

POLICY BRIEF

Japan-Taiwan Cooperation in the Area of Economic Security: Strengthening Semiconductor Supply Chains

Introduction

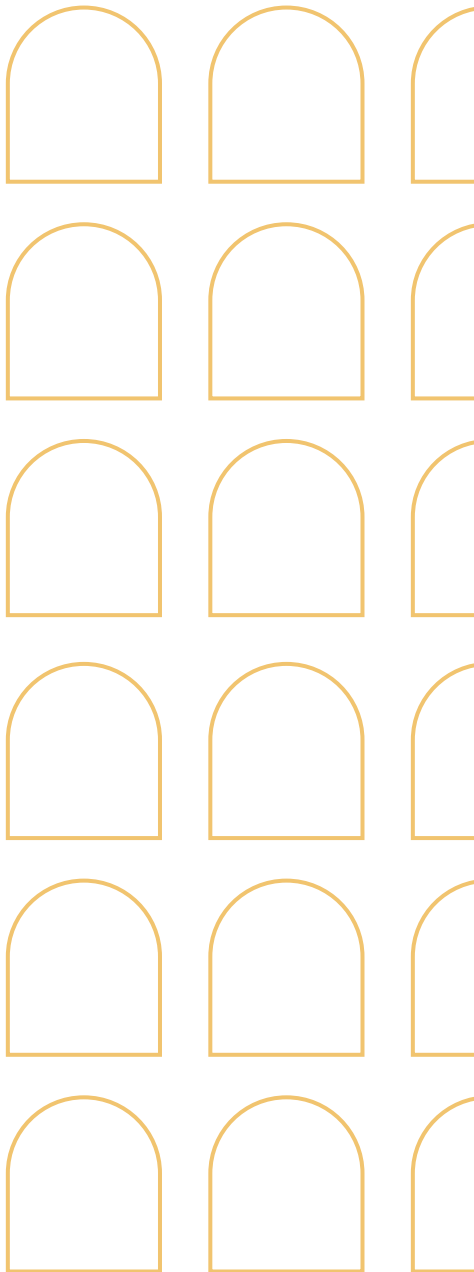
Since the Kishida administration took office last autumn, Japan has been debating economic security, which is the centrepiece of the administration's policies. On 11 May 2022, the House of Councillors passed the Economic Security Promotion Bill in a plenary session, putting the bill into law.¹ The law has four pillars: strengthening supply chains; prior screening to ensure the security of core infrastructure; promoting public-private cooperation on advanced technology; and not disclosing patents on sensitive technologies that could be used for military purposes.² In particular, securing a stable supply of semiconductors and rebuilding Japan's semiconductor industry are recognised as urgent tasks for the Japanese government. One of the measures being considered to address these issues is industrial cooperation with Taiwan. Before the bill was passed, in December 2021 lawmakers from the ruling parties in Japan and Taiwan agreed to bolster cooperation in the field of economic security with an emphasis

1 "Japan passes economic security bill to guard sensitive technology," The Japan Times, 11 May 2022. (<https://www.japantimes.co.jp/news/2022/05/11/business/japan-passes-economic-security-bill-protect-sensitive-technology/>).

2 "Diet approves legislation to promote economic security," The Japan News, 12 May 2022. (<https://japannews.yomiuri.co.jp/politics/defense-security/20220512-27406/>).

Author

Madoka Fukuda | Hosei University



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on supply chain resilience for semiconductors and other crucial goods.³

Japan and Taiwan previously had close industrial ties. They had been cooperating on the high-tech industry before the changes in the international environment which the next section will describe. However, as a result of these changes both sides reconsidered their semiconductor strategies. This has created incentives for further collaboration. There are positive relationships between many Japanese and Taiwanese companies in the global semiconductor supply chain. In addition, although there is no diplomatic relationship between Japan and Taiwan, various economic agreements and industrial collaborations have fostered a substantial stable relationship. This paper focuses on the semiconductor industry and analyses the positioning of Japan and Taiwan in the international supply chain. It then reviews the foundations of Taiwan-Japan relations that should support Taiwan-Japan cooperation on semiconductors and discusses the challenges in future Taiwan-Japan cooperation.

