FOREIGN TRADE IN TAIWAN AND KOREA
UNDER JAPANESE RULE

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I. *Introduction*[1]

Recently, some interesting papers have been published on the quantitative economic history of Taiwan and Korea under Japanese rule. These are very useful not only for the studies on the Taiwanese and the Korean economy but also the developing economics in general. But it seems to this writer that the analysis on foreign trade[2] is one of weak points in this field. This paper aims to supplement it by some statistical studies by using

Goverment General of Taiwan, *Yearbook of Taiwanese Foreign Trade* (Taiwan Boeki Nempyo), and

Government General of Korea, *Yearbook of Korean Foreign Trade* (Chosen Boeki Nempyo).

These data cover not only the trade with *foreign* countries for Japan but also trade with Japan and her colony. They inform us the monetary values of trade for all items and the quantities for some commondities groups which are relatively homogeneous. We can get the time-series from 1896 for Taiwan and from 1912 for Korea.

This paper is consisted of three topics as follows;

(1) we calculate the price indices for trade and discuss about the terms of tarde in these area,

(2) we try to estimate of the growth rates of trade in the real terms according to their

[1] The summary of this paper was published in the *Hitotsubashi Review*, Vol. LXIX, No. 5-6 1973 (in Japanese). The wirter expresses his gratitude for useful suggestions by Professors Han-Yu Chang of the Taiwan National University, Konosuke Odaka and Ippei Yamazawa of Hitotsubashi University. Discussions with Professors Yuzo Yamamoto of Kobe Commercial University and Ryu-gil Choe, Korea University of Foreign Language have stimulated this work.

[2] Since our interests concern on the Taiwanese and the Korean economy, it is convenient to treat these area as if independent countries in the analysis of trade. Therefore, we do treat their trade with Japan and her colony as a part of foreign trade.

[3] This section is written to inform the general knowledge for the readers who are unfamiliar to the history of Taiwan and Korea under Japanese rule. The writer hopes that specialists in this field skip this section only by referring Table 2 and 3. The history of Korean foreign trade can be found in Korean Foreign Traders Association (Chosen Boeki Kyokai), *History of Korean Foreign Trade* (Chosen Boekishi), The Association, 1943 (in Japanese) or Korean Traders Association, *Korean Trade History*, The Association, 1972 (in Korean). See also Byung Gwon Cha "Korean Trade Policy under Japanese Rule" (Il Je Ha e Issusu Han Kuk ui Mu Yuk Jung Chaek) in Mun Sik Kim et al, *History of Economic Exploitation by Japanese Empire*, 1971, People's Publishing Companies (in Korean). As far as this writer knows, there is no systematic publication on Taiwanese trade, but the summarized history can be found in various publications by the Government General of Taiwan. See, for example, Government General of Taiwan, *The State of Affair in Taiwan* (Taiwan Jijo), Annual (in Japanese).

components and to obatin the tentative functions for imports and exports, and

(3) we touch upon the problem of balance of payments in these area.

However, in order to understand the detailed discussions of these problems, it is necessary to know the general characters of the trade in these area, and the following summary may be useful for this purpose.

II. *Summarized History of Taiwanese and Korean Foreign Trade*[3]

By the peace treaty of Sino-Japan war in 1895, Japan got Taiwan and Pascardress Islands. Before that, Taiwanese foreign trade had been done mainly with Mainland China. Major exports were agricultural products including sugar and consumer goods were imported from China. However, amounts of trade were relatively small.

Undar Japanese rule, the share of trade with Japan had enlarged as shown in Table 1, and the amounts of trade had also increased remarkably. Taiwanese exports and imports were 14 million yen and 18 million yen respectively on the average from 1896 to 1900, but they attained up to 428 million yen and 327 million yen in the average of 1936-38. The growth of Taiwanese exports was supported by sugar and rice. In the early 1900's,

TABLE 1. PERCENTAGE OF TRADE OCCUPIED
BY THAT WITH JAPAN

Taiwan			Korea		
year	export	import	year	export	import
1897	14.2	22.8			
1905	56.2	55.2	1910	77.2	63.7
1915	79.6	76.0	1915	81.4	69.6
1925	81.8	69.7	1925	83.2	69.0
1935	89.7	82.9	1935	88.2	73.3

Source: See text.

Japanese government was earnest to increase Taiwanese sugar production in order to improve the balance of payments of Japan. She settled modern sugar factories and improve sugar canes. After 1910's, Taiwanese sugar had occupied Japanese sugar market through the protection of tariff. In the 1920's, the productivity of rice was pulled up by the plant breeding. This makes it possible to increase the exports of rice. Taiwanese percentage of exports occupied by both rice and sugar was 59% in 1915 and 74% in 1935. Other major commodities of Taiwanese exports were fruits, alcohol and campher.

Taiwanese imports are composed of three kinds of commodity groups; *i.e.*, (1) consumption goods, (2) materials for production and (3) materials for construction and machines. The first group is food other than raw agricultural products, clothings, consumer durables and sundries. Regarding the second group, we should note that the imports of fertilizer were relatively large. Taiwanese agriculture had developed enough to use chemical fertilizer before the Second World War. These two commodity groups were imported dominantly from Japan. The amounts of third group showed cyclical changes around the remarkable upward trend. This can be explained partially by the railway constructions.

Table 1 showes that Korean trade with Japan had a large share in her trade from the beginning of Japanese rule. Korea had closed her market for foreign countries until 1871 when the Korean government was forced to open the port of Pusan by Japanese political pressure. Afterward, Japanese marchants had kept their dominant position in Korean

foreign trade though the trade by Chinese was also remarkable in the 1890's. This is especially true after Russo-Japanese war in 1904-5. In this period, the major export *commodities* are agricultural products as well as gold and silver, and her imports are consisted of various kinds of consumer goods.[4]

In the first decade under Japanese rule, the amounts of trade rose significantly. Especially, the exports of rice for Japan increased owing to the abolition of Japanese tariff for Korean rice. Japan had supplied consumer goods, machines and equipments and materials for constructions. Though the growth rate of trade was low in the second decade because of the depression of Japanese economy, it grew again afterward. Regarding the trade in the 1930's we should call our attention to the increase of Korean trade with Manchuria which is occupied by Japan from 1927 to 1945.

