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THE RESEARCH INSTITUTE FOR
ECONOMICS AND BUSINESS ADMINISTRATION
KOBE UNIVERSITY

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CONTENTS

AN ANALYSIS OF THE BRAZILIAN BALANCE OF PAYMENTS, 1960-1972

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I. Introduction

The purpose of this paper is to analyse the changing structure of Brazilian balance of payments in the sixties and early seventies. Brazilian economy had been stagnant in the 1960–67 period, but it has suddenly turned dynamic since 1968, making so remarkable an expansion that it is usually called the "Brazilian economic miracle."

The annual average growth rate of real GDP in Brazil was 4.7% (1.7% per capita) in the 1961–67 period, while it sprang up to 9.8% (6.7% per capita) in the years ranging from 1968 to 1971.(1)

The essence of the Brazilian economic miracle consists in the successful performance of high rate of growth, while combating with the hyper-inflation in the early sixties. Inflation had been rampant, reaching an annual rate of over 100% in mid-1964 and the growth rate of GDP fell down to a very low level (1.5% in 1963, and 2.4% in 1964), when the military coup overthrew "a crumbling and corrupt democratic regime,"(2) and started a new drastic policy.

It is pointed out by the Economist that the Brazilian miracle is based on seven pillars.(3) They are (1) abolition of politicians, (2) domestic stability, (3) welcoming foreign investors, (4) high internal savings, (5) regular devaluations, (6) high tariff walls, and (7) belief in free enterprise. These seven factors are respectively important, but, in my opinion, the abolition of politicians is most essential. "The generals handed over the running of the economy to a young generation of technocrats, merely instructing them to get growth and cut inflation. Brazilian ministers do not have to worry their heads about opinion polls or parliamentary debates and since they do not have to run the economy to fit an election timetable, they can actually effect a long-run economic strategy."(4) This point is also stressed by Baer. He mentions as an important source of the high growth "the existence of a strong and stable government which placed professional economists in key economic policy-making

(1) Inter-American Development Bank, *Economic and Social Progress in Latin America*, Annual Report 1972, p. 4.
(2) *The Economist*, Dec. 15, 1973, p. 85.
(3) Ibid., p. 85.
(4) Ibid., p. 85.

positions and gave them a free hand to implement their policies."(5)

The official counter-inflation plan is based on wage and price controls, balanced budgets, monetary correction and the crawling peg.(6)

Among them, the uniquely Brazilian policy measures are monetary correction and the crawling peg. The aim of monetary correction is to neutralize the harmful effects of inflation. In other words, "no one is expected to be in a worse position because of the loss in purchasing power of money over time."(7) According to the policy of monetary correction, "All companies are compelled to adopt inflation accounting. At the end of each year they must correct both their fixed assets and their working capital by the monetary correction coefficient, calculated by the government. Companies only have to pay tax on the real profits. The effect is that inflation does not reduce the real return on capital as it does in so many countries."(8)

Monetary correction policy is adopted also for the purpose of readjusting the value of debt instruments and the interest on them in accordance with the rate of inflation.(9)

The crawling peg policy consists of "devaluing the cruzeiro at frequent, but unpredictable, intervals. This kept the exchange rate from becoming overvalued as inflation continued, kept speculation against the cruzeiro at a minimum, and in effect, kept the exchange rate from being a political issue."(10)

At the time of 1964 coup, the Brazilian economy was in a state of stagnation, and the low real growth rate of the economy continued after the change of regime until 1968. It took four years for the new policy to take effect. This is explained by Baer that "the continued stagnation in the years 1964–67 was due to a number of factors: the stabilization measures applied in those years; the time-lag involved before the various financial and capital market reforms could be felt, and also before the various feasibility studies for the expansion of the country's infrastructure and its heavy industries could result in actual construction activities; and finally, the time-lag which was necessary to convince both the domestic and the foreign (private and official) investors that the new regime and its control of the economy was stable enough to make substantial commitments."(11)

Table 1 and Figure 1 show the annual rate of growth of GDP, industry and

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(5) Baer, W., *The Brazilian boom* 1968–72: An explanation and interpretation, World Development, Vol. 1 No. 8, Aug. 1973, p. 2.
(6) *Economist*, ibid., p. 86.
(7) Robock, S. H., We can live with inflation, *Harvard Business Review*, November-December, 1972, p. 30.
(8) *Economist*, ibid., p. 86.
(9) Baer, W., ibid., p. 2.
(10) Baer, W., ibid., p. 2.
(11) Baer, W., ibid., p. 2.

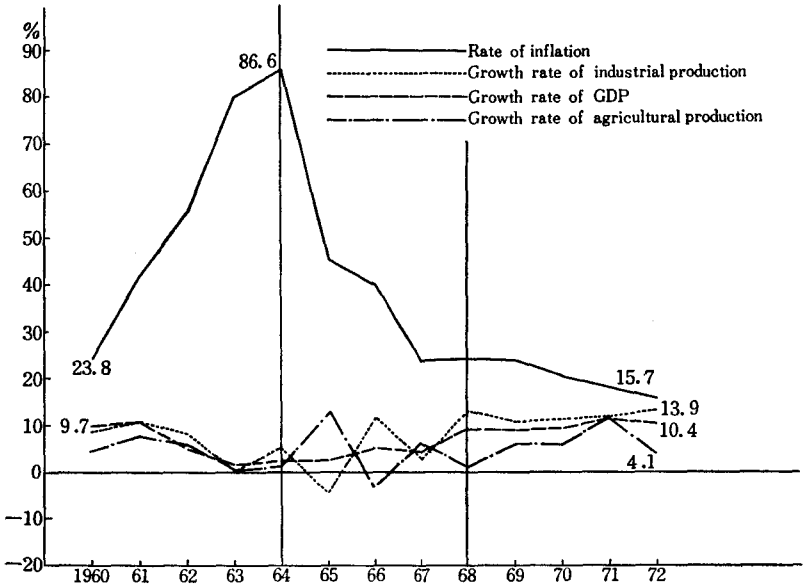
Table 1. Yearly Growth Rate of GDP, Industry, Agriculture and the Rate of Inflation in Brazil

Year	Growth Rate (%)			Rate of Inflation
	GDP	Industry	Agriculture	(%)
1960	9.7	9.6	4.9	23.8
1961	10.3	10.6	7.6	42.9
1962	5.3	7.8	5.5	55.8
1963	1.5	0.2	1.0	80.2
1964	2.9	5.2	1.3	86.6
1965	2.7	−4.7	13.8	45.5
1966	5.1	11.7	−3.2	41.2
1967	4.8	3.0	5.7	24.1
1968	9.3	13.2	1.5	24.5
1969	9.0	10.8	6.0	24.3
1970	9.5	11.1	5.6	20.9
1971	11.3	11.2	12.2	18.1
1972	10.4	13.9	4.1	15.7
1956–62	7.8	10.3	5.7	—
1962–67	3.7	3.9	4.0	—

Source: Fundação Getúlio Vargas, Conjuntura Econômica, Novembro 1972.
Werner Baer, the Brazilian boom 1968–72: an explanation and interpretation, World Development, August 1973, p. 3

Note: Rate of Inflation is represented by the cost of Living Index in Guanabara.

Fig. 1. Rate of Economic Growth and Rate of Inflation in Brazil



agriculture and the rate of inflation in Brazil.

From the above Table 1 and Figure 1, it is made clear that in the period of hyper-inflation, the growth rate of GDP was very low, but as the rate of inflation slowed

down, the growth rate tended to increase.

It is also noticeable, as Baer points out, that "industry has been the leading sector in the boom that started in 1968. The extraordinary performance of agriculture in 1971 was mainly due to the unusual recovery of coffee from the previous year's very poor crop."(12)

The summary of the Brazilian balance of payments in the 1960–1972 period is shown in Table 2.

Table 2 reveals the following facts:

(1) Trade balance surplus registered the highest amount of 655 million dollars in 1965, but later it declined gradually, coming down to the deficit of 364 million dollars in 1971 owing chiefly to the large increase of imports. The deficit of trade balance is witnessed for the first time since 1962.

(2) The balance of services recorded deficit throughout the 1960–72 period. The amount of deficit grew rapidly in the booming years. It was doubled in four years between 1968 and 1972 from 574 million dollars to 1,134 million SDR units.

(3) Unrequited transfers recorded positive balance in the whole period, registering in 1966 the peak of 79 million dollars, but thereafter it declined to 7 million SDR units in 1972.

(4) Balance on current account throughout the 1960–1972 period was in the red except in 1964 and 1965. The amount of deficit was more than doubled in the 1968–72 period, from 526 million dollars to 1,346 million SDR units.

(5) The net inflow of long-term capital was in the black in all years during the 1960–1972 period. The positive amount increased remarkably since 1968, coming up from 315 million dollars in 1968 to 2,358 million SDR units in 1972. The miraculous economic growth of Brazil is chiefly due to this conspicuously huge inflow of foreign long-term capital.

(6) Basic balance of payments which is the amount of current balance plus long-term capital balance, is deemed to be an appropriate indicator to diagnose the long-term solvency of a country. It was in red in seven years and in black in six years. In 1972, however, the basic balance recorded a large surplus, mainly owing to an abundant inflow of long-term capital.

(7) The net inflow of private short-term capital increased about five fold from 114 million dollars in 1968 to 516 million dollars in 1971, but in 1972 the net outflow of 74 million SDR units was recorded.

(8) The balance on capital account, which is the sum total of balances on long-

(12) Baer, W., ibid., p. 2.

Table 2. Summary of Brazilian Balance, of Payments, 1960–1972 (in millions of SDRs)[5]

Year	Trade Balance (1)	Balance of Services (2)	Unrequited Transfers (3)	Balance of Current Account (4)=(1)+(2)+(3)	Long-term Capital (5)	Basic Balance (6)=(4)+(5)	Private Short Term Capital (7)	Balance of Capital Account (8)=(5)+(7)	Errors and Omissions (9)	Over-all Balance (10)=(4)+(8)+(9)	International Reserves (end of year)
1960	−23	−498	4	−517	111	−406	81	192	10	−315	428
1961	113	−389	15	−261	400	139	−115	285	49	73	563
1962	−89	−402	39	−452	224	−228	49	273	−138	−317	291
1963	112	−326	43	−171	140	−31	26	166	−76	−81	216
1960–63 (average)[1]	28	−404	25	−350	219	−131	−5	214	−39	−160	375
1964	344	−318	55	81	167	248	24	191	−217	55	256
1965	655	−447	75	283	70	353	20	90	−31	342	505
1966	438	−548	79	−31	344	313	11	355	−25	299	409
1967	213	−566	77	−276	245	−31	−116	129	−35	−182	199
1964–67 (average)[2]	412	−470	54	14	207	221	−15	192	−77	129	342
1968	26	−574	22	−526	315	−221	114	429	−1	−98	257
1969	318	−685	31	−336	723	387	131	854	−20	498	656
1970	232	−814	21	−561	536	−25	336	872	38	349	1,187
1971	−364	−959	13	−1,310	1,085	−225	516	1,601	−6	285	1,746
1968–71 (average)[3]	53	−758	22	−683	665	−18	274	939	3	259	864
1972[P4]	−219	−1,134	7	−1,346	2,358	1,012	−74	2,284	310	1,248	4,123
1968–72	−1	−833	19	−816	1,003	187	204	1,209	64	457	1,516

Source: IMF, Balance of Payments Yearbook
IMF, International Financial Statistics

Note:
(1) 1960–63 period is the period before the new regime.
(2) 1964–67 period is the period of stabilization policy under the new regime.
(3) 1968–71 or 1968–72 period is the period of high rate of growth.
(4) In this table, and in the following tables, figures for 1972 are provisional.
(5) The value of U.S. $1 in terms of SDR is as follows:
U.S. $1=1 SDR (before May 1972)
U.S. $1=0.921053 SDR (from May 1972 to February 1973)
U.S. $1=0.828948 SDR (since February 1973)

term and short-term capital, registered surplus in every year of the 1960–1972 period, which presents a striking contrast to the balance on current account showing deficit in almost all years in the period in question.

(9) The overall balance of payments which is the aggregate of the balances on current and on capital account, after adjusting the amount of net errors and omissions, was negative in five years, that is, 1960, 62, 63, 67 and 68, and positive in eight years, that is, 1961, 64, 65, 66, 69, 70, 71 and 72.

In the high growth period, the overall balance was in black every year since 1969. Figure 4 represents the movement of balances of overall, basic, long-term capital and current accounts.

II. Current Account Balance

The current account of international transactions is composed of three items, that is, merchandise trade, services and unrequited transfers. The merchandise trade is the most important item, followed by services, and the unrequited transfers are very small both in amount and as a percentage.

Table 3 shows the relative importance of those three items in the Brazilian current account. The period from 1960 to 1971 (or 1972) is divided into three phases. The first is from 1960 to 1963, four years before the new regime. The second is from 1964 to 1967, the first four years under the new regime and the phase of the stabilization policy. The third ranges from 1968 to 1971 or 1972, the boom phase. In the following, this time division is often used to compare the situation of each phase. Exports account for more than 85% on the receipt side and imports for more than 65% on the payment side. The higher percentage for exports than that for imports is attributed to the fact that developing countries like Brazil, have little to receive and much to pay in the invisible trade owing to the lack of their international shipping, banking, insurance, and investment activities.

The invisible trade takes about 10% on the receipt and 30% on the payment side. The unrequited transfers are far smaller in amount than the other two items, occupying about 3% of the current receipts and less than 2% of the current payments.

The deficits of service account are largely responsible for the negative balance of current account.

1. Trade Balance

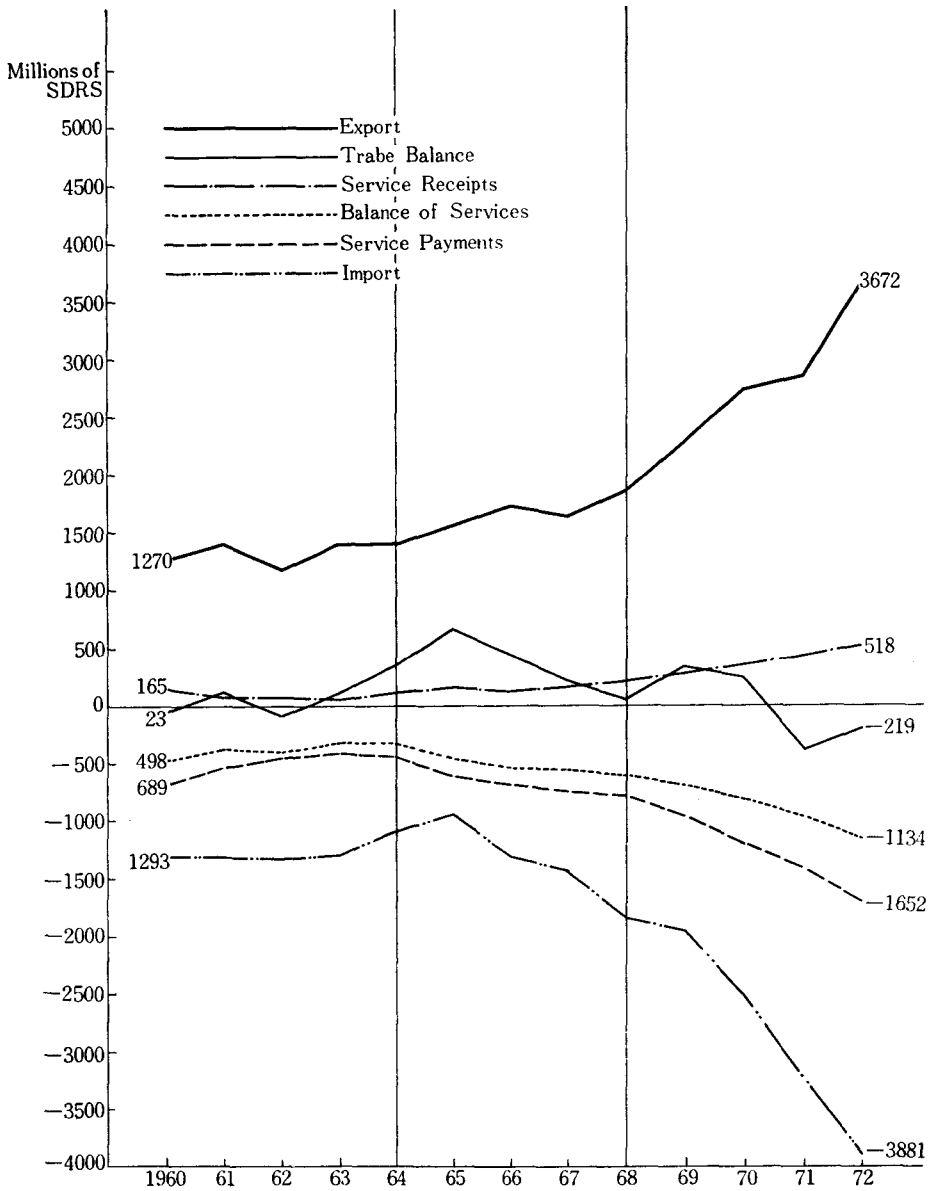
In the 1960–63 period, the average export surplus was 28 million dollars, but in the 1964–67 period it increased to 412 million dollars owing to the increase in exports and decrease in imports. In the 1968–71 period both exports and imports increased, bringing the excess of exports down to 53 million dollars, and in 1972,

Table 3. The Composition of Brazilian Current Account
(in millions of SDRs)

Year	Receipts				Payments				Balance			
	Export (f.o.b.)	Services	Unrequited Transfers	Total	Import (f.o.b.)	Services	Unrequited Transfers	Total	Trade	Service	Unrequited Transfers	Total
1960–63 Average	1,324 (89.4)	113 (7.6)	44 (3.0)	1,481 (100.0)	1,296 (70.1)	533 (28.8)	20 (1.1)	1,849 (100.0)	28	−420	24	−368
1964–67 Average	1,605 (87.0)	151 (8.2)	86 (4.7)	1,842 (100.0)	1,193 (65.2)	621 (34.0)	15 (0.8)	1,829 (100.0)	412	−470	71	13
1968–71 Average	2,453 (85.6)	329 (11.5)	85 (2.9)	2,867 (100.0)	2,400 (67.6)	1,087 (30.6)	63 (1.8)	3,550 (100.0)	53	−758	22	−683
1972p	3,672 (85.6)	518 (12.0)	98 (2.3)	4,288 (100.0)	3,891 (69.0)	1,652 (29.3)	91 (1.6)	5,634 (100.0)	−219	−1,134	7	−1,346
1968–72 Average	2,697 (85.6)	367 (11.6)	87 (2.8)	3,151 (100.0)	2,698 (68.0)	1,200 (30.2)	69 (1.8)	3,967 (100.0)	−1	−833	18	−816

Source: IMF, Balance of Payments Yearbook

Fig. 2. Balance of Trade and Services (in millions of SDRs)



an import surplus of 219 million SDR units was recorded. In the 1968–72 period, the amount of exports was almost equal to that of imports. (See Table 4, and Figure 2)

The regional distribution of trade balance points out that trade with the United States and Canada registered surplus in 1962, 1965 and 1968, and the amount of surplus was decreasing from 75 million dollars in 1962 to 8 million dollars in 1968.

Table 4. Trade Balance of Brazil (in millions of SDRs)

Period	Export (f.o.b.) (A)	Import (f.o.b.) (B)	Balance (C)=(A)−(B)	Rate of Excess Export(%) (C)/(B)
1960–63 (average)	1,324	1,296	28	2.2
1964–67 (average)	1,605	1,193	412	34.6
1968–71 (average)	2,453	2,400	53	2.2
1972p	3,672	3,891	−219	−5.6
1968–72 (average)	2,697	2,698	−1	0.0

Source: IMF, Balance of Payments Yearbook

Table 5. Regional Distribution of Trade Balance (in millions of SDRs)

Year	U.S. and Canada	Other OECD Countries	CMEA and China	Other Countries	Total
1962	75	27	16	−207	−89
1966	66	287	59	26	438
1967	38	213	28	−66	213
1968	8	102	51	−135	26
1969	−9	299	68	−40	318
1970	−167	311	72	17	232
1971	−233	−106	29	−54	−364

Source: IMF, Balance of Payments Yearbook

Since 1969, however, trade balance turned negative, the amount growing larger from 9 million dollars to 233 million dollars. Trade balance with other OECD countries remained positive till 1970, but in 1971 it turned negative. Trade balance with CMEA countries and China was in black every year in the table, while that with other countries was in red except in 1966 and 1970. (See Table 5)

2. Balance of Services

Balance of services was in red throughout the whole period, the deficits tending to increase year after year. The amount of yearly negative balance was 417 million dollars in the 1960–63 period, reaching to 758 million dollars in the 1968–71 period and 1,234 million SDR units in 1972.

