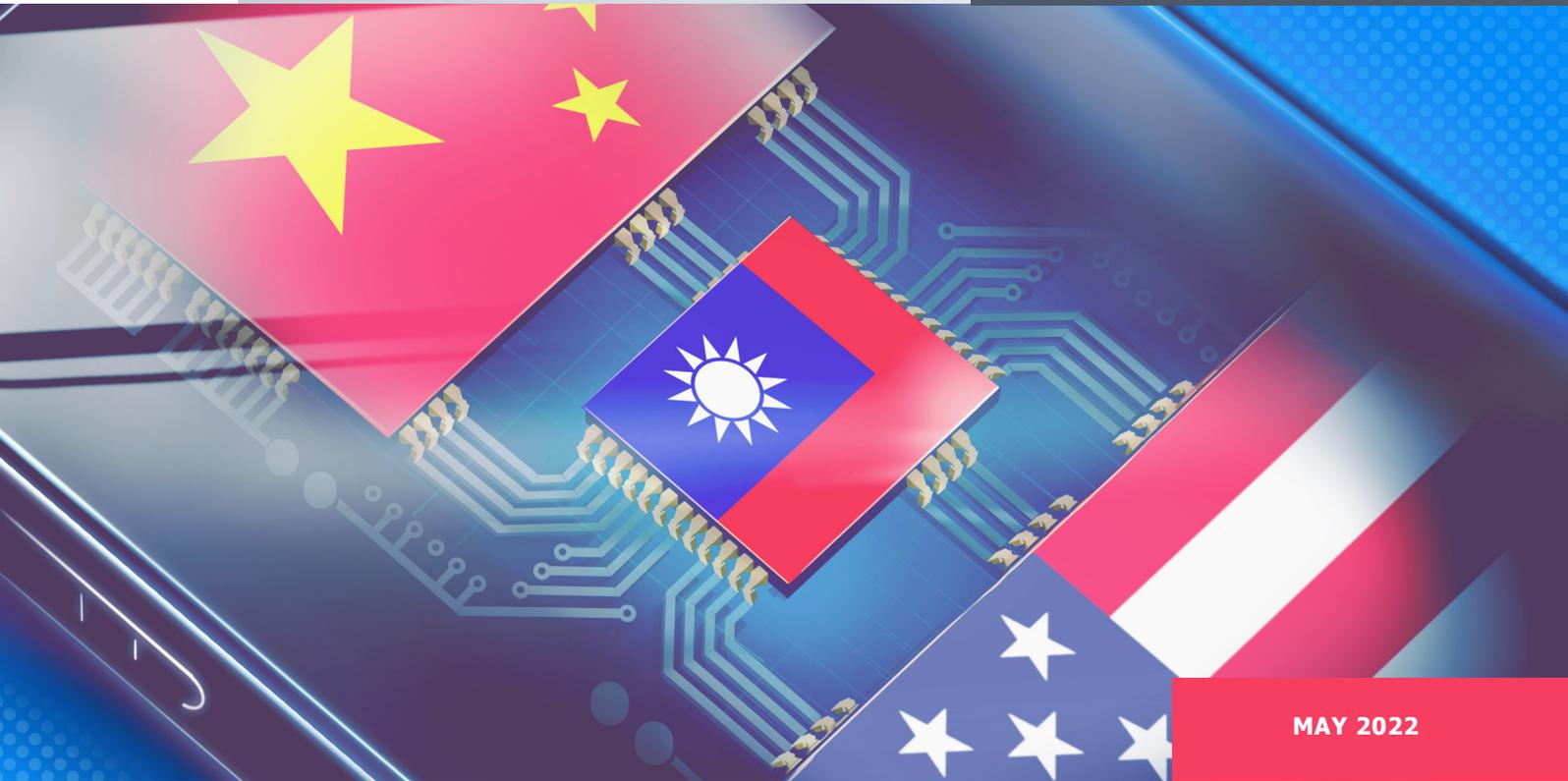


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Implications of the Global Supply Chain Reform A Taiwanese Perspective



Roy LEE

Center for Asian
Studies

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Abstract

This paper discusses the responses that have been undertaken by both the private and public sectors in Taiwan to mitigate the challenges of the global supply chains (GSCs) reform agenda, and future issues that Taiwan needs to be prepared for.

Participation in GSCs has long been a central pillar of Taiwan's economic development. Over the last four decades, the mode of participation has evolved from labor-intensive assembling to electronic contract manufacturing (ECM) of information and communications products, semiconductors, and other high-tech products. Many Taiwan ECM companies are now world leaders, especially in the semiconductor and information and communications technology (ICT) contract manufacturing sectors, with more than 50% of global market share across many product lines. Market share reflects not only the competitiveness of these companies but more importantly the level of involvement in the GSCs. One unique element behind Taiwan's success in GSC participation is the rise of China and the robust ECM production networks that were established across the Taiwan Strait. As of 2021, a significant portion of Taiwan ECM companies were still delivering their orders through their production facilities in China.

As a major stakeholder in the GSCs, the unprecedented and growing pressure of GSC reform is having a strong and direct impact in Taiwan. The first source of pressure came from the soaring production costs in China and the rise in Chinese supply-chain competition. Strategic industry policies such as the "Made in China 2025" that favor domestic competitors over Taiwanese and other foreign firms further increase the persistent pressure to operate in China. The second and more acute wave of pressure comes from the US-China economic rivalry, while the Covid-19 pandemic has further intensified the pressure for supply-chain diversification. Finally, major economic powers, including the US, the European Union and Japan, are all pursuing economic "strategic autonomy" that aims at increasing national manufacturing capacity, forging new trusted alliances and reducing reliance on China.

Taiwan ECM companies reacted swiftly to the trade and technology war between the US and China. Production in China has been scaled back rapidly in recent years, especially of ICT products. Diversification efforts started with the jumpstart and expansion of production capacities in Taiwan, with new investments in Vietnam, Indonesia, the US and the EU. Supply-chain reform (in particular the homecoming of ECM companies) also amends trade patterns. The US, for instance, returned in 2019 as

Taiwan's second largest export market after China. The Taiwan government, on the other hand, initiated large facilitation programs to welcome the homecoming ECM companies, and other trade and regional programs, including the "New Southbound Policy" to assist the GSC reform process.

This paper underscores several structural uncertainties and challenges. The first is associated with an international economic environment that is increasingly dominated by economic security and strategic autonomy policies. The structure and operation of the GSCs are likely to depart from economic rationales to accommodate geopolitical considerations. In the long run, the possibilities of over-supply and other distorted consequences are high. The second risk is "supply chain nationalism", i.e. the emergence of advocacy for preferential treatment for domestic suppliers based on the nationality of the supplier. Finally, the risk of decoupling between China on one hand and US-led democratic countries on the other is also increasing.

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Overview

Participation in global supply chains (GSCs) has long been a central pillar of the Taiwanese economy. Over the last sixty years, Taiwan has built a robust network of supply-chain cooperation, starting with US and Japanese clients, with the establishment of the first Export Processing Zone (EPZ) in 1966, which aimed to attract offshoring foreign investment in the manufacturing sector.¹ Over time, while contract manufacturing and Original Design Manufacturing (ODM)² remain the centerpiece of the manufacturing sector,³ Taiwan also started to offshore production capacities, primarily, to China and ASEAN countries in the 1990s. The content of participation has moved as well, from labor-intensive sectors toward Electronic Contract Manufacturing (ECM) of information and communications technology (ICT) products, semiconductors, and other high-tech products.

Nonetheless, the current global supply-chain structure faces unprecedented and growing pressure to reconfigure and reform. The first source of pressure came from soaring production costs in China and the rise of Chinese supply-chain competition. Since the 1990s, Taiwan's contract manufacturers, especially in the ECM sector, have been moving their production lines to China to seek arbitrage in both lower production costs and incentives provided by China to attract foreign investment. A recent survey in China shows a continued annual real wage increase of between 9% and 11% in four traditional manufacturing sectors, including home appliances and footwear, for the nine years between 2005 and 2014.⁴ On the other hand, investments and know-how/technology transfers through sub-contracting to local suppliers also facilitated the creation of a competitive network of Chinese suppliers that, in recent years, have been competing with and replacing their Taiwanese partners⁵ Strategic industry

1. G. Fitting, "Export Processing Zones in Taiwan and the People's Republic of China", *Asian Survey*, Vol. 22, No. 8, 1982, pp. 732-744.

2. An original design manufacturer takes the original specifications of another company and builds the design to the product specifications. The ODM supplies manufacturing capacities.