The composition of Korean trade was not so simple as Taiwanese. Rice is the most important commodity of Korean exports, but the percentage of Korean exports occupied by rice is much lower than that for Taiwanese rice and sugar. Korea had exported sea food, mineral, natural fertilizer, fiber and some kinds of industrial products for Japan and Manchuria. The fundamental nature of Korean imports is similar to Taiwanese, but some comments are needed here. Korean industry had more developed than Taiwanese before the Second World War, and some manufactured consumption goods such as clothes were supplied by Korean factories. This tended to decrease the percentage of consumption goods in the period. However, an inverse tendency could be found in her imports; *i.e.*, Korea had imported other cereal than rice from Manchuria. Further, the development of second industry and minings was very remarkable in the 1930's and this demanded the various kinds of investment goods from Japan.

In order to know the nature of trade in these area in detail, we must examine the time-series data classified by the subgroups which are economically meaningful. Though the *Yearbooks* mentioned above have divided the amounts of trade depending on the system of classification adopted in Japan before the Second World War this is not good for our study. (Hereafter, we shall use the term of "War" as the Second World War if no comment is added there). For example, clocks and camera belong to the same classification as the industrial machines and locomotives. We then reclassify the amounts of trade into five by the following defintions shown in Table 2. Since this system depends on the major

TABLE 2. CLASSIFICATION OF TRADE

name of group	major commodities
(I) food	food including raw material for processed food
(II) other consumption goods	clothes, sundry goods, consumer durables, printed matters and charcoal
(III) raw material for production	fiber, leather, rubber, chemical products (excluding sundry goods), oil (excluding edible oil) coal, fertilizer and mineral
(IV) material for construction	timber, iron and steel, glass, cement and stone productus
(V) machines and equipments	industrial and other machine, locomotive, car, ship and their parts

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[4] An interesting quantitative studies on Korean trade before the Japanese rule have been proceeding by Professor Choe. See, Yoo-gil Choe, "Import and Export Index Number and the Terms of Trade between Korea and Japan, 1877-95" (Nisshin Senso madeno Nikkan Boeki) *The Hitotsubashi Review*, Vol. LXIX, No. 6, 1973 (in Japanese).

TABLE 3.   COMPOSITION OF FOREIGN TRADE IN KOREAN
AND TAIWAN UNDER JAPANESE RULE

	composition of trade (%)					yearly average of trade (1000 yen)
group	I	II	III	IV	V	
Taiwanese export						
1896—1900	76.79	18.71	4.33	0.17	0.00	14,579
1901—1905	74.13	21.23	4.41	0.23	0.00	20,888
1906—1910	80.30	14.92	4.55	0.22	0.01	39,411
1911—1915	77.32	12.66	9.66	0.36	0.00	59,420
1916—1920	77.73	8.34	12.92	0.91	0.10	156,095
1921—1925	82.90	6.61	8.23	2.21	0.05	205,158
1926—1930	84.62	6.94	6.76	1.60	0.08	251,970
1931—1935	86.53	5.38	7.07	0.93	0.09	272,761
1936—1938	89.06	4.97	4.72	0.99	0.26	428,015
Taiwanese import						
1896—1900	32.87	39.48	19.03	8.10	0.52	18,090
1901—1905	27.67	41.56	17.09	12.42	1.26	22,065
1906—1910	22.76	35.51	19.41	20.11	2.21	36,573
1911—1915	30.18	28.66	23.71	14.89	2.56	56,608
1916—1920	29.76	24.38	30.01	10.64	5.21	117,003
1921—1925	32.22	26.61	27.44	9.59	4.14	136,520
1926—1930	28.47	28.71	28.20	9.15	5.47	186,836
1931—1935	21.83	29.63	32.44	9.38	6.72	194,727
1936—1938	23.95	28.93	26.92	13.44	6.76	327,076
Korean export						
1911—1915	72.25	4.53	22.39	0.83	0.00	31,267
1916—1920	68.37	4.71	26.41	0.51	0.00	143,530
1921—1925	67.78	4.35	25.55	2.21	0.11	273,203
1926—1930	66.84	6.25	25.10	1.57	0.24	340,014
1931—1935	61.14	7.66	28.73	1.78	0.69	391,589
1936—1938	49.27	15.01	32.47	1.51	1.74	719,487
Korean import						
1911—1915	19.08	47.03	21.31	7.09	5.49	63,328
1916—1920	18.45	44.24	24.72	6.17	6.42	174,403
1921—1925	21.66	41.45	24.38	8.81	3.70	280,765
1926—1930	24.66	36.86	26.30	6.51	5.67	391,944
1931—1935	17.00	39.79	29.90	6.35	6.96	434,712
1936—1938	14.59	38.86	28.07	7.71	10.77	893,966

Note: Numbers of groups correspond to those shown in Table 2.

characters of commodities, these cannot be related to the concepts used in modern economics. For example, iron can be used to make the consumer durables by Taiwanese factories though it is classified as the materials for construction. But our concepts would be more convenient than the system shown in *Yearbooks*. In Table 3, the results for our works are summarized.

III. *Terms of Trade*

Now let us proceed our major work. First, we must calculate the price indices on foreign trade. The detailed method of our calculations is shown in the appendix of this paper, so we show here only the outlines of our calculation. We make, in principle, the indices depending on the Laspyres types. Since the composition of trade had varied violently in both Taiwan and Korea, we divided the periods into 5 for Taiwan and into 3 for Korea, and linked the indices corresponding to these periods. Price data are taken from the average prices by commodies, which are obtained by dividing the monetary values of trade with its quantities for relatively homogeneous commodity groups. For some commodity groups of which quality varies each other, for example industrial machines, we used other kinds of information. The results are shown in Table 4.

