国民所得推計研究会資料(14)

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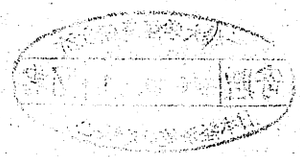

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資料 D10

AN APPROACH TO THE MEASUREMENT OF NATIONAL SAVING IN JAPAN (1878-1940)

Contents

KOICHI EMI

An approach to the Measurement of National Saving in Japan (1878-1940)

By Koichi Emi [1]

I. The Estimate of Private Savings

In the international comparison of economic growth, it has been often pointed out that the growth rate of Japanese economy has been very rapid compared with the western countries in prewar periods as well as in recent postwars years. [2] The question to ask is what factors have contributed to this growth and attentions are naturally concentrated to analyse the formation of saving and the channels which saving is transformed into investment. These analysis requires the historical statistics both on saving and capital formation within the conceptual framework of national income statistics.

The aim of this paper is, first of all, to estimate national saving and test its reliability in comparison with the estimate of capital formation which has already presented. [3]

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1) The author is greatly indebted to Professor Simon Kuznets and Professor Irwin Friend for reading the manuscript and making useful suggestions. However, the results presented here, is only an approximation of saving estimate and the the writer alone, of course, responsible for all errors of fact and interpretations.

2) For example, Colin Clark, The Conditions of Economic Progress, 2nd ed., Chap.5, 1951. Simon Kuznets, Quantitative Aspects of the Economic Growth of Nations (I. Level and Variability of Rates of Growth) pp.9-15. For postwar years, The Bank of Japan and Rissho Univ., Savings in the Economic Growth of Postwar Japan, ECAFE Bulletin Vol.XI, No.2

3) Henry Rosovsky, Capital Formation in Japan (1868-1940), The Free Press of Glencoe, 1961. The author collaborated with him.

1. Method of Saving Estimate by Financial Approach

Basic relationships to define savings are comprehensively arranged in 'A Study of Saving in The United States' of Raymond Goldsmith. [1] He shows the fundamental three relationships as follows.

(1) Saving = Current income* - (Current consumption + Captal consumption allowances)

(2) Saving = Changes in assets - Changes in liabilities **

(3) Saving = Change in earned net worth

Relations (2) and (3) can be additionally rearranged into the next essential feature.

(4) Change in earned net worth = Change in tangible assets + Change in intangible assets - Change in liabilities **

For each economic units, say for firms, relation (1) is gotten from the profits and loss statements and relation (5) is reported by the balance sheet. In estimating saving, we may call the former method an income approach and the latter a balance sheet (or wealth) approach. The question is how to estimate various sectors of nationwide saving, especially as historical series.

Generally speaking, it is difficult to estimate saving by different economic groups. It is necessary to adopt an indirect method, namely the institutional approach [2] in which the exsisting

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1) R. Goldsmith, Study of Saving in The United States, Vol.I, pp.23-

2) An evaluation of this method is dicussed by Irwin Friend. He describes " By an appropriate sampling of accounts on the books of financial institutions, corporations and govefrnmental units, it should be possible to derive reliable estimates of distribution among economic and other groups of most items of assets and liabilities and saving " (Cf. I. Friend, Institutional Data as a Source of New Information for Use in Social Accounting System. Mimeograph in Congerence on Research in Income and Wealth, 1959.) However, this method can not be applied back to historical series of financial institutions, particularly the estimates of saving by economic groups. Here the author uses the meaning of institutional approach in a more aggregative sense.

records of financial intermediaries are used.

Let us assume three economic units in a closed economy, viz. firms, households and financial institutions, then we have the relations:

$$S_1 = \Delta W_1$$
$$= \Delta T_1 + \Delta F_1 - \Delta L_1 \qquad (1)$$
$$S_2 = \Delta W_2$$
$$= \Delta T_2 + \Delta F_2 - \Delta L_2 \qquad (2)$$

Here, T=Tangible assets, F=Financial assets including cash holdings, L=Liabilities, W=Net Worth, S=Gross saving, s=Net saving. Suffixes 1,2 and 3 mean respectively those of firms, households and financial institutions.

If we assume a simplified model in which the corporate sector invests more than its saving while the household sector saves more than its investments, the relation is shown as follows.

Corporations $\Delta T_1 - S_1 = \Delta L_1 - \Delta F_1$ (3)

Households $S_2 - \Delta T_2 = \Delta F_2 - \Delta L_2$ (4)

And the relation linked with financial institutions is,

$$\Delta F_1 + \Delta F_2 = \Delta L_3 \qquad (5)$$

In corporations, ΔT_1 is larger than S_1 and its difference is shown as the same amount of financial gap between the increase of liabilities and that of financial assets. In other words, investment in corporate sector is dependent upon the increase of liabilities, namely the external financing through the channels of financial intermediaries. On the other hand, household sector holds its surplus ($S_2 > \Delta T_2$) in various forms of the increase of financial assets over the liabilities. The actual private economy is more or less different from the above simplification and the connection of saving with investment is different according to the development of financial market each country. However, these four components - savings, tangible assets, financial assets and liabilities have generally grown up with close interrelations among them.[1)]

Let's test the relation among these four components in the actual statistics of the United States. Table 1 is very instructive from this viewpoint. First of all, we can see saving is in excess of investment in the non-corporate sector and conversely business corporations invest more than their saving and the respective gaps are filled up through the financial transactions. In the private sector as a whole, saving does not meet the demands for net investment and this fact shows the dependency of private funds for net

Table 1 Sources and Uses of Non-corporate and Corporate Funds, Cumulative Totals (1947 - 1957) Unit: Billions of Dollars

	Sources (1)	Uses (2)	(1)-(2)
Non-corp.	$s_2 = 171$	$\Delta F_2 = 174$	- 3
	$\Delta L_2 = 168$	$\Delta T_1 - d_2 = 166$	2
Corp.	$s_1 = 106$	$\Delta F_1 = 87$	19
	$\Delta L_1 = 149$	$\Delta T_1 - d_1 = 168$	- 19
Combined	$s_1 + s_2 = 277$	$\Delta F_1 + \Delta F_2 = 261$	16
	$\Delta L_1 + \Delta L_2 = 317$	$\Delta T_1 + d_1 + \Delta T_2 - d_2 = 334$	- 17

Here, d means depriciation.
Sources: Dept. of Commerce, Income and Output, 1958 ed., pp.11-12

(Continued) * It must be 'Current income after taxes'.
** They must be adjusted for items of capital transfers and revaluation.