Balance of services consists of many items. They are (1) freight and insurance on merchandise, (2) other transportation, which includes port disbursement, passenger fares, time-charter payments and so on, (3) travel, (4) investment income covering remitted income as given in the exchange record and undistributed income retained in Brazil by U.S.-owned enterprises, (5) private services, which include the com-

Table 6. Components of Balance of Services

(in millions of SDRs)

Period	Freight and Insurance on Merchandise	Other Transportation	Travel	Investment Income	Government Services	Private Services	Total
1960–63	−97	12	−34	−181	−37	−67	−417
	(23.3)	(−2.9)	(8.2)	(43.4)	(8.9)	(16.1)	(100.0)
1964–67	−80	28	−21	−257	−45	−100	−470
	(17.0)	(−6.0)	(4.5)	(54.7)	(9.6)	(21.3)	(100.0)
1968–71	−65	−100	−89	−356	−71	−82	−758
	(8.6)	(13.2)	(11.7)	(47.0)	(9.4)	(10.8)	(100.0)
1972p	−72	−212	−164	−475	−124	−87	−1,234
	(5.8)	(17.2)	(13.3)	(38.5)	(10.0)	(7.1)	(100.0)
1968–72	−66	−122	−104	−380	−82	−83	−853
	(7.7)	(14.3)	(12.2)	(44.5)	(9.6)	(9.7)	(100.0)

Source: IMF, Balance of Payments Yearbook
Note: Figures on 1972 are Provisional

Table 7. Regional Distribution of Balance of Services

(in millions of SDRs)

Year	U.S. and Canada	Other OECD Countries	CMEA and China	International Institutions	Other Countries	Total
Total						
1962	−257	−84	—	—	−70	−411
	(62.5)	(20.4)			(17.0)	(100.0)
1966	−359	−127	−2	−17	−45	−550
	(65.0)	(23.1)	(0.4)	(3.1)	(8.2)	(100.0)
1967	−338	−134	−1	−19	−73	−565
	(59.8)	(23.7)	(0.1)	(3.4)	(12.9)	(100.0)
1968	−329	−167	−2	−13	−40	−551
	(59.7)	(30.3)	(0.4)	(2.4)	(7.3)	(100.0)
1969	−397	−190	−7	−17	−74	−685
	(58.0)	(27.7)	(1.0)	(2.5)	(10.8)	(100.0)
1970	−433	−340	0	−18	−78	−814
	(53.2)	(41.8)	(0)	(2.2)	(9.6)	(100.0)
1971	−475	−374	−5	−6	−119	−959
	(49.5)	(39.0)	(0.5)	(0.6)	(12.4)	(100.0)
Of which: Investment Income						
1962	−159	−22	1	—	−17	−203
	(78.3)	(13.8)	(0.5)		(8.4)	(100.0)
1966	−208	−50	0	−17	−9	−284
	(73.2)	(17.6)	(0)	(6.0)	(3.2)	(100.0)
1967	−196	−47	0	−19	−33	−295
	(66.5)	(15.9)	(0)	(6.4)	(11.2)	(100.0)
1968	−188	−72	−1	−13	−5	−279
	(67.4)	(25.8)	(0.4)	(4.7)	(1.8)	(100.0)
1969	−238	−81	−1	−17	−7	−344
	(69.2)	(23.5)	(0.3)	(4.9)	(2.0)	(100.0)
1970	−190	−122	−3	−18	−20	−353
	(53.8)	(34.6)	(0.8)	(5.0)	(5.7)	(100.0)
1971	−224	−168	−5	−6	−17	−420
	(53.3)	(40.0)	(1.2)	(1.4)	(4.0)	(100.0)

Source: IMF, Balance of Payments Yearbook

missions and other expenses paid abroad on imports, as well as remittances through the free exchange market assumed to be for miscellaneous services.

Among the components of services, investment income is by far the largest, taking up about 40% or more than 50% of the total invisible deficit. (See Table 6)

Regional distribution of total balance of services shows that United States and Canada accounted for more than 60% in 1962 and 1966, but later the percentage decreased gradually to about 50% in 1971, while other OECD countries occupying about 20% in 1962 and 1966, rose to about 40% in 1970 and 1971.

The declining share of the United States and Canada and the increasing portion of other OECD countries form a strong contrast. The share of "other countries" (implying developing countries) is rather stagnant, remaining around the 10% level, except in 1962.

The part played by CMEA countries and China is insignificant, showing less than 1%. (See Table 7)

The regional distribution of investment income, which is the most important item of balance of services, indicates that the United States and Canada take a predominant portion, although the share is decreasing from more than 70% in 1962 and 1966 to about 50% in 1970 and 1971. The portion of other OECD countries, remaining at more or less 15% level in 1961 and 1966, sprang up to 40% in 1971. Here also is seen the same contrast as in the case of total balance of services, that is the declining share of the United States and Canada against the rising share of the other OECD countries. (See Table 7)

3. Unrequited Transfers

Private unrequited transfers cover miscellaneous transfers abroad and government unrequited transfers mainly comprise Brazil's contributions toward the administrative expenses of international institutions. Balance of total unrequited transfers was largest in the 1964–67 period, reaching 71 million dollars, but in later years, it declined to 22 million dollars. Private unrequited transfers are generally larger than that of government with the exception of 1960–63 period. (See Table 8)

Table 8. Balance of Unrequited Transfers

(in millions of SDRs)

Period	Private	Government	Total
1960–63	−2	26	24
1964–67	40	32	71
1968–71	11	11	22
1972p	4	3	7
1968–72	10	9	19

Source: IMF, Balance of Payments Yearbook

Table 9. Regional Distribution of Balance of Unrequited Transfers
(in millions of SDRs)

Year	U.S. and Canada	Other OECD Countries	CMEA and China	International Institutions	Other Countries	Total
1962	31	3	—	—	—	34
P	(1)	(−4)	—	—		(−3)
G	(30)	(7)	—	—		(37)
1966	74	4	—	—	1	79
P	(41)	(3)			(1)	(45)
G	(33)	(1)			(–)	(34)
1967	86	−4	—	−3	−2	77
P	(56)	(−5)	—	—	(−1)	(50)
G	(30)	(1)	—	(−3)	(−1)	(27)
1968	51	−22	—	−3	−4	22
P	(32)	(−23)		(–)		(5)
G	(19)	(1)		(−3)		(17)
1969	54	−15	—	−4	−4	31
P	(35)	(−17)		(–)		(14)
G	(19)	(2)		(−4)		(17)
1970	50	−16	—	−5	−8	21
P	(40)	(−18)		(–)		(13)
G	(10)	(2)		(−5)		(8)
1971	36	−17	—	−4	−2	13
P	(33)	(−20)		(–)		(11)
G	(3)	(3)		(−4)		(2)

Source: IMF, Balance of Payments Yearbook
Note: P signifies private transfers and G denotes government transfers

Balance of unrequited transfers with the United States and Canada keeps always positive, taking up the predominant part of the total balance. Conversely, the balance with other OECD Countries is almost negative with the exception of 1962 and 1966. Balance with other countries is very small in amount, and that with CMEA countries and China is zero. (See Table 9)

The development of visible and invisible trade during the 1960–72 period is shown in Figure 2.

III. Capital Account

Balance of capital account is composed of long-term capital balance and short-term capital balance. The former registered positive balance throughout the 1960–1972 period, while the latter recorded negative balance in 1961, 1967 and 1972, although the total capital balance remained positive during the whole period. (See Table 2)

1. Balance of Long-term Capital

Main components of the balance of long-term capital are (a) direct investment, (b) loans received by private non-monetary sector, (c) loans received by central

government, and (d) loans received by local government.

(a) Direct investment in Brazil: This covers net new investment in branches and subsidiaries in Brazil, as well as the reinvestment of undistributed income by U.S.-owned subsidiaries. Direct investment also covers the investment in the form of capital goods imported by direct investment enterprises without payment of foreign exchange.

(b) Loans received by Private Non-monetary Sector: This covers the drawings and repayment of loans granted by the United States, United Kingdom and other nations as well as those by the international institutions, such as IDB, IBRD and IFC.

(c) Loans received by Central Government: This covers the drawings and repayments of loans-granted by various countries and international institutions.

(d) Loans received by Local Government: This covers drawings and repayments of loans chiefly granted by AID, Export-Import Bank, IDB and IBRD.

In 1971, the net drawings of loans received by private non-monetary sector, by central government and by local government were respectively 530 million dollars, 333 million dollars and 87 million dollars, while the amount of net direct investment was 124 million dollars.

Table 10 indicates the relative position of the main four items of long-term capital. In the booming period of 1968–1971, all of the four items increased as compared with the preceding period. Among them loans received by private sector grew more than seven-fold and loans by central government and by local government nearly doubled, while direct investment remaind rather stable.

This means that the high growth rate of Brazilian economy in the 1968–71 period was supported principally by long-term loans received by private non-monetary sector and by central government.

The movement of the above four categories of long-term capital during the

Table 10. Net Long-term Capital Inflow

(in millions of SDRs)

Period	Direct Investment	Loans to Private Sector	Loans to Central Government	Loans to Local Government
1960–63	127	23	66	−1
1964–67	129	37	110	12
1968–71	143	276	205	31
1972p	309	1,416	545	88
1968–72p	176	504	273	42

Source: IMF, Balance of Payments Yearbook

1960–1972 period is charted in Figure 3.

Table 11 shows that in the 1968–71 boom period, the United States was the first and foremost supplier of long-term loans to private non-monetary sector taking up nearly 50% of the total. Next to the United States came the United Kingdom,

Fig. 3. Balance of Long-term Capital Account (in millions of SDRs)

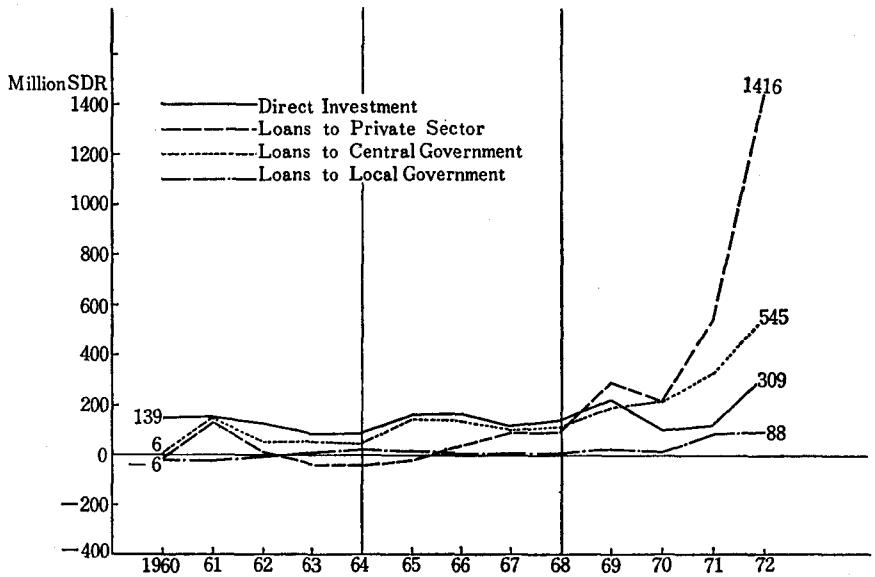


Table 11. Net Receipt of Loans by Private Non-monetary Sector
(in millions of SDRs)

Source	1962–63 average	1964–67 average	1968–71 average	1970	1971
From:					
France	1.5	−3	12	5	42
West Germany	0	−2	23	28	27
IBRD	6.5	−5	12	7	0
IDB	6.5	16	8	—	−2
IFC	—	3	4	3	6
Netherlands	−0.5	0	1	1	2
Sweden	−1	1	2	1	3
Switzerland	0	4	10	3	21
U.K.	1	−1	45	29	121
U.S.	−30	6	130	139	180
AID	1.5	22	14	—	—
EX-IM Bank	−33	−30	14	10	31
Private Lenders	1.5	14	103	129	149
Other Lenders	−3.5	−0.5	29	−14	130
Total	−17	37	276	202	530

Source: IMF, Balance of Payments Yearbook

West Germany, France and Switzerland. Beside these capital exporting countries, the international institutions, such as IBRD, IDB and FIC made not insignificant amount of loans to private sector, but the amount was not so large as those made to public sector. It is to be noted that the bulk of the United States loans to private sector was supplied by private lenders in the 1968–71 period.

Table 12 shows that in the 1968–71 period about half of the loans received by central government came from the United States. IDB and IBRD, coming next to the United States, supplied more loans to the central government than to the private sector. (Cf. Table 11)

West Germany, Canada and the United Kingdom were also important suppliers of loans to the central government, although their contribution was not so large as that of the above international institutions.

Regional distribution of sources of long-term capital is given in Table 13. From 1962 to 1969, the United States held a predominant position as a supplier of long-term capital, but in 1970 and 1971, other OECD countries surpassed the United States in total lending as well as in direct investment and in loans to private sector.

International institutions, although they do not make direct investment, rank in the third place since 1969, following the United States and Canada, and other OECD countries. Loans made by international institutions were chiefly directed

Table 12. Net Receipt of Loans by Central Government

(in millions of SDRs)

Source	1962–63 average	1964–67 average	1968–71 average	1970	1971
From:					
Canada	—	—	15	28	31
France	−1	−4	2	−3	4
West Germany	9.5	−4	16	6	20
IDB	—	11	48	69	43
IBRD	−2	−2	23	53	44
Italy	3	−4	−2	−5	−5
Japan	22	−1	−8.5	9	−10
U.K.	2	−1	13	4	49
U.S.	12.5	138	115	68	167
AID	2.5	100	90	76	60
EX-IM Bank	−0.5*	19	−6	2	10
Other Gov't Agencies		10	−6.5	−12	−7
Private Lenders	10.5*	9	37	2	104
Other Lenders	12	2	−15	−22	−17
Total	58	135	220	207	333

Source: IMF, Balance of Payments Yearbook

* estimated

Table 13. Regional Distribution of Sources of Net Long-term Capital Inflow (in millions of SDRs)

From Year	U.S. and Canada	Other OECD Countries	CMEA and China	International Institutions	Other Countries	Total %
1962	136(59.9)	42(18.5)	−3(−1.3)	52(22.9)		227 (100.0)
D	95	25	—	12		132 (58.1)
P	−14	18	−3	62		63 (27.8)
C	57	—	—	−22		35 (15.4)
L	−2	−1	—	—		−3 (−1.3)
1966	311(91.2)	−24(−7.0)	10(2.9)	20(5.9)	24(7.0)	341 (100.0)
D	118	27	—	—	14	159 (46.6)
P	−29	−27	3	10	9	−34 (−10.0)
C	223	−23	7	1	1	209 (61.3)
L	−1	−1	—	9	—	7 (2.1)
1967	175(68.9)	29(11.4)	6(2.4)	66(26.0)	−22(−8.7)	254 (100.0)
D	71	35	—	—	9	115 (45.3)
P	6	17	—	34	−16	41 (16.1)
C	99	−22	6	27	−15	95 (37.4)
L	−1	−1	—	5	—	3 (1.2)
1968	152(70.4)	19(8.8)	15(6.9)	16(7.4)	14(6.5)	216 (100.0)
D	80	25	—	—	4	109 (50.4)
P	23	27	3	31	10	94 (43.5)
C	50	−33	12	−18	—	11 (5.1)
L	−1	—	—	3	—	2 (0.9)
1969	463(64.5)	131(18.3)	−11(−1.5)	102(14.2)	32(4.5)	717 (100.0)
D	143	60	—	—	4	207 (28.9)
P	189	61	−5	52	29	326 (45.5)
C	129	10	−6	28	−1	160 (22.3)
L	2	—	—	22	—	24 (3.3)
1970	163(29.8)	200(36.6)	−7(−1.3)	129(23.6)	62(11.3)	547 (100.0)
D	37	65	—	—	5	107 (19.6)
P	49	109	9	9	49	225 (41.1)
C	77	26	−16	109	8	204 (37.3)
L	—	—	—	11	—	11 (2.0)
1971	427(40.7)	438(41.7)	−13(−1.2)	145(13.8)	53(5.0)	1,050 (100.0)
D	44	70	—	—	10	124 (11.8)
P	185	300	2	4	38	529 (50.4)
C	182	68	−15	70	5	310 (29.5)
L	16	—	—	71	—	87 (8.3)

Source: IMF, Balance of Payments Yearbook
Note: D signifies Direct Investment
P signifies Long-term Capital to Private Sector
C signifies Central Government Loans
L signifies Local Government Loans

to the public sector in 1970 and 1971.

"Other countries" made loans principally to private sector except in 1966, though the amount was not so large.

CMEA countries and China which made no direct investment, but they were

interested in loans to central government.

2. Balance of Private Short-term Capital

Short-term assets and liabilities of private non-monetary sector cover (1) net borrowing under Brazilian Instruction No. 289, (2) net borrowing under Brazilian Law No. 4131, (3) estimated free market transactions, (4) changes in short-term assets and liabilities of Brazilian businesses and individuals as reported by U.S. banks and security brokers as well as other nonbanking concerns, and (5) estimated changes in trade credits extended to, or received from countries other than the United States. The balance of short-term capital in the private non-monetary sector recorded a susplus of 10 million dollars in the 1960–63 period, a deficit of 15 million dollars in the 1964–67 period, a susplus of 274 million dollars in the 1968–71 period, a deficit of 74 million SDR units in 1972 (provisional) and a susplus of 205 million SDR units in the 1968–72 period.

Regional distribution of private short-term capital is given in Table 14. United States and Canada assumed the paramount position in the supply of short-term capital, except in 1970, when "other countries" played the foremost part.

The United States and Canada are followed by other OECD countries as an important lender.

International institutions have nothing to do with the transactions of private short-term capital, although they have much to do with the long-term capital movement to private sector.

CMEA countries and China made no short-term capital transactions whatever except in 1970.

The movement of the balance of long-term and short-term capital, and of total capital account as compared with the balance of current account is given in Figure 4.

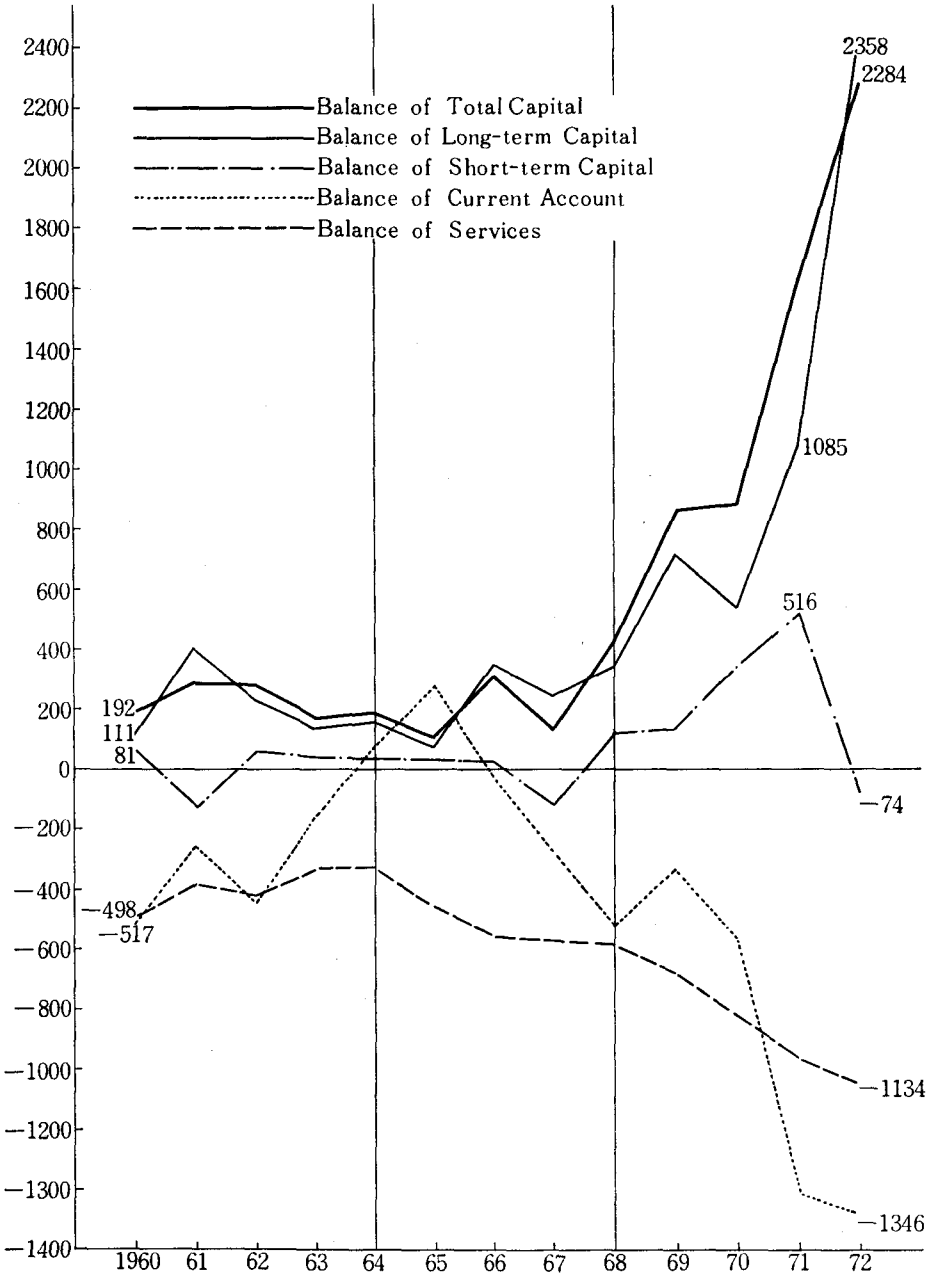
According to Figure 4, it becomes obvious that the balance of total capital increased tremendously in the 1968–72 boom period, while the balance on current

Table 14. Regional Distribution of Sources of Net Short-term Capital Inflow
(in millions of SDRs)

From / Year	U.S. and Canada	Other OECD Countries	CMEA and China	International Institutions	Other Countries	Total
1962	64	—	—	—	—	64
1966	55	−44	—	—	—	11
1967	−19	−54	—	−2	—	−75
1968	169	137	—	—	53	359
1969	125	105	—	—	48	278
1970	−58	77	1	—	316	336
1971	315	163	—	—	38	516

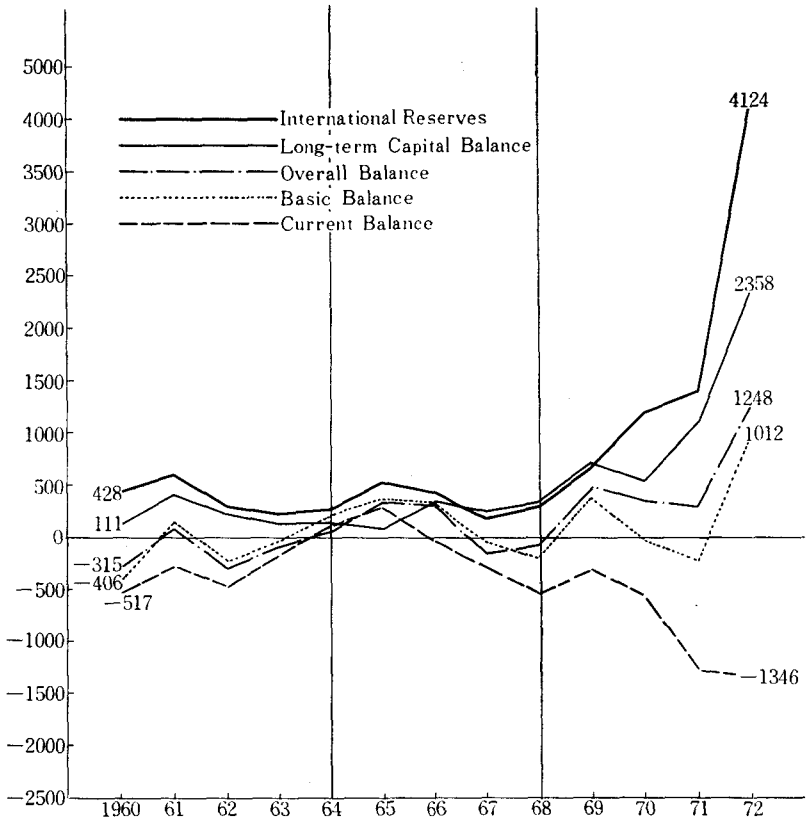
Source: IMF, Balance of Payments Yearbook

Fig. 4. Balance of Current and Capital Account (in millions of SDRs)



account declined remarkably in the same period, making sharp contrast to the movement of the capital account balance. The startling upswing of total capital balance is attributed mainly to that conspicuous rise of long-term capital balance, which is regarded as the propelling power of high rate of growth. The movement

Fig. 5. Overall, Basic, Current, Long-term Capital Balance, and International Reserves (in millions of SDRs)



of the long-term capital account stands in sharp contrast with that of service account; throughout the 1960–72 period, the former registered positive balance, while the latter negative balance every year.