Now let us study the terms of trade in Taiwan and Korea under Japanese rule. Before the war, the terms of trade of Japan had a downward trend through the cut down of ex-

TABLE 4.   PRICE INDICES OF FOREIGN TRADES

year	Taiwan		Korea		year	Taiwan		Korea	
	export	import	export	import		export	import	export	import
1896	40.11	37.62			1920	153.59	155.87	75.82	183.33
97	42.98	36.96			21	126.74	127.43	76.43	129.00
98	48.63	38.75			22	103.93	123.29	98.09	112.89
99	48.84	41.67			23	114.06	120.67	97.35	112.88
					24	116.97	128.27	104.66	122.43
1900	48.30	48.89							
01	49.21	51.65			1925	113.60	134.51	102.83	128.76
02	61.00	47.40			26	105.84	113.92	111.82	119.78
03	54.23	48.91			27	101.22	106.95	109.61	111.40
04	59.18	51.25			28	95.69	106.17	100.74	111.71
					29	92.59	107.08	99.69	109.61
1905	57.64	55.24							
06	58.63	58.24			1930	85.21	88.03	97.45	94.72
07	66.70	61.71			31	68.79	75.87	88.69	76.95
08	71.61	57.60			32	78.82	82.31	93.60	83.48
09	72.19	58.24			33	97.71	94.17	82.39	102.86
					34	97.10	94.32	95.19	94.24
1910	63.17	61.47							
11	61.86	63.79	62.28	53.40	1935	94.70	101.89	100.04	101.45
12	67.72	62.87	67.57	56.70	36	108.20	103.79	104.30	104.31
13	72.89	63.88	68.20	59.87	37	113.62	124.41	91.39	124.20
14	65.29	61.98	80.21	62.04	38	118.15	132.47	91.34	132.22
1915	63.54	65.06	72.70	62.24					
16	67.06	82.93	64.55	80.96					
17	77.82	112.18	65.78	106.41					
18	89.02	133.47	67.52	144.16					
19	108.11	143.89	79.31	162.89					

Fig. 1.   Terms of Trade, Cereal Export Ratio and Real Wages in
Taiwan and Korea under Japanese Rule
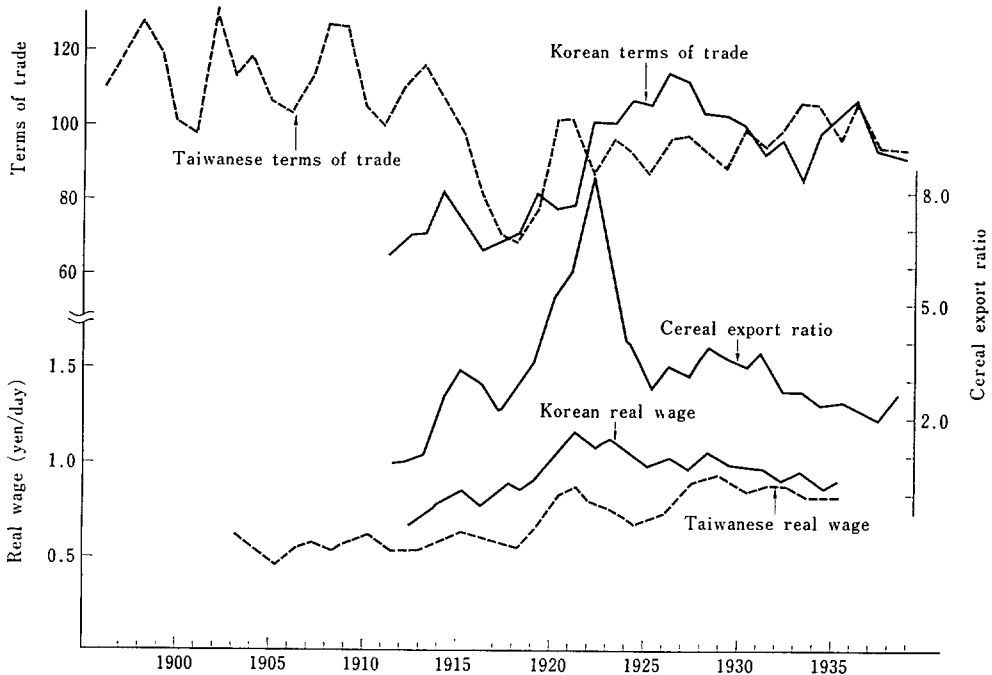
Note: Regarding definitions see text.

change rate of Japanese Yen, and so the analyses become very complicated.   However, we can escape from such confusions in the cases of Taiwan and Korea, because major trade had been done by using Japanese Yen.

In Figure 1, the indices are shown for the terms of trade in both Taiwan and Korea. This indices are calculated by dividing the exports prices by the imports prices.   According to the figure, Taiwanese terms of trade showed a downward trend and then tended to increase.   Korean index rose from 1910 to 1927 and tended to decrease afterwards.   It is very interesting that a reverse tendency can be found in these two indices if we exclude the period from 1923 to 1927.

Generally speaking, it is not surprising to find the reverse tendency in the term of trade between two countries.   For instance, it is natural that the indices move differently between industrialized and agrarian countries.   This is also true between two countries which are closely related by the trade with each other.   But we should note that the trade between Taiwan and Korea had been negligible and that thelevel of industrialization is not much different.   Therefore some additional explanations are necessary.

This question is not answered easily, but the writer wants to present a preliminary assumption.   Figure 1 shows also the ratio of Korean cereal exports for Japan to Taiwanese. This informs us that the share of Korea increased until 1922 and tends to decrease afterwards. This turning point exists very near to the kinked points of Korean terms of trade.

This suggests us that the exports of rice for Japan occupy an important role in our study. When we investigate Korean export price of rice, we can find a significant rise in the 1910's. It is very probable that the absolute prices of Korean rice is lower than Japanese or Taiwanese rice at the beginning of Japanese rule of Korea. In such a situtaion, it is not surprising to find the upward trend of export prices as well as the quantities. On the other hand, the increase of Korean exports draw down the export prices of Taiwanese rices relatively to other commodities. Since rice and sugar are major commodities of Taiwanese exports, it is natural that this makes worse the terms of trade of Taiwan. Further, it is not causal that the growth rate of production of sugar canes is higher than that of rice in the 1910's.[5]

However, the improvements in the techniques of rice production in Taiwan broke this tendency. In the early 1920's, the productivity of Taiwanese rice had remarkably increased. This kept down the relative prices of rice in Japanese market and this explained the downward trend of Korean terms of trade. Why, then, Taiwanese terms of trade were improved in spite of the fall of relative price of rice? To this question, we should remember that Taiwanese exports are consisted of two kinds of commodities; i.e., rice and sugar. In this period, the exports price of sugar had increased and this had improved the terms of Taiwanese trade.

There are some papers to note that wholesale prices of sugar canes in Taiwan are determined by referring the incomes from rice production.[6] If so, the rise of productivity of rice production increases the income per hectare, and this affects possitively for price of sugar canes. In the other words, the rise of productivity of Taiwanese rice draw down Korean terms of trade through the fall of relative prices of rice in Japanese market but pulls up those of Taiwan through the rise of sugar price. We should also note that the rise of sugar price was possible because Taiwanese sugar was protected by tariff in Japanese market.

