

# Interactions between Japan's “weaponized interdependence” and Korea's responses: “decoupling from Japan” vs. “decoupling from Japanese firms”

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Japan's  
weaponized  
interdependence

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## Abstract

**Purpose** – This paper aims at exploring the interactions between Japan's export curbs against Korea, dubbed as “weaponized interdependence,” and Korea's decoupling from Japan' phenomenon in response. Thereby, it sheds light on the characteristics of the semiconductor industry, where the two economies' effective division of labor takes place. In addition, it attempts to typology the “decoupling from Japan” into two types. Furthermore, it deals with the political-economic implications of bilateral trade disputes and projects in the future.

**Design/methodology/approach** – This paper segregates the economic concept of “decoupling” into “decoupling from Japan” and “decoupling from Japanese firms” to better analyze the related phenomenon that occurred in Korea in response to the Japanese government's export restrictions in 2019. Along with it, the paper attempts to observe the trade dispute between Korea-Japan from a political-economic point of view.

**Findings** – The main findings are: First, Korea's decoupling from Japan' does not necessarily mean “decoupling from Japanese firms”. When Korean firms had to decouple from Japan due to non-economic factors, some has circumvented the decoupling to maintain economic ties with Japanese firms in the market, stemming from long-term transaction relationships in the semiconductor industry. Second, the two countries were confronted in a modest manner, even though they seemed to be fighting like a fierce tit-for-tat chicken game as those economies are interdependent with one another. Hence, both put effort to avoid sober damages or disruptive results on two economies and the global semiconductor supply chain.

**Originality/value** – The originality of this paper is to typologize the characteristics of “decoupling from Japan” in Korea by segregating it into two types of decoupling. On the other hand, other previous studies appeal to focus on the decoupling phenomenon *per se* and are interested in its potential for success.

**Keywords** Korea, Japan, Export restrictions, Weaponized interdependence, Decoupling

**Paper type** Research paper

## 1. Introduction

Japan announced that it would revise its “Export Trade Control Order,” to remove Korea from the “white country list” on July 1, 2019. The Order took effect on August 28 [1]. Despite the Japanese government's denial, it is widely believed that the action is Japan's economic retaliatory measure originated from the pro-longed bilateral historical disputes [2]. More than a year has passed since then. Henry Farrell and Abraham Newman (2019) [3] conceptualized “weaponized interdependence” phenomenon to explain how a hub state, say, global juggernaut, the US, exerts its coercive power when there is power asymmetry in the global economic network. In an article published in Washington Post on August 1, 2019, Farrell and



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Newman pointed out Japan's export control to be an example of "weaponized interdependence [4]." In the meantime, in response to Japanese export restrictions, Korea quickly proceeded to separate its economic tie from Japan as much as it could. This response of Korea regarded as "decoupling" from Japan. Thus, the ongoing bilateral trade dispute can be seen a dynamic interaction between Japan's "weaponized interdependence" and Korea's "decoupling."

Up until today, most of the discussion on this subject tends to focus on the current state and effectiveness of the decoupling. On the contrary, it has rarely paid attention to neither semiconductor-specific factors nor the background allowed Korea to reap satisfied outcomes in a short period of time.

In this context, this paper will first investigate the reason why Japan chose the export restrictions as a retaliate measure. Second, it will explore the background that enabled Korea's decoupling in a relatively short time, which sheds lights on the semiconductor industry-specific factors. Third, it will examine to what extent Japan's export restrictions affected Korean economy. And finally, it will address the political and economic implications of the bilateral trade dispute, and future projections.

The paper is organized as follows: [Section 2](#) identifies the paper's originality throughout literature review. [Section 3](#) investigates how the Japan's export controls as a "weaponized interdependence" carried out and its effects on the two economies' trades to answer to the above first and third research questions. [Section 4](#) demonstrates status and characteristics of Korea's "decoupling from Japan" as a response to the export curbs to answer the second question. [Section 5](#) consists of the interactions between Korea and Japan over the export controls for better understanding the close economic relations between Korea and Japan corresponding to the third question. Lastly, [Section 6](#) sums up and shows political economic implications of the findings.

## 2. Literature review

Korea's technological dependence on Japan has been regarded as one of the prolonged structural pitfalls of the Korean economy. As a result, skepticism about the achievements of Korean decoupling from Japan was dominant. However, Korea did not face to significant damage due to Japan's export restrictions, and the decoupling even seemed successful to some extent. If so, what about the reality? Will it be possible in the long run?

In the era of globalization of the economy, when the core global economic network has an asymmetric structure such as hub and spokes in which the former enforces its interests on the latter, Farrell and Newman (2019a) comprehend the grim international order as a concept of "weaponized interdependence." At this time, the hub country enjoys "panopticon effects" on the network, while also reaping "chokepoint effects" that block the interests of the spoke country. A specific means of it are jurisdictional grasp or institutions of the hub country.

However, Farrell and Newman (2019b) mentioned in the Washington Post that Japan's tightening of export restrictions on Korea is also regarded an economic retaliation against the Supreme Court ruling on the forced labors issue, despite of Japan's denial. Therefore, for these arguments to be convincing, it is necessary to clarify that Japan has a strong asymmetric advantage as a hub so that Japan's export restrictions on at least three items exert "panopticon effects" over Korea. In addition, it must be identified that it has the degree of institutional completion enough to block the interests of Korea by exerting "chokepoint effects."