1) Gurley and Shaw, Money in a Theory of Finance, Chap. IV, V. 1960

investment to external financing. Here the external financing includes not only the borrowings from financial institutions, but also that of government and foreign sector.

If we combine the equations, (1) and (2),

$$S_1 + S_2 + \Delta L_1 + \Delta L_2 = \Delta T_1 + \Delta T_2 + \Delta F_1 + \Delta F_2 \qquad (6)$$

The left hand shows the sources of funds which consist of internal ($=S_1 + S_2$) and external financing ($=\Delta L_1 + \Delta L_2$). On the other hand, the right hand means the uses of funds which are divided into physical and financial assets. Transforming the above to a net basis,

$$\begin{aligned} S_1 + S_2 + \Delta L_1 + \Delta L_2 &= \Delta T_1 - d_1 + \Delta T_2 - d_2 + \Delta F_1 + \Delta F_2 \\ &= \Delta t_1 + \Delta t_2 + \Delta F_1 + \Delta F_2 \end{aligned} \qquad (7)$$

(d=depreciation, t=net tangible assets)

Here, the author's assumption is to consider that net private saving is roughly equal to the net increase of financial assets held by private sector, namely

$$S_1 + S_2 \cong \Delta F_1 + \Delta F_2 \qquad (8)$$

As a matter of fact, however, it is quite complicated how the relation between sources and uses of funds in[s] correspond precisely each other, because saving is directed not only for the addition of financial assets but also for other purposes, say for investment and for reducing the debt. The latter belongs purely to financial transactions. In connection with the latter transaction, we can guess changes in financial assets in corporate area are fairly related to changes in liabilities, especially and some part of increase of liabilities may be transformed to that of financial assets.

Consequently the eqation (8) may be rewritten,

$$S_1 + S_2 = \Delta F_1 + \Delta F_2 + X_p \qquad (9)$$

Here X_p represents the difference between saving and net increase of financial assets in private sector as a whole, accordingly it is interpreted as the part of internal funds directed to other purposes, mostly for the new acquisition of tangible assets besides the net increase of financial assets. Equation (10) shows the same relation with (9).

$$\Delta L_1 + \Delta L_2 = I_1 + I_2 - X_p \qquad (10)$$

According to the above two equations, the more dependency of funds for net investment to external financing, the less of X_p and then we might say that saving is approximately equal to the net increase of financial assets if we assume the schems in which the funds for new acquisition of tangible assets are almost all provided by the increase of liabilities. In addtion to this assumption, the estimation formula of private saving is shown as follows.

$$S_1 + S_2 \cong \Delta F_1 + \Delta F_2 \cong \Delta L_3 - \Delta F_g \qquad (11)$$

Some financial assets held by non-financial sectors are not necessarily connected with liabilities of financial institutions like as credit of corporations to consumer and direct investment to securities, but their figures are almost all gotten from financial statistics. Here ΔL_3 is considered as the broader concept in which cash holdings and government bonds held by private sector also are included. ΔF_g means deposits of government to financial institutions.

In Table (1), this assumption is fairly applicable to the case of the non-corporate area, but not so in the business corporations. Combining both sectors, the disparity between net saving and

the increase of financial assets in corporate sector is somewhat mitigated and the ratio of the discrepancy is 5.7 per cent in the accumulated total of eleven years (1947-57).[1] If the difference is kept roughly constant at about five per cent, the assumption is broadly safe in the longer run not only in the non-corporate but also in the private sector as a whole. Let's examine the annual movements of the relation between saving and net increase of financial assets.

Table 2 Relation between saving and financial Assets

Unit:Billion of Dollars

	S_1	S_2	Total private saving	ΔF_1	ΔF_2	Total financial assets	Difference	Ratio of difference
	(1)	(2)	(3)=(1)+(2)	(4)	(5)	(6)=(4)+(5)	(7)=(3)-(6)	(8)=(7)/(3)
1946	7.2	13.5	20.7	- .5	13.4	12.9	7.8	0.376
1947	11.4	4.7	16.1	8.6	9.4	18.0	- 1.9	- 0.117
1948	12.6	11.0	23.6	5.3	6.9	12.2	11.4	0.482
1949	7.8	8.5	16.3	3.8	6.9	10.7	5.6	0.343
1950	13.0	12.6	25.6	18.6	11.1	29.7	- 4.1	- 0.160
1951	10.0	17.7	27.7	8.1	14.1	22.2	5.5	0.198
1952	7.4	18.9	26.3	6.3	20.0	26.3	0	0
1953	7.9	19.8	27.7	2.9	18.9	21.8	5.9	0.212
1954	6.3	18.9	25.2	3.0	17.4	20.4	4.8	0.190
1955	10.9	17.5	28.4	19.7	22.5	42.2	- 13.8	- 0.485
1956	10.2	21.0	31.2	4.3	22.9	27.2	4.0	0.128
1957	8.8	20.7	29.5	3.8	24.3	28.1	1.4	0.047
Cumulative	113.5	184.8	298.3	83.9	187.8	271.7		

Source : U.S. Dept. of Commerce, U.S.Income and Output, 1958, Tables V-9 and V-10, pp.194-195. ΔF_2 comes from SEC estimate in Table V-9

1) $(\sum S_p - \Sigma \Delta F_p)/\Sigma S_p = 0.057$ (p=private)

From Table 2, we can find that in the non-corporate area, the assumption is roughly applicable to annual basis as well as to the cumulative total. However, in business corporations, the annual level of saving is quite different from that of financial assets although the direction of movement is somewhat alike. In the whole private sector, savings in 1947, 1952, 1956 and 1957 are fairly close to changes in financial assets, but those in 1946, 1948, 1949 and 1955 are not well correlated with the latter.[1]

The above evidence is probable because some financial assets for liquidity use are quite sensitive to the changing business conditions, especially in corporate area. The big difference in 1948 and 1955 is due to the violent changes of receivables of corporations to others except consumer. Such changes in

1) In reference with this checking, the annual correlations among the movements of these four components are caluculated as Table 2a.