These results are also important to study the time-series changes of real agricultural wages. Regarding Taiwan, there are discussions about the trend of real wages. P.S. Ho showed that there is no upward trend on the agricultural wages deflated by the price indices of agricultural products. H. Chang, R.H. Myers and Y.M. Ho suggested, by the indirect data, that the standard of livings of Taiwanese farmers had risen under Japanese rule. The latter was supported by this writer's study which shows that the real wages calculated by using the consumer prices have an upward trend.[7] This contradiction can be, at least partially, by the facts mentioned above. The rise of standard of livings of Taiwanese farmers depends on the rise of rice production per units of labor imputs. Since the rise of rice prices had been relatively low, the consumer prices had moved slowly. This is why the real income deflated by consumer prices has an upward trend. But we should note that prices of sugar canes had pulled up in this period. Since the share of sugar canes in

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[5] Most of previous papers explain the increase of sugar cane's production in this period as the results of policies of the Government General. It is true that the Government General tries to expand the area not only by economic stimulus but also by the administrative guide. But the economic situation mentioned above may be more important than these factors.

[6] Generally speaking, the production of rice had been more profitable than those of sugar canes in pre-war Taiwan and Taiwanese farmers had a tendency to use their paddy field for rice production. Therefore in order to keep the supply of sugar canes for Japanese sugar factories in Taiwan, prices of sugar canes were decided highly enough to guarantee as much income as one expected by the rice prodcution. Such reports can be found in many academic researches as well as the documents by Japanese sugar companies. For example, see Shigetau Kawano, *Taiwanese Rice Economy* (Taiwan Beikoku Keizai Ron), Yuhikaku. 1941, (in Japanese).
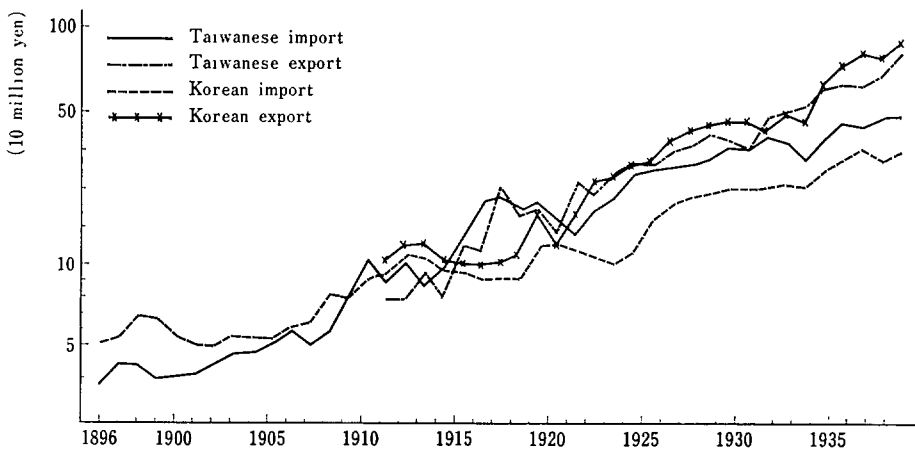
Taiwanese agricultural productions was high, it is not surprising that the wholesale price indices on agricultural products rose with higher speed than the consumer prices'.   There-fore, it is not curious that the results for real wages are different depending on the deflators adopted.   But it should be mentioned that this tendency was not supported by the phe-nomenon suggested in the theory of disguised unemployments but by the special situation in Taiwan under Japanese rule.

Regarding Korea, we suggested that the real wages of Korean farmers by using the consumer prices as deflators was pulled up at the beginning of Japanese rule but had been nearly constant afterward as is shown in Figure 1.[8]   This tendency is similar to Korean terms of trade.   In this sense, the explanation on the terms of trade could be directly ap-plied for changes of agricultural wages.

IV. Growth of Real Amounts of Trade

Now, let us proceed on the analysis of the level of real foreign trade in Taiwan and Korea.   Since our price indices are made not only for the total amounts of exports or im-ports but also for the subgroups defined in Table 2, we can calculate the growth rate of

FIG. 2.   TIME-SERIES CHANGES OF REAL EXPORTS AND IMPORTS IN
TAIWAN AND KOREA UNDER JAPANESE RULE

trade by their components.   Figure 2 shows the time-series changes of total real exports and imports in Taiwan and Korea.   When we calculate the "average" growth rate by fitting the formula

$$\log_e Z(t) = a + bt \qquad (1)$$

by the least squares method, where Z is exports or imports and t shows years, we can obtain the following figures:

Taiwan	exports 16.9%,	imports 14.9%,
Korea	exports 8.7%,	imports 8.2%.

The growth rate of trade is very high in Taiwan, and the rate of exports is higher than the

TABLE 5.   GROWTH RATE OF REAL TRADE IN 5 YEARS BY SUBGROUPS AND PERIODS

	Subgroup				
	I	II	III	IV	V
Taiwanese export					
1896—1900/1901—1905	9.21	△ 2.28	35.67	72.71	—
1901— 05/1906— 10	68.33	43.37	84.99	61.05	—
1906— 10/1911— 15	52.61	52.83	69.12	163.29	—
1911— 15/1916— 20	77.34	14.69	114.56	476.18	1031.32
1916— 20/1921— 25	48.75	△ 5.24	35.83	52.11	△ 30.76
1921— 25/1926— 30	50.14	55.64	17.37	△ 6.06	148.94
1926— 30/1931— 36	57.83	1.08	28.80	△ 19.95	19.58
Taiwanese import					
1896—1900/1901—1905	△ 5.58	△ 12.16	△ 11.03	72.22	—
1901— 05/1906— 10	9.46	17.47	59.57	132.90	174.39
1906— 10/1911— 15	97.47	32.98	45.71	18.25	69.59
1911— 15/1916— 20	28.33	△ 11.01	26.85	△ 39.14	115.67
1916— 20/1921— 25	15.35	24.66	1.37	27.28	4.35
1921— 25/1926— 30	39.65	86.65	66.70	57.16	119.99
1926— 30/1931— 35	△ 20.52	28.20	48.64	33.86	32.85
Korean export					
1911—1915/1916—1920	64.38	127.91	197.81	36.36	—
1916— 20/1921— 25	50.02	47.26	47.93	616.00	—
1921— 25/1926— 30	32.19	85.19	40.96	△ 17.24	150.81
1926— 30/1931— 35	38.61	95.16	74.09	68.84	261.25
Korean import					
1911—1915/1916—1920	2.56	5.42	25.20	△ 22.02	54.45
1916— 20/1921— 25	169.37	75.35	74.97	233.22	17.46
1921— 25/1926— 30	79.05	52.17	85.74	18.88	117.16
1926— 30/1931— 35	△ 9.43	31.17	65.02	28.13	49.64

