

Analyzing South Korea's Semiconductor Industry: Trade Dynamics and Global Position

Hyung-gon JEONG Senior Research Fellow, Center for East Asian and Advanced Economy Studies (hgjeong@kiep.go.kr)

I. Introduction

U.S. sanctions on China's semiconductor industry are causing major shifts in the global supply chain, affecting South Korea's industry due to its reliance on Chinese manufacturing. The Biden administration's increased sanctions, combined with global trends towards semiconductor self-sufficiency, are putting South Korea's semiconductor position at risk. Countries such as the U.S., China, and Japan are building up their domestic semiconductor industries, potentially affecting South Korea's position in the global market. Deeply integrated with China, Korean companies, face the challenge of reducing this dependence and adapting to the evolving supply chain landscape.

This paper examines the import and export trends of the South Korean semiconductor industry over the last five years to assess its global standing, identify challenges, and suggest strategic directions. Using data from the

Korea Customs Service from 2019 to 2023, the study analyzes trade patterns and supply chain configurations within South Korea's semiconductor industry. The industry is divided into six main categories and 33 subcategories, based on the analysis of 381 semiconductor-related items categorized under the Harmonized System at the 10-digit level. This detailed classification allows for an in-depth examination of trade trends, supply chain structures, and associated risks within the South Korean semiconductor industry. Moreover, this research uses the classification method described and UN Comtrade statistics to create a dataset on global semiconductor trade. This dataset is used to analyze the international presence of the South Korean semiconductor industry and its market shares in China across different segments.

II. Import/Export Trends and Supply Chain of the Korean Semiconductor Industry

In 2023, South Korea's semiconductor exports amounted to \$131.09 billion, while imports totaled \$106.067 billion, resulting in a \$25.023 billion trade surplus, the lowest in five years.¹ The sector saw a 20% export reduction, exceeding the country's overall 7% export decline. Despite annually contributing over 20% to South Korea's exports, peaking at 25% in 2021, the sector's share dropped to a five-year low of 20.7% in 2023. The trade surplus in

semiconductors, which significantly supports South Korea's overall trade surplus, fell by 64% from the previous year.

Semiconductor exports stood at \$97.58 billion, and imports at \$59.982 billion in 2023, representing 66.4% of the industry's trade. Semiconductor manufacturing equipment trade was valued at \$27.356 billion, or 11.5% of the total, while silicon wafers accounted for only 1.5%. Trade in materials and parts reached \$48.79 billion, making up 20.6% of the industry's trade volume.

Table 1. Trends of Korea's Exports and Imports and Semiconductor Industry (2019-2023)

Classification	2019	2020	2021	2022	2023
Exports across all industry (USD million)	542,233	512,498	644,439	683,585	632,384
Imports across all industry (USD million)	503,343	467,633	615,037	731,370	642,593
Trade Balance Across All Sectors (USD million)	38,890	44,865	29,402	-47,785	-10,209
Semiconductor industry exports (USD million)	121,831	127,257	161,204	163,354	131,090
Semiconductor Industry Imports (USD million)	75,381	85,964	109,452	122,283	106,067
Semiconductor industry trade balance (USD million)	46,450	41,293	51,753	41,071	25,023
Semiconductor industry Export share (%)	22.5	24.8	25.0	23.9	20.7
Semiconductor industry Import share (%)	15.0	18.4	17.8	16.7	16.5

Source: South Korean Customs Service.

¹ This study provides a comprehensive analysis of the semiconductor industry, covering semiconductors, manufacturing equipment, silicon wafers, and related

materials and parts. Table 2 shows detailed data on South Korean semiconductors.

Table 2. Semiconductor Industry Export and Import Trends (2023)

Classification		Exports (USD million)	Imports (USD million)	Total (USD million)	Ratio (%)
Semiconductor	System semiconductor	43,326	36,914	80,240	33.8
	Memory semiconductor	51,381	17,962	69,343	29.2
	Optoelectronic components and discrete devices	2,876	5,106	7,982	3.4
Materials and Parts		24,742	24,057	48,799	20.6
Semiconductor manufacturing equipment		7,718	19,639	27,356	11.5
Silicon wafer		1,047	2,389	3,436	1.5
Sum		131,090	106,067	237,157	100.00

Source: South Korean Customs Service.

