound imports of the three controlled chemicals, all of which were mainly imported from Japan, was limited. According to Korea's Ministry of Trade, Investment and Energy, Japan's METI approved seven individual export licenses, consisting of one case of fluorinated polyimide, three cases of resists and three cases of hydrogen fluorides (Figure C3). Meanwhile, the direct impact of Japan's removal of Korea from its Group A

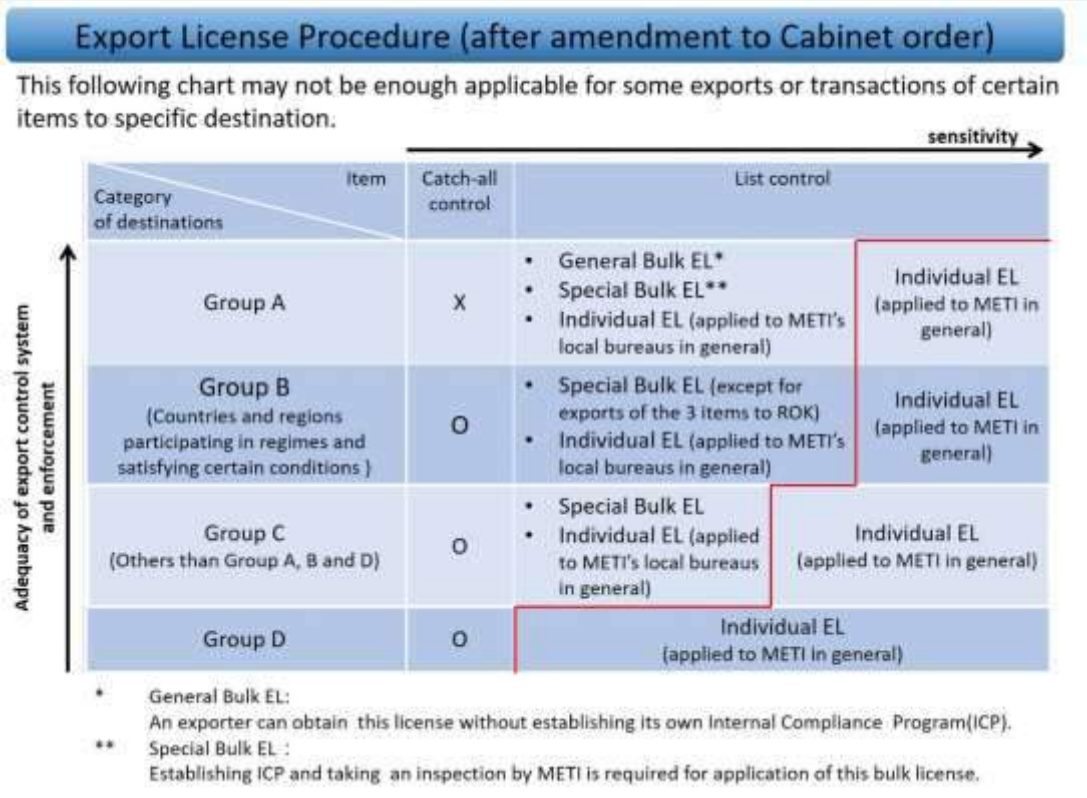
[20] Prepared by Wanwisa May Vorranikulkij (Specialist, Country Economist for Korea Surveillance) and Jinho Choi (Senior Specialist, Country Economist for Japan Surveillance).

trade partner is yet to be witnessed, as some Korean firms had frontloaded their purchase of the affected products before the measures became effective.

Meanwhile, indirect impacts were witnessed in the form of worsening business and consumer sentiments as well as the boycott of Japanese products in Korea (Figure C4). After the announcement of controls, consumer and business sentiments in Korea declined, and the measures created higher business uncertainty for Korean firms. In financial markets, the KRW depreciated, while Korea Composite Stock Price Index (KOSPI) dropped, reflecting heightened market concerns. The number of Korean tourists in Japan and the sales of Japanese products such as passenger cars and consumer products in Korea, dropped significantly in July and August 2019. In addition, the measures have given rise to concerns over the excessive reliance of Korea's manufacturing sector on Japanese technology and core materials.

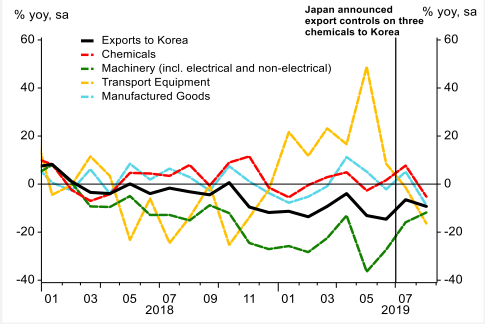
The policy dialogue between both sides would shape the exports of affected goods. The Korean government and the Japanese government started the policy dialogue about export controls in December 2019. The dialogue is aimed at exploring resolution of the export controls, including updating status of the export control system and the implementations.

Figure C1. Japan's Security Export Controls



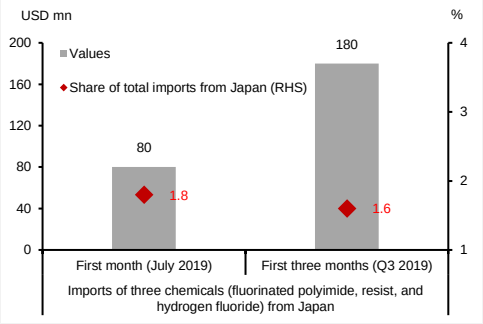
Source: Japan's METI

Figure C2. Japan's Exports of Major Products to Korea



Source: Ministry of Finance, Japan; Haver Analytics

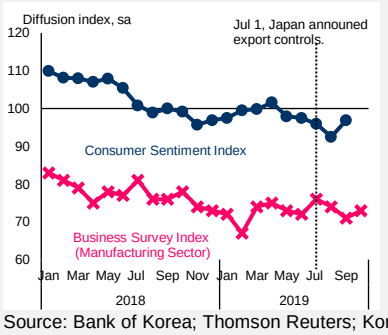
Figure C3. Korea's Imports of Three Key Chemicals



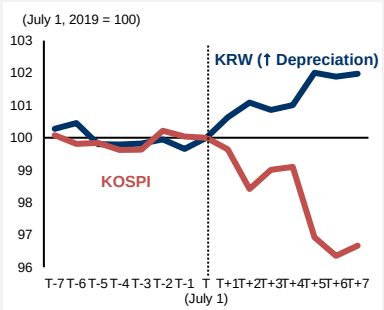
Source: Ministry of Trade, Industry and Energy, Korea

Figure C4. Impact on Sentiment in Korea

Business and Consumer Sentiment in Korea



KRW and KOSPI Movements



Korean Tourist Arrivals to Japan and Japanese Car Sales in Korea

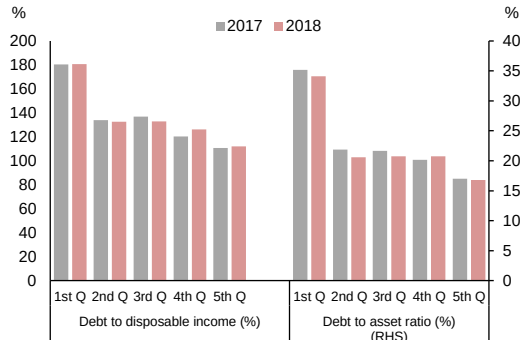
Source: Bank of Korea; Thomson Reuters; Korea Automobile Importers and Distributors Association; Japan National Tourist Organization; AMRO staff calculations

17. **Risks and vulnerability stemming from high household debt and increasing housing prices are contained.** While the build-up of household debt has moderated, the household debt-to-disposable income ratio is still high at about 157.4 percent in Q3 2018. That said, systemic risk from debt build-up is not a concern, given that debt distribution is skewed towards mid- to high-income borrowers who possess significant financial assets and are unlikely to default.[21] However, low-income and self-employed borrowers with high indebtedness remain vulnerable, as these borrowers may pose a default risk to financial institutions in the event of a deterioration in economic conditions (Figure 14). In the real estate sector, house price inflation in Seoul, which had moderated after the September 2018 measures came into effect, started to pick up again in June 2019. Easing monetary conditions again pose some concerns about an intensification of housing price speculation in prime zones (Figure 15). Therefore, the risks associated with a rapid rebound of home prices warrants vigilance.

18. **Growing global economic uncertainty arising from geopolitical risks and ongoing trade friction could heighten financial market volatility.** Korea's external position is very strong with ample international reserves and a low level of external debt. Its financial markets are also deep but highly open, making them attractive to portfolio investors and sensitive to changes in investor sentiments. Heightened financial market volatility could in turn exacerbate already fragile domestic demand by dampening corporate investment appetite and consumer confidence.

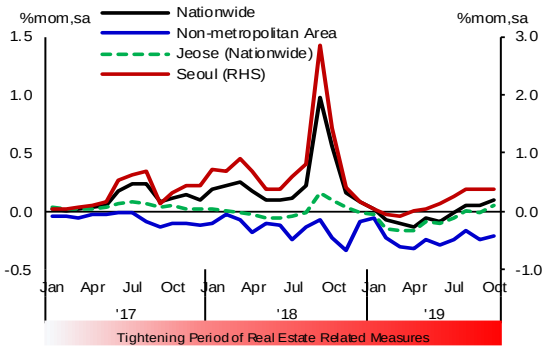
[21] Loans to vulnerable borrowers with low income or low credit ratings accounted for 5.9 percent of total loans as at the end of Q1 2019. (BOK Financial Stability Report, June 2019)

Figure 14. Household Indebtedness



Note: The quintile is based on household's income.
Source: Statistics Korea; AMRO staff calculations

Figure 15. Development of House Prices

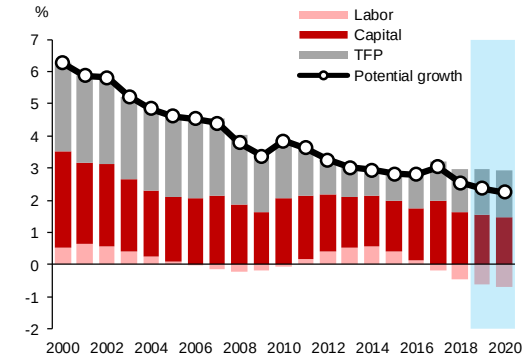


Source: Kookmin Bank; AMRO staff calculations

B.2 Longer-term Challenges and Vulnerabilities

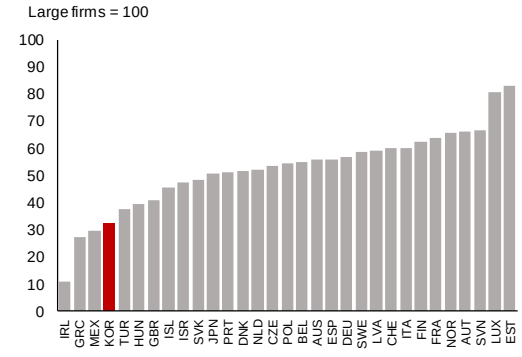
19. **Over the longer term, the Korean economy faces a decline in potential growth (Figure 16) owing to structural challenges in the labor market**. Korea's labor market is experiencing a slowdown in labor force growth, a rapid rise in minimum wages and a reduction in working hours. In addition, the labor market continues to be marked by a dualism between regular and non-regular workers. Recently, large corporates in the ICT, automotive and shipbuilding sectors have increased offshore investments to locations where labor supply is ample and wages are lower in order to curtail costs and maintain competitiveness. As a result, employment in the traditional corporate sector has been declining, which puts pressure on the rest of the economy, especially SMEs, to create more jobs for retrenched workers and new entrants in the labor force.

Figure 16. Potential Growth



Source: AMRO staff estimations

Figure 17. The Productivity Gap between SMEs and Large Firms in OECD Countries



Source: OECD

20. **The Korean economy is heavily dominated by large conglomerates.** The large disparity and unfair competition between large and small-and-medium firms have deterred SMEs from making efforts to improve productivity (Figure 17) and to invest in R&D. It is the large conglomerates that have invested and accumulated capital and led in terms of research and development and technology adoption, with SMEs trailing way behind, which has resulted in relatively low productivity among them (Selected Issue 2. Korean Firms' Innovation and Technology Adoption).

C. Policy Discussions and Recommendations

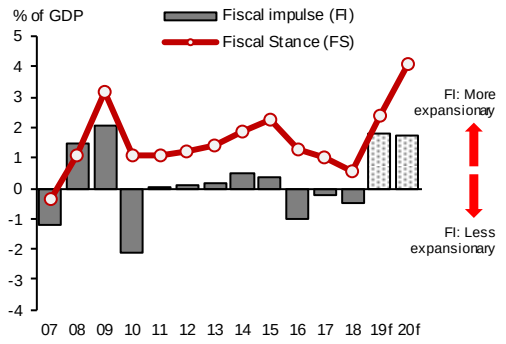
21. Amid intensified external risks, expansionary fiscal and monetary policies should be employed to support the economy against a cyclical slowdown, while a concerted effort should be made to promote innovation-led inclusive growth to address structural challenges that impede potential growth over the long term.

C.1 Active Role of Fiscal Policy

22. **Given ample fiscal space, the fiscal stance should remain expansionary to support growth in the face of heightened external economic uncertainty.** Considering the recent economic moderation and relatively low government debt levels, fiscal policy has been actively used since 2017 to boost domestic demand (Figure 18).The temporary reduction of excise tax on car purchases, financial support for households' daily expenses such as free tuitions and cheaper healthcare, and the promotion of domestic tourism will help to support the economy. Temporary tax incentives for facilities investment and construction and refurbishment of SOC would improve the subdued investment climate. Meanwhile, the actual execution rate of the budget, including by local governments and state-owned enterprises, need to be improved.

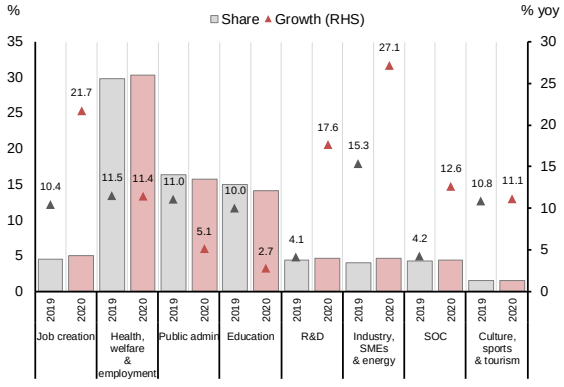
23. **Fiscal spending allocated towards restructuring of the economy should be increased further.** Inclusive growth and job creation are still one of the focus of the 2020 budget (Figure 19). Higher budget allocation for social welfare should be targeted towards low income households. Besides creating jobs for the retired population, the job creation policy should also focus on vocational training, re-skilling and building the competency and productivity of low income or irregular workers. In addition, the policy should address the disparities in employment conditions between large corporates and SMEs. In light of structural challenges facing SMEs, a significant increase in budget allocated to promote R&D, innovation and competitiveness of SMEs and startups is welcome.

Figure 18. Fiscal Impulse



Note: Fiscal stance is calculated from fiscal balance, including the supplementary budget, as a percentage of GDP. Fiscal impulse (FI) is the difference between fiscal balance of the current and previous fiscal years. FI<0 indicates less expansionary (or more contractionary) while FI>0 indicates more expansionary (or less contractionary) policy.
Source: Ministry of Economy and Finance; AMRO staff estimates

Figure 19. Budget Composition



Note: The 2020 data are based on the budget proposal.
Source: Ministry of Economy and Finance

24. **Over the medium term, the fiscal deficit should be gradually reduced once the economy starts recovering.** The medium-term fiscal outlook and fiscal management goal,

announced in 2019, show that the government plans to increase fiscal expenditures at an average of 6.5 percent a year during 2019-2023 with a rising share of the budget for R&D and SME development. In addition, the need for social welfare spending is growing and likely to be persistent owing to an aging population. As the increase in fiscal expenditure is expected to outpace revenue collection, the fiscal deficit, excluding Social Security Fund, is projected by the government to widen from 1.9 percent in 2019[22] to 3.9 percent of GDP in 2021 and stay at that level until 2023. Consequently, the government debt is expected to increase from 37.1 percent of GDP in 2019 to 46.4 percent of GDP in 2023. Although government debt has been maintained at a relatively low level, a continuously rising level of debt will eventually weaken the fiscal soundness over time. Hence, it would be more prudent to reduce the fiscal deficit to a size which is more consistent with a sustainable debt level once the economy has recovered to its potential growth. Meanwhile, the enhancing of spending efficiencies should be continued. At the same time, fiscal reforms should be continued to improve revenue mobilization to meet the rising expenditure needs over time.

