

# Japanese Industrial Policies in Colonial Taiwan: Tea and Sugar

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Tea and sugar were the two most important exports in late Ching. After Taiwan became a colony of Japan in 1895, the colonial government put a great effort to develop the two industries. But the growth of the tea and sugar industries took complete different paths. While there was a phenomenal growth in the sugar production and export, the export of Oolong tea to the U.S. was stagnant in the beginning and then declined in late 1910s. This paper analyzes the effects of the industrial policy of the Japanese colonial government, and its implications on the post-colonial development of Taiwan.

Taiwan's exports saw tremendous increase during the Japanese colonial period. At the end of 1930s, Export to GDP ratio exceeded 40%. Sugar and rice were the two most important products, both went to Japan. Around the world, export expansion helps raising the GDP level, Taiwan's high growth beginning in the early 1960s has been a well-known example. The purpose of this paper is to study the export expansion during the Japanese colonial period.

One of the factors that helps export expansion was the lowering of transportation cost. Hummels (2007) analyses the effect of lower transportation cost on international trade and economic growth. At the end of the Ching

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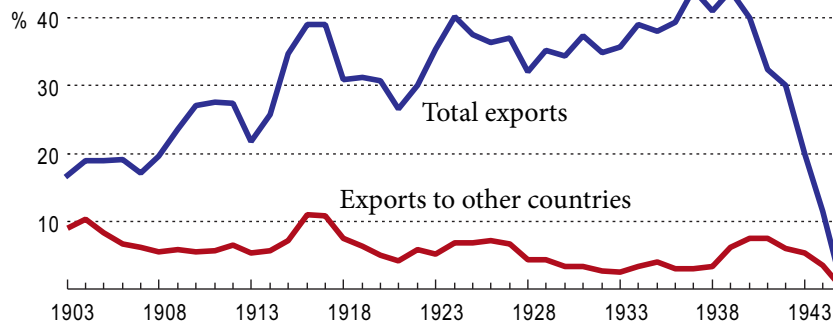


Figure 1: Export to GDP Ratio

Source: Exports, Chief Executive Office of Taiwan (1946); GDP, Wu (2004).

dynasty, inland transportation in Taiwan was rather backward. Because of the high transportation cost, only a small amount of the rice produced in Taichung was transported to the Taipei area via ships. The Japanese colonial government put great efforts to build a modern transportation system, and the north-south railway finished in 1908 was the first milestone. Wu and Lu (2008) show that after the railway was built, the regional rice prices converged, and Taiwan became an integrated market for the first time.

Figure 1 shows Taiwan’s export to GDP ratio from 1903 to 1945. Taiwan became a colony of Japan in 1895, so total exports were divided into “exports to foreign countries” and “exports to Japan”. During the colonial period, export to GDP saw an upward trend up to the end of 1930s, and reached to over 40% in 1938. However, exports to foreign countries showed a downward trend. In other words, more and more exports went to Japan.

In the beginning of the Japanese period, tea and sugar were the two important exports. Oolong tea was exported to New York, and sugar was shipped to Japan. This paper will first analyze how exports were helped by the newly developed transportation system. It will be shown that the lowering of the inland transportation cost did not help much to the tea export.

As for sugar industry, new transportation system lowered the inland transportation cost, but the real factor behind the growth of the sugar industry was the heavy tariff imposed on sugar imports from other countries. During the colonial time, Taiwan’s cane agriculture and sugar production technology did see tremendous improvement, but comparing with the other cane sugar areas

such as Java, Taiwan's sugar production cost was much higher. In other words, Taiwan did not have comparative advantage in sugar production. This situation did not change toward the end of the colonial period.

After Japan was defeated in August 1945, Taiwan was taken over by the KMT government. From 1945 to 1949, Taiwan's sugar was exported to Shanghai, and enjoyed the tax-free status. However, the KMT government retreated to Taiwan in late 1949, and starting in 1950 Taiwan's sugar had to compete in the international market. With higher production cost than other countries, Taiwan's sugar industry quickly declined.

In the following, section 1 discusses the development of tea industry, section 2 analyzes the rise and fall of the sugar industry. And finally, some concluding remarks are provided in section 3.

## 1 Tea Industry

Tea was the most important export in the late Ching. In 1897, the most three important exports were tea, sugar, and camphor, the value of tea export were 6,920,630 yens, 22.2% of total exports. The exports of sugar and camphor were 1,494,041 yens and 1,339,435 yens respectively, or 4.8% and 4.3% of total exports.<sup>1</sup> Taiwan started to export tea in 1866, the volume of export was 180,824 pounds. In 1897, tea export increased to 20,532,407 pounds. In other words, during the thirty years from 1866 to 1897, the yearly average growth rate of tea exports was 16.5%.<sup>2</sup>

Davidson (1903) analyzed Taiwan's tea industry development at the beginning of the 20th century, and he held high hope for its potential. Similarly, when the Taiwan Government General conducted extensive industry surveys early in the administration, it also held high hope for the further development of tea industry. For example, in the first issue of *Financial Reference Document* (《第一次金融事項參考書》) published by the Bank of Taiwan, there was an appendix titled *Reports on Taiwan's Tea Industry*.