Figure 5 shows that the development of international reserves has a close positive correlation with the movement of the net inflow of long-term capital throughout the 1960–72 period, especially in the 1968–72 period, while the current balance moved inversely to the development of international reserves as well as to the long-term capital inflow.

IV. Conclusion

The high rate of Brazilian economic growth is sustained by the foreign loans flowing into Brazil in large amounts. These loans contributed to the expansion of Brazilian economy and, in turn, the rapid growth of Brazil attracted abundant foreign capital. Growth and foreign capital inflow have become mutual causes and

effects. On the other hand, the amount of foreign debt, which was 2.9 billion dollars in the 1960–64 period on a yearly average increased to 4.4 billion dollars in 1969, 5.3 billion dollars in 1970, 6.6 billion dollars in 1971, and it is estimated the amount reached 10.2 billion dollars in 1972.(13)

Brazilian authorities are reported to be unconcerned about the increasing foreign debt above the level of 10 billion dollars. According to their opinion, the foreign net liabilities, that is 10.2 billion dollars minus 4 billion dollars of foreign exchange reserves, amount to 6.2 billion dollars. The ratio of this amount to export is 1.56 in 1972. In 1964, the ratio was 1.89, but in later years the figure tended to decrease. When this ratio is kept below 2.0, there is nothing to worry about for the prospect of Brazilian economy.(14) This may be true or may not be true. But it is not good to have too heavy a foreign debt, which has ultimately to be repayed by exports.

Thanks to the favourable conditions of international commodity market and to the Government policy for the promotion of manufacturing export, Brazil's export increased tremendously in the early seventies, and it is estimated that in the first nine months of 1973, "its export rose by 57% to 4.6 billion dollars, while import rose only 17% to 3.7 billion dollars. The official forecast is for a surplus of visible of $1 billion this year (1973), but this will be more than obliterated by a deficit of over $1 billion on invisibles.(15)

As is shown in Table 6, about half the net invisible payments are made up by the payment of investment income, such as interest and dividends. Moreover, foreign debt service of Brazil takes up a fairly large portion of export receipts. To lighten this burden, it is desirable that Brazil should take appropriate measures to repay or reduce the accumulated foreign debt.

It has usually been the pattern of Brazilian balance of payments that the deficit of current account has been offset by the surplus of capital account. As long as Brazilian economy keeps growing rapidly, this pattern may be maintained and there is hardly any fear about the Brazilian balance of payments. But if the prospect of Brazilian economy happens to prove less bright, then the foreign capital may cease to flow in or may dwindle.

Accordingly, as the Brazilian economy is more and more woven into the international economic fabric through the expansion of trade and capital transactions, it is more liable to be affected by the changes of world economic and political situations, and its balance of payments may turn less favourable. This may be one of the vulnerable points of Brazilian pattern of balance of payments which depends

(13) Baer, W., ibid., p. 5.
(14) Nihon Keizai Shimbun, Sept. 9, 1973.
(15) *Economist*, ibid., p. 89.

too much upon foreign capital.

As Baer points out, "if export growth rates cannot be maintained, and the current deficit worsens, the necessary foreign capital to counter-balance this might not always be available and the resulting balance of payments crisis might severely constrain the further rapid growth of the Brazilian economy."[16]

(16) Baer, W., ibid., p. 13.

INTERNATIONAL MONEY FLOW AND THE MULTINATIONAL CORPORATIONS

Masahiro FUJITA

I. Collapse of the IMF system and the New Economic Policy by President Nixon.

This paper aims to analyze the function of multinational corporations and the international money market, especially the important relations between international money flow of developed countries and less-developed countries from the view point of financing of international business.

The IMF system is now collapsing, but the share of the U.S. dollar as an international transaction currency still accounts for 75% of total transactions of the free world. On the other hand, it is clear that the confidence in the dollar has been weakened by the suspension of the convertibility of the dollar into gold. Rumania joined the Fund in January 1973 and became the 127th member country. According to recent reports Mainland China may be admitted as a member in the near future. Thus the U.S. dollar still has preeminance in the IMF system, although a postdollar standard (system) is now in the process of being constructed.

1. Actual Situation of the Dollar Crisis

The crisis of IMF system was caused by the fact that dollar as the domestic currency in the U.S. constituted the key currency. It had been long expected, but this fact would lead to a crisis formally because of a shortage of that key currency and recently because of a surplus but lack of confidence in it.

This is because the dollar has the broadest acceptability as an international currency, upon which depends the organization of the IMF system, and so the system is very sustable to crisis. The IMF was an exchange stabilization mechanism which depended on gold convertibility (U.S. dollar was both gold exchange and the key currency at the same time), and also depended on the adjustable peg system whose central rate is set in terms of the dollar. This organization of international monetary cooperation compels every member nation to accept the heavy obligation of stabilizing its exchange rate, and it supplies short-term money in return for this duty. But on the 15th of August in 1971 the dollar standard was brought into being, formally and substantially, by the Nixon New Economic Policy (NEP). The amount of overhanging dollars reached 83 billion dollars in March, 1973. Therefore it goes without saying that the recovering of dollar confidence will be the key for reconstruction

of the IMF.

Thinking of this background, it is natural that the control of overhanging dollars will be the first problem for the re-building of the IMF. If the U.S. cannot satisfy the requirement of gold convertibility by the countries which keep dollars as major reserve assets, the countries cannot help submitting to "*benign neglect*" or sharing in the cost of supporting the dollar by the realignment of foreign exchange rates, especially by revaluation. For the sake accomplishing the NEP, it is universally expected that the U.S. has to strictly maintain balance of payments discipline and at the same time monetary discipline. Nixon New Economic Policy made a big contribution to the recovery of business conditions; for example, it pulled up the real rate of growth to 7.4%: pressed down the GNP deflator to 2.9% (the consumers' goods deflator to 2.7%), and reduced the rate of unemployment to 5.2%. On the external balance, the amount of deficit was 29.8 billion dollars in 1971, but decreased to 10.1 billion dollars in 1972, but the figures above did not realize the hoped levels.

2. Contribution by MNCs to the basic balance

The change of balance of payments in the U.S. after 1966 shows that the advance of MNCs makes much more contribution to the balance of payments than the private non-MNCs do. That is, although the current balance worsened by 1.6 billion dollars from 1966 to 1970, the amount of surplus was 5.6 billion dollars. Moreover, according to the report by the Committee on Finance of the U.S. Senate in 1973 most of the surplus depends upon MNCs, the amount of surplus contributed by the MNCs being 8.5 billion dollars.

The current balance by MNCs improved from zero to 2 billion dollars from 1966 to 1970 while the current balance by non-MNCs worsened by 3.6 billion dollars. The 2 billion dollars' surplus by the MNCs in 1970 would be expected to contribute to an overall surplus, but this overall surplus decreased from 1.7 billion dollars in 1969 to zero in 1970. As for the service balance in 1970, the surplus by MNCs was 6.4 billion dollars and in the case of non-MNCs, the deficit was 2 billion dollars.

Considering the contribution to the basic balance, the net outflow of international long-term capital from the U.S. is very large, therefore the influence on the basic balance is not so big as the influence to the current balance, and the surplus on the basic balance decreased from 4.2 billion dollars in 1966 to 3.7 billion dollars in 1971. The U.S. basic balance was improved by 2.8 billion dollars by the contribution of MNCs, and this amount consists of 2 billion dollars' improvement on current balance and 800 million dollars' improvement on capital balance. This is because the outflow of long-term capital decreased and the surplus on current balance become character-

istic. An effective policy for the recovery of dollar confidence could be to concentrate on the improvement in capital account, for example, by the Interest Equalization Tax (IET). The dollar outflow is severly restricted by the Interest Equalization Tax enforced in July 1963, by the Voluntary Foreign Credit Restraint Program (VCFR) enforced in February 1965, and by the Voluntary Restraint of Direct Investment Abroad in December 1965. Therefore, the U.S. dollar, which formerly flowed out to the rest of the world as international long or middle-term capital changed to short-term capital which cannot be easily regulated. As a result, it is natural that U.S. dollars flow out to the Euro-market.

President Nixon attempted to adopt a Dollar Defence Policy which is very different from that of the Kennedy or Johnson administrations. By switching to the floating exchange rate system, the U.S. dollar is now floating against gold, and so gold reserves are unnecessary. The tendency to give too much importance to the dollar in the composition of international money was weakened and a trend to be used internationally emerged for the powerful surplus country's currencies.

The NEP, expected two effects, firstly that surplus country currencies would share in the burden of being covertible currencies, and secondly that the shortage of these would help relief the U.S. dollar of its burden as the sole key currency.

II. MNCs and 268 billion dollars' assets

Basic currency should keep every country's confidence so that the international money will circulate smoothly. Here we define international money as international monetary purchasing power. This definition means that even if dollar are trasfered into a country, they cannot be regarded as international money unless they, in fact, are converted to monetary purchasing power.

1. The Multiplier effect of international money (*international currency multiplier*)

Let Y be national income, M imports, E exports, I investment, C consumption, c average propensity to consume, s average propensity to save, m marginal propensity to import.

The basic Keynsian multiplier may be derived as:

$$\frac{\Delta Y}{\Delta (I+E)} = \frac{1}{s+m}$$

Now we shall incorporate this expression into the effect of expansion of the volume of international money. That is, as international money is expanded the receipts of exporters will increase, causing domestic bank deposits to rise and thus having an overall expansionary effect via the bank credit multiplier.

If L is the volume of international liquidity which enters a country as a result

of a balance of payments surplus, then, if this is deposited in domestic banks and used for credit expansion, the effect on national income (i.e. the *international currency multiplier*) will be represented by the following expression.

$$\Delta Y = \frac{L}{s+m} \cdot \frac{1}{s+m}$$

Denoting International Currency Multiplier(f);

$$f = \frac{1-s-m}{1-s}\left(\frac{1}{s+m}\right)$$

For the dollar, for instance, this multiplier is effective only in the dollar circulating area. But when we look at the reality of international money flows, we find the dollar area, in fact, consists of dollar preference countries which keep relatively low levels of foreign currencies and they have not enough gold to respond to the demand for gold convertibility. Japan has only a little gold though her international reserves (gold and dollar reserves) are greater than that of the U.S. On the other hand, West Germany has a high gold ratio, 25%. In other words, the actual amount of Japan's gold holdings amounted to only 870 million dollars, and the gold holdings of West Germany were 6 billion dollars at the end of 1973. West Germany demands strong gold convertibility for its foreign reserve holdings, so it does not belong to the dollar area. But we should take note of the fact that nevertheless West Germany has a rather strong dollar preference. The developing countries belong generally to the dollar area.

2. The Present State of the Dollar in International Money Flow

The dollar flow area is very wide, though the U.S. dollar has weakened in its role as a basic currency. We are going to talk about the financing needs of MNCs, dollar availability and the distribution of its international money flows.

The amount of deficit in the U.S. basic balance becomes dollar outflow. Moreover, because of the easy money policy, U.S. comercial banks repayed their Euro dollar debts, taking advantage of the difference between domestic and Euro interest rates. And the money flowed out of the U.S. to other countries, especially to Western Europe. Even after these countries paid back their official debts, the dollar capital still flowed into the Euro-dollar market, to the extent of one hundred billion dollars. This is because U.S. MNCs are increasingly narrowing the capital from host countries, even despite the Department of Commerce restrictions on the outflow from the U.S. Thus U.S. dollar plays very important role in the international money flows.

After the World War II, the U.S. promoted direct investments and it was the only source of supply of international money. The reason is that in the U.S. profit rates were decreasing because of upward pressure of labor costs, and the U.S. was

looking for cheaper labor. Also export industries of high technical level sought for greater oppotunities for investment abroad.

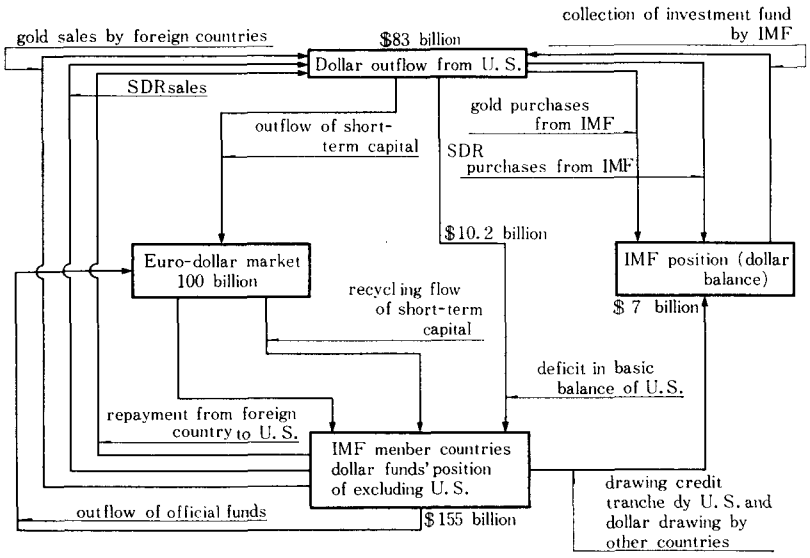
As mentioned before, the increase of private direct investment has brought about the surplus in the balance of payments due remittance of profits to the U.S. The U.S. profit from international direct investment abroad amounted to 2.9 billion dollars in 1960, 5.2 billion dollars in 1965, 7 billion dollars in 1970, and 9 billion 400 million dollars in 1971.

MNCs are urged to remit their profits to the U.S. by strict Department of Commerce regualtions. The host country governments urge the MNCs to reinvest the profits. Especially the MNCs in weak and soft currency countries tend not to accumulate internal reserves but send profit or revenues back to the native countries as soon as possible, while in turn the parent company may lend capital back to the foreign subsidiaries that are operating in the weak currency countries. The subsidiaries may also attempt to send.

The capital and profits out of the country to more secure locations and try to choose more profitable opportunities for investment. This tendency in the field of inter national money brought about the specualtion against the *German Mark* in February 1973, and also brought about gold specualtion. In 1971, when the amount of deficit in balance of payments was estimated at 30 billion dollars, even the former Secretary of the Treasury, Thomas T. Connally stated that if the total amount of profits of MNCs is remitted to the U.S., the devaluation of the dollar would not be necessary.

To illustrate the significance of the dollar in the World Monetary System, we

Fig. 1 Dollar flows in 1971



present a flow chart of the world dollar circulation in 1971.

At the end of 1971, total book-value of the short-term liquid assets in the private sector of American international business, or the total amount of MNCs' funds, was 268 billion dollars. This amount is 8.5 times as much as the 32 billion dollars in 1960. Under these circumstances, if only a one percent movement of MNCs' capital occurs, it would bring about a severe international currency crisis. This 268 billion dollars all managed by private persons and traded in private markets virtually uncontrolled by official institutions anywhere, was more than twice the total of all international reserves held by all central banks and international monetary institutions in the world at the end of 1972. The total amount of international liquidity at the same date is estimated to be about 15.5 billion dollars. These are the reserves with which central banks fight to defend their exchange rates. The resources of the private sector outclass them. Because 268 billion dollars is such an immense number, it is clear that only a small fraction of the assets which it measures needs to move in order for a genuine crisis to develop. The international money market, possessing such *a masse de manouevre* as well as an efficency and flexibility unknown in the past, can focus with telling effect on a crisis-prone situation . . . , some weak currency which repels funds and some strong one which attracts them.

Because such a small proportion of the resources of the MNCs is needed to produce monetary explosions, it appears appropriate to conclude that destructive, predatory motivations do not characterize the sophisticated international financial activities of most MNCs, even though much of the funds which flow internationally during the crisis doubtlessly is of MNC origin.

In the controversy over reforming the international monetary system, international liquidity has been discussed in relation to the amount of trade, especially the amount of imports, and also optimum level of international liquidity has constituted one of the most important debating problems. Compared with the foreign reserves held by the central banks, the assets of MNCs are much greater. Considering this fact, the Central Bank always has to keep adequate liquidity to overcome international monetary crises.

III. The Multinationalization of Banks and the rapid growth of Euro-market

Next, we consider the structure of Euro-market which has become to be used as a source of financing by multinational corporation.

The U.S. banks have advanced into Europe, supplying short-term dollar funds and issuing bonds.

1. The integration of the international money market and the movement of funds

Overseas enterprises should pay much more to raise finance in New York, if the Interest Equalization Tax is effective. Therefore they seek to raise the long-term funds in the Euro-bond market. Restraints on external credits have begun to be

Table 1. Estimated short-term asset and liability positions of principale institutions in International Money Markets, 1969–71 (in Billion of U.S. dollars)

Holder of assets or liabilities	Denominated in Dollars		Denominated in foriegn currencies		Total	
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
United States banks						
1969	8.9	28.1	0.5	0.2	9.4	28.3
70	10.1	21.8	0.6	0.2	10.7	22.0
71	12.1	15.8	0.9	0.2	13.0	16.0
United State nonbanks						
1969	3.5	1.7	0.7	0.4	4.2	2.1
70	3.6	2.2	0.6	0.5	4.2	2.7
71	4.7	2.2	0.5	0.4	5.2	2.6
Forien banks						
1969	64.9	52.3	10.7	10.6	75.6	63.0
70	43.0	31.7	5.8	5.8	48.8	37.5
71	44.3	38.3	8.4	8.2	52.7	46.5
Foreign Governments Central banks and International Organization						
1969	4.9	na	0.4	na	5.3	na
70	10.0	na	2.8	na	12.8	na
71	10.7	na	8.0	na	18.7	na
Foreign Banks						
1969	7.3	6.2	na	na	7.3	6.2
70	7.6	9.4	na	na	7.6	9.4
71	6.8	11.4	na	na	6.8	11.4
Foreign affiliates of U.S. Nonbanks						
1969	na	na	na	na	59.9	34.9
70	na	na	na	na	80.6	46.9
71	na	na	na	na	110.0	63.0
Foreign branches of U.S. banks						
1969	na	na	na	na	na	na
70	34.6	36.1	12.7	11.3	47.3	47.4
71	40.2	42.1	21.2	19.4	61.4	61.5
Total						
1969	89.5	88.3	12.3	11.2	161.7	134.5
70	108.9	101.2	22.5	17.8	212.0	165.9
71	118.8	109.8	39.0	28.2	267.8	201.0

Sources: *Federal Reserve Bulletin*, Sept. 1972
U.S. Treasury Bulletin, Sept. 1972
Foriegn Direct Investment Program, Selected Statistics, July 1971

strengthened since February 1965, and so American business abroad has come to seek finance in Euro-Money Markets. The deficit in the balance of payments of the U.S. continues, despite the dollar-defence measures. The total amount of accumulated deficit in the net liquidity balance from 1960 to 1970 was 35 billion dollars. The increase of the deficit in the official balance was 14 billion dollars over 10 years (from 1960 to 1970). So we can say that overseas corporations had the use of 21 billion dollars as funds in the international money market. In 1971, newly issued money in the international bond market was 5.2 billion dollars, and the total amount of assets in Euro-currency market was 71 billion dollars, of which Euro-dollars were 54 billion dollars.

As a result of the integration between the Euro-currency market and the Euro-bond market, the long-term rate of interest have been equilibrated, and the international money has been able to easily and smoothly.

With advancing integration, it would be difficult for the central bank authorities to behave against the movement of international money market, as has been shown by the experience of the Mark speculation in 1971. That is, the rate of interest in the U.S. decreased and the large amount of American capital flowed into Europe, so that the dollar funds rushed into West Germany which was promoting a high interest rate policy. Therefore, German Mark was eventually revalued.

With the strengthening of the function of international money markets, imperfections of the markets are being eliminated, and a more stable investment environment is being brought about. Needless to say, this is the reason why there is the necessity for internationalization of banking.

2. Recent Features of MNCs' Financing

We will examine the character of financing in MNCs. Firstly, as the subsidiaries overseas generally have obtained high profits up to now, internal funds or internal reserves have been used to supply financial needs.

But today in addition to internal funds, they finance by borrowing from the financial institutions in host countries and by issuing Euro bonds. Taking U.S. MNCs, the share of internal reserve financing was 32.2% and that of local financing was 51.4% over the period from 1968 to 1970.

Secondly, the primary investment money was supplied by the parent company, but often the large amount of capital demanded afterward was supplied by consolidated bank groups, so called consortium banks. These consortium banks not only supply investment money but also investigate the link up or the amalgamation of enterprises. Furthermore they are practicing the internationalization of money and finance, just as manufacturing is being internationalized. As for local financing of the U.S., MNCs, borrowing from financial intermediaries is 52%,

comprising short-term borrowing of 20.2%, and middle and long-term borrowing of 31.9%. The issuing of debentures is 21.9%, and that of convertible debentures is 24.2%, making a total of 45% loan financing. Local financing enables the parent company to obtain low interst rate money.