3. For a review of the development of Taiwan's supply-chain-oriented approach between 1960 and 1990, see J. Hauge, "Industrial Policy in the Era of Global Value Chains: Towards a Developmentalist Framework Drawing on the Industrialisation Experiences of South Korea and Taiwan", *The World Economy*, Vol. 43, No. 8, August 2020, available at: <https://onlinelibrary.wiley.com>.

4. J. J. Xu *et al.*, "Adjusting to Rising Costs in Chinese Light Manufacturing: What Opportunities for Developing Countries?", Center for New Structural Economics, Peking University (CNSE), December 2017, available at: <https://set.odi.org>.

5. For a comprehensive discussion on how Taiwanese firms helped to forge the China development model, see J. M. Wu, *Rent-Seeking Developmental State in China: Taishang, Guangdong Model and Global Capitalism*, Taipei: NTU Press, 2019.

policies such as the “Made in China 2025”, which aims to “leverage the power of the state to alter competitive dynamics in global markets in industries core to economic competitiveness”, provide supports that favor domestic competitors over Taiwanese and other foreign firms, and further increase the persistent pressure to operate in China.⁶

The second and more acute wave of pressure comes from the ongoing US-China trade war that started in 2018, with supply networks seeking to circumvent the punitive tariffs by adjusting to alternative (e.g. non-Chinese) supply sources and relocating assembly lines away from the battlefield. The Covid-19 pandemic further accelerated the reform process through the growing demand for supply-chain resilience. In 2021, the reform pressure was elevated to a new height after both the US and the European Union published their official reviews on critical supply-chain vulnerability. As a consequence of the review, “strategic autonomy” is now at the center of policy considerations in reforming the supply chain, and Russia’s invasion of Ukraine is likely to add a further sense of urgency in this regard.

As the main beneficiary and stakeholder of the current global supply chain architecture, Taiwan faces critical challenges (and opportunities) considering these reform pressures. Against this background, the first part of this paper provides an overview of the development of Taiwan’s supply-chain-oriented economic structure. The second part reviews Taiwan’s responses to date to these reform agendas, and the final part offers observations on the future outlook.

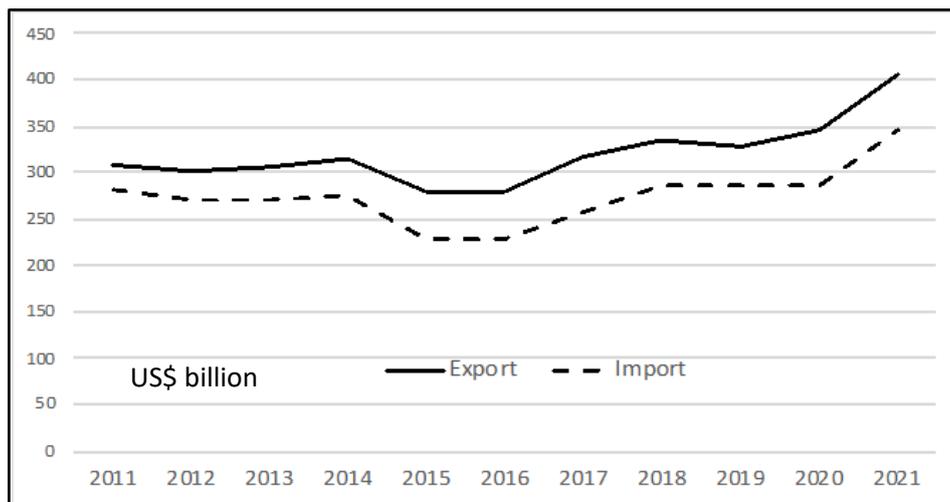
6. US Chamber of Commerce, *Made in China 2025: Global Ambitions Build on Local Protections*, 2017, available at: www.uschamber.com.

Taiwan's Supply-Chain-Focused Economic Structure and Integration with China

Taiwan's Global Supply-Chain Participation

Taiwan is highly dependent on trade. Its average trade dependency rate (total trade value as a percentage of GDP) is consistently over 100%. By comparison, the global average rate stands at around 55%.⁷ As reflected in Figure 1, Taiwan's trade performance was directly affected by the global downturn in 2014-15. Although rebounds occurred after each crisis, this fluctuation still reflects Taiwan's vulnerability to the global trade environment. Another notable development is the steady increase in exports since 2015 (Figure 1), especially during the global outbreak of the Covid-19 pandemic between 2020 and 2021. This suggests that Taiwan's contract manufacturing model offers a better level of resilience through the ability of contract manufacturers to diversify export orders from multiple clients.

Figure 1. Changes in Taiwan's Trade in Goods



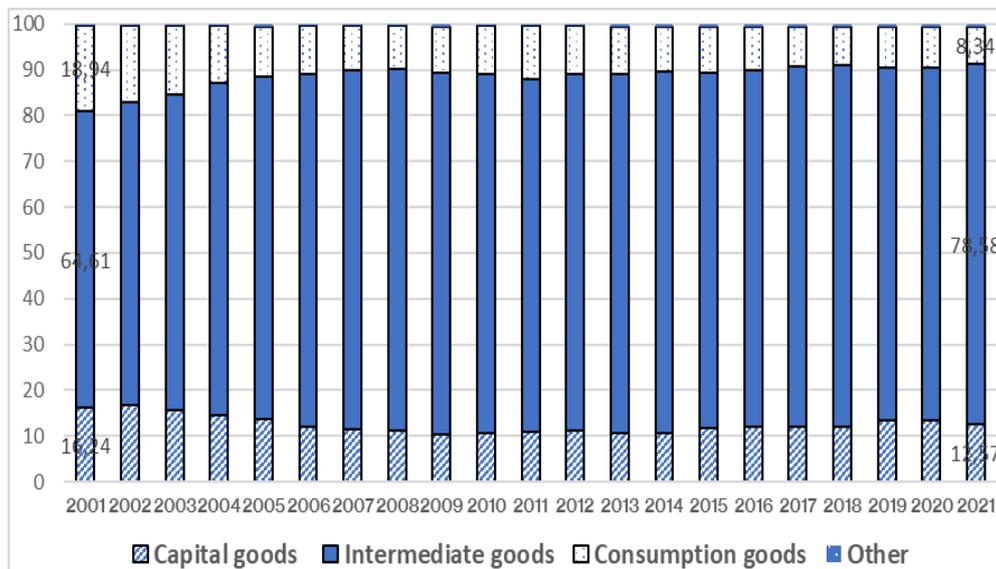
Source: Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan.

7. Based on World Bank data, available at: data.worldbank.org.

The salient feature of Taiwan’s export trade portfolio is the decline of consumption products and the high level of intermediate products. As demonstrated in Figure 2, the ratio of consumption goods in Taiwan’s overall export portfolio declined rapidly during the past twenty years, falling from 18.94% of total exports in 2001 to just over 8% in 2021. Contrarily, the contribution of intermediate inputs and capital goods increased from 81% in 2001 to over 92% of overall trade. In short, Taiwan’s export portfolio clearly demonstrates an economic structure that is highly supply-chain oriented.

For some supply chains, Taiwan contract manufacturers enjoy significant market dominance globally. By way of demonstration, the recent Critical Supply Chain Review undertaken by the US government confirms that Taiwan currently dominates the global semiconductor contract manufacturing (pure-play foundries) market, with 63% market share, and 92% in leading-edge (under 10nm) logic chips manufacturing capacities.⁸ The supply chain of ECM that produces consumer electronic, desktop and laptop computers and smartphones that are marketed under the name of their clients is another example. As of 2020, Taiwan ECM providers ranked among the top five places in terms of global ECM market revenue, and the number one company, Hon Hai Precision Industry (also known as Foxconn in China), enjoys a global market share exceeding 40%.⁹

Figure 2. Changes in Taiwan’s export portfolios, 2001–2021



Source: Author’s calculations based on Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan.

8. The White House, “Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth: 100-Day Reviews under Executive Order 14017”, June 2021, p. 35.