It turned out, however, that the development of tea industry in colonial Tai-

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<sup>1</sup>Davidson (1903), p. 394; Chief Executive Office of Taiwan (1946), p. 918.

<sup>2</sup>The figures only contain the exports via the newly opened international ports, there were some exports through the traditional ports. But no records left for these ports.

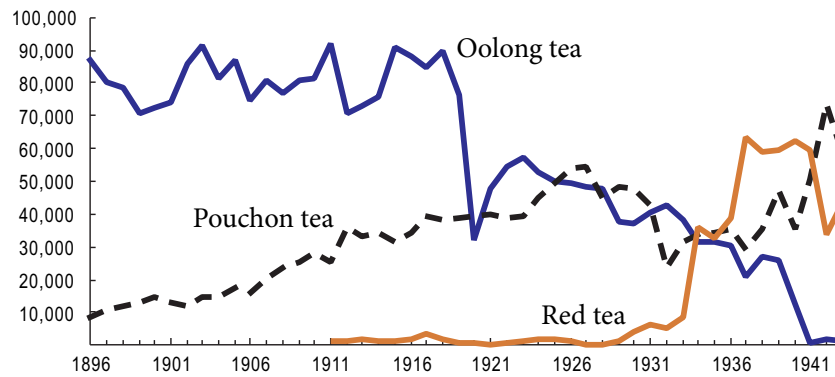


Figure 2: Tea Production

Unit: 100 kg. Source: 古慧雯 (2003), original source: *Taiwan Tea Statistics*, 1929, pp. 14, 21, 1939, 21; 善後救濟總署台灣分署 (1946), p. 28. For Oolong and Pouchong, 1896–1905 were weight of export.

wan was not as good as expected. Figure 2 shows that Oolong tea production actually declined after the late 1910s. However, there was an upward trend for Pouchong tea up to the late 1920s, most of which were exported to the South-east countries. Red tea showed rapid increase starting the early 1930s.

### 1.1 Transportation Cost and Trade

How the modernization of the transportation system helped the tea industry? In 1897, 96.1% of Oolong tea was exported to New York and Chicago, the rest was sent to London. In the retail markets, tea price was mainly determined by quality. Around 1903, Oolong tea prices in New York ranged from 0.245 to 0.700 dollar per ounce. For the Finest grade, the price was 0.340–0.380 per pound.<sup>3</sup> Converted to the Taiwanese unit, this was equivalent to 45.3–50.7 Taiwan dollar per 60 kg. The average price was 48.0 Taiwan dollar per 60 kg.

The production of Oolong tea can be divided into two stages: crude tea and refined tea. Taiwan's tea tree was grown in northern Taiwan including Taipei and Taoyuan. In 1900, Taoyuan county (桃澗堡) was the most important area producing 35.4% of the total tea leaf exported. Shih-Dean county (石碇堡) ranked the second, and Bai-Jai county (擺接堡), and Wen-San county (文山堡) ranked the third and the fourth.<sup>4</sup> After fresh tea leaf was picked, it was im-

<sup>3</sup>臨時臺灣舊慣調查會 (1905), vol. 1, p. 110. For tea quality grade system of Oolong tea, see Ukers (1934), p. 34.

<sup>4</sup>臨時臺灣舊慣調查會 (1905), vol. 1, pp. 62–63.

mediately processed to become crude tea locally, and then sent to Dadaocheng (大稻埕) to refine.

At the beginning of the 20th century, crude tea seasons started in April and ended in October. Out of the yearly output, Spring tea took the biggest share of 50%, Summer and Fall tea had 20% each, and Winter tea had only 10%.<sup>5</sup> The best quality came in Summer, and the price was the highest. According a survey in 1903, the price of Average Grade crude tea was 48.0 Taiwan dollar per 60 kg in May, but only 15.5 dollar in April.<sup>6</sup> For the whole year, the weighted average of price was 22.15 dollar per 60 kg.

Refined Oolong tea was produced in Dadaocheng and then sent to Tamshui. From there, it was shipped to Amoy, and finally to New York. An alternative route was from Amoy to the west coast of the US., and then transported to Chicago. At the beginning of the Japanese colonial period, a new shipping route was created. Oolong tea was sent from Dadaocheng to Keelung, and then shipped to Japan's Kobe, and finally to New York or Chicago via the Pacific Ocean route. The shipping cost difference of the new and the original lines was marginal, however. For overseas shipping cost from Keelung to the west coast of the U.S. was almost the same as the route from Tamshui.<sup>7</sup>

Table 1 shows Oolong tea's transaction price at the various stages from the crude tea in the mountain side to the retail market in New York. For example, the shipping cost from Amoy to New York (including insurance) was 4.650 US dollar per 60 kg, or 11.93% of the retail price of 38.982 dollar in New York. In contrast, the shipping cost from Tamshui to Amoy was 0.400 dollar (1.03%).

