

Can Taiwan Maintain Its Economic Resilience Amidst the Ongoing Restructuring of the Global Supply Chain?
Interview with Dr. Chien-Yi Chang, President of the Taiwan Institute of Economic Research

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Enjeux et stratégies en Indo-Pacifique : entre rivalité et coopération

Sous la direction de **Éric Boulanger** et **Éric Mottet**

Can Taiwan Maintain Its Economic Resilience Amidst the Ongoing Restructuring of the Global Supply Chain?

Interview with Dr. Chien-Yi Chang, President of the Taiwan Institute of Economic Research



Dr. Chien-Yi Chang obtained his Doctorate in Economics from National Taipei University in 1998. Subsequently, he joined the Taiwan Institute of Economic Research, advancing

from a Researcher to the Director of the Second Department (Industrial Development Strategy), and has served as President since 2019. Dr. Chang has an extensive background in industrial economic development, contributing to over 240 industry-specific research projects and acquiring profound knowledge in the manufacturing and service sectors of Taiwan. He is adept in understanding the competitive cooperation dynamics between Taiwan and major global economic and trade countries.

Dr. Chang is a recognized authority in his field, serving as a principal contact for international delegations visiting economic think tanks in Taiwan. His leadership has steered the Institute towards alignment with global industrial trends, including initiatives in ESG (Environmental, Social, and Governance) sustainability and carbon trading. Following the COVID-19 pandemic, his strategic focus has shifted towards the reconfiguration of global supply chains, offering vital counsel to government agencies regarding the international positioning of Taiwanese businesses.

<https://english.tier.org.tw/>

***Le docteur Chien-Yi Chang** a obtenu son doctorat en économie de l'Université nationale de Taipei en 1998. Par la suite, il a intégré l'Institut de recherche économique de Taïwan, où il a progressé du poste de chercheur à celui de directeur du Deuxième Département (Stratégie de Développement Industriel), et finalement en devenir le président en 2019. Dr. Chang jouit d'une expérience étendue dans le domaine du développement économique industriel, ayant contribué à plus de 240 projets de recherche spécifiques à l'industrie. Son expertise s'étend également à la compréhension des dynamiques de coopération compétitive entre Taïwan et les principales nations économiques et commerciales mondiales. Sous sa direction, l'institut s'est aligné sur les courants industriels mondiaux, notamment dans les domaines de la durabilité ESG et du marché du carbone. À la suite de la pandémie de COVID-19, ses priorités stratégiques ont été recentrées sur la reconfiguration des chaînes d'approvisionnement mondiales. Agissant à titre de conseiller auprès de nombreux organismes gouvernementaux, l'Institut aide ainsi les entreprises taïwanaises à mieux se positionner sur l'échiquier économique mondial.*

- 1 **Interventions économiques:** Thank you, President Chang, for taking the time out of your busy schedule to speak with us for *Interventions Économiques*. Could you please begin by providing an overview of the restructuring of the global supply chain in Asia following the US-China trade war, as well as the situation regarding Taiwanese firms' investment returning home?
- 2 **Chien-Yi Chang:** Certainly. The global supply chain has always been changing, shifting from the Four Asian Tigers to Southeast Asia, then to China, and now moving out of China. This is primarily based on the economic principle of comparative advantage. China's comparative advantage has largely been due to government subsidies. The US-China trade war initiated by President Trump in 2018 had significant implications, particularly for Taiwan. Let's take the Information and Communication Technology (ICT) industry as an example to illustrate the impact of global supply chain changes on Taiwan. Prior to 2018, major international brands like Dell and HP outsourced hardware production to Taiwanese manufacturers. These Taiwanese enterprises initially produced in Taiwan but later shifted operations to China due to cost considerations. Taiwan was among the earliest countries to establish a presence in

China, driven by factors such as proximity, shared language, and preferential policies offered by the Chinese government to Taiwanese businesses.

