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PUBLIC INVESTMENT IN POSTWAR JAPAN

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I. *Features of Investment Fluctuations*

The postwar economy of Japan may be characterized by two seemingly contradictory features, namely, by certain persistent tendencies and by incessant changes. Of these phenomena there are trends as the result of inertia from the prewar days and those which are phenomena resulting from the postwar reconstruction process. For example, as to the rate of increase of gross national product, the prewar tempo of growth is estimated to have been about 4% annually and after the war it shows a rate of about 8%. Thus, it might be asked whether this is merely a temporary phenomenon accompanying the reconstruction process. However, the reconstruction process after the war is not a process of returning back to past conditions, but rather a process of regrouping or reshuffling the economic conditions. This is particularly true as to the regrouping of capital stock, changes in the structure of capital is what has been supporting the features of postwar economy. Furthermore, this fact is related to the essence of capital, the significance of capital stock lies, quite different from other factors of production, in its heterogeneity. Heterogeneity indicates not simply the differences in physical property but rather the specific purposes for which the capital is used, that is the functionally differentiated structural pattern. Therefore, regrouping combinations of capital stock cannot but have profound effects in the economy.

As to growth of capital, that is, investment process, economic theories pay particular attention to the amount and rate of change in investment. However, it is not appropriate to disregard the difference in functions classified by uses. One way of classification is to divide domestic investment into construction, equipment and inventories, and then have overseas investment. Another way

is to classify investment as either autonomous investment or induced investment. It is for convenience that the concept of capital with a variety of specific purposes is treated as if it were homogeneous.

The classification of domestic investment into construction, equipment and inventories, does not reveal satisfactorily the relationship of credit circulations between changes of fixed capital, operating capital and liquid capital in individual firms which Keynes once tried to show in his "Treatise on Money" (Book VI, the Rate of Investment and its Change). However, as to investment fluctuations a sharp rise or fall in inventories obviously shows failures in investment decisions which firms made in anticipation of future demand conditions and in general the demand and supply of inventories are not always equal but rather imbalanced. As to construction and equipment, the increase in fixed capital may be seen as a process of increasing future productivity. However it is not easy to change investment decision in fixed capital later, adjustment processes will be carried out only through changes in the depreciation rate. Furthermore, constructions of housing and welfare facilities have no direct effect upon productivity and this type of construction has increased in the postwar period, its character differs greatly from factory construction.

Another theoretical classification of investment is between autonomous investment and induced investment. Almost all the investment functions contained in recent theories of economic fluctuations use this two-type classification. Autonomous investment is independent from any kind of income type (income level, distribution or change) and it is important for its multiplier effect. On the other hand, induced investment is those which will be induced by changes in some sort of income type. It is based on the acceleration principle. However, this classification, though quite clear in concept by strict dichotomy, is not so clear as to the *modus operandi* and there are even some cases where this classification can not be made in practice. Therefore the *modus operandi* of independent investment can be specified only by giving examples. For example, Hicks specified autonomous investment as follows. (L. R. Hicks, *A Contribution to the Theory of the Trade Cycle*, 1950, p. 59) "Public investment, investment which occurs in direct response to inventions, and much of the 'long-range' investment (as Mr. Harrod calls it) which is only expected to pay for itself over a long period, all of these can be regarded as *autonomous investment* for our purposes." The content of public investment is ambiguous as will be seen later. And it is also questionable to regard all government investment as autonomous investment. Investment which occurs in direct response to invention is called as innovation, but there is this kind of investment among government investments as well as private investments. Further long-range investment which is only expected to pay for itself over a long period not only earns revenue over a long period but also its investment period is distributed over a long-range. Thus, many public utility works such as roads, transportation, communication and electric power come under this category. Public investment includes, in addition to public works such as roads and harbors, various government-operated

enterprises. However, the range of government-operated enterprises differs according to countries and it is hard to draw line between public enterprises and public works. But, viewed from points of function rather than path of fluctuation, autonomous investment is defined to consist mainly of innovating business equipment, construction, transportation, communication, electric power, water supply, and other public works, together with government-operated enterprises. Accordingly, when fluctuation paths of public and private investment are examined, it shall be borne in mind that the private investment includes what can be regarded as autonomous investment.