The average inland shipping cost from the crude tea production site to Dadaocheng was 0.55 dollar per 60 kg. Cost varied somewhat from different local regions to Dadaocheng. During the Ching period, crude teas were transported to the nearest port by porters. For example, crude teas from Long-Tan district (龍潭陂) to Da-Ker-Kan (大料坎) were transported by porters, and the cost was 0.35 to 0.40 dollar per 60 kg. From Da-Ker-Kan to Dadaocheng, crude teas were shipped via river (0.20–0.30 dollar), hence the total shipping

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<sup>5</sup>藤江勝太郎 (1899), p. 216.

<sup>6</sup>臨時臺灣舊慣調查會 (1905), vol. 1, p. 78.

<sup>7</sup>臨時臺灣舊慣調查會 (1905), vol. 1, pp. 94–96.

Table 1: Tea Production cost

	60 kg	60 kg
Crude tea farm price		22.150
Crude tea at Dadaocheng		24.365
Local to Dadaocheng	0.550	
Tea tax	2.400	
Refined tea at Dadaocheng		30.862
Dadaocheng to Amoy		2.287
Amoy to New York		5.833
<b>Total</b>		<b>38.982</b>
New York: Fine Grade	0.300*	40.000
New York: Finest Grade	0.360*	48.000

Unit, Taiwan dollar per 60 kg, but New York's price denoted by \* was cents per pound. Source: Crude tea farm price, 臨時臺灣舊慣調查會 (1905), vol. 1, p. 78. Dadaocheng to Amoy shipping cost, 臨時臺灣舊慣調查會 (1905), vol. 1, pp. 93, 84, 114, 110.

cost was 0.55 to 0.70 dollar per 60 kg.<sup>8</sup> If crude tea were produced in Chung-Li district (中壢), it was transported to Da-Ker-Kan by porters, the cost was about 0.2–0.3 dollar, and the total cost to Dadaocheng was 0.4–0.6 dollar.

At the beginning the Japanese colonial period, a human trolley system was constructed. The crude teas from Da-Ker-Kan were transported to Chung-Li by trolley, and then transported to Dadaocheng by the newly constructed railway. The modernization of transportation system lowered the inland transportation cost, but the benefit to the Oolong tea exports was marginal. The new system saved at most 0.55 dollar per 60 kg, or 1.375% of New York's retail price.<sup>9</sup>

## 1.2 Tea Tax

Table 1 shows that tax occupied a big portion of the retail price of tea. During late Ching's land reform by Liu Ming-Chung (mid-1880s), the original Tea Field tax was replaced by two dollars of Likin (厘金) and 0.4 dollar of Landing

<sup>8</sup>台灣銀行 (1903), pp. 30–32.

<sup>9</sup>陳家豪與蔡龍保 (2017) argues that the main advantages of the human trolley system were twofold. First, the transportation time was shortened. Second, the adverse effects of bad weather became relatively minor.

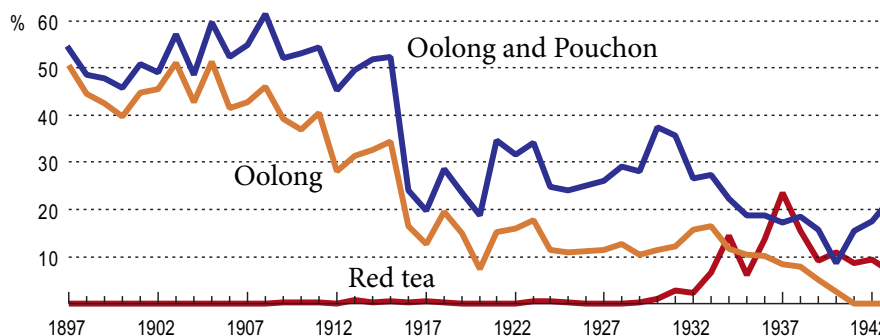


Figure 3: Tea Exports Ratio

Red tea was mainly exported to Japan. Source: Chief Executive Office of Taiwan (1946).

Table 2: Tea Export Tax

1886–1896.2	Custom duty	3.95 dollars
1886–1896.2	Export tax (good tea)	1.50 dollars
1896.2–1899.7	Export tax	3.50 taels
1899.7	Export Tax (Oolong)	1.60 dollars
1899.7	Departure tax (Oolong tea)	1.00 dollars
1896.11	Tea production tax	2.40 dollars

Unit: 60 kg.

fee (落地稅) per 60 kg.<sup>10</sup> At the beginning of the Japanese colonial period, Taiwan Government General abolished both taxes, and initiated a Tea Production Tax beginning in November 1896. The tax rate was 2.40 dollars per 60 kg.<sup>11</sup>

Besides Likin, the Ching court imposed custom duty as well as export tax. The Custom duty was 3.95 dollars per 60 kg, and Export duty was 1.50 dollar.<sup>12</sup> After, the Taiwan Government General revised the tax code, but the tax burden remained almost the same. In 1900, for 60 kg of Oolong shipped from Dadaocheng to New York, the total of the Export duty and the Production tax was 4.00 dollars, only slightly lower than the overseas shipping cost (4.65 dollars).<sup>13</sup> Ten years later, the shipping cost from Keelung to New York increased to 5.31 dollars per 60 kg, but the total of the Export duty and Production tax remained at 4.0 dollars.