Thirdly, the share of financing by Euro-bonds is 46%. After the foreign credit restraint in the U.S. in 1965, this tendency was undoutedly strengthened. The issuing of Euro-Bonds by private companies is 60%, 61% of this on a dollar base and 21% of it on a German Mark base. The huge amount of international capital demand of MNCs, so much that it is impossibly to mobilize their needs in the money market of any single country, is still increasing rapidly, so the scale of the Euro-Bond market is expanding greatly.

Fourthly, we will discuss the method hedging against the risk of exchange. This risk comes from the realignment of foreign exchange rates which seems to be a barrier against securing of the stable supplies of funds. Method of hedging include the maintenance of a square position in short-term liquid assets and short-term liquid liabilities, the buying and selling of forward exchange, the manipulation of leads and lags, the adjustment of remittance dates, local borrowing, the time adjustment of the increase of capital to the subsidiaries, and so on.

3. Multinationalization of Banks

The characteristics of the MNCs of money raising is that they finance basically in cooperation with banks abroad.

This characteristic naturally promotes the internationalization of banks and the multinationalization of finance. The first reason is that they cannot raise all the finance that they need merely from banks.

The second reason is that Euro currency market made a rapid growth because it is an efficient supplier of international money.

As a matter of fact, the number of foreign branches of the U.S. banks was 244 in 1966, but in 1970 the number increased to 536. Over the same period, the total amount of assets of the branches all over the world increased fourfold. And three-fourths of total assets we held by the branches in Europe. 365 billion dollars, which is equal to 90% of the total deposits in the foreign branches of American banks, is time deposits. But even though cash balances and make up only 10% in absolute value they are very large.

The reasons for the expansion of Euro-market are as follows. Firstly, the U.S. subsidiaries overseas reinvested the profits in the Euro-market and limited the remittance as much as possible. Secondly, accumulated money in oil producing countries flowed in to the Euro-market. And lastly, money moved to the Euro market for better return because the rate of interest in the U.S. was low due to

"*Regulation Q.*"

On the other hand, the demand for international funds has been determined by two factors. Firstly, because of the tight-money policy and the "*Restraint External Credit*" in the U.S., MNCs have launched into Europe in order to try to finance in the Euro-market.

Secondly, the U.S. banks borrowed Euro-dollars through the head office in Europe in order to cover the lack of funds caused by the tight money policy.

Multinationalization of banks came to be necessary because the demand for long and middle-term money increased from American corporations abroad. Multinationalization of banks enables the spreading of risks.

Euro-currency, for example the Euro-dollar, has become stabilized in quality and quantity as middle and long-term money, and has even taken the character of an international currency. These are the reasons of the establishment of multinational banks.

Methods of financing have been further diversified due to the advance abroad togather of related corporations. Thus the multinationalization was strenghtened through the international cooperation of financial intermedies and the establishment of investment banks whose scales are very large internationally.

IV. Dominant position of Euro-dollar

So for we have discussed the function of the Euro-money market. There are two points to consider for improving the U.S. balance of payment. Firstly it is necessary to combat the problem of the overhanging dollars. Secondly, it is necessary to control the domestic inflation.

To control the domestic inflation the U.S. Government should take a tight money policy.

If U.S. money rates rise more than the Euro-money rates, overhanging dollars will return to the U.S. from the Euro-dollars market.

If the European economic and currency integration proceeds successfully, the Euro-dollars may be expected to remain there, and even further inflows to occur due to the stabilized investment opportunity.

Actually EC countries have four times as much gold as the U.S. surplus country currencies, for example the German Mark, are superior to the U.S. dollar.

V. The Role of Japanese MNCs in the World Economy

"Multinational Corporation" is the hottest economic topic today, and at the same time it is the most difficult one. Some Japanese companies have declared they

Table 2. Japanese Overseas Investment as of December 31, 1972

	Direct Investment		Loans		Other types of Investment		Establishment of Branches		Total (B)	
	No. of Investment (X)*1	Vol. of Investments (Y)*2	No. of Investment	Vol. of Investment	No. of Investment	Vol. of Investment	No. of Investment	Vol. of Investment	No. of Investment (w)*5	Vol. of Investment (z)*6
Asia	2,015 (44.9)*3	632 (20.0)*4	337 (34.5)	600 (25.7)	48 (14.9)	15 (3.2)	258 (53.2)	26 (9.0)	2,658 (42.4)	1,273 (20.4)
Latin America	440 (9.8)	502 (15.9)	285 (29.2)	342 (14.7)	38 (11.8)	6 (1.3)	14 (2.9)	2 (0.7)	777 (12.4)	853 (13.6)
Near East	32 (0.7)	11 (0.3)	— (—)	— (—)	2 (0.6)	370 (79.4)	6 (1.2)	218 (75.4)	40 (0.6)	599 (9.6)
North America	1,181 (26.3)	856 (27.0)	201 (20.6)	433 (18.6)	191 (59.1)	71 (15.2)	12 (25.2)	23 (8.0)	1,695 (27.0)	1,384 (22.1)
Europe	493 (11.0)	1,003 (31.7)	71 (7.3)	570 (24.4)	30 (9.3)	3 (0.6)	71 (14.6)	17 (5.9)	665 (10.6)	1,592 (25.5)
Africa	117 (2.6)	52 (1.6)	28 (2.9)	81 (3.5)	3 (0.9)	0 (0)	9 (1.9)	1 (0.3)	157 (2.5)	135 (2.2)
Oceania	214 (4.8)	189 (3.4)	54 (5.5)	307 (13.2)	11 (3.4)	1 (0.2)	5 (1.0)	3 (1.0)	284 (4.5)	419 (6.7)
Total (A)	4,492	3,166	970	2,334	323	466	485	289	6,276 (C)	6,255 (C)
$\frac{A}{C}$	(71.6)	(50.6)	(15.6)	(37.3)	(5.1)	(7.5)	(7.7)	(4.6)	(100.0)	(100.0)

*1 Represents number of investment

*2 million US dollars

*3 $\frac{X}{A}\%$

*4 $\frac{Y}{A}\%$

*5 $\frac{W}{C}\%$

*6 $\frac{Z}{C}\%$

Source: Ministry of Finance, Statistical Report, monthly 1973

Table 3. Estimated Euro-currency Market Size
(billions of U.S. dollars)

	1969	1970	1971	1972
Sources:				
Outside area				
United States	4.1	4.5	6.1	6.9
Rest of World	17.6	24.0	31.5	47.9
Total	21.7	28.5	37.6	54.8
Inside area				
Banks	10.7	15.0	18.2	16.4
Non-banks	11.6	13.5	15.2	19.8
Total	22.3	28.5	33.4	36.2
Grand total	44.0	57.0	71.0	91.0
Uses:				
Outside area				
United States	16.8	13.1	8.3	9.6
Rest of World	12.0	19.0	29.1	43.1
Total	28.8	32.1	37.4	52.7
Inside area				
Banks	7.1	9.8	14.5	17.5
Non-banks	8.1	15.1	19.1	20.8
Total	15.2	24.9	33.6	38.3
Grand total	44.0	57.0	71.0	91.0

Source: BIS, Annual Report, Basle, June 1972

would multinationalize themselves or they must do so in order to achieve further progress. It is quite doubtful if they have detailed plans for multinationalization or not, but it is a fact that they know of multinational spread of U.S. business, and feel that it is necessary to have a gloval point of view in their management.

Such a company is "*Mitsubishi Trading Corporation,*" a typical Japanese trading company, which we usually call "*Sogo-Shosha,*" "*Sogo-Shosha*" is a trading company, but their activities are not confined to just "*Trading.*" They are playing a very important role in the internationalization of the Japanese economy.

As long as "*Growth*" is the most important principle of enterprise, especially "*Sogo-Shosha,*" it is very natural that they always try to expand into new fields of business; that is to become a "*Conglomerate*" and also try to extend their market abroad when their domestic market is filled. Whether they prefer direct investment from export, is apt to be subject to the condition of the domestic market. When the domestic market is still growing, business in foreign countries will be regarded as an additional revenue source, and they prefer export to direct investment because direct investment involves various risks.

We would point out the remarkable contribution by Japanese export in the

rapid growth of G.N.P. In 1969, the portion of G.N.P. growth contributed by expansion of exports was 4% in United States, 9.6% in Japan, 1.1% in France, 1.5% in England, and 1.8% in West Germany.

The rapid growth of Japan in 1960's did not depend on foreign market so much. The role of exports was just to cover the import of resources which were necessary to produce goods for the domestic market. However since 1971, the situation has changed. Growth rate of our G.N.P. is decreasing. The expansion of our domestic market is coming close to the limit. In the 1960's companies were busy in supplying for domestic markets, and considered foreign markets as merely an additional market. But recently they have found that their domestic market was not enough to cover their growth. They began to re-estimate foreign markets, to consider foreign markets as one of the major supports of their development. And at the same time, they know well the success of U.S. enterprises by multinationalization, or quality of their products is enough to do so. As for management skills, it might be an obstacle for multinationalization because of big differentiation of cultures. Though as they overcome this difficult problem, the next ten years will be characterized by multinationalization of Japanese firms.

Then, they are two major characteristics of MNCs which must be considered especially in the case of analysis of the multinationalization of Japanese firms. Firstly, we would like to consider the matter of extraterritorial jurisdiction; this refers to the situation where a sovereign state loses some control over its legal citizens.

When the economy is in a sufficiently expansionary phrase, the government will usually take a tight money policy fearing an excessive boom. But a subsidiary of a multinational might not follow this policy, and continue to invest funds supplied by its parent company. Another case is where the government hopes to export the subsidiary's product, but the subsidiary does not follow the policy if the parent company does not agree with it. Further, if the government tries to appropriate the subsidiary's profits for the benefit of its domestic economy, "*transfer price*" manipulation by the MNCs might make the efforts ineffective. Then the host country's government will feel dissatisfied. The attitude of Andes Common Market expresses this uneasiness. In order to recover sovereignty all parent companies are requested to fade out of the stock holding of the subsidiary within fifteen years. This is a new tendency, but it seems to indicate some pattern of direct investment in the future. Secondly, the other important characteristic of the Multinational Corporation is that they are often oligopolistic. It is very clear that today's multinational corporations here come from oligopolistic industries. If multinationalization is continued international oligopolization of the world economy should lead to the optimum division of resources, but it appears that the demerits of oligopoly would be big enough to cancel out the economic merits of multinationals. We cannot control the

world wide oligopoly or monopoly by individual nations' anti-monopoly laws. Therefore, it is necessary to establish an international organization to control multinationals. Of course it will be very difficult to establish such an organization. But we have to recall the fact that the economic principle liberalization of goods and capital transaction was promoted only step by step. GATT, IMF and some other international organizations were established in order to promote this principle. As the result of liberalization of capital, foreign capital inflow into Japan is increasing rapidly, and so it will be necessary to apply controls to it. At the same time since the advance of Japanese enterprise abroad is increasing as well, it will be necessary to apply restrictions on its behavior abroad.

Table 4. Industrial Classification Japanese Private Investment Abroad (in thousand of US dollars)

Fiscal year / Industries	1951–1957		1958		1959		1960		1961		1962		1963		1964		1965		1966		1967		1968		1969		1970		Cumulative total	
	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.	No.	Acct.
Food Stuffs	5	712	1	83	10	4,339	12	1,562	13	2,988	4	2,619	10	6,706	2	3,568	10	3,583	5	1,618	12	6,877	7	6,233	14	4,167	30	15,785	135	60,841
Textile	11	10,698	3	1,873	5	3,422	9	10,980	7	6,317	9	2,803	16	7,655	19	13,504	16	5,549	15	11,370	20	16,664	31	15,120	52	34,040	46	49,898	259	189,798
Pulp & Wooden	3	15,556	1	22,693	0	10,598	1	1,397	0	300	0	300	2	9,037	2	10,347	1	3,937	5	36,419	4	2,360	5	17,280	6	3,315	14	78,815	44	212,454
Chemical	4	157	1	95	3	122	8	736	2	298	7	927	7	927	15	631	20	4,178	12	9,104	16	3,345	17	4,956	24	6,286	40	25,467	175	59,632
Iron & Metal	2	1,878	0	2,133	3	3,787	3	2,571	4	27,157	3	616	11	2,897	8	15,494	5	4,432	6	6,013	9	19,724	9	3,878	23	38,241	13	9,110	99	137,926
Machinery	6	6,423	1	991	4	2,220	4	1,176	3	642	3	1,045	8	10,241	6	1,142	3	3,185	6	3,074	19	6,954	19	5,141	19	9,373	37	15,629	138	67,236
Electric Appliances	1	24	4	117	3	189	3	495	8	1,308	9	2,235	5	3,294	7	1,862	14	2,744	20	5,102	21	6,096	29	6,579	39	21,960	43	21,885	206	70,890
Transport Machinery			4	13,288	1	15	1	2,405	3	3,052	5	8,838	2	3,810	7	5,858	3	20,571	5	14,106	5	11,996	1	4,311	2	11,430	4	2,850	43	102,530
Others	10	1,311	8	1,154	5	654	7	6,555	2	2,119	7	1,368	14	3,141	8	3,529	9	1,378	23	2,978	19	3,484	53	5,175	50	6,892	77	21,754	292	61,492
Sub-Total	42	36,759	23	42,427	34	25,346	48	27,877	42	44,181	47	20,756	84	47,111	64	55,935	81	49,557	97	89,684	125	77,500	171	68,668	229	135,705	304	241,193	1,391	962,699
Agriculture-Forestry	7	1,319	0	250	0	538	3	1,149	0	300	6	1,633	3	1,919	2	670	6	7,216	2	4,834	8	5,665	16	10,625	23	12,009	18	9,566	94	57,693
Fisheries	12	1,463	2	234	5	429	7	2,130	6	1,082	5	961	2	484	3	659	4	1,317	10	1,050	10	2,518	6	1,533	8	4,904	16	8,453	96	27,218
Mining	25	17,176	5	13,148	4	11,510	10	44,630	5	104,086	12	34,366	3	25,534	4	20,916	12	33,664	17	72,147	14	58,625	15	158,681	31	297,301	38	234,955	195	1,126,743
Sub-Total	44	19,958	7	13,632	9	12,477	20	47,908	11	105,468	23	36,961	8	27,937	9	22,245	22	42,197	29	78,032	32	66,809	37	170,840	62	314,216	72	252,974	385	1,211,654
Construction	—	—	—	—	—	—	—	—	1	12	3	938	4	4,497	3	3,797	1	8,228	2	6,269	2	1,330	1	725	5	7,004	10	5,003	32	37,805
Commerce	231	13,120	25	4,216	51	10,930	59	11,716	45	5,142	66	14,148	88	13,505	79	11,206	68	23,050	88	19,559	115	48,018	124	119,358	200	54,995	253	54,141	1,492	403,105
Finance-Insurance	10	4,289	4	1,843	5	1,769	2	2,654	3	3,458	6	4,517	8	6,651	7	14,513	6	29,596	9	20,865	3	46,045	13	49,769	9	43,821	30	92,099	115	321,889
Others	40	4,428	19	2,520	24	2,535	22	2,570	31	6,546	34	22,106	31	26,275	31	12,591	31	4,112	28	12,598	29	35,166	38	147,813	63	111,840	99	258,038	520	659,137
Sub-Total	281	21,837	48	8,579	80	15,234	83	16,940	80	15,158	109	41,709	131	50,929	120	42,107	106	64,986	127	59,292	149	130,561	176	317,663	277	217,659	392	419,281	2,159	1,421,935
Grand Total	367	78,554	78	64,640	123	53,062	151	92,729	133	164,811	179	99,425	223	125,977	193	120,291	209	156,739	253	227,008	306	274,867	384	557,174	568	667,579	768	918,449	3,935	3,596,306

Source: (1) *Toyo Keizai Tokeigeppo* (Toyo Keizai's Statistics Monthly) Vol. 33 No. 5 (Tokyo: Toyo Keizai Shinposha, May 1973).
(2) MITI, *Keizai-Kyoryoku no Genjo to Mondaiten* (Present State and Problems of International Economic Cooperation in Japan, 1972).
(3) JETRO, *Wagakuni Kaigai Toshi no Genjo* (Present State of Japanese Overseas Investments 1972, 1973).

ESTIMATION OF INVESTMENT ALLOCATION RATIOS OF JAPANESE ECONOMY: 1960-1969[1]

Hikoji KATANO

1. For analysing the changes of industrial structure of Japanese economy, one of the most essential indicators is allocation ratios of investment to individual industrial sectors. However, no available data of this sort are in our hands. In this paper, we will estimate the investment allocation ratios of Japanese economy for period from 1960 to 1969.

2. Notations and the data sources, used in our analysis, are as follows:

Notations	Descriptions	References	Data Sources[2]
$B+E=[b_{ij}+e_{ij}]$	: capital coefficient matrix	(Table 1)	UIS/ERI/EPA
$B=[b_{ij}]$	: fixed capital coefficient matrix	(Table 3)	to be calculated
$E=[e_{ij}]$	: inventory capital coefficient matrix	(Table 2)	Tōkei Kenkyūkai
I^*	: investment by commodity	(Table 6)	UEA/PB/EPA
I	: investment by industry	(Table 12)	to be estimated
X	: output by industry	(Table 4-a)	UEA/PB/EPA
XT	: trend value of output by industry	(Table 7-a)	to be estimated

3. The original matrices of capital coefficient and inventory capital coefficient are composed of 56 industrial sectors. However, we will aggregate this classification to 12 sector classification in this analysis. The followings are used for the aggregation.

12 sectors	sectors in 56 sector classification to be aggregated upto 12 sectors
1. Foodstuffs	1, 4, 6, 12～17
2. Raw Materials	2, 3, 5, 8, 9, 11, 24*
3. Petrolium and Gas	10, 46
4. Other Fuels	7, 31, 45
5. Chemicals	28～30, 32
6. Textile Products	18, 19, 20
7. Iron and Steel	34, 35

(1) The author is indebted to Mr. H. Nagata at Economic Research Institute of Economic Planning Agency, by whom the computer processing has been done.

(2) EPA: Economic Planning Agency; ERI: Economic Research Institute; UIS: Unit of Industrial Structure; PB: Planning Bureau; UEA: Unit of Econometric Analysis.

8.	Other manufacturing Products	21～23, 24*, 25～27, 33, 36, 37
9.	Non-Electrical Machineries	38
10.	Electrical Machineries	39
11.	Transport Equipments	40
12.	Others	43, 44, 47～56

4. The aggregated matrices are shown by Table 1 and 2; capital coefficient matrix $(B+E)$ by Table 1 and inventory capital coefficient matrix (E) by Table 2. By using these matrices, we calculate the fixed capital coefficient matrix (B) (Table 3).

5. When the fixed capital coefficients are stable for a certain time horizon, investment by industry can be calculated by relation of

$$I_j = \Sigma b_{ij} \Delta X_i \,.$$

For making this sort of calculation feasible, we have to examine stability of the fixed capital coefficient matrix. As checking data for the examination, we will use the figures of investment by commodity, which are only data to be available for our purpose.

Here we compare the following two sets of time series data:

$I_i^*(t)$: actual value of investment by commodity,

$\hat{I}_i^*(t) = \Sigma_j b_{ij} \Delta X_j$: calculated value of investment by commodity.

We may consider that the fixed capital coefficients are kept in stable for a certain time horizon, if divergence between these two time series in small.

6. *Examination I*

At first, we will use the actual value of output for calculating increment of output ΔX. These values are shown by Table 4. And the resulting "calculated values of investment by commodity" are shown by Table 5. Correspondingly, the actual values of investment by commodity are shown by Table 6.

The comparison of these two sets of time series are shown by Figure 1 (a-h). As shown in these Figures, there are large divergences between the actual values and the calculated values of investment by commodity. We consider that the main cause of this divergence may be due to the *actual value* of output to be used. The actual value of output may reflect the changing degree of utilization of production capacities in each industrial sector. And this changing degree of utilization may cause the divergence between two time series.

7. *Examination II*

* 20% of 24th sector in the original matrix is to be included in our 2nd sector, and the rest goes to our 8th sector.

Considering the results of examination II, we will use the trend value of output for calculating increment of output in our second examination.

The trend value are estimated by

$$XT(t) = e^{a_0 + a_1 t},$$

where a_0 and a_1 are estimated by the relation

$$\log X(t) = a_0 + a_1 t + u(t).$$

The estimated trend value of output and the increment value are shown by Table 7.

Using these value, we calculate

$$\hat{I}_i^{**} = \Sigma_j b_{ij} \Delta XT_j \,.$$

The results are shown by Table 8.

Comparision of this results to the actual investment by commodity shows that there are still divergences between these two time series.

See Figure 1 (a-h). The reason of this divergence, we consider, is due to the insufficient modification of coefficients in the original fixed capital coefficient matrix. In the original matrix, certain modification of coefficients has been performed, considering the degree of utilization of production capacities at the years when the matrix is based.(3) But this modification is not generalized for a certain time horizon; for 1960–1969 in our analysis.

8. *Examination III*

We have no information for the generalized modification of fixed capital coefficient for a certain time horizon. Then, here we use the deflator

$$d_i = \frac{\hat{I}_i^{**}(1965)}{I_i(1965)}$$

for the modification (Table 9). The modified fixed capital coefficients are

$$b_{ij}^* = b_{ij} d_i \,. \qquad \text{(Table 10)}$$

Using this modified coefficients and the trend values of output, we calculate

$$\hat{I}_i^{***} = \Sigma_j b^*_{ij} \Delta XT_j \,.$$

The results are shown by Table 11.

Comparison of this results to the actual investment by commodity shows that there are still divergences between these two time series but the divergences are not so large. So we will use this modified coefficient matrix, together with the trend value of output, for calculating the investment by industry.

