Is Economic Security National Security? Defining South Korea's Economic Security for Future Industries

By June Park

Introduction:

Defining "Economic Security": The South Korean Response to U.S. Industrial Policy

Is economic security national security? What are the impediments to making economic security an independent pillar of national security in the post-pandemic era? Within the scope of international relations, the concept of economic security has traditionally been broadly defined as a subset of national security. During the pandemic and into the endemic, the first term of the Biden administration has seen a further surge in policy interest and several policy initiatives to integrate supply chain issues into the national security narrative.[1]

Faced with global supply chain shortages during the pandemic, the United States went from releasing the "100-Day Review" report, which identified four critical elements of future industries–semiconductors, batteries, pharmaceuticals and critical minerals – to mobilizing efforts to revitalize the U.S. economy geared towards future industries via the Inflation Reduction Act (IRA) and the Chips & Science Act.[2] The IRA increases public investment in green energy and inclusivity, and the second aims to bring back chip manufacturing to the United States to complete the semiconductor production ecosystem – of which the United States lacks sufficient foundries – to prevent supply chain issues in the future. Through such legislation, the Biden administration has changed U.S. industrial policy in the aftermath of the pandemic and amidst the geopolitical turmoil from the ongoing war in the Ukraine.

Industrial policy has become a buzzword and a campaign slogan for domestic politics in the run-up to the 2024 U.S. presidential election. Moreover, several industrialized economies are introducing subsidy-based policies to launch chip production facilities within their own jurisdictions to ensure chip supply.[3] In addition to the CHIPS and Science Act, the United States implemented a series of export

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controls on semiconductors through the Bureau of Industry and Security (BIS) for national security reasons. The uncertainty surrounding these export controls and their implications for semiconductor production in China compelled countries with extensive foundry capacity – notably Taiwan and South Korea – to build foundries within the United States, while uncertainty remained about the level of subsidies they would receive from the United States government.

From the U.S. perspective, it appears as though allied and partner countries' economic losses borne from participating in the U.S. industrial policy drive under national security concerns should be considered as defense burden sharing.[4] But the U.S. industrial policy drive was not without criticism, both domestically and internationally.[5] In Washington, there is a lack of attention and effort to the understanding of policy responses from countries on the receiving end of U.S. industrial policy. Given the United States is entering the presidential election cycle, it is likely the industrial policy drive will be hotly debated within the context of the U.S.-China relations, focusing on technology and AI, and lead to further policy gaps with U.S. allies and partners.

This paper attempts to fill a gap in the policy discourse with a detailed account of how U.S. industrial policy is perceived in South Korea, one of the countries that has been asked to participate in the broader scope of that policy, with particular emphasis on export controls and semiconductors. It examines South Korea's approach to economic security by unraveling how its political leadership and public and private sectors have responded to the Biden administration's industrial policy drive, which entails political and economic commitments by South Korea.

The paper examines South Korea's launch of its own industrial policy through the Advanced Industries Act and the K-Chips Act. The paper argues that, although internally divided, South Korea's policy response prioritizes protection of the industrial capacity of its future industries. Despite organizational conflict within the bureaucracy resulting from the country's fiscal challenges, South Korea's policy mindset on economic security is not necessarily defined as national security. Rather, it is designed to protect and nurture its talent and future economic prosperity by retaining its advantages in cutting-edge technology.

South Korea's Approach to Economic Security: Leadership, Public, and Private Sectors

As a global technology player and a major export economy, South Korea became acutely aware of the reshuffling of supply chains during the COVID-19 pandemic. The U.S.-ROK bilateral summit between Presidents Moon Jae In

and Joe Biden in May 2021[6] occurred at a time when South Korea did not have indigenous COVID-19 vaccine development or production capacity (of mRNA vaccines), and the Moon administration was under heavy pressure as it was late in the game for bilateral contracts with global pharmaceuticals.[7] Some reports have speculated that the U.S. leveraged vaccines to solicit the construction of Taiwanese and South Korean foundries in the U.S. to ease the global chip shortage, which impacted auto manufacturers in the U.S. and around the world.[8] Taiwan's TSMC became the main negotiator to gain access to COVID-19 vaccines from the U.S. and pledged a $40 billion foundry in Phoenix, Arizona.[9] South Korea's Samsung pledged to build a $17 billion foundry in Taylor, Texas, adjacent to the Samsung Austin Semiconductor which had been in operation since 1996.[10]

