

How Indigenous Industrialization Began in Postwar Taiwan

Presented at
Hong Kong Institute for the Humanities and Social Sciences
Making Modernity in East Asia Lecture Series
Hong Kong University
2017/11/23

Wan-wen Chu
Research Center for Humanities and Social Sciences (RCHSS)
Academia Sinica
Taipei, Taiwan
E-mail: wwchu@sinica.edu.tw

Introduction

Taiwan has been a star performer economically in the postwar period. In Maddison's (2010) estimates, Taiwan's per capita income in 1950 was only \$916, measured in 1990 international dollars (PPP), which was far lower than that of not only Latin America but also the Philippines, and less than one tenth of that of the US. After more than half a century, by 2008, Taiwan's per capita income had increased 22.8-fold¹. It hence ranked along with South Korea at the top of developing countries in terms of the rate of growth in this postwar period². Therefore, by 2017, this exceptional growth record has made Taiwan reach the rank of 21st in the world in terms of per capita PPP GDP, surpassing many of the OECD countries³.

Looking back historically, the speed and magnitude of Taiwan's postwar development indeed looks impressive. When the Japanese colonialists were forced to withdraw from Taiwan due to Japan's defeat in 1945, Taiwan was still a typical colonial economy relying upon exporting sugar and rice to a protected Japan market, which vanished after Japan's defeat. Over 90 percent of Taiwan's exports were primary goods in 1939. The industrialization after 1937 was to support Japanese military activities in the south Pacific, and the plants were all owned and managed by Japanese⁴. Indigenous industrial development would be a postwar phenomenon. With luck, in 1945, Taiwan's traditional exports were able to swiftly turn to the Chinese market in place of the Japanese one. However, just four years later, the export market disappeared again after the Nationalist regime was defeated by the Communists and had to retreat to Taiwan at the end of 1949. Taiwan had to find other outlets for its exports. Fortunately, Taiwan was able to embark on a path of sustained industrialization in the early postwar period, so that it managed to gradually reduce its dependence upon primary exports. The share of rice and sugar in Taiwan's exports declined from 74 percent in 1952, to 47 in 1960, 22 in 1965, and a

¹ This is from Maddison (2010). The unit was 1990's International Geary-Khamis dollars.

² This calculated from Maddison (2010), using each country's per capita GDP of 2008 divided by that of 1950. The ranking excludes the top-ranked Equatorial Guinea, which is an oil-rich country with less than one million people.

³ According to IMF World Economic Outlook (July 2018), Taiwan's PPP per capita GDP was \$50,293, about 84 percent of the US's (\$59,501), in 2017.

<http://www.imf.org/external/datamapper/PPP@WEO/OEMDC/ADVEC/WEOWORLD>.

⁴ For discussion of the Japanese colonial period, see Ho (1978), Cumings (1984), and Myers and Peattie (1984).

mere 3.2 percent in 1970⁵, clearly demonstrating the fruits of industrialization in the first twenty postwar years.

Taiwan has been able to grow from a low-income to a high-income economy in the postwar decades, because it managed to sustain its quick pace of development throughout this period. Its GDP and per capita GNP grew at an average annual rate of 9.2 and 6.3 percent respectively in the first thirty postwar years, 1951-1980, and 5.7 and 4.9 percent from 1981 to 2016 (see Table 1). It faced various challenges along the way, but managed to adapt to the new environment and transform itself at every turn. That is, it has undergone several rounds of structural transformation successfully. For example, recently, after successful upgrading, its high-tech industry has been the major manufacturer of IT and IC products in the world in the last two decades⁶.

This paper will examine how Taiwan managed to industrialize in the postwar era. The discussion will follow the chronological order, from import-substitution industrialization in the 1950s, to export promotion and secondary import substitution in the 1960s and 1970s, to the entry into the high tech sector starting in the 1980s, and to liberalization and globalization in the 1990s. It will be shown that at every turn the transformation was successful because it was facilitated by suitable and adaptive industrial policies.

How to Explain Taiwan's Postwar Growth

How can we explain Taiwan's excellent postwar economic growth record? There are two main schools of thought in development economics in this regard. One is the mainstream neoclassical school, which argues that the East Asian economies, including Taiwan, grew by adopting export-promoting policy. The neoclassical economists contend this policy to be an "outward-oriented" one, hence implying that East Asians participated in the global market and benefited from the forces of the free market. The other, the structuralist school, however, claims that the states in East Asia played a crucial role instead, emphasizing the importance of industrial policy in particular. The structuralists also argue that the East Asian governments actively promoted import-substitution of upstream inputs used in export industries. Thus, adopting export-promoting policy does not imply that the states do not intervene in the market place. On the contrary, these various policies represent

⁵ See Chu (2017).

⁶ This will be discussed later in the paper.

different parts of the state development strategies for the whole of East Asia. The debate on how to explain the East Asian growth has been much discussed and hence will not be covered here⁷. It suffices to note that these two theories remain the main explanations for East Asian growth.

Recently in Taiwan, after the democratization movement set in, the dominant discourse in society began to attribute Taiwan's economic miracle to either the Japanese colonial legacy, or American intervention. Understandably, the democratization movement would not wish to give credit to the then ruling Nationalist party in terms of the contributing to the economic miracle. Both the Japanese legacy and American aid are external factors. Thus, in terms of theoretical explanations, these two theses fall under the free market school, in that the role of the state presumably played no role in fostering economic development.

This paper will argue that these two explanatory factors are only supplementary ones. Japanese colonialists laid the foundation for subsequent modernization, and US aid provided much-needed resources. But it was up to the Nationalist government to build up the infrastructure to make postwar growth possible, confirming the structuralist theory. The locals, who were discouraged from engaging in modern industries during the colonial era, now found the environment inducing. The effect of the Japanese colonial legacy will be discussed in the next section.