Note: 1. Numbers of subgroups correspond to Table 2.
        2. 1901—05/1906—10 means the growth rate between the average from 1901 to 1905 and one from 1906 to 1910, and so on.

imports '. The latter is also true for nominal values. In the early period of Japanese rule, the imports including both consumption and investment goods surpassed the exports, but the increase of exports of sugar and rice upset this tendency in the 1920's. Korean rate is similar between exports and imports. Though both rates were very high at the beginning of Japanese rule, but slowed down afterward. In nominal values, Korean imports were larger than exports on the average under Japanese rule. This problem will be taken up again in Section (V).

The more interesting attempts may be to calculate the real growth rate of trade according to sub-groups. In Table 5, the growth rates in 5 years are shown for five subgroups. Regarding Taiwan, the most important group for exports is, of course, food's.

Though the growth rate of this subgroup is similar among periods except the first, its origins are different by periods. Before the mid 1910's the high growth rate had been supported mainly by the increase of rice exports though the exports of sugar had been also increasing in this period. In the period from the mid 1910's to the mid 1920's, the major cause of growth was the expansion of sugar exports. It is important to note that Korean export of rice grew remarkably in this period. After the mid 1920's, the export of Taiwanese rice has increased significantly. In the 1930's, the food exports other than rice and sugar cannot be neglected; i.e., the amounts of exports of banana and other kinds of fruits had risen in these years. Regarding Taiwanese exports other than food, it is enough to note the relatively important role of chemicals including alcohol, campher and Chinese medicals before the mid 1920's and the growth of export of timber in the 1930's.

Korean exports had been consisted of more various commodities than Taiwanese. Though the major commodities of exports is food including rice, its share in total exports had been decreasing under Japanese rule. Further, we can find the diversification of commodities regarding food exports. Before the mid 1920's, Korean export growth of food had been maintained by rice's, but the growth rate of rice exports had been decreasing afterwards. On the other hand, the exports of sea food rose significantly in the latter period. The materials for production had been also important commodities in Korean exports. Before the mid 1920's major commodities of this group were natural fiber. Especially the exports of silk were remarkable at the beginning of Japanese rule. In the latter period, the exports of mineral grew significantly. This is because Japanese companies had developed Korean minings with the supports of Japanese government. Since the trade statistics used here does not include the transfer of gold and gold mineral for Japan in the amounts of exports, the share or the growth rate for this group may be higher than those shown in Table 3 and Table 5.

Though the growth rate of the "other" consumption good is also high, we should use this figure with our causion, because there is the trade between Japan and Manchuria which uses Korean railways. The amounts of such trade are written in both accounts of Korean exports and imports. We cannot neglect this effects on Korean trade of clothings which are major commodities in this groups.[9] We need not give any comments on the final group's exports because the share had been small in both Taiwan and Korea.

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[9] There have been asserted that the increase of Korean imports of clothing in the latter period of Japanese rule should be considered as pretended figures caused by the trade between Japan and Manchuria. See for example, Korean Trader's Association, *Korean Trade History, op. cit..* Though this writer cannot support this without his reservation, he admits that such an effect is not negligible.

The compositon of imports is not so simple as exports in these two area. It is natural that the imports of consumption goods had grown steadily as the number of population and income increased. We should note two things for Korean imports. Since the mid 1910's the food imports had increased and this was consisted of miscellaneous cereals from Manchuria which was said to be consumed by Korean people as the substitute food for exported rice. In the latter period of Japanese rule, the Korean industries had developed and could supply some kinds of consumer goods. This is especially true for clothings and processed food. We should consider these two facts in our comparisons of trade between Taiwan and Korea.

When we investigate yearly figures which are not shown here in order to save our space, the real imports of construction materials showed cyclical variations around the upward trend in both Taiwan and Korea. It is very interesting that the cycles were reverse between Taiwan and Korea. The writer cannot judge whether this is causal or not, but we can safely say that the cycles were closely related to the railway construction and the other large scale plans conducted by the Government General. The imports of machines and equipments had also cyclical fluctuations, and this seems to be correlated to the general trade cycles in Japan. It is also important to note that the share of investment goods had been increasing in Taiwan and Korea under Japanese rule.

The final attempt in this section is to calculate a preliminary export and import function. Generally speaking, the simplest type of these functions can be written as follows:

$$M = F(Y_d, P_d/P_w) \qquad (2)$$
$$X = G(Y_w, P_d/P_w) \qquad (3)$$

where M and X show the real amounts of import and export, Y_d and P_d are real income and prices of the country and Y_w and P_w are those of other countries. However, we cannot expect to get reliable coefficients for price effects in our case because P_w is determined dominantly by Japanese prices which are similar to the price system of Korea or Taiwan. Therefore what we should do is to estimate the income elasticity. There have not been published the figures on Y_d regarding Taiwan or Korea, but we can obtain a proxy variable. Ishikawa calculated real production of agriculture in both Taiwan and Korea. Shinohara has shown the real amounts of Taiwanese industrial production. This writer has obtained a preliminary result on the real industrial production in Korea.[10] When we pool these figures together, we can obtain the real amounts of production for agriculture and industry including minings for Taiwan and Korea from 1912 to 1940. In

TABLE 6.   THE INCOME ELASTICITIES OF FOREIGN TRADE BY GROUPS

number of groups	Taiwan		Korea	
	export	import	export	import
I	2.393	1.829	0.893	2.751
II	0.617	3.988	2.220	2.873
III	1.030	2.860	1.827	3.965
IV	1.328	3.400	1.847	2.204
V			2.806	4.480
total	1.491	2.299	1.855	1.970

Note: Numbers of groups correspond to Table 2.