- 3 However, with the onset of the trade war, these international brands began demanding that Taiwanese manufacturers relocate their production lines out of China due to US tariffs on Chinese goods. Initially, Taiwanese businesses adopted a wait-and-see approach, hoping for a swift resolution to the trade dispute. However, with President Biden's administration indicating that tariffs wouldn't be lifted immediately, Taiwanese businesses had to move their production lines back to Taiwan or to Southeast Asia. Taiwan benefited economically from this shift, with Thailand experiencing the most significant gains among Southeast Asian countries. While China remains Taiwan's largest export market, Taiwan's exports to China and Hong Kong as a proportion of total exports have steadily decreased, dropping from 39.5% in 2015 to 35.4% in 2023 (January to November), while exports to the US increased from 12.1% in 2016 to 17.3% in 2023 (January to November).¹
- 4 This restructuring isn't merely about adapting to changes in the supply chain; there are deeper transformations at play. During the eight years of President Ma Ying-jeou's administration, Taiwan's overreliance on China led to a continuous decline in domestic investment. By comparing the share of fixed capital formation to GDP among the Four Asian Tigers (Taiwan, South Korea, Singapore, and Hong Kong), Taiwan had the lowest proportion. By 2017, it had even fallen below 20.5%, lower than during the nadir of the 2009 financial crisis.² The return of Taiwanese businesses following the US-China trade war has led to a resurgence in domestic investment, a significant change for Taiwan's economic growth.
- 5 President Tsai Ing-wen's administration aimed to reshape Taiwan's economic growth model upon taking office, leading to the launch of the "5+2 Industrial Transformation Plan" in 2016. This plan encompasses seven major projects: "Asia/Silicon Valley," "Smart Machinery," "Green Energy," "Biomedical," "National Defense," "High-Value Agriculture," and "Circular Economy."³ Taiwan's historically high reliance on exports has made it particularly vulnerable to global economic fluctuations. During the bursting of the dot-com bubble in 2001 and the financial crisis in 2008, Taiwan's economy was very poor. Therefore, the government strategically selected industries and promoted domestic and foreign investment to foster a new economic growth model, emphasizing the creation of domestic demand, which includes domestic investment. Subsequent initiatives, such as the "Forward-looking Infrastructure Development Program," also prioritize creating domestic demand.⁴
- 6 Take "Green Energy Technology," commonly referred to as "Green Power," for instance. Given the government's goal of achieving a "Nuclear-free Homeland by 2025," it is a crucial project.⁵ Taiwan has long grappled with power shortages, and transitioning away from nuclear power necessitates exploring new energy sources. Offshore wind power is a focal point, with Taiwan already having onshore wind facilities and now expanding into offshore installations. These investments contribute to domestic demand, as Taiwan doesn't export electricity, but they also mitigate the impact of declining international trade on Taiwan's economy.
- 7 Taiwan has a saying, "Self-help, mutual assistance, and divine help." In this context, Taiwan seeks to change its economic growth model, relying more on domestic demand, which is self-help. Given Taiwan's economy is primarily export-oriented, transitioning entirely on its own isn't feasible. President Trump's initiation of the trade war with

China in 2018 represented mutual assistance. The rapid shift in the global supply chain from manufacturing in China for export to manufacturing in Taiwan for export demonstrates this. Although Taiwanese businesses have been moving to China for many years, they still have production capacity in Taiwan. It's just that they are not producing here. Therefore, bringing production back will be quick, especially for the ICT industry. Divine help comes from the changes in lifestyle brought about by the COVID-19 pandemic, increasing demand for ICT products. For instance, the surge in demand for products like Zoom for remote meetings and the resulting need for upgraded computer hardware has fueled growth in Taiwan's exports. Moreover, as everyone leaves urban areas for leisure activities in the suburbs, there is a significant increase in demand for automotive chips, leading to rapid export growth for Taiwan. While the origins of the virus remain contentious, the pandemic's significant global impact has coincidentally revitalized Taiwan's ICT industry.