9. Hon Hai Precision Industry, *2020 Annual Report*, August 2021, available at: www.foxconn.com.

Economic Integration with China and the Security Debate

After China introduced its “reform and opening up” policy in the late 1970s, Taiwanese contract manufacturers and their foreign clients discovered the new economic opportunity and began to move their production lines to China, and the speed of supply-chain migration accelerated after China joined the WTO in 2001. The approved investment value from Taiwan to China in 1991 was only US\$ 174 million, but in 2003 the value jumped to US\$ 6.72 billion before reaching its peak of US\$ 146.18 billion in 2010.¹⁰ Investment in China is evidently related to supply-chain relocation. One indication is the high concentration of investment in the manufacturing sector: Taiwanese investments in China in electronic parts and components manufacturing (34.9%) and computers and optical products manufacturing (13.8%) account for almost half (48.7%) of Taiwan’s total investment value in 2021.¹¹ It is also reflected in the fact that a majority of Taiwanese firms (79.4%) indicate that, still in 2021, offshore production activities in China are undertaken by subsidiaries or affiliated facilities.¹²

Rising costs and local competition render China less attractive as an overseas manufacturing base for Taiwan contract manufacturers. Supply-chain reform pressures, especially the ongoing US-China rivalry, exacerbate the uncertainties of operating in China. Consequently, investment volume from Taiwan to China began to decline: investment in China accounted for over 80% of Taiwan’s total outbound investment in 2010, but since 2016 it has been lagging investment in destinations other than China (Figure 3). In 2020, the value of investment in China was only 40% that of 2010.¹³

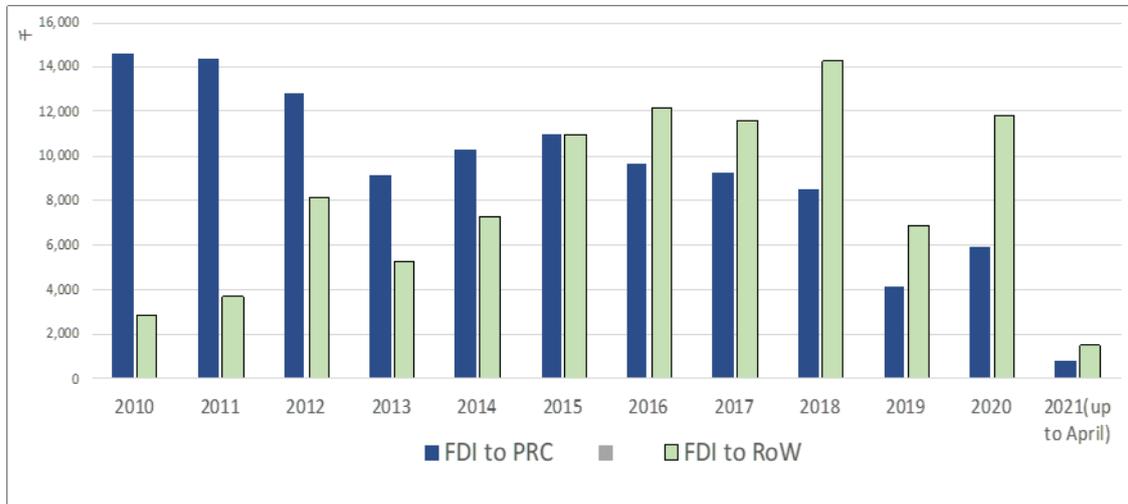
10. L. S Hsia, “The Situation of Taiwan Businesspeople Investing in Mainland China and the Impact on Taiwan’s Economy”, *Prospect & Exploration* Vol. 2, No. 4, April 2004 (in Chinese). It is of note that, because to date *ex ante* approval is required for all outbound investment in China exceeding US\$ 1 million, this figure captures only part of the actual investment; a large, unreported number of Taiwan’s investments in China are likely to take place via Hong Kong and the British Virgin Islands so as to bypass the approval procedures.

11. See: www.moeaic.gov.tw.

12. Ministry of Economic Affairs (MOEA), *The 2021 Survey on Overseas Manufacturing Activities relating to Export Orders*, MOEA, March 2022, available at: www.moeaic.gov.tw (in Chinese).

13. Investment Commission, *Outbound Investment Statistics*, Ministry of Economic Affairs, Taiwan, available at: www.moeaic.gov.tw.

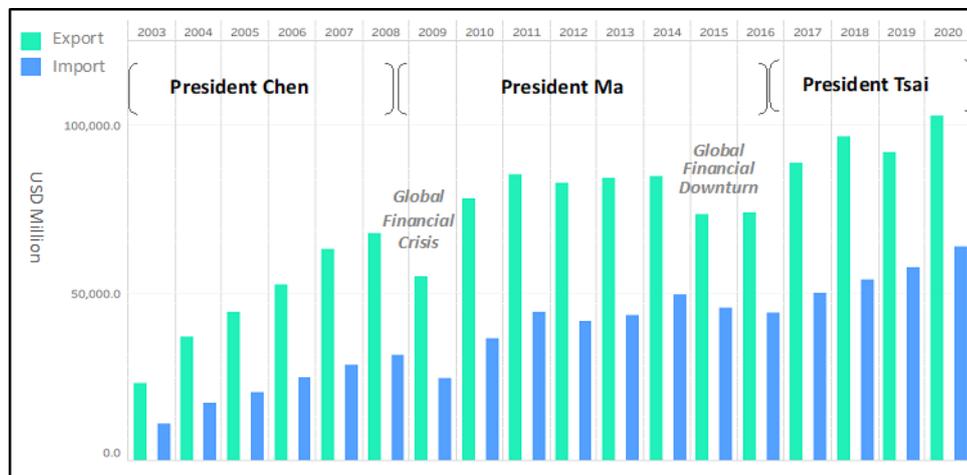
Figure 3. Changes in Taiwanese Investment in China, 2010–2020



Source: Investment Commission, Ministry of Economic Affairs, Taiwan.

In terms of trade, exports to China steadily increased over the last two decades (Figure 4), despite the fact that different governments in Taiwan followed significantly different Cross-Strait policies. For instance, for the two Democratic Progressive Party (DPP) administrations of 2000–2008 (under President Chen Shui-bian) and 2016 until today (under President Tsai Ing-wen), relatively unfavorable policies toward China were adopted, to emphasize Taiwan’s autonomy. On the contrary, Kuomintang (KMT) President Ma Ying-jeou (2008–2016) pursued a policy of improving cross-strait relations and economic integration with China by, *inter alia*, relaxing cross-strait travel and investment restrictions and initiating negotiations on a free-trade agreement with China.¹⁴ As demonstrated in Figure 4, trade with China continued to increase regardless of the policy approaches of Taiwan’s governments. This decoupling of policy and trade performance is a unique feature of the Taiwan-China economic relationship, and a source of debate on economic security concerns.

14. For an overview of trade policy toward China, see F. Liu and Y. Li, “Generation Matters: Taiwan’s Perceptions of Mainland China and Attitudes Towards Cross-strait Trade Talks”, *Journal of Contemporary China*, Vol. 26, No. 104, 2017, pp. 263-279.

Figure 4. Trend in Taiwan's trade with China, 2003–2020

Source: Bureau of Foreign Trade, Ministry of Economic Affairs, Taiwan.

One major explanation behind this unique economic relationship is that cross-strait trade intensity is primarily defined by the global supply chain rather than government policy. That is, the direction of trade flows between Taiwan and China, and specifically the significant trade surplus enjoyed by Taiwan, reflects the level of Taiwan's manufacturing capacity offshoring to China. In 2010, according to the Annual Survey of Offshore Manufacturing Activities for Export Orders published by Taiwan's Ministry of Economic Affairs (MOEA, Table 1), on average around 44% of export orders for Taiwanese companies were manufactured in China by mainly (95%) affiliated factories.¹⁵ The ratio has continued to increase; by 2016 it reached 49.8%, so that China effectively replaced Taiwan as the largest production base for Taiwanese companies. On average, the affiliates of Taiwanese firms in China import 22% of their parts and components from either headquarters or suppliers located in Taiwan,¹⁶ and this underpins a major portion of the demand for Taiwanese exports to China.

In particular, with China emerging as the global powerhouse of electronic contract manufacturing (e.g. laptop computers and smartphones) related products, its demand for Taiwan-made semiconductors and other related parts and components has increased substantially in the last decade. In 2020, around 35% of China's demand for semiconductors was met by imports from Taiwan.¹⁷ Furthermore, the primary factor in China becoming a global ECM production hub is associated with the fact that ICT products

15. Department of Statistics, *The Annual Survey of Offshore Manufacturing Activities for Export Orders* (in Chinese), Ministry of Economic Affairs, Taiwan, 2010-2021, available at: www.moea.gov.tw.

16. The last year that this question was included in the Annual Survey was 2018. See Department of Statistics, *The Annual Survey of Offshore Manufacturing Activities for Export Orders* (in Chinese), Ministry of Economic Affairs, Taiwan, 2008, available at: www.moea.gov.tw.