[10] Ishikawa's and Shinohara's estimates on Taiwan can be found in Chapter 1 and 2 of Miyohei Shinohara and Shigeru Ishikawa (ed.) Economics Growth of Taiwan (Taiwan no Keizai Seicho), Institute of Developing Economics, 1971 (in Japanese). This writer express his gratitude for the permission of Shigeru Ishikawa to use his work sheet on the estimates of Korean agricultural production. Regarding the Korean industrial production, see T. Mizoguchi, "Estimate of Korean Industrial Production, 1912-1940", (Senzenki Chosen no Kokogyo Shisu), Keizai Kenkyu, Vol. 24, No. 4, 1973 (in Japanese).

order to keep comparability, we use the real production of agriculture and industry of Japan as the proxy variable for Y_w.[11] The results are shown in Table 6. The elasticity of Y_d is relatively high when we remember that it is about 1.5 in pre-war Japan though the concept of Y_d is different from our analysis. Though the elasticity is calculated for each sub-group, the detailed study will be done in the future, because it closely related to the investment analysis which is now proceeding by the writer.

V. *Balance of Payments*

In some previous papers discussing the colonialism of Japanese Empire, there are some studies on the balance of trade of Taiwan and Korea with Japan because this can be considered one of the indicators of Japanese exploitations from her colony. As mentioned earlier, Taiwanese exports had been larger than her imports after the 1910's. The accumulated claim of Taiwan is shown in Figure 3. Note that the logarithmic scale is adopted for figures after 1915 though the usual scale is used for those before 1915. This amount is very large because the value in 1938 per a Taiwanese people is about 290 yen which is nearly equal to one year's income of Taiwanese farmers. On the other hand, Korean

FIG. 3.   ACCUMULATED CLAIM IN THE INTERNATIONAL TRADE OF TAIWAN

(10 milion yen)
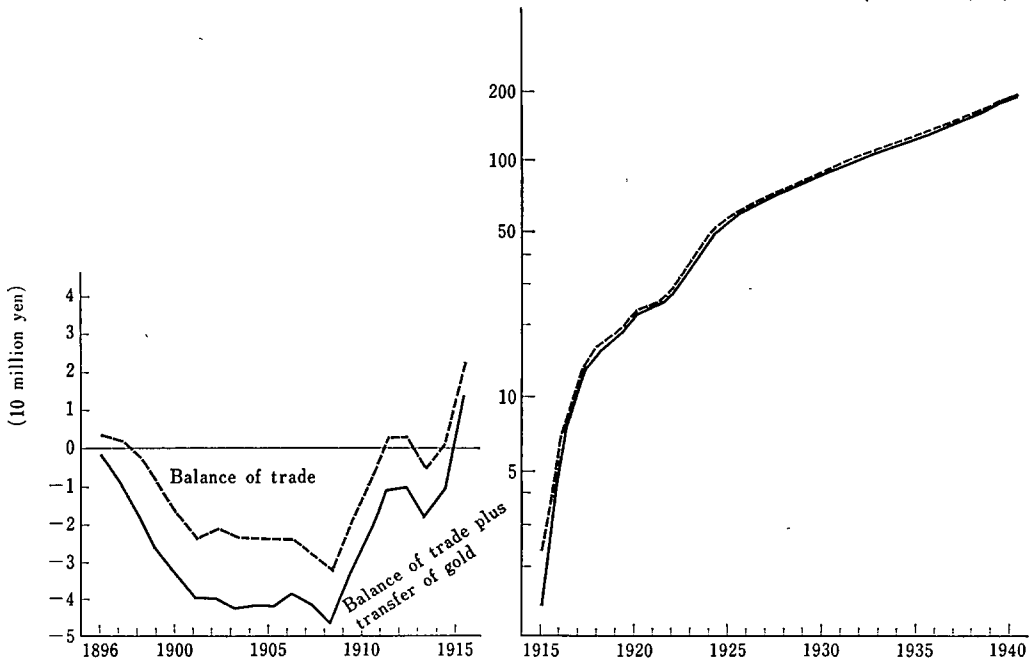
[11] Japanese data are taken from *Estimate of Long Term Economic Statistics of Japan Since* 1868 edited by Kazushi Ohkawa, Miyohei Shiohara and Mataji Umemura. Since the exports of Taiwan had been dominated by the trade with Japan, there are not too many problems in our approximation. Regarding Korea, we cannot neglect the trade with the Northern part of China, but we cannot ger reliable data to be used for the estimate of Y_w.

balance of trade had been deficit in most of years under Japanese rule. The accumulated liabilities are shown in Figure 4 using the logarithmic scale. This is very contrasting with the case of Taiwan. However, we should note that there are discussions represented by Kim.[12] He pointed out that Korean liabilities were not too large if he restricted his study on Korea-Japan trade and that they should be canceled out by the transfer of gold for Japan. This presentation should be remembered in the evaluation of Japanese colonial policies, but this is too restrictive for the Korean economic study.

FIG. 4.   ACCUMULATED LIABILITIES IN THE INTERNATIONAL TRADE OF KOREA

(10 milion yen)
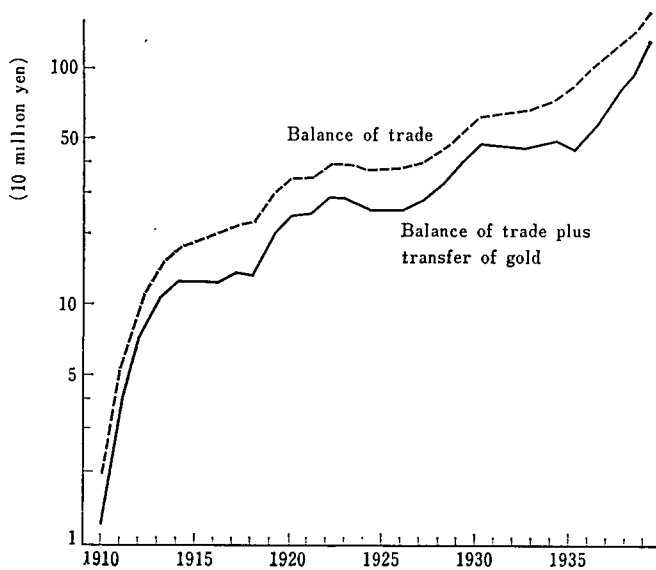
The more important approach may be to make the table of international payments of Taiwan and Korea under Japanese rule. In the period, Taiwan and Korea have their central banks which have authorities to publish bank notes and to conduct foreign exchanges. Therefore, we can get some information on the payments of invisible trade. There have been published two estimates on the international payments of Taiwan which can be converted approximately to the IMF style table. The first was done officially by the Government General of Taiwan and this informed us the values from 1921 to 1939. The estimates were extended to the period from 1900 to 1920 and from 1940 to 1944 by the unofficial publication by the Ministry of Finance of the Government of Japan, though the latter was less reliable than the first.[13] According to these estimate, the balance of invisible

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[12] Tetsu Kim, *Population and Economics in the Republic of Korea*, (Kankoku no Jinko to Keizai), Iwanami Shoten, 1965 (in Japanese).