9. The investment by industry can be calculated by

$$I_j = \Sigma_i b_{ij}^* \Delta XT_i$$

The results are shown by Table 12. This results can directly produce the investment

(3) Cf. J. Tsukui et al., "Showa 40 nen • 56 Bumon Shihonkeisū Gyōretsu no Suikei to Kinkō Seichō Keiro no Shisan," Keizai Bunseki, No. 35 (Dec. 1971) pp. 1—39.

allocation ratios, that are shown by Table 13 and Figure 2.

10. The estimated results indicate:

(1) Weights of investment to sector 1 (foodstuffs), sector 2 (raw materials), sector 3 (petroleum and gas), and sector 6 (textile products) have been lost through the 1960's.

(2) Increases of weights of investment have been realized in sector 5 (chemicals), sector 7 (iron and steel), sector 8 (other manufacturing products), sector 9 (non-electrical machineries), sector 10 (electrical machineries) and sector 11 (transport equipments).

(3) In sector 12 (others: construction, tranportation and communication, commerce and services), which absorbs about a half of total domestic fixed capital formation, weight of investment has been decreased as a whole.

These results show the typical patterns of changes in industrial structure of Japanese economy through the 1960's.

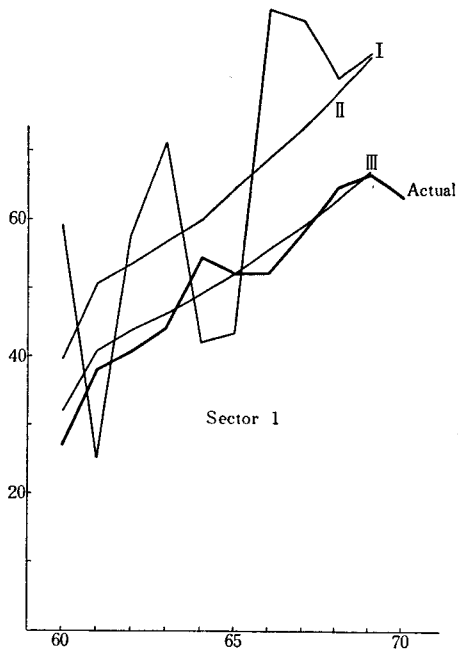


Figure 1–a.

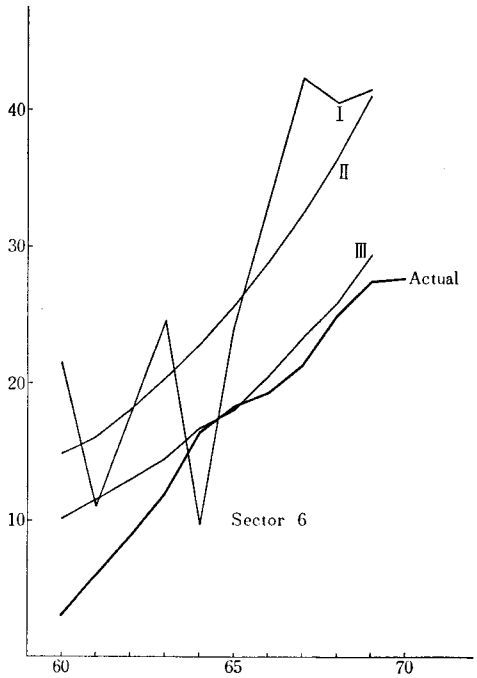


Figure 1–b.

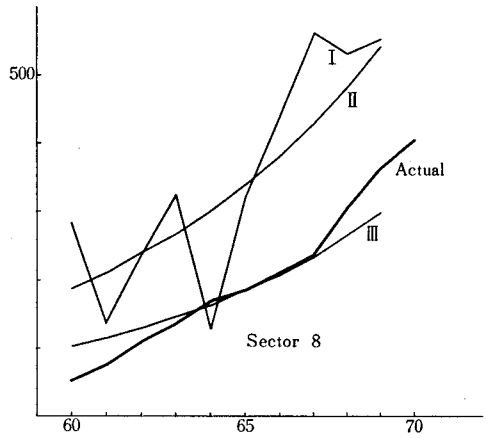


Figure 1–c.

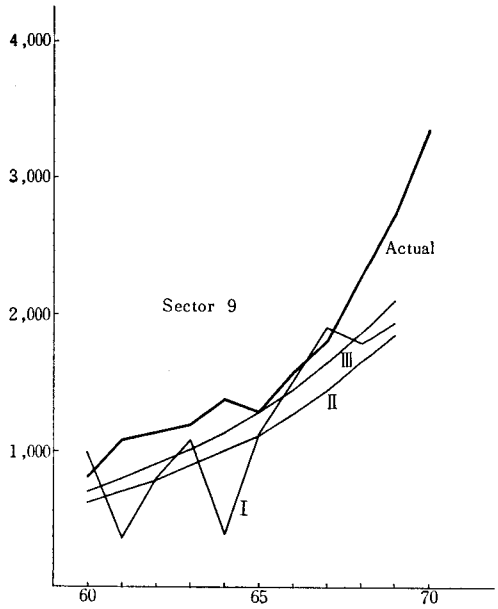


Figure 1–d.

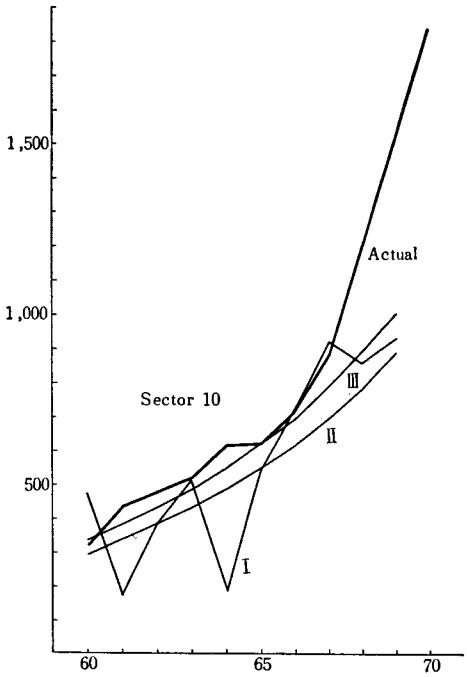


Figure 1–e.

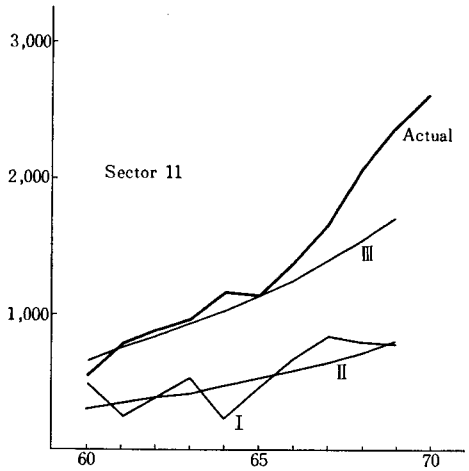


Figure 1–f.

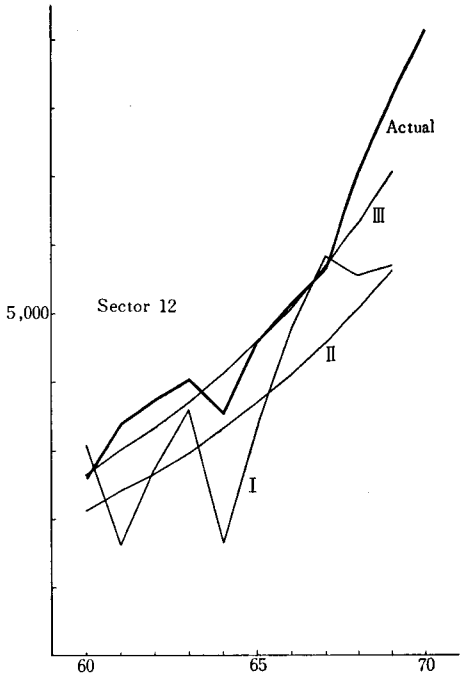


Figure 1–g.

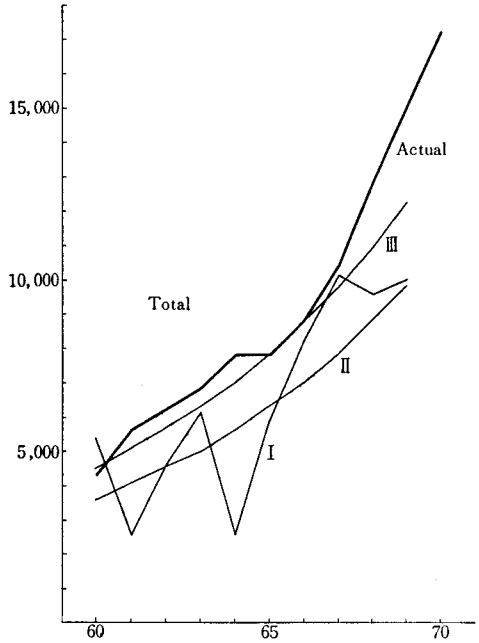


Figure 1–h.

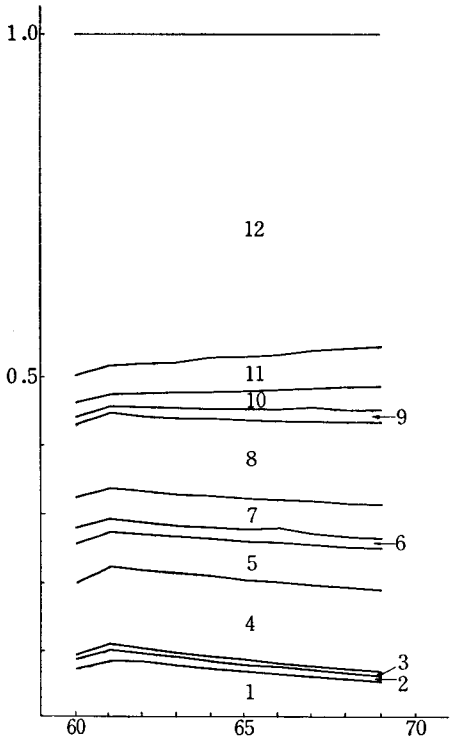


Figure 2.

Table 1: B+E

	1	2	3	4	5	6	7	8	9	10	11	12
1	0.112637	0.107745	0.000588	0.000389	0.002714	0.001834	0.000049	0.000628	0.0	0.0	0.0	0.006852
2	0.000751	0.015655	0.000003	0.000169	0.002940	0.005645	0.002319	0.004183	0.000028	0.000092	0.000012	0.001593
3	0.000008	0.000006	0.007968	0.006878	0.000339	0.000010	0.000018	0.000032	0.000055	0.000209	0.000169	0.000058
4	0.001952	0.004312	0.001682	0.009694	0.006501	0.000756	0.001424	0.001385	0.000741	0.001153	0.000975	0.006943
5	0.008481	0.004687	0.000014	0.000302	0.044827	0.005913	0.001944	0.002506	0.000383	0.001747	0.001028	0.000574
6	0.001289	0.000915	0.002065	0.001921	0.002491	0.051313	0.001238	0.004253	0.001320	0.003454	0.004091	0.005024
7	0.0	0.000215	0.0	0.000113	0.000003	0.000004	0.052926	0.001629	0.006695	0.006095	0.008799	0.002114
8	0.014587	0.020624	0.068490	0.063725	0.048695	0.029667	0.025829	0.080476	0.021719	0.056571	0.063965	0.069558
9	0.095735	0.185665	0.755439	0.702134	0.288405	0.193294	0.195363	0.182612	0.092711	0.081249	0.181670	0.056910
10	0.045610	0.088975	0.361897	0.336339	0.138219	0.092532	0.093448	0.087369	0.035414	0.077579	0.085492	0.028643
11	0.100155	0.100010	0.041233	0.024817	0.013688	0.016230	0.010221	0.028595	0.008221	0.006135	0.058793	0.132270
12	0.618714	1.055130	1.600073	1.567054	0.336279	0.259399	0.193995	0.257918	0.093246	0.160612	0.268416	0.673496

Table 2: E

	1	2	3	4	5	6	7	8	9	10	11	12
1	0.026333	0.001093	0.0	0.0	0.002710	0.001800	0.0	0.000384	0.0	0.0	0.0	0.000248
2	0.000704	0.015598	0.000003	0.000169	0.002940	0.005645	0.002319	0.004183	0.000028	0.000092	0.000012	0.001589
3	0.000008	0.000006	0.007968	0.006878	0.000339	0.000010	0.000018	0.000032	0.000055	0.000209	0.000169	0.000058
4	0.001952	0.004312	0.001682	0.009694	0.006501	0.000756	0.001424	0.001385	0.000741	0.001153	0.000975	0.006943
5	0.008481	0.004687	0.000014	0.000302	0.044827	0.005913	0.001944	0.002506	0.000383	0.001747	0.001028	0.000574
6	0.000709	0.000339	0.0	0.0	0.000065	0.049693	0.000002	0.001733	0.000073	0.000315	0.000233	0.000336
7	0.0	0.000215	0.0	0.000113	0.000003	0.000004	0.052926	0.001629	0.006695	0.006095	0.008799	0.002114
8	0.002679	0.003255	0.000387	0.000459	0.005684	0.000886	0.000948	0.042991	0.004588	0.018953	0.013092	0.017254
9	0.000559	0.001239	0.000318	0.000190	0.000698	0.000216	0.000436	0.000331	0.025611	0.001687	0.008493	0.001002
10	0.000031	0.000655	0.000272	0.000184	0.000439	0.000068	0.000098	0.000076	0.003280	0.039477	0.002559	0.001869
11	0.000236	0.000454	0.000036	0.000038	0.000086	0.000027	0.000088	0.000058	0.000152	0.000096	0.039563	0.004258
12	0.009948	0.008884	0.002077	0.001809	0.011967	0.003828	0.003605	0.060798	0.006556	0.012302	0.009219	0.045697

Table 3: B

	1	2	3	4	5	6	7	8	9	10	11	12
1	0.086304	0.106652	0.000588	0.000389	0.000004	0.000034	0.000049	0.000243	0.0	0.0	0.0	0.006604
2	0.000047	0.000057	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000004
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.000580	0.000576	0.002065	0.001921	0.002426	0.001620	0.001235	0.002519	0.001247	0.003139	0.003858	0.004688
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.011908	0.017369	0.068103	0.063266	0.043010	0.028781	0.024881	0.037484	0.017131	0.037618	0.050873	0.052304
9	0.095176	0.184425	0.755121	0.701944	0.287708	0.193078	0.194927	0.182280	0.067100	0.079562	0.173177	0.055908
10	0.045579	0.088320	0.361625	0.336155	0.137781	0.092464	0.093350	0.087293	0.032134	0.038102	0.082933	0.026774
11	0.099919	0.099557	0.041197	0.024779	0.013602	0.016203	0.010133	0.028537	0.008069	0.006039	0.019230	0.128013
12	0.608766	1.046246	1.597996	1.565245	0.324311	0.255570	0.190390	0.252430	0.086690	0.148310	0.259197	0.627799

Table 4–a: X

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	7595.0	8033.6	8225.1	8665.2	9188.6	9520.9	9763.4	10449.0	11047.5	11560.2	12113.6
2	1257.3	1296.9	1316.2	1360.2	1406.8	1438.5	1475.2	1522.2	1560.9	1600.5	1656.1
3	100.4	112.8	121.4	133.7	148.5	157.5	172.6	191.8	215.1	237.4	261.3
4	1309.8	1535.1	1640.7	1851.5	2111.2	2234.0	2528.3	2906.4	3352.1	3788.7	4280.6
5	1700.6	2047.6	2179.4	2499.1	2906.3	3200.3	3615.2	4263.3	4992.9	5694.9	6548.5
6	2105.5	2271.5	2342.1	2472.7	2656.8	2809.5	2938.2	3144.0	3378.2	3577.5	3807.0
7	2640.6	3314.7	3343.6	3735.5	4287.8	4058.2	5036.7	5828.7	7244.3	8377.8	9541.0
8	5041.0	6171.4	6598.0	7540.3	8819.9	9313.5	10471.5	12176.1	14190.4	16127.7	18138.8
9	1662.2	2196.6	2231.6	2460.7	2870.8	2721.4	3230.1	4044.5	5034.2	6008.3	7284.4
10	1029.3	1479.0	1586.9	1900.9	2344.0	2405.6	3022.6	3822.0	5008.2	6230.3	7630.0
11	1566.6	2069.5	2207.5	2549.5	3064.2	3154.2	3745.0	4537.6	5582.9	6515.8	7516.8
12	17443.6	19993.8	21756.9	24052.0	27166.8	28649.4	31422.1	35321.7	40232.4	44996.2	49543.9
T	43451.9	50522.5	53549.4	59221.3	66971.8	69663.0	77420.9	88207.3	101839.4	114715.3	128322.1

Table 4–b: ΔX

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	438.6	191.5	440.1	523.4	332.3	242.5	685.6	598.5	512.7	553.4	
2	39.6	19.3	44.0	46.6	31.7	36.7	47.0	38.7	39.6	55.6	
3	12.4	8.6	12.3	14.8	9.0	15.1	19.2	23.3	22.3	23.9	
4	225.3	105.6	210.8	259.7	122.8	294.3	378.1	445.7	436.6	491.9	
5	347.0	131.8	319.7	407.2	294.0	414.9	648.1	729.6	702.0	853.6	
6	166.0	70.6	130.6	184.1	152.7	128.7	205.8	234.2	199.3	229.5	
7	674.1	28.9	391.9	552.3	△229.6	978.5	792.0	1415.6	1133.5	1163.2	
8	1130.4	426.6	942.3	1279.6	493.6	1158.0	1704.6	2014.3	1937.3	2011.1	
9	534.4	35.0	229.1	410.1	△149.4	508.7	814.4	989.7	974.1	1276.1	
10	449.7	107.9	314.0	443.1	61.6	617.0	799.4	1186.5	1221.8	1399.7	
11	502.9	138.0	342.0	514.7	90.0	590.8	792.6	1045.3	932.9	1001.0	
12	2550.2	1763.1	2295.1	3114.8	1482.6	2772.7	3899.6	4910.7	4763.8	4547.7	

Table 5: $\hat{I}_1^* (\Sigma_j b_{1j} \Delta X_j)$

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	59.3	25.2	58.1	71.2	42.0	43.6	90.6	89.0	80.7	84.5	
2	0.03	0.01	0.03	0.04	0.02	0.02	0.05	0.05	0.05	0.05	
3	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	
6	21.5	11.0	17.9	24.5	9.7	23.9	33.2	42.3	40.5	41.5	
7	0	0	0	0	0	0	0	0	0	0	
8	284.9	137.5	235.9	321.8	124.6	319.5	439.9	558.0	531.9	551.3	
9	987.2	365.0	800.5	1071.6	383.1	1134.4	1518.6	1909.2	1784.4	1934.1	
10	472.8	174.8	383.4	513.1	183.5	543.3	727.3	914.3	854.5	926.2	
11	443.5	262.7	395.5	529.2	248.7	460.6	678.0	825.1	789.5	778.6	
12	3093.9	1614.9	2708.9	3595.1	1607.5	3346.3	4775.7	5829.8	5554.2	5700.5	
T	5363.2	2591.1	4600.4	6126.6	2599.1	5871.7	8263.3	10167.7	9635.7	10016.8	

Table 6: I_1*

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	27.2	38.1	40.8	44.2	54.2	52.3	52.4	58.4	64.6	66.5	63.3
2	△5.7	△6.3	△4.9	△3.5	△2.2	△0.1	△0.1	△0.1	△0.1	△0.1	0
3	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0
6	3.1	6.0	9.0	11.9	16.5	18.3	19.3	21.3	25.1	27.4	27.7
7	△45.9	△60.1	△54.4	△67.7	△77.6	△73.3	△82.2	△97.1	△123.2	△146.1	△164.5
8	52.0	76.5	110.2	135.6	169.9	185.4	212.3	237.9	307.0	364.4	405.1
9	816.4	1073.5	1136.3	1191.8	1376.4	1293.0	1441.6	1809.6	2277.7	2749.0	3357.9
10	324.6	436.8	478.6	521.8	615.6	619.3	715.2	878.2	1201.3	1520.9	1836.0
11	555.8	782.4	876.5	968.9	1168.0	1131.7	1368.2	1646.0	2056.3	2365.7	2594.1
12	2607.4	3340.0	3714.6	4035.2	3555.5	4586.2	5121.9	5892.6	7037.4	8130.8	9092.7
T	4334.9	5686.9	6296.7	6838.2	7876.3	7842.8	8848.6	10446.8	12846.3	15078.5	17212.3

Table 7–a: XT (Value in billion yen)

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	7658.1	7927.9	8304.9	8699.8	9113.5	9546.9	10000.8	10476.4	10974.5	11496.4	12043.0
2	1255.6	1290.3	1326.1	1362.8	1400.5	1439.2	1479.1	1520.0	1562.1	1605.3	1649.7
3	100.7	110.6	121.5	133.5	146.7	161.1	177.0	194.0	213.6	234.7	257.9
4	1310.0	1471.2	1652.1	1855.3	2083.5	2399.8	2627.6	2950.8	3313.8	3721.3	4179.1
5	1699.2	1940.5	2216.0	2530.7	2890.1	3300.5	3769.2	4304.4	4915.7	5613.7	6410.9
6	2098.7	2225.6	2360.2	2502.9	2654.3	2814.8	2985.0	3165.5	3356.9	3560.0	3775.1
7	2607.1	2947.6	3332.6	3767.8	4259.8	4816.2	5445.2	6156.3	6960.3	7869.3	8897.0
8	5181.6	5867.4	6643.9	7523.2	8518.9	9646.3	10923.0	12368.6	14005.6	15859.2	17958.1
9	1654.2	1895.3	2171.5	2487.9	2850.5	3265.9	3741.9	4287.2	4912.0	5627.9	6448.1
10	1069.6	1293.0	1563.1	1890.0	2284.3	2761.5	3338.4	4035.7	4878.8	5897.9	7129.9
11	1623.9	1887.9	2194.7	2551.4	2966.1	3448.2	4008.7	4660.2	5417.6	6298.2	7321.8
12	17647.6	19543.1	21642.2	23966.7	26540.9	29391.6	32548.4	36044.4	39915.8	44203.1	48950.8
T	43906.3	48400.4	53528.8	59272.0	65709.1	72932.0	81044.3	90164.0	100426.7	111987.0	125021.4