Meanwhile, Farrell and Newman (2019a) also point out the broader limits to weaponize interdependence. This is because not all markets rest directly on asymmetric networks, not all sectors have internationalized or rest heavily on networks of exchange, and not all states are well integrated into the international economy. Goodman *et al.* (2019) focus on the supply

chain risks inherent in the high-tech semiconductor industry. However, their views on the global supply chain (hereinafter referred to as GSC) of semiconductors are somewhat different from Farrell and Newman (2019a). In today's semiconductor GSC, there are always supply chain risks as addressed in detail in [Section 3](#). Therefore, there is a limit to defining this relationship between companies as a clear hub-spoke relationship.

Yang-Hee Kim (2019) argues that Japan's intention to regulate exports targeting three items is to contain Korea's semiconductor industry. However, in this study, we pay more attention to ripple effects such as the panopticon and chokepoint effect due to its industrial and technical characteristics. In this paper, Japan's export regulation is understood as the concept of "weaponized interdependence." The core interest of this study is to see how the "decoupling from Japan" of Korea is progressing, and whether it has the ripple power to neutralize Japan's export regulations.

The "decoupling" is literally defined as "a situation in which two or more activities are separated, or do not develop in the same way" by the Cambridge Dictionary. In international economics, it refers to the situation in which two economies closely related each other move in different directions.

According to Farrell and Newman (2019a), targeted states by the hub of the global economic network attempt either to deviate themselves from the networks or to even rebuild networks to minimize their resulting vulnerabilities. The implicit assumption of decoupling is that the separation of economic relations between states also entails separation of business relations. However, the phenomenon of "decoupling from Japan" does not necessarily mean "decoupling from Japanese firms" in Korea. It may have a clue for forecasting the sustainability of Korea's decoupling from Japan.

Mukoyama Hidehiko(向山英彦)(2019, 2020) [5] pays attention to the "decoupling from Japan" in Korea as a trigger for Japan's export regulation, but it has not been able to find out the characteristics of the phenomenon. Yang-Hee Kim (2020) approaches Japan's export restrictions from the concept of "weaponized interdependence," but further systemic analysis is insufficient. Hence, this study attempts to further investigate the phenomenon shedding lights on the interactions between weaponized interdependence and decoupling following Yang-Hee Kim's (2020) methodology. In this regard, the paper is differentiated from existing related literatures.

### 3. Japan's "weaponized Interdependence": export controls

Japan's export restrictions are largely composed of two parts; (1) "list control" for military-specific and dual-use items, and (2) "catch-all control" for the rest. With the revision of Japan's above-mentioned export order, and subsequent removal of Korea from the white country list, Korea became subject to the catch-all control. Consequently, Japan's licensing procedure for the export of 857 dual-use items exported to Korea are subject to strict inspections, as they require "Individual Export License" now, rather than the "General Bulk Export License." As a result, the validity period for export licenses (3 years → 6 months), number of documents to be submitted (2 types → 9 types), and the license review period (1 week → around 90 days) changed, which increased the uncertainty when exporting to Korea. However, Japanese firms those owned the "Internal Compliance Program (ICP)," a sort of export certification system, remained to trade under "Special General Bulk Export License" that is almost the same with the "General Bulk Export License" in terms of the function and validity. Nevertheless, Japanese government went ahead on July 4, and immediately started to require "Individual Export Licenses" for the three items – hydrogen fluoride (HF), photoresists (PR), and fluorinated polyimide (FP).

To understand why Japan imposed retaliatory measures in the form of restrictions on the 3 core semiconductor materials, we need to first figure out the semiconductor industry. First,

there are two supply chain risks in today's semiconductor global chain (GSC) [6]. Semiconductor industry is a typical market of imperfect competition. A few firms playing in the market, high entry barriers of huge initial investment costs allowed them to create a monopolistic structure (see Figure 1). In a highly specialized GSC with a small number of "visible hands," the first risk is the difficulty of replacing suppliers, because firms normally tend to establish long-term relationships to minimize transaction costs. And, since the industry deals with dual-use high-tech technologies, the second risk is the impact of non-economic variables in the era of economy-security nexus.

Second, in this industry, Korea and Japan have established an efficient division of labor, as each specializing in memory chips, materials or equipment respectively. It must be noted that Korea is a global monopsony of materials and equipment for memory chips, therefore, a major buyer which Japan cannot ignore. At the same time, Korean semiconductor industry could rapidly expand based upon an active recruiting of Japanese engineers and manufacturing technologies. The industry is a symbol of Korea's economic development, benefitting in part from the US-Japan semiconductor dispute.

This structure of the semiconductor industry is reflected in the 3 controlled items. As mentioned earlier, in the monopolistic semiconductor market, where sellers and buyers cannot be replaced easily, a small number of competitors tends to react sensitively to each other's strategies. Japan is highly competitive in producing all 3 items, as a result, Korea is dependent on Japanese supply of the 3 items. At the same time, Korea is also dependent on Korea. This is reflected in the fact that almost, if not all, of the Japanese semiconductor firms exporting the 3 regulated items run local production subsidiaries in Korea in order to support R&D collaboration and Just-in-Time (JIT) supply to the monopsony such as Samsung Electronics. Before the export bans, however, all the 3 high-tech products were exported from Japan, whereas those with low-tech ones were produced by Japanese subsidiaries in Korea.

