

Agricultural Trade Between Taiwan and Mainland China: Impacts on Taiwan*

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I. Introduction

Taiwan's island economy of 20 million people, with per capita gross national product reaching US\$7,997 in 1990, relies heavily on international trade. Ceded to Japan in 1895 and returned to China following World War II, Taiwan became the home of the Chinese Nationalist government in 1949. The democratic republic government began planning the island's economic development in 1953.

The economy progressed rapidly under several consecutive economic plans. Real GNP growth averaged 9 percent during 1953-1990. The island's export-expansion policy also drastically changed its export mix from mainly rice and sugar before the 1960s to electrical and electronic products, textile, metal products and machinery in the 1980s. Except for the recession of 1974-75, Taiwan has consistently enjoyed a surplus in foreign trade since the early 1970s. In 1990, the total value of foreign trade amounted to US\$122 billion, which ranked thirteenth among the countries in the world. Taiwan's agricultural trade has expanded steadily during the last four decades. The value of agricultural imports increased from US\$66 million in 1952 to US\$5,789 million in 1990. Agricultural exports rose from US\$114 million to US\$3,489 million in this same period.

* Paper presented at Discussion Group on "China's Participation in the International Food Markets" at the XXI International Conference of Agricultural Economists, August 22-29, 1991, Tokyo, Japan.

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Taiwan's agricultural trade has turned from a surplus to a deficit situation since 1970. Several major reasons are cited for this phenomenon. During rapid, multi-phased structural adjustment, an unavoidable productivity lag exists in countries with small farms and with rapid economic structural changes in agriculture (Peng and Chang, 1983). In terms of a revealed comparative advantage index, Taiwan's agricultural products had a small comparative advantage to both developing countries and developed countries as a whole after 1970 (Anderson, 1983).

With changes in income, income distribution, relative prices, urbanization, and the opportunity cost of women's time, food consumption patterns in Taiwan have changed significantly during the last two decades. Intra-industry trade has increased with the quality difference and the production season gap between exporting countries and Taiwan (Peng, 1991). With an increased trade surplus from industrial products, particularly with the United States, the agricultural sector has been compelled to import cheap final consumption goods.

In Mainland China, the production and marketing of agricultural products are highly controlled by the State. Peasants are required to sell certain proportion of their output to the government at specified prices. Economic reform started in late 1978 introduced the "production responsibility system (PRS)" to replace the old labor-day work payment system. PRS has greatly decentralized agricultural production decision making and increased peasants' efficiency.

After the reforms, annual grain output increased by double digits annually over the 1978 level. Mainland China is one of the biggest grain producers in the world and its red meat output ranks second, behind the United States (USDA, 1989). The increases in grain output have helped Mainland China shift from a net grain importer to a net exporter during the last several years.

Martial Law in Taiwan was lifted on July 15, 1987. The tensions between Taiwan and the Mainland have eased. The government has allowed 158 items of industrial and agricultural materials to be imported indirectly from the Mainland since June 6, 1989. The re-export (indirect trade) of agricultural products through Hong Kong between these two regions has increased rapidly both in volume and in items. In 1990, indirect trade between these two regions via Hong Kong amounted to HK\$2.6 billion (1US\$=8HK\$). Moreover,

the smuggling of agricultural products, from the Fukien coast by fishing boats has been very active.

The main objective of this paper is to explain the state of "agricultural trade" between these two regions through the channels of re-export and smuggling by analyzing the characteristics of this trade, and assessing the impact of legal and illegal trade by means of a partial equilibrium analysis.

II. Trade Relations between Taiwan and Mainland China

(1) The Agricultural Trade Situation in Taiwan

In the early stages of Taiwan's economic development, agricultural products were a major foreign exchange earner, greatly improving Taiwan's balance of payments situation. In 1953, agricultural products and their processed products accounted for 91.6 percent of total exports, while industrial exports contributed only 8.4 percent. Prior to 1965, the share of agricultural exports in total export trade exceeded 50 percent. By 1990, the picture had become different. Industrial exports accounted for 94.8 percent of total exports, while agricultural and their processed products accounted for only 5.2 percent (Table 1). This was mainly due to the rapid expansion of the industrial sector. However, the annual growth rate of agricultural exports was about 10 percent and the components of agricultural exports changed significantly. In the 1950s and 1960s, sugar, rice, bananas, tea, citronella oil and canned pineapple were major export products. In the 1970s, major agricultural exports were processed products, such as sugar, canned mushrooms, and canned asparagus. In the 1980s, the major agricultural exports included frozen pork and marine products. The change in export structure reveals that the comparative advantage of agricultural products shifted from labor-intensive crops to high-value and capital intensive products. This is attributed to the change in the supply and demand for domestic resources.