Authorities' Views

25. The authorities emphasized the active role of macroeconomic policy in boosting the economy. The Korean economy is experiencing difficulties due to strong external headwinds and heightened global uncertainty. The escalation in U.S.-China trade tensions has contributed to the weakness in global demand, and consequently, Korea's exports has declined. Likewise, domestic investments have contracted amid the heightened economic uncertainty. Against these unfavorable developments, the government has taken an expansionary stance since the beginning of the year. A KRW5.8 trillion supplementary budget was passed in August 2019. The government also intends to lower the unspent amount of the budget to a minimum this year (and accordingly boost the disbursement and execution rate), from the current estimated unspent amount of KRW40-50 trillion per annum. Aside from the budget, public sector funds are also being mobilized to support the economy, while SOEs are being instructed to frontload their investments as much as possible. The government has also rolled out several measures to promote consumption and investment.

C.2 Maintaining an Accommodative Monetary Policy

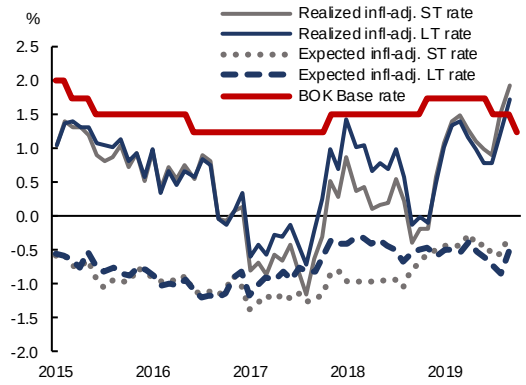
26. **BOK's monetary policy stance has become more accommodative in 2019.** Responding to both the weakening domestic economic conditions as well as escalating external risks, the BOK has shifted its monetary policy stance from policy normalization to one of an easing bias and has cut the policy rate twice, in July and October 2019. In response to the base rate cut, nominal interest rates of bank loans and short-term market rates have declined. However, real interest rates have risen on the back of declining headline inflation as well as softening inflation expectations (Figure 20).

27. **Monetary policy should be accommodative in view of moderating economic growth and muted inflation pressure.** The output gap has turned negative (Figure 21), and

[22] The government's fiscal balance projection for 2019 is based on the original 2019 budget which does not include the supplementary budget passed in August 2019.

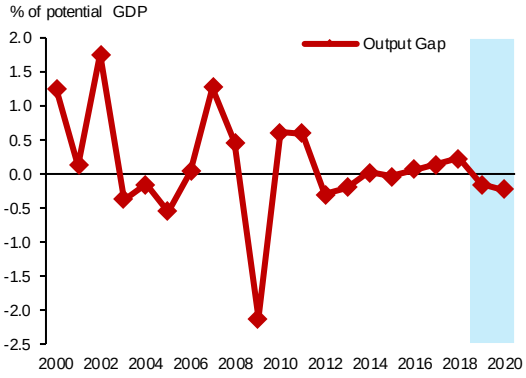
the current weakness in economic conditions is likely to continue. Meanwhile, inflation has declined to well below the BOK's target rate and inflationary pressure has weakened with declining inflation expectations. A more accommodative monetary stance will lead to lower interest rates which will ease the financial burden on SMEs and highly indebted households, supporting business and consumer confidence to some extent.

Figure 20. Interest Rates



Note: The 3-month KORIBOR is used for the short-term interest rate, while 3-year treasury bond yield is used for the long-term interest rate.
Source: BOK; Yonhap Infomax; CEIC; AMRO staff calculations

Figure 21. Output Gap Estimation



Source: AMRO staff estimates

Authorities' Views

28. Monetary policy has been conducted in a cautious manner in order to support the economic recovery and stabilize headline inflation at the target level over a medium-term horizon, while maintaining financial stability. The accommodative monetary policy stance will be maintained as inflationary pressures on the demand side are forecast to remain low, while growth of the domestic economy will be moderate. The authorities will judge whether to adjust the degree of monetary accommodation, while monitoring closely any changes in macroeconomic and financial stability conditions and the effects of the two base rate cuts. The authorities will also carefully monitor the US-China trade dispute, changes in the economic outlook of major countries, household debt and geopolitical risks.

C.3 Macroprudential Measures to Safeguard Financial Stability

29. **A series of tighter regulations has largely contained the build-up of household debt and housing prices, although pockets of risk remain and warrant close monitoring.** However, the high household debt-to-disposable income ratio makes households, especially the low-income ones, more vulnerable to economic shocks. The full implementation of the debt service ratio is expected to strengthen households' financial soundness and safeguard financial stability. Given the high level of property prices in Seoul, the mission commends the government's continuing efforts and timely and targeted measures to stabilize the housing market and curb house price speculation. As monetary easing can lead to higher liquidity in the market, the development of housing prices and housing market activities, especially speculation in Seoul, still warrants close monitoring.

30. **Overall macroprudential policy mix should remain tight to guard against systemic risks. However, certain measures should be recalibrated to allow monetary**

policy to play a more effective role in supporting the economy. Due to stringent macroprudential measures in place, the recent base rate cuts may result in limited credit creation among financially prudent households with high net worth and debt servicing capacity. Therefore, the macroprudential measures should be reviewed with a view to selective easing of certain measures, especially those which are applied uniformly across all households without differentiating between different categories of households, to encourage more credit expansion without jeopardizing overall financial stability.

Authorities' Views

31. From a financial stability viewpoint, low interest rates could result in increasing household debt, implying tight macroprudential measures will be able to partially counter those effects. The rate of growth in household debt has slowed in 2019 after being affected by government policies. There are factors that could increase loan demand such as an expansion in the number of houses available for sale and the rebound of housing prices in Seoul. Going forward, the government's regulations on real estate and lending may curb household loan growth, but certain factors including expectations of house price increases and lower interest rates on loans and deposits may also spur loan growth. Therefore, the future trend of household debt should be monitored closely. In addition, macroprudential measures must be continued to safeguard financial stability. The selective easing of macroprudential policies, combined with an accommodative monetary policy, could aggravate financial imbalances through expansion of credit supply to the housing market.

C.4 Comprehensive Structural Reforms to Address the Dichotomy

32. **The mission supports the government's continuing efforts and strong commitment to achieve more inclusive growth and promote innovation.** The government's efforts to level the playing field and promote fairer competition between large enterprises or *chaebols* and SMEs, by amending relevant laws and regulations to reduce the chaebols' monopoly and monopsony power, are important for enhancing the productivity of the SMEs. In order to enhance the productivity and competitiveness of SMEs, the government should also provide more support for R&D and human capital development. The mission also supports the government's ongoing efforts to promote entrepreneurship and innovation, including the adoption of a regulatory sandbox approach. Although Korea ranks high in terms of technological development, the level of technological adoption among SMEs remains relatively low and thus calls for more government-initiated promotion and facilitation. In addition, structural reforms in the non-ICT and automotive industries should be stepped up in order to enhance their productivity and competitiveness as well as create more quality jobs.

33. **Policies should be taken to mitigate Korea's dependence on a few export markets and diversify the sources of key technology materials and component imports.** Spillovers from the U.S-China trade conflict, a slowdown of the Chinese economy, and Korean companies' concerns over Japan's export restrictions, have highlighted Korea's reliance on specific markets and suppliers, as well as its vulnerability to changes in economic conditions and policies in particular countries. In this regard, the mission supports the existing

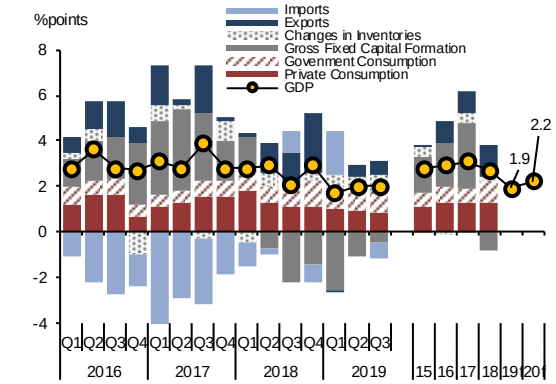
diversification efforts with regard to export markets and overseas suppliers. Additionally, the government's efforts towards improving domestic production capacities by promoting R&D is welcome.

Appendices

Appendix 1. Selected Figures for Major Economic Indicators

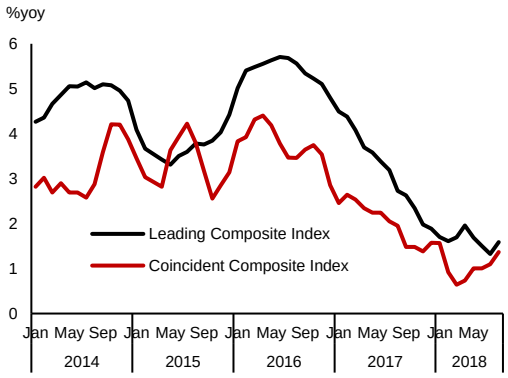
Figure 1.1. Real Sector

The Korean economy continues to moderate in 2019.



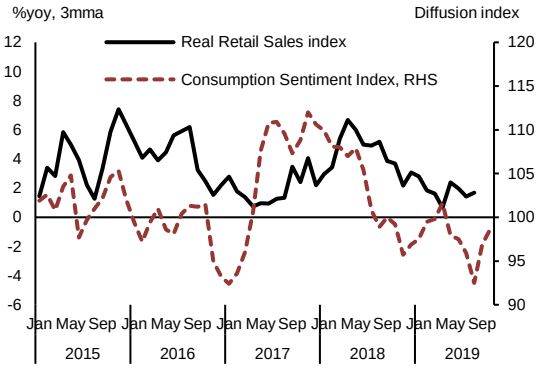
Source: BOK; AMRO Staff Estimates

Leading and coincident composite indices improved recently.



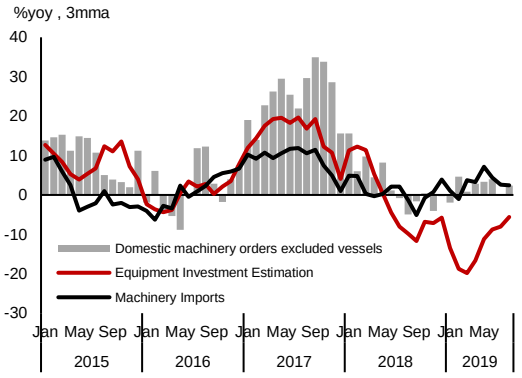
Source: Statistics Korea; AMRO Staff Calculations

Retail sales continues its moderate growth, while consumer sentiment remains weak.



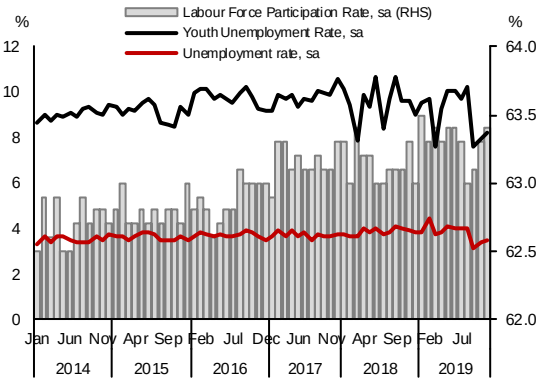
Source: Bank of Korea; Statistics Korea

Facilities investment have bottomed out.



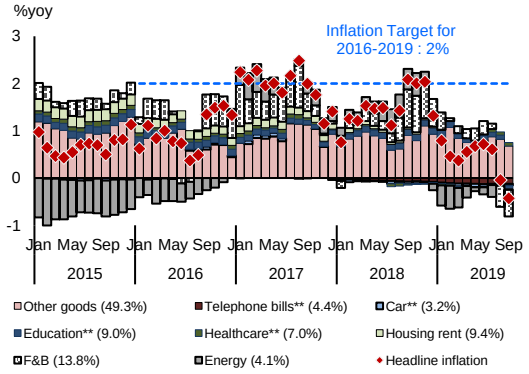
Source: Korea International Trade Association; Statistics Korea; AMRO Staff Calculations

Unemployment declined in August and September.



Note: Korean youth composes population aging between 15-29 years.
Source: Statistics Korea

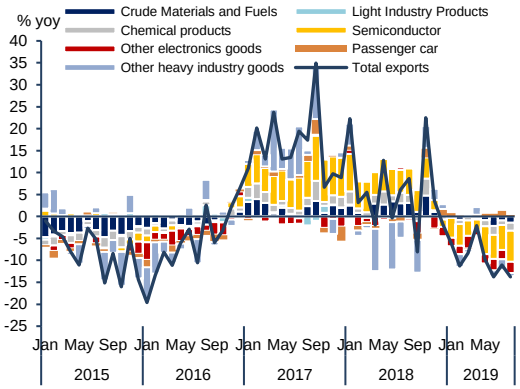
Declining headline inflation was due to food and oil prices and policy induction measures.



Note: **shows the items whose prices were affected by government policies or the temporary reduction in excise tax.
Source: Statistics Korea

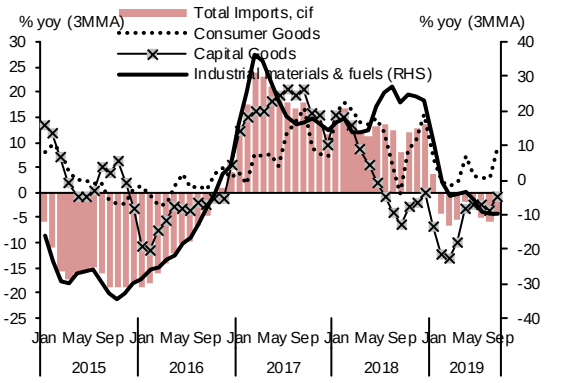
Figure 1.2. External Sector

Exports have dropped since Q4 2018, led by the exports of tech products.



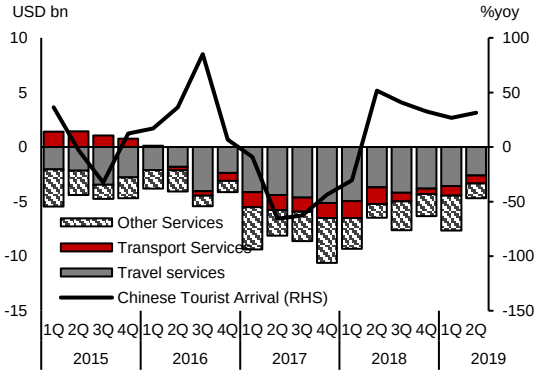
Source: Korea Customs Service; AMRO staff calculations

Imports of capital and raw materials have also contracted.



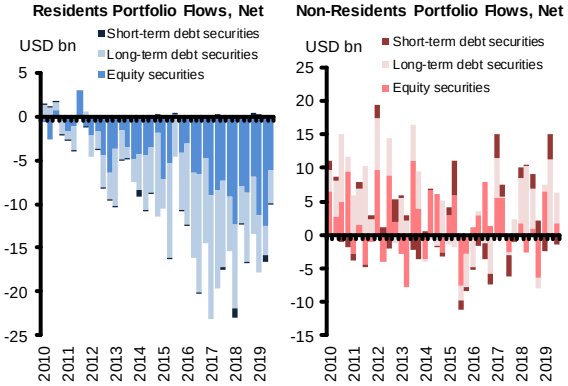
Source: Korea Customs Service; AMRO staff calculations

Meanwhile, a service account deficit reduced due to robust tourism.



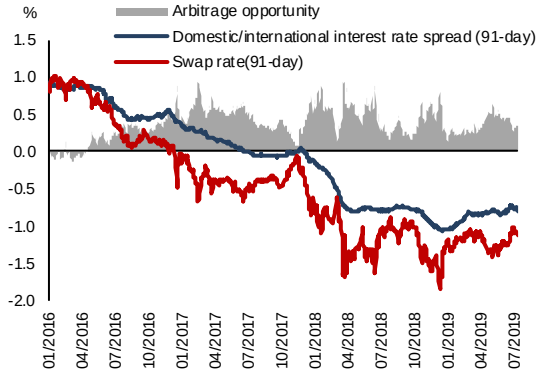
Source: BOK; Korea National Tourism Organization

Residents have increased their overseas portfolio investment, while non-resident portfolio investment registered a strong inflow in 2019.