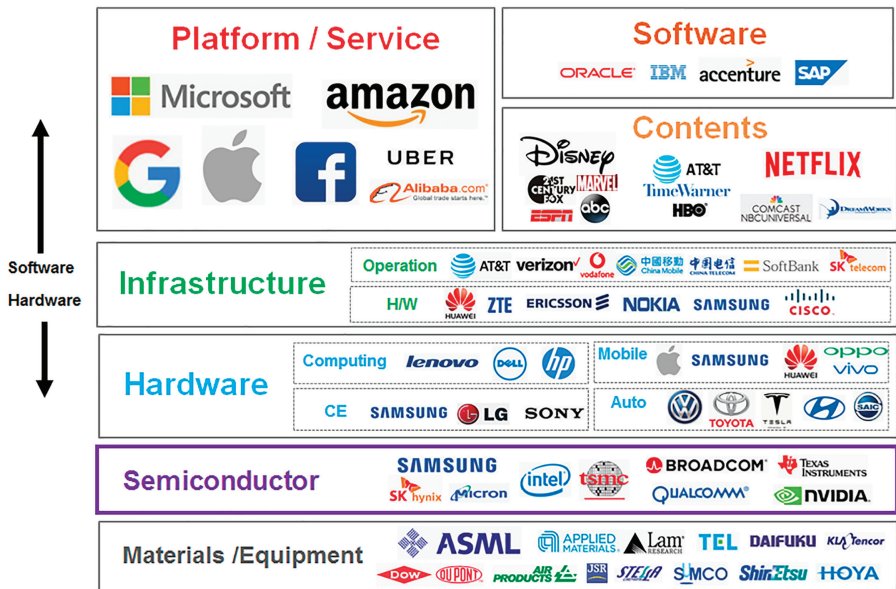


Figure 1. Forward and backward industries of semiconductor

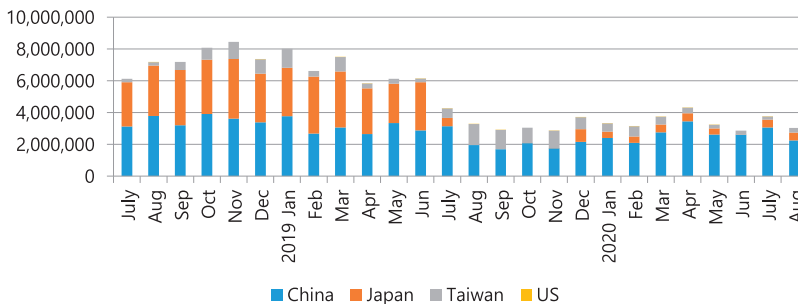
Source(s): Seung-woo Lee (2019), "Korea's responses and impacts on the GVC according to excluding of Korea in the White Countries in Japan" presented in IFANS, Korea National Diplomatic Academy

Korea took the export restrictions as a retaliatory measure related to the forced labor issue and strongly protested. Facing Korea's fierce resistance, Japan's Ministry of Economy, Trade and Industry (METI) and the CISTEC (Center for Information on Security Trade Control), a joint organization between the METI and Japanese exporters. They argued that Korea misunderstood the purpose and context of the restrictions and repeatedly emphasized that it would not in fact harm exports because of the following reasons [7]. First, the "Special General Bulk License" could be applied (excluding the 3 items) when exporting to firms with "ICP" status. Second, of the 857 non-sensitive items that Japan exports to Korea, the products Korea relied highly on Japan account for only 18.6% (159 items). Third, even for "Individual Licenses," the expiration or processing period can be shortened if there were no problems in exports, and the procedure becomes simpler once get hang of it. Fourth, the catch-all control could cause problems only in extremely unusual cases.

Then how much damage has Japan's export restrictions inflicted on Korea? It is hard to identify its impact on bilateral trade by means of general trade statistics as classification methods differ between the controlled items and general commodities items. In effect, the three chemicals were scattered into seven to eight items in terms of the 10-digit HSK code which Korea matched for the sake of convenience. Among the three items, the impact of hydrogen fluoride is easier to identify. From there, let us examine the short-term effects of the export control on hydrogen fluoride alone.

As we can see in Figure 2, the shares of Japan of total imports for HF (for making semiconductor) in terms of volume was 49.2% in June 2019. This sharply dropped to 12.4% in July, then to zero in August and September. The volume bounced to a mere 300 and 400 kg in October and November, respectively. After recovering to 21.4% in September, however, the share of Japanese ones remained in the 10% level dropped to not far from zero in June 2020 and again recovered up to 16.2% in August. Followed by the sharp decline in Japanese imports, the total volume of hydrogen fluoride imports in August 2020 was only a half of that of 2018. The share of exports to Korea, accounted for 85.3% of Japan's total exports in the first half of 2019, decreased by 83.4% in the second half. Instead, most of the volume Korea lost went to Taiwan. As shown in Figure 3, however, the unit price (price/weight) of the extremely small volume imported from Japan in October and November skyrocketed from US\$2/kg to US\$353/kg. A similar surge occurred in June 2020 as well. For the same reason, the unit price of imports from the US also jumped up to US\$870 in July 2019.