17. J. R. Wang, "The Dependency and Interdependency of the Semiconductor Sector Between the US, Taiwan and China" (in Chinese), *National Security Bi-weekly*, No. 28, May 2021, available at: indsr.org.tw.

have the highest offshore manufacturing level among all the product categories of Taiwan firms; in 2016, the China-made ratio of ICT-related products of Taiwan firms stood at 90.1%. Of note is that the offshore manufacturing level in China has declined significantly since 2016; the US-China trade war appears to be an accelerating factor, especially for ECM providers producing ICT-related products. Indeed, the ratio of ICT products manufactured by Taiwanese ECM companies in China relative to total Taiwanese ICT export orders fell by 9 percentage points in 2019 at the height of the US-China trade tensions. In 2020 they were down 11 points relative to the peak reached in 2016.

Table 1. Results of the Annual Survey of Offshore Manufacturing Activities for Taiwan Export Orders

Year	Level of production in Taiwan (% of total export orders)	Level of offshore production in China (% of total export orders)	Level of offshore production in China for "ICT products" (% of ICT export orders)
2010	49.19	44.14	82.58
2016	45.4	49.8	90.1
2017	46.5	48.2	89.2
2018	47.6	46.9	89.7
2019	47.4	44.8	80.7
2020	46	45.4	79.4

Source: Department of Statistics, Annual Survey of Offshore Manufacturing Activities for Export Orders, Ministry of Economic Affairs, Taiwan.

Many in Taiwan argue that trade dependency on China indicates that the current Democratic Progressive Party (DPP) government’s approach—keeping China at arm’s length while pursuing a closer alliance with the US and EU—is just political rhetoric. Taiwan, after all, needs China for economic prosperity. At the same time, there are calls to address this high export concentration issue based on economic security concerns. One key risk is that the current structure may increase China’s ability to coerce Taiwan for political benefit.

The key question is whether trade concentration represents low resilience levels, over-dependence and other economic security risks that Taiwan faces, or, on the contrary, is an indication of China’s “supplier dependency” on Taiwan. Cross-strait trade is predominantly in electrical machinery, which accounts for 64% of total Taiwanese exports to China. Semiconductors are the most important product in this category, accounting for 78% of electrical machinery exports. The 27% increase in

semiconductor exports to China in 2020 was thus the main factor underpinning the overall increase in exports.¹⁸

In that light, insofar as economic security is concerned, the risk for Taiwan appears to be limited. In particular, China's current domestic capacity can only supply somewhere between 15% and 20% of semiconductor demand; this makes semiconductors from Taiwan (and South Korea) the primary sources of supply underpinning China's position as the global manufacturing powerhouse for semiconductor-enabled electronic products. Considering Taiwan's dominance in the global semiconductor contract manufacturing market, the lack of alternative supply sources means that, if Beijing were to weaponize semiconductor trade to coerce Taiwan, it could harm China's own economic growth much more than Taiwan's. In fact, the "reverse" dependency structure is one of China's primary strategic concerns; it was a key driver of China's semiconductor import substitution policy created more than twenty years ago. Taiwan's current trade structure suggests that the threat of economic coercion is small. As a major hub in global supply chains, the future orientation of Taiwan's trade relationship with China depends more on other external factors, such as the direction of US policy toward China and supply-chain reform.

18. *Ibid.*

The Rise of Strategic Competition and Strategic Autonomy Considerations

The US-China Trade War and Strategic Competition

Until recently, global supply chains have been developed on the basis of comparative advantage, efficiency and free trade. Unfortunately, mainstream policy orientations have changed significantly across many governments in the last five years. First, the ongoing US-China economic and technology rivalry that has expanded from a tariff war to export control and investment restrictions creates the first wave of pressure for supply chain reconfiguration. Started in 2018, the US-China trade war is entering its fourth year, and sanctions and retaliatory tariffs imposed by both sides have covered most bilateral trade between the US and China.

From a US perspective, the trade war is justified on the grounds of unfair practices relating to forced technology transfer, lack of intellectual property protection, and a state-backed innovation policy that discriminated against US products, services and technologies.¹⁹ China disagreed with all the US allegations,²⁰ and rebutted Washington by introducing retaliatory tariffs and filing a WTO dispute case against the US. Although the two countries reached a first-phase trade deal in 2020, most of the tariffs have remained in place to date under the Biden administration. Furthermore, there is no sign of US technology restrictions and export controls against China being de-escalated post-2021.

The continuation and broadening of the US-China economic and technology rivalry indicates that it has gone beyond disputes regarding technical issues of unfair economic practices. In fact, as reflected in its first Interim National Security Strategic Guidance, the Biden administration has formally maintained the “strategic competition” with China.²¹ Elements of

19. United States Trade Representative, *Findings of the Investigation Into China's Acts, Policies, and Practices Related to Technology Transfer, Intellectual Property, and Innovation Under Section 301 of The Trade Act Of 1974*, USTR, March 22, 2018, pp. III-XIV.

20. The State Council Information Office (SCIO) of the People's Republic of China (2019), *China's Position on the China-US Economic and Trade Consultations*, SCIO, Beijing, June 2019, available at: english.www.gov.cn.

21. The White House, *Interim National Security Strategic Guidance*, March 2021, available at: www.whitehouse.gov.

the strategic competition are relatively vague in substance, but it is not a new concept; in 2019 the European Commission already defined the strategic relationship with China as “a cooperation partner with whom the EU has closely aligned objectives, a negotiating partner with whom the EU needs to find a balance of interests, an economic competitor in the pursuit of technological leadership, and a systemic rival promoting alternative models of governance”.²²

Regarding the supply-chain reform agenda, the draft Strategic Competition Act passed by the US Senate’s Foreign Relations Committee in April 2021 (which was integrated as part of the US Innovation and Competition Act in June 2021) demonstrates how the concept of strategic competition would be applied to the supply-chain architecture. The draft Strategic Competition Act includes tangible measures to assist US-based supply chains to reduce their presence in China, such as requesting US overseas missions accompany American firms embedded in global supply chains to relocate outside of China, and identifying new sources of supply outside China.²³ This is often referred to as the “decoupling” policy. Taiwanese suppliers that have been enjoying economic partnerships with both the US and China are now inevitably involved in this strategic competition.

The Emergence of the Strategic Autonomy Policy

The shortage of essential medical supplies during the Covid-19 pandemic and the development of Washington’s strategic competition approach to China underpin the emergence of policies in pursuance of “strategic autonomy”.²⁴ Although still promoting open and free trade, this approach aims at reducing dependence on imports/competitors for critical sectors on the one hand, and at elevating domestic production capabilities on the other.

The first element of the strategic autonomy policy is to achieve “strategic independence” by reducing reliance on imports for critical sectors and to re-establish domestic substitution capacity.²⁵ Both the US and the

22. European Commission and HR/VP, *EU-China: A Strategic Outlook*, Joint Communication to the European Parliament, the European Council and the Council, JOIN(2019) 5 final, 12 March 2019.

23. The US Congress, S.1169 – Strategic Competition Act of 2021, Title I–Investing in A Competitive Future, Subtitle A–Science And Technology, Sec. 101. Authorization to Assist United States Companies With Global Supply Chain Diversification and Management.

24. A snapshot of the EU’s Open Strategic Autonomy is available at: trade.ec.europa.eu.

25. For a comprehensive overview of those elements and the recommended actions, see: The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth—100-Day Reviews under Executive Order 14017*, June 2021; EU Commission, *Updating the 2020 New Industrial Strategy: Building a Stronger Single Market for Europe’s Recovery*, Communication from the Commission to the European Parliament, The Council, The European

EU have two common priorities: a) reorganization and diversification of all supply chains to elevate the level of resilience, and b) rebuilding the domestic manufacturing capacities of a selected group of “critical” sectors, such as semiconductors and medical devices. The US initiated a review of 10 critical supply chains (including semiconductors, advanced batteries, public health, information and communications, energy, transportation, defense) in February 2021, and proposed its first-stage recommendations in June 2021.²⁶ It is no surprise that four critical sectors—semiconductors, advanced batteries, key minerals and materials, and pharmaceutical products and active pharmaceutical ingredients (APIs)—have been identified as suffering from different levels of vulnerability due to over-reliance on imports and insufficient local production capacity. The report further identifies that China, Taiwan, Korea and India are the main sources of imports in these areas.

Interestingly, the EU published an “EU Industrial Policy Update” in May 2021, pointing out that import dependency problems arise in the supply chains of many key products that are likely sources of economic vulnerability. Specifically, the European Commission identified 137 highly dependent products (around half of the products are currently supplied by China), 34 of which are most vulnerable due to low potential for further diversification and substitution with EU production.²⁷ The report notes that it is necessary to improve European “strategic autonomy” in six key strategic areas: raw materials, batteries, APIs, hydrogen, semiconductors, and cloud and edge technologies.