1. Trends by Country and Region

In 2023, South Korea's semiconductor exports showed a strong focus on specific markets, with China being the largest recipient at 35.8% and Hong Kong at 14.1%, together accounting for nearly half of South Korea's semiconductor exports. A significant portion of the exports to Hong Kong are believed to be re-exported to China, suggesting that around 50% of South Korea's semiconductor exports effectively go to China. This concentration represents a slight decrease from 2022, when the combined share for China and Hong Kong was 52%.

Apart from China and Hong Kong, Vietnam has become a notable destination for South Korea's semiconductor exports, claiming 12.3% of the total, with Taiwan and the United States also being significant markets. The trend of exports to Vietnam is on the rise. Regarding imports, China is also the largest source for South Korea's semiconductor industry, con-

tributing 25.3% of the total imports. Other major sources include Taiwan, Japan, and the United States, with imports from Japan and the U.S. consisting mainly of semiconductor manufacturing equipment and materials. Imports from Taiwan include both processed South Korean semiconductors and system semiconductors.

Trade dynamics reveal a substantial surplus with China, Hong Kong, and Vietnam, contrasting with deficits with Japan, the Netherlands, and Taiwan. The surpluses with China and Hong Kong are particularly significant and contribute greatly to South Korea's overall trade surplus in the semiconductor sector. However, the trade balance has been evolving, with the surplus with China peaking in 2021 and a slight decline in the surplus with Vietnam in 2023. The largest trade deficit in 2023 was with Japan, followed by Taiwan, the Netherlands, and Germany, highlighting the challenges and complexities in South Korea's semiconductor trade.

Table 3. Export and Import Trends in the Semiconductor Industry by Country (2023)

Nation	Exports (USD million)	Imports (USD million)	Export share (%)	Import share (%)
China	46,897	26,855	35.8	25.3
Hong Kong, China	18,531	1,082	14.1	1.0
Vietnam	16,079	3,527	12.3	3.3
Taiwan, China	11,383	19,170	8.7	18.1
USA	10,677	10,938	8.1	10.3
Singapore	5,691	5,970	4.3	5.6
Japan	3,153	16,623	2.4	15.7
Germany	1,126	3,275	0.9	3.1
Netherlands	845	5,766	0.6	5.4
Sum	114,382	93,206	87.3	87.9

Source: South Korean Customs Service.

2. Trends by Industry Sector

South Korea's semiconductor industry shows varying trade balances across its segments in 2023. The memory and system semiconductor sectors recorded surpluses, with memory semiconductors at \$33.4 billion, down 45.6% year-on-year, and system semiconductors at \$6.4 billion, down by 51.2%. In contrast, significant deficits were observed in semiconductor manufacturing equipment and silicon wafers, with the former facing an \$11.921 billion deficit. When the industry is broken down into 33 sectors, notable surpluses were recorded in specific areas of memory and system semiconductors. The DRAM, MCP,

and flash memory sectors, in particular, showed strong surpluses, with the MCP sector leading the way at \$16.23185 billion, followed by DRAM at \$14.23475 billion. In the system semiconductor segment, processors and controllers recorded a \$3.5 billion surplus, with Flash memory adding \$3.036 billion. However, trade deficits were prominent in sectors like optoelectronic components & discrete devices, and silicon wafers, with deficits of \$2.23 billion and \$1.342 billion, respectively. The semiconductor manufacturing equipment segment also faced challenges, with deficits in photo equipment, etching equipment, and ion implantation equipment, indicating areas for attention within the industry.

Figure 1. Trade Balance Trends by Major Semiconductor Industry Sectors (2023)

(Unit: USD million)



Source: South Korean Customs Service.

3. Memory Semiconductor

In 2023, multi-chip packages (MCPs), dynamic random-access memory (DRAM), and flash memory were key to South Korea's semiconductor exports, particularly to China and Hong Kong, which held 41% and 27% market shares respectively. MCP, crucial for its high-capacity NAND flash and mobile DRAM, had its largest exports to Hong Kong at \$11.06 billion, followed by China at \$15.94 million. These regions dominated South Korea's MCP exports with 49% and 22.7% shares, while imports from these areas were 9.7% and 72.1%, showing their reliance.