The change in political leadership from Moon Jae-in to Yoon Suk Yeol[11] was accompanied by drastic changes in foreign affairs, especially regarding U.S.-Japan-South Korea trilateral cooperation, primarily to address North Korea's increasing missile threats.[12] Amid the intensifying U.S.-China tech war, there has been considerable apprehension in South Korea on China's view of trilateral cooperation, given South Korea's economic reliance on the Chinese market. Once the political leadership changed from Moon to Yoon in March 2022, the bureaucracy followed suit, as the South Korean policymaking structure evolves around the presidency. At the outset of the Yoon administration, the term "technological alliance" was used frequently but over time faded, upon the stark realization that the Biden administration's "friend-shoring" policies are for "Made in America," and that such an alliance does not exist.[13] Several U.S. policies to deter China's technological advancement in semiconductors via BIS may impact South Korean firms, and the passage of IRA would exclude South Korean EV producers from U.S. subsidies, creating concerns for South Korean industries, though these concerns were addressed to a degree through the rule making process for commercial vehicles under the IRA. Using the term technological alliance, however, would be inappropriate when it is uncertain how South Korean industries would benefit from U.S. policy moves.

The South Korean bureaucracy – primarily the Ministry of Foreign Affairs – has been at the forefront of reestablishing ties with Japan, while being fixated on fortifying relations with the United States for national security reasons. There was considerable U.S. pressure on South Korea to normalize relations with Japan following the rift resulting from the 2018 South Korean Supreme Court decision surrounding Japanese forced labor practices during wartime and the Japanese export controls on three major semiconductor production materials

(hydrogen fluoride, photoresist, polyimides) in July 2019.[14] The U.S. push for trilateral cooperation led to the South Korean president's visit to Japan in March 2023 and the U.S.-ROK-Japan Camp David Summit in August 2023.[15] Although the Camp David Summit joint statement mentions cooperation on technology, including semiconductors and battery supply chains, the summit focused primarily on security cooperation and the reality of intense industrial competition in cutting-edge technologies was conveniently brushed aside. As we will see in the third section regarding the K-Chips Act, the Ministry of Economy and Finance (MOEF), the Ministry of Trade, Industry and Economy (MOTIE) and the Ministry of Science and Technology (MOST) have been grappling with the task of designing policy solutions for economic security. They have focused on the preservation and rearing of talent for future industries – in particular the buildup of an ecosystem and cluster system semiconductors – amid organizational conflicts on the fiscal cost.

Public and private sector interactions became very salient in building the policy response to U.S. industrial policy and designing the blueprint for South Korea's own economic security. At the public sector level, with Deputy Prime Minister for Economy Chu Kyung-ho at the helm, the heads of MOTIE, the Ministry of Land, Infrastructure and Transport (MOLIT), the Ministry of SMEs and Startups, the Ministry of Science and ICT (MSIT), the Ministry of Education (MOE), the Ministry of Agriculture, Food and Rural Affairs (MAFRA), the Ministry of Environment (MOE), the Financial Services Commission (FSC) and the Ministry of the Office for Government Policy Coordination are all involved in planning an industrial policy for future industries. Amongst the South Korean bureaucracy, MOTIE has been the agency most in touch with the industry. MOTIE official have shuttled back and forth between Washington and Seoul to prevent South Korean industries from receiving adverse treatment from BIS export controls on semiconductors, IRA provisions on EVs, and the guardrails for the Chips and Science Act subsidies.[16] MSIT has been instrumental in setting a strategic technology roadmap for future industries.[17] For the private sector, the concerns regarding the uncertainties of U.S. subsidies provided by under the Chips and Science Act and the IRA were shared by Taiwan and France.[18] Severe competition in the global market is the harsh reality for South Korean companies – the big four conglomerates are striving to maintain their standing and to hold onto South Korean talent.[19] In writing and passing the Act On Special Measures For Strengthening The Competitiveness Of, And Protecting National High-tech Strategic Industries (Advanced Industries Act in short), a public-private committee was established to discuss priorities.[20]