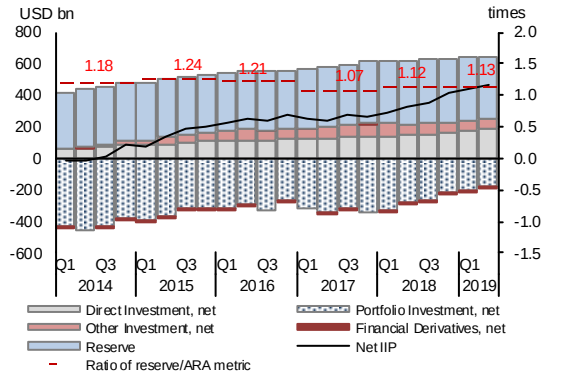
Source: BOK

Arbitrage opportunity in the F/X swap market attracts capital inflows to Korea's bond market.



Source: BOK

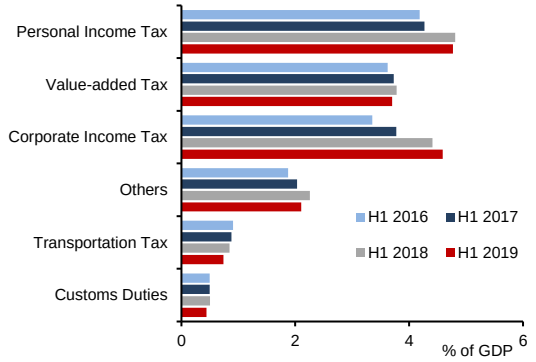
Korea's overseas portfolio assets have been growing since 2012.



Source: BOK; International Monetary Fund

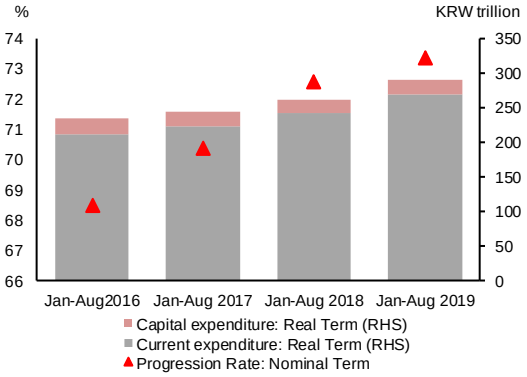
Figure 1.3. Fiscal Sector

Tax revenue, besides corporate income tax, declined in H1 2019.



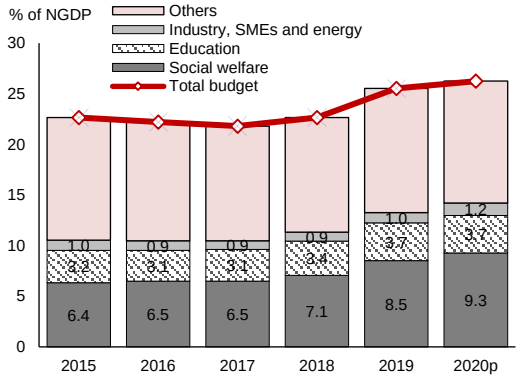
Source: Ministry of Economy and Finance (MOEF)

Central government spending outpaced the level disbursed in 2018.



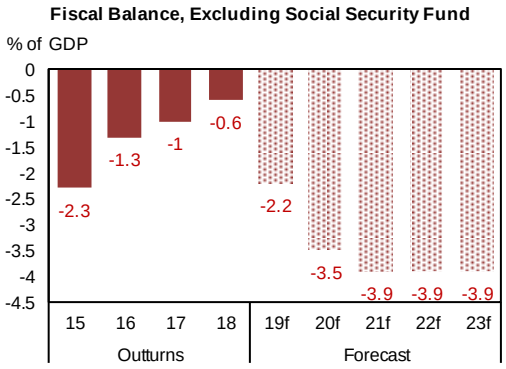
Note: Real terms are calculated from nominal value of expenditures adjusted by GDP deflator.
Source: MOEF; AMRO staff calculations

Fiscal stimulus (a change in budgeted expenditure) will be increased by 1.1 percent in 2020.



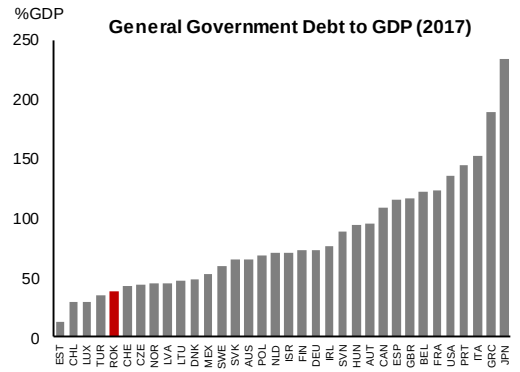
Note: The 2020 data are based on the budget proposal.
Source: MOEF; AMRO staff estimates

Over the medium term, the government showed their intention to maintain a high level of fiscal deficit.



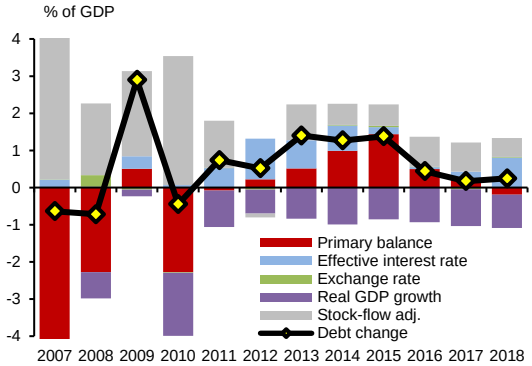
Source: The budget for 2020 and the medium term fiscal outlook and fiscal management goals, MOEF

Government debt in Korea is relatively low compared to OECD countries.



Source: OECD

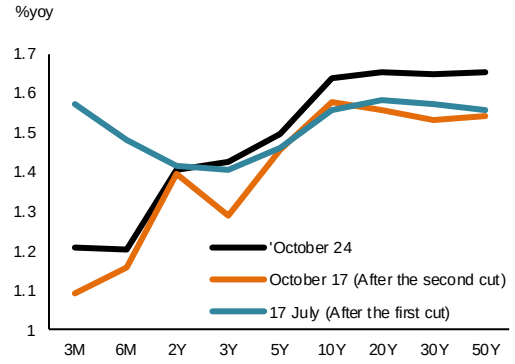
In 2018, central government debt barely increased due to improving primary balance and economic growth.



Note: Based on debt dynamics decomposition.
Source: MOEF; AMRO staff estimates

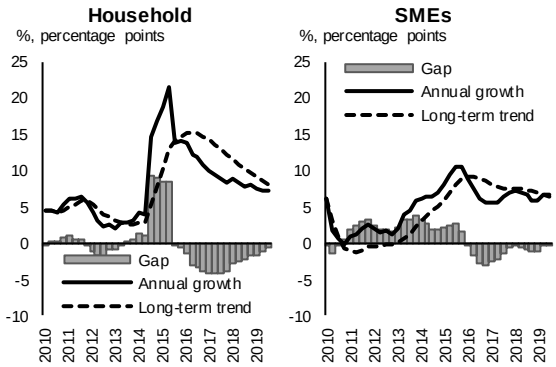
Figure 1.4. Monetary and Financial Sectors

The short-term interest rates moved in line with the base rate cuts, but long-term interest rates remained unchanged.



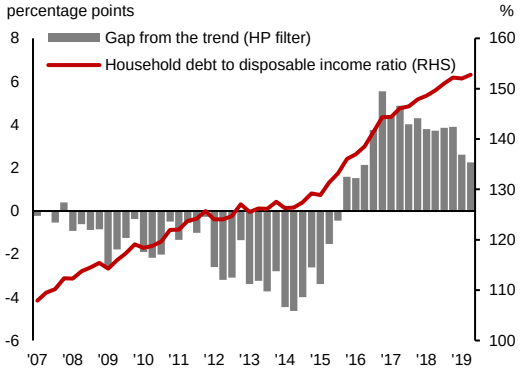
Source: BOK; Thompson Reuters

Household debt growth has declined, while SME loan growth has been at around 6-7 percent.



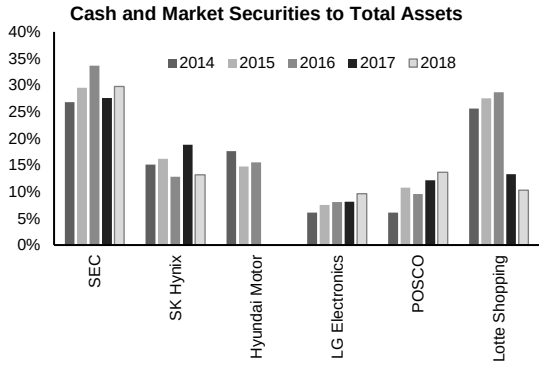
Source: BOK; AMRO staff calculations

The household debt-to-disposable income ratio is still higher than its long-term trend.



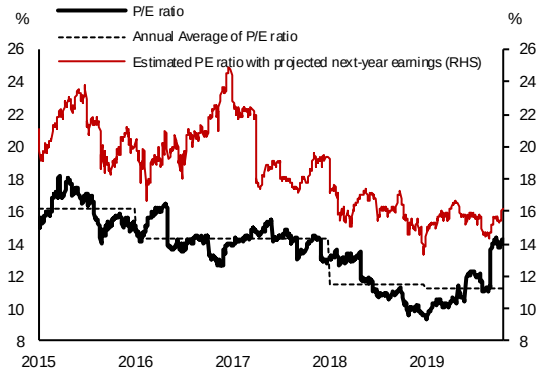
Source: BOK; AMRO staff calculations

Large corporates retain a high level of cash and liquid assets in their assets.



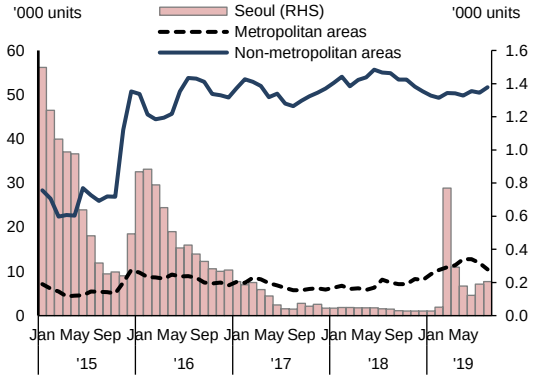
Source: Moody's

Since April 2019, the P/E ratio of the KOSPI has risen significantly due to a decline in corporate earnings.



Source: Korea Exchange; Bloomberg

The number of unsold apartment units in Seoul and non-metropolitan areas inched up in 2019.



Source: Kookmin Bank; AMRO staff calculations

Appendix 2. Selected Economic Indicators for Korea

	2015	2016	2017	2018	Projections 1/ 2019	Projections 1/ 2020
National income and prices	(In percent change unless specified)					
Real GDP	2.8	2.9	3.2	2.7	1.9	2.2
Final consumption	2.6	3.0	3.1	3.5	4.0	4.0
Private sector	2.2	2.6	2.8	2.8	2.1	2.3
Public sector	3.8	4.4	3.9	5.6	9.7	8.6
Gross capital formation	6.5	6.3	10.9	-1.8	-5.9	2.2
Construction	6.9	10.0	7.3	-4.3	-4.1	-2.1
Facilities investment	5.1	2.6	16.5	-2.4	-7.4	3.3
Intellectual property products	2.0	4.0	6.5	2.2	2.4	2.5
Exports of Goods	-0.3	2.0	4.4	3.3	-0.8	0.4
Imports of Goods	0.7	3.9	8.8	1.6	-2.2	0.5
Labor Market						
Unemployment rate (in percent, period average)	3.6	3.7	3.7	3.8	…	…
Employment to population ratio (in percent, period average)	60.5	60.6	60.8	60.7	…	…
Prices						
Consumer price inflation (period average)	0.7	1.0	1.9	1.5	0.4	0.9
Core inflation, excluding food and energy (period average)	2.4	1.9	1.5	1.2	0.7	0.8
External sector	(in billions of U.S. dollars unless specified)					
Current account balance	105.1	97.9	75.2	77.5	62.4	61.3
(In percent of GDP)	7.2	6.5	4.6	4.5	3.8	3.7
Trade balance	120.3	116.5	113.6	110.1	82.5	80.1
(In percent of GDP)	8.2	7.8	7.0	6.4	5.1	4.8
Services, net	-14.6	-17.3	-36.7	-29.4	-20.3	-18.5
Primary income, net	4.5	4.6	5.3	4.9	5.5	4.3
Secondary income, net	-5.0	-5.8	-7.0	-8.2	-5.2	-4.7
Financial account balance	90.7	92.2	80.1	59.4	54.2	60.7
(In percent of GDP)	6.2	6.1	4.9	3.5	3.3	3.6
Direct investment (net)	19.6	17.8	16.2	26.0	32.5	36.5
Portfolio investment (net)	49.5	67.0	57.9	47.4	25.0	30.5
Other investment (net)	19.8	10.9	14.3	-12.5	-8.3	-11.3
Overall balance	12.1	7.6	4.4	17.6	8.2	0.6
Gross official reserves	368.0	371.1	389.3	403.7	406.2	408.7
(In months of imports of goods & services)	8.3	8.8	7.9	7.5	8.0	7.8
Total external debt	396.1	382.1	412.0	446.5	477.2	515.4
Short-term external debt (% of international reserves)	28.3	28.2	29.8	31.1	33.4	36.6
Central government	(In percent of GDP)					
Total Revenue	22.4	23.1	23.5	24.6	25.1	24.6
Total Expenditure	22.4	22.1	22.1	22.9	25.2	26.3
Overall balance including Social Security Fund	0.0	1.0	1.3	1.6	0.0	-1.7
Managed balance	-2.3	-1.3	-1.0	-0.6	-2.3	-4.0
Central and local government debt	35.7	36.0	36.0	35.9	37.2	39.8
Monetary and financial sector	(In percent change)					
Domestic credit 2/	7.6	7.0	5.4	7.4	…	…
(In percent of GDP)	149.2	152.1	151.9	158.2	…	…
Broad money	2,247.4	2,407.5	2,530.4	2,700.4	…	…
Substandard-and-below loan ratio (in percent)	1.1	0.8	0.7	0.5	…	…
Capital adequacy ratio (in percent)	14.7	15.8	15.8	15.8	…	…
					…	…
Memorandum items:						
Exchange rate (KRW per US$, average)	1,131.5	1,160.5	1,130.8	1,100.3	…	…
Exchange rate (KRW per US$, end of period)	1,172.0	1,208.5	1,071.4	1,118.1	…	…
10-year government bond yield (in percent, end of period)	2.2	2.2	2.5	2.0	…	…
1-year government bond yield (in percent, end of period)	1.6	1.6	1.9	1.7	…	…
Property price (in percentage change, period average)	3.4	2.7	1.3	2.2	…	…
Nominal GDP (in KRW trillion)	1,658.0	1,740.8	1,835.7	1,893.5	1,890.1	1,952.8
Nominal GDP (in US$ billion)	1,465.3	1,500.0	1,623.4	1,720.9	1,621.8	1,675.5
GDP per capita (US$)	28,723.8	29,287.2	31,605.2	…	…	…

Note: 1/ The projections were done in September 2019.
2/ Domestic credits refers to other depository institutions' claims on domestic non-financial entity including the central government, local governments, corporates and households.
Source: Korean authorities; AMRO staff estimates

Appendix 3. Balance of Payments

	2015	2016	2017	2018	Projections	
					2019	2020
	(in billions of U.S. dollars unless specified)					
Current account balance (I)	**105.1**	**97.9**	**75.2**	**77.5**	**62.4**	**61.3**
Trade balance	120.3	116.5	113.6	110.1	82.5	80.1
Exports, f.o.b.	543.1	511.9	580.3	626.3	571.1	585.7
Imports, f.o.b.	422.8	395.5	466.7	516.2	488.6	505.6
Services, net	-14.6	-17.3	-36.7	-29.4	-20.3	-18.5
Receipts	97.5	94.8	89.7	103.7	99.7	103.4
Payments	112.1	112.1	126.4	133.0	120.0	121.9
Primary income, net	4.5	4.6	5.3	4.9	5.5	4.3
Secondary income, net	-5.0	-5.8	-7.0	-8.2	-5.2	-4.7
Capital account (II)	**-0.1**	**0.0**	**0.0**	**0.3**	**0.0**	**0.0**
Financial account (III) (+ indicates net outflows)	**90.7**	**92.2**	**80.1**	**59.4**	**54.2**	**60.7**
Direct investment (net)	19.6	17.8	16.2	26.0	32.5	36.5
Portfolio investment (net)	49.5	67.0	57.9	47.4	25.0	30.5
Financial derivatives (net)	1.8	-3.4	-8.3	-1.5	5.0	5.0
Other investment (net)	19.8	10.9	14.3	-12.5	-8.3	-11.3
				.		
Errors and omissions (IV)	**-2.3**	**1.9**	**9.2**	**-0.8**	**0.0**	**0.0**
Overall balance (=I + II - III + IV)	**12.1**	**7.6**	**4.4**	**17.6**	**8.2**	**0.6**
Reserve assets (+ indicates increases)	**12.1**	**7.6**	**4.4**	**17.6**	**8.2**	**0.6**
Memorandum items:						
Current account balance (In percent of GDP)	7.2	6.5	4.6	4.5	3.8	3.7
Gross reserves (US$ bns, T10)	368.0	371.1	389.3	403.7	406.2	408.7
(In months of imports of goods and services)	8.3	8.8	7.9	7.5	8.0	7.8
Changes in gross reserves (US$ bns, T10)	4.4	3.1	18.2	14.4	2.5	2.5
GDP (US$ billion)	1,465.3	1,500.0	1,623.4	1,720.9	1,621.8	1,675.5

Note: 1/ The projections were done in September 2019.