Japanese Colonial Legacy

There is no doubt that the Japanese colonialists did implement numerous infrastructure projects and laid the foundation for subsequent modernization. It is, however, not a straightforward task to evaluate the effect of the colonial legacy on postwar development. For example, Booth (2007) has argued that most colonial governments in East and Southeast Asia had tried to modernize the local environment so as to facilitate colonial rule and business undertakings. She also finds that the level of modern development achieved in the Japanese colonies was not higher than that of other colonies. Thus, she concludes that it is incorrect to attribute East Asian growth to their Japanese colonial legacy. Chang (2006) uses a broader sample and finds that East Asia did not have more favorable initial conditions than elsewhere in the early postwar period, and hence reaches similar conclusions.

Instead of attempting an overall evaluation of the effect of the Japanese colonial legacy, this paper will examine the state of Taiwan's economy at the time the Japanese colonialists had to withdraw due to defeat in 1945, and will explore whether its postwar growth had been a "natural continuation" of the colonial period

⁷ See, for example, World Bank (1993) and Chu (2003).

development.

In brief, the Japanese colonial government began a modernization drive starting in 1895 after taking over and putting down local rebellion in Taiwan. On the one hand, it wanted to demonstrate its “ability” to manage colonies just like its Western teachers of imperialism. On the other hand, it needed to be fiscally self-sufficient so as not to be a burden to the motherland, which still was short of development funds itself. Thus, its plan was to build up a modern sugar industry in Taiwan to supply Japan. A division of labor was needed: an agricultural Taiwan exporting sugar and rice to Japan, and Japan supplying industrial goods to Taiwan. To achieve this aim, the colonialists introduced and built modern infrastructure, both soft and hard types, including property rights, banking, transportation, education systems, etc. The local agricultural sector responded well to the opportunity to export rice and sugar to the protected Japanese market, and modernized the production process with help from the colonialists. As a result, the local economy enjoyed relatively stable growth of around 4% during the colonial period.

However, in 1945, Taiwan was still a typical colonial economy, exporting mainly sugar and rice to Japan (see Figure 1). Existing modern industries mainly included sugar refining and military supply. The modern industrial sector was mostly owned and operated by the Japanese, who had to leave after the war. There were few locals among the managerial and technical staff. And there were almost no modern light industries, because light industrial products used to be imported from Japan by policy design. The locals mostly remained in the traditional handicraft sector and rarely tried to enter the modern industries. This was because the Japanese industrial imports were more competitive, and the colonial government provided no policy encouragement.

Some locals did succeed in trade, and accumulated substantial wealth. A traditional tenant-landlord system was maintained in agriculture. The education and employment system had been discriminatory toward the locals. The colonialists trained and relied on their own people (Japanese) to manage the colony. Therefore, few locals obtained the necessary training to manage modern industrial enterprises and plan for economic development.

Factors Favorable to Development

Though Taiwan’s economy had been badly affected by the war, there were some

factors that were favorable to economic development in the early postwar period⁸. The Japanese colonialists had built some modern infrastructure and laid the foundation for subsequent modernization. US military and economic aid provided crucial political support and much-needed resources to stabilize the economy and the regime. But it was up to the Nationalist government to build up the infrastructure to make postwar growth possible, confirming the structuralist theory. The locals, who were discouraged from engaging in modern industries during the colonial era, now found the investment environment enticing.

When the Nationalist government took over Taiwan in 1945, it encountered difficulties, because, after fifty years of colonial rule, the state and the local society lacked sufficient mutual understanding. However, in the economic sphere in terms of taking over the management of the major modern industrial enterprises left by the Japanese, the Nationalist government was able to dispatch the well-trained staff of the National Resource Commission (NRC) to help to restore major industrial production (especially Taiwan Sugar and Taiwan Power) after the 1945 takeover⁹. Successful restoration of industrial production helped to stabilize economy and made implementing industrial policy feasible after 1949. That is, the government was able to rely upon human resources accumulated on the Mainland in the Republican period, in the areas of economic planning, modern management and technology, to promote industrial development in Taiwan. This is important, especially because the Japanese colonialists did not train the locals in these development-related areas.

Notably, a key factor in Taiwan's early success in promoting industrialization was that there were many highly motivated officials with experience in economic planning on the Mainland, especially the capable staff of the NRC. In the postwar years on the Mainland, the Nationalist government mishandled the economic affairs and brought on hyperinflation, which contributed greatly to its defeat. The political leaders had hence learned the lessons the hard way and understood that it was crucial to maintain macroeconomic stability. They thus delegated responsibilities to proficient economic officials, who managed to stabilize the economy and started promoting industrialization, in the process building up the bureaucratic organization to practice effective industrial policy for the subsequent postwar years.

Organizational capabilities of economic bureaucracy are highly related to

⁸ This section draws much from Chu (2017).

⁹ Facing the imminent threat of Japanese military invasion, the Nationalist government set up the National Resource Commission in 1935 to build up military supply and related industrial production. NRC was responsible for basic wartime industrial production and continued to train relevant personnel in preparation for postwar industrial recovery and construction. See Chu (2017: 172-198).

personnel's accumulated experience and motivation. These economic officials were highly motivated to seek solutions to economic problems, that is, to solve problems through trial and error. In the process, there emerged a new set of institutions and policies to promote industrialization effectively. They built the bureaucracy with a mission to develop. Their motivation came from nationalism. Experience derived from the war against Japan was also crucial.

US aid was another favorable factor, though only a supplementary one. The US political and military aid allowed the Nationalists to stay in Taiwan. And its associated economic aid provided crucial foreign exchange and materials for the Nationalists to support the currency, reduce the fiscal deficit, and stabilize prices and the economy. The aid agency also coordinated with the local economic bureaucracy so that the right to allocate US aid became an industrial policy tool. However, the US aid played a positive role in Taiwan's development, only because the local government used it the right way. When that condition did not hold, as was often the case elsewhere in the developing world, US aid did not necessarily bring forth favorable results. It only worked when the recipient did the right thing.

Moreover, Taiwan was fortunate in that it had room to practice industrial policy during the early postwar period. Having been defeated at war, the Japanese economic forces, with their superior productivity, had to leave Taiwan at the end of 1945. On the other hand, due to Cold War considerations, the US government allowed the Nationalists to intervene in the economy to promote development then. These conditions helped, but could not automatically bring forth Taiwan's development.