The share of Japan in total HF (for other use) imports was insignificant until the export restrictions. The import increased until September following the export control action, and then decreased until December, finally reached zero in January 2020 (see Figure 4). Subsequently, the volume of imports from Japan continued to decrease sharply and was largely replaced by Chinese products. After a resurgence in March 2020, there were numerous

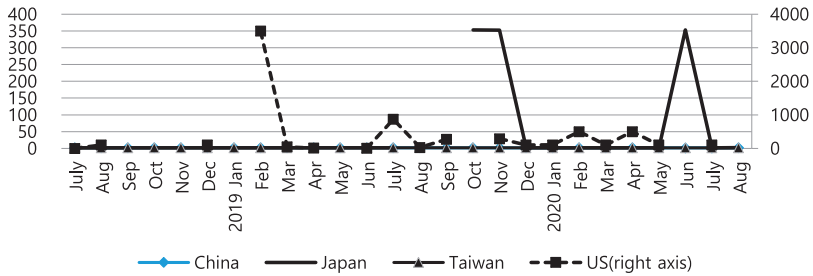


**Figure 2.**  
Import volume  
of hydrogen fluoride  
(for making  
semiconductor) by  
country (unit: kg)

Source(s): Constructed by the author based on K-stat (<https://stat.kita.net/>)

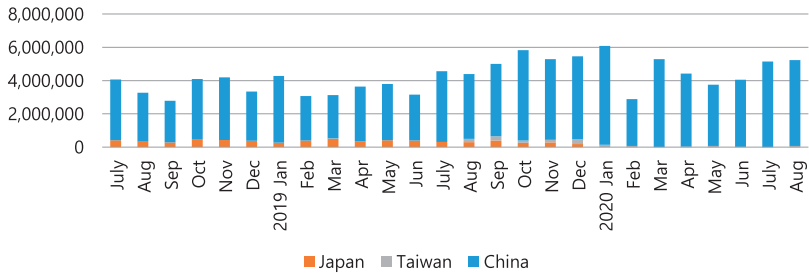
fluctuations, but the overall volume increased compared to last year. Total imports in August 2020, increased by more than 60% over the same period last year, due to a surge in demand for semiconductor spurred by Corona virus pandemic. However, most of the increased demand was sourced from not Japan but China. Owing to Japan's export restrictions, as shown in Figure 5, the unit price of Japanese imports rose to US\$11/kg in July 2019. However, throughout 2020, an exorbitant price of US\$500/kg had to be paid to import a miniscule amount. In July this year, the price of Taiwanese imports also recorded US\$50, which indicates that securing a stable supply source was so costly.

Based upon this analysis, it is obvious that at least when it comes to hydrogen fluoride, Korea suffered from sourcing its necessary items in the beginning. Fortunately, its supply



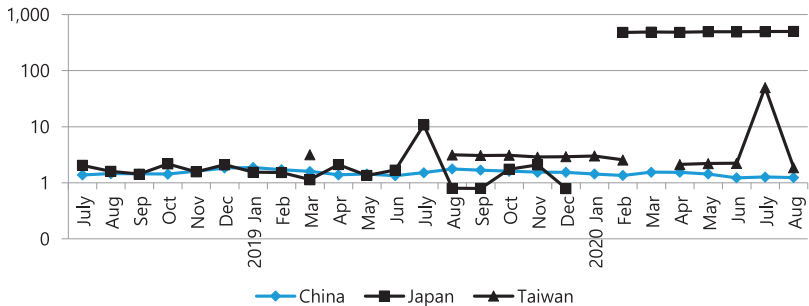
**Figure 3.**  
Unit import price of hydrogen fluoride (for making semiconductor) by country (unit: US\$)

Source(s): Constructed by the auhtor based on K-stat (<https://stat.kita.net/>)



**Figure 4.**  
Import volume share of hydrogen fluoride (other) by country (unit: kg)

Source(s): Constructed by the author based on K-stat (<https://stat.kita.net/>)



**Figure 5.**  
Unit import price of hydrogen fluoride (other) by country (unit: US\$)

Source(s): Constructed by the auhtor based on K-stat (<https://stat.kita.net/>)

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risks gradually stabilized with time owing mainly to speedy localization. Thus, the reality did not coincide with the general perception that almost no damage was inflicted on the Korean side. What is more, Japan seemingly suffered as much as Korea. In the long run, Japan's loss could further increase. This will be discussed in detail in the following section.