DRAM exports to China and Hong Kong were significant at \$10,731.5 million and \$1,940.72 million respectively, with imports from these regions at \$5,581.79 million and \$88.94 million, representing 67.3% and 1.1% of South Korea's DRAM imports respectively. Flash memory trade with China was notable, with exports at \$4,843.5 million and imports at \$2,957.2 million, highlighting China's substantial influence on South Korea's Flash memory trade with export and import shares at 79.7% and 97.2% respectively. This heavy dependence on China for key semiconductor components poses potential supply chain risks amid geopolitical uncertainties.

3. System Semiconductors

In the system semiconductor sector, processors and controllers stand out as major export items for South Korea, with China being a key market, absorbing about 33% of these exports. In 2023, global exports of these items reached \$31.415 billion, and imports were at \$27.902 billion, resulting in a \$3.513 billion trade surplus. Despite a 22% drop in exports from the previous year, the figures remained above the 2021 benchmark of \$30.4 billion. China was the primary destination for South Korea's system semiconductor exports, especially processors and controllers, which made up 82.9% of exports to China, amounting to \$11.620 billion. In contrast, imports of these items from China were valued at \$2.749 billion. Taiwan emerged as the largest source of system semiconductor imports to South Korea, accounting for 45.2%, with Japan and China also making significant contributions. Processors and controllers dominated the imported system semiconductor items, highlighting their crucial role in South Korea's semiconductor import structure.

4. Equipment for Semiconductor Manufacturing

Korea's semiconductor manufacturing equipment industry is highly dependent on foreign sources, with significant trade deficits in more than half of the product categories within 13 sectors, including photolithography, measurement, ion implantation, etching, and test equipment. In 2023, notable deficits were observed in photolithography equipment (\$5.311

billion), measurement equipment (\$2.764 million), ion implantation equipment (\$2.735 million), and etching equipment (\$2.294 million). Particularly, the photolithography sector showed a heavy dependence on imports, especially from the Netherlands and Japan, with lithography equipment imports from the Netherlands reaching \$4.737 million in 2023, highlighting South Korea's substantial reliance on specialized international equipment. In the semiconductor industry's measuring equipment sector, the United States is the primary contributor, with Japan also being a key source, albeit with fewer items surpassing a 50% dependency. Ion implantation equipment, especially under specific harmonized system codes, exhibits a notable reliance on the United States, with 2023 seeing significant imports, mainly from the U.S., and notable contributions from Singapore and Japan. Etching equipment imports are more diverse, coming from Japan, the U.S., Singapore, and China, without a high dependence on any single country. Test equipment imports, mainly from Singapore and Japan, show a moderate level of dependence, including some from China.

5. Materials and Parts

The semiconductor materials and parts sector in South Korea relies heavily on imports, particularly from China, for key chemicals and components such as nitrous oxide, silicide, supercapacitors, production gases, nanopattern wafers, bonding wires, and hydrogen fluoride. These imports are crucial to the semiconductor manufacturing process. Japan is another key

source, especially for items requiring high levels of purity not achievable domestically. Imports from Japan include hydrogen peroxide, wafers, solder balls, fluorine polyimide, die bond paste, photoresists, and photomasks, essential for semiconductor production and indicating areas for potential improvement in domestic competitiveness. The most significant import to South Korea from the U.S. in the semiconductor materials and parts sector in 2023 fell under HS code 3824999090, with a total value of \$1.149 billion. Although South Korea's dependency on U.S. imports in this sector is limited, items like 20% dilute fluorine, semiconductor devices, and specific plating solutions, notably gold plating solution PGC powder, are highly dependent on US suppliers.

6. External Dependence in Key Semiconductor Industry Sectors

Over the past five years, South Korea's semiconductor industry has shown significant reliance on imports, particularly in the manufacturing equipment and materials sectors, with 34.9% and 33.5% of items respectively showing a dependence of over 70%. Japan is a leading supplier of these high-dependence items, accounting for over 50% in these categories and 39% overall. China is also a key source, especially for materials, parts, and certain semiconductor sectors, contributing to 27.5% of the highly dependent imports.

The decline in the number of items with over 70% external dependence in the South Korean semiconductor industry since 2019 could be attributed to companies' efforts to mitigate supply chain risks or a decrease in import volumes due to reduced semiconductor exports. This trend reflects strategic adjustments within the industry to enhance resilience and self-sufficiency.