Taiwan depends heavily on agricultural imports. However, the percentage of agricultural imports has not changed as much as exports. Raw materials such as raw cotton, feed grains, logs and lumber, hides and leather, are always major imports, and account for 90

Table 1. Trade Statistics of Taiwan, ROC

Unit: US\$ million

Year	Export			Import			Balance of Trade	
	Total	Agri. Products	%	Total	Agri. Products	%	Total	Agri. Products
1952	119.52	114.17	95.5	206.98	66.50	32.1	-87.45	47.67
1955	133.44	123.80	92.8	190.06	65.51	34.5	-56.62	58.29
1960	169.86	120.67	71.0	252.21	75.84	30.1	-82.35	44.83
1965	449.68	260.09	57.8	557.40	154.16	27.7	-107.71	105.93
1970	1,428.29	310.21	21.7	1,527.76	376.52	24.7	-99.46	-66.31
1975	5,301.78	908.81	17.1	5,959.48	1,244.11	20.9	-657.69	-335.40
1980	19,775.94	1,876.52	9.5	19,694.54	3,090.03	15.7	81.40	-1,213.50
1985	30,695.40	2,107.86	6.9	20,008.72	3,380.51	16.9	10,686.68	-1,272.65
1990	67,267.95	3,488.58	5.2	54,713.88	5,788.60	10.6	12,554.06	-2,300.02

Sources: The trade statistics of the Inspectorate-General of Customs, ROC.

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percent of total agricultural imports. Only 10 percent of agricultural imports are consumption goods, such as fruit, juice, beef, wheat and powdered milk. In other words, agricultural imports are a derived demand associated with the development of the textile, shoe, lumber and livestock industry. The aggregate relationship between agricultural imports and domestic industrial development is complementary rather than competitive. However, the increasing import of consumption goods has exceeded that of raw materials since 1970, increasing competition in Taiwan's already saturated domestic market. In general, agricultural imports accounted for 32.1 percent of total imports in 1952 and dropped to 11.3 percent in 1990. The annual growth of agricultural imports is 13.0 percent, which is greater than agricultural exports.

The major items with an import value exceeding 100 million US dollars in 1990 were logs and lumber, hides and leather, soybeans, corn, cotton, fish meal, wool, tobacco leaves, sea products, dairy products, fruits and nuts, wheat, and beef. In recent years, the import of beef, dairy products, fruits, and fruit juice have been very impressive.

The suppliers of Taiwan's farm imports include Australia, Canada, EC countries, Hong Kong, Indonesia, Japan, Malaysia, U.S.A. and Thailand. In 1990, 39% of our farm imports came from the U.S. The shares for Malaysia, Australia and Japan were 9%, 8% and 7%, respectively.

Taiwan exports a number of farm products. The major agricultural exports are hogs and pork, sea products, fresh vegetables, fruits, rice, sugar, canned mushrooms, canned asparagus and preserved vegetables. In 1990, the export value of sea products (including processed products) reached US\$1,310 million, which accounted for 37% of total agricultural exports. The export values of hogs and pork, and preserved vegetables were US\$507 million and US\$162 million, respectively. The exports of these items increased tremendously over the last ten years, while the exports of rice, sugar, canned mushrooms, canned asparagus and pineapples declined substantially.

Japan is the most important market for Taiwan's farm products. Other markets include U.S.A., EC, Korea, and Hong Kong. In 1990, 65.4% of Taiwan agricultural exports went to Japan, leaving 34.6% for all other destinations.

(II) Indirect Trade between Taiwan and Mainland China

According to the data of the Hong Kong Census & Statistics Department, from 1979 to 1990, trade between Taiwan and Mainland China via Hong Kong has increased sharply both in items and in value. Total export value from Taiwan to Mainland China increased from \$22 million in 1979 to \$3,278 million in 1990, accounting for 4.88 percent of Taiwan's total export value. Total import from Mainland China to Taiwan increased from \$56 million to \$765 million during the same period. The trade between the two regions expanded rapidly, with total trade value reaching \$78 million in 1979. In 1990, total trade between the two regions increased to US\$4,043 million, which was 3.3 percent of total trade value (Table 2).

As far as the trade structure is concerned, Taiwan mainly exported semi-final manufactured goods and machinery and transport equipment to the Mainland. These two items took up about 80 percent of total export value from Taiwan to Mainland China (Tables 3 & 4). Taiwan enjoyed an increasing trade surplus in its trade with Mainland China, up from \$159 million in 1980 to \$2,513 million in 1990. However, indirect investment in Mainland China from Taiwan amounted to \$1,500 million in 1990.

As to indirect import from Mainland China to Taiwan, Taiwan mainly imported inedible crude material, such as raw hides, skins and furskin, cork, and wood before 1989. In 1990, however, chemical & related product became major import items which amounted to US\$169 million (Tables 5 & 6), or 22 percent of total import from Mainland China. Food and live animals chiefly for food, occupied 11 percent of total imports amounting to US\$36 million in 1990.

Statistics indicate that Taiwan is increasingly relying on the Mainland market. Indirect export to the Mainland via Hong Kong accounted for 4.88 percent of Taiwan's total exports in 1990 (see Table 7), up two percentage points over 1987. The figure fails somewhat to reflect the true situation because of the large amount of Hong Kong-bound shipments from Taiwan that are resold to the Mainland. Taiwan's reliance on the Mainland market has never been heavier. The value of re-export via Hong Kong from Taiwan to the Mainland accounted for 6.08 percent of the Mainland's total imports (Table 7). This made Taiwan the fourth largest supplier of the Mainland in 1990.

