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ECONOMIC GROWTH OF KOREA UNDER
THE JAPANESE OCCUPATION
— BACKGROUND OF INDUSTRIALIZATION OF KOREA†
1911—1940 —

By TOSHIYUKI MIZOGUCHI*

Introduction

This paper aims to show the trend of industrialization of Korea under Japanese occupation and to present a preliminary hypothesis to explain it. This attempt would be meaningful, at least, for two different kinds of studies. The first is to supply the information of basic situation of industrialization for the development after the Liberation of Korea. Many economists are now interested in the recent industrial development in Korea. In order to evaluate the development, we need to remember the level of industry under Japanese occupation as the initial condition of the post-war Korean economic development. Of course, there are many problems to judge whether or not we could relate the pre-war situation of industry with the industrial development after the Liberation. No doubt, most of industries in Korea were occupied by Japanese before 1945. The Korean War destroyed most of equipments which were left in Korea in 1945. Since the Korean people engaged mainly in unskilled works, they could hardly get the job treating under Japanese rule. In this sense, general arguments seem to stress that the Korean industrial development can be treated without respect to the industrialization under Japanese occupation. This may be probably true but we need to examine in detail to get the final conclusion because, generally speaking, the economic development usually depends on the past condition. The work in this paper would supply some numerical information for this question although we must supplement them with historical evidences to get our firm conclusions.

The second aspect seems to be more important than the first. The Japan Empire occupied two area under her control before 1945: Taiwan and Korea. However, there existed some differences in her policies between Taiwan and Korea. One of them was the policy for industrialization. While the Taiwanese industry was restricted only for food industry, various kinds of industries were setted in Korea. This rose two kinds of questions. The first is why the industries were developed by Japanese rulers in Korea. The second is what impacts were found in Korea by the policy.

In order to answer these problems we must examine them from historical and economical approaches. These would request the interdisciplinary cooperation and the time expensive

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† This paper was originally written as a report for the Multi-Disciplinary Conference on the Korean Industrialization in University of Hawaii in May, 1977. The revision of the draft was done as one of works of Joint Project on the Quantitative Economic Historical Analysis of the "Japan Empire" (Chairman, Professor Mataji Umemura) sponsored by the Ministry of Education, [A-341006].

research. To promote such an attempt is beyond the writer's ability. What he is intending here is to supply the statistical data for these studies and to present assumptions which he could arrive only by investigating statistical figures.

The statistics used here are taken from this writer's study as well as other Japanese researchers. This writer tried to estimate the GDE indicators for Taiwan and Korea under Japanese rule.¹ The original purpose of this work is to make clear the economic activities of Japan Empire before 1945 as a whole by combining the estimate of GDE for Japan by Ohkawa's project.² Therefore, the writer's estimates would be incomplete when some want to study the problem of colonial policies. For instance, although he estimated the capital formation depending on the GDE concepts, he did not divide the figures into those for Japanese and Korean firms. However, within such a restriction, we can discuss some kinds of problems. His estimate includes the industrial production index for Korea which can be used for our purpose. The other kinds of data he used are as follows:

Shigeru Ishikawa's estimates on agricultural production in Korea and Taiwan,
Miyohai Shinohara's estimates on the industrial production in Taiwan,
Konosuke Odaka's estimates on employments and wages in Taiwan and Korea.³

This paper is composed of five sections. After describing the general economic level by using the GDE indicator as well as the production indices of agriculture and manufacturing industries, we shall examine the economic changes by the composition of GDE, private and government consumptions, capital formation and foreign trade. The role of foreign trade will be examined intensively, because this writer believes that this could explain the different type of economic growth between Taiwan and Korea under Japanese occupation. Based on this study we shall examine the industrialization in Korea and Taiwan, and analyze its impact on the Korean economy including the employment and wages.

I *General Feature of Economic Growth in Korea and Taiwan*

It is said that the economic growth of Japan was remarkable before the Second World War in the international standard. According to the estimate by Ohkawa's project, the growth rate of the real GDP or the real GDE was above 3% on average in this period. The rate was nearly equal to the one of the U.S. and Sweden and higher than other developed countries'.⁴ Therefore it is interesting to compare the growth rate of GDE of Korea and Taiwan to the Japanese.

Since we have no estimates covering relatively long period, we are forced to use the preliminary GDE indicator of this writer. This writer calls the estimate as the "GDE indicator" not as the GDE estimate. This is because the data is preliminary in the following sense:

- (1) our GDE indicator does not cover the invisible trade as well as the changes in

¹ Mizoguchi (1975).

² Ohkawa-Takamatsu-Yamamoto (1974).

³ Ishikawa (1972), (1973), Odaka (1969), (1971), (1973) and Shinohara (1972). There are some contributions to the historical statistics on Taiwan and Korea. T.H. Lee approached the Taiwanese economy from production side and estimated the GDP (T.H. Lee (1971). See also Ho (1978)). Y.K. Lee tried to estimate the GDP for Korea and the approach was succeeded by Suh (Y.K. Lee (1971) and Suh (1974)). Ban examined in detail the agricultural statistics (Ban (1979)). The comparison of these estimates with ours is now proceeding as a part of joint project mentioned in†, so let us use preliminarily our own estimates in this paper.

⁴ See Kuznets (1968).

- stocks,
- (2) there remains area to be revised regarding private consumption expenditure figures by use of the commodity flow method, and
 - (3) it is said the coverage of statistics had been gradually increased in the early period of Japanese occupation, so some revisions will be necessary to obtain the reliable figures.⁵

However, this writer believes that the indicator could be used, at least, to show a broad trend of the economic development in this area. If his view could be accepted, we can calculate the growth rate of real GDE as follows.⁶ According to these figures, the growth

TABLE 1. GROWTH RATE OF REAL GDE

Period	Korea	Taiwan	Japan
1903—1938	%	3.21%	3.24%
1911—1938	3.57	3.80	3.36
1903—1912		2.73	2.27
1908—1917		3.16	3.09
1913—1922	8.74	6.67	5.21
1918—1927	2.73	5.09	1.50
1923—1932	0.70	3.55	2.35
1928—1937	2.98	1.21	4.70

Source: Mizoguchi (1975) for Taiwan and Korea and Ohkawa (1974) for Japan.