These new strategies and approaches reflect not only changes in mindset but also forces that are likely to push for more supply-chain reforms. The current structure of China serving as the “world’s factory”, which is traditionally considered a model of efficiency optimization, is increasingly becoming a major source of “risk maximization” and needs to be adjusted. To this end, the Covid-19 pandemic further underscores the issue of import dependency and the lack of resilience, which reinforces the justification for and support of diversification and “reshoring” policies that involve a major restructuring of the global supply chain.

China, ironically, is in fact the pioneer and predecessor of the strategic autonomy policy. It regards its independence in key technologies as an important and strategic national goal. The “Made in China 2025” policy that has attracted much attention in recent years is the latest version of this thinking, and the latest “14th Five-Year Plan” directs China to apply the new generation of “whole-of-country” approach to accelerate breakthroughs in

Economic and Social Committee and The Committee of The Regions, Brussels, 5.5.2021 COM(2021) 350 final, May 2021.

26. The White House, *Building Resilient Supply Chains*, op. cit.

27. EU Commission, *Updating the 2020 New Industrial Strategy: Building a Stronger Single Market for Europe’s Recovery*, 5.5.2021 COM (2021) 350 final, May 2021, pp. 10-12.

key technical areas to achieve the goal of self-sufficiency, ensuring China's strategic autonomy.²⁸ The development of a domestic semiconductor sector, for instance, is considered by Chinese authorities as a vital step for both economic development and national security. A major undertaking introduced in China to achieve the objective of import substitution is the *Guideline for the Promotion of the Development of the National Integrated Circuit (IC) Industry* in 2014. As part of the effort, the Chinese government established the "IC Industry Investment Fund", with initial funding of RMB 140 billion and another RMB 200 billion (US\$ 31.6 billion) in 2018.²⁹ The short-term objective of the guideline and the fund is to double the sales value of the domestic Chinese IC sector and to achieve 40% market share by 2020. China failed to meet the benchmark in 2020, with a self-sufficiency rate of just 16.5% due to technology bottlenecks and export controls initiated by the US government.³⁰ Still, with sufficient state-backed funding and whole-of-country competition from China, the pressure for Taiwan and other semiconductor manufacturers is mounting.

28. For a comprehensive review of China's strategic autonomy development, see Tanjin Chen, *The US China Trade War: The Rise of a Superpower and the Competition of Systems* [in Chinese], Taipei: Reading Times Publishing, 2021.

29. "China Is Raising Up to \$31.5 Billion to Fuel Chip Vision", *Bloomberg*, March 1, 2018, available at: www.bloomberg.com.

30. S. Tabeta, "Made in China' Chip Drive Falls Far Short of 70% Self-sufficiency", *Nikkei Asia*, October 13, 2021, available at: asia.nikkei.com.

Taiwan's Responses: Private-Sector Actions

The Trade War and the First Wave of Supply-Chain Reconfiguration

As a rule of thumb, there are three main categories of Taiwanese firms in China: A) those providing made-in-China products for the US and other foreign markets; B) those providing made-in-China products mainly for the Chinese domestic market, and C) Taiwanese service providers targeting domestic Chinese consumers. Firms in each category face a different scenario in light of the trade war, with those that primarily use China as a manufacturing base for the US market likely to be hit the hardest. The fallout for Taiwanese firms that are part of the “Red Supply Chain” will be commensurate to the level of impact on the Chinese final products in the US market. Finally, Taiwanese service providers in the Chinese services sector will be the least affected for the time being, as the outlook for the Chinese economy is still positive in the short run. In the long run, Taiwanese firms in group B and C still face growing uncertainties; Chinese Premier Li Keqiang acknowledged in his 2022 annual Working Report that the Chinese economy faced the triple pressures of “shrinking demand, supply shock and weakened expectations”, and therefore set China’s GDP growth target at 5.5%, the lowest in the last three decades.³¹

The pressures to readjust supply networks associated with the development of strategic competition between major powers and the rising policy preference for economic security are unquestionably the highest for Taiwan firms belonging to category A. Although the trade war only applies directly to products originating from the US or China, Taiwan’s high dependence on offshore manufacturing in China indicates that the impact on Taiwan’s economy is also significant. Given the ongoing tension, many Taiwanese firms with production bases in China started to consider hedging solutions by way of relocating at least part of their offshore production capacities from China to Taiwan and ASEAN countries.

As discussed in Section 2, Taiwan’s ECM firms, which have been the primary ones offshoring their production activities to China, constitute the most significant first-mover group to downsize their capacities in China

31. Li Keqiang, *2022 Report on the Work of the Government*, delivered at the Fifth Session of the 13th National People’s Congress of the People’s Republic of China, March 5, 2022, available at: <http://big5.www.gov.cn> (in Chinese).

since 2018 (see Table 1). In fact, as shown in Table 2, reduction of production presence in China is observed across all sectors, with the overall share of offshore production for the delivery of export orders in China dropping from 49.8% in 2016 to 45.4% in 2020. Since Taiwan's total export orders were valued at US\$ 533.7 billion in 2020, this reduction implies that around US\$ 24.5 billion worth of production activities have left China, if 2016 is used as a benchmark.³² ASEAN countries, mainly Vietnam, Malaysia and Thailand, have been popular offshore production alternatives, underpinned by the fact that the ratio of production in ASEAN has doubled since 2016, and recorded a 53% increase in 2020 on a year-on-year basis. The level of production in both North America (namely Mexico and the US) and Europe also increased substantially over the same period. Although their share of Taiwan's overseas production is still small in absolute terms, the trend and direction of supply-chain readjustment is still clearly visible.

Table 2. Changes in Taiwanese Firms' Production Locations for Export Orders

Unit: %										
Year	Taiwan		China		ASEAN		North America		Europe	
	Ratio	YoY change	Ratio	YoY change	Ratio	YoY change	Ratio	YoY change	Ratio	YoY change
2015	44.6	--	48.9	--	1.5	--	1.2	--	0.3	--
2016	45.4	1.79	49.8	1.84	1.4	-6.67	1.2	0	0.3	0.00
2017	46.5	2.42	48.2	-3.21	1.6	14.29	1.2	0	0.5	66.67
2018	47.6	2.37	46.9	-2.70	1.6	0.00	0.9	-25	0.7	40.00
2019	47.4	-0.42	44.8	-4.48	1.9	18.75	2	122	1.2	71.43
2020	46	-2.95	45.4	1.34	2.9	52.63	2.1	5	1.3	8.33

Source: Department of Statistics, Annual Survey of Offshore Manufacturing Activities for Export Orders, Ministry of Economic Affairs, Taiwan.

Insofar as ECM is concerned, the most popular destination of manufacturing relocation is Taiwan itself. According to Ministry of Economic Affairs data, there was over US\$ 37.5 billion of “returned/stayed investment” (i.e. investments originally planned to be outbound) in the manufacturing sector between 2019 and 2021 that have used the government's facilitation scheme (discussed in Section 5).³³ Amongst all qualified returned investments, ECM-related investment projects accounted for over 70% in June 2021.³⁴ As a consequence of the significant number of returned/stayed investments, not only did the offshore

32. Department of Statistics, Export Order Surveys, Ministry of Economic Affairs (Taiwan), available at: www.moea.gov.tw.

33. National Development Council, Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan – Three-year Extension, December 2021, available at: www.ndc.gov.tw.

34. See: www.cna.com.tw.

manufacturing rate in China decrease considerably, but the trade pattern also changed. Taiwan's direct exports to the United States increased by 21% in 2018 compared to the previous year, and by 19% and 10% in 2019 and 2020, respectively. In 2018, the US surpassed ASEAN to become Taiwan's second largest trading partner after China.³⁵ The effect of ECM being the main sector returning to Taiwan is also reflected in the growth of ICT-related products exported to the US. Between 2017 and 2021, the average annual export growth of ICT products to the US was 29.1%. In comparison, the growth rate for all product categories was only 16.1% in the same period.³⁶

Taiwanese and other foreign investors are probably more inclined to reduce but not completely terminate their operations in China, as the longevity and intensity of the economic and technology rivalry remains uncertain, and China's economy continues to grow. Furthermore, there are also costs associated with migration, such that when the cost of relocation is larger than the extra tariffs imposed by the US, the trade war will be an unlikely reason to move. The number of Taiwanese firms that have continued operating in China is still significant. Taiwan businesses' participation in the Chinese economy has evolved over the last two decades as well. One indication is the dramatic increase of Taiwanese investment in the Chinese services sector since 2010. For example, such investment (mainly in retail and wholesale, financial, and transportation services) accounted for over 38% of total Taiwanese investment in China in 2019, before the pandemic, which is an increase from just 10% in 2007.³⁷ For many Taiwanese businesses in the manufacturing sector, involvement and participation in China's domestic supply network remains a commercially viable option. A reliable survey investigating the level of involvement is lacking, but the recent decision of Taiwan Semiconductor Manufacturing Company (TSMC) to build a US\$ 3 billion new production facility in the Chinese city of Nanjing is just one of the high-profile cases already in place.³⁸

35. (Taiwan) Bureau of Foreign Trade, Import and Export Database, Ministry of Economic Affairs, available at: cuswebo.trade.gov.tw.