<sup>10</sup>臺灣總督府民政局 (1896), p. 32.

<sup>11</sup>臺灣總督府財務局 (1918), vol. 1, pp. 437–439.

<sup>12</sup>臺灣總督府民政局 (1896), p. 32.

<sup>13</sup>台灣銀行 (1903).

In New York, Taiwan's Oolong tea faced competition from other countries such as the Red tea from India. The Export duty for Oolong tea was abolished in 1910 by the colonial government but the downward trend of Oolong tea export continued.<sup>14</sup> Between 1911 and 1915, the market share of Oolong tea in the US market slightly declined from 16.6% to 16.3%. In contrast, Ceylon tea from India increased from 21.6% to 29.7%. During WWI, the export of Japanese tea to the US (including Taiwan's Oolong) was affected by the high risk of overseas transportation, and the cost of the land transportation also increased in the US.

Figure 2 above shows that after WWI, Oolong tea export to the US declined. Ukers (1934, pp. 220–221) pointed that one reason was the increase of shipping cost, the other was the quality control problem. The Bank of Taiwan published a survey on Taiwan's tea industry in 1917, in which there was a collection of tea prices in New York market in 1916. Oolong tea's average price was 33 cents/pound, Red tea from India was 25 cents/pound, and Ceylon Red tea was 26 cents/pound. The survey concluded that Oolong tea had to lower prices to compete in New York.<sup>15</sup> However, it turned out to be a impossible mission.

From the hindsight, Oolong tea's development from 1860s to the end of the 19th century was amazing. The colonial government tried hard to promote further development of the Oolong tea industry, it turned out to be futile. In contrast, the development of sugar industry was very impressive. Figure 4 compares the production index of tea and sugar from 1870 to the end of 1970s. During the Japanese colonial period, tea industry was stagnant, but the growth of the sugar industry was quite phenomenal.

## 2 Sugar Industry

In 1894, Japan consumed about 4 million tons of sugar, about 0.8 million tons of which was produced domestically, the rest were imported. Figure 5 shows Japan's sugar imports from foreign countries and Taiwan.<sup>16</sup> Taiwan's sugar export to Japan saw a big increase in 1909, exceeded Dutch India for the first

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<sup>14</sup>臺灣總督府財務局 (1918), vol. 1, pp. 613–616, 624; Davidson (1903), p. 390.

<sup>15</sup>台灣銀行 (1917), pp. 88–90.

<sup>16</sup>Geerligs (1912), pp. 78, 141.



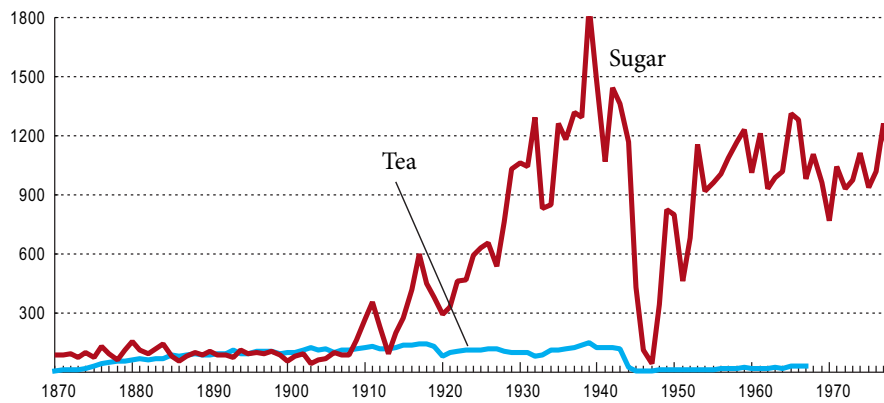


Figure 4: Production Index of Tea and Sugar (1906 = 100)

Note: 1906 = 100. The export values of tea and sugar in 1906 were almost the same.

time. After that year, Taiwan's export to Japan continued to increase, and about twenty years later, Japan imported 6,852,340 dans (擔) of sugar from Taiwan (1927 sugar year), and the imports from foreign countries reduced to 379,620 dans.<sup>17</sup>

In 1898, Japan did not export sugars. But in 1927, Japan exported 2,659,498 dans of sugars, mostly refined sugar. The raw sugar used to produce refined sugar was mainly from Taiwan, but some were from Java. It seemed that the Japanese colonial government had successfully developed a modern sugar industry in Taiwan. In contrast to the tea industry, Taiwan's sugar industry development during the colonial period was quite amazing. How did Taiwan's sugar industry overtake Java? What was the source of comparative advantage in Taiwan's sugar industry?