Table 2a Correlations among net saving, increase of tangible assets, increase of financial assets and that of liabilities (1946-1957)

	$r_{S\Delta T}$	$r_{S\Delta F}$	$r_{S\Delta L}$	$r_{\Delta T\Delta F}$	$r_{\Delta T\Delta L}$	$r_{\Delta F\Delta L}$
Non-corp.	0.51	0.90	0.46	0.49	0.82	0.66
Corp.	0.57	0.67	0.67	0.21	0.76	0.77
Combined	0.66	0.69	0.60	0.60	0.70	0.90

Source: ibid.

The correlations listed on Table 2a broadly coincide with the interpretation which is based on Table 1 and 2. In non-corporate sector, saving is most highly correlated with ΔF, namely financial assets but not tangible assets. Relatively high correlation of $r_{\Delta T\Delta L}$ is interpreted as meaning that tangible assets are financed by changes in liabilities. This dependency on external financing is also true in the case of corporations. The correlation between ΔF and ΔL is related to the interrelation between loans and deposits in the financial activities. If we combine non-corporate and corporate sectors, none of these correlations with saving is clear.

financial assets correspond simultaneously with those of short-term sources in liabilities and inventories in physical assets. The changes in government securities held by corporations also are related to the above difference. From the long-run point of view, we must notice the facts that the accumulation of internal funds in corporations have contributed to provide funds for investment by replacing gradually external financing.

In Japan, the detailed statistics on sources and uses of flow funds by seperate groups are not available, but the Bank of Japan has estimated savings from financial statistics since 1933. It considers private savings as the increase of deposits and securities differing from the author's estimates which include changes in cash holdings. Professor M. Shinohara compared the saving estimates of the Bank of Japan with that in the official national income statistics and concluded that corporate investment funds have been highly dependent upon financial institutions in the postwar Japanese economy, when changes in liabilities and depreciation have roughly equaled to gross investment in physical assets.[1)]

(continued) The increases of financial assets are most closely associated with those of liabilities because $\Sigma r_{\Delta L}$ should be unity in a closed economy. $r_{\varepsilon \Delta T}$ also should be unity, but it is not so high in Table 2a since the relation between sources and uses of funds in other sectors beyond the private sector must be complicated.

1) Journal of Political Economy. Dec. 1960

In other words, saving has been roughly equaled to the sum of changes in cash holdings, deposits and securities. This relation is shows as Table 3.

Table 3 Comparison of Private Saving in National Income Statistics with That of the Bank of Japan

Unit: million yen

Fiscal year	Economic Planning Agency (1)	Bank of Japan (2)	Adjusted (2)* (3)
1951	933	704	865
1952	885	901	1138
1953	820	888	954
1954	790	834	829
1955	1105	1029	1200
1956	1465	1423**	1813
1957	1503	1507**	1660

* (1) - net increase of cash holdings

** Since 1956, investment in securities is not estimated by the Bank, but the author computed that part and added it to the net increase of deposits

Sources: Column(1), White Paper of National Income, 1960, Economic Planning Agency
Coulumn(2), Economic Statistics of Japan, The Bank of Japan

Except for 1951, these two estimates are close each other both in their levels and in movements. He explained the reason for difference as 'in 1951 when much saving still took the form of cash [illegible] balance due to the postwar inflation'.[1)] In connection with this point, the author tried to adjust these data for changes in cash holdings, but the difference from national income statistics is generally rather bigger although that of 1951 is closer. However, in Table 3, we should notice that it is more closely fitted with saving in national income statistics to exclude cash holdings in the boom years of 1956-57. It may be said that the difference between bothe estimates are somewhat inevitable because the conception of saving in both approaches does not exactly corres-

1) ibid.

pond with each other. In other words, in financial statistics, it is difficult to exactly seperate private, government and foreign sectors. However, as Professor Shinohara pointed out, the author's assumption is broadly acceptable in the case of Japanese economy in which corporate investment is highly dependent upon external financing. This is also true in the prewar periods.[1]

2. Measurement of Private Saving

In accordance with the assumption that private saving is roughly equal to the net increase of financial assets held by private sector, the estimation proceeds. The figures of financial assets are gotten from the financial statistics which are mostly listed on the balance sheet of financial institutions.

Those items are;

(a) Currency, (b) Demand deposits, (c) Time deposits,

(d) Insurance, (e) Securities (Bonds and stocks)

Annual private saving is regarded as the sum of annual increments of these items. Needless to say, inter-duplications among these items should be removed. The estimation formula for each assets is shown as follows.

(a) Currency

Amount of currency in private hands = Total amount of currency circulated - Currency holding by banks - Currency holding by other financial institutions

The net changes in the above formula is considered as saving through the form of currency. This form of saving included those of personal, corporations and governments together, so that the part of governments should be excluded from the total amount. But here such adjustments are not taken into consideration since the information on currency holdings of these three groups is not avilable seperatly.

(b) Deposits and savings

Deposits are composed of bank deposits, money trust, postal savings, mutual financing funds and deposits in other financial institutions. Annual increment of the sum of these items is considered as saving through deposits. In calculation of the total of bank deposits, deposits in the central bank (The Bank of Japan), Government deposits and demand deposits are excluded and intra-banks deposits also are deducted.

(c) Insurance

Here ordinary life insurance, post-office life insurance and post-office pension funds are taken into consideration as saving through insurance. There are some conceptual problems in what is the true saving through insurance. Sometimes it is considered as

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1) In prewar normal periods, both estimates are shown as Table 3a.

Table 3a Comparison of Private Saving Estimats

Unit: Million Yen

	Economic Planning Agency (1)	Bank of Japan (2)	Bank of Japan (3)*
1933	1565	1384	1541
1934	1641	1702	1789
1935	2628	2563	2718
1936	2974	2839	3113

Notes: (1) Calendar year
(2) Fiscal year
* (2) plus Changes in cash holdings estimated by the author.

the amount of premium, or as amount of premium minus payment to the insured or as increment of reserve funds. Here saving through insurance is measured as the annual increment of the following formula.

Net reserve funds = All reserve funds - Loan to the insured - Deposits in other financial institutions

(d) Securities

Saving in the forms of securities is measured as the increment of the following.

