Capital Formation in Japan

I. Capital formation estimated by the supply of industiral funds.

The Economic Stabilization Board has published the annual estimates of private capital formation. But these series are yet incomplete and the methods of estimation are changing owing to the deficiency in sources. The private construction is estimated by the product approach, but the producers epuipment and inventory change series are estimated by the loans of banks and the sampling survey of the corporation balance sheets.

1. Capital wealth of Japan

No census of wealth has been taken in Japan since that for 1935. The E. S. B. computed war damages were 64, 278 million yen and remaining capital wealth (excluding land, forest, live-stocks etc. but including consumer durable goods) 188, 852 million yen valued at 15 th August, 1945. The capital wealth at that date was 101.1% of capital accumulation of 1935 census. The private capital wealth was about 80% of the total (about 950, 000 million yen). The postwar private capital of Japan has been accumulating above the 1950 level.

2. Producers equipments estimated by the supply of industrial funds.

The estimates of private producers equipment have not been taken by the commodity flow method, the annual series of equipment up to 1948 were computed by the statistics of the supply of industrial funds and after 1949, by the sampling survey of corporation balance sheets. Before war time, Japanese Government has been controlling the supply of funds, and the fund for equipment should be approved by the authority. The approve of the fund for fixed capital was shown by the cassification of all industries (see p. 24), so that we could see the industrial ratio. The ratio of the fund for equipment of manufacturing was declining. After the war up to 1948, fixed capital relative to floating capital was falling off remarkably to 28.5%, owing to the cutting down operation of the key industries. Fixed assets ratios are gradually recovering, 32.8% in 1949, 39.5% in 1950, 38.0% in 1951, and 40.0% in 1952.

3. Worn out, obsolescence of capital and deficiency of depriciation.

Almost all the capital equipment are worn out, the equipment established by 1945, for example in the case of metallic industry, is 44%, and almost all the capital are obsolescent. About a half of the industry maintains abilities under 30% at the date of establishment.

The deficiency of depreciation is remarkable. According to Dr. Shoup's advice, enterprises revalued the fixed assets, but the revaluation was not satisfactory. It was said that the valuation came up only to 45% of the level of the advice. The depreciation and improvement is not sufficient. The post war private investment does not really great. However, the government investment, especially public construction, grows larger every year.

(C. Takahashi)

II. Capital Formation by the Flow-of-Goods Method.

It cannot be denied that the weakest point in the Japanese national income estimates

hitherto published, consists in 'capital formation'. Although the housing building was usually estimated from the real side, the producer's durable equipment plus the inventory changes was measured by the increment of money funds from both outside and inside of business concerns, adjusted for some duplications. The changes in business inventories, then, were regarded as equivalent to a residual after subtracting the increment of fund for equipment purchases from the above total increases of business funds. As a consequence, the figures of inventory changes tend to swell when prices are under severe inflationary conditions, thus causing its extraordinary high ratio to GNP or GCF. Nevertheless, the adjustment for price changes, customarily, has never been made. Not only does there exist such an unreasonable result in our national income statistics, but also the popular Flow-of-Goods Method or Commodity-Flow Method has completely kept in oblivion.

Our attempt is to estimate capital formation by this method originated by S. Kuznets. As a matter of course, we have no census of distribution satisfactory enough to perform this estimate. This doubles the difficulties of our work, but we intend to accomplish this goal and to estimate the public and private capital formation taken together. In this work the full estimate of inventory changes is abandoned. Tables 1—6, in the another article (pp. 27–36) written in Japanese in this Review, shows the process of estimation. The reader can follow this process by seeing the English translation of each column. We shall add a few exposition here as to the contents of the tables.

Table 1 (p. 29). Domestic output of producer's durable equipment.

Column (b) is obtained by deducting, from column (a), the consumer's durable goods, the construction materials, the unfinished commodities and those goods under 3 years' durability.

Table 2 (p. 30). Estimate of machinery output in the factories operated by the government and by the public organizations.

This estimate is based on the relative number of employees between two groups, the private enterprise and the others. The relative ratio of employees (e) is multiplied by the output of machinery and equipment in the private enterprise (Table 1, (a)) and then (f) is obtained. Here, the labor productivities of the two groups are assumed as equivalent The result (f) is used in Table 1 (d).

Table 3 (p. 31). Estimate of producer's durable equipment used, adjusted by import and export, freights and distributive margins. Freights and distributive margins are assumed as 15% upon the producer's prices.

Table 4 (p. 32). Output and consumption of construction materials.

Here the so-called construction materials are the mixed commodities, the non-construction part of which is not segregated. From production to consumption, the import and export are adjusted.

Table 5 (p. 32). The genuine construction materials, after deducting the mixed parts which are not used for construction, and the value of construction, after adjusted for freights, distributive margins, and the value added by the construction industry.

Table 6 (p. 33). Public and private capital formation, not including the inventory changes.