Source: Korean authorities; AMRO staff estimates

Appendix 4. Statement of Central Government Operations

Unit: KRW trillion	Annual performance					Half-year performance	
	2015	2016	2017	2018		H1 2018	H1 2019
	(in trillions of the Korean won unless specified)						
Total Revenue of the Central Government	**371.8**	**401.8**	**430.6**	**465.3**		**243.8**	**246.0**
% of Estimation in the Budget Proposal (Budget)	*98.4*	*100.2*	*101.8*	*103.9*		*54.4*	*51.6*
% of GDP	*22.4*	*23.1*	*23.5*	*24.6*		*13.5*	*12.9*
(1) National Budget	241.6	266.1	290.9	319.6		171.9	170.3
Tax Revenue	217.9	242.6	265.4	293.6		157.2	156.2
% of Budget	*101.1*	*104.2*	*105.7*	*108.2*		*58.6*	*57.7*
General Accounts	210.8	235.7	258.5	285.9		152.9	152.5
% of Budget						*58.6*	*58.5*
Income Tax	60.7	68.5	75.1	84.5		44.3	44.5
% of Budget						60.7	55.4
Corporate Income Tax	45.0	52.1	59.2	70.9		40.6	42.8
% of Budget						64.4	54.0
Value-added Tax	54.2	61.8	67.1	70.0		34.8	34.5
% of Budget						*51.6*	*50.2*
Transportation Tax	14.1	15.3	15.6	15.3		7.8	6.9
Customs Duties	8.5	8.0	8.5	8.8		4.6	4.1
Others	28.4	29.9	33.1	36.3		20.8	19.6
(1.1.2) Special Accounts	7.1	6.8	6.9	7.7		4.3	3.7
% of Budget	*101.4*	*99.0*	*96.6*	*105.5*		*58.1*	*50.7*
(1.2) Non Tax Revenue	23.7	23.5	25.5	26.0		14.7	14.1
% of Budget	*83.6*	*86.6*	*96.6*	*95.6*		*54.0*	51.8
(1.2.1) General Accounts	8.4	9.4	11.0	10.7		7.0	6.2
% of Budget						*60.8*	54.4
(1.2.2) Special Accounts	15.3	14.2	14.5	15.3		7.7	7.9
% of Budget						*49.0*	50.0
(2) Fund Revenue & Extra Budget Accounts	130.3	135.7	139.7	145.7		71.8	75.7
% of Budget	*97.5*	*96.1*	*95.8*	*95.2*		*47.1*	49.7
Total Expenditure of the Central Government	**372.0**	**384.9**	**406.6**	**434.1**		**247.3**	**284.5**
% of Budget	*96.7*	*96.6*	*99.1*	*100.3*		*57.2*	59.8
% of GDP	*22.4*	*22.1*	*22.1*	*22.9*		*13.7*	14.9
Consolidated Fiscal Balance	**-** **0.2**	**16.9**	**24.0**	**31.2**		**-** **3.5**	**-** **38.5**
Social Security Funds (SSF) balance	37.8	39.6	42.5	41.7		22.0	21.0
SSF revenue	70.9	75.4	81.2	85.1		43.9	45.6
SSF expenditure	33.1	35.8	38.7	43.4		21.9	24.6
Managed Fiscal Balance (excluding SSF)	**-** **38.0**	**-** **22.7**	**-** **18.5**	**-** **10.6**		**-** **25.5**	**-** **59.5**
% of GDP	*-* *2.3*	*-* *1.3*	*-* *1.0*	*-* *0.6*		*-* *1.4*	- 3.1

Source: Korean authorities; AMRO staff calculations

Appendix 5. Data Adequacy for Surveillance Purposes: A 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 and quarterly data are available (for expenditure, production and income approach)	Quarterly data are released within one month following the end of the reference quarter	-	-	-
Balance of Payments (BOP) and External Position	Monthly BOP data are available in detail	Monthly BOP data are released about one month after the end of the reference period, while quarterly IIP data are released within two months of the end of the reference period.	-	-	-
Central Government Budget/External Debt	Monthly central government public finance data are available, while quarterly external debt data are available in detail	Monthly central government public finance data are released within four months after the end of the reference period, while quarterly data on external debt are released within two months of the end of the reference period.	-	-	-
Inflation, Money Supply and Credit Growth	Monthly inflation, money supply and credit growth are available	Monthly inflation data are released within one month after the reference period, while data on money supply and credit growth are released within two months of the end of the reference period.	-	-	-
Financial Sector Soundness Indicators	Available	Monthly data are released within one to two months of the end of the reference period, while quarterly data are available three months after the end of the reference period.	-	-	-
Housing Market Indicators	Available	Monthly data are released within one month of the end of the reference period.	-	-	-

Notes:
(i) Data availability refers to whether official data are available for public access by any means.
(ii) Reporting frequency refers to the time interval with which available data are published. Timeliness refers to how up-to-date the published data are relative to the publication date.
(iii) Data quality refers to the accuracy and reliability of the available data given the data methodologies are taken into account.
(iv) Consistency refers to both internal consistency within the data series itself and its horizontal consistency with other data series of either 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.

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

Appendix 6. Subcategory of Semiconductor Products

Semiconductor by Component Types			Functions	Demand Segment	Major Suppliers
Integrated Circuit	Digital	**Memory Semiconductor**			
		Volatile Memory			
		- DRAM (Dynamic Random Access Memory)*	It is used for data or program code that a computing processor needs to function. It is used often on the motherboard and it needs to refresh every few milliseconds.	e.g. PCs, CPs, Servers, Tablets, Data centers, automotive applications, IoT and AI.	**Samsung, SK Hynix,** Micron, Nanya, Winbond, Elite, ISSI, Etron, Fidelix, Rohm, etc.
		- SRAM (Static Random Access Memory)*	It uses bistable latching circuitry for storing bits and it exhibits data remaence. it performs at higher speeds than DRAM. It does not need to be refereshed.	e.g. PCs, CPs, Servers, CDs, Printers, Routers, Cameras, etc.	AeroFlex, Brilliance Semiconductor Inc., Cypress Products, GSI Technology, Integrated Silicon Solution Inc., Micron, NEC, Mitsubishi Electronic American Inc., Sharp Electronic Corps., etc.
		Non-Volatile Memory			
		- NAND Flash Memory	It is used to increase data storage per device. It does not require power to retain data.	e.g. CPs, PCs, SSDs, Tablets, VDO Gaming, Industrial and Medical electronics, etc.	**Samsung, SK Hynix,** Toshiba Memory, Western Digital, Micron, Intel, and YMTC
		- ROMs (Read-only Memory)**	It contains programming needed to perform instruction of the electronic devices.	e.g. PCs, CPs, Electronic Devices, etc.	Asahi Kasei Microsystems, Atmel Corporation, Datafab System Inc., Renesas Technology Corp., etc.
		- EPROM (Erasable Programmable ROM)**	It is used to store small amounts of data but allowing individual bytes to be erased by exposing it to high-intensity UV light and reprogrammed.	e.g. PCs.	Intel, Atmel Corporation, MicroChip, ROHM, STMicroelectronic, etc.
		- EEPROM (Electrically EPROM)**	The data stored in this chip can be electrically erased by using field electron emission.	e.g. PCs.	Intel, ROHM, ST Microelectronics, Atmel Corporation etc.
		Microcomponent (System Semiconductor or Processor Chips)			
		- Microprocessing Unit (MPU)	It is used to perform the instructions and tasks involved in computer processing. E.g. The microprocessor receives electrical signals from memory, external and internal hard drives, from network cards, from graphics and video devices and from other input devices like a mouse or keyboard.	e.g. PCs, CPs, Tablets, workstations, game consoles etc.	Intel, Broadcomm, Kawasaki, NVIDIA Corp., etc
		- Microcontroller (MCU)	It takes input from the device it is controlling and controls the device by sending signals to different components in the device. E.g. remote controller	e.g. CPs, Vehicles, robots, office machines, medical devices, mobile radio transcievers, home appliances, etc.	Texas Instruments, Mrcrochip Technology, Silicon Labs, Renesas, Intel, Fujitsu, etc.
		- Digital Signal Processor (DSP)	It is used to process signal digitally. Detect errors, and to filter and compress analog signals in transit.	e.g: PCs, CPs, Tablets, medical electronic, electronic device, etc.	Texas Instruments, Analog Devices, Motorola, and Lucent Technologies.
		Logic Chip			
		- Standard Logic	It is used to process the digital data for the purpose of controlling the operation of the electronic systems.		Freescale Semiconductor Inc., Fujitsu Semiconductor Inc., ARM Holdings Plc, Infineon Corporation AG, MediaTek Inc., Texas Instrument Inc., Qualcomem Incorporated, Broadcom Corporation, Marvell Technology Group, Apple Inc., etc.
		- ASIC (Application Specific Integrated Circuit)	It is designed for a particular task. E.g: running a digital voice recorder, clock, amplifier.		**Samsung**, Toshiba, Calogic LLC, eSilicon Corp, Freescale Semiconductor Inc., Fujitsu Microelectronics Inc., IBM Microeletronics and etc.
		- Others (LCD etc.)	It is the chip that design for general purpose applicationa. E.g. LCD driver is designed to control and drive the LCD panels.		
	Analog	**Analog**	It is used for electronical signal processing, power control or electrical drive capability.		Texas Instruments, Analog Devices, Infineon, Skyworks Solututiona, ST, NXP, Maxim, ON Semi, Mriconship, Renesas, etc.
		- Standard Linear			
		- Application Specific			
OSD		**OSD**			
		- **Optoelectronic** (Displays, Lamps, Image Sensors, Infrared and others)	It is used to transmit light into electrical current and vise versa or it is called "electrical-to-optical or optical to electrical transducer". E.g Solar Cell, LED		PerkinElmer, Heliatek, M Squared Lasers, AU Optronics, Nanotronics, AOI, Quanergy. OSI Sytems Inc., etc.
		- **Sensor** (Temperature, pressure, acceleration and yaw rate sensors, magnetic field sensors, actuators and etc.)	It is used to convert measurements of physical, chemical or biological properties to electrical signals.		Bosch, Infineon, NXP, Melexis, Allegro, SK Hynix
		- **Discrete component** (Doides, Transistors, Resisters, Capacitors, Retifier, Thyristors)	It is used in amplifiers and other electronic products that use large amounts of current.		Microsemi Corporation, Frontier Electronics Corps, Lectron Industries, etc.

***RAM:** Enable read/write of stored content. It is **volatile memory** chip where stored data will be lost when the power is turned OFF. It will only retain the stored data as long as power is **ON**.

**** ROM:** Allows only Read operation. It is **non-volatile memory** chip where stored data are not lost even when the power is turned **OFF**

Note: Communications (Smartphones); Consumer Electronics (Smart TV, 3-D programming, Video-on-demand content, Displays, Gaming technology and set-up box etc.); Data Processing (PCs, Ultra-mobiles, Tablets, Servers and Storage Devices); Automotive (Electric and Hybrid car, autonomous driving etc.); Industrial (IoT, AI, RFID acess system)

Source: AMRO staff compilation

Annexes: Selected Issues

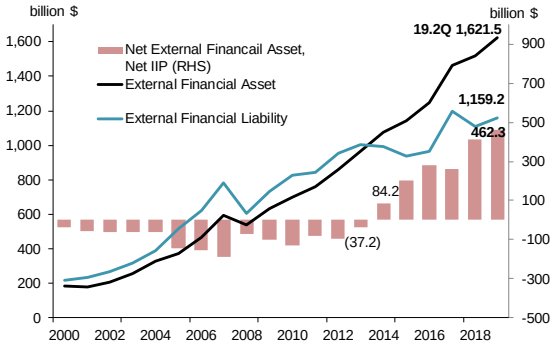
Annex 1. Development of Portfolio Investment and Foreign Exchange Swap Market[23]

1. Portfolio Investment and the Foreign Exchange (FX) Swap Market are closely related. Non-residents' investment in Korea Treasury Bonds (KTBs) is partially motivated by the interest arbitrage opportunity.[24] This comes from the demand/supply imbalance in the foreign exchange (FX, KRW/USD) swap market. The imbalance in the FX swap market (excess demand for Buy&Sell FX swap[25]), stems from a rapid increase in the portfolio investment by resident investors, such as asset management corporations and insurance companies. This note reviews how asset and liability structure of portfolio investment has changed in Korea, and examines the impact of these structural changes on the FX market and FX swap market, with a focus on its demand and supply factors, and tries to draw policy implications.

Asset and Liability Structure of Portfolio Investment in Korea

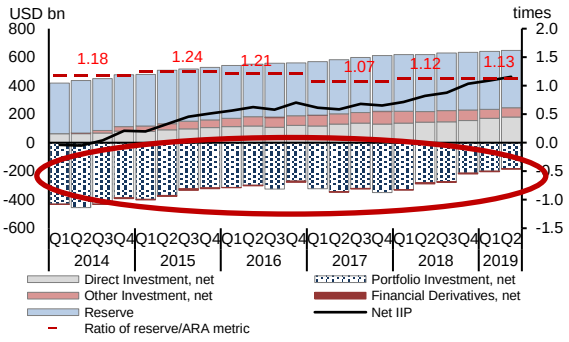
2. **While the total International Investment Positions (IIP) in Korea has shifted into net assets since 2014, net portfolio investment positions are still negative as their liabilities exceed their assets.** The net IIP (net external financial asset) positons have continued to increase since 2014, when it rose to USD462.3 billion as of Q2 2019, on account of IIP assets having grown much faster than liabilities (Figure A1.1). The increase in net IIP positions has been in line with the persistent current account surplus. This was underpinned by robust portfolio investment (PI) outflows, together with the increase in outward direct investment. However, in terms of the stock base, the net PI position is still more than negative of USD174 billion as of Q2 2019 (Figure A1.2), since PI liabilities (USD701 billion) are far greater than PI assets (USD527 billion).

Figure A1.1. Net External Financial Assets



Source: BOK

Figure A1.2. IIP with its Breakdown



Source: BOK, IMF

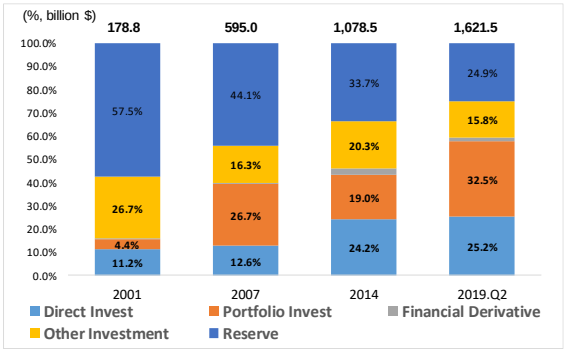
[23] Prepared by Yang-Hyeon Yang (Senior Economist)

[24] The Interest arbitrage opportunity is calculated as the gap between the interest differential (domestic interest rate minus foreign interest rate, theoretical price based on CIP condition) and the FX swap rate (market price from FX spot and forward market). For example, the spread between three-year KTB interest rate and three year KRW/USD cross currency coupon swap (CRS), which has been moving persistently over 50bp (in H1 2019), could be attractive for the global investment banks (IB). Therefore, IB attended to get risk free returns through arbitrage transaction.