What were the conditions of the private business sector at that time? During the colonial period, exporting sugar and rice to the Japanese market did bring steady growth to the local economy, but industrialization was limited to a Japanese enclave, due to the colonial policy. Some local businessmen accumulated wealth by participating in trade. After the war, from 1945 to 1949, there emerged small plants to produce light industrial consumer products. After 1949, the locals, who were discouraged from engaging in modern industries during the colonial era, now found the environment alluring. Their behavior was highly affected by industrial policy. The government controlled allocation of US aid and foreign exchange, and used them as industrial policy tools. The government also privatized four state-owned enterprises (SOEs) as compensation to the landlords during land reform.

By implementing land reform, the government discouraged the elite from relying upon agricultural rent for a living, and thus showed its resolve in promoting industrialization. The private sector now sensed the government's resolve in promoting industrialization, responded to the industrial policy and began learning

and making investment in modern industrial production.

Economic Recovery and Import Substitution in the 1950s

After the Nationalist government retreated to Taiwan in 1949, it took measures to stabilize the economic and political order. The challenges seemed formidable, including political uncertainty, a huge influx of immigrants from the mainland, persistent fiscal and balance of payment deficits, and chronic shortages of foreign exchange and material resources. However, probably due to lessons learned from political and economic governance failures on the mainland, the Nationalist government reformed itself, and began to manage its economic affairs prudently¹⁰.

In addition, the Nationalist government needed to have large amounts of material resources to restore economic stability. For that, it relied first upon gold reserves and then the US aid to shore up the currency. During this period, 1950-1965, the economic aid amounted to about 1.5 billion US dollars in total, which was almost equal to that of the total balance of payment deficit¹¹.

To consolidate Taiwan as their last bastion, after effecting the rent reduction plan in 1949, the Nationalists pushed further and implemented the Land-to-the-Tiller program in 1953. The compensation given to the landlords partly consisted of shares of the four industrial state-owned enterprises (SOEs). Consequently, the local elite could no longer rely upon rural rent for a living and had to engage in modern business. To safeguard the lasting success of the land reform, the government paid careful attention to the agriculture sector, ensuring an adequate supply of necessary inputs for production. In addition, the newly emerged industrial sector provided opportunities for the elite who had to leave the rural sector. The rise in agricultural productivity and output helped to secure ample food supply for the enlarged population and to keep the wage level low for the industrial sector. It also contributed to an improvement in income distribution.

Moreover, making industrialization possible required that the government be able to extract surplus from a very productive agricultural sector. The fact that the agricultural sector had made significant gains in productivity, and the land reform redistributed income in favor of the tenants, made the sector better able to bear the heavy fiscal burden. The former tenants' newly acquired land could be turned into capitalized assets in the modernization process. In a way, the success of the land

¹⁰ This section draws upon Chu (2017: 198-220).

¹¹ Chao (1985: 8).

reform started a virtuous cycle.

Taiwan's postwar industrialization no doubt has been very much a state-led development. In the early period, the government had almost all the essential policy tools at its disposal, especially the right to allocate US aid and foreign exchange to finance industrial projects. And it indeed used these tools to promote economic development resolutely¹².

From the beginning, industrialization was the clear objective. In the 1950s, besides pursuing economic recovery, the government promoted import-substitution industrialization due to severe foreign exchange constraints. During 1951-1953, it push-started the cotton textile industry, the main target industry, by bearing most of the risks and responsibilities itself. A few other industries, including utilities, fertilizer and some consumer essentials, were also targeted and enjoyed prioritized allocation of resources.

Notably the Nationalists did not expand the SOE sectors further, and instead promoted private enterprises. Though most of the non-agricultural US aid went to support the large SOEs, especially the utilities and transportation, a significant part of it was used to promote new manufacturing industries. Most of the projects went to private hands. In these industrial projects, the government played the role of entrepreneur, drafting the investment plans from scratch and handling them all the way up to handover to the would-be private industrialists. The share of private enterprises in the manufacturing output, therefore, increased from 41 percent in 1952 to 70 percent in 1966¹³.

Despite retreating to Taiwan, Chiang Kai-shek intended to "recover" the mainland eventually. Paradoxically this provided the strong political will necessary for supporting the postwar developmental projects. The economic bureaucracy enjoyed great autonomy in promoting industrialization under authoritarian rule.

As a result, the economy quickly recovered and stabilized in the early 1950s, and began to embark on the route to rapid industrialization, which has continued to the present time. The next section will discuss the subsequent change in policy.

Policy Reform and Start of Export-Led Growth in 1958

Regarding ways to lessen the foreign exchange constraint, besides import control and import substitution industrialization, promoting exports, if feasible, could

¹² For discussion of major policies, see Amsden (1979), Ho (1978), Wade (1990), and Chu (2017).

¹³ CEPD, *Taiwan Statistical Data Book*, various years.

be a more effective way¹⁴. In addition, the scale of the domestic market was obviously too small to allow for the realization of scale economies of the industry and to sustain growth. For example, the cotton textile industry reached self-sufficiency within just two years and began to accumulate excess capacity. However, the foreign exchange regime was designed to facilitate import substitution, and had overvalued exchange rates and a complicated set of multiple exchange rates. The government then had to design schemes, i.e., getting the prices “wrong”¹⁵, to prod the firms to export.

From hindsight, the switch to an export-promotion policy regime seemed a logical next step for a government eager to find ways to sustain growth and push industrialization. However, due to fear of unforeseen risk and resistance from vested interests, the reform took place only after a prolonged round of heated debate among the economic bureaucrats and the ruling elite. Nonetheless, the Foreign Exchange Reform did take place and was successfully implemented in two steps in 1958, converting the multiple exchange rates into a unitary rate, devaluing the currency significantly, and adopting various export promotion programs.