Further, Harrod thought that any autonomous investment could be regarded as induced investment when a growing economy was observed over a long period, thus paying attention only to induced investment based on the acceleration principle. However, this led to his neglecting any new departure as a mutation and to his failure to recognize the important result which will follow the introduction of independent investment. What is borne in mind is, as Hicks said, "it is evident that in the real world autonomous investment does not expand steadily. It is itself liable to develop 'humps' of the same sort as those which characterize induced investment, and for much the same reasons. Though it is possible (just as it is in the case of induced investment) for these humps to add up to a steady progress, there is not much reason in practice why they should do so. The best that is in fact likely to happen is that autonomous investment should have a clear trend rate of expansion, with fairly considerable oscillations about its trend." (*op. cit.*, p. 63)

Fluctuations in the economy are mainly due to fluctuations of investment, and autonomous investment will bring about not only a change in the quantity of capital but also a regrouping of combination of capital. And regrouping is based on the character of complementarity of capital resources. (L. M. Lachmann, *Capital and its Structure*, 1956.) The entrepreneur is constantly regrouping the combination of capital and this process of change is the primary cause of economic fluctuations.

II. *Content and Operation of Public Investment*

In order to see patterns of investment fluctuation in the process of postwar reconstruction, let us examine first the proportion of private gross investment in gross national expenditure (Table 1). It shows that the ratios increased remarkably while inflation advanced from 1946 to 1948, in 1949 decreased with the implementation of the Dodge-line policy, and again rose sharply after the Korean conflict up to 1951 when the rate of investment was highest.

Even during the years of 1952 and 1953, which were called the consumption boom period, investment rates showed rather high figures, however, a sharp drop in the investment level from 1951 to 1952 was due to a notable decrease in inventories. It shows that the deflationary policy in 1954 was very effective in restraining both construction and inventory. One thing that should be

noted is that what here called private capital formation, particularly equipment investment, includes government indirect investment, that is, loans through governmental banks. Therefore it should be recognized that the fluctuation of postwar private investment reflects not only the behavior of private firms but also the result of fiscal policy. Thus, during the period of 1950 to 1955, except the year 1954 when there was taken deflationary policy, equipment had been increasing because of the effect of the policy.

Table 1 Fluctuations in Private Investment
(in billions of yen)

Fiscal Year	Gross National Expenditure (A)	Private Investment (B)	B/A
1946	474.0	75.7	16.0
1947	1,308.7	199.1	15.2
1948	2,666.1	494.2	18.5
1949	3,375.2	532.0	15.8
1950	3,970.8	798.6	20.1
Source: Economic Council Board, "Nihonkeizai to Kokuminshotoku" (Japanese Economy and National Income), 1954.			
1950	3,946.7	818.	20.7
1951	5,444.2	1,252.1	23.0
1952	6,118.0	1,204.0	19.7
1953	7,084.8	1,335.2	18.8
1954	7,461.8	1,159.5	15.5
1955	8,229.8	1,376.4	16.7

Source: Economic Planning Agency, "Monthly Report on National Income" No. 85, 1957.

In economic theory, the study of the investment function to explain how investment will change has not yet reached a satisfactory state. Many economic models are trying to trace changes in investment by using the acceleration principle. This principle holds that the investment level depends upon the increase in income. However, what can be explained by this principle is only private inventory investment. Actually in 1949, 1952 and 1954 when the rate of income increase was rather slow, inventory investment decreased accordingly. However, equipment investment which decreased following the reduction in fiscal loans and investment under the deflationary policy in 1954, has been increasing steadily in spite of the slowdown in the rate of income increase. This can

be explained only by taking into consideration the functions of public investment, particularly of its indirect investment through governmental banks.

At this point it is well to examine the content of what is called public investment. Investment carried out by the government should be divided into direct and indirect investments. Direct investment consists mainly of investment into government-managed enterprises and public works. And public works include the formation of so called social overhead capital such as roads, rivers, and the like. But the bulk of indirect investment consists of loans through governmental banks, which have played an important role in supplying loanable funds to the private sector for the postwar reconstruction. Public works were once emphasized as anti-depression measures during the world-wide great depression and study of its operation has led to formulation of the multiplier theory. Today, it is not only important as merely short term policy but also developments of road, transportation and communication networks are given great attention as source of effective demand over the long period particularly in developing backward countries. The economic function of public works is very important in this sense.