rate of real GDE in Taiwan and Korea exceeded that of Japan between 1911 and 1938. To make clear the process of the economic development, two additional kinds of works will be required: (1) an examination of the over time changes of growth rate of real GDE and (2) the decomposition of GDE into its components. Regarding the first kind, we calculated the annual rate over ten years for six divisions of period. Note that these succeeding divisions overlap with each other. The growth rate was relatively low in both Japan and Taiwan before 1917. The high rate of growth can be investigated in the period of 1913–22 in all area. Especially, the Korean growth rate was very remarkable. One of the reasons may be the overestimates of the rate caused by the changes of coverages of surveys as was mentioned earlier, but the rate was too high to be explained only this factor. The 1920's could be considered to be a stagnant period in Japan and Korea, however, it is interesting that the Taiwanese economy had kept its steady growth. The reverse tendency could be investigated in the period of 1928–37. One of the purposes of this paper is to explain these differences and to relate it to the industrialization of Korea under the Japanese occupation.

Regarding the approaches by the GDE components, we can consider two kinds of methods: *i.e.*, from the production and from the expenditure. It is convenient for us to start from the latter because we estimate the GDE indicator from the expenditure side as is shown in Table 2. Because the growth rate of total GDE can be approximated by the weighted average of the growth rate of each component by using the percentage as its weight,

⁵ It is probable that as the organization of administration settled in local area the coverage of statistics enlarged. Such a trend would be remarkable in the early period of the Japanese occupation. The margin of errors caused by this situation should be examined as the future studies.

⁶ The growth rate of variable $X(t)$ is estimated by applying the least squares regression of time t for the formula, $\log_e X(t) = a + bt$.

these two kinds of indicators can show the degree of contribution of each component for the economic development. Judging from the percentages, the private consumption is, of course, the most important factor, but the growth rate is the lowest among these components.

TABLE 2. GROWTH RATE OF GDP IN 1911-38 AND COMPOSITION OF GDP IN 1935
(percent)

	Growth Rate			Composition		
	Japan	Taiwan	Korea	Japan	Taiwan	Korea
Private Consumption	2.8	3.2	3.1	64.5	64.1	85.7
Government Consumption	5.1	4.1	6.5	15.7	5.6	7.3
Capital Formation						
Construction	3.1	6.7	5.8	19.1	9.3	6.4
Producer's Equipments	2.8	6.4	9.0		2.1	2.8
Exports	6.7	6.5	10.6	25.3	40.5	22.5
Imports (minus)	5.8	4.9	8.4	-24.2	-22.0	-24.7
Total GNP	3.3	3.8	3.6	100.0	100.0	100.0

Source: Mizoguchi (1975).

The export was the leading role in the economic development of Taiwan and Korea under the Japanese occupation. Especially, the Korean rate was surprisingly high in the international standard before 1940. While the Taiwanese rate was lower than the Korean, the contribution to the GDE growth was high because the export-GDE rate had been very high. We cannot neglect the role of capital formation in Taiwan and Korea in considering the economic development. In Taiwan, the construction investments occupied relatively large portion of the GDE and its growth rate was also high. The Korean growth rate was high in the investments on producer's equipments. This is especially true in the late period of the Japanese occupation and can be related to the industrialization of Korea in this period.

Turning to the production side, the growth rate of agricultural production was low in Japan and Korea, especially, this was true in the period of 1918-32. In contrast to these, the Taiwanese agriculture seemed to have been developing in overall period under the Japanese occupation. The development of manufacturing industry was remarkable in Japan, Taiwan and Korea. The growth rate was surprisingly high in Korea in the period of 1928-37. However since amounts of agricultural production were relatively large in the GDP,

TABLE 3. GROWTH RATE OF AGRICULTURE AND INDUSTRY PRODUCTION

	Agriculture			Industry		
	Japan	Taiwan	Korea	Japan	Taiwan	Korea
1903-12	0.9	1.5				
1908-17	2.7	2.0				
1913-22	0.4	1.8	2.4	5.4	4.2	6.1
1918-27	-0.0	4.3	-0.9	3.1	6.9	6.2
1923-32	1.2	4.2	1.4	7.1	7.0	4.4
1928-37	0.7	3.5	3.7	2.8	4.6	12.2
1911-38	0.6	3.4	1.9			
1914-38				5.6	5.3	6.7

Source: Ishikawa (1973), Shinohara-Ishikawa (1968) and Mizoguchi (1975).

we can safely say that the economic development in Taiwan had been supported by the agricultural production. However, the Korean economy had been stagnant because of the slow rate of growth of agricultural production.

II *Impacts of Foreign Trade on Economic Growth*

In Section I, we suggested that the increases of exports were one of the important factors in the development of Korean and Taiwanese economy under the Japanese occupation. Two kinds of remarks should be written here regarding the nature of trade statistics. First, we treat these area as independent countries, so the trade with Japan as well as that between them is defined as a part of foreign trade. Second, the trade between Japan and China is included in the Korean trade when the Korean railway is used for the transportation.

In Table 4, the growth rate of foreign trade is shown according to the periods. It is interesting that there were some differences in the growth rates by these periods and that the pattern of overtime changes was quite different between Korea and Taiwan. This is especially true for their exports. While the growth rate was high in Taiwan until 1908-17,

TABLE 4. GROWTH RATE OF FOREIGN TRADE IN KOREA AND TAIWAN
(% in 1934-36 Prices)