- 8 Returning to the issue of the global supply chain, post-US-China trade war, the concept of "China + 1" gained traction. However, I believe it's more accurately "China + n." Frankly, China remains the world's second-largest economy, making complete decoupling impossible. Hence, the term "de-risking" emerged; while there's still demand for Chinese products, it's not as substantial as before. So where will the products that are no longer imported from China be produced? They will be produced in Southeast Asia or Taiwan.
- 9 The US government attempts to reshuffle the supply chain through the "CHIPS and Science Act, 2022," aiming to bring semiconductor production back to the US.⁶ This move seeks to strengthen control over chip products while also considering job creation within the US. Taiwan is one of the most critical semiconductor production bases globally, especially for advanced chips, with over 90% of high-end chips manufactured in Taiwan.⁷ For Taiwan, this industrial advantage serves as a safeguard for national security, known as the "Silicon Shield."⁸ Given Taiwan's importance to the global semiconductor industry, international intervention would occur if China threatened Taiwan's security, thereby safeguarding Taiwan.
- 10 However, perceptions may differ among other democratic countries. While Taiwan is a democratic country and an important trading partner, its proximity to China and China's adamant stance on reclaiming Taiwan pose significant risks. If Taiwan were to fall under Chinese control, China would gain access to the world's most advanced semiconductor fabrication technology. If Taiwan's semiconductor industry were destroyed in a conflict, it would disrupt the global semiconductor supply chain. Therefore, the US hopes for companies like TSMC to establish production facilities in the US, including cutting-edge processes. While TSMC has responded, with construction underway for its 21st fab in Arizona for over two years, it's not yet operational. Conversely, its 23rd fab in Kumamoto, Japan, which started later, has already been completed. This demonstrates that bridging the cultural gap between Taiwan and the US is not as straightforward as it seems. TSMC may also establish factories in Germany in the future.⁹ Here, we witness a specific aspect of "China + n": it is not just about moving from China to Taiwan; it is about relocating from Taiwan to other countries, particularly those closer to the market rather than low-cost production countries.

Interventions économiques: We have observed a definite trend of the supply chain returning to Taiwan, with the Taiwanese government actively facilitating this

transition. The challenges faced by TSMC's US factory lead me to wonder if Taiwanese society is capable of meeting this challenge. For instance, the widely discussed issue of declining birth rates—does Taiwan have sufficient human resources?

- 11 **Chien-Yi Chang:** Indeed, TSMC's investments in the US, Japan, Germany, and other locations are beneficial for Taiwan. Not only does it alleviate concerns among trading partners mentioned earlier, but it also reduces pressure on Taiwan's production resources, as the semiconductor industry is highly resource-intensive in terms of electricity and water consumption. Taiwan's government and private sector often refer to the "Five Shortages" in Taiwan—water, electricity, land, talent, and labor.¹⁰ To support the return of Taiwanese businesses, the National Development Council (NDC) has established a single window called "InvesTaiwan," which assists Taiwanese businesses in addressing water, electricity, and land shortages. This initiative is part of the "Action Plan for Welcoming Overseas Taiwanese Businesses to Return to Invest in Taiwan."¹¹
- 12 Regarding the issue of talent, it's essential to understand that all industries in Taiwan are competing for talent, and market mechanisms naturally come into play. There's limited government intervention in this regard. The chairman of the Taiwan Chemical Industry Association has expressed concerns that TSMC is attracting chemical engineering talent. Semiconductor manufacturing requires a significant number of chemical engineering talents, and TSMC can offer higher salaries, thus attracting talent away. Taiwanese talent is also drawn to Asia or North America, as the market for high-level talent is global and highly competitive.
- 13 Addressing the shortage of labor, it's true that Taiwan's population is declining, with deaths outnumbering births for three consecutive years.¹² In the past, the Taiwanese government introduced Southeast Asian migrant workers to alleviate the issue. However, Southeast Asian countries are also developing and require labor. Therefore, the government is considering opening up to Indian migrant workers, potentially bringing in 100,000 individuals. Additionally, Chinese descents from Southeast Asian countries studying in Taiwan, known as "overseas compatriot students," can now remain in Taiwan for work after completing their studies. Previously, foreign talent working in Taiwan faced minimum wage restrictions, which have now been relaxed. The government uses these policy measures to guide industrial development.
- 14 When Taiwanese businesspeople return to invest in Taiwan, there are generally two methods. One is for them to bring orders and production back to Taiwan, financed by loans from Taiwanese financial institutions. The other method is to use their own funds from overseas to invest in Taiwan. Both ways are handled through InvesTaiwan but must meet all three basic conditions: first, they must be firms impacted by the US-China trade war; second, companies that have invested in China for over two years; and third, the return of investment or expansion of production lines in Taiwan must possess smart technology capabilities and gradually implement carbon reduction policies in line with the government's "Net-Zero Emissions in 2050" goals.¹³ Additionally, they must meet at least one specific qualification, including: firstly, being in an innovative sector under the "5+2 Industrial Transformation Plan;" secondly, belonging to industries producing high value-added products and key components; thirdly, being enterprises occupying critical positions in the global supply chain; fourthly, being enterprises with advantages in international marketing of proprietary brands.