#### 4. Korea's response: "decoupling from Japan"

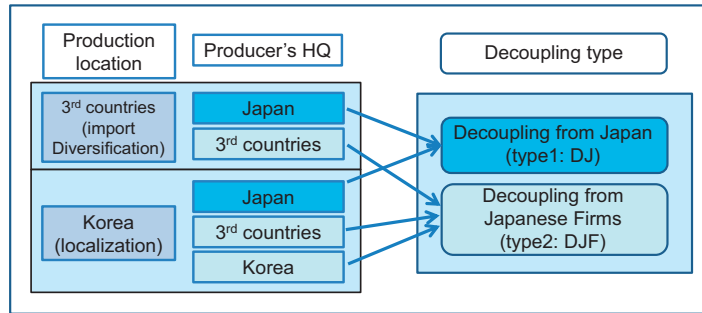
Korea immediately initiated "decoupling" measures to stand against Japan's export restrictions. On August 5, just one month after Japan tightened export controls on the 3 items, the Ministry of Trade, Industry and Energy (MOTIE) of Korea launched a plan titled "Countermeasures to Enhance the Competitiveness of Materials, Parts, and Equipment (hereinafter MPE)." The plan focuses on expeditious measures to stabilize the supply of key items and strengthening the competitiveness of the domestic MPE industry as a whole [8]. In other words, it is the very "decoupling from Japan." There are three major takeaways from the plan as follows. First, stabilize the supply of 20 leading items including the 3 controlled items within a year. In particular, MOTIE will provide support to rapidly secure alternative sources for importing the three items. For the next 5 years, MOTIE will provide investment support for R&D in key items out of the 80 leading items. For the other items, Korea will pursue import diversification, import substitution (localization), and inventory build-up at the same time. Second, the plan aimed at enhancing the competitiveness of not only the three items but the whole MPE industry. Third, measures to support the MPE industry were originally scheduled to end in 2021, but Japan's export curbs triggered transition of the temporary measures to permanent ones. At this moment, the scope of support is expanding towards R&D, cluster development, and building win-win relationships between big - and small and medium-sized enterprises. In this respect, the export restrictions have turned out to be a "blessing in disguise" for domestic SMEs, in particular, those who competing directly with Japanese firms.

It is worth noting that the MPE related policy is evolving in line with global environment changes. The COVID-19 pandemic is intensifying the strategic competition between the US and China [9]. The GSC is re-orienting itself towards localization and regionalization. It was by coincidence that the Korean government already had begun to make this shift a year ago in response to Japan's export control, which meant that the foundation was already in place for adapting to the post-COVID-19 environment. As such, the Korean government decided to go beyond Japan's current restrictions and to expand the number of supported items from 100 to 338. The criteria for support will be based upon the importance to industry security in terms of GSC risk management, and industry-wide impact.

By virtue of the government's support, Korea's "decoupling from Japan" is actively undergoing. In this respect, we need an analytical framework in order to accurately identify the characteristics of the current situation and to project the future. Interestingly, two types of decoupling happen in parallel; the first type is "decoupling from Japan (DJ)", thereby maintaining relations with Japanese firms. The second type is "decoupling from Japanese Firms (DJF)" where cutting off ties with Japanese firms in areas it looks feasible for third countries or Korean firms to catch up Japanese firms' competitiveness.

As shown in Figure 6, based on production location, "decoupling from Japan" is divided into production in third countries (import diversification) or in Korea (localization). But based on the Producer's HQ, the former is sub-divided into HQ located in Japan or third countries, and the latter is divided into Japan, third countries, or Korea. The types of DJ consist of import diversification to Japanese firms outside Japan and localization through Japan's subsidiaries in Korea. The types of DJF are either import diversification from third-country firms or localization by non-Japanese firms in Korea. Henceforth, an interesting trend is witnessed. In most of Korea's decoupling initiatives, Japanese firms are involved behind the scenes. This

**Figure 6.**  
Korea's decoupling  
from Japan by types

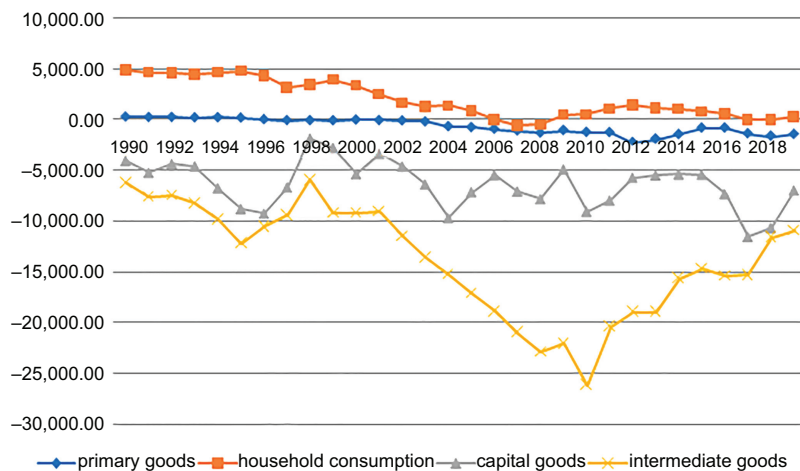


**Source(s):** Constructed by the author

leads to a unique distinction between “decoupling from Japan” and “decoupling from Japanese firms” in reality, despite both were reckoned the same in theory (see Figure 7).

Let us examine the current state of decoupling based on this analytical framework. DJ-type and DJF-type of decoupling are taking place in the space of HF. DJ occurs by replacing the import source from Japan’s Stella Chemifa and Morita to their Chinese or Taiwanese subsidiaries. DJF also shows hidden traces of Japanese firms. A Korean company, Soulbrain developed a high-purity hydrofluoric acid for semiconductors [10]. The localization effort was not so difficult, since Fect, a joint venture between Soulbrain and Stella Chemifa, had already been supplying low-purity hydrofluoric acid to Samsung in Korea [11]. Furthermore, it is said that a Japanese firm’s patent was employed in this process [12]. The DJF-type decoupling consists of localization by domestic firms such as Lam Technology, SK Materials and so on. DJF-type decoupling also happens with FP by Korean firms such as Kolon, SKC and SK Innovation.