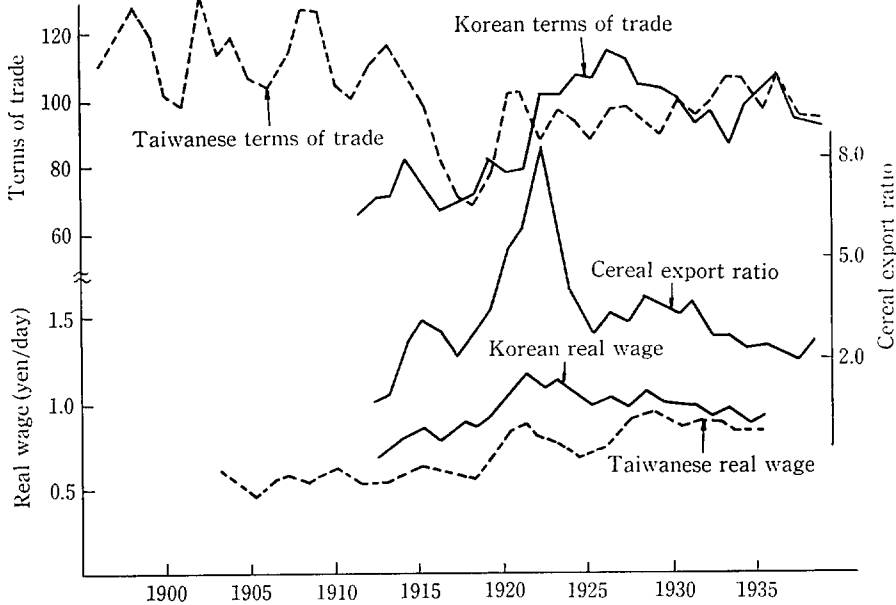
	Export		Import	
	Taiwan	Korea	Taiwan	Korea
1903-12	12.2		9.3	
1908-17	11.8		2.6	
1913-22	4.6	26.2	1.9	7.2
1918-27	6.7	7.3	6.7	14.4
1923-32	5.6	2.7	8.0	7.7
1928-37	4.4	6.3	6.1	5.5

Source: Mizoguchi (1975).

it decayed in 1913-22 when Korean export rose remarkably. In the 1920's, the Korean rate was low in contrast to the steady growth of Taiwanese export. This could be related to the competitive situation in the rice market of Japan. It is well known that rice had been one of major export commodities for Taiwan and Korea. In the 1910's when the Korean rice export rose, the Taiwanese rice export declined sharply and the sugar export rose afterwards. However, the rice export revived in the 1920's in Taiwan owing to the rise of productivities caused by the improvement of rice production techniques. On the other hand, the rice export declined in Korea in this period and such a situation continued until the end of the Japanese occupation. While the Korean export rose in the 1930's, this had been supported by that of nonagricultural products: when we investigate the share of exports, we find a rise of 'raw material for production' and a decline of agricultural products in the 1930's. In contrast to these, the Taiwanese exports had been occupied mainly by agricultural products, *i.e.*, sugar and rice. The effects of industrialization of Korea can be investigated in the import composition: the percentage of 'machinary and equipments' is larger in Korea than in Taiwan, and rose significantly in the late 1930's in Korea.

In the analysis on the over time changes of foreign trade, it is very interesting to study the terms of trade—the ratio of export prices to import prices—in Taiwan and Korea, which are shown in Figure 1. The Taiwanese indices declined in the early period of Japanese

FIG. 1 TERMS OF TRADE, CEREAL RATIO AND REAL AGRICULTURAL WAGES
IN TAIWAN AND KOREA UNDER JAPANESE RULE



Source: Mizoguchi (1975).

occupation then turned to rise. The Korean indices rose from 1910 to 1927 and then declined afterwards. We can find a reverse trend in the Taiwanese indices if we could exclude the period of 1923–27. Generally speaking, it is not surprising to find reverse trends between two countries. For instance, it is natural that the indices move inversely between developed and less developed countries. This is also true between two countries which are interdependent with each other through the foreign trade. But the trade between Taiwan and Korea had been inactive, and the level of industrialization was not much different between them.

The figure includes so called the cereal export ratio which is defined as the ratio of Korean cereal export to Japan to that of Taiwanese. This informs us that the share of Korean cereal export increased until 1922 and declined afterwards. This turning point was near the peak of Korean terms of trade and this suggests us that the role of rice export was very important to explain the changes of terms of trade of Taiwan and Korea. When we investigate the rice export prices a remarkable rise can be found in Korea in the 1910's. Since the Korean rice price was lower than Japanese or Taiwanese in the early 1910's; the export of rice rose significantly and the terms of trade were improved. On the other hand, the growth of Korean rice export reduced the relative export price of Taiwanese rice and worsened the Taiwanese terms of trade in this period.

However, this tendency was broken by the rise of productivity of Taiwanese agriculture through the introduction of new variety. The increase of investments for Taiwanese agriculture was also effective to raise the productivity. Owing to the increase of Taiwanese rice export to Japan, the relative price of rice declined and as the result, the Korean terms of trade made worse. This was one of reasons why Korean agriculture had not developed under the Japanese occupation even though Korea got a relatively large export market. Why then the Taiwanese terms of trade were improved regardless of the decline of relative rice price? It should be noted that Taiwanese agriculture had two major commodities: rice and sugar canes. There were some descriptions to note that the wholesale price of sugar canes was decided in such a manner as to assume the income of sugar cane producer equal to the rice producer's.⁷ Owing to the low rice price in the 1910's, it was relatively easy to spread the sugar cane's field. However, because of the rise of rice productivity, the rice producer's income rose in spite of the decline of rice price. This pulled up the relative price of sugar cane. In the other words while, the rise of productivity of Taiwanese rice damaged the Korean agriculture and worsened the Korean terms of trade, it developed Taiwanese agriculture and improved the terms of trade through the rise of relative price of sugar canes. This may be closely related to the industrialization problem of Korea and Taiwan as will be discussed in the latter section of this paper.

These results can explain the over time changes of real wages of agricultural workers. As is shown in Figure 1, the real wage of agricultural workers rose in the 1920's in Taiwan and this had its origin in the increase of rice productivity as well as the up of relative price of sugar cane. In contrast to this, the Korean real wage declined after the early 1920's and would be explained by the down of rice relative price.

Finally, a comment should be added here about the trade balance of Taiwan and Korea because this is closely related to the finance of capital formation. Although the Taiwanese foreign trade had deficits before 1900, it turned to have large surplus afterwards. The accumulated claim for foreign trade exceeded 1 billion yen in the middle 1930's. In contrast to this, the Korean foreign trade had deficits in most of years under the Japanese occupation, and its accumulated liabilities amounted to 1 billion yen in the late 1930's.