- 15 After the application is submitted, the government will first meet the land requirements. Through a “lease-only” approach, it will provide a two-year rent-free incentive for entering industrial zones developed by the Ministry of Economic Affairs, assisting companies in setting up factories quickly. At the same time, the government is promoting the development of science parks and industrial parks, utilizing the “Forward-looking Infrastructure Development Program” to subsidize the establishment of industrial parks at local levels, inventorying land supply, and implementing various assistance measures. It continues to inventory land and strengthen supply and matchmaking to meet the land needs of businesses. Additionally, it provides preferential loans to assist businesses in acquiring funds for constructing factory buildings and related facilities, purchasing machinery and equipment, and covering mid-term operational expenses. Finally, the Water Resources Agency of the Ministry of Economic Affairs provides dedicated assistance for water use plan applications, while the Taiwan Power Company offers a single window to expedite enterprise electricity application procedures, assisting companies in quickly obtaining water and electricity.
- 16 As of now, 307 companies have passed the review process, with total investment amounts exceeding US\$37 billion.¹⁴
- 17 **Interventions économiques:** In your article, you mentioned “guiding Taiwanese businesses to establish a new supply chain system linked with advanced countries.”¹⁵ What does this specifically entail?
- 18 **Chien-Yi Chang:** From the perspective of manufacturing, Taiwan has traditionally focused on OEM (original equipment manufacturing). For example, TSMC is essentially a semiconductor foundry, but due to its advanced process technology, it has created a unique OEM brand. Even TSMC’s biggest competitor, Intel, outsources the manufacturing of its 3-nanometer products to TSMC. The history of Taiwan’s industrial development can be explained by the “Flying Geese Paradigm”: major technologies come from the United States and Japan, while Taiwan invests capital and labor in production.¹⁶ In the ICT industry, the most significant innovations often originate from Silicon Valley in the United States. However, considering the high cost of living and expenses in the San Francisco Bay Area, the profits generated there are substantially higher than those from contract manufacturing by a large margin.
- 19 Many of the key components needed for information products were originally produced in Japan, and some components are still manufactured there. However, over time, the cost of production in Japan has become increasingly high, leading to outsourcing to foreign companies. Taiwan is often the preferred choice for Japanese companies, and this relationship has been maintained for a long time, with companies like Panasonic and JVC being excellent examples.
- 20 Japan is a country with a relatively conservative corporate culture. Although producing in Japan is no longer profitable, some brands still insist on manufacturing in Japan and are unwilling to release their technology. When we meet with Japanese companies, we often tell them that Taiwan is their best partner. Taiwanese companies are more dynamic and can revitalize Japanese brands. Over the past few decades, Japan has always been at a disadvantage in cooperation with South Korea. Later, they cooperated with Chinese companies to enter the Chinese market, but China has a deep-seated aversion to Japan, and the cooperative relationship cannot last long. I believe TSMC’s establishment of a factory in Kumamoto, Japan, may be another opportunity for

Taiwanese and Japanese companies to cooperate. If Japan can be convinced that Taiwan is trustworthy, the two countries can cooperate at a higher level of technology.