Furthermore, to promote overall economic development, the government enacted the 19-Point Program for Economic and Financial Reform and the important Statue for Encouraging Investment in 1960. The latter statue remained in effect till 1990 and was replaced by the Statue for Promoting Industrial Upgrading. It put in place the framework to reduce investment barriers and to provide tax favors to investors. The policy regime switch was not as drastic as it seemed, however, because the extent of trade liberalization was rather limited, and the domestic market continued to be protected to a great extent. The new policy had more to do with subsidizing exports than trade liberalization. Nonetheless, exports indeed began to grow very rapidly under the reformed foreign exchange regime and the new incentive structure. As a result, Taiwan’s cotton textile products began to be subject to import restraints in the US market as early as 1962. The textile industry continued to be the leading sector at the beginning stage of the export-led growth. This occurred long before apparel exports began to take off in the late 1960s, showing the beneficial effects of import substitution¹⁶.

¹⁴ This section draws upon Lin (1973: Chs. 4-6) and Chu (2017: 273-300).

¹⁵ Amsden (1989) coined the term, “getting the prices wrong”, in her seminar work on South Korea’s postwar economic development. The term means that the latecomer state has to provide subsidies to the disadvantaged latecomer firms so as to alter the prevailing market prices to induce the latecomer firms to embark on the learning process.

¹⁶ Chu (2008).

Industrial Upgrading

Switching policy from import substitution to export promotion, however, did not imply that the government intended to stop practicing industrial policy to promote industrialization. Actually, the government used a secondary import substitution program to set up the upstream production to supply inputs to the exporting downstream industries. Nevertheless, protection schemes came with strings attached; that is, there were time limits and contingent price and quality conditions¹⁷.

The promotion of upstream industry was in the plan, even when the light industry just began to grow in the 1950s. A man-made fiber manufacturing plant was established with government help in the mid-1950s. The automobile industry made a start in 1956. Plans for the steel and petrochemical industries began to be discussed in the 1950s as well. Due to difficulties in obtaining technology and capital, the first naphtha cracking plant did not begin operation until 1968, and the first integrated steel mill began construction only in the early 1970s. Both were undertaken by SOEs, socializing investment risks deemed unbearable by the private sector then. All these were part of the plan to promote industrial deepening.

In the 1970s, the level of US support, which had been crucial for the survival of the Nationalist government on Taiwan, began to lessen. The US-PRC relations started to thaw, though the US and PRC did not establish diplomatic relations until January 1979. This created a legitimacy crisis for the Nationalist regime. In addition, the first oil crisis in 1973 brought along an economic crisis around the same time. In response, the government enacted the Ten Construction Projects from 1974 to 1979, most of which were in the plan anyway. The projects included six major infrastructure projects, one nuclear power plant and three industrial projects, i.e., the integrated steel mill, and expansion of the petrochemical plants and shipyards. These helped to stimulate the economy in the short term, to build up infrastructure and to sustain and deepen industrialization in the long term.

Entry into High Tech

Right after the plan for heavy industry was more or less in place in the early

¹⁷ Chu (2001). This is similar to the Korean case as described in Amsden (1989).

1970s, the government began to plan for the next growth industry, i.e., electronics. Adopting a different policy approach this time, the government set up the National Science Council and public research laboratories, like the Industrial Technology Research Institute (ITRI), in the early 1970s, and started the first IC project in 1976. Later these consecutive IC projects were spun off from ITRI, and the spin-offs, mainly United Microelectronics Corporation in 1980 and Taiwan Semiconductor Manufacturing Company in 1987, now comprise the main part of Taiwan's IC industry.

This policy environment had also supported the spectacular growth of Taiwan's information technology (IT) industry. A policy network was in place to develop locally produced key components after local production of mature IT products became possible. Thus, by now, the majority of the world's IT products are made by Taiwanese firms.

Taiwan's industrial prowess operates mostly behind the scenes, because its leading firms are mostly subcontractors for firms in the advanced countries. In recent years, due to successful industrial upgrading, Taiwan has become one of the world's largest producers of information technology (IT) products, semiconductors, liquid-crystal-display units, and man-made fibers. Taiwan's information and communication (ICT) products continue to occupy a substantial share of the world market in 2016, such as notebook computers (83 percent), motherboards (84 percent), tablets (38 percent), servers (36 percent)¹⁸, IC foundry (71 percent) and IC design (19 percent)¹⁹.

Amsden and Chu (2003) have studied how Taiwan managed to upgrade and enter into high-tech in recent years. The entry strategy of Taiwanese firms into the high-tech industry has been one of playing second mover or doing subcontracting. Lacking frontier technology, the firms enter when the product becomes mature, and earn profits based upon efficient and low-cost manufacturing and timely delivery. They have to absorb the technology and expand production quickly. These firms have mostly relied upon locally trained engineers, as well as some returnees from abroad. Support of the education system, accumulated manufacturing experience, and local production networks provided the necessary conditions for the emergence of these firms. On the other hand, the government's industrial policy helped to set up the right environment and the crucial institutions, and assisted the advancement of the industry along the way. As a result, the main players in Taiwan's IT industry are the

¹⁸ Market Intelligence and Consulting Institute (MIC), 2017, *Information Industry Yearbook 2017*, P.12.

¹⁹ ITRI, 2017, *Semiconductor Industry Yearbook 2017*, 2-14.

large nationally owned firms, not foreign capital, and they have been able to capture a large share of global IT production, as shown above. Domestically, the share of the IT and electronics sector in total manufacturing value-added rose from around 18 percent in 1990 to 54 percent in 2017 (Table 3)²⁰. In the meantime, an increasing portion of offshore production shifted to mainland China, reaching 92 percent in 2016²¹. Moving production to China allowed Taiwanese firms to have access to an abundant supply of cheap and efficient labor, hence allowing them to greatly expand their scale of operations.