As far as agricultural trade with Mainland China is concerned, Taiwan is a net importer

Table 2. The Value of Re-Exports Via Hong Kong between Taiwan and Mainland China

Unit: US\$ million

Year	From Taiwan to Mainland (1)	Change Rate (%)	From Mainland to Taiwan (2)	Change Rate (%)	Total (3)=(1)+(2)	Change Rate (%)
1979	21.47		56.29		77.76	
1980	234.97	994.4 %	76.21	35.4 %	311.18	300.2 %
1981	384.15	63.5 %	75.18	-1.4 %	459.33	47.6 %
1982	194.45	-49.4 %	84.02	11.8 %	278.47	-39.4 %
1983	157.84	-18.8 %	89.85	6.9 %	247.69	-11.1 %
1984	425.45	169.5 %	127.75	42.2 %	553.20	123.3 %
1985	986.83	131.9 %	115.90	-9.3 %	1,102.73	99.3 %
1986	811.33	-17.8 %	144.22	24.4 %	955.55	-13.3 %
1987	1,266.53	51.2 %	288.94	100.3 %	1,515.47	58.6 %
1988	2,242.22	82.8 %	478.69	65.7 %	2,720.91	79.5 %
1989	2,896.49	29.2 %	586.90	22.6 %	3,483.39	28.0 %
1990	3,278.25	13.2 %	765.36	30.4 %	4,043.61	16.1 %

Sources: Department of Census & Statistics, Hong Kong Government.

Department of Statistics, Ministry of Finance, ROC.

Table 3. The Value of Re-Export from Taiwan to Mainland via Hong Kong - By SITC

Unit:US\$ million

SITC* Year	0*	1	2	3	4	5	6	7	8	9	Total
1979	0.10	0.00	0.02	0.00	0.00	0.74	18.52	2.02	0.07	0.00	21.47
1980	0.26	0.00	13.08	0.00	0.00	2.63	151.85	59.68	7.43	0.04	234.97
1981	0.32	0.00	7.34	0.00	0.00	4.99	276.24	83.38	11.82	0.06	384.15
1982	0.96	0.00	3.32	0.00	0.00	4.23	153.47	25.59	6.88	0.00	194.45
1983	0.58	0.01	1.99	0.00	0.01	1.98	107.44	25.15	20.52	0.17	157.84
1984	0.64	0.00	12.98	0.02	0.00	9.74	251.33	116.44	33.68	0.62	425.45
1985	1.88	0.00	12.38	0.00	0.01	22.10	522.85	337.81	74.57	15.23	986.83
1986	4.90	0.00	18.58	0.00	0.00	27.48	483.63	217.71	56.94	2.09	811.33
1987	12.77	0.00	24.45	0.03	0.24	80.52	672.85	346.65	86.44	3.41	1,226.53
1988	16.35	0.05	44.96	0.68	0.18	259.96	985.85	797.03	131.68	5.48	2,242.22
1989	36.10	0.01	56.11	0.34	0.08	325.87	1,337.79	951.10	180.68	8.41	2,896.49
1990	35.73	0.51	62.35	0.76	0.21	414.72	1,717.58	796.71	238.20	11.48	3,278.25

Sources: Department of Census & Statistics, Government of Hong Kong.

Remarks: 0: Food and live animals chiefly for food; 1: Beverages and tobacco; 2: Crude Materials, inedible, except fuels; 3: Mineral fuels, lubricants and related materials; 4: Animal and vegetable oils, fats & waxes; 5: Chemicals & related products n.e.s.; 6: Manufactured goods classified chiefly by material; 7: Machinery and transport equipment; 8: Miscellaneous manufactured articles; 9: Commodities and transactions not classified elsewhere in the SITC.

Table 4. The Structure of Re-Export from Taiwan to Mainland via Hong Kong - By SITC

		Unit: %									
SITC \ Year	0	1	2	3	4	5	6	7	8	9	Total
1979	0.5	0.0	0.1	0.0	0.0	3.4	86.3	9.4	0.3	0.0	100.0
1980	0.1	0.0	5.6	0.0	0.0	1.1	64.6	25.4	3.2	0.0	100.0
1981	0.1	0.0	1.9	0.0	0.0	1.3	71.9	21.7	3.1	0.0	100.0
1982	0.5	0.0	1.7	0.0	0.0	2.2	78.9	13.2	3.5	0.0	100.0
1983	0.4	0.0	1.3	0.0	0.0	1.3	68.1	15.9	13.0	0.1	100.0
1984	0.2	0.2	3.1	0.0	0.0	2.3	59.1	27.4	7.9	0.1	100.0
1985	0.2	0.0	1.3	0.0	0.0	2.2	53.0	34.2	7.6	1.5	100.0
1986	0.6	0.0	2.3	0.0	0.0	3.4	59.6	26.8	7.0	0.3	100.0
1987	1.0	0.0	2.0	0.0	0.0	6.6	54.8	28.3	7.0	0.3	100.0
1988	0.7	0.0	2.0	0.0	0.0	11.6	44.0	35.5	5.9	0.2	100.0
1989	1.2	0.0	1.9	0.0	0.0	11.3	46.2	32.8	6.2	8.3	100.0
1990	1.1	0.0	1.9	0.0	0.0	12.7	52.4	24.3	7.3	0.4	100.0

Sources: Same as Table 3.