Sugar production can be divided into two stages. The first stage was cane agriculture, and the second stage was sugar production from cane. If Taiwan had comparative advantage in sugar, it must be either Taiwan's cane productivity was higher, or Taiwan had better technology in sugar production technology, or both.

Before looking into the data, we first analyze the standard international sugar industry policies using the US as an example.

<sup>17</sup>矢内原忠雄 (1999), p. 300.

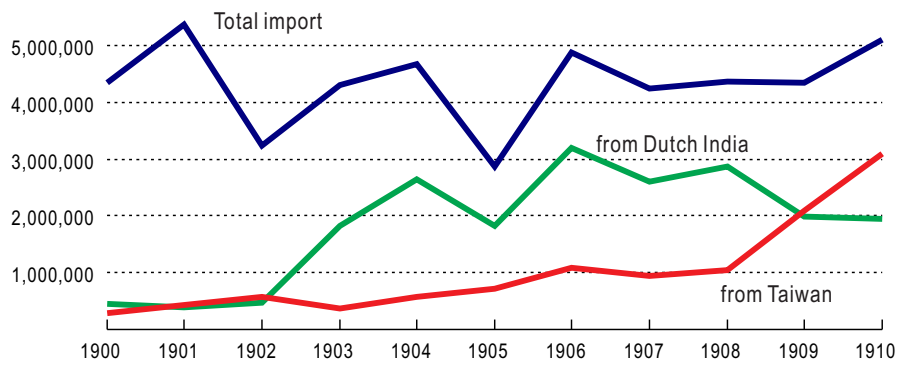


Figure 5: Japan Sugar Imports

Unit: dan. Source: Geerligs (1912), p. 78, Provincial Government of Taiwan (1950), p. 198.

## 2.1 Sugar Industrial Policy of the US

At least from the early 19th century, many countries imposed heavy tariff or quota system on sugar imports. For the US, at the end of the 19th century, there were a few domestic cane and beet sugar producers, but they could not supply all the domestic needs. For example, during 1898–1901, the share of the domestic production was only 14.3% of total supply. Among the sugar imports, the combined share of imports from Hawaii, Puerto Rico, and the Philippines was 14.8%, and imports from Cuba took a share of 16.6%.<sup>18</sup>

Dalton (1937, pp. 188–205) argued that one of the reasons that the US government determined to incorporate Hawaii into the US territory was its sugar industry. The policies toward Puerto Rico and the Philippines had similar considerations. In 1898, following the Spanish–American War, the United States appropriated Puerto Rico. In the same year, the Philippines were ceded by Spain to the US as a result of the latter’s victory in the Spanish–American War. Puerto Rico had earned duty-free entry by 1901, and the Philippines by 1914. A 20 per cent tariff preference became effective for Cuba in 1903.

Under the protection policy and the large demand for sugar in the US, the sugar industries in Hawaii, Puerto Rico and the Philippines expanded rapidly. For example, sugar exports from the Philippines to the US was 135 thousand short tons in 1915, it increased to 1,160 thousand short tons in 1933.

In 1922, two-thirds of gross American supplies came from Cuba, some of

<sup>18</sup>Dalton (1937), p. 12.

it was re-exported as refined sugar.<sup>19</sup> The US imported 2.39 thousand short tons of sugar from Cuba in 1915, it increased to 4.15 thousand tons in 1929, or 54.7% of total supply. However, in 1932 the Smoot-Hawley Tariff was passed to imposed a two cents tariff (per pound) on Cuban raw sugars. During the time, the retail price in the US was 3 cents, and world price was 1 cent.<sup>20</sup> As a result of the tariff, Cuban export to the US decreased to 1.87 thousand tons in 1934, or 28.5% of total supply.<sup>21</sup>

## 2.2 Comparative Advantage?

As a colony of Japan, sugar imports from Taiwan was duty-free, but sugar imports from other countries such as Java faced a heavy tariff. There are two major arguments for a country to impose heavy tariff, one is for tax revenue, the other is to promote a particular industry. There is an implicit assumption under the second argument: after the industry was successfully developed under the protection policy, comparative advantage would be created.

Figure 6 compares yields of raw cane sugar per harvested acre in various sugar production areas during 1919–1954. Taiwan had many old-styled sugar factories before ceded to Japan. The first New-styled sugar factory in Taiwan was established 1900. Twenty years later, the share of output from the New-styled sugar factories reached 94.5% of total output in 1919–1920. Hence, Figure 6 reflects the production technology of the New-styled factories.

In the 1919–1920 sugar year, Taiwan's cane sugar yields was less than one-fourth of Java. Although Taiwan's cane sugar yields increased quickly in the 1920s, Java had similar trend. Taiwan's cane sugar yields reached to the maximum in early 1930s, but still lagged behind Java. And the cane sugar yields of the latter continued to grow up to to beginning of the 1940s.