In the case of photoresists, both of DJ and DJF types are found for EUV (Extreme Ultraviolet) photoresist (PR-EUV). Let us first look at the DJ-type decoupling. Korea used to import PR-EUV from JSR, Shinetsu, TOK, etc., since Japan in fact monopolized PR-EUV market before export restrictions. All three companies have joint ventures in Korea but produced only non-EUV photoresists in Korea while they imported more advanced PR-



**Figure 7.**  
Korea-Japan trade  
balances by processing  
stages (Unit:  
millions US\$)

**Source(s):** Constructed by the author based on K-stat(<https://stat.kita.net/>)



EUV from Japan. However, things changed drastically after the export control. Korea diversified its supply channels to RMQC, a joint venture between JSR and IMEC, a Belgian firm. Korea was able to circumvent Japan's restrictions through exports by the Belgian subsidiary.

DJF-type decoupling is also apparent. DuPont, a worldwide well-known US company that had attempted to develop PR-EUV several years ago, considered that this was the opportunity to enter the market and decided to redevelop PR-EUV in Korea. In the past, DuPont's affiliate, Dow DuPont had supplied other types of photoresists to Samsung Electronics. With two existing plants in Cheonan and an R&D center in Hwaseong, DuPont anticipates speedy commercialization. The one of the world class chemical companies is vying to gain access to a Korean semiconductor cluster on which Samsung is the hub. This will also benefit Korea in its effort to strengthen semiconductor clusters. Meanwhile, Samsung, SK Hynix, JSR from Japan, and TSMC from Taiwan have all invested in the US startup Inpria in order to develop next-generation PR-EUV. DuPont's move triggered another DJ event. Prompted by DuPont's swift reactions, TOK also decided to produce PR-EUV in Korea instead of exporting it from Japan as it did in the past, although it would hesitate to transfer the state-of-the-art PR-EUV technologies to Korea (see Table 1).

It is interesting that "decoupling from Japan," which started with the three items, is now spreading to other items depending on imports from Japan. Most of them have been highly dependent on Japan so far. Triggered by the restrictions, as uncertainty intensified, urgent action was needed in business side in Korea. The first response was to fully utilize the current Korea-Japan joint ventures in Korea for expeditious localization. This is because the two countries have well-established efficient long-term division of labor, and these relationships cannot be replaced easily within the semiconductor supply chains. In this token, "decoupling from Japan ≠ decoupling from Japanese firms" is a smart and realistic solution for Korea. In other words, the essence of Korea's "decoupling from Japan" is not localization, but diversification of supply channels.

Japanese government unintentionally provoked "decoupling from Japan." Its export restrictions have fractured the Japanese players' monopolistic status and induced the new competitors to enter the market. It has changed the existing relations between firms from complementation to competition.

Production Location	Producer's HQ	Decoupling Type	Goods and technologies			
			HF	PR	FP	others
3 <sup>rd</sup> countries	Japan	DJ	Stella Chemifa, Morita	JSR		
	3 <sup>rd</sup> countries	DJF		Inpria		
Korea	Japan	DJ		TOK		Tosoh Quarts, Nikka, Kanto Denka, Tokyo Electron, Taiyo, Adeka, Fujikin, Rorze, Toray, etc.
	3 <sup>rd</sup> countries	DJF		DuPont		DuPont, Ram Research, MEMC
	Korea		Soulbrain, SK Materials, Lam Technology, etc.		Kolon, SKC, SK Innovation, etc.	SK Materials, SK Siltron, Hyosung, SKC, Hanhwa Solution, S&S Tech, Dongjin Semicam, etc.

**Table 1.**  
Current state of Korea's  
decoupling from Japan  
by types

**Source(s):** Constructed by the author based on each company's website and newspapers

## 5. Interactions between the two countries, mild tit-for-tat

Though the conflict between Seoul and Tokyo over export restrictions is ostensibly a tit-for-tat chicken game. The punches were soft, and both sides seemingly avoided extreme confrontation in fact.

Japan insisted several factors for imposing export restrictions; inappropriate exports found on the Korean side; lack of legal frameworks for catch-all controls in Korea; insufficient organization and manpower. Japan asserted that despite it was not an export ban, Korean side misunderstood it as retaliation against the Korean Supreme Court's decision. As evidence, Japanese side contended that there was little damage on Korea resulted from tightened restrictions, which Korea also acknowledged. The reason for selecting the 3 items was because there were many incidents of inappropriate exports regarding these items. Japan has tried to justify that, as the key supplier of the items, Japan is responsible for proper control of the three. Thus, Japan's export curbs are in accordance with the WTO's GATT Article 21 (Security Exceptions), and Korea should withdraw its WTO complaint and resolve the issue through bilateral dialogue.

However, the fact that Japan did not strictly enforce, but rather gradually ease the measure was unnoticed. The Japanese government intermittently allowed the export of the three items from August 8, the day after it announced revisions of the Export Order. On December 20, one of the items, PR-EUV was taken out of the "Individual License" and returned to the "Special General Bulk License" list. Tokyo has argued that the ground for the measure easing lies in the fact that export licenses for the item had been issued 6 times in a stable manner in Japan. Despite of Japan's argument, it is interesting to know that if Japan had wanted to take Korea's inadequate export control seriously, it should have blocked the circumventive export via Japan's subsidiaries in the third countries or the supply by investments in Korea. But Japan did not.