[13] Government General of Taiwan, *Statistics of Commerce and Industry in Taiwan* (Taiwan Shoko Tokei) annual since 1926. Ministry of Finance, *Research on Activities of Japanese in Abroad* (Nihonjin no Kaigai Katsudo ni Kansuru Chosa), (unofficial publications), 1949 (both in Japanese).

trade including transfer of long term capital and remittance had shown negative figures, but their absolute amounts were much smaller than the positive values in the balance of trade. Though there remain unfilled items when we remember the IMF standard system, it is sure that Taiwan was in the position of a credit nation. However, these credits could not be collected because these were guaranteed mainly by the bank notes of the Bank of Japan and Japanese national loan bonds. These should be remembered when we use the trade statistics in the evaluation of Japanese rule.

Regarding Korea, we have also some contributions in these area before the war. But recent study by Yuzo Yamamoto is mostly comprehensive.[14] He estimates Korean international payments under Japanese rule depending on the IMF standard systems. He succeeded in making tables for the invisible trade with Japan, but he had not made them up for other countries than Japan because of the lack of data. However, major trades have covered by his study. According to his calculations, the deficits in trade were filled mainly by the transfer from Japanese Government to the Government General of Korea before the 1920's and the flow of long term capital from Japan canceled out the deficits afterward. In this sense the structure of international payments of Korea had changed remarkable after 1930.

VI. *Final Remark*

Discussions in this paper concern three topics regarding Taiwanese and Korean foreign trade statistics. However, the analysis of foreign trade should be done from the broader sight. For instance, the relation between trade and investments is one of the interesting topics. But statistics of Taiwan and Korea have not arranged systematically. In this sense, the paper is on very preliminary stage and should be reivsed when the other kinds of data are obtained.

Appendix

In this appendix, we shall explain, in brief, the method of calculations of the price indices of foreign trade in Taiwan and Korea under Japanese rule. Basic information can be obtained from *Yearbook of Taiwanese Foreign Trade* and *Yearbook of Korean Foreign Trade*. Since these data classify figures depending on the system adopted in the foreign trade statistics of Japan before the Second World War, it is convenient to make price indices by referring these classifications. In our work, we firstly to define our indices depending on this system, and then to reclassify them for our system defined in Table 2.

Price data are taken in principle from the average prices which can be obtained by dividing the monetary amounts of trade by quantities. This can be applied for relatively homogeneous groups such as rice, sugar, oil and iron bars. But there are commodities' groups of which quantities are not shown in *Yearbooks*. Generally speaking, the information on quantities is more abundant in Korean data than Taiwanese. Further, even

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[14] Yuzo Yamamoto, "Balance of International Payments of Korea and Taiwan under Japanese Rule" (Shokuminchika Chosen, Taiwan no Kokusai Shushi—Chosen—) *Jimmom Gakuho*, No. 35, 1972 (in Japanese). The review of previous papers on Korea can be found in this paper. He is now intending to extend his works. on Taiwan. In such case, some parts of this section should be revised.

TABLE A. 1.   NUMBER OF PRICE SERIES IN TAIWANESE AND KOREAN PRICE INDICES OF FOREIGN TRADE

Period		Number of Price Series	
		Import	Export
I	1896—1900	19	10
II	1900— 10	28	17
III	1910— 20	45	26
IV	1920— 30	50	30
V	1930— 38	51	31
I	1911—1915	28	103
II	1915— 25	47	115
III	1925— 38	89	189

if we can find data on quantities, we can not use it if the group is composed of heterogeneous qualities.   In these cases, we use the other kinds of information.   For export prices, Taiwanese or Korean wholesale prices of the representative commodity of the group are important data.   We also use the wholesale prices of representative commodity in Japan or Machuria for Taiwanese or Korean import.   Though we tried to increase the number of price series as large as we could, the number is not necessarily sufficient, as is shown in Table A.1.   There should be improved in the future.

In making price indices, Laspyres type formula is adopted.   However, the composition of trade had varied violently under Japanese rule, we could not use the single weight system.   To avoid this difficulties, we divided the period of our concerns as was shown in Table A.1 and then linked them afterward.   In the calculation of weights of price indices within subgroups, we adopted the "gross weight approach"; i.e., we distribute the amounts of trade of commodities of which prices are unknown into other commodities' by considering their nature.   The sub-group indices are aggregated to total indices by using the amounts of trade by subgroups as their weights.   This means that the weight of each commodity is adjusted by considering the *coverage* of subgroup indices.   The system of weights and individual price indices are shown in

Statistical Section, Institute of Economic Research, Hitotsubashi University, *Price Statistics on Taiwan and Korea under Japanese Rule* (1) (Senzen Taiwan Chosen no Bukka Shiryo (1)), 1972, (in Japanese; mimeographed).

However, the system of this classification is very inconvenient for our study as is mentioned in the main sentence.   We then reclassify this system into one shown in Table 2.   In this reclassification, the adjusted weight by commodities is used to make subgroup indices.   The results are shown in Table A.2.