Table 7–b: ΔXT

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	269.8	377.0	394.9	413.7	433.4	453.9	475.6	498.1	521.9	546.6	
2	34.7	35.8	36.7	37.7	38.7	39.9	40.9	42.1	43.2	44.4	
3	9.9	10.9	12.0	13.2	14.4	15.9	17.5	19.1	21.1	23.2	
4	161.2	180.9	203.2	228.2	256.3	287.8	323.2	363.0	407.5	457.8	
5	241.3	275.5	314.7	359.4	410.4	468.7	535.2	611.3	698.0	797.2	
6	126.9	134.6	142.7	151.4	160.5	170.2	180.5	191.4	203.1	215.1	
7	340.5	385.0	435.2	492.0	556.4	629.0	711.1	804.0	909.0	1027.7	
8	685.8	776.5	879.3	995.7	1127.4	1276.7	1445.6	1637.0	1853.6	2098.9	
9	241.1	276.2	316.4	362.6	415.4	476.0	545.3	624.8	715.9	820.2	
10	223.4	270.1	326.9	394.3	477.2	576.9	697.3	843.1	1019.1	1232.0	
11	264.0	306.8	356.7	414.7	482.1	560.5	651.5	757.4	880.6	1023.6	
12	1895.5	2099.1	2324.5	2574.2	2850.7	3156.8	3496.0	3871.4	4287.3	4747.7	

Table 8: $\hat{I}_i^{**}$ $(\Sigma_j b_{ij} \Delta XT_j)$

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	39.8	50.5	53.7	57.1	60.8	64.7	69.0	73.6	78.6	84.0	
2	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05	
3	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	
6	14.4	16.1	18.1	20.3	22.8	25.6	28.8	32.5	36.6	41.2	
7	0	0	0	0	0	0	0	0	0	0	
8	188.0	211.9	237.9	267.1	300.1	337.4	379.7	427.5	481.8	543.3	
9	623.7	710.0	798.2	897.9	1010.9	1139.0	1284.2	1448.9	1636.0	1848.6	
10	298.7	340.0	382.3	430.0	484.1	545.5	614.9	693.9	783.5	885.3	
11	314.2	356.6	393.7	434.8	480.5	531.3	587.7	650.3	720.0	797.5	
12	2129.8	2421.9	2687.1	2983.3	3314.6	3685.4	4100.5	4565.4	5086.7	5671.6	
T	3608.4	4107.3	4570.9	5090.7	5673.8	6329.0	7064.9	7892.3	8823.3	9871.6	

Table 9: Deflater ($\hat{I}_i$* (1965)/I_i* (1965))

1	1.23700
2	1.00000
3	(1.00000)
4	(1.00000)
5	(1.00000)
6	1.39800
7	(1.00000)
8	1.81900
9	0.88000
10	0.88000
11	0.46900
12	0.80300

Table 10: B*

	1	2	3	4	5	6	7	8	9	10	11	12
1	0.069769	0.086218	0.000475	0.000314	0.000003	0.000027	0.000040	0.000196	0.0	0.0	0.0	0.005339
2	0.000047	0.000057	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000004
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.000415	0.000412	0.001477	0.001374	0.001735	0.001159	0.000883	0.001802	0.000892	0.002245	0.002760	0.003353
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.006546	0.009549	0.037440	0.034781	0.023645	0.015822	0.013678	0.020607	0.009418	0.020681	0.027968	0.028754
9	0.108155	0.209574	0.858092	0.797664	0.326941	0.219407	0.221508	0.207136	0.076250	0.090411	0.196792	0.063532
10	0.051794	0.100364	0.410938	0.381994	0.156569	0.105073	0.106080	0.099197	0.036516	0.043298	0.094242	0.030425
11	0.213047	0.212275	0.087840	0.052834	0.029002	0.034548	0.021606	0.060846	0.017205	0.012876	0.041002	0.272949
12	0.758115	1.302922	1.990032	1.949247	0.403874	0.318269	0.237098	0.314359	0.107958	0.184695	0.322786	0.781817
bi	1.207888	1.921370	3.386294	3.218207	0.941770	0.694305	0.600893	0.704143	0.248238	0.354206	0.685549	1.186173

Table 11: $\hat{I}_i^{***}$ $(\Sigma_j B_{ij}^* \Delta XT_j)$

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	32.1	40.8	43.4	46.2	49.1	52.3	55.8	59.5	63.6	67.9	
2	0.02	0.03	0.03	0.03	0.03	0.04	0.04	0.04	0.04	0.05	
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
6	10.2	11.5	13.0	14.5	16.3	18.3	20.6	23.2	26.1	29.5	
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
8	103.4	116.5	130.8	146.8	164.9	185.5	208.7	235.0	264.9	298.7	
9	708.7	806.9	907.1	1020.4	1148.7	1294.3	1459.3	1646.5	1859.1	2100.7	
10	339.4	386.4	434.4	488.7	550.1	619.9	698.9	788.5	890.3	1006.0	
11	669.9	760.4	839.4	927.2	1024.6	1132.8	1253.0	1386.6	1535.2	1700.4	
12	2656.3	3016.1	3346.3	3715.2	4127.7	4589.6	5106.5	5685.5	6334.7	7062.9	
T	4516.1	5138.7	5714.3	6358.9	7081.6	7892.7	8802.9	9824.9	10973.9	12266.3	

Table 12: I_j $(\Sigma_i b_{ij}^* \Delta XT_j)$

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	325.9	455.4	476.9	499.7	523.5	548.3	574.5	601.6	630.4	660.2	
2	66.7	68.8	70.5	72.4	74.3	76.7	78.6	80.9	83.0	85.4	
3	33.5	36.9	40.6	44.7	48.8	53.8	59.3	64.6	71.5	78.5	
4	518.8	582.2	653.9	734.4	824.8	926.2	1040.1	1168.2	1311.4	1473.3	
5	227.2	259.5	296.4	338.5	386.5	441.4	504.0	575.7	657.4	750.8	
6	88.1	93.5	99.1	105.1	111.4	118.2	125.3	132.9	141.0	149.3	
7	204.6	231.3	261.5	295.6	334.3	377.9	427.3	483.1	546.2	617.5	
8	482.9	546.8	619.2	701.1	793.9	898.9	1017.9	1152.7	1305.2	1477.9	
9	59.8	68.5	78.5	90.0	103.1	118.2	135.4	155.1	177.7	203.6	
10	79.1	95.6	115.8	139.7	169.0	204.3	246.9	298.6	360.9	436.4	
11	181.0	210.3	244.5	284.3	330.5	384.3	446.6	519.2	603.7	701.7	
12	2248.4	2489.9	2757.3	3053.4	3381.4	3744.5	4146.9	4592.1	5085.5	5631.6	
T	4516.1	5138.7	5714.3	6358.9	7081.6	7892.7	8802.9	9824.9	10973.9	12266.3	

Table 13: Investment Allocation Ratios

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
1	0.0722	0.0886	0.0835	0.0786	0.0739	0.0695	0.0653	0.0612	0.0574	0.0538	
2	0.0148	0.0134	0.0123	0.0114	0.0105	0.0097	0.0089	0.0082	0.0076	0.0070	
3	0.0074	0.0072	0.0071	0.0070	0.0069	0.0068	0.0067	0.0066	0.0065	0.0064	
4	0.1149	0.1133	0.1144	0.1155	0.1165	0.1173	0.1182	0.1189	0.1195	0.1201	
5	0.0503	0.0505	0.0519	0.0532	0.0546	0.0559	0.0573	0.0586	0.0599	0.0612	
6	0.0195	0.0182	0.0173	0.0165	0.0157	0.0150	0.0142	0.0135	0.0128	0.0122	
7	0.0453	0.0450	0.0458	0.0465	0.0472	0.0479	0.0485	0.0492	0.0498	0.0503	
8	0.1069	0.1064	0.1084	0.1103	0.1121	0.1139	0.1156	0.1173	0.1189	0.1205	
9	0.0132	0.0133	0.0137	0.0142	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	
10	0.0175	0.0186	0.0203	0.0220	0.0239	0.0259	0.0280	0.0304	0.0329	0.0356	
11	0.0401	0.0409	0.0428	0.0447	0.0467	0.0487	0.0507	0.0528	0.0550	0.0572	
12	0.4979	0.4845	0.4825	0.4802	0.4775	0.4744	0.4711	0.4674	0.4634	0.4591	
T	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	

AVAILABLE JOBS AND EMPLOYMENT IN JAPANESE FOREIGN-GOING SHIPPING

Hiromasa YAMAMOTO

I. Reduction of the Manning Scale on Japanese Foreign-going Vessels.

Complements on Japanese foreign-going ships has decreased steadily since April 1961 when a new formula for determining the manning scale was agreed between the All Japan Seamen's Union and shipping companies. Until then the manning scale was to be determined according to uniform standards such as gross tonnage, horse power of main engine and the trade areas in which the ship would operate, without any regard to the individual requirements for work or the degree of mechanisation of ships. Therefore under the old manning clause it was impossible for employers to reduce the number of crew through the application of labour saving devices.

The new manning clause of 1961 defined that each company might decide unilaterally the complement in consideration of the volume of ship's work under the premise of eight hour work day, preventing daily overtime work, if the captain of the ship concerned consented with it. In deciding the complement negotiation or consultation with the union was not required of the company, though it was necessary to give immediate notice to the union after the decision had been made. Conflicts concerning the manning scale were to be dealt with according to the ordinary grievance procedures. These changes of the manning clause gave shipping companies the incentive to reform the work relationships of the crew and to adopt automation and mechanisation of ships for the purpose of reducing the crew costs.

In addition there were revisions of the Seamen's Act and the Ship Officers' Act in October 1962 and in March 1963 respectively. By those revisions shipping companies were no longer required to have a surgeon on foreign-going ships except those running on several specified trade routes. They were also able to reduce the number of radio officers on foreign-going ships from three to one so long as the government regulation concerned, though the actual manning scale had to be determined by negotiation with the union.

After the revisions of the manning clause of 1961 shipping companies began to reduce the complements of their fleets through the reform of the working system and mechanisation on board ships. Accompanying the abolition and decrease of work on board by transfer of jobs to shoreside, reorganisation of the working system

resulted in reclassification of jobs among ratings within each department. For example, deck department jobs of carpenter, store-keeper and quartermaster are integrated into that of senior deck rating, and ratings are classified as boatswain, senior deck rating and deck hand which includes able seaman and ordinary seaman. Under the new working system there were fewer day workers than the old system because volume of maintenance and repair work was reduced. Similar changes occurred in engine-room and steward departments.

However, as we will describe later, integration of jobs beyond the traditional division of departments and co-operation between different departments such as general purpose crew and interchangeability of crew have not been realizied yet.

The new manning clause enabled the reduction of the complements of newly-constructed vessels considerably. The first ship which adopted automation of engine-room in Japan is the Kinkazan-maru, a cargo liner of 10,000 deadweight tons. She completed her maiden voyage in December 1961 with a tentative complement of forty, but after the test voyage period the complement was reduced to thirty-seven. In May 1964 the manning scale of the Mississipi-maru, an automated cargo liner of 9,050 gross tons was determined as twenty-eight which was twenty less than that of an ordinary ship of similar size. Most of Japanese foreign-going ships which were launched after 1961 introduced various type of automated or mechanised apparatus so as to reduce their complements. In 1969 the Japan Magnolia, an ore/oil-carrier of 94,415 deadweight tons was built as the first Japanese MO class ship of the Nihon Kaijikyokai (N.K.) which does not need watch-keeping in the engine-room at night. The number of her crew was at first thirty-three which was reduced to thirty afterwards. In 1970 the complement of a container ship of 24,000 gross tons was determined as twenty-five.

II. Trends in Merchant Fleet, Available Jobs and Productivity of Labour

As we have described in the previous section, rationalization has proceeded at a rapid pace in Japanese foreign-going shipping after the revision of the manning clause of 1961. Now we will look at the trend of available jobs on the Japanese foreign-going fleet.

During the twelve years of 1960–1971 gross tonnage of the Japanese foreign-going fleet increased 450 per cent, while the number of jobs in the fleet did not increase so impressively, but showed an increase of 137 per cent. In addition the available jobs decreased slightly in 1970 in spite of the fact that the number of vessels and gross tonnage increased. Though in 1971 the number of jobs showed an increase again, it was only enough to recover the level of 1969. These facts seem to suggest a declining or stagnant trend of available jobs on the Japanese foreign-going vessels

Table 1. Trend of Japanese Foreign-going Fleet, Number of Available Jobs and Volume of Cargo Carried

Year	Foreign-going Vessels(1)			Number of available(2) jobs on foreign-going Vessels		Cargo carried by Japanese foreign-going vessels (1,000 k.t.)		Cargo carried per head of crew (1,000 k.t.)	
	Number of Vessels	Gross tonnage (1,000 g.t.)							
1960	641	5,021	100	29,771	100	52,542	100	1,765	100
1961	683	5,489	109	28,824	97	57,634	110	2,000	113
1962	726	6,052	121	29,491	99	68,954	131	2,338	133
1963	760	6,986	139	30,276	102	81,662	151	2,697	153
1964	767	7,432	148	29,950	101	90,181	172	3,013	171
1965	803	8,304	165	30,760	103	99,832	190	3,264	184
1966	876	10,317	205	33,028	111	120,788	230	3,657	207
1967	963	12,447	248	35,480	119	148,033	282	4,172	236
1968	1,053	14,889	297	37,165	125	176,447	336	4,748	269
1969	1,160	17,616	351	40,429	136	211,136	402	5,222	296
1970	1,233	20,040	399	39,232	132	243,586	464	6,208	352
1971	1,262	22,588	450	40,776	137	266,787	508	6,543	371

Source: Ministry of Transport

(1) Vessels of 3,000 gross tons and over. Figures at the end of March of every year.

(2) Figures on the 1st of April.

Table 2. Size of Foreign-going Vessels and Complement

Year	Average size of foreign-going vessels (g.t.)	Average number of complement	Averaged gross tonnage per head of crew
1960	7,833	46.4	169
1961	8,037	42.2	190
1962	8,336	40.6	205
1963	9,192	39.8	231
1964	9,690	39.0	248
1965	10,341	38.3	270
1966	11,777	37.7	312
1967	12,925	36.8	351
1968	14,140	35.3	401
1969	15,186	34.9	435
1970	16,253	31.8	511
1971	17,899	32.3	554

Calculated from table 1

in near future. When considering circumstances of the Japanese shipping, there is likely to be support for this inference.

In the first palce, the productivity of seafaring labour has increased rapidly since 1960 due to the automation and mechanisation on board ship and also due to the larger size of ships. This is indicated by the increase of gross tonnage per head of crew. In addition other factors have also contributed to higher productivity of labour. In 1960 the average speed of the Japanese cargo liners was seventeen knots,

but container ships launched in 1970 can run with the speed of twenty-five knots. Time of cargo handling has also improved in the latest ten years. Consequently, even if the demand for the Japanese foreign-going vessels would increase, the number of Japanese vessels would not increase in proportion to the increase of volume of cargo, and available jobs on board ships would increase with a smaller rate of increase than that of the number of vessels.

However, it should be pointed out here that in order to increase the productivity of labour still further, it becomes necessary to introduce general purpose crew. In Japan the tripartite committee is organized by the government, employers and labour to study new working systems and the related problems such as the revision of the Ship Officers' Act and vocational education. At present time they have failed to attain mutual consent as to how and when the duties of deck and engine-room department should be intergrated.

In the second place, it is unlikely that the tonnage of Japanese foreign-going fleet will grow at the similar rate as before. Here attention should be paid to the fact that Japanese shipping companies have chartered foreign vessels on a large scale since 1970. In 1971 almost all of foreign vessels were chartered under time charter over six months. Concerning these facts several different explanations might be possible. However, as a plausible explanation it might be said that some Japanese shipowners began to prefer chartering foreign vessels to new construction of company vessels due to the increasing wage costs of Japanese vessels. Though it is quite difficult to make a cost comparison between Japanese vessels and foreign vessels, it is often said in Japanese shipping circles that ships which were built before 1961

Table 3. Foreign Vessels Chartered by Japanese Shipping Companies

(1,000 gross tons)

Year	Total foreign-going tonnage operated by Japanese shipping companies (A)	Foreign vessels chartered by Japanese shipping companies (B)	B/A (%)
1960	5,579	—	—
1961	6,144	—	—
1962	6,677	—	—
1963	7,348	502	6.8
1964	8,239	1,165	14.1
1965	9,511	1,552	16.3
1966	11,778	2,006	17.0
1967	13,640	2,346	17.2
1968	16,464	2,850	17.3
1969	19,181	3,228	16.8
1970	24,589	6,489	26.4
1971	30,527	9,881	32.4

Source: Japanese Shipoweners' Association

were becoming increasingly uneconomical because of their large complements and wage costs. In addition, in 1970 and 1971 Japanese vessels which were sold out to foreign countries amounted to more than a million gross tons respectively in comparison with 626,000 gross tons of 1969. After seamen's strike of 1972 Japanese shipowners sold out their vessels of 2.3 million gross tons to foreign countries.(1)

In summing up, observations and several indications suggest that the decline of available jobs on Japanese foreign-going vessels in 1969 should not be considered as a temporary fluctuation, but as a turning point toward a stagnant or declining trend.

III. Employment of Seafarers on Japanese Foreign-going Vessels

In Japan the number of available jobs on foreign-going vessels does not indicate the correct volume of employment of seafarers who work on foreign-going vessels. Japanese shipping companies employ officers and seamen as permanent employees. Consequently companies have to employ more seafarers than the number of available jobs so as to give paid vacations to crew members.

Since 1965 the Ministry of Transport has made public the annual report on employment of seafarers.(2) Concerning the employment of seafarers who work on foreign-going vessels data is available in the report on the number of seafarers who are employed by the companies belonging to the two main bargaining units, the Gaiko Romu Kyokai and the Gaiko Chusho Senshu Romu Kyokai. In 1970 the fleets of those companies amounted to more than ninety per cent of the Japanese foreign-going vessels. However, the number of companies which are represented by those two bargaining units varied year to year. Therefore, if we compile the time series of employment from those figures, it might lead us to incorrect conclusions.

Here, as a more reliable indicator of seafarers' employment we will make use of the ratio of reserve crew members to the available jobs on board ships in companies belonging to the above mentioned two bargaining units. In case of officers the ratio changed from 27.8 per cent in 1966 to 43.1 per cent in 1971. In case of ratings the ratio changed from 28.3 per cent of 1966 to 35.1 per cent of 1971. The optimal ratio of reserve crew members is said to be roughly at the level of 25–30 per cent, though it differs by job and by company depending on the size of fleet and the numbers of seamen belonging to the same job classification. Therefore, the increase of the ratio during 1966–1971 indicates that those companies had to employ disproportionately large numbers of reserve seafarers relative to the available jobs within the company. At the same time it shows that the effort of companies for

(1) Based on the data of the Ministry of Transport.
(2) Bureau of Seafarers, the Ministry of Transport, *Sen-in Jukyu Sōgo Chōsa Kekka Hokokusho.*

Table 4. The Ratio of Reserve Crew Members among the Total of Seafarers Employed (Companies Represented by the G.R.K. and the C.R.K.)

Year	Officers				Ratings			
	Deck	Engine-room	Radio	Total	Deck	Engine-room	Steward	Total
1966	33.0	27.9	22.9	28.7	27.7	30.0	26.6	28.3
1967	32.6	29.2	22.4	28.9	26.9	27.9	25.1	26.9
1968	36.1	31.5	46.7	36.2	26.2	26.6	25.0	26.1
1969	35.6	33.2	35.8	34.7	26.1	27.5	26.0	26.6
1970	38.4	34.8	34.2	36.2	29.6	31.7	31.7	30.8
1971	44.9	44.1	37.3	43.1	33.8	36.8	35.0	35.1

Source: Ministry of Transport

reducing the manning scale on board did not necessarily cause the decrease of seafaring employees.

Employment of surplus seafarers by companies was due to the atmosphere of the labour-management relations in Japan where dismissal often leads to severe strikes. The seamen's union did not consent to dismissal, though it cooperated with shipping companies to reduce the manning scale. For example, the union and employers concluded a new agreement in December 1967 concerning the manning scale of radio officers which allowed the reduction of degree the number of radio officers from three to two or one according to the degree of introduction of automated apparatus on foreign-going vessels. This agreement was accompanied by the understanding that companies did not dismiss the radio officers who became surplus, and it caused the rapid increase of the ratio of reserve radio officers in 1968.

Shipping companies made use of a part of surplus seafarers as relievers-in-port and other shoreside work including desk work. However, these devices do not absorb the whole of the surplus workers, and some of them were put on stand-by at home for future duties with the allowance equal to a third of wages on board.

If the tonnage and available jobs in the company fleets will increase in near future, the surplus will disappear and the ratio of reserved members will go down to the normal level again. But this is unlikely to occur, as we have described in the previous section. Then, in order to balance demand and supply of seafarers shipping companies have to stop or refrain from hiring new entrants in the industry for several years. In fact, it is reported that in 1973 only a part of graduates from the Mercantile Marine Colleges and the Seamen's Training Schools found their posts in foreign-going shipping companies. If available jobs will decrease from the present level, security of employment seems to become the most important problem between labour and management. In relation to it, general purpose crew on board will have to be negotiated for a long time to be realized.

IV. Changes of Composition of Seafaring Labour by Age—The Impact of Technological Development on Board Ships

It is considered that the technological development on board ship has influenced the composition of seafaring labour through the changes of the working system, in addition to its effect upon employment. Here, we will investigate this problem.

In Table 5 the average age, years of service as a seafarer and years of service within the present company are shown for each job for those who worked in the companies belonging to the Gaiko Romu Kyokai. The Gaiko Romu Kyokai represents twenty-one big foreign-going shipping companies including the big six.