(9)

and the trade deficit has increased. Agricultural trade between the two regions increased from HK\$1,501 million in 1987 to HK\$2,587 million in 1990, an increase of 72 percent. The value of agricultural exports from Taiwan to Mainland China was HK\$285 million in and HK\$679 million in 1990, showing a 34 percent annual growth. Farm products imported from Mainland China through Hong Kong increased from HK\$1,217 million to HK\$1,908 million, a 16 percent annual increase, during the same period. The trade deficit widened from HK\$933 million to HK\$1,229 million in the same time span.

The major items legally imported from China with values exceeding HK\$100 million in 1990 were Chinese medical materials, sea products, fruits and nuts, and beverages and tobacco. Exports from Taiwan to Mainland China with values exceeding HK\$100 million in 1990 were textile fiber, feeding stuff for animals, and crude animal and vegetable materials. Most of the products exported to Mainland China from Taiwan were intermediate products, mainly used developing and maintaining aquaculture, raising livestock and manufacturing clothes.

In general, the major Taiwan export items in the world market in the 1980s were sea products (SITC 03), meat and its processed products (01), and fruits(05). These products have been threatened by some low-priced exports from Mainland China. Moreover, many agricultural enterprises in Mainland China are operated by Taiwan investors. These investors have brought a great deal of capital and technology to Mainland China. The resulting commodities produced can be regarded as competing with Taiwan-made products. However, some commodities trading between these two regions are complementary rather than competitive, such as cereals and Chinese herbs. Under the current situation, only some commodities can be imported indirectly from the Mainland. Restrictions on the import of these commodities cause a price disparity that encourages smuggling.

III. Illegal Direct Agricultural Trade (Smuggling) from Mainland China

Under the current "Mainland China Policy" in Taiwan, direct trade is not allowed. Because of this, both legal re-export through Hong Kong and illegal smuggling activities have increased rapidly. Mainland China's farmers have made impressive progress in raising output

Table 5. The Value of Re-Export from Mainland to Taiwan via Hong Kong - By SITC

Unit: US \$ million

SITC Year	0	1	2	3	4	5	6	7	8	9	Total
1979	2.95	0.00	49.71	0.03	0.00	2.24	0.56	0.08	0.58	0.15	56.29
1980	7.14	0.00	63.26	0.03	0.00	3.52	1.75	0.23	0.27	0.01	76.21
1981	6.99	0.00	60.55	0.06	0.00	5.36	1.24	0.65	0.32	0.01	75.18
1982	6.78	0.00	66.30	0.11	0.00	7.26	2.82	0.37	0.33	0.06	84.02
1983	10.00	10.00	63.37	0.67	0.02	9.70	5.55	0.18	0.30	0.06	89.86
1984	20.48	.00	76.73	1.80	0.03	10.60	17.14	0.08	0.72	0.17	127.75
1985	29.96	0.00	56.88	1.41	0.06	11.92	14.70	0.10	0.72	0.15	115.90
1986	22.59	0.06	63.32	1.63	0.01	22.20	31.17	1.73	1.13	0.39	144.23
1987	0.00	0.79	149.98	3.03	0.43	38.96	82.81	4.48	8.25	0.21	288.94
1988	0.03	2.00	208.43	3.63	2.36	59.88	145.60	31.59	24.36	0.47	478.69
1989	58.53	0.34	184.73	5.61	0.93	70.77	126.27	57.07	81.85	0.76	586.90
1990	84.87	24.35	158.89	7.54	1.66	71.57	169.86	102.09	143.38	1.15	765.36

Sources: Same as Table 3.

Table 6. The Structure of Re-Export from Mainland to Taiwan via Hong Kong - By SITC

		Unit: %									
SITC \ Year	0	1	2	3	4	5	6	7	8	9	Total
1979	5.2	0.0	88.3	0.1	0.0	4.0	1.0	0.1	1.0	0.3	100.0
1980	9.4	0.0	83.0	0.0	0.0	4.6	2.3	0.3	0.4	0.0	100.0
1981	9.3	0.0	80.5	0.1	0.0	7.1	1.6	0.9	0.5	0.0	100.0
1982	8.1	0.0	78.9	0.1	0.0	8.6	3.4	0.4	0.4	0.1	100.0
1983	11.1	0.0	70.5	0.8	0.0	10.8	6.2	0.2	0.3	0.1	100.0
1984	16.0	0.0	60.1	1.4	0.0	8.3	13.4	0.1	0.6	0.1	100.0
1985	25.8	0.0	49.1	1.2	0.0	10.3	12.7	0.1	0.7	1.1	100.0
1986	15.7	0.0	43.9	1.1	0.0	15.4	21.6	1.2	0.8	0.3	100.0
1987	0.0	0.3	51.9	1.0	0.1	13.5	28.7	1.5	2.9	0.1	100.0
1988	0.0	0.4	43.5	0.8	0.5	12.5	30.4	6.7	5.1	0.1	100.0
1989	10.0	0.1	31.5	1.0	0.2	12.1	21.5	9.7	13.8	8.1	100.0
1990	11.1	3.2	20.8	1.0	0.2	9.4	22.2	13.3	18.6	0.2	100.0

Sources: Same as Table 3.