Why did not Japan actively exert their weapon of interdependence? First and foremost, Korean Supreme Court has not yet enforced the ruling to liquidate Japanese corporations' assets. Second, Japan probably wanted to convince that the export control was not a retaliatory measure motivated by a non-economic cause, and by doing so to prevent Korea from taking the dispute to WTO lawsuit. Third, any disruption in its exports to Korea would damage Korea alone, but also Japanese firms and then the semiconductor GSC. To be brief, it implies that Japan's position of hub in the industry's GSC is not strong enough to carry out the weaponization of interdependence.

Then what about Korea? Seoul strongly stood against Japan's action and took corresponding measures including a removal of Japan from Korea's White Country List, not to renewing GSOMIA (General Security of Military Information Agreement), an agreement on intelligence sharing between Korean and Japanese government, and filing a WTO complaint, etc. Meanwhile, Korean consumers boycotted Japanese consumer goods such as beer, clothing, cars, and travel to Japan. What was the cause behind such a fierce reaction? Korea perceived that Japan wanted to show its power to disrupt Korea's chokepoint in the semiconductor industry, the flagship of Korea's economy to cause a chilling effect on Korea. But rather than achieving that effect, the action provoked the proud of Koreans who were once under control of Japan in the past. This seems to be the reason why the restrictions incited such a strong resistance in Korea.

However, it should not be overlooked that Korea failed to maintain its assertive, strong and affirmed stance on Japan. After many twists and turns, GSOMIA extended in the end, and the WTO complaint placed under a temporary suspension. Most importantly, the three "nominal causes" that Japan had cited – suspended policy dialogue between Korea and Japan, lack of legitimacy regarding to catch-all control over conventional weapons, and inadequate organization and manpower for export control – were all resolved by Korea. All strongly rejected by Korea in the beginning of the dispute. From there, Korea demanded Japan to revoke the restrictions, but Japan rejected. Thus, Korea filed a complaint to the WTO, and tensions rose again between the two countries.

Why did Korea resume the WTO complaint? First, Korea was likely to think that it helped justify Korea's position. If Japan does not revoke the export restrictions although Korea has eliminated the allegedly claimed factors triggered the restrictions, it proves that the real reason lied somewhere else. Japan no longer justifies maintaining the export controls. Neither can it rightfully assert that it was Korea's misunderstanding. METI, the competent ministry, and another relevant body, CISTEC only mentioned issues concerning the export controls and did not refer any explanation about the detailed discussions held around the Prime Minister's Office on retaliatory measures against Korea. In addition, Japan raised only hydrogen fluoride as being inappropriately (not illegally) exported to Korea whereas there was no mention at all of the other two items. The explanation Japan gave on timing – the fact that the export control was introduced at politically sensitive time when the two countries were engaged in a historic dispute – was not very convincing.

At the same time, Korea seems to have filed the WTO complaint for practical gains as well. Japan's export restrictions provided an opportunity for Korea to decouple from Japan – something that Korea had wished for the past 20 years. Despite of several successful cases of decoupling, Korea still took the matter to the WTO. At first, it's hard to understand Korea's action, but it implicitly represents that decoupling had its limits. With uncertainty in the Korean economy at heights due to the Corona virus pandemic and intensifying US-China strategic competition, it was necessary to at least reduce the uncertainty of Japanese imports, if possible.

Looking at Korea's dependence on imports from Japan by processing stage, the trade deficit in intermediate goods, accounting for 68% of total imports as of 2019, is the largest. But this deficit fell up to US\$11 billion in 2019, which was far below the peak of US\$26.2 billion in 2010 and the lowest since 1996. This is an indication of the great technological advancement that Korea has achieved. In contrast, the trade deficit in capital goods, which accounted for 21% of total imports in 2019, fluctuated somewhat but failed to show any substantial decrease, suggesting how hard it is to overcome its dependence on Japan for capital goods. The deficit in capital goods dipped to US\$7 billion in 2019 after its peak in 2017 at US\$D11.6 billion. We need to keep an eye on how decoupling from Japan will affect this trend.

As seen above, both Korea and Japan are still highly interdependent, which is why extreme confrontation can lead to a joint demise. On the surface, it appears to be a head-on collision with nationalistic pride at stake. In fact, both sides stepped back. Yet, one cannot ignore the fact that Japan is still technologically ahead of Korea. Both countries are equally interdependent, but the power relationship is asymmetric.

## 6. Conclusion

To sum up, the above analysis leads to the following three findings. First, Japan's "export restrictions on the semiconductor items" as a retaliatory measure are owing to the characteristics of the semiconductor GSC and the symbolism of the industry in the Korean economy. So, did Japan use it as a weapon? At the least, the government apparently intended to prepare it as a weapon to block Korea from enforcing the court decision on forced labor. In this respect, the fact that Korea has yet executed the court decision seems to indicate that the weapon was effective to prevent from such occasion. However, it can be said that the weapon has not been exercised in full force. This is because in the semiconductor GSC, the relationship between the two countries is interdependent. Furthermore, weaponized interdependence is a double-edged sword that can disrupt Japanese firms as well as Korean firms. Due to the interdependence, even if the two countries consistently appeared to be confrontational, conciliations and concessions were made to not cross the line, in reality.