Public opinion remains divided on security and economic matters. The critical role China plays in global supply chains continue to put South Korean companies at risk. South Korea experienced Chinese economic coercion upon the deployment of the Terminal High Altitude Aerial Defense missile defense battery (THAAD). This experience created muscle memory for defensive measures or diversification of sources, as did Japan's export curbs of semiconductor fabrication materials against South Korea in 2019. An example of such defensive measures was the activation of an early warning system under the Moon administration in November 2021, after facing a urea shortage from China, upon which South Korea relies for diesel trucks.[21] The same problem resurfaced in December 2023, signaling to continuing challenges of supply chain disruption in the country's trade with China.[22] Furthermore, at the Asia-Pacific Economic Cooperation (APEC) Forum in November 2023, the Yoon administration sought to upgrade such early warning system to incorporate high-tech supply chain issues for easing vulnerability.[23]

While there is apprehension over alarming North Korean missile tests and China's technological catch-up, China remains a viable and indispensable market and site for production, making an immediate exit impossible. Nonetheless, South Korea needs to diversify away from China.[24] South Korean industries are eyeing India as a production site for sale to the Middle East and Europe. Meanwhile, while trilateral cooperation is touted by the United States, the South Korean public is uneasy about Japan as a reliable partner, given the previous export curbs that prompted the South Korean chip industry to diversify their sources.[25] On semiconductors, there is clear intent by the Japanese Ministry of Economy, Trade and Industry (METI) to gear up on semiconductor business via Rapidus in Hokkaido, backed by Tokyo Electron and IBM (patents), but the funding scheme or the technological catchup does not seem viable at the moment for Japan.[26]

Economic Security in Legislation on Future Industries: South Korean Industrial Policy on Semiconductors, EVs, and EV Batteries

In understanding how South Korea is formulating its roadmap for economic security, one must refrain from focusing on the optics of the country's diplomatic and foreign relations, and rather look toward its response to specific U.S. legislation and U.S. executive branch measures as well as its own domestic legislation on future industries. Before turning in greater detail to South Korea's economic security strategy on semiconductors, it is important to review how it navigated challenges surrounding EVs and EV batteries.

By the time IRA was passed in August 2022, South Korea's LG Energy Solution and SK On had just resolved a patent dispute on EV battery technology at the USITC.[27] After the issue had been resolved, South Korean EV producers such as Hyundai Motor Company and Kia Motors Corporation were steadily increasing their presence in the U.S. EV market but were dumbfounded by the IRA's clause requiring final assembly in North America to be eligible for IRA subsidies. Both companies EVs were assembled in South Korea and would not qualify for the EV consumer tax credit (up to $7,500) under the IRA. They would lose first mover advantage in the U.S. market by being discriminated against. The IRA's passage was received as a betrayal by South Korean EV players, as it came after Hyundai's commitment to build an additional $5.5 billion EV plant in Georgia by 2025. The announcement by Hyundai Motors Executive Chair Chung Eui-sun during Biden's visit to Korea in May 2022 was followed by Biden's statement that the new factory near Savannah, Georgia – a key swing state in U.S. electoral politics – would create more than 8,000 new American jobs, at a point when the U.S. was headed towards the mid-term elections in November 2022.[28]

South Korean Trade Minister Ahn Duk-geun immediately engaged in negotiations with United States Trade Representative (USTR) Katherine Tai, and there were two tweaks in the IRA. On December 29, 2022, the Internal Revenue Service stated leased vehicles would also be eligible for tax credits under the IRA. Then, on March 31, 2023, the U.S. Treasury Department announced a rule for the IRA's content requirements that includes general criteria for U.S. FTA partners, which would include Korea under the KORUS FTA.[29] However, the U.S. Treasury's recent announcement on "a Foreign Economy of Concern" (FEOC) that would require less than 25% of shares in a joint venture with a Chinese firm for IRA subsidy eligibility would compel South Korea's joint ventures on EV batteries with Chinese companies to readjust the proportion of shares through negotiation.[30] Given China's upper hand in critical mineral sources for batteries, South Korean players face an uphill battle to comply with U.S. regulations.