Japan and Taiwan in a Changing Global Environment

Behind the rapid development of economic security are debates about changes in the international environment. First, in addition to soaring labour costs in China, the slowdown in China's economic growth became apparent almost in parallel with the emergence of risks due to the competitive relationship between China and the United States. US-China competition has also developed into tensions over technological hegemony, the most prominent of which was regarding semiconductors. In response to this, starting in 2019 countries strengthened the economic security of their important industrial bases. In Japan, the focus was on reassessing its excessive dependence on China and avoiding the

risk of being caught up in US-China competition. Moves to become less dependent on China and restructure supply chains began earlier in Taiwan than in Japan because of growing caution about China's use of economic statecraft. In addition, as tension between the United States and China over technological hegemony increased, the tug of war over Taiwan's semiconductor companies and human resources intensified. In particular, the US government asked the Taiwan Semiconductor Manufacturing Company (TSMC), which boasts the world's largest market share in advanced logic semiconductors, to stop doing business with Huawei and build a new plant in the US.⁴

In 2020, the outbreak of the COVID-19 pandemic accelerated this trend. The pandemic led to a rapid digitalisation of society, which in turn greatly expanded the demand for semiconductors. The conflict between the United States and China grew into a dispute over political systems. Japan and Taiwan strengthened their relations with the United States and its allies. In addition, even during the COVID pandemic China did not relax its military, diplomatic and political offensive in neighbouring regions.⁵ China's repression of civilian movements in Hong Kong and human rights abuses in Xinjiang have become global problems. Multinational corporations operating in China are questioned about their positions on human rights issues.⁶ Furthermore, Japan and Taiwan have had to consider the potential risk of conflict with China, as both are located on China's periphery and are likely to be exposed to aggressive actions by the Chinese government.⁷

The ongoing Ukraine crisis has reminded Japan and Taiwan of the importance of being prepared for the above risks. As in the cases of well-known companies such as UNIQLO in Japan and ASUS in Taiwan, companies were forced to suspend their operations in Russia at the request of Ukraine

3 "Japan, Taiwan agree to boost economic security cooperation," Nikkei Asia, 24 Dec. 2021. (<https://asia.nikkei.com/Politics/International-relations/Japan-Taiwan-agree-to-boost-economic-security-cooperation>).

4 Momoko Kawakami, "Beicyu Haiteku Haken Kyoso to Taiwan Handotai Sangyo [US-China Competition on High-tech Hegemony and Semiconductor Investment in Taiwan]," *Afuta Korona Jidai no Beicyu Kankei to Sekai Chitsujyo [US-China Relations and the World Order after COVID-19]*, (Tokyo University Press, 2020) pp.131-139.

5 Madoka Fukuda, "How the Covid-19 Pandemic Contributes to Rising Tensions across the Taiwan Strait," *SSRC Items* (<https://items.ssrc.org/covid-19-and-the-social-sciences/covid-19-in-east-asia/how-the-covid-19-pandemic-contributes-to-rising-tensions-across-the-taiwan-strait/>).

6 For example, "US puts Japan Inc. on edge over Xinjiang supply chain risks," Nikkei Asia, 15 July 2021. (<https://asia.nikkei.com/Business/Business-trends/US-puts-Japan-Inc.-on-edge-over-Xinjiang-supply-chain-risks>).

7 For example, "Chinese mainland punishes pro-secessionist Taiwan companies 'for better cross-Straits economic ties, to push reunification'," Global Times, 23 Nov. 2021. (<https://www.globaltimes.cn/page/202111/1239752.shtml>).

and the international community.⁸ In addition, the Japanese and Taiwanese governments expressed their firm intention to join the economic sanctions. At the same time, they had to re-source their energy supplies and seek price stability. Under these circumstances, the governments became increasingly aware of the need to strengthen the supply chains of goods essential to their industries.