Most of the successful second-movers in Taiwan, however, have not pursued R&D-intensive and own-brand strategies to catch up. Second-movers expand by relying upon accumulated organizational capabilities based on subcontracting manufacturing, hence implying path dependence in development.²² Thus, the strategy of choice for most has been upgrading subcontracting, cross-industry subcontracting, and then own-brand manufacturing, in that order. Among the structural factors affecting a firm's strategic choice, industrial policy has been crucial. South Korea has produced some successful global brands, supported by the state's national champion policy and long-term commitment to the *Chaebŏl*. China has also adopted a highly ambitious national champion strategy. The fact that the government in Taiwan has never adopted a national champion strategy helps to partly explain the evolutionary path of Taiwan's second-movers, and attests to the importance of industrial policy.

Taiwan's second-movers did move along the upgrading path stated above, entering other areas, especially communications and video products, and related parts and components. Therefore, despite the trend of moving production offshore in certain segments, total employment in the electronics sector did not decline over the last two decades.

Liberalization and Globalization

Until 1986, except for the high-tech industry, which relies on a different set of policies, the overall industrial policy was export promotion but accompanied by secondary import substitution and protection of the domestic market. Most of the banks were publicly owned. The government had successfully managed to maintain

²⁰ MOEAa (2017).

²¹ MIC (2017: 13).

²² Chu (2009).

macroeconomic stability throughout the years, by keeping the budget mostly in balance and the inflation rate low. That is, before 1986, Taiwan's economy had been operating under a stable export-promotion regime, in which foreign exchange was under control, the exchange rate was kept stable and undervalued, and the domestic market was protected.

However, past success created circumstances which made the next round of transformation inevitable. Starting from 1986, Taiwan's economy began its great transformation. Though the government still tried to guide the process, it was basically passive in making necessary adjustments after its hands were forced. This time, it failed to adopt forward-looking policy to guide unavoidable transformation.

Unlike before, trade surplus and exchange reserves began to accumulate rapidly starting in 1980. The protection of the domestic market left the increasingly wealthy domestic consumers ever more unsatisfied. Sustained trade imbalance between the US and East Asia eventually led to the signing of the Plaza Accord in 1985, which forced the New Taiwan dollar to appreciate starting from 1986. Its currency value had risen 40 percent against the US dollar by 1989. Under US pressure, the government lessened foreign exchange controls and began to reduce tariff rates, remove non-tariff trade barriers, and phase out the tariff rebate program. In the meantime, substantial asset bubbles began to appear in the local stock and housing markets. The wage level began to rise significantly, and the share of industry in GDP started to decline.

Meanwhile, the government also began to liberalize the internal economic environment. Right after President Chiang Ching-Kuo²³ lifted martial law in mid-1987, the government began to open up (to both foreign and local firms) various domestic markets, in which the number of operating licenses had previously been limited and more or less frozen since the early postwar period. Among the newly liberalized markets, the most important ones were the modern services, such as banking, telecommunications, transportation, and mass retailing. Significantly, at the same time, the government began to improve the cross-Strait relationship by allowing citizens to visit relatives on the mainland for the first time since 1949. Privatization of state-owned enterprises began two years later. Thus, democratization, liberalization, and globalization went hand in hand within a short period of time. It should be stressed that this was a process of managed liberalization, even though the extent of its success can be debated.

In hindsight, the government probably should have implemented the reform

²³ He was the son of Chiang Kai-shek, the Generalissimo who had led the Nationalists from the 1920s till his death in 1975.

earlier in a more forward-looking way. However, it proved to be a difficult transformation, changing from a developmental state model, in which growth was given priority, to the one in which political, social and economic goals had to be renegotiated and realigned.

The pace of globalization has been swift in Taiwan since the late 1980s. The flow of inward and outward foreign direct investment (FDI) has increased significantly. Inward FDI now mostly flows into the modern service sectors, as entry restrictions continue to lessen. By the time Taiwan formally entered the WTO in 2002, the domestic market had already gradually become quite open.

Outward FDI mostly took place from the late 1980s on. The first wave was that of the labor-intensive production moving offshore, first to the ASEAN countries and later to China. In the last few years, the high-tech industry also began to move mass production lines to China. The high-tech firms are now under intense pressure to upgrade their operations again. The destination of Taiwan's outward FDI has become increasingly concentrated on China. The situation in the export trade is similar²⁴. In sum, though Taiwan's economy has become increasingly globalized, the external relationship has been dominated by the cross-strait relation.

Recent Slowdown and Prospects

As Taiwan's economy approaches maturity, economic growth has been slowing in the last couple decades. At the height of postwar growth, in the 1960s and 1970s, the overall annual growth rate averaged close to ten percent. Since the new century began, growth has slowed significantly and averaged only 3.3 percent from 2001 to 2016. And the average growth rate of investment has approached zero, dropping to 0.8 percent, during this century (see Table 1).

Taiwan's economy has performed relatively well since embarking on its transformation in the late 1980s. Since then, industry has managed to continue to grow, and the unemployment rate has remained at a moderate level. Although its labor-intensive production has moved offshore, its electronics industry persists in upgrading and expanding and maintaining its global competitiveness, thus becoming Taiwan's pillar industry. Integration with the Chinese economy has provided growth momentum and has helped the second-movers expand in scale.

²⁴ CEPD, *Taiwan Statistical Data Book, 2017*, 226-227. In 2016, the share of exports heading to Hong Kong and China amounted to 40.1 percent of Taiwan's total exports, while that to the US was 12 percent.

However, there remain serious challenges. Overall growth is overly reliant on the old export-promotion regime. The recent lack of investment growth is probably related to the fact that the flow across the Strait remains one-way, that the growth of domestic consumption lags behind overall growth, and that the dominant industry, electronics, has encountered greater competitive pressures. Although economic integration with China continues to grow, political debate persists in hindering rational policy planning. At the same time, globalization has also brought an unprecedented increase in the degree of inequality. The new rules of political competition have not been conducive to addressing these challenges.

The conflict in political and economic direction remains unresolved, and the society has yet to face up to the crucial question of how to fit China into Taiwan's economic future. Only if future political developments can promote more productive dialogue within Taiwan and across the Strait will Taiwan be able to formulate a new economic vision for its future development.