Table 4. South Korea's Semiconductor Industry External Dependence Number of Items Exceeding 70% (2019-2023)

Nation	Optoelectronic components and discrete devices	Memory semiconductor	semiconductor manufacturing equipment	System semiconductor	Silicon wafer	Materials and Parts	Sum	Import dependence (%)
Canada						4	4	1.0
Swiss				1			1	0.2
China	25	19	17	15	5	33	114	27.5
Germany	2		4	2		One	9	2.2
France	2						2	0.5
UK			1				1	0.2
Hong Kong, China		1				1	2	0.5
Indonesia		1					1	0.2
Ireland			1				1	0.2
Italy				1			1	0.2
Japan	5	1	84	1		71	162	39.0
Mexico				1			1	0.2
Malaysia	1		4	1			6	1.5
Netherlands			9				9	2.2
Philippines			2				2	0.5
Singapore			3	1		3	7	1.7
Thailand						1	1	0.2
Taiwan, China	10	3	5	9			27	6.5
USA		1	14	22		25	62	14.9
Vietnam			1				1	0.2
Etc.		1					1	0.2
Total (case)	45	27	145	54	5	139	415	100.0
Share (%)	10.8	6.5	34.9	13.0	1.2	33.5	100.0	

Source: South Korean Customs Service.

Table 5. Annual Overview of Items with Over 70% External Dependence in South Korea's Semiconductor Industry (2019-2023)

Year	Optoelectronic components and discrete devices	Memory semiconductor	Semiconductor manufacturing equipment	System semiconductor	Silicon wafer	Materials and Parts	Sum	Import dependence (%)
2019	8	6	37	9	One	33	94	22.7
2020	8	7	31	19	One	28	94	22.7
2021	7	6	30	16	One	27	87	21.0
2022	15	5	25	9	One	28	83	20.0
2023	7	3	22	One	One	23	57	13.7
Sum	45	27	145	54	5	139	415	100.0

Source: South Korean Customs Service.

III. Korea's Position in the Global Semiconductor Market

1. Global Ranking of South Korea's Semiconductor Sectors

In 2022, South Korea accounted for 6.2% of the global semiconductor trade, valued at \$285.637 billion, making it as the world's sixth largest semiconductor trader. China led with a 20.11% share (\$931.04 billion), followed by Hong Kong (11.9%, \$552.391 billion) and Taiwan (11.7%, \$542.304 billion). The U.S. ranked fourth, contributing 8.1% (\$373.153 billion). South Korea's semiconductor trade volume was 52.7% of Taiwan's, highlighting the differences in scale and focus within their industries and reflecting the global market's competitive dynamics, where strategic actions impact national rankings.

Among the semiconductor industry's six key sectors, system semiconductors lead global

trade with a 40.8% share, followed by materials and components (29.4%), and memory semiconductors (15.9%). South Korea ranks 9th in optoelectronic components and discrete devices, holding 3.7% of global trade, while China dominates this sector with 23.6%. In memory semiconductors, South Korea has a 13.3% share, placing 4th globally, with China, Hong Kong, and Taiwan leading. For system semiconductors, South Korea's share is 4.9%, ranking 6th, with China, Hong Kong, and Taiwan as the top players. South Korea holds a 9.3% share in the silicon wafer market, ranking 4th, with China, Japan, and Taiwan leading. In semiconductor manufacturing equipment, South Korea ranks 6th with a 7.8% share, behind China, the U.S., and Japan. For materials and parts, South Korea ranks 6th with a 3.8% share, with the U.S., China, and Germany leading. These figures highlight South Korea's significant role in the global semiconductor industry and the competitive and interconnected nature of the sector.

Table 6. Semiconductor Industry Trade Volume and Global Share by Country (2022)

Nation	Trade volume (USD million)	Share (%)
China	931,004	20.1
Hong Kong, China	552,391	11.9
Taiwan, China	542,304	11.7
USA	373,153	8.1
Singapore	337,117	7.3
South Korea	285,637	6.2
Germany	212,201	4.6
Malaysia	184,426	4.0
Japan	183,914	4.0
UK	116,096	2.5
Mexico	103,167	2.2
Netherlands	75,177	1.6
Thailand	64,184	1.4
France	63,428	1.4
Italy	47,928	1.0
India	45,601	1.0
Canada	34,537	0.8
Poland	32,866	0.7
Czech Republic	32,497	0.7
Israel	32,404	0.7
Etc.	379,266	8.1

Source: UN Comtrade DB.