Taiwan's Position in the Japanese Semiconductor Industry

Japan's semiconductor industry has gradually declined since the 1990s. Today, Japan cannot design and plan advanced logic semiconductors, and its production capacity is low. However, Japanese enterprises are competitive in memory, sensors and power semiconductors. In addition, Japan is still one of the countries that are most competitive in semiconductor materials and manufacturing equipment. The U.S.-China competition over technology is forcing Japan's semiconductor industry, like that of other countries, to rethink its dependence on China in the supply chain.⁹

According to the Japan Foreign Trade Council, in 2021 electronic components such as semiconductors accounted for 5.8% of Japan's total exports, and the main export destinations were Taiwan (19.6%), China (16.4%) and Hong Kong (7.9%). In addition, semiconductor manufacturing equipment accounted for 4.0% of Japan's total exports, and the main export destinations were China (38.8%), Taiwan (20.9%) and South Korea (17.6%). On the other hand, Japan's imports of electronic components such as semiconductors accounted for 3.9% of total imports, with the main sources being Taiwan (46.1%) and China (8.0%).¹⁰ If imports and exports

to and from China decrease, the importance of imports and exports between Taiwan and Japan will naturally increase. Another risk is related to the fact that Taiwan and South Korea account for more than 70% of manufacturing bases for advanced semiconductors.¹¹ Taiwan risks conflict with China, and South Korea risks conflict with North Korea. For this reason, Japan's potential as a destination to disperse these manufacturing bases in a restructuring of the international semiconductor supply chain is attracting attention.

In the light of these risks and opportunities, in June 2021 the Ministry of Economy, Trade, and Industry (METI) outlined a three-pronged strategy to revive Japan's semiconductor industry.¹² The first pillar of the strategy is to return to manufacturing advanced logic semiconductors. The government committed to attract advanced semiconductor foundries from overseas by providing substantial subsidies. The second pillar is to further strengthen Japan's capacity to supply semiconductors other than logic semiconductors. Research and development and capital investment will further enhance the strengths of Japanese companies. The third pillar is to extend Japan's current powers and to improve its international competitiveness in semiconductor materials and manufacturing equipment.¹³

The Japanese government's strategy is already being implemented. In October 2021 TSMC announced a plan to build a semiconductor plant in Kumamoto, Japan. TSMC will not produce the most advanced semiconductors in Japan, such as those used in mobile phones. However, it will produce ones which are more advanced than the logic semiconductors that have been made in Japan so far. It is expected that the semiconductors will be supplied in collaboration with the Sony semiconductor devel-

8 "Uniqlo suspends Russia business, reversing earlier decision," Nikkei Asia, 10 March 2022. (<https://asia.nikkei.com/Politics/Ukraine-war/Uniqlo-suspends-Russia-business-reversing-earlier-decision>) and "Asus mum after asked by Ukrainian minister to cut ties with Russia," Focus Taiwan, Mar.12, 2022 (<https://focustaiwan.tw/politics/202203120012>).

9 On the state of the Japanese semiconductor industry in the global context, see Tugio Makimoto, *Nihon Handotai Fukken e no Michi [The Road to the Restoration of Japan's Semiconductor Industry]*, (Chikuma, 2021) Chapter 1.

10 Foreign Trade 2022, (Japan Foreign Trade Council, 2022) Chapters1 and 3. (<https://www.jftc.or.jp/research/index.html>).

11 "How Asia came to dominate chipmaking and what the U.S. wants to do about it," CNBC, 11 April 2021. (<https://www.cnbc.com/2021/04/12/us-semiconductor-policy-looks-to-cut-out-china-secure-supply-chain.html>).