Cases of Industry Studies

As mentioned above, the private sector, despite some accumulated wealth, was hesitant in entering modern industrial production at the beginning stage of indigenous industrialization in the early postwar period. The industrial policy played a crucial role in changing the investment environment and providing the right incentives and necessary assistance. Two cases will be discussed below for illustration. The first case is the cotton textile industry, the first leading sector in the postwar era.

Cotton Textiles²⁵

According to the design of the colonial policy, Taiwan's role was to provide agricultural products to Japan. Textiles, being industrial products, were mostly imported from Japan before 1945. During the war years, the colonial government moved three spinning plants from Japan in 1941 to ensure supplies. These plants had rather limited capacity (9548 spindles), and were taken over as SOEs after 1945. During 1945-1949, while Japanese imports stopped coming, some locals bought mechanized weaving machines and started cotton weaving production, but they did not enter cotton spinning production, which was much more capital intensive. After 1948, some mainland businessmen moved their spinning plants (around 90,000

²⁵ Chu (2017: 395-434).

spindles) to Taiwan and greatly increased the local capacity.

In the early 1950s, the government was keen to stabilize the price level, and the major consumer goods targeted for price stabilization mainly included rice and cotton textiles. After earlier looser measures failed, the government implemented a tightly regulated scheme to promote the industry. It basically adopted a contracting-out-work type of plan (代紡代織) to promote spinning and weaving at the same time, providing inputs and assistance and paying fixed fees for assigned work. The program began in 1951, and the industry's output increased quickly, so self-sufficiency was reached by 1953. The government terminated the program promptly and began to lift other protective measures. It had lifted all restrictions by 1957. Subsequently, when the government policy switched from import substitution to export promotion, the industry responded quickly and expanded its exports. Its capacity rose to 740,000 spindles by 1966. After the trade reform in 1958, textile exports rose from US\$ 10 million in 1959, to US\$ 65 million in 1967.

While promoting cotton textiles, the economic officials then also foresaw that man-made fiber (MMF) textiles might have better growth potential. Thus, they helped to set up a privately owned MMF (rayon) plant with US technology in 1954. After the MMF plant demonstrated profitability, the number of MMF plants grew to 16 by 1970. Furthermore, the government also began to promote the related upstream input sectors, especially the petrochemical sector, which produces MMF inputs, in the late 1960s. As a result, a set of vertically integrated industries emerged, i.e., from petrochemicals to MMF, to MMF textiles, to apparel. This pattern of industrial development allowed Taiwan to retain a greater extent of local manufacturing when the labor-intensive downstream industry moved production offshore, when the wage level rose with the level of development.

The Bicycle Industry²⁶

Some bicycles were imported from Japan before 1950. During the war years, due to transportation problems, some parts were produced locally. The Nationalist government began to promote import substitution production of bicycles from 1951, restricting imports of bicycles and certain parts. It supported four main bicycle assemblers and some parts producers. However, soon there emerged numerous unregistered makers producing cheap bicycles and parts. That made the four major producers go under in the 1960s. Nonetheless, there already existed many assemblers and parts producers then.

Export opportunities arose in the late 1960s, when demand rose in the US. By

²⁶ See Chu (1997, 2001) and Chu and Li (1996).

that time, the leading bicycle exporters, the Japanese producers, had experienced a rise in wage and price levels. American importers began to look elsewhere for alternative suppliers. The pace of growth in the US market increased further due to the first oil crisis in the early 1970s. On the other hand, the Japanese yen began to appreciate in 1971. When this window of opportunity appeared, the producers in Taiwan, new and old, responded immediately. They soon learned to produce bicycles catering to the US market, and succeeded in capturing a large share of the market. The US imported 1 million bikes in 1967, and 5 million in 1972. Taiwan exported 17 thousand bikes in 1968, 107 thousand in 1970, 1 million in 1972, 3 million in 1980, and 10 million in 1986.

The foreign buyers assisted in overall upgrading, including standardization, specialization, and quality control. The producers who could learn quickly were amply rewarded. The government provided help in the following areas: it began to check export quality after shoddy products provoked an overseas boycott in the mid-1970s; it provided technical assistance from 1972; it set up an agency to promote the center-satellite system.

Producing a bicycle requires assembling numerous standardized parts. The industry hence consists of assemblers and a network of parts producers. Taiwan's bicycle sector outperformed Korea's, because its network structure of large assemblers and many specialized parts producers proved to be better suited for this kind of assembly industry. The Korean assemblers tended to be of the chaebol type of firms, i.e., vertically integrated. Thus, the Korean parts producers were not as specialized as Taiwan's. This type of structure turned out to be less competitive than Taiwan's.

In sum, in the early postwar period, while the Japanese bicycles continued to be more competitive than the local ones, the industrial policy played a role in providing initial protection. The government also helped to maintain the market order and assisted with upgrading. However, the extent of the market mattered greatly. The limited size of the domestic market led to stagnation of the industry. It was the large-scale foreign demand that induced the industry to make investment to learn, standardize, specialize, and upgrade.

Lessons Learned

Under what conditions will indigenous industrialization be more likely to occur? Summing up previous discussions, it is argued here that it is more likely to appear under the following circumstances: when expected returns exceed foreseen risk, and

those of other kinds of investment; when there are demonstration effects; when the government provides guidance; and when there are accumulated skills.

The government can play a key role in raising the likelihood by: maintaining good fundamental conditions, and implementing effective industrial policy, e.g., offering protection with a time limit and performance requirements. And, most important of all, officials must be highly motivated to pursue this goal.