Net securities held by private sectors = Total amount of securities issued in domestic market - Securities held by banks - Securities held by other financial institutions - Loans of financial institutions on securities

Here both amount of foreign securities held by Japanese and that of domestic securities held by foreigners are not considered as those are taken up at the estimation of national saving.

In the above financial assets, those of both personal (individual - unincorporated) and corporate sectors are included. In other words, net retained profits of corporations are already included in the sum of net increases of deposits, securities and other financial assets in which corporate profits are transformed. Therefore personal saving is shown as,

Personal saving = Net increase of financial assets held by the private sector - Undistributed corporate profits

Undistributed corporate profits = Corporate profits after tax + - Personal Dividends

Those of unincorporated firms also should be measured, but it is quite difficult to estimate since there are very few information to be available.

On the basis of the above method, the estimate of private saving by a financial approach is shown in decennial totals overlapping each five years as Table 4.

Table 4 Private Saving (Decennial totals overlapping each five years) Unit: million yen

Decennial years	Time deposits & insurance	Currency & demand deposits	Securities	Total	Personal income	S_p / Y_p^D
	(1)	(2)	(3)	(4)=(1)+(2)+(3)	(4)	(5)=(4)/(5)
						%
1878-1887	85*	- 9	- 20	85**	5554	1.53
1883-1892	124*	64*	- 45	188**	6108	3.07
1888-1897	242	241	128	611	8762	6.97
1893-1902	358	220	446	1024	13777	7.43
1898-1907	702	336	671	1695	18799	8.91
1903-1912	1096	392	1335	2708	23448	11.54
1908-1917	3036	872	937	4221	31466	13.41
1913-1922	7226	1793	5791	14001	65799	21.29
1918-1927	8528	1029	8319	17515	99099	17.67
1923-1932	7194	- 221	5604	12540	98394	12.74
1928-1937	12247	1170	7138	18481	106759	17.31

Notes: 1) Suffix p means personal sector,
S_p = Private saving (Column 4) - Undistributed corporate profits. But there are no figures of undistributed corporate profits before 1905.
$Y_p = Y - (\text{Tax} - \text{Pension})$, Here tax is a sum of central and local governments.

Table 4 tells us that private saving has grown with steady upward trend since the first decennial years either in its level or in the ratio to disposable income. This rapid growth of private saving is mainly provided the saving through time deposits and securities which have increased keeping pace each other, ignoring the exception like the markedly recession of the latter in 1908-1917. On the other hand, currency and demand deposits are rather moderate and drop sharply in 1923-32 differing from others. This means that the financial assets in the form of currency and demand deposits are naturally used for operating transactions or for a short term, but not necessarily for an intended saving.

We find that the figures of saving in the earlier decennial years are too low. In addition to the notes of Table 4, we could state the another reason that it is since 1893 that a systematic financial statistics [1] is available, so that the statistics before then is poor to cover the financial activities. More essentially speaking, the modern economic system through financial market was not

(continued from page 14)

ii) In the first two decennials, the figures gotten from financial statistics are quite low since we guess it comes partly from the severe deflation in which the accumulated paper money issued excessively by both new government and feudal clans was liquidated. In the process of forcible liquidation, figures in current value results in understatement than as it actually was. Therefore the writer interporated the figures for that deflation span by computing the least-square trend between the decennials of 1873-82 and 1888-97. Figures with asterisk(*) are those estimated by least-square method and those with double astrisks(**) are the totals in which negative figures are not taken consideration. If the figures of total savings estimated by such method are shown, they are 324 in 1878-1887 and 468 million yen in 1883-1892 and ratios to income are respectively 5.83 and 7.66 per cent.

1) Reference on Financial Materials (Kinyujiko-sankosho), Ministry of Finance (1893-1942)

established yet and it was under the process to be caught rapidly in a monetary economy. Secondly, the results might be understated by the facts that a various kinds of inconvertible notes were issued excessively by the new and old governments since Meiji Restoration (1868) and they were reduced in the process of severe deflation (1878-83) when Japan has firstly experienced.

Computing the average saving-income ratio in real term excluding the years of 1878-1892, private or personal savinag to its income is about 16 per cent. The periodic ratio of personal saving to income also is fairly high in compariosn with that of the United States as shown Table 5.

Table 5 Comparison of Personal Saving-income Ratio between Japan and the United States

Year periods	Japan	U.S. *
	%	%
1897-1908	7.9	10.9
1909-1914	9.5	10.4
1915-1921	21.9	13.3
1922-1929	13.8	12.8
1930-1933	10.2	0.4
1934-1938	24.2	5.7

* U.S. saving-income ratio is adopted from Goldsmith's estimates (Study of Saving in the United States, Vol.I, p.243) and it is based on asocial accounting concept excluding consumer durables. Japanese figures are redevided to be comparable with those of Goldsmith in which year periods are devided from economic point of view. However, the economic meaning of devided periods is not necessarily the same between both countries.

In Table 5, the method and range of estimation are not exactly same each other, but we compare, in broader sense, Column (2) and (3). Personal saving-income ratios in Japan are generally higher in comparison with those of the United States, particularly quite bigger in both prosperous periods of the First World War and the last quinquenium in Table 5 in which quasi-war periods in Japan are included. We might say that saving-income ratios in Japan are close to a certain upper limits in inflationary periods, but they are strongly supported against downward movements, whereas U.S. ratios are not so responsive in boom, but remarkedly drop in depression. It probably comes from the variant pattern of personal saving behavior in both countries and broadly speaking from the different stages of economic growth.

1) ibid. Chap. VII., PP 135 - 175
VIII, PP 177 - 208

II. Estimate of Government Savings

The formula which is used to measure government saving is shown as the next equation.

$$T + \Delta L_g = C_g + M + I_g + \Delta F_g$$

Here, T: Tax revenue

ΔL_g: Net increase of government liabilities which include government bonds and other borrowings. It also includes government notes issued by government.

C_g: Government consumption including transfer payment to the private sector.