12 For an interesting analysis comparing the METI's strategy with the EU's strategy, see Mathieu Duchâtel, "Racing for the New Rice; Japan's Plans For its Semiconductor Industry," Institut Montaigne, 4 Aug. 2021. (<https://www.institutmontaigne.org/en/blog/racing-new-rice-japans-plans-its-semiconductor-industry>).

13 "Handotai/Dejitaru Sangyo Senryaku [Semiconductor and Digital Industry Strategy]" June 2022, METI. (<https://www.meti.go.jp/press/2021/06/20210604008/20210604008.html>).

opment division.¹⁴ This success is due to TSMC's relationship with the University of Tokyo, with which it has been conducting joint research since 2019, and its research base in Tsukuba City, where it has been collaborating on research and development with the Joint Institute of Industrial Science and Technology (IIST) since 2021.¹⁵ The Japanese side expects TSMC to supply semiconductors and promote joint research on more advanced technologies.

Japan's Status in Taiwan's Semiconductor Industry

Taiwanese companies are currently the world's top players in semiconductor production. According to the Taiwanese Ministry of Economic Affairs, in 2020 Taiwanese foundries accounted for about 70% of the global market share, with TSMC accounting for 50%. Taiwanese companies excel in producing advanced logic semiconductors, with 92% of the factories producing ones measuring less than 10 nanometres located in Taiwan. The dispersal of TSMC factories to the United States and Japan is meant to reduce the risk inherent in this concentration of production bases. However, according to Taiwan's Ministry of Economic Affairs, 90% of TSMC's production capacity is in Taiwan. It has begun mass production of more advanced semiconductors, so Taiwan's dominance in semiconductor production will not be lost shortly.¹⁶

Since the 2000s, the growth of high-tech industry in mainland China has attracted many Taiwanese companies and talents. China accounts for a large proportion of the market for Taiwan's semiconductor companies, with 44% of Taiwan's semiconductor exports going to China in 2020. China is also a substantial semiconductor production base, with major companies such as TSMC and UMC having

factories in China. China is also attractive for Taiwanese engineers and scientists as a place to work or change jobs. As a result of the tension between the United States and China, Chinese companies increasingly recruit human resources from Taiwanese companies.¹⁷

In the light of this current situation, since 2019 the Taiwanese government has implemented policies to help companies affected by U.S.-China trade friction to return to Taiwan. Furthermore, considering future technological competition over semiconductors, in 2021 the government announced a policy to strengthen human resource development and research and development in materials and technology. In addition to expanding the industrial park area in Hsinchu where semiconductor manufacturing facilities are concentrated the government has also confirmed a plan to build an industrial park specialising in semiconductor materials in Kaohsiung in the southern part of the island, where semiconductor material-related companies will be concentrated.¹⁸

Taiwanese companies heavily rely on imports of semiconductor materials and production facilities. Many Japanese enterprises have high global market shares in semiconductor materials and production equipment, as the above section has shown. They have already expanded into Taiwan and play an essential role in the Taiwanese semiconductor supply chain. The Taiwanese and Japanese business communities are looking for further collaboration. For example, in its policy recommendations to the Taiwanese government for 2021, the Japanese Chamber of Commerce & Industry Taipei expressed an expectation of support in securing land, tax incentives and human resources in the light of the fact that many Japanese semiconductor enterprises have already established operations in

14 "TSMC to Build Specialty Technology Fab in Japan with Sony Semiconductor Solutions as Minority Shareholder," TSMC and Sony Semiconductor Solutions, 9 Nov. 2021. (<https://pr.tsmc.com/japanese/news/2880>).

15 "Japan Strengthening Collaboration with TSMC in Semiconductor R&D," Business Korea, 7 June 2021. (<http://www.businesskorea.co.kr/news/articleView.html?idxno=68979>).

16 "Handotai Sapurai Chen no Jyoryu Kyoka wo Mezasu Taiwan [Taiwan Aims to Strengthen Upstream Semiconductor Supply Chain]" JETRO, 21 June 2021. (<https://www.jetro.go.jp/biz/areareports/2021/dbd0fa7223039355.html>).

