Digest of Statistical Research

In place of *Quarterly Economic Review*, we are going to devote this space from this number to the digest of important statistical researches of our Institute.——Editors

The Relative Share of Labor Income in Japan

I Labor's Share in Manufacturing

Although the annual rate of the growth of real income in Japan since 1900 was estimated as 3.7% or thereabout, the curve of industrial production was even more sharp, i. e., it amounted to about 9%, surpassing by all odds the growth rates of the industrial volumes of production in various countries (e. g., U. S. A.=4.1%, Germany=3.4%, U. K.=1.6%, during the period 1870—1914, computed by Jan Tinbergen). Was this prominent tempo of industrial expansion in Japan enabled by such an extraordinary low labor's share of income as to bring forth a high rate of capital accumulation? Our statistical analysis starts out from such a theoretical expectations.

We have already several researches in the income distribution in the industrial sector, which are not always accurate and correct. For instance, Ⅲ. лиф calculated the rate of surplus value $\frac{M}{V}$ (1931=251%, 1937=380%) too high by excluding a salaried income from the variable capital V. Prof. Hijikata overestimated the labor's share (1919=70%, 1930=79%) by assuming a too high proportion of wage and salary earners to the total working population.

Our studies will be commenced from inter-country comparisons of labor's share computed from the census of manufactures of each country. The figures in the table are not in themselves perfectly correct, but shall be adequate for the purpose of comparisons. The following points should be noticed in making comparisons:

Inter-country Comparison of Labor's Share in Manufacturing

	Japan		U.S.A.	Canada	Eire	New-Zealand	Australia
	I	Ⅱ					
1929	44.6%	37.4%	46.7%	—%	—%	—%	—%
1931	46.6	39.4	—	—	—	—	—
1933	35.0	29.7	44.5	47.4	—	51.5	49.9
1935	37.2	31.5	51.6	48.5	—	51.4	50.5
1937	37.1	30.4	51.0	47.9	51.0	56.5	52.0
1939	29.8	25.7	51.9	48.2	—	57.8	42.2
1945	—	—	—	51.8	53.0	60.1	58.4
1946	—	—	—	50.2	51.6	59.0	57.7
1947	—	—	53.3	—	—	—	—

1. Sources of Materials: Japan ⟶ "*Census of Manufactures*" (Kōgyō-Tōkeihyō); America—→"*Statistical Abstract*"; British Commonwealth ⟶ "*Statistical Abstract for the British Commonwealth*, for the years 1933 to 1939 and 1945 to 1947, seventieth Number (Board of Trade).
2. The Labor's shares are derived by dividing the wages and salaries paid by the added value. Depreciation charges are excluded from the added values in Japan but included into them in the cases of other countries.
3. Japan I ⟶ Miscellaneous expenses (estimated as 5% of the value of products) other than materials, fuel, electricity and gas used are excluded from the added values.
   Japan II ⟶ The above items are included into them. This should be used only for the International comparisons, because the relative shares in the other countries are calculated on the same basis.

1). Only in the case of Japan, the depreciation charges are excluded in the calculation

of the value added by manufactures, making our estimate of labor's share only slightly larger than that of the other countries. 2). In addition, in the Japan's case I, the miscellaneous expenses (estimated as 5% of the value of products) are excluded in the calculation of the added value. Although this estimate is likely to be more close to the true value than the estimate II, we think the estimate II, which is not modified by the above items, should be used when the intercountry comparision is made. 3). In other countries the salaries paid are the results of the census, but in Japan's case, the salaries paid are estimated as 20% of the wage-bill.

From the above table the conclusion is derived to the effect that the labor's share in Japanese Manufacturing is of by far the low level compared with those of the other countries, and in the thirties the labor's share follows the trend-like course of decline. In the Japanese economy in the past, however, owing to the fact that the wage fluctuation was more sticky than any other country, the labor's share was apt to decline in the period of price rise and to rise when prices fell. In fact in the twenties, the ratio of wage-bill to the value of products was fairly higher (Compare Table 7, p. 130 with Table 5, p. 127). In other woıds, the labor's share in the manufacturing showed a cyclical variation in the past, which seems to be more conspicuous than any other country. Consequently, in the period of price decline (especially in the twenties), the level of Japanese labor's share will be expected to be fairly close to the level of U. S. A. and the other countries. The results computed from the data of Prof. Yuzo Yamada (Table 4, p. 125) (which are based on the assumption that the ratio of net to gross products is constant) shows that the labor's share was on the average beyond the level of 40%. But when the observation is made for the whole period which includes both the phases of price rise and decline, we may conclude that the level of the labor's share in Japanese manufacturing, is internationally low, which encouraged the high rate of a capital accumulation and the rapid tempo of industrial growth.