M: Military expenditures (include military investment)

ΔF_g: Net increase of financial assets held by government

In the equation (12), the left hand shows sources of funds which government got with uses of funds in the right side. Transforming equation (12),

$$T - (C_g + M) = I_g + \Delta F_g - \Delta L_g \qquad (13)$$

In the above equation, the left hand means the current surplus in the government budget and the right hand shows the forms of assets in which its surplus is transformed. In other words, the amount of government saving equals government investment plus net increase of financial assets held by government. Of course, all items are the total of central and local governments and then the duplication between both governments should be netted out. Concerning I_g in the equation of (13), Professor Rosovsky's estimate[1] is the most reliable one which we have and net increase of financial assets or liabilities is available from official statistics. Table 6 shows the decennial totals overlapping each five years.

Table 6 Government Saving Unit:million yen

Decennial years	I_g (1)	ΔF_g (2)	ΔL_g (3)	Total (4)=(1)+(2)-(3)	R_g (5)	S_g/R_g (6)=(4)/(6)
1878-1887	123	52	18	157	925	17.1 %
1883-1892	160	2	16	146	1070	13.6
1888-1897	250	40	192	98	1388	7.3
1893-1902	488	12	273	227	2192	10.3
1898-1907	688	439	768	359	3774	9.5
1903-1912	1081	619	966	734	6052	12.1
1908-1917	1470	660	624	1302	7943	16.4
1913-1922	3046	790	2282	1350	13179	10.2
1918-1927	5575	107	3710	1967	22609	8.7
1923-1932	6282	- 588	4242	1457	28323	5.0
1928-1937	5988	- 383	8784	- 3179	34308	- 9.4

Here, I_g means government investment. It covers both investment of construction and durable equipment in central government and local public authorites, but excludes military investment. The figures are gotten from Rosovsky's book. Netness ratio to get net investment is calculated by the author himself.

ΔF_g is net increase of financial assets held by government and ΔL_g is composed of net increase of government bonds, short-term government bills, borrowings and net increase of notes and auxiliary coins issued by government. Government borrowings are those from the Bank of Japan and Trust Fund Bureau.

R_g is the current revenues of central and local government which are mostly composed of taxes.

In Table 6, we find that government saving valued in current prices has shown a steadily upward trend ignoring the last decennial figures. Needless to say, its sources has been mainly provided by private funds through the continuous expansion of tax system, but simultaneously we must notice the facts that government bonds, postal savings and the new issues of bank notes are related to the inflationary policy of government, but the former two sources must work to neutralize such inflationary tendency. The main components of saving are government investment, but not increase of financial assets differing the case of personal saving. The upward trend of government investment explains the role of government in capital formation in Japan as is analyze in the later section. It is always over the amount of ΔL_g except the periods of 1898-1907 and 1928-1937. The former period includes the two war periods of Shino- and Russo-Japan War and the latter is related to the quasi-war periods. I_g excludes military investment while ΔL_g includes the debt for military purposes. Column (6) means government saving-income ratios. Comparing with those of private saving in Table 4, the characteristics of government saving are understandable, especially the dominant role in the initial foundation of Japanese modern economy while the big deficits in the last decennial years are covered by the high share ratio of private saving .

III. The Foreign Capital Imports

In connection with measurement of net foreign investment in Japan, we can use the official figures of balance of payments since 1902. It is measured as the balance of current transactions (commodity trade and invisible trade) with capital or gold movements as counterpart of the former. The trouble is to estimate net foreign investment before 1901. So the writer tried to measure the balance of payments in terms of accumulated totals during 1868-1897 as Table 7.

Table 7 Balance of Payments in Japan (Accumulated totals during 1868-1887)

Unit: Million yen

	Receipt		Payment		Balance
R1	Export *	549	P1 Import *	572	- 23.0
R2	Transportation and insurance	26.1	P2 Transportation and insurance	119.8	
R3	Customs on export	29.4	P3 Purchases of warship and other ordnances**	28.8	
R4	Receipt of foreign loan*	7.0	P4 Redemption of borrowings	5.6	
R5	Others	2.5	P5 Redemption of foreign bonds*	34.6	
			P6 Others	4.8	- 128.6
R6	Export of gold and silver*	152.5	P7 Import of gold and silver*	64.4	
R7	Deposits in foreign banks	80.9			+ 169.0
					+ 18.0

(Continued from Table 7)

1) Koichi Emi, Balance of Payments in the First-half of Meiji Era, A Mimeograph of Historical Statistics, The Inst. of Economic Research of Hitotsubashi Univ., 1957.

Source: Ministry of Finance, Records of Public Finance in the First-half of Meiji Era.

Notes: R1 to R5 and P1 to P6 are current transactions. R6 to R7 and P7 are capital transactions.

Of all items in both sides of Table 7, those marked with asterisk are available in individual series and those of double asterisks were estimated by the writer. The ratio of residual items to the total amount of exports or imports are computed and then that percentage is applied to fill up the figures for the periods before 1901. The detailed results are listed on Appendix Table and here shows only the decennial totals overapping each five years linking the author's estimates before 1901 with the official ones since 1902.

Table 8 Balance of Payments in Japan, 1878-1937
(Decennial totals overlapping each five years)
Unit: million yen

Decennial years	Export (1)	Import (2)	Balance of trade (3)=(1)-(2)	Invisible trade (4)	Gold & silver (5)	Net foreign investment (6)=(3)+(4)+(5)
1878-1887	359	326	33	- 9	26	49
1883-1892	572	510	62	- 9	- 26	26
1888-1897	988	1074	- 88	- 10	- 95	- 193
1893-1902	1757	2065	- 323	58	- 2	- 267
1898-1907	2990	3498	- 522	780	155	358
1903-1912	4024	4532	- 507	1222	- 5	709
1908-1917	6886	6076	809	879	- 288	1400
1913-1922	13561	13331	230	2139	- 1109	1260
1918-1927	18496	21246	- 2750	2788	- 766	- 728
1923-1932	17714	20190	- 2445	1560	934	50
1928-1937	20547	21844	- 1296	- 100	1138	- 258

Sources: 1878-1907, estimated by the author.
1903-1937, Y. Yamada, A Comprehensive Survey of National Income in Japan, 1957.
Both estimate are based on A Detailed Survey of Foreign Trade in Japan, Oriental Economist Co., 1934.

Notes: i) In exports and imports of trade, those to old territories (Korea, Taiwan and Kwantung) or those from there are considered as exports to or imports from foreign country. But the trade with Sakhalin can not be recounted seperately as that of foreign country.

ii) As it is quite difficult to pick out the part of old territories in invisible trade, it is not taken consideration in Column(4) of the above Table.