III *Capital Formation*

In Section I we pointed out that the capital formation was one of the important engines to accelerate the economic growth of Korea and Taiwan under the Japanese occupation. Therefore, we shall examine here the level of capital formation and its composition regarding these area. This is also important to consider the industrialization problem. According to the national accounts, the capital formation consists of the following categories: (1) construction, (2) machinery and equipments, (3) apparatus and furniture, (4) large livestock and pernnia plantings and (5) increase of stocks. We tried to estimate these categories by the commodity flow method, and obtained figures for (1) and the sum of (2) and (3).

⁷ Generally speaking, the production of rice had been more profitable than sugar cane production. Therefore, Taiwanese farmers wanted to use their paddy field for rice production. In order to keep the supply of sugar canes for suger industry, the price of sugar canes was decided in such a level to guarantee as much income as one expected from the rice production.

Because amounts of category (4) were generally small, we can neglect them for a broad study. The amounts of category (5) would be too large to be neglected and about 10% of total capital formation, but the estimation involves very difficult treatments which require various kinds of information. Therefore, our discussions are forced to be restricted only for the categories from (1) to (3). (In order to simplify the description we shall call the sum of (2) and (3) as the investments for equipments in the following discussion). Regarding our commodity flow estimate, one remark should be added here. According to the experience of Japanese estimates, the application of commodity method tended to underestimate the residual construction regarding the historical statistics.⁸ However, we had no reliable data to correct this bias unlike the case of Japanese estimates.

In Table 5, a comparison was made for the growth rate of capital formation by period. Total amounts of investments are also shown in the table. The Korean amount of total construction investments was nearly equal to the Taiwanese for the period of 1911–38. However we should note that the relatively large scale investments were done in Taiwan before 1910. Further since the construction investments had a close relation to the welfare of people, we should compare them in per capita bases. The result shows that the Taiwanese construction investments exceeded the Japanese level and were about four times of the Korean. Since our estimates depended on the commodity flow method, we could not know what kinds of construction had been made. However, judging from various kinds of descriptions as well as the composition government budgets, the most dominant factor to explain these differences would be the construction for agricultural production: the famous construction was the dam for irrigation called Kanan-Taishu, in the late 1920's. Although we need to admit that these construction had been done with imperfect agreement of Taiwanese farmers as was criticized by some scholars, it is also true that these investments

TABLE 5. GROWTH RATE OF CAPITAL FORMATION AND TOTAL INVESTMENTS
(1934–36 Prices)

	Construction			Equipments		
	Japan	Taiwan	Korea	Japan	Taiwan	Korea
Growth Rate	(%)					
1903–12	6.9	14.5		11.0	23.2	
1908–17	3.6	2.8		9.6	–17.2	
1913–22	6.1	11.3	2.3	12.0	15.2	14.4
1918–27	4.9	4.9	3.4	–13.9	5.3	1.8
1923–32	1.2	7.5	11.3	–0.4	9.0	6.0
1928–37	3.5	7.4	7.6	12.1	6.3	11.6
1911–38	3.1	6.6	5.7	2.8	6.4	8.9
Total amounts of investments (million yen)						
1911–38	18,515	1,451	1,567	18,370	323,923	699,652
Per capita investments (Yen/Year)						
1911–38	11.01	12.08	3.00	10.89	2.30	1.34

Source: Mizoguchi (1975).

⁸ Emi-Ishi (1971) pointed out that the residential construction seemed to be underestimated when the commodity flow method was adopted for the capital formation, by using the scarcity information from the historical statistics.

were effective to rise the agricultural productivities and as the results to increase farm household income.

The Taiwanese construction investments grew relatively smoothly in overall period under the Japanese occupation, though there were some fluctuations caused mainly by the railway construction. The construction investments grew slowly in Korea before 1920's. Owing to large scale projects to development of North Korea and to increase the gold and silver production, the construction investments rose in the 1930's. But it is this writer's impression that there were relatively small investments aiming to improve agriculture production in Korea. When we remember that the dominant part of population engaged in agriculture the implication of the difference should be noted.

Korean investments on producer's equipments were nearly double of the Taiwanese. While the Taiwanese investments grew remarkably in the early period of Japanese occupation they did not increase remarkably after the 1920's. This depended on the fact that the Taiwanese manufacturing industry was restricted only for the sugar industry. The Korean investments rose significantly in the 1910's and the 1930's. The latter originated from the settlement of heavy industry in North Korea.

Now, let us touch upon the role of government in the capital formation. Since the budgetary reports divide their expenditures into detailed categories, we can classify total expenditures into (1) government consumption, (2) government capital formation, (3) government transfer expenditures and (4) expenditures to manage public enterprises such as railway, if we admit some margins of errors. It is considered that the government capital formation had an important role in the economic development in Taiwan and Korea under the Japanese occupation, and so it is interesting to study the share of government capital formation in total investments. However, in comparing the figures from budgetary data to those from the commodity flow method, we should remember the differences of concepts. Although the former includes the purchase of land or old buildings or equipments, the latter covers only new investments. But it is not meaningless to compare them if the conclusion is used with cautions. The Korea growth rate of government investments was much higher than the Taiwanese: especially the rate of Korea was high after the mid 1920's. The average growth rate in the period of 1911-38 was 3.6% in Taiwan and 5.6% in Korea. If we neglect the differences of the concept of capital formation, we can calculate the share of government investment in the total capital formation. In contrast to the Taiwanese decline the share had been nearly constant in Korea. These differences could be explained by the availability of investments fund in this area. It was reported that financial situation was relatively untight in Taiwan under the Japanese occupation because of the surplus of trade balance.⁹ It is not surprising that the investments were financed by the private sector. Further the government investments for the agricultural sector drew the investments by farmers. In contrast to this, the financial market was tight in Korea, and the Government General must play an important role in the capital formation. Especially, the investments on North Korea in the 1930 had been supported by the government expenditures. This fact should be remembered when we consider the industrialization problem in Korea and Taiwan under the Japanese occupation.

⁹ Such a description can be found in various kinds of publications. For instance, see *Taiwan Jijo* (Conditions of Taiwan) by the Government General of Taiwan.