Second, decoupling has hitherto demonstrated an intriguing aspect. It takes place in two different forms; "decoupling from Japan" and "decoupling from Japanese firms." In other words, "DJ  $\neq$  DJF." It was attributed to the fact that both countries are accustomed to the long-

term business relationship in an efficient division of labor where Japan specializes in. However, in third countries or in areas where Korean companies can advance to be on par with Japan, “DJ = DJF” occurs. In this case, decoupling from Japan happens in parallel with decoupling from Japanese firms. As Farrell and Newman (2019a) pointed out, at present, Korea attempts either to deviate itself from the networks on which Japan exists as a hub or to even reshape new networks without Japan with Japan’s competitors to minimize its resulting vulnerabilities. In any case, Japanese government has unwillingly turned the complementary relationship between Japanese and foreign firms into competitive relationship, which leads to new competitors in the market. For the Japanese government, decoupling from Japanese firms was probably more painful than decoupling from Japan.

Third, belief that Korea suffered at limited extent from Japan’s export restrictions is both correct and incorrect. This is because in Korea it differs from one another resting one’s position with regard to decoupling. For the users of Japanese exports, the weaponization of interdependence means increased uncertainty, so, the resulting opportunity cost is not negligible. A temporary rise in unit prices of imports implies that imports are at least possible. There may cases when import itself becomes impossible. For these users, decoupling results in an unwelcome situation where they have to replace the optimal supplier with less optimal. On the contrary, it is an opportunity for those competing vis-a-vis Japan. Therefore, Korea’s decoupling from Japan needs to be carefully balanced and harmonized with both sides’ point of view.

How far can Korea’s decoupling go further in the long run? It would not be easy for Korea to reduce its dependence on Japan in the field of basic science and capital goods which require massive investments. Even if there are short-term monetary gains, unless Japan is in an overwhelmingly powerful position, the two countries would avoid chicken game catastrophic for all. Once decoupling occurs, corresponding adjustments will be made in chip design, material, and equipment. Therefore, even if export restrictions are later lifted, it will be difficult to revoke back to the pre-restriction state due to significant switching costs.

Korea’s trade with Japan was on an absolute decline since its peak in 2011. Afterwards, export and import started to increase again after bottoming out in 2015 and 2016 respectively but decreased again in 2019. If the tension between Korea and Japan continues persist for a long time, interdependence will gradually diminish as well. Many political scientists, including Farrell and Newman, maintain the view that interdependence provides the cause for exercising state power in asymmetric relations. That is not to say that interdependence always provides the condition for states to abuse power. As the U.S. did with China, and Japan with Korea, coercion is likely to happen when states feel that their asymmetric predominance as a hub is threatened. On the other hand, as Van Jackson, a former US Department of Defense official said that decoupling creates space for conflict; it might remove the safety pin that kept states away from ultimate confrontation.

In the era of economy-security nexus, Japan alerted us the reality of an international order where interdependence can be weaponized against countries even sharing the same values of democracy and market economy, as the US did to the allies such as the EU or Japan. Therefore, governments and firms in all countries need to be well-prepared for a new era. In addition, the WTO complaint Korea filed against Japan revealed the implicit tension between export control rules and WTO rules. One of the market’s responses against such uncertainty is the strategy of circumventive or segregated decoupling, which was witnessed in the Korea-Japan trade dispute. It would be interesting to observe whether this will happen in the case of US-China dispute.

The COVID-19 appears to change economic order. Instead of the traditional focus on the value of efficiency, lean, and Just-In-Time, more emphasis is drawn to that of robustness, resilience, and Just-in-Case. Moreover, as the former US Treasury Secretary Henry Paulson said, the intensifying technological competition between the US and China is creating a so-called “economic iron curtain” in the world. Because of this, global technological standards

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and rules are split into two. So-called “splinternet” forces countries to choose one of them. The key regional value chains, no doubt, become more and more concentrated in North America, Europe and Asia. It means regional cooperation in Asia becomes increasingly crucial. Given these circumstances, if decoupling will further proceed between Korea and Japan, the neighboring value-sharing economies’ cooperation and solidarity-which both desperately need-will not take place and the two will confront to limited strategic options. Conflict over the past must not become a black hole that sucks future-looking responses. What needs at this hard time for Korea and Japan, is neither confrontation nor conflict, but either cooperation or collaboration.

### Notes

1. For a detailed discussion, see Yang-Hee Kim (2019), “Political Economics and Policy Implications for Reinforcing Japan’s Export Control against Korea”, IFANS, Korea National Diplomatic Academy (in Korean), and “Strategic Materials Management” (KOSTI) website.
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3. Henry Farrell and Abraham Newman (2019) “Weaponized Interdependence: How Global Economic Networks Shape Coercion and Surveillance”, *International Security*, Vol. 44, No. 1.
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6. For a detailed discussion, see Goodman Samuel, Dan Kim, and John VerWey (2019), “The South Korea-Japan Trade Dispute in Context: Semiconductor Manufacturing, Chemicals, and Concentrated Supply Chains”, USITC; Chad P. Bown (2020), “How Trump’s export curbs semiconductors and equipment hurt the US technology sector”, PIIE.
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12. Ibid.

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