Table 7. World Trade Size and Proportion by Semiconductor Industry Sector (2022)

Semiconductor industry	Trade volume (USD million)	Share (%)
System semiconductor	1,887,833	40.8
Materials and Parts	1,359,393	29.4
Memory semiconductor	736,167	15.9
Semiconductor manufacturing equipment	370,519	8.0
Optoelectronic components and discrete devices	234,061	5.1
Silicon wafer	41,321	0.9
Sum	4,629,296	100.0

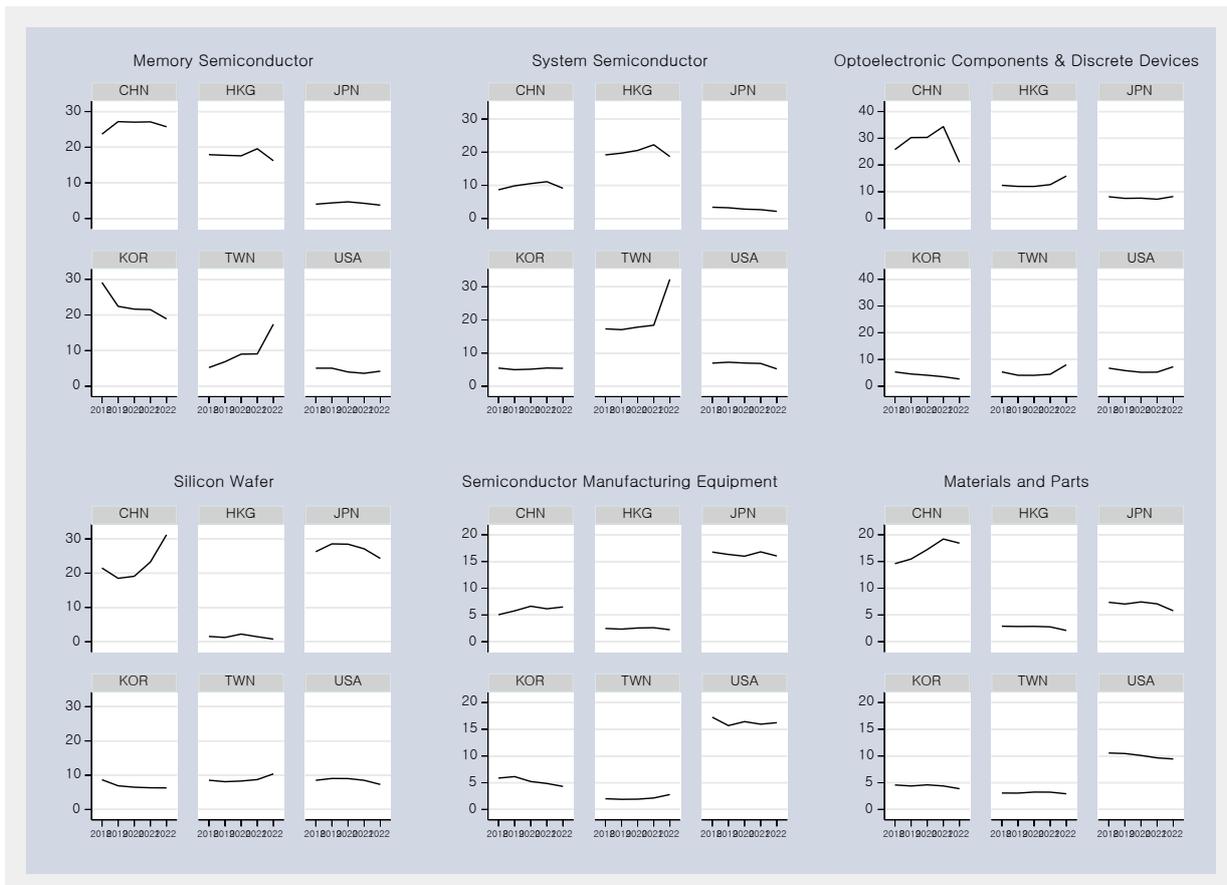
Source: UN Comtrade DB.