36. Department of Statistics, *Industrial Economic Bulletin*, March 4, 2022, Ministry of Economic Affairs (Taiwan), available at: www.moea.gov.tw.

37. (Taiwan) Mainland Affairs Council, *Summary of Cross-strait Economic Statistics*, No. 320, December 2019, and Chung-Hua Institution for Economics Research, *A Study on the Changing Patterns of Taiwan's Outbound Investment in China*, Investment Commission Report [in Chinese], 2013.

38. Staff writer, "Taiwan Approves TSMC's Plan to Expand in Nanjin", *Taipei Times*, July 31, 2021, available at: www.taipeitimes.com.

Responses to Strategic Autonomy Policies

Taiwan faces a mixture of challenges and opportunities in light of the global supply-chain reform developments. As discussed above, the reform agenda pursued by the US and the EU to address economic security concerns and to elevate the level of resilience involves at least two dimensions.

The first dimension is to address economic security risks associated with “geographical concentration” of critical products, i.e. supply vulnerability due to a high degree of import dependency and the fact that foreign supply sources are limited and concentrated in specific geographical locations. The best example of a critical product with a “geographical concentration” risk is semiconductors. The US “100-Day Reviews” report found that 92% of US demand for logic chips depended on imports from a single location, namely Taiwan; and Taiwan is subject to potential disruptions for multiple environmental and geopolitical reasons. The lack of domestic capacity in the US to alleviate the recent chip shortage further underscores the risks of geographical concentration.³⁹ The report recommends that the US government accelerate the process of rebuilding its domestic semiconductor manufacturing, as well as research and development capabilities. Among the policy tools available, reshoring of semiconductor manufacturing facilities by Taiwanese suppliers (e.g. TSMC) is a top option recommended.⁴⁰ Semiconductor manufacturing is not the only sector with the issue of “geographical concentration”, and the ICT supply chain, which is still supplied by Taiwanese and Chinese contract manufacturers located in China, is likely to be the next target.

The second dimension is economic security risks related to “supplier concentration”, in particular when major supply sources are dominated by countries considered as strategic competitors and strategic rivals. The US “100-Day Reviews” report identifies advanced batteries, critical minerals and critical medical supplies as the key sectors facing a “supplier concentration” problem, with a high level of Chinese suppliers. The report thus suggests the creation of a new alliance with suppliers from like-minded partners as the key solution to mitigate the risk.

For Taiwan, the findings of the US review represent both challenges and opportunities; the former stem mainly from the “geographical concentration” concerns, and the latter are underpinned by solutions intending to address the “supplier concentration” issue. The most direct challenge associated with the “geographical concentration” issue is plausibly the reshoring pressure to diversify, at least partially,

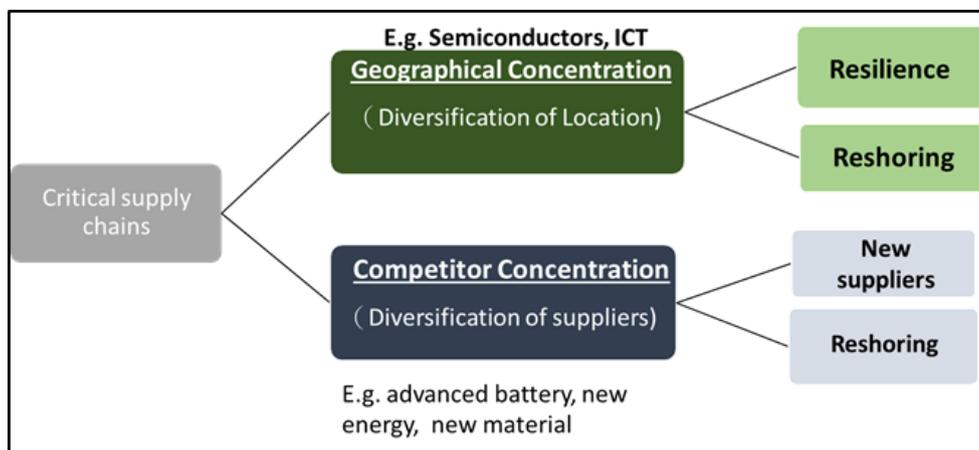
39. The White House, *Building Resilient Supply Chains, Revitalizing American Manufacturing, and Fostering Broad-Based Growth—100-Day Reviews under Executive Order 14017*, June 2021.

40. The White House, *Building Resilient Supply Chains*, *op. cit.*

manufacturing facilities outside Taiwan. The impacts of relocation are not limited to the increase in production costs but also uncertainties associated with the lack of qualified suppliers and workers. More importantly, both the EU and Japan are pursuing similar reshoring programs as well.⁴¹

There are several key implications of this situation for Taiwan contract manufacturers. First, pressure to diversify supply chains will likely increase for those companies that are currently located in China and have a majority of US clients. In the long run, both investment and investment-led trade between Taiwan and China will likely decline. Taiwan may be able to leverage this situation to secure its position in the new supply chain. Second, as all major economies are pursuing similar “import substitution” policies on semiconductors, Taiwan’s semiconductor-led exports to China and elsewhere will likely decline as well. Contract manufacturers such as TSMC can mitigate these challenges by diversifying production facilities to the US, the EU and Japan, but the impact on Taiwan’s trade surplus and GDP growth will be significant. This suggests that it will be a critical policy assignment for Taiwan to define strategies and solutions to address these structural changes that are unfolding rapidly.

Figure 5. The Framework of Critical Supply Chain Vulnerabilities and Solutions



Source: Author based on the US “100-Day Reviews” report.

41. For an overview of the EU’s semiconductor autonomy strategy, see a commentary by Thierry Breton, the EU Commissioner for the Internal Market here: T. Breton, “How a European Chips Act Will Put Europe Back in the Tech Race”, *Blog Post*, European Commission, September 15, 2021, available at: ec.europa.eu.

Taiwan's Responses: Public-Sector Actions

Facilitation Scheme for “Returning” Taiwanese Businesses

With the return of ECM and other contract manufacturers on the rise in recent years, the Taiwan government introduced a three-year (2019–2021) “Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan” in 2019. The Action Plan applies to both “returned” and “stayed” investment (i.e. investments originally planned to be outbound). The goal of the Action Plan is to facilitate the relocation process and enhance supply-chain resilience by encouraging Taiwanese firms to return and invest in Taiwan. At its center is an integrated single-window service to address the need for industrial land acquisition, energy, manpower, taxation and capital. A “matchmaking” program is also part of the package to connect returned investments with local suppliers. Finally, there is a new facility for assisting firms to access financial resources. As the trend of supply-chain readjusting and relocation continues to expand, the government decided in late 2021 to extend the Action Plan for three years.⁴²

Interestingly, at the inception stage of the implementation of the Action Plan, complaints were voiced by companies that have never moved their production facilities outside Taiwan, as the scheme provides favorable treatment only to qualified “returned” investment projects.⁴³ Consequently, two additional programs, the “Action Plan for Accelerated Investment by Domestic Corporations” and the “Action Plan for Accelerated Investment by SMEs”, were introduced in late 2019 as a package of the original scheme.

Participation in Regional Trade Integration

In the last two decades, Taiwan has been sidelined in economic integration agreements at both bilateral and regional levels, primarily because of opposition from China, which regards trade agreement negotiations with Taiwan as violating the “one China” policy. To demonstrate the impact,

42. National Development Council, Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan — Three-year Extension, December 2021, available at: www.ndc.gov.tw.

43. S.H. Chang, “Government Considering to Provide Equal Treatment to Domestic Companies in Two Weeks”, Ratio Taiwan International, May 29, 2019, available at: www.rti.org.tw (in Chinese).