On the other hand indirect investment of the government takes place in the form of credit extending to the private sector and this is a new measure which appeared to meet difficult situation on the part of the private sector in supplying long-term funds. The effects of this on private capital formation are tremendous. As explained above, it is included in the estimate of private investment, amounting to about 15% of total private investment (12.8% in 1952, 14.2% in 1953, 15.1% in 1954 and 11.5% in 1955). Furthermore, as will be pointed out later, it has become the main source of funds to important industries, therefore, many of the changes in postwar industrial structure have been due to its operation.

Direct investment of the government recently accounts for about one third of the total investment. Accordingly, investment, either direct or indirect, carried out by the government amounts to almost one half of total domestic investment. We cannot, therefore, talk about the postwar economy, neglecting the operation of public investment. The following figures show the proportion of government direct investment and changes in its level. [Table 2]

The direct investment fluctuates each year as it is subject to political influences. From 1946 to 1949 it amounted to about 30%—40% of total investment, after 1950 it decreased temporarily as private investment was activated by the boom, and after 1953 it again increased. Under the deflationary policy of 1954, levels of investment, both public and private, sharply decreased, however it should be noticed that government direct investment moved almost in the opposite direction of private investment, for example, it decreased in 1950 and increased in 1952. It is assumed that this had a considerable effect on the adjustment of business fluctuations.

The shift in direction of private investment financed by governmental banks deserves attention. Its main role is to supply funds for equipment to important

Table 2 Fluctuations in Government and Private Investment (in billions of yen)

Fiscal Year	Gross Capital Formation			Ratio Over the Previous Year			Proportion	
	Private Gross Capital Formation	Government Gross Capital Formation	Domestic Gross Capital Formation	Private Gross Capital Formation	Government Gross Capital Formation	Domestic Gross Capital Formation	Private	Government
1946	75.7	29.7	105.4	—	—	—	71.8	28.2
1947	199.1	146.1	345.2	263.0	491.9	327.5	57.7	42.3
1948	494.2	258.0	752.2	248.2	176.6	217.9	65.7	34.3
1949	532.0	298.6	830.6	107.6	115.7	110.4	64.1	35.9
1950	798.6	189.1	987.7	150.1	63.3	118.9	80.9	19.1

Source: Economic Council Board, "Nihonkeizai to Kokuminshotoku" (Japanese Economy and National Income).

1950	818.1	189.2	1,007.3	—	—	—	81.2	18.8
1951	1,252.1	411.7	1,663.8	153.0	217.6	165.1	75.3	24.7
1952	1,204.0	474.0	1,678.0	96.2	115.1	100.8	71.8	28.2
1953	1,335.2	642.8	1,978.0	110.9	135.6	117.9	67.5	32.5
1954	1,159.5	592.6	1,752.1	86.8	92.2	88.6	66.2	33.8
1955	1,376.4	729.1	2,105.5	118.7	123.0	120.2	65.4	34.6

Source: Economic Planning Agency, "Monthly Report on National Income" No. 85.

Table 3 Shifts in Fiscal Loans and Investment (in billions of yen)

Fiscal year	1949 (%)	1950 (%)	1951 (%)	1952 (%)	1953 (%)	1954 (%)	1955 (%)	1956 (%)								
Supply of funds to basic industries	87.1	53.7	51.8	38.7	96.1	41.6	108.7	38.8	111.5	37.0	79.5	32.7	65.2	23.6	43.6	16.9
Promotion of exports	—	—	5.0	3.7	12.0	5.2	4.0	1.4	—	—	—	—	20.0	8.0	24.5	9.4
Financing agriculture, forestry, small and medium business and construction of housing	3.3	2.2	17.0	12.7	33.8	14.6	55.0	19.6	68.2	22.7	63.6	26.2	81.8	29.6	93.8	36.2
Local government bonds	31.0	20.9	41.0	30.7	56.2	24.3	83.0	29.6	99.8	33.2	89.4	36.8	91.4	33.0	84.0	32.4
Government construction investment	27.0	18.2	19.0	14.2	33.0	14.3	29.7	10.6	20.5	6.8	9.5	3.9	15.0	15.4	10.3	4.0
Others	—	—	—	—	—	—	—	—	1.0	0.3	1.0	0.4	1.2	0.4	2.9	1.1
Total	148.4	100.0	133.8	100.0	231.1	100.0	280.4	100.0	301.0	100.0	243.0	100.0	276.6	100.0	259.2	100.0

Source: Ministry of Finance, "Zaisei Kinyu Tokai Geppo" (Monthly Report of Fiscal and Monetary Statistics) No. 62, 1956.