IV *Private and Government Consumption*

According to the results in Section 1, the consumption expenditure grew slowly in Japan, Taiwan and Korea. Since we have not completed our estimates on private consumption expenditures by using the commodity flow method, we must make some reservations on our figures. However, we can safely say that the growth rate was very low in these area. In Table 6, the growth rate and level of real consumption are compared among Japan, Taiwan and Korea. Because Japanese figures depended on the commodity flow method and our estimates were done by combining the family budget data and the time-series of real wages, it is problematic to compare the absolute levels. However, we can say that the consumption level was relatively high in Taiwan. We should note that the level grew relatively smoothly in Japan and Taiwan if we exclude the period of 1933–37.¹⁰ The Korean consumption level was very low, and that the level did not rise after 1918.

Anyway, it is very important to remember that the per-capita real consumption expenditure grew in a low rate such as from 0.8 to 1.8% in Japan, Taiwan and Korea. It is often said that the Japanese industrial development had been supported by the low wage rate

TABLE 6. GROWTH RATE AND PER-CAPITA AMOUNTS OF PRIVATE AND GOVERNMENT CONSUMPTION EXPENDITURE (Unit: % for Growth Rate and Yen (1934–6 Prices) for Expenditures)

	Government Consumption			Private Consumption			Private Consumption (Per Capita)		
	Japan	Taiwan	Korea	Japan	Taiwan	Korea	Japan	Taiwan	Korea
Growth Rate									
1903–12	–4.8	15.1		2.4	0.9		1.3	–0.5	
1908–17	–0.0	6.6		2.3	1.0		0.9	–0.5	
1913–22	5.8	15.6	6.7	4.7	6.2	7.3	3.6	5.2	6.0
1918–27	2.9	6.8	14.5	3.1	5.1	3.1	1.9	3.2	1.7
1923–32	7.3	4.0	5.7	1.4	3.4	1.0	–0.3	1.0	–0.5
1928–37	5.1	5.1	5.3	2.5	0.0	2.2	1.0	–2.6	0.3
1911–38	5.1	4.1	6.5	2.8	3.2	3.1	0.8	1.5	1.8
Per Capita Consumption Expenditures									
1935	30.3	30.3	10.6	7.1			181	153	81

Source: Mizoguchi (1975) and Ohkawa (1974).

before the Second World War, and the low rate of wages had been kept owing to the relatively low prices of food. Such an explanation can be applied for Taiwan and Korea under the Japanese occupation.

In Section 1, we have pointed out that the growth rate of government consumption in Korea was relatively high. It is natural that the consumption rose significantly in the early period of Japanese rule because administrative institutions had gradually settled up and

¹⁰ Chang (1977) wrote that he could not agree the declining trend of real wages in the 1930's in Taiwan and considered that the author's CPI in this period should be revised to some extents.

some new projects were scheduled. If we exclude the period of 1910–15 in Taiwan,¹¹ the real government consumption grew steadily in both Taiwan and Korea. The level of consumption expenditure was not much different between Taiwan and Korea.

However, when we consider the government consumption, we need to examine its nature. This, of course, included various kinds of expenditures to contribute to the welfare of people; for example, those for public health, education, agricultural production etc. However, they also involved some expenditures which were irrelevant to the welfare: for example, expenditures for the Japanese shrines, the police system to control the colony, etc. Therefore, the growth of government consumption cannot be related to the increase of benefits of people. In order to solve this problem, we must reclassify the government consumption expenditures by categories of objects. Since Taiwanese budget data had a detailed classification, we can proceed such an attempt. According to this writer's preliminary result,¹² nearly constant was the share of expenditures which could be related to the welfare of people. Therefore, at least for the Taiwanese case, the growth of government consumption expenditure had been meaningful even if we consider the welfare being of colonial people. In order to apply such a study for Korea, we must collect the original budgetary reports because the classification of budgets shown in *Statistical Yearbook of Government General of Korea* was too broad. These attempts will be done in the future.

V Trend and Impacts of Industrialization in Korea and Taiwan Under the Japanese Occupation

Based on the analysis on the GDP components, let us proceed our consideration for the trend of industrialization in Korea and Taiwan under the Japanese occupation. As was shown in Table 3, the growth rate of manufacturing production was high in Taiwan and Korea in comparison with the international standard before the Second World War. Especially, the development of Korean manufacturing industry was significant in the 1930's. This can be supported by the annual figures shown in Figure 2, which indicates the over time changes of real manufacturing and mining production for Taiwan, Korea and South Korea. The South Korea defined here corresponds to the territory ruled by the Republic of Korea.¹³ According to this figure, the growth rate of overall Korea was higher than the South Korean in the 1930's and this suggests that the industrial development in the 1930's concentrated in North Korea.

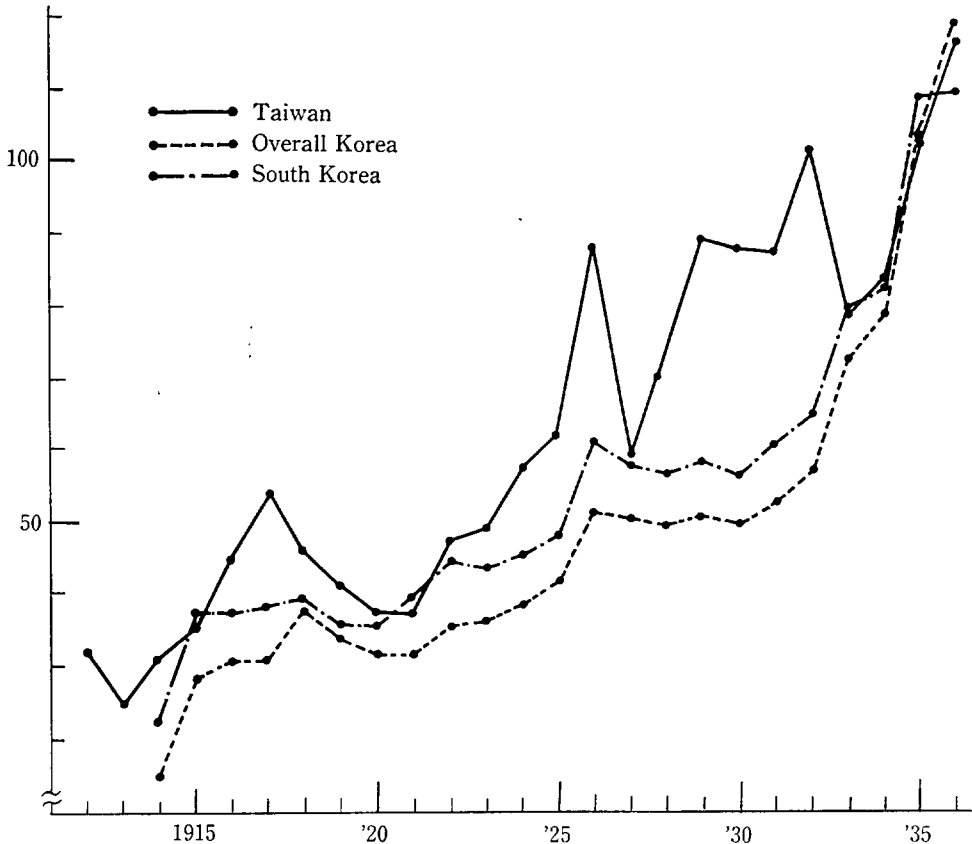
It is very important to investigate the composition of manufacturing production by area as well as the periods. Figure 3 shows that the nature of industrial development was different among three area: Taiwan, South Korea and North Korea. In Taiwan, a large portion of manufacturing industrial production had been occupied by food industry. It is well known that the industrialization of Taiwan was restricted for the sugar industry