Cane sugar yield was a combination of two factors. The first one was cane output per unit of cane plantation area, the second was the recovery rate of raw sugar from sugar cane. During the Japanese colonial period, there had been tremendous advancements in both areas, in which the advancement in the recovery rate was particular impressive. In the 1919 sugar year, the recovery

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<sup>19</sup>Timoshenko and Swerling (1912), p. 158.

<sup>20</sup>Dalton (1937), pp. 29, 198.

<sup>21</sup>Timoshenko and Swerling (1912), p. 157, Dalton (1937), p. 199.

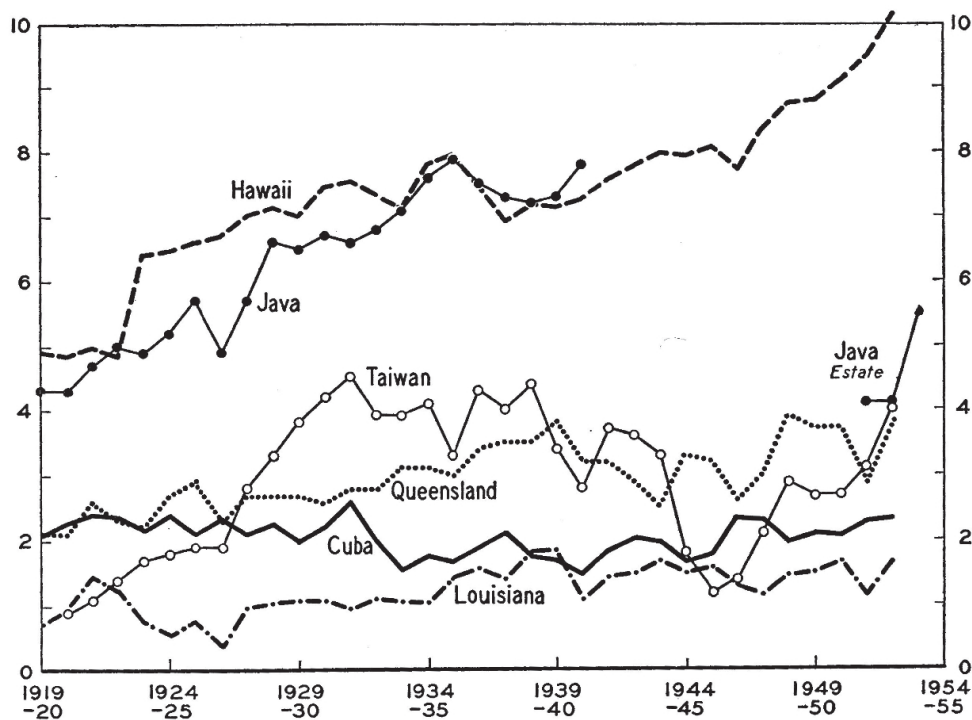


Figure 6: Yields of raw cane sugar per harvested acre

Unit: Short tons per harvested acre. Source: Timoshenko and Swerling (1912), p. 58.

rate lagged behind Java by a large extent, but at the beginning of the 1930s Taiwan's recovery rate had exceeded Java. However, Taiwan's cane productivity had lagged behind Java by a even larger margin, and consequently its cane sugar yields was not able to catch up with Java.

The cane productivity itself was determined by two factors: the natural soil conditions and the crop selection of farmers. In Taiwan, the primary competing crop to cane was rice, which was the main food source for Taiwanese people. Consequently, almost all the paddy fields (with better irrigation system) were used plant rice, only the relatively inferior fields, most of them without irrigation system, were used to plant cane. Ebi (1947, p. 46) pointed out that soil conditions in different areas varied considerably, and sugar canes fields were usually of inferior grade.

A more direct way to analyze comparative advantage was to compute the production cost of sugar. Figure 7 compares Taiwan and Java's production cost of sugar from 1910 to 1926. Java's grade was Dutch Standard 15/17 (中雙), which was higher than Taiwan's Dutch Standard 15 (黃雙). In 1926, Java's production

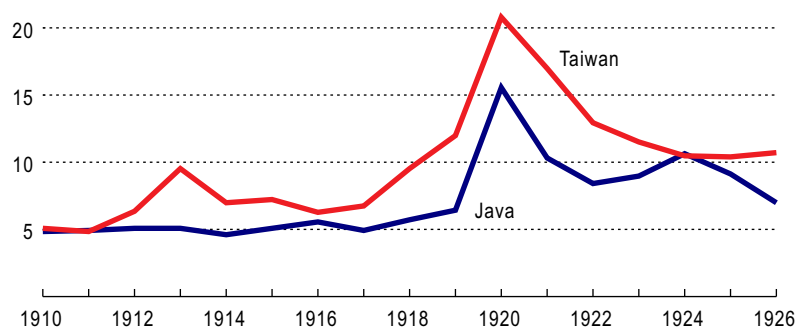


Figure 7: Sugar Production Cost

Unit: dollar per 60 kg. Source: *Taiwan Sugar Statistics*. Java was sugar average production cost, Taiwan was sugar average production cost of New-style factories. Exchange rate, 溝口敏行 (2008), p. 369.

cost was 6.97 dollar per 60 kg, and Taiwan was 10.707 dollar.