Table 4 Shifts in Funds Source of Fiscal Loans and Investment (in billions of yen)

Fiscal Year	1946-1948 (%)	1949 (%)	1950 (%)	1951 (%)	1952 (%)	1953 (%)	1954 (%)	1955 (%)	1956 (%)									
General Account	26.4	43.6	91.5	38.7	25.3	77.1	156.0	44.1	79.0	24.8	48.8	16.2	21.5	8.9	10.8	3.9	2.0	0.8
Trust Fund Bureau	34.1	56.4	31.0	13.1	59.0	39.8	129.0	36.5	178.3	56.0	172.3	57.2	158.0	65.0	171.1	61.9	169.9	65.5
Postal Life Insurance	—	—	—	—	—	—	—	—	—	—	19.0	6.3	46.0	18.9	50.3	18.2	56.4	21.8
U. S. Aid Counterpart Fund	—	—	114.1	48.2	63.9	43.1	68.7	19.4	61.1	19.2	18.5	6.1	—	—	—	—	—	—
Surplus Agricultural Commodity Fund	—	—	—	—	—	—	—	—	—	—	—	—	—	—	21.4	7.7	17.7	6.9
Industrial Investment Special Account	—	—	—	—	—	—	—	—	—	—	42.5	14.1	17.5	7.2	23.0	8.3	13.2	5.1
Total	60.5	100.0	236.6	100.0	148.2	100.0	353.7	100.0	318.4	100.0	301.1	100.0	243.0	100.0	276.6	100.0	259.2	100.0

Source: Ministry of Finance, "Zaisei Kinyu Tokai Geppo" (Monthly Report of Fiscal and Monetary Statistics) No. 62.

industries such as electric power, shipbuilding and the like. Thus, it should be analysed what was basic industries and to what extent fiscal loans and investment have been directed. In both of the above two respects, it has changed notably during the twelve years of the postwar period and the effects on the change in industrial structure of our country have been decisive. The process of shifting emphasis from primary industries such as agriculture and mining immediately after the war to key industries such as electric power, steel, shipbuilding and the like later is very interesting to observe as a concrete example of economic policy. Further, it seems that the main direction of fiscal loans and investment is changing from industrial reconstruction to housing construction and is decreasing; in 1949 it was 58.7%, in 1952 38.8%, in 1955 23.6% and in 1956 it was only 16.9%. The decrease in 1956, not only in proportion but also in absolute volume, is regarded as a cause for the appearance of the bottle neck problem as will be pointed out later.

It is hard to say whether this recent trend indicates properly the future of fiscal loans and investment. In response to the increase in bottle necks or slow-down of the increase in the rate of income, it might be possible that fiscal loans will be directed again to basic industries. However what should be taken into account is sources on which this sort of investment is dependent. The nature and change of the funds source restrict the range and direction of fiscal loans and investment.

III. *Changes in the Sources of Investment Funds*

In general, the sources of public investment funds which is directed to government-managed corporation and public works is a contribution from the government general account, that is, taxes, and indirect investment as supplying funds to private industry depends on the Trust Funds Bureau Fund, that is, postal saving. There is a big difference between immediate postwar period and today as to this investment funds sources.

Change in loan funds shows (Table 4) that from 1946 to 1948 up to 43% of these supplementary funds to private industry were provided by taxes (general account). It may be an abnormal phenomenon that such indirect investment was also financed by tax revenues. This supply of funds from taxes decreased to 17.1% by 1950 fiscal year, however, it rose to 44.1%, the highest level, in fiscal year 1951 (note that this year's private investment rate was the postwar highest), then sharply decreased and in 1956 it became only 0.8%. According to this trend, fund sources moved to Trust Funds Bureau Fund and postal life insurance funds.