From Table 5 the following points become clear; for the senior rating in the engine-room department the average age and years of service increased considerably during the period of 1962–1970, and similar situation is also found in case of the deck senior rating; in case of the lowest grade of officers and ratings of each department the averaged age and years of service fell, and in case of jobs other than the above-mentioned the age and years of service stayed at more or less constant levels. The same findings are also hold for employees of the companies which are represented by the Gaiko Chusho Senshu Romu Kyokai, though we do not present the figures here.

These findings suggest the following points. The fact that in many jobs the averaged age and years of service remained at similar level during the period of our comparison was due in part to the increase of the number of company vessels from 457 in 1962 to 589 in 1970 which countervailed the decrease of complement on board. It was also due to the moving out of considerable number of seafarers from foreign-going shipping during the same period.(3)

Next, the increase of age and years of service in engine-room and deck senior ratings means that workers in these jobs have had their promotion to upper jobs defferred to a greater degree than before. This is considered to be related to the reduction of manning scale on board. As is well known, automation on board ship has developed intensively in the engine-room, and over all rationalisation has decreased the jobs of ratings in all departments on board. Finally, the decrease of averaged age in the lowest grades indicates that companies continued to hire new entrants during the period.

From the above observations we may conclude that in Japanese foreign-going shipping technological development has not changed the composition of labour

(3) We have compared the composition of those seafaring labour by age in 1962, 1967 and 1970. In case of officers a considerable flow out from foreign-going shipping and wastage was found in the age group of 25–30. In case of ratings the same phemomenon was found in the age group of 21–25.

to a great extent. However, if our expectations on the available jobs in future are correct, the management and labour in the industry will have to face difficult employment problems, including determination of systems of employment, promotion and payment of wages.

Table 5. Age and Years of Service
(companies represented by the G.R.K.)

Job	Year	Age	Years of Service as a seafarer	Years of Service in the present company
Chief Officer	1962	36.0	14.2	12.3
	1967	35.9	13.5	12.7
	1970	35.6	13.4	12.6
Second Officer	1962	30.4	8.0	7.5
	1967	30.0	7.9	7.4
	1970	29.5	7.4	6.9
Third Officer	1962	25.2	3.2	3.0
	1967	24.6	2.7	2.6
	1970	24.4	2.7	2.5
First Engineer	1962	36.3	14.8	12.3
	1967	36.6	14.7	13.2
	1970	36.3	14.6	13.4
Second Engineer	1962	31.2	8.9	7.6
	1967	30.5	8.7	8.0
	1970	30.0	8.0	7.3
Third Engineer	1962	26.0	4.2	3.8
	1967	24.5	2.7	2.6
	1970	24.5	2.8	2.7
Chief Radio Officer	1962	41.8	19.9	16.0
	1967	43.1	21.7	18.9
	1970	43.9	22.6	19.8
Second Radio Officer	1962	31.6	10.0	8.7
	1967	31.9	10.3	8.7
	1970	31.8	9.9	8.6
Third Radio Officer	1962	24.9	3.9	3.4
	1967	24.3	3.0	2.6
	1970	24.3	3.4	3.3
Bos'n	1962	48.7	29.8	21.6
	1967	48.9	31.5	25.3
	1970	49.1	32.1	26.8
Deck Senior Rating	1962	34.8	17.2	14.5
	1967	35.7	18.3	16.4
	1970	36.6	19.2	17.3
Deck Ordinary Rating	1962	23.3	5.6	5.3
	1967	22.2	4.7	4.5
	1970	21.6	3.8	3.5

Table 5.

Job	Year	Age	Years of Service as A seafarer	Years of Service in the present company
Chief	1962	49.5	29.1	21.5
Mechanic	1967	49.0	29.9	24.4
	1970	49.3	30.6	25.8
Engine-room	1962	34.4	15.5	13.4
Senior	1967	36.5	17.9	16.2
Rating	1970	37.6	19.1	17.4
Engine-room	1962	24.0	5.0	4.8
Ordinary	1967	22.4	4.1	4.0
Rating	1970	21.5	3.6	3.4
Chief	1962	47.9	28.0	20.1
Steward	1967	47.7	29.8	23.4
	1970	47.8	30.0	24.6
Steward	1962	35.5	17.2	14.5
Senior	1967	34.8	17.1	15.7
Rating	1970	34.8	17.1	15.9
Steward	1962	23.9	6.0	5.8
Ordinary	1967	22.1	4.7	4.5
Rating	1970	21.5	4.1	3.7

Source: All Japan Seamen's Union

HOMOMORPHISM AND BUSINESS INCOME MEASUREMENT

Isao NAKANO

I. Introduction

In a previous paper[1] I have elaborated on the "homomorphism" concept. And I tried to show its usefulness as a requirement for accurate accounting measurement.

The homomorphism concept is a variant of the "isomorphism" concept. And this latter concept may be roughly described as follows.[2] Suppose that a relation R has been defined among any two elements of a set A of measurement objects and that this relation is the principal to be isolated by the measurement (i.e., the object of the representation). Next, we stipulate a set B of numbers (e.g., measured income values) which are to be assigned to each measurement object (i.e., to each element of the set A). Among these elements we define a relation S. Then, a necessary condition for a proper measurement is that when the relation S is found between two measurement figures there must always exist the relation R (and not any other) between the corresponding measurement objects, because only in this case one can be sure of the existence of the principal relation R on the basis of the surrogate relationship S. This condition is called "isomorphism."

However, the isomorphism concept is too stringent for accounting application in that it restricts number assignment in such a way that any one number is allowed to correspond to one object only. In real accounting (and other) measurements it is possible and proper to assign a single number to plural objects in the same situation. Hence, we must rather adopt a modified concept, "homomorphism." This still requires the proper representation of a principal relation R by a surrogate relation S but allows any one number to relate to plural objects.

We are going to apply this concept to business income measurement. And to facilitate this application, we must clearly distinguish between the "income as a numerical expression" (i.e., an income number), that is, "surrogate-income" (e.g., an income of ¥200), and the "income as a substantive object of accounting measurement", which we describe as "principal-income" (e.g., a net increase in total service

(1) Isao Nakano, "Accounting Measurement and Homomorphism," *Kobe Economic & Business Review*, 1972, pp. 43–54.

(2) A more precise definition appears in the above article, pp. 51–52.

potential of an enterprise in a time period). But this principal-income cannot be compared with the surrogate-income directly, because the former is something not yet represented by numbers. A comparison must rather be made between a given surrogate measure and another surrogate measure that one knows or acknowledges in advance to be true. So, we are led to introduce a concept, "ideal surrogate-income" as a true and proper numerical representation of the principal income, whereas the term "real surrogate-income" may be given to that surrogate-income which has resulted from an actual accounting measurement under the conventional and technical restrictions of current accounting practice. In actual situations, it would be impossible for a real surrogate-income to equal to the ideal except as a mere coincidence.

Our problem is this: what specific relation must exist between ideal surrogate-income numbers and the corresponding real ones so that one can conclude that the periodic income is correct? The requirement for a correct income measurement will follow using the homomorphism concept as defined above.

We denote the ideal surrogate-income in period i as Pi and the corresponding real surrogate-income as P'_i. And a set of the ideal surrogate-income figures from period 1 through n shall be P and a set of the real surrogate-income figures during the same time-periods P'. That is,

$$P = \{P_1, P_2, \ldots\ldots, P_n\},$$
$$P' = \{P'_1, P'_2, \ldots\ldots, P'_n\}.$$

The homomorphism concept requires that in order for an income measurement to be proper, "a certain relation" among the elements $P_i s$ in the set P be homomorphically represented by "some relation" among the $P'_i s$ in set P'. Then, what is the relation to be represented in this way?

Our conclusion in the previous paper is that "homomorphism on ratio scale" should be satisfied. And this concept is further devided into two subconcepts, "homomorphism of interperiod-ratio" and "homomorphism of unit-ratio". The former means a homorphic representation of ratios between ideal surrogate-income numbers for different periods by the ratios between the corresponding real surrogate-income figures. Then, it follows that when a series of ideal surrogate-incomes are

$$P_n = 100, \quad P_{n-1} = 90, \quad P_{n-2} = 80, \quad P_{n-3} = 60,$$

the corresponding real surrogate-incomes could be, for example,

$$P''_n = 10, \quad P''_{n-1} = 9, \quad P''_{n-2} = 8, \quad P''_{n-3} = 6.$$

The latter concept of "homomorphism of unit-ratio" can be explained as follows. Let us conceive of a set π consisting of ideal surrogate-incomes of the periods 1 through n, i.e., $P_1, P_2, \ldots, P_n$ as well as of the numeral 1 (as the unit of the numerical expression of income).

$$\pi = \{1, P_1, P_2, \ldots\ldots, P_n\}.$$

Further, we define another set π' composed of real surrogate-incomes P'_1, P'_2,

..., P'_n and the numeral 1.

$$\pi' = \{1, P'_1, P'_2, \ldots\ldots, P'_n\}.$$

Then, the homomorphism of unit-ratio requires that the ratio between each ideal surrogate-income P_i and the measurement unit 1 in π, viz. $\frac{P_i}{1}$ $(i=1, 2, \ldots, n)$ be homomorphically represented by the ratio between each corresponding real surrogate-income P'_i and the measurement unit 1 in π', that is, $\frac{P'_i}{1}$.

$$\frac{P_i}{1} = \frac{P'_i}{1},$$

$$\therefore P_i = P'_i.$$

In short, this kind of homomorphism requires that the amount of each ideal surrogate-income be equal to the amount of the corresponding real surrogate-income. It will be clear that an income measurement coming up to the standard of the "homomorphism of interperiod-ratio" does not necessarily suffice the "homomorphism of unit-ratio", but that a measurement fulfilling the latter never fails to assure the former requirement.

These two kinds of ratio-homormorphism concepts will be subjected to further consideration in the following sections. Our problem is: which one is the better criterion for judging the propriety of an accounting income measurement?

II. The Viewpoint of Preferring the Interperiod-Ratio Homomorphism to the Unit-Ratio Homomorphism

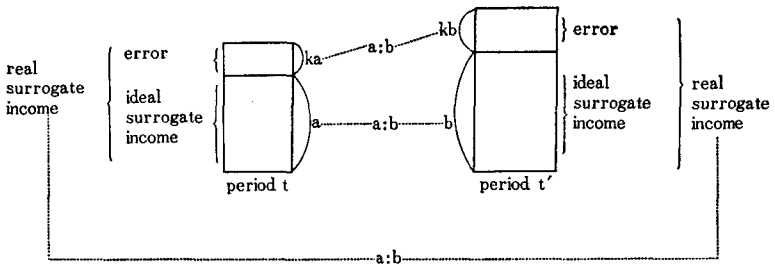
Without concerning ourselves with the problem of which income concept is best for the principal-income, we will start by assuming some principal-income as given and merely consider a formal problem of which homomorphism concept should be preferred as the predominant standard for judging the validity of any measurement of a real surrogate-income series as an expression of the given principal-income sequence. There are three logically possible alternative viewpoints on this problem: (1) the viewpoint of preferring the interperiod-ratio homomorphism to the unit-ratio homomorphism; (2) that of considering both homomorphism concepts as equally important; and (3) that of preferring the unit-ratio-homomorphism to the interperiod-ratio-homomorphism. The ultimate purpose of this inquiry is to investigate which of these three models will best explain the current conventional measurement of accounting income.

It may be argued that the superiority of the unit-ratio-homomorphism is self-evident since a measurement sufficing this standard always meets the interperiod-ratio-homomorphism but not vice-versa. But we note that the future is so uncertain

that no income measurement can attain the unit-ratio-homomorphism "perfectly" and that therefore a problem necessarily arises of which of the two standards should be preferred in the process of accounting measurement, especially when each standard requires different accounting procedures.

The first viewpoint is that of considering the interperiod-ratio-homomorphism to be more important than the unit-ratio-homomorphism; that is, that of attempting to realize to the maximum extent the interperiod-ratio homomorphism between a sequence of ideal surrogate-incomes and a sequence of real surrogate-incomes at the cost of disturbing the unit-ratio-homomorphism, if necessary. Such a pattern of thought is evident in the proposition that the most important problem in accounting income measurement lies in correctly showing not an absolute amount of income for each period but the trend of a series of periodic incomes.(3) Given the current emphasis upon the importance of "trends" as accounting information,(3) one might be seduced into believing that this model (and not others) underlies the current generally accepted accounting principles. We will try to prove the falsity of this belief.

One interesting logical consequence of this viewpoint is that in some cases the assurance of the interperiod-ratio-homomorphism as the exclusive standard for income measurement would require a deliberate disturbance of the unit-ratio-homomorphism. Look at the following figure.



(3) Cf. "The presentation of comparative financial statements in annual and other reports enhances the usefulness of such reports and brings out more clearly the nature and trends of current changes affecting the enterprise. Such presentation emphasizes the fact that statements for a series of periods are far more significant than those for a single period and that the accounts for one period are but an instalment of what is essentially a continuous history. ... It is necessary that prior-year figures shown for comparative purposes be in fact comparable with those shown for the most recent period, or that any exceptions to comparability be clearly brought out." (Accounting Research and Terminology Bulletins, Final Edition, American Institute of Certified Public Accountants 1961, Chapter 2, Section A, p. 15). "Because the effective use of financial statements involves interperiod and intercompany comparisons, comparability of data over time and among companies is important." (Accounting and Reporting Standards for Corporate Financial Statements, 1957 Revision, in: Accounting and Reporting Standards for Corporate Financial Statements and Preceding Statements and Supplement, American Accounting Association, p. 9).

This figure serves to show that so far as the real surrogate-income for period t has turned out to contain error, the ratio between the real surrogate-income for period t and that for period t' ($t<t'$) is equal to the ratio between the ideal surrogate-incomes for the corresponding periods when and only when the ratio between the errors for these periods equals the ratio between the corresponding ideal surrogate-incomes. In other words, in an income measurement model with the utmost emphasis on interperiod-ratio-homomorphism rather than on unit-ratio-homomorphism, it is required to deliberately introduce error dt' into the real surrogate-income for period t', i.e., $P'_{t'}$, when the real surrogate-income for a previous period t, i.e. P'_t, has proven to contain some error d_t, that is,

$$\frac{P'_t}{P'_{t'}} = \frac{P_t + d_t}{P_{t'} + d_{t'}} = \frac{P_t}{P_{t'}},$$

(where P_t denotes the ideal surrogate income for period t and $P_{t'}$, that for t').

In accounting practice such a deliberate introduction of error would have to be made as in the following examples.

Ex. 1. Assume a plant asset with total depreciable cost 1,000,000 yen and total useful life of 5 years, which is being depreciated by the straight-line method.

Depreciation charge	200,000	
accumulated depreciation		200,000

But in the 4th year of its use it is found that the correct total useful life of the asset is 10 years and hence the correct annual depreciation charge 100,000 yen (=1,000,000÷10), so that we have continued an excessive depreciation charge of 100,000 yen (=200,000 yen − 100,000 yen) for three years. An interesting point is that under the income measurement model assumed here it is *prohibited* to charge the correct depreciation expense of 100,000 yen for the remaining 7 years.

The requirement of this model rather is that assuming, say, the ideal surrogate-income (which we assume for convenience is equal to an income figure resulting from the proper depreciation charge of 100,000 yen) for each of the 1st, 2nd and 3rd periods is 500,000 yen and the ideal surrogate-income for the 4th year 800,000 yen, an error must be deliberately introduced into the depreciation charge for the current (i.e. 4th) period such that the ratio between both ideal surrogate-incomes $\frac{800,000}{500,000} = \frac{8}{5}$ may equal to the ratio between the errors in depreciation charge for both periods. That is, denoting the required error in depreciation charge for the 4th period as x,

$$\frac{x}{100,000} = \frac{8}{5}$$

$$\therefore\ x = 160,000 \text{ yen}$$

Therefore, the depreciation charge for period 4th must be 260,000 yen as a result

of deliberate introduction of error by 160,000 yen.[4] The entry would be,

Depreciation Charge	260,000	
Accumulated depreciation		100,000
Adjustment for Interperiod Comparison—Depreciation		160,000

The account "Adjustment for Interperiod Comparison" will have the nature of a sort of aperiodic income.

Ex. 2. Suppose that the principal-income, therefore the ideal surrogate-income is such as to require a periodic allocation of inventory acquisition costs reflecting the movement of the physical objects as nearly as possible. We further assume that although the actual flow of physical goods conforms to the weighted-average assumption, the fifo method has been applied for some reason (e.g., due to ignorance of the actual movement). The current acquisition price of the goods has been rising, so that the cost of sales for this period computed by the fifo method happens to be less than that by the periodic average method. This means the real surrogate-income contains a positive error when compared with the ideal surrogate profit. A detailed example is as follows:

	(Period 1)		
	Quantity	Unit Price	Total Price
Opening Inventory	100 units	100 yen	10,000 yen
The 1st Purchase	200	110	22,000
The 2nd Purchase	100	120	12,000
The 1st Sale	100		
The 2nd Sale	150		

Accordingly,

(1) The unit cost by the periodic average method

$$= \frac{10{,}000 + 22{,}000 + 12{,}000}{400} = 100 \text{ (yen)}$$

The cost of sales by the same method

$= 250 \times 110 = 27{,}500$ (yen)

(2) The cost of sales by the fifo method

100 Units	10,000 yen
150	16,500
	26,500 yen

Therefore, the real surrogate-income for this period contains a positive error of 1,000 yen (=27,500−26,500).

(4) It is assumed that in this example the total annual depreciation expense for each year is directly charged to the year's revenue. If some of the charge goes to the closing inventory, the calculation of the required error must be adjusted accordingly.

It is supposed to be at the beginning of the next period that the physical movement of the inventory really is found to follow a weighted average pattern.[5] But under the income measurement model with the utmost emphasis upon the inter-period-ratio homomorphism one is not allowed to charge the correct cost of sale (by the average method) to this period.

Let the data for period 2 be as follows.

	(Period 2) Quantity	Unit Price	Total Price	
The Beginning Inventory	150		Weighted Average	16,500 yen
			Fifo	17,500
The 1st Purchase	150	110		16,500
The 2nd Purchase	200	90		18,000
Sale	300			

Hence,

the unit cost by the periodic average method

$$= \frac{16{,}500 + 16{,}500 + 18{,}000}{500} = 102 \text{ (yen)},$$

the cost of sales by the periodic average method

$= 300 \times 102 = 30{,}600$ (yen).

If the ratio of the ideal surrogate-income for the 1st period to that for the 2nd period is 1:1.5, the error y to be introduced into the cost of sales for the 2nd period is calculated as

$$\frac{1}{1.5} = \frac{1{,}000}{y}$$

$\therefore\ y = 1{,}500$ (yen)

$\therefore$ the cost of sales for the 2nd period

$= 30{,}600 - 1{,}500 = 29{,}100$ (yen).

The necessary entry would be

Cost of Sales	29,100	
Adjustment for Interperiod Comparison—Inventory	1,500	
Purchases		30,600

The account "Adjustment for Interperiod Comparison" may be regarded as a sort of aperiodic charge.

The above examples have shown the logical necessity of a deliberate introduction

(5) This may be the case when it is found for the first time that current goods delivered for sale are being taken from a well-mixed pool of all the goods received up to the time of delivery (like petrolium for sale at a gas station).

of an error under the accounting measurement model preferring the interperiod-ratio-homomorphism to the unit-ratio-homomorphism. Then, do we find such an accounting procedure in the realm of the generally accepted accounting principles governing the accounting practice today? The answer is evidently "no." For instance, the allowable alternative accounting procedures in a case where the initial estimate of the useful life of a plant asset has turned out to be false are, according to current accounting textbooks,[6] as follows:

(1) To adjust the accumulated depreciation to the amount which would have been reached if the depreciation had been based from the beginning, on the estimated useful life currently believed to be true and to calculate depreciation charges hereafter on that estimate.

An application of this method to Ex. 1 above would result in a following entry:

Accumulated Depreciation	300,000	
Excess Depreciation Charged in Prior Years		300,000

And the depreciation charges in and after the 4th year will be the adjusted correct amount, 100,000 yen.

Depreciation Charge	100,000	
Accumulated Depreciation		100,000.

(2) To calculate the depreciation charges hereafter by allocating the uncorrected remaining plant cost over the remaining (corrected) useful life, without changing the current balance in the accumulated depreciation account.

If one applies this procedure to Ex. 1, the following entry will be required. The depreciation charges until the 3rd year total 200,000 yen$\times 3=$600,000 yen, hence the remaining depreciable cost at the close of the 4th year (before depreciation) is 1,000,000$-$600,000$=$400,000 (yen), so that, by dividing it by the remaining useful life of 7 years, the annual depreciation charge hereafter is 400,000/7$\fallingdotseq$57,142 (yen).

Depreciation charge	57,142	
accumulated depreciation		57,142

There exists no unanimous agreement as to which is the more proper method. The proponents of the former method (1) assert that any accounting error requires both retroactive and future corrections. "Failure to make prior corrections...leads to compensating errors in future periods with the result that the operating results of both past and future accounting periods are distorted."[7] Adherents to the latter

(6) H. A. Finney and Herbert E. Miller, *Principles of Financial Accounting, A Conceptual Approach,* Englewood Cliffs, N. J. 1968, pp. 206–208; R. W. Schattke, H. G. Jensen and V. L. Bean, Accounting, *Concepts and Uses*, Boston 1969, pp. 327–328; Rufus Wixon (ed.) Accountants' Handbook, New York 1956, pp. 17. 37–17. 38.

(7) Rufus Wixon (ed.), op. cit., p. 17. 37. Also Paton expressed the same view in: W. A. Paton and W. A. Paton, Jr., *Asset Accounting*, New York 1952, pp. 301–302.

method (2) hold that "costs once identified and absorbed through amortization or depreciation charges are not considered to be subject to further accounting."[8] There is also a practical consideration that alternative (1) is not acceptable for federal income tax purposes (in the United States of America).

As to the accounting methods for inventories, we cannot find any accounting literature which refer to the "deliberate introduction of errors" which should be required by the income measurement model preferring the interperiod-ratio-homomorphism to the unit-ratio-homomorphism.