[25] Buy&Sell FX swap refers to a swap transaction in which a party buys USD in the spot market and sells USD in the forward market. This swap transaction may be demanded, for example, by the resident investors, such as asset management corporations or insurance companies who demand USD for overseas investment and hedging the exchange rate risk. On the other hand, Sell&Buy FX swap is the opposite transaction that entails selling USD in the spot market and buying USD in the forward market. Such a swap transaction may be demanded, for example, by foreign commercial banks, who supply USD in exchange of KRW to invest in the Korean domestic assets such as KTBs and MSBs (Monetary Stabilization Bonds) with hedging the exchange rate risk.

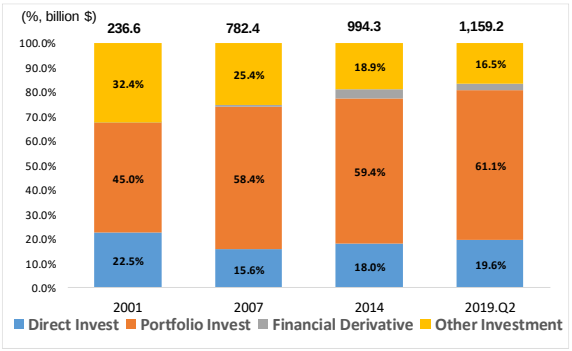
3. **Moreover, the increase in net IIP positions has been accompanied by a shift in the composition of external assets and liabilities.** There was a nine-fold increase in total external assets, from USD178.8 billion in 2001 to USD1,621.5 billion in Q2 2019. This was mainly driven by an increase in residents' portfolio investments and outward direct investments. The proportion of official FX reserves decreased from 57.5 percent to 24.9 percent. On the other hand, on the external liability side, the share of foreign portfolio liability increased from 45.0 percent to 61.1 percent, while other investments decreased from 32.4 percent to 16.5 percent, driven by the reduction in bank's foreign borrowing.

Figure A1.3. Composition of External Assets in IIP



Source: BOK

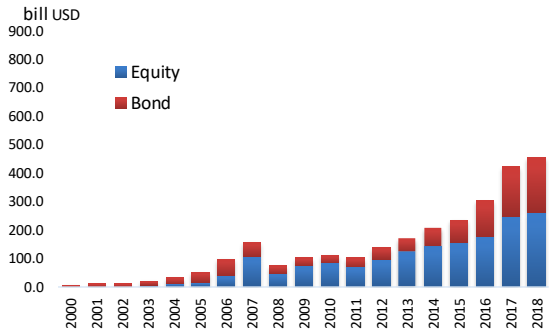
Figure A1.4 Composition of External Liabilities in IIP



Source: BOK

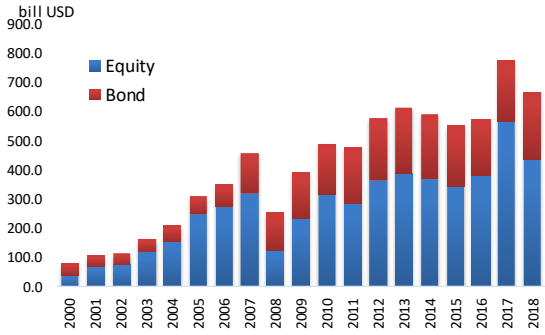
4. **Despite negative net PI (stock) positions, the growth of PI assets has been much faster than PI liabilities in the past decade, supported by sizable net PI outflows.** The annual average growth of PI assets was 27.8 percent during 2000-2018 while that of PI liabilities was only 12.5 percent in the same period (Figure A1.5, A1.6). The gap has been wider in recent years, with PI assets growing by 22.1 percent per annum during 2014-2018 and PI liabilities by just 3.1 percent per annum. The recent growth in PI assets is in both equities and bonds, while there has been no significant increase in the liabilities, particularly in bonds outstanding. By ownership, in the context of PI assets, around 61 percent of overseas equity investments are on account of the general government including the National Pension System (NPS) at large and 33 percent by non-deposit taking financial corporations including asset management corporations and life insurance companies. Meanwhile, 7 percent of overseas bond investments are held by the general government and 66 percent by non-deposit taking financial corporations. The National Pension System (NPS) has been expanding its overseas investments, particularly in equities in recent years. Meanwhile, the asset management corporations and life insurance companies are also investing proactively in both equities and bonds. As for PI liabilities, among debt securities held by non-resident investors, 36 percent constitute bonds issued by the general government, 29 percent by deposit taking corporations, 10 percent by BOK, and 17 percent by non-financial corporations.

Figure A1.5. Portfolio Investment, Assets



Source: BOK

Figure A1.6. Portfolio Investment, Liabilities

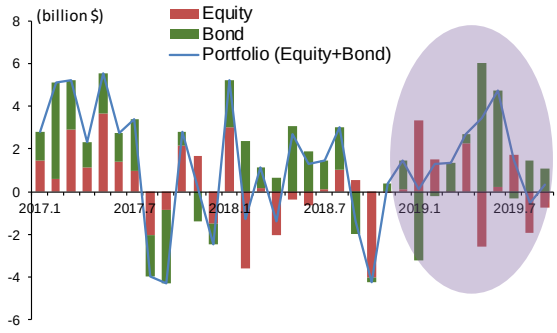


Source: BOK

Portfolio Investment Development in 2019

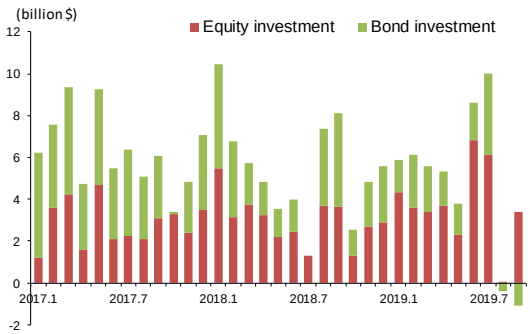
5. **Sizable PI outflows from residents have continued in 2019, on the back of a persistent current account surplus as well as a low interest environment.** Residents made outward PIs amounting to USD48 billion between January and September 2019, as against USD69 billion in 2018 and USD75 billion in 2017 (Figure A1.8). Insurance companies have invested in overseas bonds, seeking longer-term assets due to a shortage of longer-term bonds in Korea's market and maturity matching requirements under the International Financial Reporting Standards (IFRS 17), which will be implemented in 2022. Asset management companies, meanwhile, have invested in overseas bonds and equities seeking both yield and portfolio diversification. Moreover, the NPS has set its sights on increasing its overseas investment assets as a share of total investment assets, from 10 percent in 2006 to 50 percent by 2024.

Figure A1.7. Non-resident Inward Portfolio Investment



Source: BOK

Figure A1.8. Resident's Outward Portfolio Investment



Source: BOK

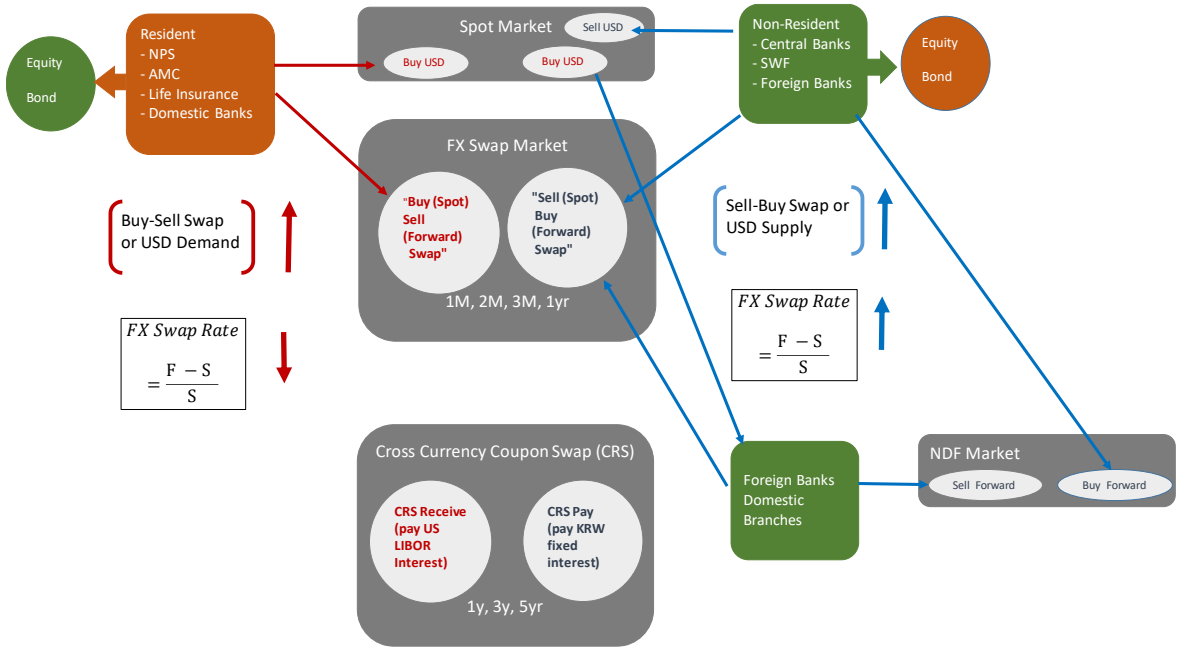
6. **Meanwhile, non-residents' PI inflows have been highly volatile in 2019 due to external uncertainties and slowdown of domestic economic growth.** The large capital inflow into the bond market in May-June 2019 was attributed partly to the additional returns from an arbitrage opportunity, stemming from an increase in the demand/supply imbalance in the FX swap market in Korea. Moreover, the KRW depreciated significantly in 2019, with KRW/USD exchange rate averaging 1,100 in 2018 against 1,160 during January and September 2019[26].

[26] The background of won depreciation is as followings: Delayed recovery in Semiconductor industry (negative Korean fundamental); US-China trade tension and weak CNH (high correlated trade structure between China and Korea, KRW-RMB synchronizing); Increase of overseas investment (demand in FX market); Korea-Japan trade tension (psychological effect); and Non-resident's purchase of Non-deliverable Forwards (NDF)

Some foreign investors have increased their investment in Korean sovereign bonds, which have become cheaper due to the depreciation of KRW/USD exchange rate. Investors increased their bond investments at around that time with the expectation of a further decline in the KTB yields amid the expected policy rate cuts by BOK[27]. Meanwhile, a strong credit rating was maintained for Korea and investors preferred KTBs as a highly liquid asset. Despite the re-escalation in U.S.-China trade tensions, non-residents invested in Korea's bond market, particularly in the KTBs, in May-June 2019. KTB remained attractive to non-resident investors in this period as one-third of advanced economies' sovereign bonds were traded with negative yields.

Foreign Exchange (FX, KRW/USD) Swap Market Conditions in 2019

Figure A1.9. Relationship among Portfolio Investment, FX Market, and FX swap Market



Note: Turnover of the spot market, the FX swap market and the forward market were USD 9.3 billion, USD 13.7 billion, and USD 0.6 billion respectively in September 2019. The CRS market is significantly smaller than the FX swap market. Non-banking sectors' (including public enterprises) liability swap and foreign authorities also do Sell&Buy FX swap in the FX swap market, although not included in this chart.

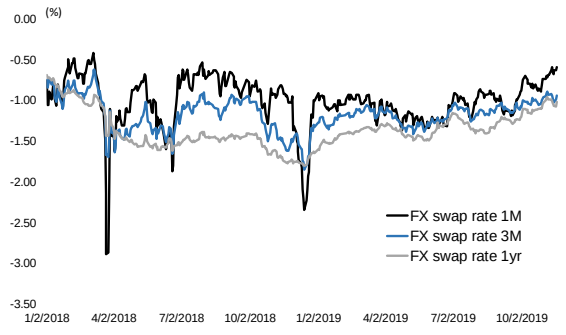
7. **With strong outward portfolio investment by residents, there has been strong demand for U.S. dollar in the FX swap market in Korea, which has lowered the swap rate below parity and has provided an arbitrage opportunity to non-resident bond investors.** Demand for USD liquidity in the FX swap market is generated mainly from portfolio investments by the NPS, asset management companies and insurance companies. Meanwhile, the supply of USD liquidity in the FX market is provided mainly by the foreign banks' domestic branches on the back of foreign investors' bond investment. Moreover, the increase in non-residents' net buying position of non-deliverable forwards (NDF, KRW/USD), reflecting their hedging of the exchange rate risk, also provides supply of USD liquidity in the FX swap market[28]. According to

[27] BOK cut the policy rate in July and October 2019.
[28] If non-resident increase NDF buying position, foreign bank domestic branches, as a counterparty, increase NDF selling position. To square this over-sold FX positon (that is to make neutral FX position), foreign bank domestic branches either do opposite transaction (buy the NDF from other banks), or buy USD in the spot FX market. In the latter case, they could operate Sell&Buy FX Swap using USD they purchased. In all, USD liquidity (Sell&Buy FX swap) in the FX swap market could be provided through this mechanism. (See the detailed flow chart in Figure A1.9).

the covered interest parity (CIP) condition, the FX swap rate[29] should be equal to the interest rate differential (theoretical value) on condition that there are no restrictions on capital flows (that is no transaction cost) and that the FX market is efficient. Normally, the currency with the higher (or lower) interest rate should be more depreciated (or appreciated) in the forward market compared with the counterpart currency. However, the FX swap rate is also affected by other factors, including demand/supply forces in the FX swap market as well as USD funding conditions (see the "BOX. A1. Main Determinants of FX Swap Rate"). The persistent excess demand in Korea's FX swap market makes the FX swap rate continuously lower than the parity by 20 bps, but it widened to 30-40 bps during May-June 2019. This difference provides an arbitrage opportunity and incentivizes non-resident investors to invest KTBs despite negative interest rate differentials (Figure A1.9, A1.11).

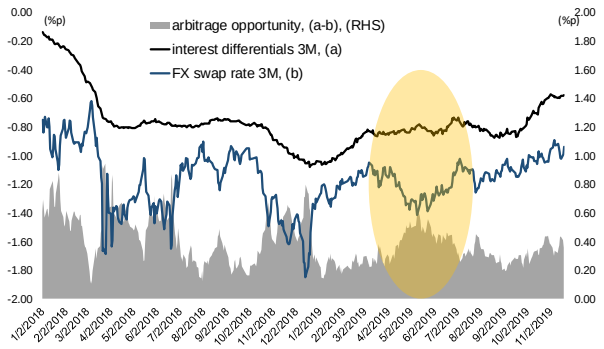
8. **The FX swap market has shown a slight upward trend since Q2 2019, despite persistent robust demand in the FX swap market.** The FX swap rate has remained in negative territory since early 2017 partly due to the negative interest rate differentials (Korea's interest rate is lower than the U.S. interest rate), and there is excess demand for the USD liquidity in the FX swap market. In 2018, the FX swap rate was more volatile and it registered a downward trend with a decline in the interest rate differential, reflecting normalization of US monetary policy. However the FX swap rate has shown a turnaround, and a slight upward trend since Q2 2019 as the Fed's shift to a dovish monetary policy stance has narrowed the negative interest rate differential (Figure A1.11).

Figure A1.10. F/X Swap Rate (1M, 3M, 1Y)



Source: KMBC(Korea Money Brokerage Corp)

Figure A1.11 Interest Arbitrage Opportunity



Source: KMBC, CEIC, AMRO staff calculations

9. **In the meantime, a slight change in the supply and demand imbalance in the FX swap market may also have exerted upward pressures on the swap rate.** The supply of USD in the FX swap market appears to increase somewhat due to an increase in the net NDF buy position by non-residents in H1 2019 (Figure A1.12). Non-residents increased their net NDF buy positon, perhaps with the expectation of a KRW depreciation in H1, by USD19.2 billion from January to September 2019. This increased the supply of the USD in the FX swap market through bank's FX position adjustment mechanism (Figure A1.9). On the other hand, the

[29] The FX swap rate is represented as (F-S)/S where F is the forward rate and S is the spot rate, both in terms of KRW per USD1. The FX swap rate is interpreted as the cost incurred by foreign investors for borrowing KRW with USD collateral. Foreign investors do Sell&Buy FX Swaps through Foreign banks domestic branches, using the USD they have. On the other hand, when resident investors do Buy&Sell FX swap (i.e. demand of USD liquidity) through domestic banks, using KRW they have, the FX swap rate will be exerted a downward pressure. Currently the demand for Buy&Sell FX Swap by resident investor is stronger than the demand for Sell&Buy FX Swap by foreign investors.