The enactment of the IRA and these developments between the United States and Korea were covered in full detail by the South Korean media and led to considerable political pressures on the Yoon administration. Public opinion reflected discontent about the government's lack of business intelligence toward the passing of the IRA and not being observant enough towards the legislation. The South Korean public questioned the United States' end goal in "friendshoring" and the validity of cooperation with the United States on future

technologies. It also led the South Korean government to proceed with joint investment with battery companies to develop advanced technologies, announce investment tax credits for its own EV plants within South Korea, and push through with legislations to protect South Korean battery technologies, alongside semiconductors, displays, and biopharmaceuticals.

Turning specifically to semiconductors, South Korea passed three laws central to its economic security strategy in response to U.S. export controls and the Chips and Science Act. These laws demonstrate South Korea's policy response to U.S. industrial policy is focused on fortifying its innate capacity and protecting technology and talent for the potential growth of future industries, in which South Korea is strong. The government is focused on: 1) giving tax breaks to encourage further investment; 2) preventing tech leaks and talent loss; and 3) securing the chip supply chain.

The 'K-Chips Act' (K 칩스법) or the Act on Restriction on Special Cases Concerning Taxation (조세특례제한법)

The K-Chips Act was proposed by National Assemblywoman Yang Hyang-ja, an independent lawmaker and former chip engineer and executive of Samsung.[31] It was an amendment to the Act on Restriction on Special Cases Concerning Taxation to give partial tax breaks to companies ranging from conglomerates and middle-standing to SMEs engaged in the semiconductor industry. The amended Act took effect in April 2023. During the drafting of the amendments, partisan discord on the tax deduction rate and conflicts between MOTIE and MOEF arose. MOTIE was primarily concerned about South Korean industrial competitiveness as the U.S.-China tech conflict on chips became heated, and MOEF worried about reduced tax revenue due to the proposed tax deductions given to semiconductor firms. The presidency had to step in to set the originally proposed rates at a higher rate and to give impetus for the bill to be passed.[32] Both domestic and foreign companies investing in the 2023 fiscal year are eligible for the tax breaks in the amended act. According to the Korea Economic Research Institute, raising the tax deduction rate from 8% to 15% would save KRW 2.5 trillion for the local chip industry.

Table 1. Tax Deduction Rate from the K-Chips Act

Catagory	Tax Deduction Rate for Current Investment			Deduction Rate for Increased Investment
	Large Companies	Middle-Standing Companies	SMEs	
General Technologies	1 → 3	5 → 7	10 → 12	3 → 10
Newly Emerging Growth and Original Technologies	3 → 6	6 → 10	12 → 18	
National Strategic Technologies	8 → 15	8 → 15	16 → 25	4 → 10

Note: Total tax deduction amount for investments for companies = (investment amount * tax deduction rate for the current investment) + (increased investment compared to the preceding three-year average * tax deduction rate for the increased investment)

Source: 조세특례제한법 일부개정법률안 입법예고, Ministry of Trade, Industry and Energy (MOTIE)
https://www.moleg.go.kr/lawinfo/makingInfo.mo?lawSeq=71634&lawCd=0&&lawType=TYPE5&mid=a10104010000

As indicated in Table 1, for instance, a large company which annually invests 100 billion KRW focusing on newly emerging growth and original technologies can receive a total tax cut of 17 billion KRW from the temporary tax deduction for increased investment (6 billion KRW each for 2023 and 2024) and an additional 5 billion KRW for the increased amount.

The concerns expressed by MOEF are indeed valid, as the South Korean government faces fiscal challenges.[33] The government experienced a deficit of 2.7% of GDP in 2020 (on a general government basis), as spending soared to offset the impact of the pandemic, but the deficit declined to -0.6% of GDP in 2022. However, with the most rapid population aging in the world, government spending is certain to soar in the years ahead, making it important to maintain

a sound fiscal position. Nonetheless, the overall loss from losing a competitive edge in semiconductors would be insurmountable for the South Korean economy, as witnessed in the earning shocks in the previous quarters in 2022 and 2023. For recovery, any form of government support for the industry is highly desirable as the competition gets fiercer.