In Table 8, Column (6) is considered as net foreign assets or foreign capital imports (or exports). As is seen in Column (6), we can find that plus or minus in the balance of payments is fundamentally decided by the movements in the balance of trade in which imports are generally more than exports over entire periods except the opening periods of Japanese foreign trade and a rapid expansion of her exports during the 1st World War. On the other hand, the invisible trade which includes ordinary (transportation and insurance) and extra-ordinary items (investment income), are shown in a lump in Table 8, mostly moves to cover the deficit in the balance of trade even though it shows minus in the earlier periods. The movements of gold and silver are interpreted as an counterpart to balance the commodity and invisible trade although it is not clear enough to point out the relation in the table. Thus Column (6) is induced as the final balance of payments and then the positive figures mean the increase of net foreign assets and those marked minus are the decrease of them. Here we may consider the former as capital export and the latter as capital import in the components of capital formation.

Ⅳ. A Comparison of Financial Approach with the Commodity Flow Series

1. National saving and national investment

National saving is composed of private saving and government saving which are already estimated in the previous sections. If the case is a closed economy, national saving should be equal to domestic investment. However, as is seen in the measurement of net foreign investment, in a country like Japan which is highly dependent upon foreign trade, national saving is strongly related to not only domestic but also foreign investment. The relation is:

National saving = Domestic investment + Net foreign investment

Therefore,

Domestic(or national) investment = National saving - Net foreign investment

Consequently national saving and national investment can be calculated by combining the estimates of each sector in the previous chapters. Expressing the above equations in the author's term,

$$S_n = S_p - S_g$$

$$= \Delta F_p + I_g + \Delta F_g - \Delta L_g \qquad (14)$$

$$S_n = I_d + NFI \qquad (15)$$

or

$$I_d = S_n - NFI \qquad (16)$$

Notations of S, I, F, and L are respectively savings, investment, financial assets and liabilities. Suffixes n, p and g mean respectively national, private and government.

It is quite interesting whether or not national investment from financial approach coincides with that from commodity flow series which is presented by H. Rosovsky.[1] His series are on net capital formation within country, whether financed from home or abroad. Therefore we could compare the author's national savings with his series plus net foreign investment as shown in equation (15). Net foreign investment is related to the financial gap between domestic(or national) saving and investment. If NFI is negative, it means that domestic economy requires capital imports for its capital formation in addition to domestic saving. In such case, equation (15) is rewritten as;

$$S_n = I_n - \text{Capital imports} \qquad (17)$$

Reversely if NFI is positive, it is interpreted that some part of domestic saving leaves domestic use for foreign investment. Namely,

$$S_n = I_n + \text{Capital exports} \qquad (18)$$

In Table 9, the author's national saving is compared with Rosovsky's series, in which NFI is adjusted by equations (17) and (18).

Table 9 Comparison of National Saving with Net Capital Formation (Decennial Totals overlapping each five years)

Unit: million yen

Decennial years	GCF (1)	NCF (2)	NFI (3)	Adjusted NCF (4)=(2)-(3)	S_n* (5)
1878-1887			49		242
1883-1892			26		334
1888-1897	1066	656	- 193	493	468
1893-1902	1696	1019	- 262	757	1031
1898-1907	2435	1436	358	1794	1732
1903-1912	3726	2231	709	2940	3165
1908-1917	5271	3263	1400	4663	5275
1913-1922	13369	8690	1260	9950	14367
1918-1927	21488	14440	- 728	13712	18814
1923-1932	21052	14084	50	14134	14209
1928-1937	25830	17538	- 258	17280	16166

Notations: NCF = Net Capital Formation, GCF = Gross Capital Formation, NNP = Net National Products, GNP = Gross National Products

* Here S_n does not include cash holdings.

1) ibid. pp.109-110

Notes of Table 9: i) Column (1) GCF; Rosovsky's estimates (ibid. pp.109-110)
ii) The ratio of net to gross investment is computed by the following form.

$$\frac{NCF}{GCF} = \frac{GCF - (GNP - NNP)}{GCF}$$

The results are ;

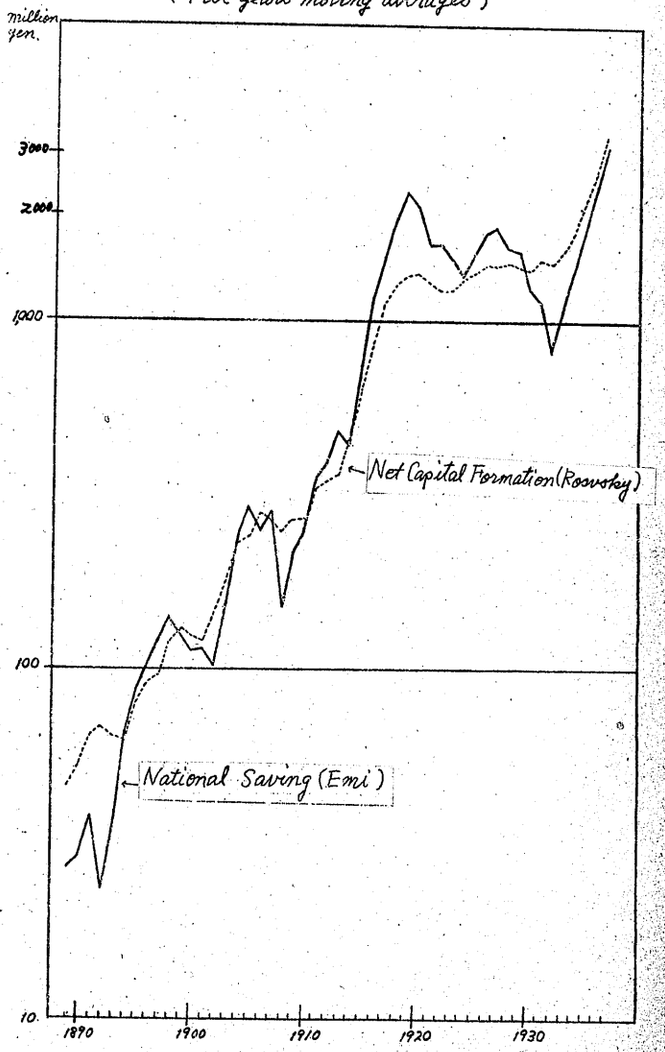
1888-1897	61.6 %
1893-1902	60.1
1898-1907	59.0
1903-1912	59.9
1908-1917	61.9
1913-1922	65.0
1918-1927	67.2
1923-1932	66.9
1928-1937	67.9

iii) NFI comes from Table 8.
iv) $S_n = S_p$ (excluding cash holdings and demand deposits) $- S_g$

In Table 9, Columns (4) and (5) are comparable each other and we can find that national saving in Column(5) is relatively well checked by Rosovsky's series adjusted NFI in Column(4) in long run, ignoring the fairly big difference in the overlapping two decennial years of 1913-22 and 1918-27. These decennial years are ranged from mid- to post-World War I when Japanese economy rapidly expanded through unprecedented war boom. Which side does more influence the above gaps, commodity flow series is underestimated or financial approach exaggerate the increase of financial assets ?