TABLE A. 2.   TAIWANESE AND KOREAN PRICE INDICES OF FOREIGN TRADE BY FIVE MAJOR SUB-GROUPS

(A)   TAIWAN

NG	Import					Export			
	I	II	III	IV	V	I	II	III	IV
1896	36.90	37.36	37.76	46.23	—	62.30	23.75	37.04	39.23
1897	37.51	40.04	24.33	49.39	—	67.80	48.85	45.83	41.90
1898	37.53	41.66	27.03	54.21	—	79.83	91.47	50.22	46.00
1899	40.06	46.32	29.36	54.88	—	79.90	73.26	55.77	46.57
1900	49.04	47.11	46.44	60.38	63.17	78.67	73.29	56.11	51.23
1901	48.31	59.89	40.81	62.10	60.73	76.12	88.44	54.74	52.70
1902	40.45	60.39	33.04	57.04	59.35	102.35	87.38	52.46	48.40
1903	40.29	62.11	36.41	58.57	59.51	87.38	88.42	51.24	49.70

1904	41.63	63.53	40.64	60.97	64.56	99.54	83.67	52.20	51.74
1905	48.10	67.87	43.56	63.33	68.95	95.47	84.97	56.23	53.74
1906	52.91	74.00	41.04	64.47	69.84	94.53	93.60	62.15	54.70
1907	54.30	108.36	42.38	72.09	74.71	108.01	106.54	64.39	61.17
1908	47.63	71.90	43.14	72.35	65.69	121.70	98.62	57.15	61.39
1909	55.05	71.22	44.20	67.09	60.66	134.19	62.68	53.14	56.93
1910	58.57	66.92	56.30	67.86	62.20	110.66	75.24	55.80	57.58
1911	61.79	72.39	60.50	66.76	61.71	108.23	72.67	121.15	56.65
1912	54.70	71.91	61.01	65.64	70.81	120.41	71.96	112.35	55.69
1913	54.66	73.14	61.97	69.40	68.54	130.66	71.24	114.00	58.89
1914	55.66	70.11	56.88	66.23	65.69	113.92	73.44	115.23	56.20
1915	56.84	68.63	59.18	73.01	81.79	109.24	70.76	113.72	61.96
1916	60.21	85.00	78.57	107.66	104.22	111.02	70.86	119.58	91.35
1917	68.13	111.53	97.57	171.29	140.16	127.66	75.54	157.00	145.35
1918	82.93	146.25	117.72	195.34	152.84	144.89	99.68	200.34	165.76
1919	101.77	193.48 ·	151.23	153.41	123.90	183.83	129.23	223.79	130.18
1920	113.34	198.08	173.48	179.59	143.84	265.46	224.08	191.04	126.91
1921	92.37	137.91	129.88	154.45	133.28	164.03	138.01	129.79	144.44
1922	97.73	136.96	126.26	125.32	125.15	133.98	105.72	109.47	153.43
1923	94.49	134.38	120.10	124.31	116.05	152.85	110.70	96.87	125.09
1924	96.26	145.75	133.63	134.78	125.89	156.22	110.52	106.15	122.12
1925	196.97	160.27	137.54	139.53	105.52	151.36	109.71	104.48	128.49
1926	87.48	138.82	124.85	113.77	101.23	138.76	109.13	108.94	129.20
1927	84.78	118.26	112.40	114.71	101.14	134.98	91.65	99.80	124.60
1928	83.15	116.33	110.35	121.23	100.39	127.42	87.54	93.08	121.34
1929	86.95	112.39	109.29	115.66	102.27	122.35	91.06	87.82	122.46
1930	77.57	88.51	90.47	96.71	90.63	113.16	83.96	75.45	118.68
1931	70.35	84.00	71.54	74.47	81.75	90.88	64.80	67.69	99.41
1932	80.13	88.81	79.66	76.90	88.69	83.71	68.04	70.88	98.60
1933	84.33	102.35	90.15	96.31	98.35	80.29	74.11	76.65	99.86
1934	85.11	100.78	90.93	97.00	102.16	89.45	88.23	88.49	95.96
1935	103.24	99.91	104.34	102.44	99.59	102.26	89.83	101.32	96.31
1936	111.65	99.31	104.73	100.56	98.25	108.29	121.94	110.20	107.73
1937	117.27	105.50	118.12	151.00	125.65	109.86	116.26	104.59	131.38
1938	119.37	114.50	133.82	159.05	138.68	112.46	135.75	121.79	163.31

(B) KOREA

NG	Import					Export			
	I	II	III	IV	V	I	II	III	IV
1911	50.11	52.29	61.46	55.00	55.67	21.31	39.93	63.11	49.95
1912	52.86	56.14	62.65	53.24	63.89	26.43	48.14	65.48	46.30
1913	57.12	60.83	64.25	56.78	61.84	31.31	59.71	58.08	41.01
1914	74.74	60.54	61.06	56.94	59.27	49.77	48.12	50.95	43.24
1915	72.02	55.72	59.52	68.15	73.35	39.39	52.98	57.97	40.80
1916	82.92	69.51	79.20	98.38	94.04	48.03	67.97	58.80	40.98
1917	97.06	93.82	104.13	145.49	126.47	61.60	96.02	94.09	52.31
1918	133.93	129.72	148.04	208.75	137.90	94.34	126.03	111.41	88.19
1919	145.89	166.65	188.59	177.72	111.79	133.83	155.10	131.47	133.40
1920	212.66	178.36	211.20	179.39	117.29	138.52	176.32	152.71	142.85
1921	142.18	126.28	138.91	131.96	105.63	96.43	88.34	125.40	102.98
1922	97.79	116.19	132.04	116.76	100.93	110.42	112.26	134.06	109.49
1923	99.10	112.09	139.79	119.79	103.43	105.36	139.16	135.59	111.16
1924	106.37	127.20	146.54	128.66	101.52	128.95	161.32	138.42	112.83
1925	122.31	126.80	164.45	126.50	105.77	135.06	163.58	141.13	131.83
1926	109.77	113.03	144.88	120.00	103.62	124.61	152.80	131.54	130.53
1927	98.25	107.93	130.47	112.23	107.75	113.22	138.49	124.55	118.89
1928	104.33	106.32	126.71	112.42	110.94	104.49	129.61	117.69	114.45

1929	106.63	104.77	117.78	109.19	108.02	103.31	121.81	113.70	114.45
1930	94.43	88.30	102.45	101.83	97.89	86.53	107.84	98.78	107.21
1931	70.26	78.26	78.66	80.39	86.20	63.36	80.45	76.45	81.96
1932	80.01	82.73	87.58	83.01	90.14	75.41	84.47	80.05	81.29
1933	88.49	117.92	101.42	102.01	100.10	79.97	96.35	88.70	91.81
1934	85.20	96.89	98.34	99.10	102.52	88.13	95.65	90.07	96.64
1935	106.02	99.01	100.38	100.70	98.95	102.63	97.73	100.03	99.03
1936	108.78	104.10	101.28	100.20	98.53	109.24	106.62	109.90	104.33
1937	118.49	128.75	106.39	118.86	152.13	113.73	109.90	113.61	121.53
1938	129.62	136.96	115.35	141.02	140.76	118.55	118.99	125.50	135.58

Note: NG (Numbers of Groups) corresponds to Table 2.