Here the above series are compared with the national income series. This comparison, of course, is not adequate, because capital formation is gross, while national income is

net, but in Japan GNP series is not available in 1914—1929 and not reliable even since 1930. Therefore this procedure will be inevitable as a first preliminary approach.

Although our estimate is extended to the post-war 1950 year, but in this digest we shall not refer to it.

The above study throws light upon the following interesting relations.

Firstly, when, as in Chart 1 (p. 34), the real capital formation (excluding the inventory changes) is compared with the real national income, three sets of investment curve can be fitted, 1914—20; 1921—30; 1931—36. Each curve is a linear straight line and the variance of scattered points is extremely small. In the two periods, 1914—20, and 1931 —36, which can be characterized by the prosperous price-rise phase, the slopes of investment curves are fairly steep, while during the price-fall period over 10 year (1921—30), the slope becomes extremely smooth. In other words, in Japan the investment curve (and perhaps the savings function too) alters its slope sensitively in response to the trade cycle. This result appears to correspond contrariwise to the cyclical behavior of the labor's relative share in Japan, that is, the latter decreases during the price rise phase and increases during the price-fall phase.

Secondly, the comparison between 'real construction/real producer's durable equipment' and the relative price index of construction materials is made in Chart 2 (p. 35). In Chart 2, A, is there depicted the negative correlation between them, thus explicitly indicating the strong elasticity of substitution or the large relative price effect upon the relative proportion of two forms of investments. As a matter of course, the public works by government and the reconstruction

after the Kanto earthquake disaster in 1924, played a prominent role in promoting the relative weight of construction, but the relative price fall of construction materials is expected to have exerted a more extensive and permeating influence. In Chart 2, A, one extremely scattered point is 1924. In this year, the Kanto earthquake disaster took place. Chart 2, B, too, exhibits the opposite movements of the two forms of investments and their relative prices.

Thirdly, during about 10 years (1920—31), the price level fell by 55%, while on the other hand industrial production rose by 90%. This is the puzzle I gave to myself. I can prepare one answer to this problem, that is, during this time the Japanese textile industry achieved a high rate of expansion, being accelerated by steep curve of its export. Of course, this may be true. But during my work upon capital formation, I found another answer, that is, the strengthened construction activity during the price-fall period surpassed the decreasing production of equipment, thus leading to the mysterious opposite movement of prices and production. Although I don't know to what extent this effect may be powerful, I believe the discovery of this fact is the most fruitful by-product of our study. The producer's durable equipment, which amounted to ¥1, 184 million in 1920 in the 1921—24 price, fell to ¥742 million in 1925 in the same const. price, while the real construction increased from ¥732 million to ¥1, 452 million during the same period. The high growth rate of industrial production was not slowed down by this construction activity.

We should estimate the inventory changes, in addition to the producer's durable equipment and the construction, but we abandon this work owing to the deficiency of statisti-

cal data. We, however, measure the inventory changes only in the manufacturing industry. The result, after adjusting for the price changes, shows that, from 1931 onward, the figures were, — ¥ 50 million, — ¥ 43 million, ¥ 560 million, ¥ 366 million, ¥ 80 million, ¥ 178 million. According to this, the inventory changes in the recovery period 1933—34, were extremely high. The data is limited to the manufacturing sector, but this fact gives the important suggestion that the Japanese industry which had shown more rapid tempo of expansion than the American, had to reserve a higher normal amount of inventories. We do not finish an exhaustive study in the behavior of total inventories, but we can theoretically expect the proportion of the inventory changes in GCF or GNP will be higher in Japan than any other country.

(Miyohei Shinohara)

Résumé of Articles

NAKAYAMA, Ichiro "Basic Theory of Capital Accumulation"

The principle of capital accumulation has two theoretical focal points. One is the nature of a long-range theory and the other, of a theory with reference to structural changes. Undoubtedly, these two characteristics are intimately related with each other. The reason is that any change taking place over a long period of time is accompanied by a big structual change. But in theory, these two characteristics should be distinguished. In fact, individual theories on capital accumulation seek to develop a dynamic principle of capital with emphasis on their chosen points.

Of the modern theories, two are worthy of note as those expounding the long-range accumulation of capital. One is what is called the theory of acceleration. Although this has been developed as an instrument of short-term analysis, attempts are being made to make use of this as a dynamic investment function for the purpose of long-range analysis. This is an interesting attempt. But the hypothesis required for the principle of acceleration as a means of long-run analysis, is not necessarily satisfied in actual cases. First, it presupposes that a technical function of production is independent of the price structure. But such a presupposition runs counter to the basic nature of a long-range theory. Second, it assumes that there is no inter-relationship between autonomous investment and a capital co-efficient. But this is subject to question, too.

Another is that which takes a fixed rate of capital accumlation for granted. Although this is recently set forih, with comparative accuracy, by Joan Robinson as a model of steady accumulation, it is none the less new, since it is a way of thinking prevailing from the day of classical school. But it assumues a new meaning when it is regarded as something that stands up against the theory of acceleration designed to solve the problems of development from the standpoint of the relationship between an increase in income and the corresponding amout of capital re-