2. The Eroding Global Position of the South Korean Semiconductor Industry

Over the past five years, the South Korean semiconductor industry's global presence has diminished. South Korea's top export, memory semiconductors, saw its global market share fall from 29.1% in 2018 to 18.9% in 2022, moving to second place as shown in Figure 2. Meanwhile, China took the lead in 2019 with a 27.2% share, maintaining its position with 25.7% in 2022. This shift suggests that a significant amount of memory semiconductors, including those from South Korea, are now en-

tering the global market via China, emphasizing China's influence in the memory semiconductor supply chain. China's lead is attributed to its favorable semiconductor manufacturing environment, supported by government initiatives and strong infrastructure, attracting international firms to set up production there. The future of this trend, particularly with the possibility of US sanctions, is uncertain. Additionally, China is overtaking South Korea in key production areas like DRAM, Flash, MCP, and SRAM, highlighting its competitive advantage.

Figure 2. Evolution of Global Semiconductor Industry Export Market Shares by Country (2018-2022)



Source: UN Comtrade DB.

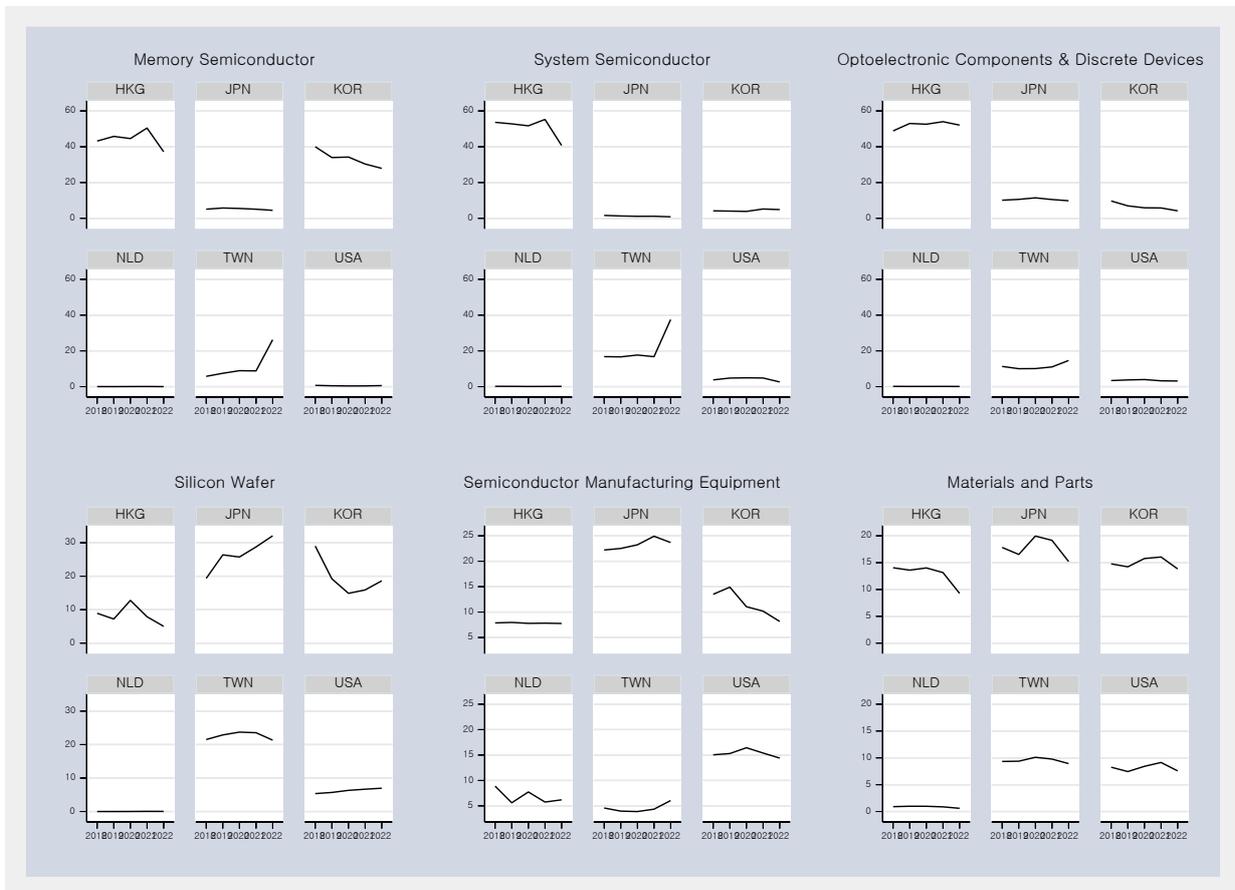
Over the past five years, South Korea's semiconductor industry has seen a decline in global market share across all sectors, while Taiwan has enjoyed a significant export boost in most areas. Meanwhile, China's semiconductor exports have been declining since 2021, except for a notable increase in silicon wafer exports, as shown in Figure 2. Both Taiwan and China are growing their global market shares, contrasting with South Korea's consistent decrease, raising concerns about South Korea's competitive position in the semiconductor field.