¹¹ In this period, there was the Anti-Japanese movements were spreaded in the mountain area of Taiwan. The Government General expended a relatively large amount of budgets to improve the living conditions in these area. The exceptional high level of government consumption in this period can be explained by this special situation.

¹² See Mizoguchi (1975. a).

¹³ We divided the total production into North and South Korea by using the information by Dons. When a Don belong to both area, we divide the production by using the proportion of area.

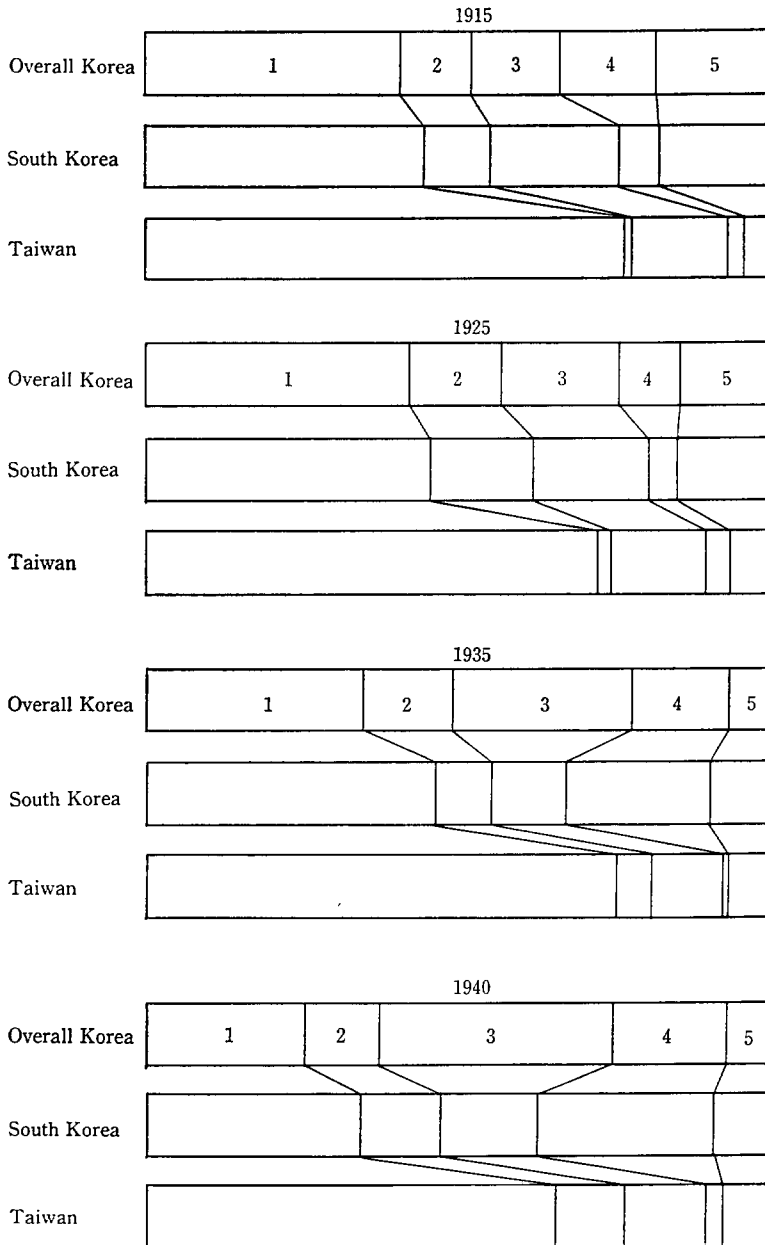
FIG. 2. PRODUCTION INDICES OF MANUFACTURING AND MINING INDUSTRIES (1934-6=100)



Source: Shinohara (1972) and Mizoguchi (1975).

although there was a plan to promote other kinds of industries in the late 1930's. The food industry was also the most important industry in Korea: its production share was nearly 30% in total manufacturing industry. However, we can find other kinds of industry in Korea: textile, chemical and metal-machinery industry. Especially, the rise of share was remarkable in chemical industry. When we compare the figures for overall Korea with South Korean, we can find some different structures of manufacturing industry. While one of the important industries was metal industry in South Korea, chemical and metal-machinery industry took their position in North Korea. The development of these heavy industry was remarkable in North Korea in the 1930's. In Table 7 the growth rates of real production were shown by industry. While the Korean growth rate was extremely high in lumber-wooden and ceramics industry, we need not to pay our attention to these because the production shares were very small. In South Korea, textile industry had been developing smoothly in the overall period of Japanese occupation, and the development seemed to have been accelerated in the 1930's. It should be mentioned that this industry is labor intensive in its nature, and the low wages in this area gave an incentive for the industry. In contrast to these, the construction of heavy industry in North Korea would be oriented from the

FIG. 3. COMPOSITION OF PRODUCTION IN MANUFACTURING INDUSTRY



Note: The numbers in the figure are as follows: (1) Food, (2) Textile, (3) Chemical and Ceramics, (4) Metal and Machinery and (5) Others.