(12)

Table 7. Trade Reliance between Taiwan and Mainland

Unit: %

Year	Taiwan		Mainland	
	Export to Mainland Total Export	Import from Mainland Total Import	Export to Taiwan Total Export	Import from Taiwan Total Import
1979	0.13	0.38	0.41	0.14
1980	1.19	0.39	0.42	1.20
1981	1.70	0.35	0.34	1.75
1982	0.88	0.44	0.38	1.01
1983	0.63	0.44	0.40	0.74
1984	1.40	0.58	0.49	1.55
1985	3.21	0.58	0.42	2.34
1986	2.04	0.60	0.47	1.89
1987	2.30	0.84	0.73	2.84
1988	3.70	0.96	1.01	4.06
1989	4.38	1.12	1.19	4.90
1990	4.88	1.40	1.23	6.08

- Sources: 1. Department of Census & Statistics, Hong Kong Government.
 2. Department of Statistics, Ministry of Finance, Taiwan, ROC.
 3. Department of Customs, PRC.

levels as well as productivity. The prices for agricultural products in Mainland China are much lower than those in Taiwan. Some products, such as Chinese herbs, cannot be grown in Taiwan. Even during the period under Martial Law, some agricultural products were imported from Mainland China to satisfy growing demand in Taiwan.

For the purpose of protecting Taiwan farmers, import of some products is prohibited, such as peanuts and garlic. The prices of these products increase sharply during the off season. Fish resources in the Taiwan Strait have decreased drastically due to over catch. Many fishermen have given up fishing. They have used Taiwan produced manufacturing products to exchange for cheap farm products from Mainland China and have smuggled them back to Taiwan. Moreover, the distance between Nan-Lao port in Taiwan and Pin-Tang County in Fukein is only about 80 miles. It takes about 7 hours to travel from Nan-Lao to Pin-Tang by boat. Smuggling has become much more attractive than fishing.

The growing demand for cheap Mainland China farm products for processing purposes in Taiwan is another factor that encourages fishermen to smuggle. Moreover, the risk of being caught and the punishment for smuggling are light. Since Martial Law was lifted, the enforcing authority against smuggling law has switched from the army to the police.

Economic reforms in Mainland China, implemented since the end of 1978, have decentralized power and given it to local governments. In order to accelerate economic development, local governments encourage "exporting" farm products to Taiwan through smuggling channel to earn foreign exchange (New Taiwan Dollar (NT\$)). Of course, there may also be some political and military purposes behind the smuggling activities.

The smuggling of farm products from Mainland China has increased sharply both in volume and in items. In 1989, 670 instances of smuggling were uncovered by the coastal guard. Smuggled items included melon seeds, peanuts, red beans, forest mushrooms, garlic, frozen pork, beef, mutton, snacks, dogs, wine, Chinese herbs, and sea products. The value of the smuggled products was over US\$4 million, according to the data revealed by the General Police Administration. Since June 6, 1990, a vigorous policy has been in effect, aimed at the enforcement of laws against smuggling farm products and laborers from Mainland China. Smuggled farm products will be destroyed and laborers will be repatriated to Mainland China via Red Cross Councils and the Strait Exchange Foundation. Whoever is caught buying smug-

gled products or hiring illegal laborers from Mainland China will be punished as well. The risk of smuggling have increased and the activities of smuggling have decreased significantly*.

IV. Impacts Analysis

Since agricultural products in both regions have competitive and complementary components in the Taiwan market as well as in the world market, the impact on Taiwan of agricultural trade between the two regions will be analyzed by a partial equilibrium analysis. We limit our view to specific sectors of Taiwan, Mainland China, and the international economy, while we hold other things constant. Our main emphasis will be on the effects of policy decisions with regard to price, production, income, and trade.

(I) Legal Indirect Agricultural Trade Case

In Figure 1, we can derive the excess demand and excess supply function in panel (B) from panels (A) and (C). For simplicity, let's assume transportation cost is negligible. Trade volume will be $oc=ab=de$ at price P_0 for both Taiwan and Mainland China.

Since direct trade is not allowed, trade can only be made via third countries, such as Hong Kong. In this case, profit will be charged and trade volume will decrease from oc to oh . Mainland China export price is P_1 , and Taiwan import price is P_2 , and excess profit for third countries and tariff revenue for Taiwan are $P_1h_1h_2P_2$. The price difference between Mainland China and Taiwan products will induce smuggling activities or illegal trade. The smuggler's profit is $P_1h_1h_2P_2$ ignoring transportation cost and the risk of being caught. We will discuss these factors in more detail in the next section.