Let's check this point by the Chart 1 where is drawn in a five years moving averages in current value. At a glance, NCF series moves upwards smothly while NS fluctuates repeatedly with violent up and down swings. In other words, NS is appeared higher than NCF in the properous periods whereas the former drops sharply compared with the latter in the cyclical recession. The main reason for difference between both series lies in the method of estimation, namely the effects of changing price levels on re-valuations in financial approach.

Chart: Comparison of National Saving with Net Capital Formation
(Five years moving averages)



As is explained in Section 1, private saving is computed as annual changes which is subtracted by the amount of financial assets in stock at the previous year end from those at the current year end. If it is in the rising phase of price changes, the results are exaggerated with upwards bias. Reversely if it is on the way to deep depression, the estimates are probably understated. In other words, financial assets, for example, the assets like stocks are more sensitive to the changes of business conditions. Accordingly, we could guess the gaps between both series in the periods in question are due to the overvaluation of such kind of financial assets. In addition, we might point out another reason that some duplications among financial assets are not completely netted out in inflationary periods. The quite low level of NS in the earlier periods comes from the reason that, as is already pointed out, the financial net work mobilizing saving to investment is not suufficiently established yet over the country.

Second, the results may be affected in some degree from the procedure that inventory accumulation is not taken consideration in NCF series while it is included in lump together in financial sides. We would say this should be noticed to interprete the estimation of NCF because inventory investment is considered as a factor of business fluctuations, especially in short run changes. Thirdly, they also may be affected slightly by the static element of commodity flow series in which ratios or percentages to estimate each components of capital formation are sometimes assumed as constant or moderate rates in their changes. Let's compare the saving-income ratios of both series in Table 10.

Table 10 Comparison of Saving- and Investment-income Ratios between Financial and Commodity Flow Series (1878-1937)
(in terms of decennial overapping each five years)

Unit: million yen in Column (4)

Decennial years	National saving (1)	National Investment (2)	Net Capital Formation (3)	National Income (4)
	%	%		
1878-1887	3.34	2.68		7478 (100.00 %)
1883-1892	4.22	3.86		7072 (100.00)
1888-1897	4.64	6.55	6.50 %	10084 (100.00)
1893-1902	6.47	8.11	6.39	15935 (100.00)
1898-1907	7.69	6.10	6.38	22499 (100.00)
1903-1912	10.75	8.45	7.57	29437 (100.00)
1908-1917	13.24	9.79	8.19	39821 (100.00)
1913-1922	17.97	16.40	10.87	79912 (100.00)
1918-1927	15.46	16.06	11.86	121652 (100.00)
1923-1932	11.33	11.29	11.23	125393 (100.00)
1928-1937	11.42	11.60	12.39	141468 (100.00)

Notes: i) Column (1) = Emi's estimates.
Column (2) = National saving - Net Foreign Investment
Column (3) = Rosovsky's estimates
Column (4) = Ohkawa's estimates.

In Table 10, the difference between Column (1) and (2) equals to the ratio of net foreign investment to national income, namely the ratio of capital exports if Column (1) is larger than Column (2) or that of capital imports if it is appeared reversely. Column(2) and (3) are to be compared as domestic investment even though they are computed in different approach. Both series moves almost with the same ratios to national income except the overapping two decennial years of 1913-1927. Here we can find that the averaged saving-income ratio computed over long periods, in real term, is 11.4 per cent and those of both domestic investment and net capital formation are a little bits smaller than that of saving, namely 11.0 per cent in the former and 10.6 per cent in the latter. The relatively small balance of net foreign investment means that Japan did not import capital to a significant extent.[1] In sofar as a long run point of view concerns, investment ratios estimated by two different approaches are fairly well checked with each other, although a big question still remains in the causes of gaps between both in 1st World War period, mid- and post-.

1) Many economists refer to the evidance that Japans successfully laid the foundation of capitalistic economy without relying on net capital imports. For example, Paul Samuelson, Economics 5th ed., p.790; L.R. Klein, A Model of Japanese Economic Growth (1878-1932), Mimeograph, pages 3 and 12.

V. The Distribution of National Saving among Personal, Corporate, Private and Government

Needless to say, national saving is composed of private and government and the former is distributed between personal and corporate sector. Personal saving is further devided into individuals' and unincorporated sector, but the statistics for unincoporated savings are not available although we can guess that part has taken a fairly large share of personal savings in prewar as well as in postpar experience.[1] The share distribution of national saving among personal, corporate, private and government is shown as Table 11.

Table 11 Share Distribution of National Saving by Sector

Unit: million yen

Decennial years	Personal (1)	Corp. (2)	Private (3)=(1)+(2)	Gover't (4)	Total (5)=(3)+(4)
	%	%	%	%	%
1878-1892			35.2	64.8	242(100.0)
1883-1892			56.3	43.7	334(100.0)
1888-1897			79.1	20.9	468(100.0)
1893-1902			78.0	22.0	1031(100.0)
1898-1907			79.3	20.7	1732(100.0)
1903-1912	73.2	3.6	76.8	23.2	3165(100.0)
1908-1917	63.5	11.8	75.3	24.7	5275(100.0)
1913-1922	88.7	1.9	90.6	9.4	14367(100.0)
1918-1927	90.4	-0.9	89.5	10.5	18814(100.0)
1923-1932	88.8	0.3	90.1	9.9	14209(100.0)
1928-1937	100.4	12.5	119.9	- 19.9	16166(100.0)

Notes: Personal saving = Private saving - Corp.saving
Corp.saving = Gross profits - (Dividends - Losses - Corp.taxes)

Table 11 clearly illustrate that the overwhelming part of national saving has been provided by the personal sector. On the other

1) M.Shinohara, Consumption Function (in Japanese), p.220. 1958. In the United States also, it is clarified by Professors I. Friend and I. Kravis that the share distribution and the level of unincorporated saving quite high. ('Entrepreneur Income, Saving and Investment', American Economic Review. 1957. p.270

business corporations have a quite small share (or dissaving) in the overapping three decennials of 1913-32, although it hold fairly reward in the other prosperous periods. Judging from the above features, we can guess that the high rate of saving in personal sector has supported corporate investment which has been linked with high growth rate of Japanese economy.