South Korea, which is considered as Taiwan's main competitor in trade, enjoys free-trade agreement (FTA) coverage of over 73% (i.e. 73% of Korea's exports are eligible for preferential tariffs and other treatments), while Taiwan's coverage is only 13.6%.⁴⁴ The latest impact comes from the entry into force of the Regional Comprehensive Economic Partnership Agreement (RCEP) between ASEAN and five dialogue partners (Australia, China, Japan, Korea and New Zealand). In the short run, the impact of RCEP can be expected to be small because it is in essence merely an upgrade of existing FTAs between the 15 countries, and because the level of additional liberalization is limited by long phase-in arrangements.⁴⁵ One recent analysis shows that the largest impact of Taiwan's non-participation in the RCEP will come from favorable tariff concessions made by Japan and Indonesia, and that around 3.6% and 2.1% of Taiwan's exports to Japan and Indonesia respectively will be affected; for the rest of RCEP markets, the impact rate will be less than 1%.⁴⁶

That said, the new preferential trade relationship between Japan, China and Korea under the auspices of RCEP still creates pressure for the competitiveness of Taiwanese exports in the long run, and government measures are still required to help alleviate the discrimination that RCEP entails for Taiwanese industry. The most direct approach for Taiwan is to apply for RCEP accession. Yet, as China is already a member of the agreement, it is politically unlikely that Taiwan could join the RCEP with China's consent. Joining the Comprehensive and Progressive Trans-Pacific Partnership (CPTPP) membership, which shares two-thirds of the participating members with RCEP and of which China is not a member, appears to be the only possible option for Taiwan.

Taiwan formally applied for CPTPP membership in September 2021. The importance of CPTPP stems from the fact that it is a regional undertaking with multiple members, and the accession clause (CPTPP Article 30.4(a)) expressly welcomes all countries and separate customs territories that are ready to comply with the obligations in the agreement to apply. It is expected that Taiwan's participation in the CPTPP as an APEC economy, in tandem with the CPTPP's collective decision-making process, could ease political concerns and offer comfort room for CPTPP partners. Japan, for instance, has formally welcomed Taiwan's application, stating

44. H. S. Yen, "Reflection on South Korea's Application to Join the CPTPP" (in Chinese), Co-op, *Commercial Times*, December 15, 2021, available at: ctee.com.tw.

45. In China's case, for example, its zero-tariff concession offered to Japan covers 85% of tariff lines within 21 years, yet the coverage of zero-tariff treatment with immediate effect will only be 17.81% of all product lines. By comparison, the lowest zero tariff with immediate effect commitment in CPTPP (by Vietnam) is 65%. See Y. G. Gao, "The Short- and Long-term Impact of RCEP Tariff Concession on Taiwan", *Economic Outlook Bimonthly*, No. 197, September 2021, pp. 124-131 (in Chinese); and APEC Policy Support Unit, *Taking Forward the Lima Declaration on the Free Trade Area of the Asia-Pacific (FTAAP): Study on Tariffs*, APEC, November 2019, p. 46.

46. *Ibid.*, pp. 128-129.

that Taiwan was an important partner with shared “fundamental values such as freedom, democracy, basic human rights, and rule of law”.⁴⁷

Still, challenges remain. China, which itself is a new applicant to CPTPP, has once again voiced its opposition to Taiwan’s application. Existing bilateral trade concerns with Japan persist, particularly over Taiwan’s ban on Japanese food from five specific prefectures introduced since the Fukushima nuclear plant accident in March 2011, which remains unresolved,⁴⁸ and over Taiwan’s agriculture sector reform, which needs to move forward quickly. Nevertheless, the CPTPP is the best and perhaps the only opportunity available for Taiwan for meaningful participation in regional trade integration, and 2022 would be a key year for the accession process. In September 2022, Taiwan will face the first accession milestone when the CPTPP 11 members decide if they have a consensus to establish a working group for Taiwan’s application.

New Industrial Initiatives and the New Southbound Policy

For Taiwan, despite all the impacts and costs, the trade war paradoxically offers the opportunity to reconsider its economic and trade structure with China and other partners. Specifically, as the “US-China-Taiwan” triangle that has underpinned Taiwan’s economic growth for the last twenty years appears to be increasingly unsustainable, creating a new framework, or doubling down on efforts related to the New Southbound Policy (NSP), intended to expand relations with South and Southeast Asia, appears to be further justified by this external impetus.

In responding to the challenges discussed above, the current Taiwan government under President Tsai Ing-wen introduced two major economic policy undertakings when she took office in 2016: the “Industrial Innovation Plan” (IIP), and the “New Southbound Policy” (NSP). The IIP now includes programs for promoting the “Six Core Strategic Industries”, namely advanced semiconductors and Artificial Intelligence of Things (AIoT),⁴⁹ cybersecurity, precision health industry, defense and strategic industries, green and renewable energy industry, and a national stockpile-related industry.⁵⁰ The official objective of the “Six Core Strategic Industries” program is to transform industrial innovation, moving toward high-value-added, service-oriented business models. It envisions achieving

47. K. Komiya, “Japan Welcomes Taiwan Bid to Join Trade Pact, Citing Shared Values”, Reuters, September 24, 2021, available at: www.reuters.com.

48. “Japan Asks Taiwan to Lift Ban on Food Imports”, *NHK World News*, January 11, 2022, available at: www3.nhk.or.jp.

49. AIoT refers to technologies oriented to integrate Artificial Intelligence (AI) with the Internet of Things (IoT).

50. “Promoting the Six Core Strategic Industries”, Department of Information Services, Executive Yuan, Taiwan, January 18, 2021, available at: english.ey.gov.tw.

industrial innovation, job creation, equitable wealth distribution, and sustainability.⁵¹ The economic rationales, however, intend to address many of the challenges discussed above, namely the two concentration (product and production base) issues by encouraging and diversifying Made-in-Taiwan manufacturing, as well as to modernize and create new jobs for the services sector.

As for the NSP, it is a key policy undertaking to enhance connectivity with the Indo-Pacific region. Specifically, the NSP is designed to elevate the relationship with South and Southeast Asian countries plus Australia and New Zealand through the following four key areas of cooperation:⁵²

- Soft power connectivity: enhancing cooperation through, inter alia, medical, education, technology, agricultural cooperation and small-and-medium enterprises cooperation
- Supply-chain connectivity: enhancing economic ties through supply-chain integration, with priority given to ICT, domestic demand-oriented industries, energy and petrochemicals, new agriculture, and financial services
- Linking regional markets: expanding two-way investment and trade relationships and strengthening linkages among different markets via soft (i.e. legal and regulatory) and hard infrastructure
- People-centered approach and people-to-people connectivity: intensifying people-to-people interaction via education, tourism and cultural exchanges

It is important to note that the NSP is not an economic-only policy, and the rationale goes beyond trade and investment promotion. As reflected in the “Guidelines for the New Southbound Policy”,⁵³ the ultimate goal of the NSP is to “build up mutual trust and a sense of community”. Yang (2017) argues that the NSP aims to achieve the “4Rs” objectives: relocation, reinvention, reinvigoration and reform. Relocation means to enhance and relocate Taiwan’s role and capacity in Southeast Asia and other NSP regional networks with the goal of demonstrating that Taiwan is willing and able to make contributions to development and prosperity in this region. Reinvention refers to Taiwan’s willingness to reinvent its partnership as a member of the community for the mutual benefit of Taiwan and NSP partners. Reinvigoration means elevating engagement and connectivity with both public and private stakeholders in the region. Finally, the NSP policy also plays a role in promoting a reform agenda in Taiwan, including the mindset and institutional framework for engaging with NSP partners.

51. National Development Council (Taiwan), “Program for Promoting Six Core Strategic Industries”, National Development Council, undated, available at: www.ndc.gov.tw.

52. A complete introduction to the NSP policy is available at: <https://newsouthboundpolicy.trade.gov.tw>.

53. See: <https://newsouthboundpolicy.trade.gov.tw>.

This is not to say that trade and investment promotion is outside the scope of the NSP; on the contrary, there are still strong economic elements in the NSP program. For instance, one of the implicit economic rationales of the NSP is indeed to address the China-dependency concerns by encouraging diversification of economic relations with NSP partners and facilitating enhanced access to the domestic markets of NSP partners. The NSP policy focuses on the implementation of five “Flagship Programs”: 1) Regional Agricultural Development, 2) Medical and Healthcare Cooperation and the Development of Industrial Chains, 3) Industrial Talent Development, 4) Industrial Innovation and Cooperation, and 5) the New Southbound Policy Forum and Youth Exchange Platform. Currently the NSP is targeting seven priority partners: India, Indonesia, Malaysia, Myanmar, the Philippines, Thailand, and Vietnam.⁵⁴

Taking the Medical and Healthcare Cooperation and the Development of Industrial Chains Flagship Program as an example, one of the short-term assignments under the program is to establish a regional network on the prevention of epidemics. At the same time, the supply-chain connectivity initiative will try to link healthcare service providers and made-in-Taiwan smart medical systems with the collaborating healthcare stakeholders in ASEAN countries.⁵⁵ A network of healthcare professionals and regulators has been created through capacity-building and training programs provided for healthcare professionals from the priority partners. According to Taiwan Ministry of Health and Welfare (MoHW) statistics, a total number of 1,185 professionals from the seven countries participated in the training program between 2018 and 2021. Exports of medical devices and pharmaceuticals have also been growing. More importantly, this Flagship Program has provided a timely platform to deliver Taiwan’s assistance during the Covid-19 pandemic.