While the K-Chips Act falls short in amount to support South Korea's expansion of chip production capacity and upgrading of the industry, it is seen as an attempt to bolster the semiconductor ecosystem in South Korea. Samsung Electronics intends to spend $230.4 billion to build a semiconductor ecosystem cluster in the city of Yong-in in Kyeonggi province outside of Seoul, for operation by end of 2030. The cluster will focus on system semiconductor development and fabrication. Given the amount of electricity (up to 10GW and above by 2042) and water and land (4,150,000 square meters) that will be required to construct the cluster, a public-private partnership between local governments and industry was required. SK Hynix will also construct a chip-cluster in Yong-in by investing $88 billion and needed a breakthrough to overcome the water provision issue to construct the cluster.[34] Because the two clusters will require more than 10GW of electricity by 2050, nuclear power plant-based power generation (in addition to renewables for additional energy sources) would be indispensable for the plan to be executed thoroughly.

Enforcement Decree of the Act on Prevention of Divulgence and Protection of Industrial Technology (산업기술의 유출방지 및 보호에 관한 법률 "산업기술보호법" 시행령)

The Act on Prevention of Divulgence and Protection of Industrial Technology (ITA), implemented in February 2020, is intended to protect the future industries from technological spills, unintended tech transfers and the loss of tech talent.[35] South Korean companies struggle to find foreign tech talent.[36] Currently, there are nine different proposals for amending the law that are being circulated in the National Assembly by the ruling party, or in bi- or multi-partisan form, to meet the challenges of the heightened global tensions on technology, particularly on semiconductors, large capacity batteries, and displays – as will be explained in the following legislation on advanced industries.[37] The proposed amendments to the law entail protection of technology from spillover to overseas companies, trade secret theft, and theft of technologies developed by start-ups and SMEs. The list of technologies to be applied to the law can be updated or are subject to change.

Act on Special Measures for Strengthening the Competitiveness of, and Protecting National High-tech Strategic Industries or Advanced Industries Act (첨단기술전략산업법)

Under the Advanced Industries Act, enacted on July 10, 2023, the government designated 17 different technologies in the areas of semiconductors, displays, batteries, and biopharmaceuticals as future industries the country will strive to nurture and foster strategically.[38] The act diverges from the ITA in that the scope of the applicability of the law and designation of specific technologies differ. Under ITA, a broader spectrum of 75 technologies across future industries – automobiles, railroads, steel, shipbuilding, nuclear power, telecommunications, space, machinery, robotics, and hydrogen – are designated as core technologies into the national strategy. The Advanced Industries Act places emphasis on a more narrowly defined cluster of technologies related to the stability of supply chains and national and economic security, whereas ITA overseas the breadth of technologies that may impact the national security or economic well-being of the South Korean citizens. The Advanced Industries Act currently specifies at present eight specific technologies concerning semiconductors, as well as four technologies on displays, three technologies on batteries and two technologies on biopharmaceuticals (Table 2).

Table 2. Specific Technologies Governed under the Advanced Industries Act in Semiconductors, Displays, Batteries and Biopharmaceuticals

Industry	Technology
Semiconductors (8 technologies)	DRAM design, fabrication, device processing and 3-dimensional stacking, 16 nanometer (nm) or below
	DRAM stacking assembly and testing, 16 nm or below
	Stacked 3D NAND Flash design, fabrication, and device processing, 128 layers and above
	3D NAND Flash stacking assembly and testing, 128 layers and above
	Image sensor design, fabrication, device processing, 0.8-micrometer (μm) pixels and below
	DDI (Display Driver IC) design for OLED for display panel powering
	Fabrication and device processing and 3-dimensional stacking for foundries, 14 nm and below
	FO-WLP, FO-PLP, FO-PoP, SiP fabrication, assembly, and testing for System-on-Chip (SoCs) advanced packaging