The relation that excess saving over investment in the personal sector is closely connected with excess investment over saving in the business corporation sector can be clarified by comparing with the ratio of investment by each sector in Table 12.

Table 12 Ratios of Share Distribution of National Investment by Sector

Unit: million yen

Decennial years	Personal (1)	%	Corp. (2)	%	Private (3)=(1)-(2)	%	Gov't (4)	%	Total (5)=(3)-(4)	%
1908-1917	21.1		33.9		55.0		45.0		3263	(100.0)
1913-1922	22.6		42.3		65.0		35.0		8690	(100.0)
1918-1927	25.3		36.1		61.4		38.6		14440	(100.0)
1923-1932	23.2		32.2		55.4		44.6		14084	(100.0)
1928-1937	16.2		49.7		65.9		34.1		17538	(100.0)

Notes: This table is based on Rosovsky-Emi estimate. Here the author tentatively assumes that personal investment is composed of residential and commercial building construction, because shops for commodity sales are numerous, but unimportant in terms of investment. Therefore building construction for commercial use is assumed as almost all that of unincorporated businesses. This might overestimate commercial investment of non-corporate business in personal sector, but it is supposed to be offset by considering all industrial construction as that of corporate business. The incompleteness of farm's investment in Rosovsky's estimate understates investment of personal sector, but a fair part of agricultural construction is covered by government investment for agriculture.

Tables 11 and 12 do not exactly correspond as already mentioned, but the saving-investment relation is broadly explainable in those tables. Here we should notice that the low level of investment in personal sector comes from relatively poor quality of Japanese housing[1] and numerous, but small size of unincorporated business units. Therefore we might say that this feature released personal savings for investment in corporate and government sectors although it is in a passive sense.

Turning our attention to the saving-investment relation in government sector, government saving is less in the stationary while fairly high in the prosperous periods. However, looking at the investment side, its constantly high ratio, say 35 to 45 per cent is impressive. Here we should stress that capital formation in Japan has been strongly pushed through the system of government expenditures.

Concerning the role of net foreign investment to economic growth, we find that Japan successfully laid the foundation of capitalistic economy in the first two decennials without relying on net capital imports and after that the need for capital imports has been relatively small. In other words, we may say that Japan has maintained the high rate of capital formation mostly depending on her internal sources.

The question is "how Japan has been able to mobilize her internal sources of funds to her capital formation ?". This is to answer the secret of the high ratio of saving in Japan. In the macroscopic point of view, the answer is closely related to the problems on the share distribution of income, an oligopolistic alliance between industry and finance, and wage rate and price mechanism of market and so on. The continuing but mild inflation which she has experienced must play a significant role. The dominant source of saving has been provided by the personal sector as already seen. Accordingly, the reason for the high propensity to

1) Koichi Emi, 'Capital Formation in Residential Real Estate in Japan, 1887-1940', The Annals of the Hitotsubashi Univ., Vol.IX No.2.

save in the personal sector must be clarified. The saving pattern of households or unincorporated sector is connected not only with economic structure, but also with the social background. To answer all the related questions is beyond this paper and the author wish to develop this problem in another paper.

Nov. 20, 1961
K. Emi

国民貯蓄推計の再検討

1. 民間貯蓄の推計（資料4 B32 — 昭34・7）に政府貯蓄を加えて国民貯蓄を推計し、対外純債権を考慮に入れて、Emi-Rosovsky推計による資本形成と突き合せる。

2. 金融的接近の方法論的吟味

(1) 篠原 経済研究 Vol.10 No.4「金融統計による貯蓄推計の性格」

(2) 伊東「日本の国富構造」所載の「国富推計における実物的接近と請求権的接近」

$$S_i = \Delta T_i + \Delta F_i - \Delta L_i$$
$$S_p = \Delta T_p + \Delta F_p - \Delta L_p$$
$$S_g = \Delta T_g + \Delta F_g - \Delta L_g$$

$$S_d = I_d + \Delta F_d - \Delta L_d$$
$$S_d = I_d + \text{Capital export}$$
$$S_d' = I_d - \text{Capital import}$$

$$S_p = I_p + \Delta F_p - \Delta L_p$$
$$S_p = \Delta F_p + (I_p - \Delta L_p)$$
$$I_p \cong \Delta L_p$$

I_h → 住宅建築

I_c → 設備 + 在庫

<u>篠原氏のチェック</u>

	(国民所得統計)	(日銀金融統計)
$S_p = D_p$	個人貯蓄 + 法人貯蓄	民間預貯金
$S_c = D_c$	固定資産 + 棚卸資産の形成高増加額	外部負債・資本金の増加

<u>アメリカについてのチェック</u>

cumulative　　annual

$$S_i \cong \Delta F_i$$
$$S_c \neq \Delta F_c$$

$$S_p = \Delta F_p$$

3. 推計の実際

(1) $S_p = \Delta L_f - \Delta F_g$

問題点 — 明治15年以前の紙幣銀行の取扱い。

(2) $S_g = I_g + \Delta F_g - \Delta L_g$

(3) $S_d = I_d + \underline{\Delta F_d - \Delta L_d}$

問題点 —(イ)金銀 a/c の取扱い

(ロ) 明治34年以前の国際収支

(4) 資本形成との突き合せ

問題点 — (イ) 明治前期

(ロ) 第一次大戦期

i) 推計方法から来る誤差

ii) revaluation

iii) inventory

4. (附) 貯蓄の distribution