Source: Shinohara (1972) and Mizoguchi (1975).

TABLE 7. INDUSTRIAL GROWTH RATES OF REAL PRODUCTION IN KOREA AND TAIWAN

	Growth Rates (Annual)						
	All Korea		South Korea		North Korea		Taiwan
	1914—27	1928—40	1914—27	1928—40	1914—27	1928—40	1921—38
Food products	7.13	8.43	7.26	8.88	6.88	4.98	2.60
Textiles	4.71	10.00	5.43	10.53	3.05	7.99	2.36
Lumber and wood products	16.34	6.89	17.38	4.83	14.90	13.41	3.97
Chemicals	8.87	21.62	4.44	12.63	7.49	27.18	1.06
Ceramics	15.04	11.81	18.55	7.03	9.82	14.42	3.00
Metal products	3.20	11.55	0.00*	21.82	5.79	6.78	4.03
Machinery	6.52	12.98	8.89	10.77	0.00*	19.87	4.47
Other Industry	2.42	5.22	1.07	6.17	0.00*	3.17	3.17
All industry	5.13	12.37	4.86	9.70	6.22	15.50	2.48

	1914—27	1928—36	1914—27	1928—36	1914—27	1928—40	1912—38
Minings	6.63	19.70	6.68	25.28	6.47	18.67	2.48
Minings and industry	5.33	11.56	4.87	9.34	6.25	14.31	

Note: 1. The growth rate is calculated by applying the least squares regression on $\log_e X(t) = a + bt$ where $X(t)$ is the industry outputs and t is time variable.

2. 0.00* means that the estimate of b is insignificant.

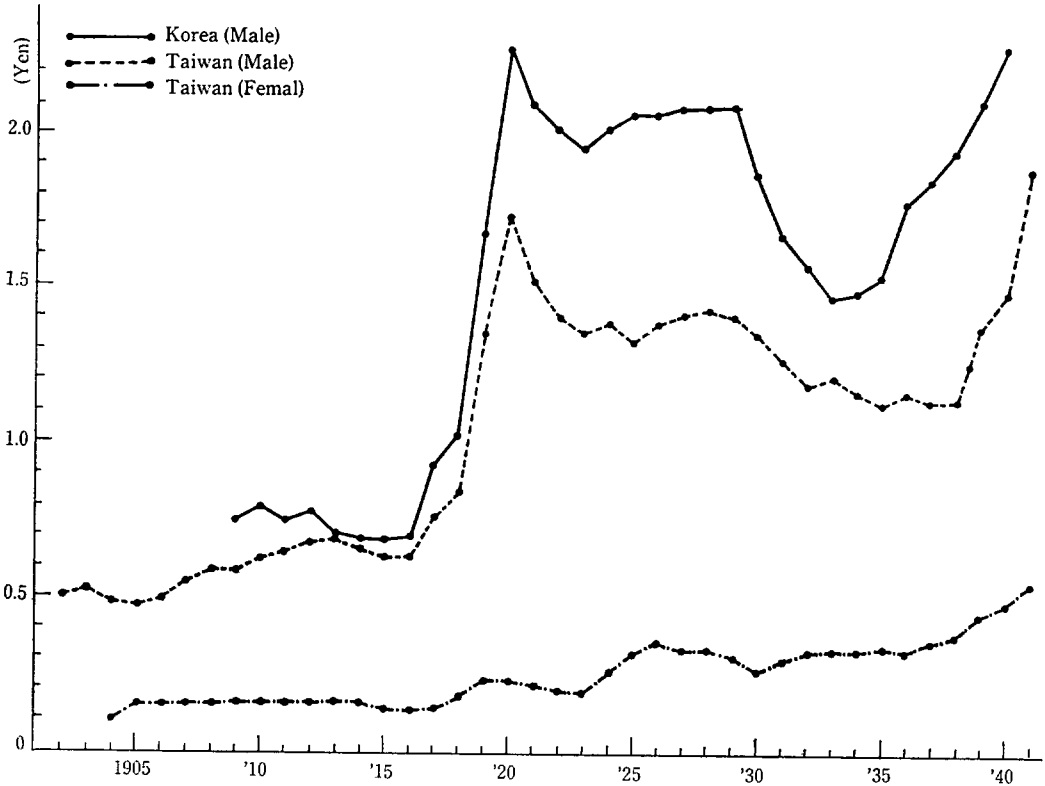
Source: Shinohara (1972) and Mizoguchi (1975).

different reasons. No doubt, North Korea had an advantage in the abundance of electricity regarding the chemical industry. The metal and machinery industry would be supported by the increases of production of minings as well as the supply of raw material from North China. Although these industries are capital intensive, their remarkable development rose the job opportunity. From the employment problem, the development of minings in North Korea would be also important. It is interesting that the growth rate of Taiwanese industry was not much different by the types of industries. However, as said before, the Taiwanese industry had been supported by sugar industry so we need not to make many discussions on this fact.

In considering the impacts of industrialization on the Korean and the Taiwanese economy, we should consider the employment problem. In the early stage of industrialization, the wage of manufacturing industry was higher than agricultural wages. Therefore, the increases of employment in industry benefited people's livings. Since we can find wage data in the *Statistical Yearbook of Government General*, we can make the wage index for manufacturing workers. According to Odaka's index, which were calculated from these data, there was a large differences between manufacturing and agricultural wage in the 1910's in Korea. The difference increased until 1920's and declined sharply afterwards. When we investigate the over time changes of real wages, it had risen until 1931, then declined afterwards. Regarding Taiwan, the real wage rose before 1930 then declined remarkably. The wage differences between manufacturing and agriculture were not so large in the 1930's. This can be related to the rise agricultural productivity and the increase of farmer's income in this period.