17 Kawakami, *Ibid.*, pp.134-135.

18 "Handotai Sangyo no Kyosoryoku Iji no Tame, Kenkyu Kaihatu Jinzai Ikusei wo Kyoka [Strengthen R&D and human resource development to maintain the competitiveness of the semiconductor industry]," JETRO, 23 April 2021. (<https://www.jetro.go.jp/biznews/2021/04/0be1efd94ec5a6fc.html>).

Taiwan and play an important role in the Taiwanese semiconductor industry.¹⁹

Japan-Taiwan Industrial Cooperation and the Semiconductor Industry

There is a long history of industrial cooperation between Japanese and Taiwanese enterprises. Until the 1980s, the technological capabilities of Japanese firms were attractive to Taiwanese firms wishing to acquire technology. The relationship between Japanese and Taiwanese firms in manufacturing industries was vertical, with Japanese firms providing technology and components and Taiwanese firms providing inexpensive labour. As a result, Taiwan's growing trade deficit with Japan became a problem. However, Taiwan was able to offset its trade deficit with Japan with a trade surplus with the United States, a significant exporter of manufactured goods. Since the 1990s the cooperative relationship between Taiwanese and Japanese firms has shifted from a vertical to a horizontal one as the Japanese economy stagnated, Taiwanese firms improved their technological capabilities and the economic development of China increased the advantage of Taiwanese firms that entered the Chinese market at an early stage.

Since the 2000s, the number of 'Japan-Taiwan business alliances' in which small and medium-sized Japanese and Taiwanese enterprises (SMEs) work together to conduct business in third countries such as China has attracted attention. For Japanese firms, it was attractive to collaborate with Taiwanese firms which had established an early presence in mainland China and had linguistic and cultural similarities with China. In addition, as Japanese SMEs lost domestic clients due to Japan's industrial downturn and needed to tap into the industrial structure of the Asia-Pacific region, linkages with Taiwanese firms became one

of the leading options to help these firms expand overseas. As an extension of this, there has been a growing trend in recent years for Japanese and Taiwanese firms to collaborate on expanding into southeast and southern Asia.²⁰

Although both Japan and Taiwan are members of the WTO, they have no diplomatic relations and have not concluded any official economic partnership agreements such as FTAs or EPAs. However, they have adopted what is known as the 'building block method' of establishing the legal and institutional framework necessary for the development of economic and cultural relations through a series of semi-official agreements or memoranda of understandings (MOUs). In particular, since the late 2000s many agreements that contribute to Taiwan-Japan industrial cooperation have been signed between the Japan-Taiwan Exchange Association and the Taiwan-Japan Relations Association, for example an Arrangement for Mutual Cooperation on the Liberalisation, Promotion and Protection of Investment (2010),²¹ a MOU on Strengthening Industrial Cooperation (2012)²² and an Agreement for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income (2015).²³ As a result of the MOU on Strengthening Industrial Cooperation, a Japan-Taiwan Industrial Cooperation Bridge Project has been developed to facilitate matching and dialogue between Japanese and Taiwanese enterprises. Various frameworks and seminars providing information and financial support have been established in both Japan and Taiwan to support SMEs and economic organisations seeking to conduct exchanges. The experience and trust that has been fostered through the above history of economic cooperation will be actively utilised in future cooperation in the field of semiconductors.

19 "2021 Taiwan Seifu Seisaku ni Taisuru Taihokushi Nihon Koshokai no Teigen to Yobou [2021 Recommendations and Requests for Taiwanese Government from the Taipei Japanese Chamber of Commerce & Industry]" (<https://www.jccit.org.tw/白書.html>).

20 Yukihito Sato, "Higashi Ajia Keizai no Hendo to Nittai Bijinesu Araiansu [East Asian Economic Changes and Japan-Taiwan Business Alliance]," *Toyo Bunka*, No.94 (2014), pp. 121-145.