Figure 5 above shows that starting 1909 Japan's sugar imports from Taiwan quickly replaced imports from Dutch India. If Taiwan's production cost was higher than Java, how could this happen? The reason was Japan's sugar industrial policy.

Japan's industrial policy was a standard import substitution policy. Under the policy, Japan imposed heavy tariff on sugar imports from foreign countries, and only sugar import from colony Taiwan was free of duty. Geerligs (1912, p. 90) made the following comments on the rapid progress of Taiwan's sugar industry:<sup>22</sup>

We must not lose sight of the fact that the success achieved is greatly due to the Government's powerful patronage, and the preferential treatment accorded to Formosan sugar in Japan.

How much was the tariff? In 1926, Japan imposed a tariff of 3.35 dollars per 60 kg on sugar imports of the grade lower than the Dutch Standard 18, and 4.25 dollars for the Dutch Standard 18. With the heavy tariff, Java's higher grade sugar (Dutch Standard 18) could not compete with Taiwan's sugars, so the Dutch sugar factories in Java added yellow pigment to the sugar to make it looks like a lower grade sugar, which was levied a lower tariff. However, Japan changed the tariff rate for both grades to 3.95 dollar in 1927, as a result, even Java's "faked" lower grade sugar could not compete with Taiwan.<sup>23</sup>

<sup>22</sup>The author had served as the director of the Sugar Experiment Station in Java.

<sup>23</sup>矢内原忠雄 (1999), p. 305.

Toward the end of the World War II, the import substitution policy for sugar did not change, and from Figure 6 above, Taiwan's cane sugar yields did not catch up with Java.

### 2.3 The Fall of the Taiwan Sugar Empire

Taiwan's sugar industry was strictly controlled by the Japanese government during the war time, both cane productivity and recovery rate declined. Ebi (1947, pp. 29, 102–103) surveyed Taiwan and Java's sugar industry after World War II, the basic facts did not changed.

As a whole, however, the yield of cane, consequently the yield of sugar, per hectare in Formosa have scarcely reached half of the yield of Java.” (p. 48)

張澤南 (1948, pp. 46–47) echoed the above comments.

After the end of World War II, Taiwan was taken over by the KMT government. In 1946, market structure of the sugar industry was changed from four private oligopoly firms to a public monopoly, Taiwan Sugar Corporation (TSC). During 1946–1949, Taiwan's sugars were exported to Shanghai, and sugar prices were controlled by the government. At the end of 1949, the KMT government retreated to Taipei, and hence the China's market was lost. This was actually a big blow to the TSC, because it now had to compete in the world market.

Beginning in 1950, the TSC tried to export sugars, and Japan was one of the countries that import Taiwan's sugar.<sup>24</sup> Unfortunately, almost all the sugar importing countries imposed heavy tariff or quota system. This means that even if Taiwan had comparative advantage in sugar production, it might not be able to compete with other sugar production countries. And the fact that it had no comparative advantage made the situation even worse.

Figure 8 shows the ratio of the sugar production to the total of the industry sector from 1902 to 1977. After 1950, the ratio of sugar production showed a rapid downward trend. What was the cause of the fall of the Taiwan sugar empire? It is easy to guess that high production cost was the key. Since the TSC

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<sup>24</sup>From 1947 to 1958, most of the sugar exports went to Japan. 孫鐵齋 (1959), pp. 91–94; 張季熙 (1958), pp. 100–103.

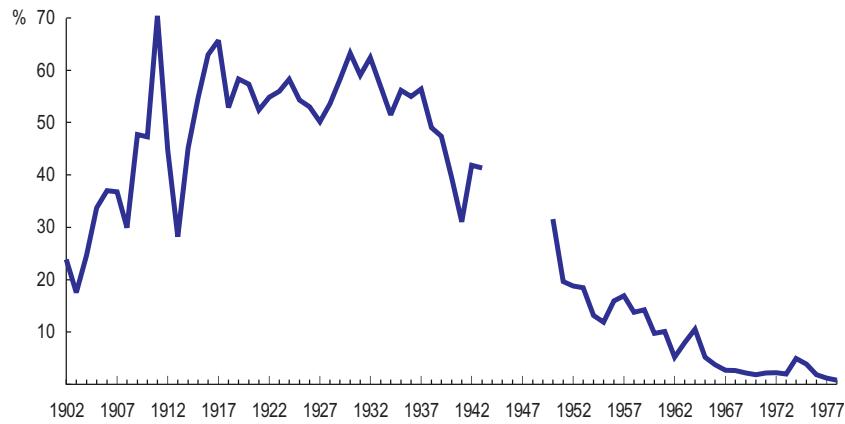


Figure 8: Sugar Production

Note: Ratio of sugar production to the total production of the industry sector.

was a public enterprise, it is difficult to know the true cost of sugar production from the available documents.