References

- Amsden, Alice H. 1979. "Taiwan's Economic History: A Case of *Etatisme* and a Challenge to Dependency Theory." *Modern China* 5(3):341-380.
- Amsden, Alice H. 1989. *Asia's Next Giant: South Korea and Late Industrialization*. Oxford: Oxford University Press.
- Amsden, Alice H. 1995. "Inductive Theory in Economic Development: A Tribute to Wassily Leontief on his 90th Birthday." *Structural Change and Economic Dynamics* 6:279-293.
- Amsden, Alice H. 2001. *The Rise of "The Rest": Challenges to the West from Late-Industrializing Economies*. New York: Oxford University Press.
- Booth, Anne. 2007. "Did it Really Help to Be a Japanese Colony? East Asian Performance in Historical Perspective." *Japan Focus*.
- Chang, Ha-joon. 2005. "How Important Were the Initial Conditions for Economic Development? East Asia vs. Sub-Saharan Africa." In Ha-Joon Chang (eds.), *The East Asian Development Experience: The Miracle, the Crisis, and the Future*, London: Zed Press, 143-177.
- Cheng, Tun-jen. 1990. "Political Regimes and Development Strategies: South Korea and Taiwan." In Gereffi, G. & D. Wyman (eds.), *Manufacturing Miracles: Paths of Industrialization in Latin America and East Asia*, Princeton: Princeton UP. 139-178.
- Chu, Wan-wen, 1997, "Causes of Growth: A Study of Taiwan's Bicycle Industry", *Cambridge Journal of Economics*. 21(1): 55-72.
- Chu, Wan-wen, 2001, "The Development Pattern of the Bicycle Industry in Taiwan", in L. Cheng and H. Kierzkowski (eds.), *Global Production and Trade in East Asia*. Pp. 295-304, Mass.: Kluwer Academic Press.
- Chu, Wan-wen, 2017, *The Causes of Taiwan's Postwar Economic Growth: The Why and How of Late Development*, Taipei: Academia Sinica book series, Linking Press. (in Chinese)

- Chu, Wan-wen, and Jia-Jing Li, 1996, "Growth and Industrial Organization: A Comparative Study of the Bicycle Industry in Taiwan and South Korea". *Journal of Industry Study*, June, 3(1): 35-52.
- Dore, Ronald. 1990. "Reflections on Culture and Social Change." In Gereffi, G. & D. Wyman (eds.), *Manufacturing Miracles: Paths of Industrialization in Latin America and East Asia*, Princeton: Princeton University Press, 353-367.
- Eckert, Carter. 2000. "Korea's Transition to Modernity: A Will to Greatness." In Merle Goldman & Andrew Gordon (eds.), *Historical Perspectives on Contemporary East Asia*, Cambridge, Mass.: Harvard University Press, 119-154.
- Evans, Peter B. 1995. *Embedded Autonomy: States and Industrial Transformation*. Princeton: Princeton University Press.
- Gerschenkron, A. 1962. *Economic Backwardness in Historical Perspective*. Cambridge: Harvard University.
- Greenfeld, Liah. 1992. *Nationalism: Five Roads to Modernity*. Cambridge: Harvard University Press.
- Greenfeld, Liah. 2001. *The Spirit of Capitalism: Nationalism and Economic Growth*. Cambridge: Harvard University Press.
- Haggard, S, David Kang & Chung-In Moon, 1997. "Japanese Colonialism and Korean Development: A Critique." *World Development* 25(6):867-881.
- Ho, Samuel P.S. 1978. *Economic Development of Taiwan, 1860-1970*. New Haven: Yale University Press.
- Ho, Samuel P.S. 1987. "Economics, Economic Bureaucracy, and Taiwan's Economic Development." *Pacific Affairs* 60(2):226-247.
- Johnson, Chalmers A. 1982. *MITI and the Japanese Miracle: the Growth of Industrial Policy, 1925-1975*. Stanford: Stanford University Press.
- Kim, Seok Ki. 1987. Business Concentration and Government Policy: A Study of the Phenomenon of Business Groups in Korea, 1845-1985. Ph.D. thesis, Graduate School of Business Administration, Harvard University.
- Kirby, W.C. 1990. "Continuity and Change in Modern China: Economic Planning on the Mainland and on Taiwan, 1943-1958." *The Australian Journal of Chinese Affairs* 24:121-141.
- Ladejinsky, Wolf. 1964. "Agrarian Reform in Asia." *Foreign Affairs* April: 445-460.
- Maddison, Angus. 2001. *The World Economy: A Millennial Perspective*. Paris: OECD Development Center.
- Rodrik, Dani. 1994. "King Kong Meets Godzilla: The World Bank and The East Asian Miracle." In Fishlow, A. (ed.), *Miracle or Design? Lessons from the East Asian Experience*, Washington, D.C.: Overseas Development Council.
- Shapiro, H. & L. Taylor. 1990. "The State and Industrial Strategy." *World Development*

18(6):861-78.

Wade, Robert. 1990. *Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization*. Princeton: Princeton University Press.

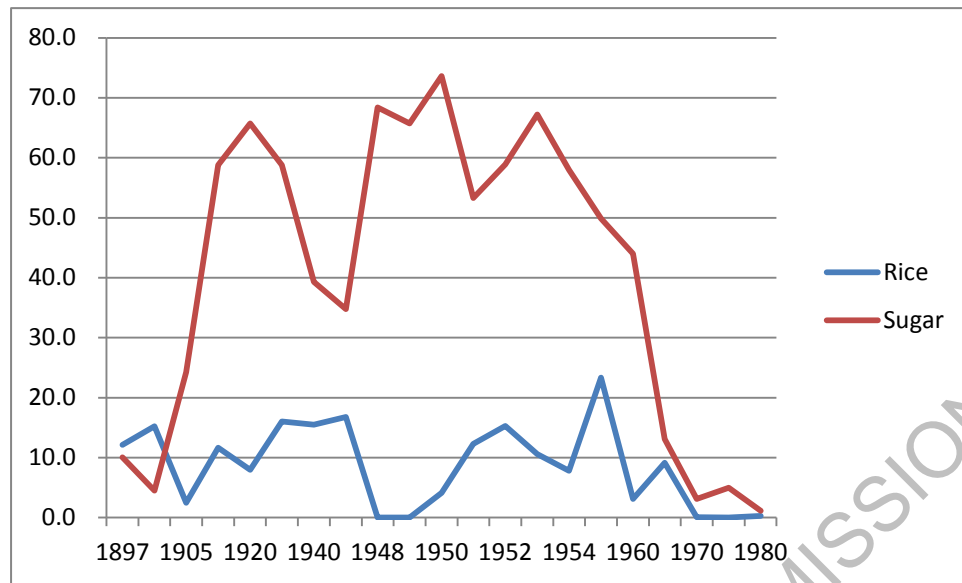
Woo-Cumings, Meredith (ed.) 1999. *The Developmental State*. New York: Cornell University Press.