21 "Arrangement Between the Interchange Association and the Association of East Asian Relations for the Mutual Cooperation on the Liberalization, Promotion and Protection of Investment," (<https://www.koryu.or.jp/Portals/0/images/news/20111122/main1.pdf>).

22 "Nittai Sangyo Kyoryoku Kakehashi Purojyekuto no Kyoryoku Kyoka ni Kansuru Oboegaki [the MOU on Strengthening Industrial Cooperation]" (<https://www.koryu.or.jp/news/?itemid=547&dispmid=5287>).

23 "Agreement Between the Interchange Association and the Association of East Asian Relations for the Avoidance of Double Taxation and the Prevention of Fiscal Evasion with Respect to Taxes on Income," (<https://www.koryu.or.jp/Portals/0/images/news/20160615/sozei-E.pdf>).

Conclusion

When considering restructuring the semiconductor supply chain from the perspectives of both Japan and Taiwan, strengthening ties between Japan and Taiwan is a promising option for both sides, and strengthened ties are already beginning to take shape. For Japan, Taiwan is a reliable partner in catching up with global trends in logic semiconductor manufacturing. It could also be a research partner in developing more advanced technologies. On the other hand, Japan is an essential partner for Taiwan as a semiconductor materials and production equipment supplier. When considering reducing dependence on China as a market and production base, it will be essential to strengthen cooperation between Japan and Taiwan in the semiconductor industry. There is an accumulation of industrial cooperation between companies in Japan and Taiwan, and a semi-private-sector mechanism has been developed to support this collaboration. Therefore, in circumstances in which both governments have come to encourage cooperation on economic security, cooperation in high-tech industries, especially semiconductors, is likely to progress further.

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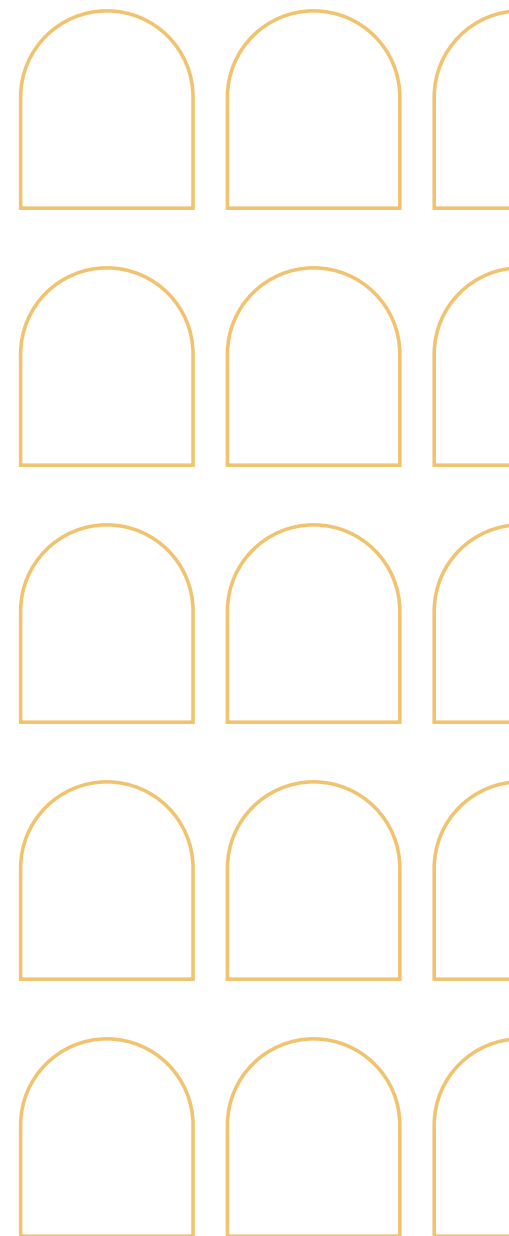
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