In summary, the NSP’s healthcare cooperation program creates essential enabling factors for Taiwan’s medical products and healthcare service providers through enhancing connectivity with the local medical and healthcare networks, and lowering regulatory and other policy impediments. These underpinning factors would improve the market access opportunities for Taiwanese business and service providers. This is the role the NSP plays in promoting intensified economic relationships with Indo-Pacific partners and in facilitating enhanced economic engagement in response to global supply-chain reform pressures, and in diversifying Taiwan’s economic composition beyond semiconductor and ICT manufacturing.

54. *Ibid.*

55. See: www.ey.gov.tw.

Finally, for Taiwan to maintain its economic growth, a key area will be maintaining its technological leadership through research and innovation. While Taiwan consistently receives a high ranking in international competitiveness indexes (e.g. Taiwan ranks 8th globally in the 2021 IMD World Competitiveness Index for both overall performance and digital readiness),⁵⁶ there are constant calls from industry for the government to elevate commitment to and investment in the development of next-generation technology and of new talent in priority areas.⁵⁷ Concrete steps have been taken in response to these challenges and to industrial demand. By way of demonstration, new legislation enacted in 2021, the “Act on National Key Fields Industry–University Cooperation and Skilled Personnel Training”, is designed to provide flexibility for universities in locating funding and creating training programs through public-private partnership arrangements. Five new graduate schools for advanced technology or semiconductor research were established in five top-tier universities across Taiwan in 2021 through joint collaboration with the private hi-tech sector.⁵⁸

56. *IMD World Competitiveness Index*, Institute for Management Development (IMD), 2021, available at: [worldcompetitiveness.imd.org](https://www.worldcompetitiveness.imd.org).

57. See, for example, the 2021 White Papers of the Chinese (Taiwan) National Federation of Industries (in Chinese), available at: drive.google.com.

58. “Taiwan Opens Semiconductor Graduate School”, *NHK World News*, December 25, 2021, available at: www3.nhk.or.jp.

Future Outlook

Up to now, Taiwan has demonstrated its ability to mitigate the global supply-chain reform pressure with agility and flexibility. Economically, the impact of the reform agenda seems to be limited. Amid the Covid-19 pandemic, exports continued to expand for a record-breaking 20 consecutive months in February 2022, and 6.45% GDP growth was recorded for 2021. The development also provides the opportunity and impetus for Taiwan to improve its economic security concerns in relation to China. That said, Taiwan also needs to recognize that the economic costs of supply-chain reform will be immense, especially considering the following long-term uncertainties.

The first and foremost uncertainty is an international economic environment that is increasingly dominated by economic security and strategic autonomy policies. Being a major supply source for semiconductor, electronic and ICT products, Taiwan is already the target in most of the economic autonomy reviews discussed above. The pressure on Taiwanese contract manufacturers to cooperate and facilitate the rebuilding of domestic manufacturing capacity programs pursued by a growing number of national governments is mounting.⁵⁹ Supply-chain architectures that are established based on cost advantage, efficiency, worker quality, and technology know-how are now subject to distortions to satisfy the localization and import substitution policies of the importing countries. At the business level, Taiwanese contract manufacturers face tremendous challenges, both financially and managerially, to readjust under new and unfavorable terms.

The second risk is associated with the issue of “supply-chain nationalism”, which is defined here as advocating preferential treatment for domestic suppliers based on the nationality of the supplier. Currently, most countries measure self-reliance and autonomy as the refined level of local production capacity within its territory. The nationality of suppliers has yet to become a qualification for supply-chain participation. TSMC’s investments in the US or EU should therefore be subject to the same set of facilitations provided under the “CHIP Act” that both the US and EU are formulating. Yet there are now calls for national companies to receive preferential treatment. A recent high-profile example is Intel CEO Pat

59. The latest example is the Australian government’s announcement of seven categories of products, including semiconductors and telecom equipment, that are important to the national interest. See A. Gleeson, “Scott Morrison Reveals Seven Goods That Need to Be Manufactured Domestically in the ‘National Interest’”, *NCA NewsWire*, March 7, 2022, available at: www.news.com.au.

Gelsinger's open advocacy for the US government to invest more in American semiconductor companies such as Intel over Asian competitors. Gelsinger argued that, while the US should welcome and support investment in the country from TSMC and Korea's Samsung, it also faced the risks of R&D results and intellectual properties "going back to Asia".⁶⁰ Putting aside the validity of the argument, the spread of supply-chain nationalism is unquestionably creating an additional challenge for Taiwanese manufacturers considering relocating.

The next uncertainty is the risk of supply distortion for products currently considered critical. Semiconductor and ICT products, for instance, are now on the critical/essential product list for almost all countries that are reviewing their economic security and autonomy status. And the solution to mitigate the risk is also similar: secure supply and increase the level of domestic production. Besides the US and EU, Japan has announced its plan to triple semiconductor revenue by 2030,⁶¹ the Indian government approved a US\$ 10 billion plan to boost domestic semiconductor manufacturing capacity,⁶² and the Australian government announced its intention to increase domestic semiconductor manufacturing. All these security-based rather than market-based initiatives not only increase competition for Taiwan manufacturers, but also may lead to oversupply of chips in the long run.

Finally, the risk of decoupling between China on one hand and US-led democratic countries on the other is on the rise. In the broadest sense, decoupling denotes the process of reducing reliance on each other's supply chain, yet increasingly it is also taking place in the form of mandatory measures and anti-measures implemented by the US and China. Since 2018, Taiwan contract manufacturers have already been cooperating with the export control regime of the US against China over an expanding list of dual-use (i.e. commercial and military) products and "listed entities". In response, China enacted its Export Control Law in December 2020, as well introducing an export licensing regime for "controlled items" that affect national security. This was followed by the enactment of an Anti-foreign Sanctions Act in June 2021 that authorizes retaliatory measures against foreign governments, individuals and organizations that "discriminate against Chinese citizens, violate China's sovereignty, or interfere in China's internal affairs" in carrying out sanctions by foreign governments.⁶³ Taiwanese companies, caught in the crossfire of US sanctions and Chinese

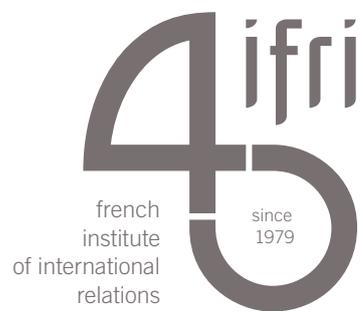
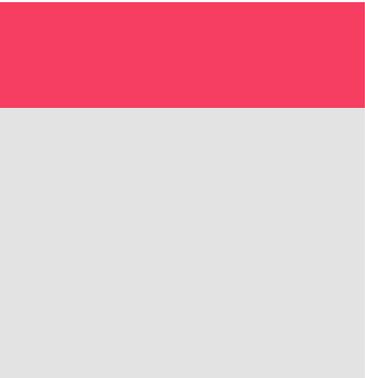
60. Y. F. Yu, "U.S. Priority Should be American Chipmakers, Not TSMC: Intel Chief", *Nikkei Asia*, December 2, 2021, available at: <https://asia.nikkei.com>.

61. T. Mochizuki, "Japan Sets Goal of Tripling Domestic Chip Revenue by 2030", *Bloomberg*, November 15, 2021, available at: www.bloomberg.com.

62. A. Kumar, "Cabinet Approves Rs 76,000-cr PLI Scheme for Semiconductors", *Fortune India*, December 15, 2021, available at: www.fortuneindia.com.

63. T. Toshiya, "Three Things to Know About China's 'Economic Security'", available at: www.nippon.com.

retaliatory legislation, will find it increasingly difficult to sustain the existing US-Taiwan-China supply-chain network and the growing pressure to take sides. While this might be a positive development insofar as economic security and autonomy threats with China are concerned, there will be enormous economic costs that require careful calculation and recovery planning.



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