Usually taxes are thought of as forced saving, but it deserves that name only when it becomes a source of public investment. However, it should be government direct investment that taxes are spent for and it is a rather abnormal phenomenon that taxes are used for private capital formation. It shows how insufficient the funds for postwar reconstruction were. Under normal condi-

tions, the range of fiscal loans to private sector is restricted so that it may not depend on taxes. In this respect it can be said that fiscal loans came to be normal in fiscal 1953.

Still, it is questionable whether more exclusive dependency of fiscal loan and investment funds upon Trust Funds Bureau Fund and the like instead of tax revenue can be called normalization. For example, in 1956 an unexpected decrease in postal saving restricted the supply of funds for fiscal loans and investment and funds to key industries were cut down. It was the restrictive measures taken in key industries during that year when private investment was abnormally high that caused the bottlenecks. Further, it can hardly be considered normal to use such as postal saving, that is funds for consumption by the low income groups, for financing only key industries. It may be regarded rather as normal that fiscal loans and investment are directed to the construction of housing and other welfare facilities so long as it depends on this sort of funds source.

There is more to be considered as to funds source of fiscal loans and investment. The United Kingdom with similarly large volume of government investment is financing funds to governmental enterprise out of social security funds such as annuities. This seems to indicate that the future source of funds should be from such long-term funds.

The role performed by public investment is such that, if pursued intentionally, it can not only adjust short-term business cycle but it has also influence upon long-range changes in the capital structure. However, due consideration to the source of funds should make it clear that, formally speaking, government direct investment is appropriate as a short-term measure and long-term investment should be carried out by indirect investment. Thus, unless funds source of loans programs and investment shift from short-term funds like taxes to long-term funds such as annuities, fiscal loans and investment can not perform smoothly long-term investment programs. Adequate social security funds have not been established in this country. The social security system has its economic significance in that its expenditures maintain consumption on the one hand and funds as savings go to investment.

IV. *Investment out of Government Revenues*

In the process of the reconstruction, even fiscal loans and investment, (government indirect investment), was financed out of tax revenues. Thus it is necessary to comprehend the difference between this and the case where the source of investment funds is restricted to private saving. This fact has been completely neglected in formulating the saving function.

The simplest hypothesis is that the source of investment funds is only saving which depends upon the level of income. Let Y be national income, S private saving and s the saving ratio. Then we have.

$$(1) S = sY$$

This is not an appropriate formula for the consideration of our problem. It does not take into account the revenue and expenditure of the government. Therefore, we introduce tax and assume that saving is made out of income after the reduction of all sorts of tax. Let t be the tax rate then

$$(2) \quad S = s(1-t)Y$$

Saving out of disposable income after tax is lower than in the case of no tax imposition and the higher the tax rate the lower saving. And if no investment is made out of tax, private saving decreases with the introduction of tax. Then tax is not forced saving. However, if some proportion (v) of tax proceeds is invested by the government, with that savings added, gross domestic saving becomes,

$$(3) \quad S = [s(1-t) + vt]Y = [s + (v-s)t]Y$$

What should be noted is the fact that so long as the proportion of tax to be invested (v) is larger than the private saving rate (s), a portion of the government investment carried out in this way will raise the total investment level. Furthermore, in this case a rise in the tax rate also helps increase investment. On the other hand, if $s < v$, a level of saving will be lowered. In this case a rise in tax rate decreases investment. This formula shows that as investment out of tax, that is, government direct investment should decrease notably, making it lower than the private saving rate, a reduction of tax (that is, a decrease in t) is the only measure to prevent the level of saving from dropping.

Suppose that the investment function consists of acceleration investment and independent investment and let the acceleration coefficient be b and independent investment be A . Then, in equilibrium, with saving as mentioned above, we have (surfix n indicates period)

$$(4) \quad b(Y_{n-1} - Y_{n-2}) + At = [s + (v-s)t]Y_{n-1}$$

From this, a growth rate of income becomes

$$(5) \quad \frac{(Y_{n-1} - Y_{n-2})}{Y_{n-1}} = \frac{[s - (v-s)t]}{b} - \frac{At/Y_{n-1}}{b}$$

As it can be seen, the tax rate (t) and the rate of investment out of tax (v) both operate as strategic factors to determine the rate of growth.