* After a long survey and debate, the government of Taiwan has finally decided allow melon seeds, peanuts, and tiny fish to be imported indirectly from Mainland China, effective July 1, 1991.

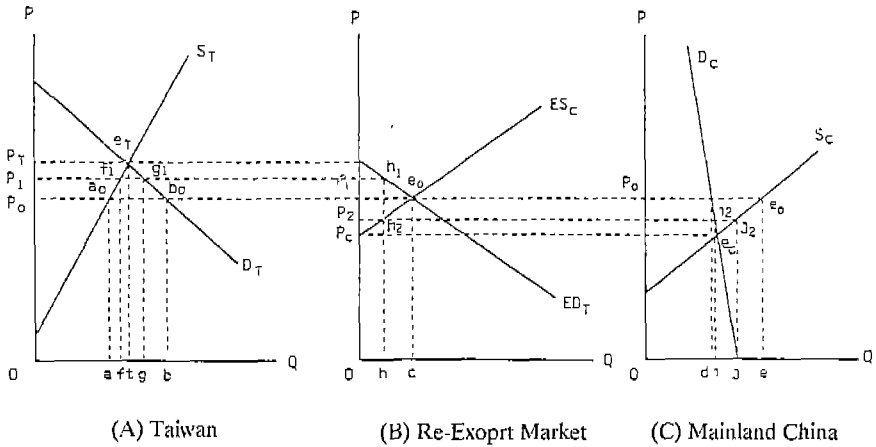


Figure 1. Re-Export of Farm Products between the Two Regions

Figure 1 indicates the trade flow from Mainland China to Taiwan. Comparing Figure 1 with the autarky case in re-export trade, the following impacts on Taiwan economy can be summarized: First, domestic price and output will decrease. Second, consumers will gain from re-export via Hong Kong, and consumer's surplus will increase by $P_1 P_T e_T g_1$. Third, economic welfare will increase by $f_1 e_T g_1$ via re-export at the expense of farm revenue. Fourth, the larger the price difference between the two regions, and the larger the excess profit for middle agents, the more smuggling will be.

For the same reasons, we can use Figure 1 to explain Taiwan's export of final and semi-final products to Mainland China. Assuming other things to be equal, the economic welfare of direct trade is greater than that of indirect trade for the Taiwan economy. Taiwan farm products in the form of semi-final product, capital and technology re-exported via Hong Kong can, to some extent, shift Mainland China from a net importer to a net exporter. Eventually, these commodities will be exported to Taiwan to compete with related products in the Taiwan market. Sea products are an example.

(II). Illegal Direct Trade (Smuggling) Case

In many developing countries, smuggling is a significant economic phenomenon. Until recently, smuggling was completely ignored in the analysis of the theory of international

trade. Bhagwati and Hansen (1973) have successfully incorporated the smuggling phenomenon into the standard international trade model.

In the model used by Bhagwati and Hansen, it is assumed --- in the tradition of Samuelson's (1954) well-known method of treating transportation costs --- that the real costs of smuggling are incurred in the form of the two tradeable goods which comprise the standard two-good trade-theoretical model. Smuggling merely represents another way in which the exportables are transformed into importables. Bhagwati and Hansen demonstrate the false view that smuggling helps improve economic welfare. While under restrictive conditions, smuggling may improve welfare, while tariffs may be levied to achieve specific objectives, such as protecting import-competing production or collecting revenue. They found that to attain a feasible target increase in domestic production of importable goods, a tariff with no smuggling is superior to a tariff with smuggling. Their analysis has been further extended by several economists (Sheikh, 1974; Kemp, 1976; Pitt, 1981; Martin and Pangariya, 1984).

As analyzed before, some agricultural commodities smuggled into Taiwan compete with Taiwan's high-cost products, and some are intermediate inputs of Taiwan products. A partial equilibrium approach is used to analyze the welfare impact of smuggled products on the Taiwan economy.

A. Competitive products

Smuggled products compete with domestic products which benefit from import restriction. The price of these products will be forced downward. Consider a demand-supply framework as shown in Figure 2, S_1 is the domestic supply curve before smuggling, the demand curve is D_1^d or D_2^d , and the equilibrium price is P_1 . After smuggling, the supply curve shifts rightward to S_2 , and the equilibrium price falls to P_2 . Domestic production decreases from OQ_1 to OQ_2 , consumer's demand increases from OQ_1 to OQ_2 . O_2Q_2 is the quantity of smuggling.

Let us look at the changes of welfare due to smuggling. Before the smuggling occurs, $\triangle FPE$ is consumer's surplus, and $\triangle P_1GE$ is producer's surplus. After the smuggling, consumer's surplus becomes $\triangle EP_2B$, and producer's surplus is $\triangle P_2GA$. The smuggling activity increases $\triangle ABE$ net social welfare. If an identical marginal utility of money for both consumer and producer is assumed, smuggling improves economic welfare.