The exchange devaluation in 1932, encouraged in fact the export, but it was accompanied by the price rise of imported raw materials, thus forcing down the ratio of net to gross value of output $\left(\frac{Y}{T}\right)$ substantially, (35.3 % in 1932 to 27.6% in 1937). Inasmuch as the general level of wage rate was almost constant during this period, the ratio of labor income to the value of products $\left(\frac{W}{T}\right)$ decreased. But as the decrease of $\frac{Y}{T}$ and $\frac{W}{T}$ was nearly to the same extent, $\frac{W}{Y}\left(=\frac{W}{T}\Big/\frac{Y}{T}\right)$ was nearly constant during this period (Table 2, p. 124).

Next, let us analyze this tendency with respect to the textile industry. In the textile industry, the value of products increased by 92% and the volume of production by 30% during this period, but the added values showed only 6% increase. Consequently, the ratio of net to the gross products decreased from 26.9% in 1932 to14.9% in 1937. The rate of decline of this ratio amounted to 45% in the textile industry, which was two times as high as the decline rate in the machinery and equipment industry (22%). This was the result of the impact given by the aggravated terms of trade upon the price-cost structure of our textile industry, which is obliged to obtain a substantial part of its raw materials from abroad. On the other hand, the wage-rate of unskilled worker (e. g., the female worker in the cotton-spinning industry) was

more sensitive to the cyclical fluctuation than that of skilled worker (e. g., the male worker in the machinery industry). In consequence, the wage-rate index of textile industry followed a somewhat upward courve, in spite of the gradual fall of the wage-rate index of machinery industry. Being attacked from two sides by increased prices of raw material and wage-rate, the wage-bill-net income ratio (excluding salaries paid) rose from 31% to 40.6% during this period. The upward change played a role enough to maintain the relative share of labor in the whole manufacturing intact, by offsetting the downfall labor's share in the metal industry (28.6% to 23.4%) and the machinery and equipment industry (33.2% to 28.5%) (Table 5, p. 127).

It has been generally believed that the rate of exploitation in the Japanese textile industry is conspicuosly high. The wage-bill-net income ratio, shown in the following table, however, exhibits the opposite result, because the wage-bill ratio in the textile industry is extremely high as compared with the other industries. This is the phenomenon caused by the low product price due to the severe competition with the foreign countries, on the one hand, and by the high cost of raw materials due to the aggravated terms of foreign trade, on the other hand, notwithstanding the cheap labor in this industry. In addition to this, high cyclical flexibility of wage-rate of cotton spinning female workers, made the fluctuation of the labor's relative share considerably large. On the other side, the labor's share of metal and machinery industries shows a steady decline owing to inflexibility of the relative wages of their skilled workers. (Chart 1 and 2, p. 129).

Labor's relative share $\frac{W}{Y}$ moves as a combined result of the respective changes of both

Ratio of Wage-bill to the net income

	Metal industry	Machinery industry	Chemical industry	Ceramic industry	Textile industry	Food industry
	%	%	%	%	%	%
1929	36.5	29.6	17.7	36.9	49.2	11.1
1932	28.6	33.2	16.1	27.9	31.0	10.8
1937	23.4	28.5	15.5	30.8	40.6	10.1

the ratio of net to gross output $\frac{Y}{T}$ and the ratio of wage-bill to the value of products $\frac{W}{T}$ • Therefore, the anlysis of $\frac{Y}{T}$ is also extremely important. The change of $\frac{Y}{T}$ of the whole manufacturing, however, can be segregated into the two separate factors, i. e., the change due to the causes in the respective industry proper, and that due to the shift of industrial structure. The actual change of $\frac{Y}{Y}$ in the manufacturing industry as a whole was 24.5% from 1932 to 1937, but the change of $\frac{Y}{T}$ due to the causes in the respective industry proper alone could be derived, if $\frac{Y}{T}$'s in various industries were averaged, taking, for instance, industrial structure of the value of products in 1929, as a constant weight. They were 28.7%. Consequently, by simple calculation $\frac{1-0.245}{1-0.287}=1.0585$, we can deduce that the rise of $\frac{Y}{T}$ by +5.85% is genuinely due to the change of industrial structure. During this period, the proportion of light industries whose $\frac{Y}{T}$ were relatively low, shrinked, and the proportion of heavy industries whose $\frac{Y}{T}$ were relatively high, expanded, thus raising the aggregate $\frac{Y}{T}$ by 5.85%. In other words, in spite of the potential falling tendency of $\frac{Y}{T}$ by 28.7%, $\frac{Y}{T}$ fell, as a matter of fact no more than 24.5% owing to the heavy industrialization. (Table 6, p. 128).

The change of wage-bill-net income ratio $\frac{W}{Y}$ does not exhibit any difference whether it

may be an actual figure or an averaged one by fixed weight. (Table 6, p. 128). But we should not overlook the exact counterbalance existing between the rise of $\frac{W}{Y}$ in the light industries and the fall of $\frac{W}{Y}$ in the heavy industries during 1932—37 period.

Now let us return to the above table. The labor's share in the chemical industry is relatively low, but this seems to be common phenomenon in every country. In the food industry, however, $\frac{W}{Y}$ is extremely low. The first reason is that sake, beer, sugar and etc., were subject to heavy taxation, so that the tax to be transferred to consumers were involved in Y—W. The second reason is that the Japanese food industry stood at a more or less favorable position, because the relative prices of rice, fishes, fruits, etc.——the raw materials of such industries——, were especially low.