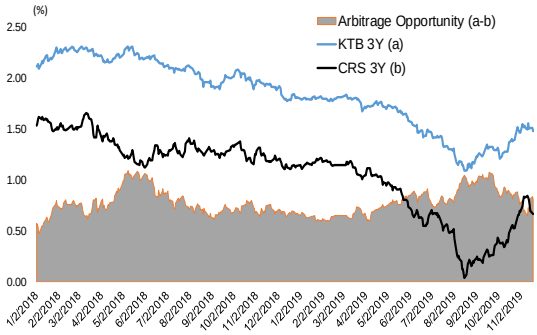
demand for USD in the FX swap market may be constrained by reduction of corporate forward sales (slowdown in the future export revenue), overseas bond investment slowdown, and the NPS's reduction of its hedge ratio on offshore investment.[30] Demand for short-term FX swap transactions has moderated recently due to insurance companies' hedging maturity shift from a short-term (within 3 months) to a long-term (over 1-3 years) swap transaction. Cross Currency Coupon Swap (CRS) declined in Q3 but rebounded in line with KTB's rate surge (Figure A1.13).

Figure A1.12. NDF Net Positon & F/X Borrowing Condition

	2017	2018	2019 (Jan to Sep)			
				(Q1)	(Q2)	(Q3)
NDF net buy position (bill $)	-6.3	8.8	19.4	10.6	6.2	2.7
KRW/USD (avergae, won)	1130.5	1100.6	1162.1	1125.7	1166.5	1194.2
F/X S/T borrowing spread (aver, bp)	1	1	3			
F/X L/T borrowing spread (aver, bp)	68	58	54			
F/X stabilization bond CDS premimum (5yr, aver, bp)	57	44	32			

Source: BOK

Figure A1.13. KTB Rate & Cross Currency Coupon Swap Rate (CRS)



Source: KMBC, CEIC, AMRO staff calculations

Prospects and Policy Implications

10. **Korea's overseas portfolio investment has increased relatively rapidly in the past few decades reflecting a high level of private sector saving and lower private investment, and this trend is expected to continue** (Figure A1.15). Considering the low interest rate environment and aging population, the NPS will increase its overseas investment based on its mid-term asset allocation strategy. Ahead of the implementation of IFRS17 in 2022, insurance companies are expected to increase long-term overseas investment to match the liabilities' duration. This increase of residents' overseas portfolio investment is in line with the persistent current account surplus.

11. **However, such overseas investment, accompanied by hedging through the FX swap market, has resulted in other risks, which warrant continuous vigilance**. For example, while domestic investors' overseas investments are primarily long-term, their hedging is done through short-term FX swaps and rollover, resulting in maturity and rollover risks. In particular, a sudden significant shift in global risk sentiment could result in valuation and other losses for investors. The authorities has already adjusted their supervisory regulations to diversify the hedging tools to accommodate the requirements of longer-term hedging, and this efforts should be continued[31].

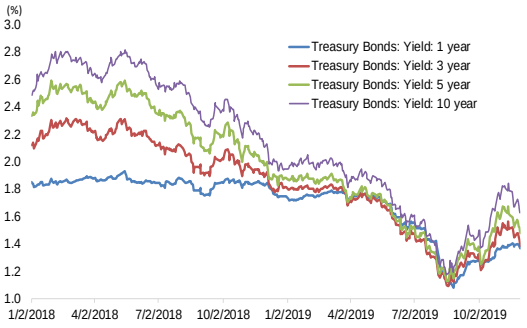
12. **Non-residents' portfolio investments in Korea's financial markets have maintained net inflows even if they have been volatile**. Going forward, the likelihood of abrupt capital outflows is expected to be low in view of Korea's good fundamentals and sound

[30] NPS is reducing the hedge ratio (demand for FX swap roll-over decrease) while expanding the share of overseas stock investment.
[31] For example, in early 2019, the FSC decided to require life insurances to raise capital equivalent to 0.8% of the FX hedges that have maturities of less than one year, effective January 2022, This would incentivize life insurances to hedge FX exposure using longer-term instruments.
.

external positions. Furthermore, around two-thirds of non-residents' bond investments are by public sector investors such sovereign funds and other central banks which are long-term and more stable. However, volatility may increase for the portfolio investment outflows given that KTB investment with FX swap transactions are concentrated mainly on the short-term.

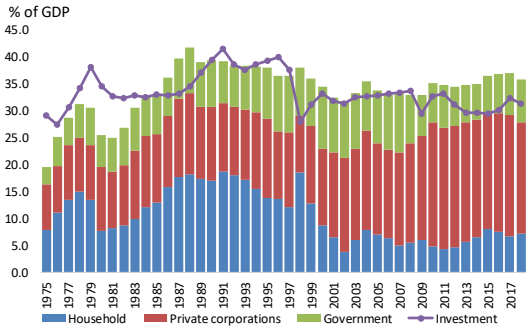
13. **Going forward, FX swap market downward pressure is expected to be limited.** Despite the BOK's rate cut in October, the long-term bond yield has started to increase in October and November. As a result, this has narrowed the negative interest rate differential and, thus increased the FX swap rate during the same period. As for U.S.' funding condition in domestic markets, since the USD liquidity is amply backed by the advanced economies accommodative monetary policy stance, the domestic USD liquidity funding situation continues to be favourable with a low average spread of short-term USD borrowing by the domestic banks.

Figure A1.14. KTB Yield



Source: CEIC

Figure A1.15. Saving and Investment Ratio



Source: CEIC

14. **The degree of imbalance in the FX swap market may moderate due to the change in hedging policy by resident investors.** First, insurance companies are changing their hedging strategies from short-term hedging to long term hedging, which may put upward pressures on the FX swap rate, while lowering the long-term CRS rate. Second, the NPS is reducing its hedging activity, with new investments unhedged and the roll-over of FX hedging for previous transactions has been reduced. Third, continued sizable non-resident's net NDF buying position would serve as one of the factors in supplying more USD liquidity in the FX swap market (See footnote 26 and Figure A1. 12). Moreover, Korea's current account surplus is narrowing while net financial account is expected to be balance over medium- and long-term. This may adjust asymmetric hedging behavior of Korean corporations, tending to hedge at the time of KRW appreciation rather than at the time depreciation.

Box A1. Main Determinant of FX Swap Rate

The current negative FX swap rate is determined by both the negative interest rate differential and the imbalance of supply/demand in the FX swap market, rather than tightened credit/ funding conditions. There are three main determinants of the FX swap rate: (i) interest rate differential; (ii) supply and demand of the USD liquidity in the FX swap market; and (iii) USD funding conditions. Factors (i) and (ii) dominate currently, while factor (iii) could trigger a liquidity crisis through FX swap markets as in 2008.

(i) Interest rate differential: The interest rate gap between Korean and U.S. sovereign bonds, which remained in negative territory after the U.S. Fed monetary policy normalization, is the primary reason for the negative FX swap rate. It means the cost of borrowing KRW with a U.S. dollar collateral, is

negative. As the Fed continues with its dovish monetary policy stance, this could narrow the negative interest rate differential (this means the interest rate differential increases), thus could increase the FX swap rate.

(ii) Demand/ supply forces in the FX swap market: Demand for USD liquidity has been chronically higher than supply in the FX swap market, although this imbalance has moderated somewhat. The USD liquidity providers (Sell spot & Buy forward FX swap, CRS payers), when playing the role of price setters, can get additional premiums (minus the swap rate) from USD liquidity buyers (Buy spot & Sell forward FX swap, CRS receiver). Key demand for USD liquidity in the FX swap market comes from continuing FX hedging for offshore portfolio investments by asset management companies and insurance companies. Meanwhile, the supply of the U.S. dollar in the FX swap market is driven by foreign banks' domestic branches on the back of FX hedging for bond investments by foreign investors and increase in non-residents' net buying position of non-deliverable forwards (NDF) amid concerns over KRW/USD depreciation.

(iii) USD funding conditions: U.S. dollar funding conditions has been stable. Domestic banks' average spread of short-term USD borrowing has been almost zero, hovering at around 3bps in 2019 after being at 1bp during 2017 and 2018. The longer-term FX borrowing average spread stood at 48bps in September 2019. The current FX borrowing spread through wholesale funding is historically low, reflecting Korea's lowest sovereign CDS premium (Figure A1.12). Foreign currency LCR has also been higher than what the regulatory standards requirement (80 percent). In addition, residents' foreign currency deposits have increased to USD70 billion as of September 2019.

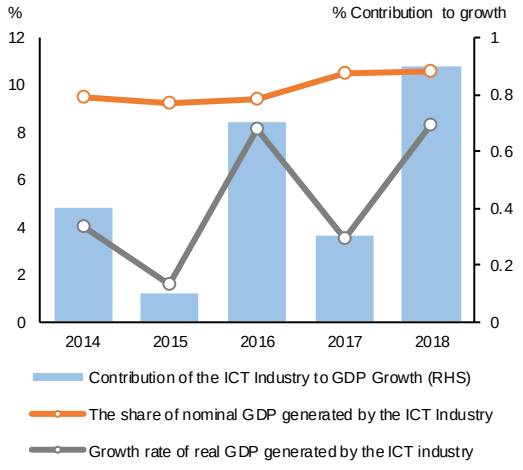
Annex 2. Korean Firms' Technology Adoption and The Implications for SMEs[32]

1. **Korea is a well-known global leader in the information and communications technology (ICT) industry; however, Korean firms especially SMEs, are still catching up with its peers in terms of technology adoption and innovation.** This study aims to explore the degree of technological adoption in Korea's manufacturing sector, particularly among SMEs, and come up with some policy recommendations to improve productivity of Korean SMEs. The first section intends to analyze different angles of Korea's ICT development covering manufacturing of ICT products, availability of ICT infrastructure, and ICT usage by households and local corporates. The second section focuses on the technological adoption of Korean SMEs. The last section compiles the government policies to promote innovation and technology of Korea corporates and suggest additional policies.

Korea's Technology Advancement

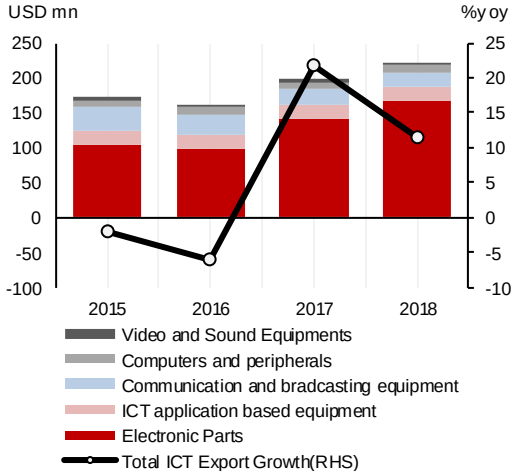
2. **The ICT industry plays a crucial role in driving Korea's economy and exports.** In 2018, real GDP generated by the ICT industry accounted for 10.3 percent of total GDP, and the ICT industry grew by 8.3 percent [33](Figure A2.1). Exports of ICT products grew by 11.5 percent per annum, posting positive growth for two consecutive years since 2017. The growth was mainly driven by a significant rise in electronic parts such as semiconductors, display panels and sensors, which accounted for 75 percent of total ICT exports. Most of total ICT exports are intermediate goods rather than the final products (Figure A2.2).

Figure A2.1. ICT Industry And Its Contribution to the Korean Economy



Source: IT Statistics of Korea

Figure A2.2. ICT Exports by Sector



Source: MOEF

3. **Korea is one of the global leaders in the ICT industry.** Korea is ranked among the top countries in terms of innovation development (Table A2.1) and patent activity. It is also the country with the most intensive research and development (R&D) work in the world (Organization for Economic Cooperation and Development, 2018). Total R&D investment in

[32] Prepared by Malichanh Chiemsisoulath (Associate)
[33] Source: IT Statistics of Korea, http://www.itstat.go.kr/stat.it?no=1075

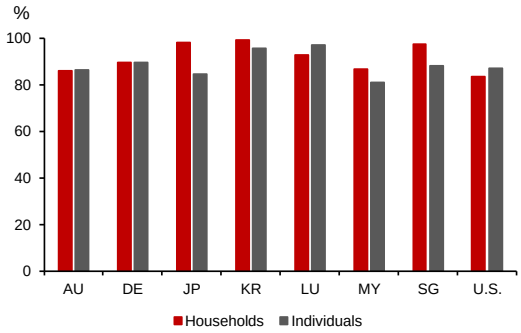
Korea in 2017 was KRW78.8 trillion, equivalent to 4.6 percent of GDP[34] and an increase of 13.5 percent from 2016. In addition, Korean conglomerates – Samsung Electronics, SK Telecom, LG Electronics and KT Corporation – are among the world's largest technology companies. In terms of ICT infrastructure and usage, the country also has the fastest internet speed (World Economic Forum, 2018), which gives rise to a high internet penetration rate (Figure A2.3). The ICT infrastructure is constantly being upgraded. Recently, the country also took the global lead in fifth-generation (5G) technology commercialization[35]. The data speed of 5G will be 20 times faster than that of 4G, enabling better support for artificial intelligence (AI) and virtual reality with low latency[36] (Box A2).

Table A2.1. Korea's Rankings in International Innovation-related Evaluation

Evaluation Index	Rank
Bloomberg Global Innovation Index (2019)	1
ICT Development Index, UN (2017)	2
Global Innovation Index, WIPO (2019)	11
Network Readiness Index, WEF (2016)	13
Global Competitive Index (Innovation Capability Pillar), WEF (2018)	8

Source: AMRO

Figure A2.3. Households and Individuals' ICT Access and Use

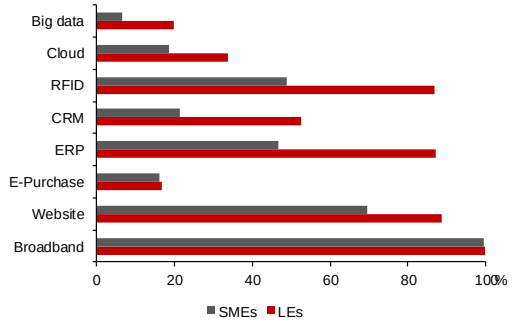


Note: The data of Australia (AU), Japan (JP) and the United States (U.S.) is valid as at 2017. The other countries are Germany (DE), Korea (KR), Luxemburg (LU), Malaysia (MY) and Singapore (SG).
Source: International Telecommunication Union, UN (2018)

4. **Despite Korea occupying high rankings in technological advancement on the whole, the technological adoption by Korean enterprises is concentrated in large enterprises (LEs) and lags behind other advanced countries.** Although almost all firms in Korea have broadband connections, large firms are more advanced in using technology, such as websites and electronic commerce platforms, the Enterprise Resource Planning (ERP)[37] system, Customer Relationship Management (CRM) [38] system and Radio Frequency Identification (RFID)[39] system, to improve productivity and revenue. Furthermore, the usage of cloud computing and big data analysis in Korean firms, including LEs, is still low compared with Germany, Japan and Spain (Figure A2.4 and A2.5).

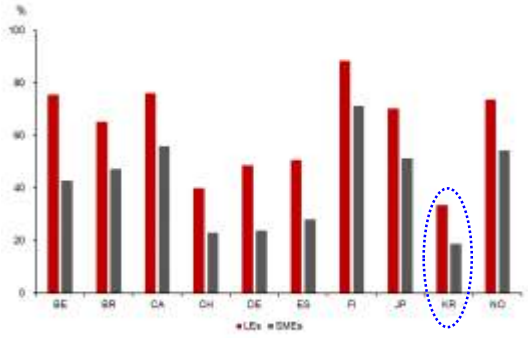
[34] Cornell University, INSEAD, and WIPO (2019); The Global Innovation Index 2019: Creating Healthy Lives—The Future of Medical Innovation, Ithaca, Fontainebleau, and Geneva, 314.
[35] A pilot project to promote the convergence of 5G with other industries started in 2018 and the nationwide 5G mobile communications network will be completed by 2020.
[36] Latency is the time delay between the cause and the effect of a physical change in the system. Low latency means the system has the ability to transfer big amounts of data within a short period of time.
[37] A software-based tool that integrates the management of internal and external information flows, covering material and human resources, finance, accounting, customer relations and other areas.
[38] A software package used for managing a company's interactions with customers, partners, employees and suppliers.
[39] A technology that enables contactless transmission of information via radio waves. RFID can be used for a wide range of purposes, including personal identification and access control, logistics, the retail trade, and manufacturing process monitoring.

Figure A2.4. Usage of Selected ICT Tools in Korean SMEs and LEs



Source: OECD (2017)

Figure A2.5. SME and LE Usage of Cloud Computing between Korea and Its Peers



Note: Germany's data was taken from 2018 as the 2017 data was unavailable. All country abbreviations are Belgium (BE), Brazil (BR), Canada (CA), Switzerland (CH), Germany (DE), Spain (ES), Finland (FI), Japan (JP), Korea (KR) and Norway (NO).
Source: OECD (2017),

Technological Adoption by Korean Firms, Particularly SMEs

Anecdotally, SMEs' productivity lack behind large conglomerates, and the SMEs also have difficulty to create innovative products or improve efficiency of their production process. Limited technology adoption is possibly one of the underlying reasons of these challenges.