The slope of the importable's demand curve affects the price of the product and the quantity of smuggling, as shown in Figure 2. The less elastic the demand curve, the larger the fall in the product price. If the demand curve is D^2 , the price falls from P_c to P^2 , domestic production drops to OQ' , and the volume of smuggling becomes Q', Q'_h . Producer's surplus is much lower than elastic demand after smuggling, even less smuggling quantity in a less elastic demand curve. If there is a larger gap between domestic price and world price, the distance between S_d and S_w will become larger as shown in Figure 2, and the ratio of illegal to legal trade will increase.

If vigorous policy against smuggling is imposed on traders or fishermen, the domestic supply curve will shift from S_c to S'_c , the volume of smuggling will be reduced from Q_c, Q_h to Q'_c, Q'_h . This action increases domestic price and domestic production. However, the net social welfare is reduced by area of $LABJ$ as shown in Figure 3. This implies that a vigorous policy towards the enforcement of laws against smuggling raises per unit smuggling cost and the domestic price of the importables and lowers the social welfare of the importables.

If punishment is imposed on both suppliers (smugglers) and demanders, not only will the supply curve shift, but the demand curve will also. This is shown in Figure 4. Vigorous enforcement of laws against smuggling on both the supply and demand sides tends to raise the domestic price and lower the quantity of smuggling. The effect on welfare is ambiguous.

B. Complementary case

Raw materials and other intermediate goods are in the bundle of smuggled goods as well. However, these products can be used as inputs of importable or exportable products. Suppose that a smuggled product is an intermediate importable good in Taiwan. In Figure 5, S_d is domestic supply curve, D_d, P_d which is higher than the world price P_w including tariff. The volume of the importable is Q_c, Q_h under the prevailing world price, and the domestic production is Q_d . With cheap intermediate goods smuggled for the domestic production of importables, the supply curve shifts from S_d to S'_d as shown in Figure 5. This raises the ratio of domestic production to the total import and increases producer's surplus.



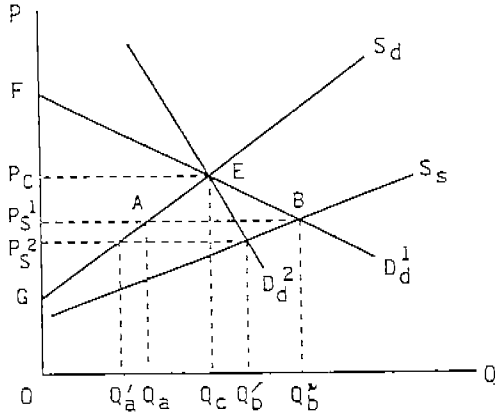


Figure 2. Impacts of Smuggling Competitive Commodities

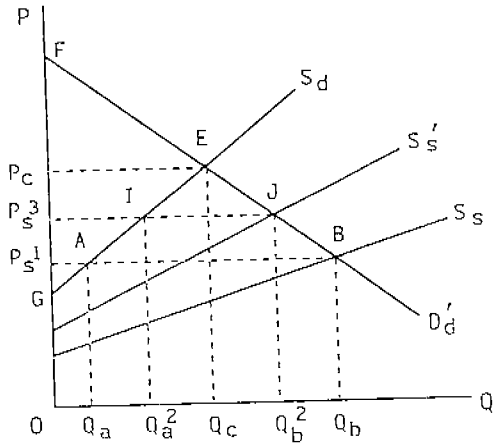


Figure 3. Punishment of Smugglers

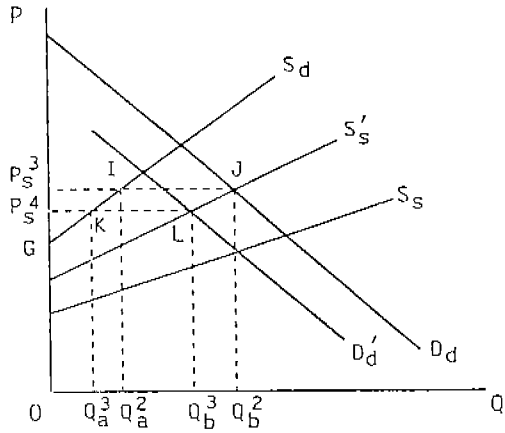


Figure 4. Punishment of Smugglers and Buyers

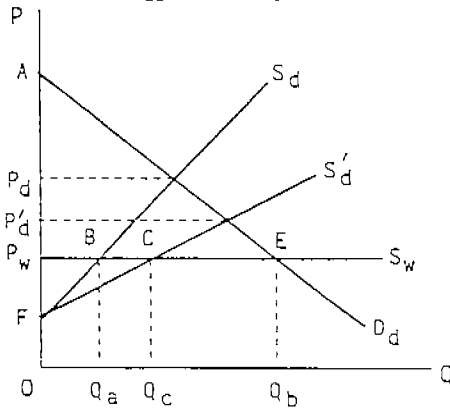


Figure 5. Impacts of Smuggling Inputs on Importable Products

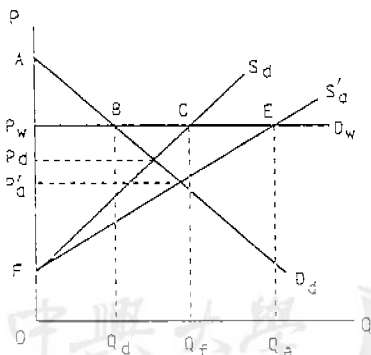


Figure 6. Impacts of Smuggling Inputs on Exportable Products

Let us now turn to the smuggled products which are the intermediate products for producing exportable commodities. For a small-country case in Figure 6, Q_1Q_2 is exported to the world market. Since cheap intermediate products are smuggled from Mainland China, the supply curve shifts from S_1 to S'_1 , under the world price (P_w), quantity of export increases from Q_1Q_1 to Q_1Q_2 . The welfare is improved as a result of smuggling.