The comparison of wage-bill-gross income ratio between Japan and U. S. A. will elucidate the above points more clearly (Table 9, p. 133). In making this comparison we do not exclude the depreciation charges from the income so as to be able to compare with each other on the same common basis. Moreover, we overlook the salaries payroll. In the first place, $\frac{W}{Y}$ of the food industry was 10.2% in Japan (1929), but in U. S. A. it was but 26.9 %in 1929, and 28.4% in 1947. On the other hand, $\frac{Y}{T}$ (in this case Y=gross income) was 29% in U. S. A. (1929), and 40.5% in Japan (1929). These results will support our above expectations.

On the other hand, $\frac{Y}{T}$ in the textile industry was 44.7% in U. S. A. (1929), but only 25.5% in Japan (1929). Relative high prices of textile raw material in Japan is reflected in these figures. As a matter of fact, $\frac{W}{T}$ was somewhat lower in Japan (1929) than in U. S. A. (1929), but when compared with the Japanese other industries, it remains still higher.

With respect to the metal and the machinery industry (1929), $\frac{W}{Y}$ in Japan was 33.6.% and 28% respectively, while in U. S. A. it was 41.4% and 43.2%. This shows that in the heavy industry too $\frac{W}{Y}$ was lower in Japan than in U. S. A., reflecting in part the almost non-existence of trade unions in the past Japan.

The wage-bill-gross income ratio in the whole manufacturing (1929) was 36.5% in U. S. A. and 27.8% in Japan. However, when American $\frac{W}{Y}$ is recomputed, taking the Japanese industrial structure as the weight, 36.5% will amount to 36.8% with only a slight change, but if, to the contrary, the Japanese $\frac{W}{T}$ is recomputed taking the American industrial structure as the weight, 27.8% will rose to 30.2% with rather a marked change.

Thus even if we compare $\frac{W}{Y}$ of both countries in 1929 (a year when $\frac{W}{Y}$ was relatively high in Japan), Japanese labor's share is still lower. When we compare $\frac{W}{Y}$ during the price rise period, the difference will be much greater. The low labor's relative share in the Japanese manufacturing is, indeed, an undeniable fact, although this is often exaggerated by such Marxian economists as Шлиф and S. Uesugi. (**by Miyohei Shinohara**)

II Agriculture

Many writers[1] have argued that the agriculture played on important role in the capital accumulation in Japan, i. e., a part of

1) For example, see Mr. Bruce F. Johnston, Agricultural Productivity and Economic Development in Japan (*Journal of Political Economy*, December 1951)

profit derived from the increase in productivity in agriculture was siphoned off by heavy land taxes and rents and was reinvested mainly for the industrialization of Japanese economy.

In this paper, as the first approach to this problem, we have attempted to estimate labor's relative share in Japanese agriculture over the periods of 65 years (1878—1942), compare it with that of U. S. agriculture and make some analysis of its long-runtrend.

Labor's Relative Share in Agricultue

	Japan		Japan	U.S.A.*
1878–82	42.6%	1913–17	52.8%	55.0%
1883–87	48.4	1918–22	48.7	58.3
1888–92	46.0	1923–27	41.1	59.5
1892–97	42.7	1928–32	44.4	61.3
1898–1902	49.9	1933–37	46.1	62.7
1903–07	48.2	1938–42	53.3	64.9
1908–12	52.4			

* Data are from Prof. D. Gale Johnson, Allocation of Agricultural Income (*Journal of Farm Economics*, November 1948)

It should be noted that the method of our estimation is based on the assumption that labor-income can be estimated by deducting the land-income from the total agricultural net income.

In this case the land income will be imputed not only to the tenant lands but to the non-tenant lands.

Labor's relative share in Japan was lower than that in U. S., and the difference of their levels may be due to the difference of the population pressure and the growth rate of productivity in agriculture in both countries. We did not treat the recent situation in Japanese agriculture after the land reform, but hereafter, higher labor's relative shares may be reasonably expected than in the past.

It is observed that labor's relative share in Japan had changed cyclically and the share in U. S. increased year after year. The increase of rent has a general tendency to lag behind the steady increase of productivity, so that labor's relative share will raise up gradually. In the case of U. S. agriculture, this law was fully valid for the whole periods while in the case of Japan it was only valid throughout the earlier four decades. After 1917, labor's relative share decreased, and in the period of the world depression it returned to the average of 1878—97 figures. This reduction may be based on the increase of the so-called disguised employment in agriculture. But in accordance with the recovery of the urban employment, labor's relative share increased again and reached about 53% under the impact of the war economy in Japan. **(by Mataji Umemura & Tsutomu Noda)**

Résumé of Articles

TAKAHASHI, Chotaro "Relative Share and Redistribution Effects"

In considering changes and the cause of changes, in the shares of the national income of a community, absolute and relative shares must be studied together. The Theory of Distribution has been a study of determination of factor prices, but it is not sufficient to answer the question, what are the causes of the determination of the absolute and rela-