Despite South Korea's strong export presence in key memory semiconductor sectors like DRAM, Flash, and MCP, China's rapid expansion poses a significant challenge to its global leadership. The decline in South Korea's domestic production, amid US-China tensions calls for an urgent increase in manufacturing capacity to stabilize the global supply chain. South Korea must enhance its role as a semiconductor manufacturer and prioritize technological innovation to maintain its market edge. Strengthening domestic production, particularly for import-dependent categories, and focusing on system semiconductors are critical for South Korea's competitive position in the dynamic global semiconductor industry.

3. Market Share Dynamics by Industry and Country in China

The South Korean semiconductor industry's share of China's import market is declining, in contrast to Taiwan's improving performance. Since 2018, South Korea's market share for memory semiconductors in China has dropped, while Taiwan's has risen, as shown in Figure 3. In 2022, South Korea was second with a 27.9% share, behind Hong Kong's 37.2% and ahead of Taiwan's 22.2%. However, a significant portion of South Korea's exports to China passes through Hong Kong, making South Korea the de facto largest shareholder. Taiwan's increasing share in China's memory semiconductor market is notable, partly due to South Korea's semiconductors being processed in Taiwan before entering China. This trend, especially the 2022 surge in Taiwanese exports to China, is likely due to China's pre-emptive imports in response to potential US sanctions. In system semiconductors, while Taiwan leads in production, much of its export to China goes through Hong Kong, which holds a 40.7% share in China's import market, with Taiwan at 37.5% and South Korea at 4.9%. Taiwan's significant market share increase in 2022 is attributed to China's strategic imports from Taiwan ahead of US sanctions. In the silicon wafer sector, Japan leads with a 32.1% share, followed by Taiwan and South Korea. Despite China's increasing silicon wafer production, Japan continues to expand its market share in China and remains the top supplier.

Figure 3. Evolution of Semiconductor Industry Export Shares in the Chinese Market by Country (2018-2022)



Source: UN Comtrade DB.

The share of the South Korean semiconductor industry in the Chinese import market is notably strong in sectors like DRAM and multi-chip packages (MCPs), which are integral components of memory semiconductors. This prominence mirrors South Korea's position in the wider global export market across various other semiconductor sectors. Japan leads as the top provider of semiconductor manufacturing equipment, holding 23.7% of the market followed by Singapore and the United States with 17.4% and 14.4% respectively. South Korea contributes 8.2% to this segment.

Japan has been the dominant force in supplying semiconductor manufacturing equipment to the Chinese market, and its market share continued to rise until 2022, when it experienced a decrease. On the other hand, the United States, another significant player in China's semiconductor manufacturing equipment market, has seen its share diminish since 2021. In contrast, the shares of Singapore and Taiwan in this market witnessed an increase in 2022.

While the South Korean semiconductor manufacturing equipment industry doesn't have a

large share of the Chinese import market overall, it does have a relatively large presence in specific segments like mask production, assembly equipment, ion implantation equipment, wafer manufacturing equipment, and testing equipment. In the realm of materials and parts, Japan leads with a 15.2% share, followed closely by South Korea with 13.8%. Despite South Korea's modest global competitiveness in materials and parts, the relatively high share in the Chinese market can be attributed to intra-firm trade. This involves transactions between South Korean companies operating in China and their parent companies in South Korea, reflecting a unique feature of the industry that boosts South Korea's share in these specific sectors.