The saving function usually assumed that there is not the existence of the government as formula (1). Even if the assumption that saving is made out of disposable income is introduced, it merely presents tax only as a factor lowering the saving level. Only by considering investment out of government revenues, can tax be treated to work as forced saving and determine a level of investment.

In the process of postwar reconstruction, investment out of tax revenues financed not only direct investment of the government but also indirect investment. This, coupled with a relatively high tax rate, raised the total investment level and also furthered the growth of the economy. The mechanism of such phenomena was described above.

V. *Public Investment as Fiscal Policy*

Generally speaking, fiscal policy has developed to rectify gaps in the economy. These gaps may be deflationary gaps, or inflationary gaps, gaps between saving and investment; in short, they are gaps between demand and supply. This means that voluntary actions of the private economy alone do not always bring about equilibrium between demand and supply. Furthermore, even if equilibrium situations are maintained for a long period, the level of the equilibrium may be too low to guarantee full employment of labor and full utilization of capital. This necessitates fiscal policy as a complementary operation.

In a country with already matured capital accumulation, a deflationary gap or excess saving over investment is likely to happen, and this mechanism is analysed as the secular stagnation thesis or the theory of a mature economy. Accordingly, a corresponding fiscal policy is mainly to fill up the deflationary gap and to absorb excess saving. Also in such a country inflation is considered a temporary phenomenon which appears only after demand (investment) exceeds supply (saving) beyond full employment (or utilisation) income level. It seems that there exists no inflation before full employment or full utilization. As a means to fill gaps in the country, it is felt necessary to apply fiscal policy in order to increase effective demand temporarily. Thus, attention is given only to public works, which are most easily operated.

On the contrary, in an economy where capital accumulation is not sufficient and not matured, things are entirely different. There appear constantly the phenomena of inflationary gap and excess investment demand. In such a country it becomes all the more necessary to absorb consumption demand and investment demand and to reduce the multiplier effect by tax measures. However, this can not be done effectively by negative measures of minimizing fiscal expenditures. Especially in a war devastated country, even risking the danger of inflation rapid rehabilitation construction has to be carried out. In this respect the investment policy of the government here differs from merely absorbing excess saving. As was seen already the way to influence private capital formation through fiscal loans and investment gives not only a short-term impact to the economy, but also long-term effects to the structure of the economy. The rapid process of postwar economic development shows this result.

However, private investment in such a country is extremely unstable. Accordingly the direction of fiscal policy also can not help but fluctuate and thus the direction of government investment is not determined. The experience in this country indicates this. Particularly a reduction or postponement of government investment is likely to be adopted as disinflationary policy for oppressing excess investment demand. This is what happened in 1954 and this year. When government investment amounts to nearly half of total investment, merely raising the rate of interest does not have a big effect on the total investment level except psychologically. Furthermore, as indirect investment of the government

covers important industries, particularly bottle-neck industries, the policy of investment reduction influences greatly supply capacity over a long-range as well as restrict short-term effective demand. Without stabilization of this unstable investment, particularly, complementary stabilization of investment which has the character of independent investment such as government investment, the economy can not but fluctuate.

Before concluding this essay, some remarks should be mentioned as to the efficiency of government investment. Usually a concept of marginal productivity of capital is used in order to measure investment efficiency. However, this only compares investment with revenue at a certain point of time. This is not an appropriate measure to judge efficiency for "long-range investment which only pays for itself over a long-range." In the case of such long-range investment comparable revenue should be the long-range anticipated revenue until the end of its durable period and also comparable investment distributed over a long-range. The very way of comparison between anticipated revenue and distributed investment is the measure of judging the efficiency of investment as a genuinely dynamic concept. Furthermore, where various types of capital have respectively specific purposes, investment criteria should be varied according to their uses. Public investment has entirely different uses according to whether it is direct investment or indirect investment. In judging the efficiency of investment of government-operated corporations or public works for which revenue is not the sole purpose, the criteria should be different from the usual one which is directed to only private investment. I do not try to go into the problem deeply, however, further studies should be conducted in order to avoid misunderstandings.