The domestic market for farm products in Taiwan is not large, most farm products are inelastic. The prices of some products are sensitive to the changes of supply. According to the data of the Council of Agriculture in Taiwan, the prices of peanuts, red beans, forest mushrooms, melon seeds and garlic in Mainland China are much lower than those of Taiwan. The quality of products in Mainland China, moreover, are much better than those of Taiwan. The price of Taiwan forest mushrooms are about double that of Mainland China. Due to the smuggling of cheap peanuts, melon seed, red bean, and garlic from Mainland China, the planted acreage of these three products drastically decreased by 90 percent during 1986-1990. However, after the strong policy to stop smuggling activities, the price of red beans increased from NT\$ 16 per kilogram to NT\$ 36 per kilogram within half a year. Planted acreage also increased impressively.

If the products smuggled from Mainland China complement domestic production, they will improve the economic welfare on Taiwan. If the smuggled products compete with domestic production, the economic welfare will be improved at the cost of reduction in the producer's surplus. As mentioned earlier, some products have been protected by means of tariff and non-tariff measures for the purpose of inducing structural adjustments within the Taiwan agricultural sector during the last decade.

The protection of producer's interests is one of important objectives in society. To increase domestic production of importable goods, a tariff with no smuggling is superior to a tariff with smuggling (Bhagwati and Hansen, 1973). The enforcement of a strong policy to reduce smuggling activities is justified and necessary.

V. Conclusions

With a strong built-in family farm system, the small farm economy in Taiwan greatly benefited from the successful implementation of a land reform program and the balanced expansion of the dual economy from 1953 to 1968. After 1968, the situation began to change.

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Adoption of modern technology and increase in labor costs have increased production costs and reduced net farm income. Farm size has become a major constraint to the improvement of management efficiency. With the rapid development of the non-farm sector, the income gap between the industrial and farm sectors has continued to widen over the past 20 years. Despite the transfer of farm labor to off-farm work, farm family income can hardly be maintained at three fourths the level of nonfarm income.

From the 1970s on, the government has launched many important measures to stimulate development of the small farm economy. The measures include structural adjustments, guaranteed reasonable income, marketing efficiency promotion, and welfare improvement. Maintaining a certain reasonable level of agricultural protection is necessary for Taiwan agriculture in order to adjust itself in the course of rapid structural changes in the Taiwan economy.

The Nation Unification council under the president's Office was set up to sketch the policies of reunification in April 1990. In addition, the Mainland Affairs Council under the Executive Yuan (Cabinet) was set up on July 1, 1990. The main guideline set forth for agriculture is that technological exchange are encouraged but they should not be made at the expense of Taiwan agriculture. The Asian Agricultural Technical Service Center has sponsored several agricultural exchange programs with the Ministry of Agriculture, Mainland China during the past two years. The Straits Exchange Foundation, the only body in charge of affairs with the Mainland, will work with the Mainland authorities to deal with trade and technical exchange programs. Based on the earlier analysis, indirect trade and smuggling, under certain assumptions, will improve economic welfare on Taiwan. But it is done at the expense of Taiwan producers' interests. Until this situation is improved, the policy to maintain indirect trade and indirect investment, and vigorously combat smuggling will be maintained.

In general, if the products smuggled from Mainland China complement domestic production, they will improve the economic welfare on Taiwan. If the smuggled products compete with domestic production, the economic welfare will be improved at the cost of reduction in the producer's surplus. As mentioned earlier, some products have been protected by means of tariff and non-tariff measures for the purpose of inducing structural adjustments within the Taiwan agricultural sector during the last decade.

The protection of producer's interests is one of important objectives in society. To increase domestic production of importable goods, a tariff with no smuggling is superior to a tariff with smuggling (Bhagwati and Hansen, 1973). Based on the earlier analysis, indirect trade, under certain assumptions, will improve economic welfare on Taiwan. But it is done at the expense of Taiwan producers' interests. Until this situation is improved, the policy to maintain indirect trade and indirect investment, and vigorously combat smuggling will be maintained.

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海峽兩岸農產品流通對台灣 之影響

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自一九八七年以後，海峽兩岸之農產貿易劇增。貿易之主要通路是藉由香港轉口及漁船走私為主。本文利用部分均衡模型來分析兩岸農產品貿易之衝擊。兩岸之貿易行為，使農民利益受到傷害，但社會總福利提高。緝私措施之加強確使走私數量減少。長期而言，兩岸之農產品流通不論質或量均會增加。

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