4. Competitive Analysis of the Semiconductor Industry: South Korea versus Taiwan

While the South Korean and Taiwanese semiconductor industries share structural similarities, the gap between their global and Chinese market competitiveness is growing. South Korea's capabilities in optoelectronic components and discrete devices are declining and its global market competitiveness appears low in 2022, while Taiwan has a high level of competitiveness in this area, as indicated by a trade specialization index close to 0.5. For the

memory semiconductors, South Korea maintains a high level of competitiveness with a trade specialization index above 0.5, although this is declining. Conversely, Taiwan's memory semiconductor industry, traditionally less competitive, is showing signs of improvement. Both South Korea and Taiwan face challenges in the global market for semiconductor manufacturing equipment, highlighting the need to improve competitiveness in this segment. The gap between South Korea and Taiwan is particularly pronounced in system semiconductors, where Taiwan's competitiveness has surged while South Korea has not made any significant progress. Regarding silicon wafers, both nations exhibit low competitiveness, yet Taiwan demonstrates a stronger recovery trend. In materials and parts, South Korea and Taiwan share low competitiveness and a high reliance on imports, highlighting the need for technological innovation to boost self-sufficiency. The comparison of the competitiveness of South Korea's and Taiwan's semiconductor industries in the Chinese market mirrors global trends, with the notable exception that South Korea's semiconductor manufacturing equipment industry is enjoying considerable success in China. For system semiconductors, South Korea's competitiveness in the Chinese market seems to be more pronounced than Taiwan's.

Figure 4. Trend Comparison of Trade Specialization Index between South Korea and Taiwan



Source: UN Comtrade DB.

IV. Conclusion

Since 2018, South Korea's semiconductor industry has seen its global export market share fall, highlighting the need for a shift towards strengthening domestic manufacturing and its ecosystem. Memory semiconductors, a key export, have fallen from a leading global share of 29.1% in 2018 to 18.9% in 2022, with China maintaining its lead since 2019. China's growth in the semiconductor export market, particularly in areas like DRAM and flash, has been driven by increased participation from Chinese and South Korean companies, as well

as an increase in China's general-purpose semiconductor exports. Despite the strong competitiveness of South Korean memory semiconductors, a decrease in the trade specialization index along with market share indicates a reduced competitive edge, highlighting the need for strategic responses.

South Korea's shrinking semiconductor market share globally and in China, contrasted with Taiwan's growing influence, especially in China, calls for strategic action. The decline in South Korea's market share and trade specialization index in China's import market over the last five years, prior to US sanctions on

China, suggests deep-rooted challenges beyond current geopolitical tensions. With Taiwan's increased government support for semiconductor innovation, South Korea needs to quickly implement its 'semiconductor mega-cluster' initiative to align with global trends where countries like the US, Japan, and the EU are boosting their semiconductor sectors to drive innovation and competitiveness.

To address the decline in competitiveness and export market share, South Korea must reinforce its leadership in the advanced semiconductors through strategic initiatives that enhance its competitive advantage and boost exports. The government has introduced support

measures such as R&D tax credits and investment incentives, aiming to create a leading semiconductor hub. However, global competitiveness requires that these incentives be increased to meet international standards. Increasing policy funding is crucial to develop science and technology talent, prevent brain drain, and strengthen the manufacturing industry, including support for SMEs, fabless companies, and the post-process sector. Addressing supply chain vulnerabilities, especially for products that are heavily dependent on specific countries, calls for continuous monitoring and encouraging innovation in highly dependent areas. **KIEP**

Appendix

Table A1. Classification of Semiconductor Items

Main Category	Subcategory
① Memory semiconductor	DRAM
	Flash
	MCP
	SRAM
	Memory Semiconductors-Others
② System semiconductor	Processor & controllers
	Amplifier
	Other integrated circuit semiconductors
	Integrated circuit semiconductor components
③ Optoelectronic components and discrete devices	Transistor
	Diode
	Discrete device
	Semiconductor-based transducer
	Other individual elements
④ Silicon wafer	Silicon wafer
⑤ Semiconductor manufacturing equipment	Wafer manufacturing
	Pre-assembly process
	Assembly
	Measurement
	Mask making
	By diffusion
	Photo
	Etching
	Ion Implantation
	Deposition
	Photosensitizer removal and cleaning
	Microscope
	Other support equipment
⑥ Materials and parts	Equipment parts for semiconductor manufacturing
	Materials and Parts