World Bank. 1993. *The East Asian Miracle: Economic Growth and Public Policy*. New York: Oxford University Press.

Yin, K.Y. 1954. "The Development of Textile Industry in Taiwan." *Industry of Free China* 1(1):5-18.

PLEASE DO NOT CITE WITHOUT PERMISSION OF AUTHOR

Figure 1 Share of rice and sugar in Taiwan's exports (%), 1897-1980



Source: Chu (2017:68).

PLEASE DO NOT CITE WITHOUT PERMISSION OF AUTHOR

Table 1 Major Economic Indicators I, 1951-2016

Year	Average annual growth rates of						CPI
	Real GDP	Population	Real GDP per capita*	Gross capital formation**	Industrial production***	Exports	
1951-60	8.1	3.6	4.5	14.1	11.9	22.1	9.8
1961-70	9.7	3.1	6.8	15.4	16.5	26.0	3.4
1971-80	9.8	2.0	7.7	13.9	13.8	29.5	11.1
1981-90	7.6	1.4	6.4	7.9	6.2	10.0	3.1
1991-2000	6.3	0.9	5.1	8.2	5.1	10.0	2.6
2001-2016	3.3	0.4	3.1	0.8	3.7	4.7	1.0
1951-2016	7.0	1.7	5.4	9.1	9.1	15.9	4.6

Source: 1. DGBAS, <http://www.dgbas.gov.tw/mp.asp?mp=1>;

<http://61.60.106.109/task/sdb>;

<http://www.dgbas.gov.tw/ct.asp?xItem=9522&ctNode=2857>;

2. CEPD, *Taiwan Statistical Data Book*, various years.

3. DGBAS, <http://www.dgbas.gov.tw/ct.asp?xItem=9522&ctNode=2857>.

Note: *Figures were deflated by indexes with 2011 as the base.

** : Figure before 1969 was deflated by indexes with 1986 as the base; those afterwards were by indexes with 2011 as the base.

*** : Figures for 1995 and before exclude quarrying.

Table 2 Major Economic Indicators II, 1952-2016

Year	GDP per capita (US\$)	Gross fixed capital formation as % of GDP	Exports as % of GDP	Trade Balance (US\$million)	GDP by Industry (%)		
					Agriculture	Industry	Services
1952	213	11.3	8.0	-71	32.2	19.7	48.1
1960	164	16.6	11.5	-133	28.5	26.9	44.6
1965	229	17.0	19.4	-106	23.6	30.2	46.2
1970	393	21.7	30.4	-43	15.5	36.8	47.7
1975	978	31.3	39.9	-643	12.7	39.9	47.4
1980	2,385	30.7	52.6	78	7.7	45.7	46.6
1985	3,290	19.5	52.5	10,678	5.7	44.6	49.7
1990	8,124	23.1	44.5	12,639	4.0	38.9	57.0
1995	12,918	25.7	46.3	9,330	3.3	33.1	63.5
2000	14,704	24.4	52.2	11,218	2.0	30.5	67.5
2005	16,051	21.9	61.0	15,817	1.7	31.3	67.1
2010	18,503	20.7	71.5	23,364	1.6	31.1	67.2
2016	22,540	20.9	62.8	49,753	1.8	35.1	63.1

Sources: 1.

DGBAS, <http://www.dgbas.gov.tw/mp.asp?mp=1>; <http://61.60.106.109/task/sdb>; <http://www.dgbas.gov.tw/ct.asp?xItem=9522&ctNode=2857>;

2. CEPD, *Taiwan Statistical Data Book*, various years.

Table 3

Distribution of Manufacturing Value-Added, 1971-2017

Unit: %

	1971	1975	1980	1985	1990	2000	2010	2017	Changes 1971-2000	Changes 2000-2017
Food, beverages and tobacco	12.8	11.9	7.9	8.4	6.8	7.1	4.2	5.3	-5.8	-1.8
Textile, apparel and leather	23.2	23.9	18.7	17.5	12.6	6.0	2.1	1.8	-17.2	-4.2
Wood and furniture	4.3	2.9	2.7	4.3	2.6	1.0	0.3	0.3	-3.3	-0.7
Paper and printing	3.3	2.6	3.5	3.5	3.6	2.2	1.6	1.5	-1.1	-0.7
Chemicals and products	8.8	9.2	8.9	8.8	9.4	12.8	12.7	9.2	4.1	-3.6
Petroleum refining	5.4	4.9	8.0	5.3	4.8	2.3	2.3	4.4	-3.1	2.1
Rubber and plastics	9.4	8.7	8.4	9.8	9.4	4.6	2.6	2.6	-4.8	-2.0
Non-metallic minerals	4.0	3.7	4.3	4.0	3.8	2.8	1.7	1.2	-1.2	-1.6
Basic metal	6.2	5.3	5.2	6.7	7.6	13.6	10.2	4.8	7.4	-8.8
Metal products	1.1	1.1	5.7	5.2	5.5	8.2	4.4	4.1	7.1	-4.1
Machinery	4.2	3.1	4.0	3.7	4.8	5.8	5.0	4.4	1.6	-1.4
Electrical and electronics machinery	11.9	16.8	13.3	13.8	18.6	26.9	48.2	54.2	15.0	27.3
Transport equipment	4.3	4.7	6.6	5.8	7.1	4.7	3.6	4.1	0.4	-0.6
Miscellaneous	1.2	1.2	3.0	3.1	3.5	2.1	1.4	2.2	0.9	0.0
sum	100	100	100	100	100	100	100	100		

Source: MOEA, *Yearbook of Industrial Production Statistics by Taiwan Area, R.O.C.*,

various years.