- 21 Regarding the connection with the United States, we can see the relationship between Taiwan's top five ICT companies (Quanta, Wistron, Pegatron, Compal, Inventec) and Silicon Valley. The founders of these companies have experience working in Silicon Valley or have close relationships with US technology companies. In the past, Taiwanese graduates went to the United States for further studies and then worked in US technology companies. Therefore, when Taiwan developed its ICT industry in the 1980s, these talents returned to Taiwan to start businesses. Nowadays, fewer young people from Taiwan go to the United States for studies, with many choosing China or Australia, weakening the connection with Silicon Valley compared to the past.
- 22 As mentioned earlier, President Tsai Ing-wen's "5+2 Industrial Transformation Plan" includes an "Asia/Silicon Valley" project.¹⁷ In the name of this project, "Asia" and "Silicon Valley" are separated, indicating that the goal is not to "replicate" Silicon Valley in Asia but to re-establish close "connections" between Taiwan, Asia, and Silicon Valley. The cooperation between Taiwan and Japan mentioned earlier represents the Asian end of this initiative. "Replication" and "establishing new connections" are two entirely different concepts.
- 23 The "Asia Silicon Valley Development Plan" (Asia/Silicon Valley 1.0), launched in September 2016, represents a strategic initiative by Taiwan to capitalize on its established strengths in hardware manufacturing, including ICT and semiconductors. This plan, a collaborative effort among the NDC, Ministry of Economic Affairs, National Science and Technology Council, Ministry of Transportation, and other relevant departments, aims to bridge Taiwan's hardware expertise with cutting-edge global technology research. The objective is to facilitate the transition from hardware prowess to software innovation, steering Taiwan toward a new economic development model.
- 24 The initiative focuses on two primary objectives: promoting the development of the Internet of Things (IoT) and bolstering the Startup Ecosystem (innovation and entrepreneurship ecosystem). These efforts have already yielded significant achievements. Notably, Taiwan was recognized as one of the world's top four "super innovators" by the World Economic Forum in 2018 and 2019, alongside Germany, the United States, and Switzerland. Furthermore, the value of Taiwan's IoT sector has surpassed US\$30 billion.¹⁸ Additionally, the plan has been instrumental in providing startups with crucial support, including funding for development and opportunities to engage in international exhibitions. These measures have laid a robust foundation for Taiwan's industrial digital transformation, demonstrating the plan's pivotal role in advancing the nation's economic landscape.
- 25 In recent years, with the rapid development of technologies such as artificial intelligence (AI) and 5G, the scope of IoT applications has become broader, contributing to the development of various innovative services. Additionally, due to the increasingly active environment of Taiwan's Startup Ecosystem, it is necessary to accelerate the growth of startup businesses. Building on the foundation of the "Asia/Silicon Valley 1.0" initiative, the NDC coordinated with relevant departments to jointly plan the "Asia/Silicon Valley 2.0 Development Plan," which was approved in 2021. The output value of Taiwan's IoT surpassed US\$60 billion in 2022, driving the ICT industry from hardware manufacturing towards integrated system applications. Moreover, Taiwan's

Startup Ecosystem has flourished, with over 7,400 domestic startups and the emergence of four unicorns (enterprises established in less than ten years but valued at over US\$1 billion), with the amount of funds raised by startups increasing from US\$800 million in 2015 to US\$2.2 billion in 2022.¹⁹