5. **The number of innovative small and medium enterprises (SMEs), including start-ups, remains low.** Only 4.6 percent of SMEs are classified as "innovative SMEs", consisting of start-ups, business ventures, and "Inno-Biz" firms (Figure A2.6). In terms of the number of unicorns, Korea is ranked sixth globally; however, it has only nine unicorns, well below the leading countries namely U.S. and China, which have 127 and 94 unicorns respectively[40].

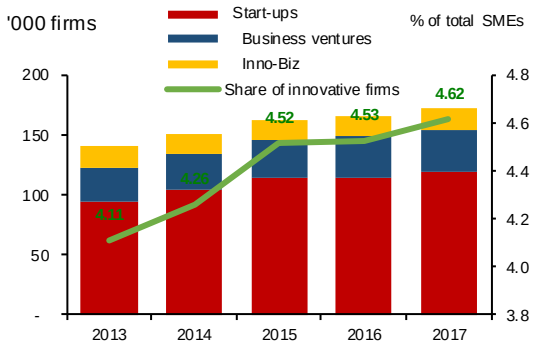
6. **The limited adoption of new technological innovation results in low productivity among SMEs.** In Korea, SMEs play a more prominent role in the economy relative to other OECD countries. There are about 3.7 million SMEs which make up 99.9 percent of total number of enterprises and employ 15.5 million people, accounting for nearly 90 percent of total employment. While Korea has a greater number of SMEs than most of OECD countries, its labor productivity per hour worked is lower (Figure A2.7). In addition, Korean SMEs are struggling to combine different modes of technology to expand their productivity and may encounter challenges stemming from a lack of resources and ICT expertise. However, SMEs may face challenges in adopting new technology, particularly in managing digital security and privacy risks, mainly due to the lack of resources and expertise to manage such risks effectively.

7. **Korean SMEs have a high potential to grow, given the country's high technological development.** The firms should be encouraged to use e-commerce platforms, big data, cloud computing and the internet of things (IoT)[41]. Fortunately, Korea already specializes in these technologies. Firms that undergo the technological transformation would better understand their own internal production process, customers' demand and expectations

[40] Korean Venture Business Association.
[41] Internet of Things (IoT) refers to the environment in which information is shared between sensors and terminals through a wired or wireless network. It can also mean the software platform that implements IoT or the information distributed through the IoT environment.

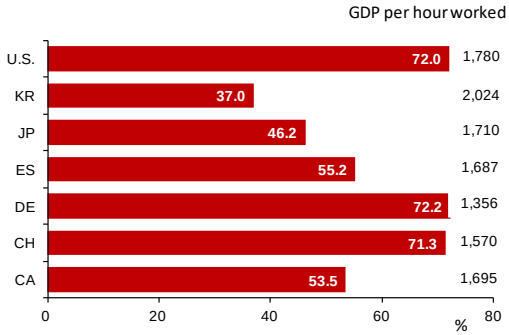
as well as the business environment. Through technology, they can gain access to skilled and talented segments of the workforce as well as the outsourcing market. They can also take advantage of technology to obtain various financing instruments that will improve production performance and reduce costs.

Figure A2.6. Innovative SMEs by Type, 2017



Source: Korea SMEs and Startups Agency; KOSTAT

Figure A2.7. Korea's Labor Productivity Compared with Its Peers



Note: The country abbreviation are Korea (KR); Japan (JP): Spain (ES); Germany (DE): Switzerland (CH); and Canada (CA).
Source: OECD (2017)

Ongoing Efforts to Enhance SMEs' Productivity and Additional Policy Suggestion

8. **To boost SME productivity and nurture the development of start-ups, the Korean government is promoting "fair competition" and "innovation-led growth".** Since the current administration took office in 2017, 100 policy tasks had been launched to support its New Economic Policy Plan[42]. Out of those 100 tasks, five were meant to ensure a fair economy, while 10 were targeted at promoting innovation and technological developments. Many programs have since been implemented to support these fair competition and innovation-related policy tasks[43] (Table A2.2). The country is trying to move toward a knowledge-based economy that is fueled by creativity and innovation. To embrace the new economy and lead the 4th industrial revolution (4IR), the government in 2017 established a 4IR committee and defined its action plan, with the aim of developing advanced science and technology, such as AI[44], big data[45], cloud computing[46], block chain, 5G mobile communications, IoT and robotics, in order to foster an ecosystem of innovative start-ups, supplement existing industries, and develop new services.

9. **Moreover, supportive policies are in place to promote the financing of SMEs and start-ups.** The government provides several channels of financial support to SMEs and start-

[42] The economic policy of President Moon's administration comprises four pillars, namely income-driven growth, a job-centered economy, innovation-led growth, and fair competition.
[43] Amendments have been made to the Act on Subcontracting Transactions, Act on Fair Treatment, Act on Fair Franchise and Retail Agency and Act on Unfair Competition and Trade Secret Protection. The Subcontracting Act was amended partly to address the theft of technology. In addition, the government has introduced punitive damages on LEs that practice collusion and retaliatory measures, so as to prevent them from forcing unfair payments on SME subcontractors, setting unjustifiable prices and engaging in other unfair conduct and misconduct. The government also encourages cooperative profit sharing between LEs and SMEs, to share the profits generated by SMEs' new cost-cutting innovations in more reasonable ways.
[44] AI is a software that implements the intellectual ability to think and learn logically like human beings, and to recognize and make judgments using a computer. Computers equipped with deep learning technology learn data and discover rules by themselves to implement human intelligence.
[45] Big data can refer to the fixed or unstructured large-scale data generated in a digital environment; the platform to collect, store, process, and analyze the data; or the service to analyze the big data and make projections.
[46] Cloud is a computing technology that is being developed to share and transmit the exponentially growing amount of data on the internet. The cloud service provides functions such as information analysis, processing, storage, management and distribution.

ups, in the form of lending facilities offered by public financial institutions and a hybrid of investment and loan assistance provided by the Korea SMEs and Start-ups Agency. In 2017, financing for SMEs reached more than KRW126 trillion, or USD112 billion. Korea also runs the Credit Guarantee Fund, which is a public financial institution that provides credit guarantees to SMEs in order to help SMEs to get financial access. Korea Enterprise Data, a credit rating agency, specializes in preparing credit information on SMEs and start-ups. In addition, the government promotes venture capital as a source of direct funding for SMEs and start-ups. In 2018, venture capital investment in start-ups increased by 43.9 percent to KRW3.4 trillion from KRW2.4 trillion in the previous year[47].

10. **To better support the productivity of Korean SMEs through the adoption of innovation and technology, continued investment using tangible and intangible capital needs to be actively implemented alongside regulatory reform.** Increasing investment in complementary knowledge-based assets, such as R&D, human resources, organizational changes and process innovation, will help in lifting the capacity to translate technological changes into innovation and productivity growth. Simplifying and coordinating administrative procedures will ensure a business-friendly regulatory environment and promote a fast-track system, especially for start-ups.

[47] Korean Venture Capital Association.

Table A2.2. Government Program to Support Innovation and SMEs

Month/Year	Program
May 2017	- The New Economic Policy was established.
Jul 2017	- The Five-Year Plan for the Administration of State Affairs was launched, consisting of the national vision, five policy goals, 20 strategies and 100 policy tasks.
Oct 2017	- The 4IR committee was set up.
Nov 2017	- Support measures for start-ups were announced. - The 4IR response plan was announced, with KRW2.2 trillion to be invested in intelligent technologies.
2018	- Preparations were underway for regulatory reform that would be crucial to growth through encouraging innovation and promoting fair competition.
June 2018	- The Joint Private-Public Task Force on Growth through Innovation was formed.
Aug 2018	- The 2019 Growth through Innovation Investment Plan was launched, with KWR5 trillion to be spent on eight pilot projects[48] (KRW3.5 trillion) and the building of a platform economy[49] (KRW1.5 trillion).
Oct 2018	- KRW15 trillion was earmarked to support innovation that would be led by the private sector. Of this sum, KRW10 trillion would go toward modernizing industrial structures, with 80 percent of the KRW10 trillion to be offered to SMEs in the form of loans and tax incentives; the remaining KWR5 trillion would be used to upgrade facilities for SMEs as well as old buildings and infrastructure through the provision of loans offered by the Industrial Bank of Korea and Korea Development Bank at low interest rates, with KRW60 billion set aside to improve industrial complexes and KRW290 billion to develop smart factories, which will take up 81 percent of the KRW290 billion.
Feb 2019	- A measure was drawn up to promote online payment, involving a shared payment system and deregulation. - Changwon and the Banwol Special Zone were designated for smart manufacturing facilities, with the aim of building 10 facilities by the end of 2022.
Mar 2019	- An industrial innovation committee was launched to regularly review the government's support for industrial innovation.
Apr 2019	- New measures were announced to support ventures. - A 5G+ promotional measure was announced. - A regulatory sandbox system was announced, comprising an industry-ICT convergence sandbox, financial service innovation sandbox, and zone-specific sandbox.
May 2019	- A supplementary budget was announced, providing KRW100 billion to support cash-strapped SMEs and KRW200 billion for small merchants.
Jun 2019	- An announcement was made to invest about KRW6 trillion under the next five-year plan (2020-2024) in public service R&D, and to expand tax incentives for service R&D.

Source: Ministry of Economy and Finance

[48] Future cars, drone services, new energies, health-care biotechnology, smart factories, smart cities, smart farms and financial technology.
[49] Digital platform for big-data analytics and transactions, and hydrogen fuel cell supply chains.

Box A2. Impacts of 5G on the Korean Economy

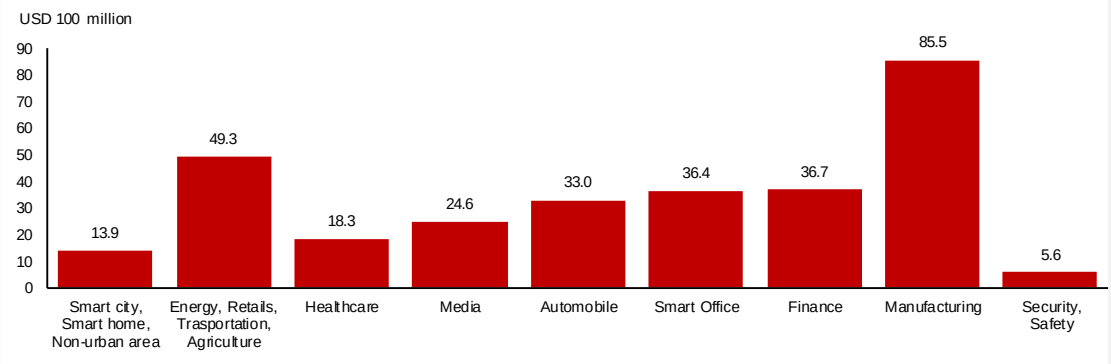
The fifth generation, or 5G, of mobile internet connectivity provides faster speeds in data transfer, wider coverage and more stable connections. The technology of 5G will offer data transmission speeds 20 times faster than 4G and reduce latency to 1 millisecond from the 30-70 milliseconds achieved by 4G. This will not only allow faster data transmission, but also open up new possibilities for critical applications that require high responsiveness in areas such as autonomous vehicles and drones, smart factories, smart cities, remote health care and the larger IoT ecosystem to work efficiently.

The year 2019 has been remarkable in terms of global competition in information technology. Major countries are competing tooth and nail to provide the world's first 5G service and dominate the 5G device market. Korea was the first country to commercialize 5G and offer 5G mobile services, followed by the U.S., Australia, the United Kingdom, Switzerland, and China. Samsung Electronics later released the world's first built-in 5G technology smartphone to the market, followed by models from Huawei, ZTE Corp and others. China and Japan, who are also advanced in IT, are developing their own 5G network infrastructure as well, and piloting the use of 5G in various fields in major cities. China launched 5G commercialization in October 2019, while Japan plans to do the same in spring 2020. Other countries in the region are actively accelerating their 5G network infrastructure development to catch up with their peers (Table A2.3).

Korea aims to complete 5G nationwide coverage by 2022, with huge investments planned to support the 5G ecosystem. The government and private sector are planning to invest more than KRW30 trillion in developing the world's best 5G ecosystem. The initial rollout will be focused on main cities, with full widespread coverage ready by 2022. Korea also plans to invest KRW49.1 billion by 2020 in the areas like smart factory, smart city, autonomous vehicle, immersive media, and disaster prevention.

The impact of 5G is expected to be far-reaching in all sectors of the Korean economy. It is expected that 5G would be contributing about KRW30.3 trillion to the Korean economy by 2025, accounting for 1.5 percent of GDP[50]. In manufacturing, for example, smart factories would help manufacturers to improve operational performance and reduce costs. Usage of autonomous vehicles and truck platooning would become more prevalent. More widespread use of big data, AI, and biometric authentication would also bring significant benefits for the financial sector. The technology of 5G would be the key to unlocking the potential of virtual reality and augmented reality, thereby changing the immersive media experience. Revolution in the health-care industry would be significant as people would be able to access their own health data remotely, and to receive home health care and remote surgery. Delivery drones would be widely deployed and are expected to shorten delivery time and cost. The retail industry would intensify its focus on inventory and logistics rather than physical displays and showrooms. In agriculture, the development and application of smart farming is expected to increase agricultural productivity (Figure A2.8).

Figure A2.8: Value added by 5G (2025)



Source: KT Management Research Institute

[50] KT Economic and Management Research Institute Report, 1 August 2018

Table A2.3. 5G Developments in the Region

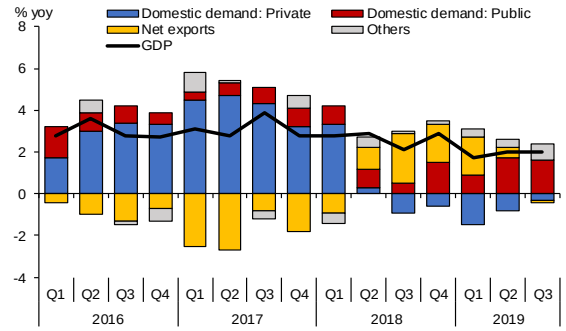
Country	5G Development Status	5G Trial	Official 5G Commercialization
Brunei	No concrete announcement on 5G adoption yet, but Brunei plans to roll out 5G services in 2021 and 2022.	N/A	2022
Cambodia	The government is partnering with Huawei to develop 5G network infrastructure. Major telecommunications providers, including Smart, will invest USD300 million in 5G over the next 3-5 years.	Q3 2019	Government approval is expected to be granted at the end of 2019
China	The government granted 5G licenses to communications carriers for commercial use in June 2019, and 5G was rolled out in October of the same year, with nationwide coverage expected to be achieved in 2020. China will invest over USD150 billion in its 5G networks through 2025.	2018	2019 October
Hong Kong, China	Hong Kong tested 5G outdoors in late 2018. It promotes 5G developments on various fronts, including in the supply of spectrum, support for technical trials and implementation of facilitation measures.	2018	A roll-out of 5G services is expected in 2020, with a full launch in the same year
Indonesia	Indonesia tested 5G in the 2018 Jakarta Asian Games but official commercialization, as to whether the technology will be rolled out in 2020 or later, remains unscheduled because telecommunications providers want to see market demand for 5G. Meanwhile, a local provider is partnering with Ericsson to upgrade the existing network in preparation for 5G and expects to achieve 5G coverage in the next 2-3 years.	2020	No schedule yet
Japan	Many pilot projects have been conducted using 5G technology in different fields, such as sightseeing, smart city, medical services, construction, entertainment and transport. Local service providers have committed to building nationwide 5G networks by 2022 and are expected to invest $14.4 billion in their networks during the next five years.	2017	2020 spring
Korea	The government has set 2018-2020 as the 5G pilot phase, during which it will promote 5G convergence with other industries. Nationwide coverage is expected to be accomplished in 2022. The government plans to support the 5G ecosystem by investing more than USD26.2 billion over the next four years, while three major service providers will likely invest USD20 billion-USD25 billion in 5G network infrastructure.	2018	2019 April
Lao PDR	The government partnered with Huawei starting from 2018 to develop 5G network infrastructure. Local communications providers performed technical tests in October 2019 and will officially launch a trial run by the end of the year.	Q4 2019	2020
Malaysia	The government is partnering with Huawei. Nationwide 5G trials were launched in October 2019.	2019 Oct	2020
Myanmar	Local communications provider Ooredo Mynamar is partnering with ZTE Corp to develop a 5G infrastructure network and technology. Their joint venture, Mytel, conducted technical tests in July 2019 and expects to officially launch 5G soon, when the infrastructure is ready.	N/A	2020-2021
Philippines	The Philippines is partnering with Huawei. Leading communications operators rolled out 5G services for selected home broadband subscribers in Q2 2019. The country needs another two to three years to fully support 5G services.		2019 November
Singapore	The government has announced an SGD40 million investment in 5G innovation. Six strategic clusters for early adoption trials have been identified, namely maritime operations, urban mobility, smart estate management, smart manufacturing, government applications and consumer applications.		2020
Thailand	The government is organising a 5G spectrum auction to be held in late 2019.		2020
Vietnam	Vietnam is partnering with Ericsson. Viettel, the first local operator to get a 5G licence, has deployed 70 trial base stations in Hanoi and Ho Chi Minh City.	H2 2019	2020

Source: AMRO Staff compilations

Annex 3. Fiscal Policy in Korea as a Counter-cyclical Measure[51]

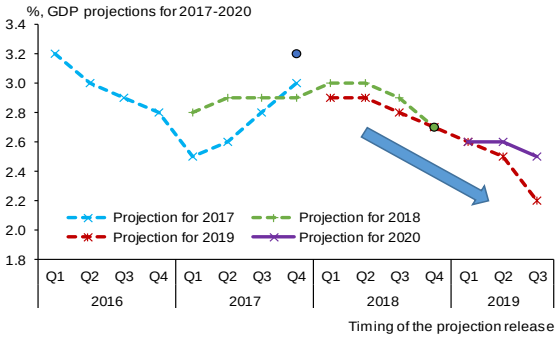
1. **Korea's growth momentum is losing steam with sluggish private demand and external headwinds.** Private consumption remains soft, while capital investment turned negative in Q2 2018 amid weaker external demand and has remained negative since then. To address sluggish private demand, the government has aggressively expanded spending, while boosting supplementary budgets in recent years. As a result, the public sector has contributed more to GDP growth than the private sector (Figure A3.1). Nevertheless, concerns over the economic outlook remain (Figure A3.2), drawing attention to counter-cyclical fiscal policy measures to support the economy and avoid slipping into a severe economic downturn. This note aims to characterize counter-cyclical fiscal policy in Korea to draw some policy implications.