For example, the TSC announced a guaranteed cane price scheme based on Taipei's rice price beginning in 1950–1951 sugar year. Unfortunately, Taipei rice price increased tremendously in 1953, as a result the total subsidy to the farmers amounted to 146 million NT dollars.<sup>25</sup> To help paying the subsidy, the central government issued a Sugar-Price Subsidy Bonds. This means that part of the production cost was financed by the government.

The available sources of production cost did indicate that the TSC's production cost was higher than international sugar price. Chang (1967, p. 23) indicated that in 1965, sugar price in the international sugar market, in which the TSC was able to participate, was 2.12 cents per pound, while the production cost was about 4.8 cents if canes were purchased from outside farmers.<sup>26</sup>

Figure 9 compares the sugar production cost estimated by this paper and the international "free market sugar" prices. Except for the period when sugar price was abnormal high, such as 1963 and 1964, the TSC was losing money in sugar production most of the time. For those two years, the increase in sugar prices was due to bad harvest of canes and the Cuban missile crisis in 1962.

So how the TSC as a public enterprise handled the money-losing business?

<sup>25</sup>孫鐵齋 (1959), p. 80.

<sup>26</sup>The author was a professor of the National Taiwan University, and worked with the TSC to construct a scheme of determining the cane price to be offered from the TSC to cane farmers.

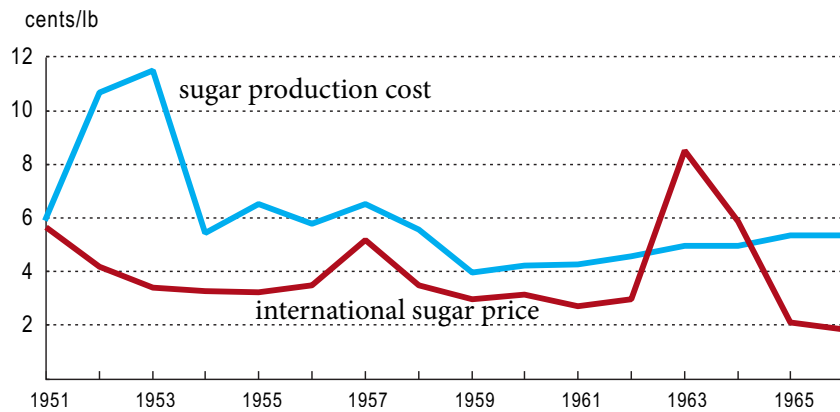


Figure 9: Sugar Production Cost and International Price

Sugar cost was sum of the following: guaranteed cane price and the miscellaneous cost, which was estimated to be 450 NT dollars per ton in 1959 by 孫鐵齋 (1959), p. 95. For the period of 1951–1958, the miscellaneous cost was assumed to grow by the same rate as CPI. For 1960–1966, it is assumed to be 450 NT dollars per ton. Sugar price was free market price.

The answer: more and more sugar was sold in the domestic market, and consumers were charged a high price. Taiwan prohibited sugar imports in September 1949.<sup>27</sup> From 1962 to 1967, the average domestic wholesale price for first grade sugar was 10,880.6 NT dollars per ton, while the TSC's average export price for raw sugar was 3,936.3 NT dollars. The standard conversion rate from first grade to raw sugar was 1:1.087, hence domestic whole price was 2.54 times of export price. Domestic consumers were charged a higher price to subsidize sugar exports.

### 3 Concluding Remarks

After Taiwan became a colony of Japan in 1895, the Japanese colonial government made great efforts to modernize Taiwan's legal system, property rights, and transportation system. These were generally regarded by growth economists as essential infrastructures for long-term economic growth, but it turned out that they did not help all the domestic industries immediately. For example, the Oolong tea industry was stagnant up to the late 1910s, and then declined.

Sugar production saw a tremendous increase starting in the late 1900s, and it seemed that the sugar industry development in the colonial period was

<sup>27</sup>李文環 (2004), pp. 351–352.



highly successful. However, this paper argues that the high growth of the sugar industry was not a direct result of the growth institutions established by the colonial government. Rather, it was a result of the protective industry policies by the Japanese government.

During the Japanese colonial period, even though there had been a remarkable improvement in cane agriculture and sugar production technology, Taiwan's sugar production cost had been much higher than Java. However, Taiwan's sugar export to Japan was tariff-free, but there was a heavy tariff imposed on sugar imports from foreign countries. In contrast, Japan could not apply a similar policy on tea, because Oolong teas were exported to the US.

How did Japan's industrial policy affected the Japanese and Taiwanese people? Since most of the sugars produced in Taiwan were exported to Japan, Japanese consumers were harmed by the policy because they had to pay a high price for sugar. On the other hand, the Japanese sugar factories as well as Taiwanese farmers, both cane and rice growers, were benefited by the policy.

After 1950, Taiwan became an independent country, and its sugar had to compete in the world market. Given that Taiwan did not have comparative advantage in sugar production, there was no way to prevent the fall of the sugar empire.

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