Displays (4 technologies)	AMOLED Panel design, fabrication, processing, and powering (for displays of micro-types 3,000 ppi and above, medium types 500ppi and above, medium large types FHD and above, and large types 4K and above) (excludes module fabrication technology)
	Design, fabrication, processing, and powering of environment-friendly display panels of QD materials, full width at half maximum (FWHM) 40nm and below (90% and above at color gamout REC2020 standard, excludes LCD and module fabrication technology)
	Design, fabrication, processing, and powering of micro-LED applied display panels, 30 μm and below, mobile chip size 20 μm and below, microchip size 5 μm and below
	Design, fabrication, processing and powering of nano LED-applied display panels, size 1 μm and below (excludes module technology)
Batteries (3 technologies)	Design, fabrication, processing, and assessment of high-energy density lithium batteries (pouch type batteries of 280 Wh/kg and above, angular batteries 252 Wh/kg and above, cylinder type batteries 280 WH/kg and above and radius of 21 mm and below, and cylinder type batteries 260 Wh/kg and above exceeding radius of 21 mm)
	Cathode materials-based design, fabrication, and processing of large capacity lithium batteries (nickel content exceeding 80%)
	Design, processing, fabrication, and testing of ultra-high-performance electrode 600mAh/g and above (silicongraphite compound cathode, sulfer anode, lithium metal cathode) or next-generation lithium batteries (all-solid-state battery, lithium-sulfer batteries, lithium metal batteries)
Biopharmaceuticals (2 technologies)	Cultivation and refining of animal cells for developing and manufacturing of biomedical products (multiple-use bioreactor cell cultivation: 10,000 liters and above)
	Organoid cell culture and subculture for high-quality organoid reproduction cure development and fabrication (Autologous and allogeneic organoid reproduction cure culturation size: 100 dose/lot and above, organs-based organoid purpose cell construction: 80% and above, organs-based survival rate: 80% and above)

Source: The Law Times, June 9, 2023. https://www.lawtimes.co.kr/LawFirm-NewsLetter/188214

During the drafting of the Advanced Industries Act, a special public-private committee was established and industries that were originally not included lobbied hard, which led to the current list. Domestic companies in nine future industry categories filed requests to include 43 technologies under the Act, including: 18 technologies on semiconductors, five on batteries, four on autos, four on hydrogen, three on aerospace, two on food tech, one on textiles and one on solar panels, of which 17 were included on the list.[39] However, the law mandates the National Assembly to review the technologies governed by this law every three years, so the list may be changed or expanded in the future.

The national strategic industry roadmap that South Korea has outlined focuses on identifying core technologies that require tech sovereignty for industrial competition and survival.[40] The roadmap defines national strategic technologies as those that are strategically important from the perspective of the national economy, diplomacy and security, and creation of new industries, and span across twelve designated technologies: semiconductors and displays, batteries, cutting-edge mobility, next-generation nuclear power, high-tech bio, aerospace and aeronautics, cybersecurity, artificial intelligence, next-generation telecommunications, state-of-the-art robotics and fabrication, and quantum technology. Strong policy emphasis will continue to be placed on batteries and future mobility (i.e., self-driving vehicles, and K-UAM, or urban air mobility – flying taxis).

Conclusion

Given the recent rapprochement between the United States, South Korea, and Japan, one may conveniently assume that a U.S. military ally such as South Korea would fall in line with the U.S. push for cooperation even in the realms of critical technologies, as indicated in the joint statement at Camp David mentioning cooperation on supply chains, specifically on chips. Such diplomatic efforts relate directly to South Korea's national security concerns, particularly as North Korea has steadily increased the number and degree of missile tests.

However, while South Korea has adhered to BIS-led export controls on semiconductors, the chip industry is the backbone of its economy. As this paper shows, recent domestic legislation indicates South Korea is eager to construct its own version of industrial policy to nurture and protect technologies for future industries. The three laws examined above, the committees established based

on mobilizing public-private partnerships, and detailed funding plans using government and private sector capabilities across the semiconductor, display, battery, and biotech sectors reveal this policy drive at work.

South Korea's economic security prioritizes retaining and fortifying industrial capacity, in its policy response to the intensifying U.S.-China tech war and supply chain reshuffling. Going forward, U.S. and South Korean policymakers would also benefit from: 1) taking cautionary steps toward trilateral cooperation, given the public wariness on relations with Japan except for security cooperation concerning North Korea; and 2) taking into account the Korean public's strong sentiments in support of protecting future industries and perception of economic security concerns as directly related to their economic livelihood. Additionally, anxiety of tech transfer to China has always been existent in South Korea. Yet an equal level of anxiety regarding possible U.S. absorption of South Korean tech talent and industrial capacity has arisen amongst in recent years, as a result of the U.S. Chips and Science Act's subsidy guidelines and guardrails in tandem with BIS export control guidelines and IRA.

In sum, it would be an overestimation to expect that South Korea would adhere to a complete alignment with U.S. requests on cooperating on emerging technologies in the absence of its own industrial strategies for the future.

Endnotes

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