Figure A3.1. Contribution to GDP



Source: Bank of Korea

Figure A3.2. Real-time Revision of GDP Projections



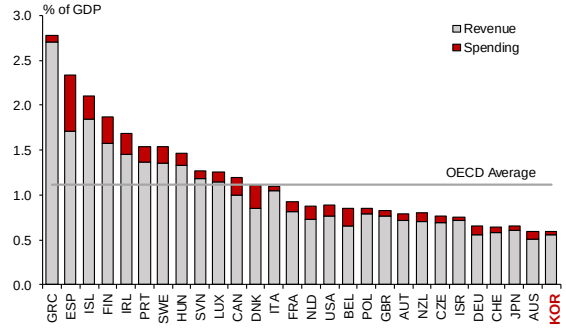
Note: Circled markers indicate realized GDP growth rates in 2017-2018.
Source: Bank of Korea (Quarterly Economic Projections)

Counter-cyclical Fiscal Policy in Korea

2. **Automatic stabilizers in Korea's fiscal budget are relatively small.** Automatic stabilizers in the fiscal budget should enable an economy to smoothen out its business cycle fluctuations if the stabilizers are working effectively. In Korea, however, the size of the automatic stabilizers—measured as the cyclical component of fiscal budget—appears to be only about one half of the OECD countries' average (Figure A3.3). This is mainly due to the fact that Korea's tax-to-GDP ratio, including social security contributions, remains relatively small (25.4 percent as compared with the OECD average of 34.2 percent as of 2017), and also because of its higher share of indirect taxes (49 percent as compared with the OECD average of 46.8 percent as of 2015), which are known to be less sensitive to the business cycle. On the spending side, unemployment-related expenditures remain very small (Figure A3.4). This reveals the importance of discretionary fiscal policy measures that may complement a lack of automatic stabilizers during severe economic downturns.

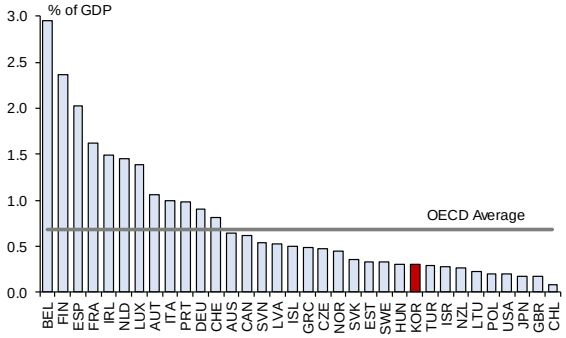
[51] Prepared by Jinho Choi (Senior Specialist).

Figure A3.3. Automatic Stabilizers in OECD Countries



Note: Defined as the sum of cyclical components of the revenue and expenditure; based on yearly average from 1985 to 2016.
Source: Recited from Park (2018); OECD

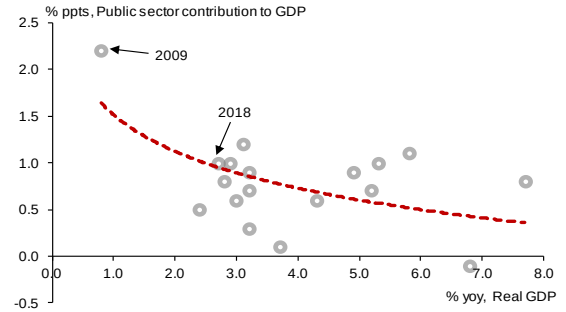
Figure A3.4. Public Unemployment Spending in OECD Countries



Note: Defined as expenditure on cash benefits for people to compensate for unemployment; as of 2017, or latest available data.
Source: OECD Social Expenditure

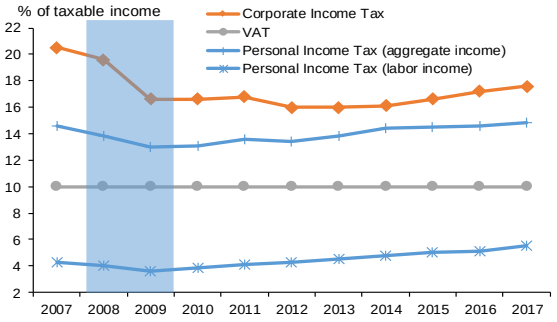
3. **Government spending has been the main tool of fiscal stimulus policy.** In the past two decades, the Korean government has tended to expand spending aggressively to cope with economic downturns, especially after the GFC (Figure A3.5). In contrast, the tax cut policy measure has been rarely used, except during the 2008-2009 GFC when both corporate as well as individual tax rates were cut. Since 2016, the effective tax rates have been brought back to pre-crisis levels or even raised gradually (Figure A3.6).

Figure A3.5. Public Spending and Business Cycle



Note: Based on the annual data from 2001 to 2018; The dotted line indicates the logarithmic trend line.
Source: Bank of Korea; AMRO staff calculations

Figure A3.6. Effective Tax Rates



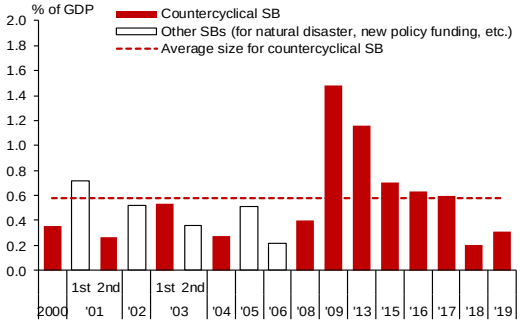
Note: Based on the effective tax rates, which are the tax amounts paid by individuals or firms, divided by total earned incomes.
Source: National Assembly Budget Office

4. **In recent times, supplementary budgets have been proposed each year, but with increasing legislative lags.** Of the seventeen supplementary budgets that were implemented over the past two decades, 12 were proposed to counteract potential economic recessions. The supplementary budgets have been proposed more frequently in recent years, despite strict legal requirements [52] for their adoption. On average, the size of counter-cyclical supplementary budgets has been 0.6 percent of GDP (Figure A3.7), while it has taken almost 50 days from when legislation was proposed until its passage at the National Assembly. Such

[52] According to the National Finance Act, the formulation of the supplementary revised budget bill is strictly restricted to one of the following three conditions (i) *A war or large-scale disaster* (referring to damage caused by natural disasters and social disasters) breaks out;(ii) *A significant change in circumstances at home and abroad*, such as an economic recession, mass unemployment, change in inter-Korean relations or economic cooperation, occurs or is likely to occur; and(iii) *the expenditure the State is obligated to pay pursuant to statutes is incurred or increased*. Furthermore, the Act states the government shall not allocate or execute the supplementary revised budget in advance before the budget bill is finally adopted by a resolution of the National Assembly.

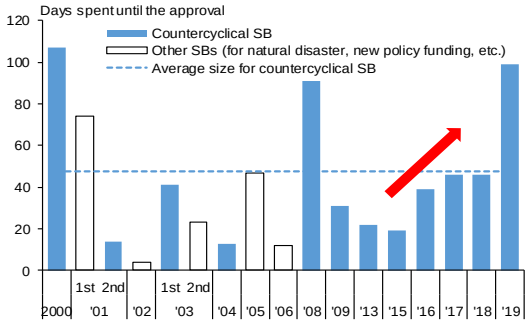
legislative lags can also lengthen up to 100 days, as seen in the 2019 supplementary budget. This may block the timely implementation of a stimulus package (Figure A3.8).

Figure A3.7. Size of Supplementary Budget



Note: The purpose of each supplementary budget is classified by its budget bill's proposal.
Source: Ministry of Economy and Finance; AMRO staff compilations

Figure A3.8. Legislation Lag for Supplementary Budget



Note: Legislation lags are defined as the number of days from when legislation was proposed to when it is signed into law.
Source: Ministry of Economy and Finance

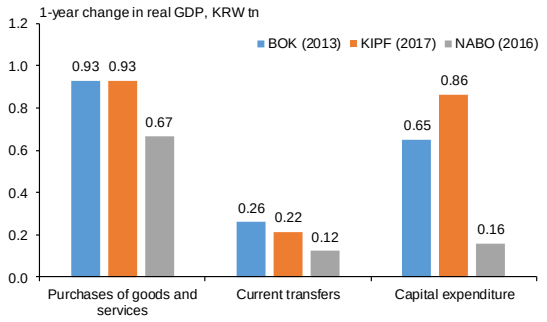
Effectiveness of Counter-cyclical Spending Measures

5. **The impact of government spending on economic growth likely depends on not only the size of spending, but also its composition.** Existing studies have not reached a consensus over the size of government spending multipliers in Korea. Some argue that it is around 0.45 for first-year impact (KIPF, 2017), suggesting that a 10 trillion won of government spending may result in an additional 4.5 trillion won of GDP in a year. However, the effectiveness of government spending may vary based on the composition of the spending. By spending purpose, major model estimates (Figure A3.9) indicate that government consumption is likely to have the largest impact on boosting real GDP in the short-term, followed by capital investment and then current transfers.

6. **The policy environment and lag impact also need to be considered in formulating counter-cyclical spending measures.** The actual impact of a fiscal stimulus may vary depending on the surrounding economic and policy environments – the phase the business cycle is in, the share of liquidity-constrained households, degree of accommodative monetary policy and so forth.[53] Moreover, in addition to legislative lags, fiscal policy's implementation lag—the time taken from when a new supplementary budget is enacted to when it takes effect—should be also taken into account. Model estimates (Figure A3.10) suggest it may take as long as three years for a fiscal stimulus to take full effect.

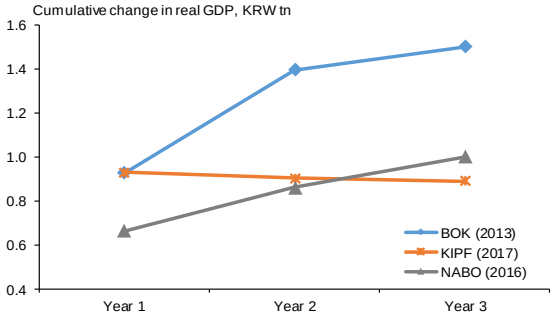
[53] Existing studies broadly agree that the effect of fiscal stimulus tends to increase when (i) the economy is in recession; (ii) the share of liquidity-constrained households is higher; and (iii) monetary policy becomes more accommodative. See Choi, Jinho, and Minkyu Son.2016. "A note on the effects of government spending on economic growth in Korea." *Journal of the Asia Pacific Economy* 21 (4): 651-63.

Figure A3.9. Model Estimates of Fiscal Multiplier by Spending Purpose



Note: Based on the shock assumption that government spending is increased by KRW1 trillion.
Source: Bank of Korea (Son, Kim and Hwang, 2013); Korea Institute of Public Finance (Park and Oh, 2017); National Assembly Budget Office (Lee et al., 2016)

Figure A3.10. Dynamic Response of GDP to Government Consumption Spending

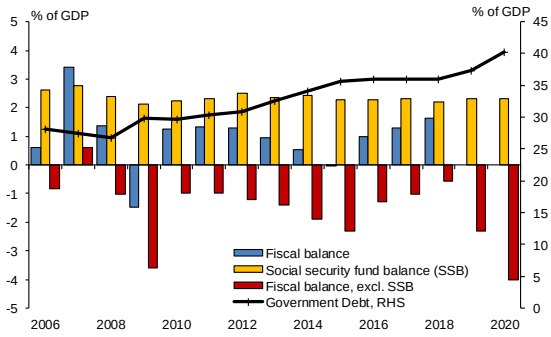


Note: Based on the shock assumption that government spending on goods and services is increased by KRW1 trillion.
Source: Bank of Korea (Son, Kim and Hwang, 2013); Korea Institute of Public Finance (Park and Oh, 2017); National Assembly Budget Office (Lee et al., 2016)

Conclusions

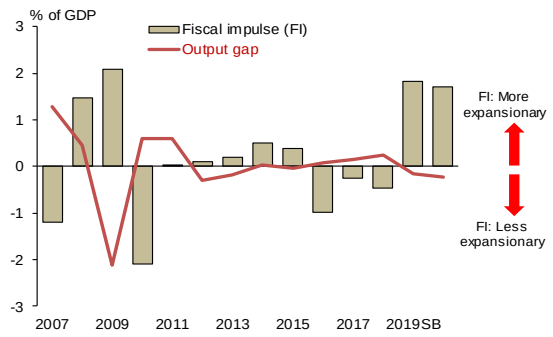
7. **In 2019-2020, the fiscal stance is expected to shift to a more expansionary position to support the economy.** Korea's overall fiscal balance has remained in surplus, mainly driven by continued accumulations in social security contributions. In the Figure (A3.11) below, excluding the social security balances that represent the government's future payment burdens to pensioners, the fiscal balance turns into deficit, leading to a gradual rise in government debt. In 2019-2020, according to AMRO's estimation on the cyclically adjusted fiscal balance, the fiscal stance is likely to become more expansionary (Figure A3.12). Considering the growth outlook is below potential, more expansionary fiscal policy is encouraged to arrest a potential economic slowdown.

Figure A3.11. Overall Fiscal Balance



Note: The 2019-20 figures are based on AMRO projections.
Source: Ministry of Economy and Finance; AMRO staff estimations

Figure A3.12. Fiscal Stance



Note: Fiscal impulse (FI) is defined as the annual changes of cyclically-adjust fiscal balances; The 2019-20 figures are based on AMRO projections.
Source: AMRO staff estimations

8. **The implementation of counter-cyclical fiscal stimulus should be timely, targeted and temporary to increase its effectiveness.** To enhance the effectiveness of the supplementary budget, the lags in legislation and implementation should be reduced. Moreover, a higher degree of flexibility to adopt counter-cyclical policy tools, such as unemployment insurance for which the eligibility could be adjusted under the government's own discretion, may be considered to expedite the government's response. Meanwhile, current transfers should be made to lower-income groups that are highly liquidity-constrained. To maximize the impact of a short-term stimulus, a temporary increase in government

consumption could be considered owing to its higher fiscal multiplier. Lastly, regarding more frequent implementations of counter-cyclical measures in recent times, ex-post policy assessment, such as 'Program Assessment Rating', to measure their impacts on the economy should be continually implemented and intensively.