- 26 At this stage, we can see what the new connection between Taiwan and the United States entails: Microsoft established the IoT Innovation Center in Taiwan in 2016, followed by the establishment of AI research centers and startup accelerators (Microsoft for Startups Founders Hub) in 2018, and the IoT Center of Excellence in 2020. Google launched the Intelligent Taiwan project in 2018, increased its investment by US\$800 million to expand its data center operations in Taiwan in 2019, established its first Hardware Engineering Hub outside the United States in Taiwan in 2021, promoted the Yawan Cloud Service in 2022, and collaborated with four top universities in Taiwan to promote the “Taiwan Silicon Research Program” in 2023. Amazon Web Services (AWS) established the AWS IoT Lab and AWS Joint Innovation Center in Taiwan in 2019, and in 2022, it launched the first AWS Local Zone outside the United States. Qualcomm established the Qualcomm Innovation Center in Kaohsiung, Taiwan, in 2022, and promoted the accelerated adoption and commercialization of 5G.²⁰ These are all examples of integrated system application services, and through these collaborations, Taiwan can find new development directions beyond traditional low-value-added OEM.
- 27 Given the dual challenges of digital and net-zero transformation facing industries in recent years, and the continuous advancement of technologies such as AI and IoT, the Taiwanese government further proposed the “Asia/Silicon Valley 3.0 Development Plan” in February 2024. This plan will focus on the development of 5G Private Networks and AI Miniaturization Technology. Through innovative approaches, the Taiwanese government will also encourage private capital investment to achieve the goal of providing tax incentives to promote fundraising for startups.²¹
- 28 As Taiwan becomes a center for innovative technological development, it’s also extending these achievements overseas. Since 2017, there have been 107 successful cases, including: Intelligent Traffic Surveillance Systems exported to 13 countries such as the United States, Canada, the United Kingdom, and Southeast Asia; Smart Manufacturing exported to Indonesia and Thailand; Smart Commerce and Management Solutions exported to 18 countries including the United States, Canada, France, and Southeast Asia; Smart Governance solutions like Air Pollution Monitoring exported to 12 countries including the United States, Japan, South Korea, and Southeast Asia; Smart Health Management Systems exported to 11 countries including the United States, Europe, and Southeast Asia.²²
- 29 **Interventions économiques:** Taiwan is a democratic and open society, where diverse opinions naturally emerge regarding industrial development. Does political competition seem to affect policy consistency?
- 30 **Chien-Yi Chang:** President Tsai Ing-wen has actually performed quite well in the economic field. Of course, this is also due to political cooperation, as the Democratic Progressive Party (DPP) holds a majority of seats in the parliament, making it easier to implement many policies, such as special budget allocations and so on. With the recent elections (2024) resulting in no majority in parliament, it might be a bit more challenging after President Lai Ching-te’s inauguration on May 20th. As for the continuity of economic policies, it will depend on the actions of the two major opposition parties, the Kuomintang (KMT) and the Taiwan People’s Party (TPP). Since

the elections ended in January, the political atmosphere in Taiwan has been different from before, with constant disputes. However, this is democracy. Though it may not always be efficient, everyone can have their own opinions. Looking at it from another perspective, collective wisdom is less likely to make mistakes because of the mechanisms of checks and balances.

- 31 **Interventions économiques:** Lastly, could you briefly introduce the history and main missions of the Taiwan Institute of Economic Research (TIER)?
- 32 **Chien-Yi Chang:** The predecessor of the Taiwan Institute of Economic Research (TIER) was the Taiwan Economic Research Center established by Dr. Gu Jen-fu in September 1976 under the Taiwan Economic Research Foundation, a non-profit organization. It was the earliest independent academic research institution established by the private sector in Taiwan. TIER was founded with the aim of actively engaging in research on domestic and foreign economics and industrial economics, and providing research results to the government, enterprises, and academia to promote Taiwan's economic development. Due to the continuous expansion of its operations and increasing scale, and to meet the needs of management and development, it was reorganized and renamed as the Taiwan Institute of Economic Research in September 1989.
- 33 In recent years, with the frequent occurrence of abnormal weather conditions, governments, enterprises, and civil organizations worldwide have attached greater importance to promoting sustainable economies. Taiwan is a very open economy, and the global trend of sustainable development will have a profound impact on Taiwan's economy. As sustainable development involves a wide range of aspects, most of our small and medium-sized enterprises are still exploring and adapting to this challenge. TIER has accumulated extensive expertise in industrial research over the years and is now duty-bound to assist small and medium-sized enterprises in their sustainable transformation. While sustainable economics pose significant challenges, they also bring opportunities for development. Because the areas that may be integrated into sustainable transformation include digital transformation, sustainable finance, corporate governance, financial technology, and innovative business models, which are important directions for industrial development in various countries around the world today.
- 34 As the global economic and trade situation undergoes rapid changes, new technologies emerge, and societal environments evolve swiftly, Taiwan's industrial structure and economic development must continue to adapt and keep pace with the times. Looking ahead, TIER will persist in its pursuit of greater specialization, foresight, and international excellence, aiming to become a top-tier think tank. We will continue to offer recommendations for Taiwan's sustainable development, making our greatest contributions to the country's future.
- 35 **Interventions économiques:** Thank you once again for accepting the interview.

Date: April 4th, 2024 By: Ting-sheng Lin, Professor, Department of Political Science, UQAM

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