The next problem is to estimate the number of employment of manufacturing industry in Korea and Taiwan. However, the data were not abundant regarding the topic. It is

FIG. 4. OVERTIME CHANGES OF REAL WAGES IN MANUFACTURING INDUSTRY
(1934-6 Prices)



Source: Odaka (1971) (1972).

true that the *Statistical Yearbook of Government General* gave us the figures on the number of workers in manufacturing factories. But the figures seem to cover only the factories with 5 or more workers. Another kinds of data are also used for Taiwan to cover overall period of the Japanese occupation: they are *Statistical Yearbook of Commerce and Industry* by Government General of Taiwan and *Yearbook of Economic Statistics* by Tokyo Keizai Shimposha. The data were systematically examined by Odaka,¹⁴ and we can use his figures as timeseries. According to the result in Table 8, the Korean employment rose significantly in manufacturing and mining industry: the annual rate of increase was 9.4% in manufacturing and 14.1% in mining industry in the period of 1920-40.¹⁵ The employment in mining industry rose in a high rate after 1930 and this can be mainly explained by the development of gold and silver minings: nearly 60% of mining workers engaged in these minings in the late 1930's. The increase of workers in manufacturing industry could be found mainly in

¹⁴ Odaka (1969), (1970) and (1972).

¹⁵ Regarding the minings we estimated the growth rate for the period of 1920-1938.

TABLE 8. NUMBER OF EMPLOYEES IN MANUFACTURING AND MINING INDUSTRY
(Factories with 5 or more employees)

	Manufacturing		Mining	
	Taiwan	Korea	Taiwan	Korea
1910	24,583		6,146	21,702
1915	27,119		6,506	22,445
1920	50,199	54,657	13,591	16,470
1925	48,795	67,226	18,821	18,746
1930	58,116	101,048	20,347	31,103
1935	68,621	167,488	30,109	130,841
1940	104,027	294,971		206,427*

Source: Odaka (1969) (1971) (1974).

textile, chemical and metal-machinery industry. We can also obtain the composition of manufacturing industries from this data. Of course, we should mention that this had an upward biases for heavy industry because our data did cover the factories with 4 or less employees which would mainly belong to light industry. However, the results indicates that the development of heavy industry had contributed to increase the employment in manufacturing industry in Korea.

In contrast to these, the increase of Taiwanese employment was not so significant in manufacturing industry if we exclude the late 1930's when some attempts were done to construct industries other than sugar industry: the annual rate was only 3.6%. While the rate of increase was higher in mining industry (5.6%), this can be mainly explained by the changes after 1935. It has been pointed out that the surplus laborers in the agricultural sector were not so large in Taiwan, because the agricultural productivities were high.¹⁶ This seems to suggest the agricultural development in Taiwan had prevented the rapid industrialization in Taiwan while it had promoted implicitly the Korean industrialization through the negative effects on Korean agriculture.

The above findings based on the statistics restricted for the factories with 5 or more employees. However, we cannot neglect the role of small scale factories when we study the employment problem. Such data were found in the population census. The official reports on population census were published for the surveys of 1925, 1930 and 1940 for Taiwan and 1930 for Korea. A brief description on the 1940 Korean population census was found in *Monthly Statistics of Korea*, No. 1-2, 1962.¹⁷ Yoshiro Matsuda estimated the distribution of gainful workers in 1944 by using the partial information of the 1944 census.¹⁸ The results are summarized in Table 9.

The conclusions obtained from this table are not inconsistent with those from Odaka's data for the Taiwanese manufacturing and mining industry. This is also true for the Korean minings. However, a surprising difference can be found in the number of gainful workers in Korean manufacturing industry. While Odaka's data indicates a significant increase

¹⁶ See Takahashi (1937).

¹⁷ See also Park (1962).

¹⁸ This writer thanks for Assistant Professor Yoshiro Matsuda of the Institute of Economic Research, Hitotsubashi University, who supplies the information on 1944 Survey before his publication. According his information, the classification of 1944 by industries was a little different from the previous ones, so the comparison of Table 9 includes some margins of errors.

TABLE 9. NUMBERS OF EMPLOYEES IN POPULATION CENSUS (unit: thousand)

	Korea			Taiwan	
	1930	1940	1949	1930	1940
Agriculture	7,644	6,685	7,421	1,197	1,400
Fishing	122	135		29	34
Mining	34	176	708	20	44
Manufacturing	586	495	1,718	154	221
Commerce	562	601	362	178	230
Transportation	108	152	36	63	63
Government	183	239	178	76	117
Service	121	173	?	10	17
Others	386	539	?	63	118
No Job	11,293	15,058	15,316	2,802	3,629

Source: See text.

of the number, the corresponding figure declined from 1930 to 1940 in the population census. How can we explain this difference? Since we have not accessed the detailed report of 1940 population census in Korea, we cannot present our final conclusion. However, when we calculate the number of manufacturing gainful workers by sexes, the number of male workers rose from 291 thousands to 432 thousands in this period. A sharp decline can be found in female manufacturing workers: they decrease from 278 thousands to 56 thousands. Odaka's data suggested that the increase of employment can be found in the heavy industry. No doubt, the industry was composed of large scale factories and its employees were mainly male workers. If we exclude the textile industry, female workers would be employed in small scale factories which were composed of traditional industries. It is very probable that these traditional industries decayed after the recession in the late 1920's and this situation had a negative effect on the job opportunity for female workers. However, the decline seems to be too large to be explained only by this fact. Therefore the re-examination of data would be one of the important works in the future.

Finally, we should consider the effects of job treatment by the industrialization in Korea under Japanese occupation. We should mention that the most of large scaled factories were occupied by Japanese as was suggested by previous contributions but also that numbers of Korean managers and craftsmen were not so small. According to 1944 Population Census, the Korean managers amounted to 7,421,000 and craftsmen increased up to 28,267,000. Further when we remember the recent experience in developing countries, we cannot neglect the effects of job treatment even for unskilled workers. However, the evaluation on this aspect should be done by referring also other non statistical information.

Final Remark

In order to avoid the misunderstanding on the intention of this paper, the writer would like to stress that this paper does not try to evaluate the policy of industrialization by the Japanese government. However, we cannot deny that the industrialization had been supported by various kinds of economic situation in that period and this had some effects on the livings of Korean and Taiwanese people. Strictly speaking, it is this writer's impression that the critics of the Japanese Imperialism had concentrated for the intensification of the

Japanese rulers. Such an attempt is, of course, very important. But we should also remember that the intension did not necessarily realize in the actual situation. Therefore, it is also interesting to analyze what was the actual economic situation was. The writer hopes that this paper could support some attempts in this direction.

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