What are the implications of these facts? It seems that the fact that in accounting practice or writings no one has ever recommended for the introduction of errors as would be required by the income measurement with explicit emphasis on interperiod-ratio-homomorphism and the fact that there are rather the contrary efforts of making retroactive and (or) future corrections of errors currently found will mean the predominance of the unit-ratio-homomorphism over the current accounting practice rather than that of the interperiod-ratio-homomorphism. Therefore, we have come to the conclusion that an income measurement model preferring the interperiod-ratio-homomorphism to unit-ratio-homomorphism does not concur with the actual structure of accounting measurement practice.

The following objections would probably be possible against this conclusion, however. The first would be that the currently stressed accounting principle of "consistency" has the objective of being "able to visualize trends in the significant components of the accounting entity, (being) able to measure differences in them, and ... knowing that the trends or differences are real (i.e., reflecting actual economic or business events) and are not an illusion"[9]—that is, the objective of consciously pursuing the "interperiod-ratio-homomorphism" in our terms—, so that the interperiod-ratio-homomorphism must still be regarded as ranking higher than the unit-ratio-homomorphism as accounting standards. But our views are (1) that this emphasis upon the consistency principle *per se* does not necessarily suggest the preponderance of the interperiod-ratio-homomorphism alone in accounting measurement because "consistency" is also required for the purpose of assuring achievement of maximum unit-ratio-homomorphism so far as the most proper accounting methods possible have been adopted and the circumstances thereafter have not yet conclusively proven the impropriety of these methods. (E.g., Consider that with respect to a plant asset the straight-line method which has been believed to be the most appropriate is changed to the declining-balance method without any reason. Ceteris paribus this change must have caused a decreased probability of attaining the unit-ratio-homomorphism as well as a disturbance of the interperiod-ratio-homo-

(8) Ibid., p. 208.
(9) Maurice Moonitz, *The Basic Postulates of Accounting*, New York 1961, p. 44.

morphism). (2) "Consistency" should not be broken "except to make the measurement more accurate than before."[10] This is to say, even the "consistency" principle does not preclude a substitution of a more accurate accounting method (accurate in the sense of an absolute measure). The viewpoint of preferring the interperiod-ratio-homomorphism will not successfully justify such a substitution. It seems this justification will rather require the other viewpoint of emphasizing the unit-ratio-homomorphism as the highest accounting standard.

The second possible objection against our case for the unit-ratio-homomorphism will stress the fact that in the current accounting practice no generally accepted rule is available as to which accounting method should be applied in a specific situation, and that this decision is left to the accountant's judgement. It will be insisted that this fact proves that the accountants have given up the pursuit of the unit-ratio-homomorphism from the beginning, their only effort perceived lying in approaching the interperiod-ratio-homomorphism with observance of the interperiod consistency of accounting methods. But we think (1) that the initial adoption of an arbitrary and possibly inappropriate accounting method would, in spite of its consistent application from period to period, exclude the possibility of achieving the interperiod-ratio-homomorphism as well as the unit-ratio-homomorphism. (E.g., Consider that the declining balance depreciation method is applied to a plant asset, given its expected constant output of service in quality and quantity each period. "Although the company has applied the same depreciation method consistently, the net incomes are not comparable because the depreciation charges have decreased each year."[11] This is to say, the prevalence of the consistency alone would not necessarily lead to the existence of the interperiod-ratio-homomorphism in accounting practice. (2) Dynamic changes in the business structure as well as in the economic and social environments would tend to decrease the probability of approaching the interperiod-ratio-homomorphism even when one observes the consistency principle. Assume that the same depreciation method is being applied to a machine. But the quantity of the products from the use of the machine for this period have changed greatly from that for the previous period. In this case we could scarcely expect the existence of the interperiod-ratio-homomorphism between the depreciation expenses for both periods and also between the income figures. All these considerations will suggest there will probably be a low degree of the interperiod-ratio-homomorphism in the current accounting practice, admitting on the other hand, of course, that the unit-ratio-homomorphism is also possible only to a small extent, even when the consistency principle is assumed to be widely observed.

(10) Ibid., p. 43.
(11) Norton M. Bedford and Toshio Iino, "Consistency Reexamined," *the Accounting Review*, July 1968, p. 454.

Therefore, when one is going to study the relationship between the unit-ratio-homomorphism and the interperiod-ratio-homomorphism which is to be perceived in the accounting practice, we must attend to what accounting procedure will be made in a situation where both standards, hence the accounting procedures to be required by each standard conflict with each other. Considering that the deliberate introduction of errors into accounting measurement is not required, we are led to conclude that the current accounting practice is based on the standpoint of ranking the unit-ratio-homomorphism higher than the interperiod-ratio-homomorphism, and not on the viewpoint of preferring the latter to the former.

III. The Viewpoint of Putting Equal Emphasis on the Unit-Ratio-Homomorphism and on the Interperiod-Ratio-Homomorphism

Before giving the final conclusion, however, we will have to turn to the second possible point-of-view as expressed by the above title of this section. This standpoint is that of requiring both unit-ratio-homomorphism and interperiod-ratio-homomorphism to exist at the same time between the ideal surrogate-income series and the corresponding real surrogate-income series. The logically required accounting procedure from this viewpoint would consist of the following. (1) The emphasis on the interperiod-ratio-homomorphism between the income figures under this viewpoint would inevitably require, when an error in the income figure for some previous period has been discovered in this period, a deliberate introduction of error into the accounting income figure for the current period to the extent that the correct interperiod-homomorphism will hold for the income figures for both periods. (The accounting procedure for this has been explained in the previous section.) (2) Since the real surrogate-income with maximum unit-ratio-homomorphism is also required, however, one would have to measure and disclose the income figure before introducing the error referred to in (1) at the same time. In short, this point-of-view regarding the homomorphism will make it necessary to measure and disclose separately the income figure before introducing the deliberate error (this unadjusted income is assumed here to have the maximum unit-ratio-homomorphism) and the income figure with the introduced error, (the income figure logically required to assure the maximum interperiod-ratio-homomorphism.)

E.g. Combining Ex. 1 and Ex. 2 in the previous section, assume that a positive error of 160,000 yen for depreciation (whose correct figure is 100,000 yen) and a negative error of 1,500 yen for cost of sales (whose accurate figure is 30,600 yen) are to be introduced to achieve interperiod-ratio-homomorphism. We assume further that the sales (revenue) for the current period is 300,000 yen and that there occur no other expenses. In this case an income statement like the following will

have to be prepared under this second model of income measurement.

Income Statement

Sales	300,000
Cost of sales	30,600
Excess of sales price over cost of goods sold	269,400
Depreciation expenses	100,000
Net income —— (unit-ratio-homomorphic)	169,400
Adjustment for interperiod homomorphism	158,500*
Net income —— (interperiod-homomorphic)	10,900

*160,000−1,500=158,500

Are such forms of income statement prepared in current accounting practice? The answer is clearly "no". Therefore we must conclude that an income measurement model with equal emphasis on the unit-ratio-homomorphism and on the interperiod-ratio-homomorphism does not fit the structure of the current conventional income measurement.

But one might object against this conclusion and point out that in current accounting practice in the case of the substitution of a more accurate accounting method than before, "adequate disclosure is required. For example, if the method of computing depreciation is changed at the beginning of 1968, the accountant would compute depreciation for 1968 by the old and new methods."(12) Thus both income measurements are reported, approaching an expression of both forms of homomorphism. The amount computed under the new method would be recorded in the books and reported in the statements. And the change in depreciation method and the effect on net income, if the difference between the amounts computed by the two mehtods is significant, are disclosed as a footnote to the financial statements. That is, the readers of the statements are informed of the interperiod-homomorphic income (by the footnote) as well as of the unit-ratio-homomorphic income so that the same emphasis is being placed, one might contend, on both kinds of homo-

(12) H. A. Finnery and H. E. Miller, op. cit., p. 242.

morphism, even though the "forms" of reporting may differ (i.e., reporting by the formal statements vs. reporting by a footnote).

This objection is not convincing, however. First, it seems that the fact that the interperiod-ratio-homomorphic income is being reported only by a "footnote" does indicate the preponderance of the unit-ratio-homomorphism over the interperiod-ratio-homomorphism in the current accounting practice. Second, the information provided by the conventional "footnote" in the above-mentioned case of a change in an accounting method relates to the old accounting method and the income figure computed under this method, which have proven not to satisfy the interperiod-ratio-homorphism in the light of the current knowledge. The income figure required for correct interperiod comparison in the state of knowledge in this period is not this income under the old accounting method but that income figure which would have resulted from deliberately introducing an error into the unit-ratio-homomorphic income for this year such that the resulting income figure for this period becomes really comparable (in the sense of interperiod-ratio-homomorphism) with the income for a previous period which has been discovered to contain an error. This deliberately manipulated income for the current period may be different from the income figure computed by the old accounting method. (E.g., Referring to Ex. 1 in the previous section, the depreciation expense for the current period on the basis of the old estimate of the useful life is 200,000 yen, whereas the depreciation expense which would lead to the income figure with interperiod-ratio-homomorphism is 260,000 yen). So, we have come back to the conclusion that the current conventional measurement of accounting income does not place equal emphasis on the unit-ratio-homomorphism and on the interperiod-ratio-homomorphism.

IV. The Viewpoint of Preferring the Unit-Ratio-Homomorphism to the Interperiod-Ratio-Homomorphism and Consistency Principle

The foregoing discussion has asserted that the accounting income measurement in current accounting practice is based neither on the standpoint of preferring the interperiod-ratio-homomorphism to the unit-ratio-homomorphism nor on the viewpoint of regarding them as equally important, so that we can negatively infer that the point-of-view governing the current income measurement is no other than that of ranking the unit-ratio-homomorphism higher than the interperiod-ratio-homomorphism.

But one may wonder whether it makes any sense to try to use the unit-ratio-homomorphism as the standard for judging the propriety of income measurement since no accounting measurement can satisfy this requirement completely, and further no one can even tell whether and to what extent an accounting measurement has

satisfied it. Just as the metaphysical statement "there is god" has no meaning from the standpoint of empirical sciences, so is not the proposition" an income measurement possesses (or does not possess) unit-ratio-homomorphism" utterly meaningless?

A philosopher of logical positivism A. J. Ayer says that to test the genuineness of a sentence concerning empirical matters of fact "the criterion of verifiability" is to be applied. "We say that a sentence is factually significant to any given person, if and only if, he knows how to verify the proposition which it purports to express—that is, if he knows what observations would lead him, under certain conditions, to accept the proposition as being true, or reject it as being false. It, on the other hand, the putative proposition is of such a character that the assumption of its truth, or falsehood, is consistent with any assumption whatsoever concerning the nature of his future experience, then, as far as he is concerned, it is, if not a tautology, a mere pseudo-proposition."(13) Then, what does he mean by the term "verifiable" or "verifiability"?

According to Ayer, "a statement is 'directly verifiable' if it is either itself an observation-statement [i.e., a statement acceptable or refutable on the basis of an observation], or is such that in conjunction with one or more observation-statements it entails at least one observation-statement which is not deducible from these other premises alone; and...a statement is 'indirectly verifiable' if it satisfies the following conditions: first, that in conjunction with certain other premises it entails one or more directly verifiable statements which are not deducible from these other premises alone; and secondly, that these other premises do not include any statement that is not either analytic, or directly verifiable, or capable of being independently established as indirectly verifiable."(14) And "the principle of verification" is defined as requiring that a (not analytic) statement should be either directly or indirectly verifiable, in the foregoing sense."(15)

In the light of this requirement, it becomes clear that the meaningfulness, therefore verifiability of the statement "an income figure possesses unit-ratio-homomorphism" does not necessarily require a direct verification of this statement per se, which is evidently impossible; rather, all that is necessary is, as far as its verification is concerned, that a statement deducible from a conjunction of this statement with other premises can be verified on the basis of an observation.

So consider the following statements.

(a) The statement to be verified: "a periodic income (real surrogate-income) figure possesses the (maximum) unit-ratio-homomorphism."

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(13) Alfred Jules Ayer, *Language, Truth and Logic*, New York (Dover Publications Inc.), p. 35.

(14) Ibid., p. 13.

(15) Ibid., p. 13.

(b) Premises to be added: (1) "Such accounting methods as would represent the given business activity with maximum unit-ratio-homomorphism were adopted at the beginning: (2) No events or changes in circumstances have thereafter taken place which would have disturbed the propriety of these accounting methods: (3) No new accounting methods have since been devised which would achieve as much unit-ratio-homomorphism as those in use.

Clearly, the conjunction of all these four statements (by "and") would necessarily result in a statement, "The accounting methods initially adopted are being consistently applied", for, if any of these methods has been changed the degree of actually achieved unit-ratio-homorphism is expected to decrease. And this fact denotes the (direct) verifiability of the statement, "a periodic income figure prossesses the (maximum) unit-ratio-homomorphism" in the foregoing sense of the logical positivism, hence it proves the meaningfulness of using the unit-ratio-homomorphism as a standard for judging the periodic income measurement. And the criterion for testing the existence of this homomorphism is whether or not the "consistency" (consistent use) of once adopted accounting methods is being observed. Accordingly, the consistency principle is understood to aim at unit-ratio-homomorphism (on the basis of the foregoing premises (1), (2) and (3)), and hence to serve as a partial criterion for judging the existence of unit-ratio-homorphism, i.e., as a necessary condition for its existence.

One might question, however, that the observance of "consistency" will lead to the (maximum) unit-ratio-homomorphism of income measurement only when the above mentioned premises (1), (2) and (3) hold good in the given actual situation, and one might argue that this condition will rarely be satisfied in actual accounting practice. Our answer to this is that accounting theories as well as the generally accepted accounting principles are at least "making efforts" to realize those premises in accounting practice.

Ex. 1. From among various methods of inventory cost allocation such as "fifo, average methods, lifo, the identified cost method, etc."(16) "each firm should select one method with the valid calculation of periodic income as the guiding principle and also taking the characteristics of the business, the nature and kinds of inventory involved, the movement of physical goods, cost accounting methods adopted, etc. into account."(17) As for the selection of a depreciation method, "time should be the basis of cost allocation in case the depreciation is expected to accrue mainly due

(16) Opinion Series on Reconciliation of the Business Accounting Principles with Relative Laws and Regulations, No. 4, "On Inventory Valuation", Sec. 1–2 (The Council on Business Accounting, Japan, 1962).

(17) Opinion Series on Reconciliation of the Business Accounting Principles with Relative Laws and Regulations, No. 3, "On Depreciation of Tangible Fixed Assets," Sec. 1–5 (The Council on Business Accounting, Japan, 1960).

to the passage of time [i.e., the straightline method, the declining-balance method, the sum-of-years' digit's method, sinking fund method etc.]. On the other hand, when the depreciation accrues in proportion to the use of the fixed asset concerned, it is reasonable to use the products from it as the basis for cost allocation [i.e., the production method]."(17) These rules for the selection of appropriate accounting methods at least show "the existence of efforts" to specify for selection such a method which will most accurately reflect the actual accrual of expenses, that is, which will enable a measurement with the maximum unit-ratio-homomorphism, even though, of course, the specification does not seem so workable as to identify a single appropriate accounting method in each conceivable situation.

Ex. 2. In actual application of the consistency principle to accounting methods, a change in any accounting method is only permitted when the alteration will lead to a more accurate measurement, and "when the changes are introduced they will be disclosed in sufficient detail to make the reports comparable."(18) In this context the case where the change would lead to a more accurate measurement will probably mean a case where an event or situation has arisen which tends to destroy the appropriateness of the accounting methods hitherto applied and/or the case when a new accounting method has been devised which could result in a higher degree of the unit-ratio-homomorphism than before. And the fact that consistency is to be broken only in these cases will mean that the accountant is supposed to be constantly checking whether any one of these situations is not actually the case with the firm concerned, that is, whether the foregoing premises (b)–(2) and (b)–(3) for verification of the unit-ratio-homomorphism in the sense of logical positivism are being staisfied in practice. When he finds any of these premises is not satisfied, the observance of the consistency principle does not necessarily assure the unit-ratio-homomorphism, so that a substitution for another accounting method is made to recover the unit-ratio-homomorphism.

Our explanation hitherto has shown, we hope, that the conventional income measurement under the generally accepted accounting system is based on the viewpoint of placing greater emphasis on the "unit-ratio-homomorphism" than on the interperiod-ratio-homomorphism." The verification of existence of unit-ratio-homomorphism (in the sense of logical positivism) depends on showing that the consistency principle is being observed and that the premises necessary for successfully judging the existence of unit-ratio-homomorphism from the angle of consistency hold good in the actual situation.

V. Concluding Remark

Although the current periodic income measurement for external reporting is

(18) Maurice Moorvitz, op. cit., p. 43.

based on the standpoint of preferring the unit-ratio-homomorphism to the inter-period-ratio-homomorphism, the actually achieved degree of unit-ratio-homomorphism is probably small. The reasons are: (1) that it is not yet specified which accounting method is best for each possible situation for attaining maximum unit-ratio-homomorphism; (2) that it remains ambiguous as to when the hitherto used accounting methods should be changed; (3) that enough effort has not been directed towards developing, and spreading the use of, new accounting methods which would result in a greater degree of unit-ratio-homomorphism than before.

Therefore, when we turn to the political problem of how to enhance the actually attainable degree of unit-ratio-homomorphism, it seems necessary for this purpose (1) to identify which accounting method will provide maximum unit-ratio-homomorphism for each possible situation, (2) to specify in what situations the already adopted accounting methods should be altered, and (3) to devise new accounting methods which would achieve a greater degree of unit-ratio-homomorphism. We will have to leave it to another occasion to consider how to solve these problems.

ASSETS CHOICE AND OPTIMAL INTERNATIONAL RESERVES

Kazuhiro IGAWA

Introduction*

In his pioneering paper [8], H. R. Heller investigated the optimal foreign reserves, considering the opportunity cost to hold them. Following his works, Clark [4]・[5] and Kelly [11] extended them to fit general equilibrium frameworks of the macro economics. In this paper, I also follow these trends and extend them in some respects by using the theory of portfolio choice.

The wealth of one country can be considered to be composed of three assets, real capital, net holdings of foreign securities and foreign reserves. We would like to make clear the optimal composition of the wealth, using the social welfare function.

I. Domestic Policies and the Properties of Assets

First, we make clear the behavior of the policy makers (authorities)(1) and the properties of each asset, which are basic for the model building in section 2.

We assume that the economic authorities have some measure to evaluate the social welfare level. This is evaluated by the level of the disposable-income (especially, mean and standard deviation of it) and the value of the liquidity assets (which represents the convenience yield(2)). The objective of the economic policy is to maximize social welfare level.

In our paper, we consider economic policies of two types. One is usual macro economic policies such as fiscal and monetary policies, and the other is the policies to determine the compositions of the wealth. The policies of the first type are assumed as followed. There are two policies. One is the policy aimed at increasing the mean level of the real disposable-income by the adjustment of the mean level of the government expenditure which we call "the effective demand policy". The other is the policy aimed at decreasing the standard deviation of the disposable-income by

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(1) It is important to clarify the policies when we consider the problem of the optimum foreign reserves. See Clark, P. B. [4] p. 359, [5] p. 580. Hamada, K. [7] p. 23 and Kelly, M. G. [11] pp. 655–656.

(2) See Amano, A. [1] p. 69.

carefully changing the value of the government expenditure, corresponding to the exogenous disturbances, which we call "the stabilization policy". But, exogenous disturbances may not be offset perfectly, because of the constraint(3) that the level of the foreign reserves cannot be negative, which we call "the balance of payments constraint".

By these two policies, the relations of three assets to the mean and standard deviation of the level of the disposable-income will be determined. If a large share of wealth is held as real capital, the level of the domestic output will be high and the variations of disposable-income may be large because of the balance of payments constraint. On the contrary, holding a relatively large share of foreign reserves in the wealth, the level of the disposable-income will be low because the foreign reserves produce small income. Fluctuations of disposable-income will be small due to the stabilization policy and convenience yield will be large. Holding foreign securities, we can get interest and some improvements of the balance of payments, the former increasing the level of disposable income and the latter bringing stability to it.

Economic authorities choose the compositions of the assets, taking account of these properties with the objective of maximizing social welfare level. This is the second type policy above mentioned.

In section 2, we construct a simple model, and relations between stabilization policy and the balance of payments constraint are clarified in section 3. In section 4, using the social welfare function, we get the optimal conditions and using those conditions, we investigate the properties of the demand functions for assets.

II. Model Construction

By using a simple macro model, we determine the effective demand policy and the stabilization policy. The model may be called, in short, a Keynsian short-run open model under the fixed exchange rate system. By the assumption that in foreign countries, the level of the disposable-income and the rate of interest of foreign securities are constant, the properties of a small country model are retained.

It is convenient to list the notations which will be used.

W: the total value of the wealth

K: the quantity (value) of the real capital

A: the net holdings of the foreign securities

R: the net holdings of foreign reserves

Yd: disposable-income (net national product)

C: private expenditure

(3) See Clark, P. B. [4] pp. 362–364 and Hamada, K. [7] pp. 26–29.

G: the mean level of the government expenditure
X: Exports
M: imports
ε: exogenous disturbances of the balance of trades
g: variation of G
B: the balance of payments
r: rate of interest of foreign securities
Y: the quantity of the domestic products
p: the price level of products (unity at full-employment)
s: marginal propensity to hold
m: marginal propensity to import
$P_R{}^2$: the critical level of the probability of the foreign reserves becoming negative(4)
U: the level of the social welfare
E: operator to calculate mean value
σ: operator to calculate standard deviation

Assuming that the foreign reserves yield no interest, the disposable-income is

$$Yd = pY + rA \tag{1}$$

Equilibrium equation in money term is

$$Yd = C(Yd) + G + X - M(Yd) + \varepsilon + g \tag{2}$$

where the left hand side is not pY, assuming that the interest is paid in the form of goods. If X, ε are given and government expenditure G, g are determined, equilibrium disposable-income Yd will be determined. Other policies are not considered explicitly, but will be referred to in a latter section.

To determine the effective demand policy, G, we must specify the phases of inflation and deflation. We assume that there is a unique relation between the price level and the level of unemployment. In this paper, we only analyze a special case where the price level is constant and the quantity of the domestic output changes corresponding to the change of effective demand level in deflation (unemployment), and, on a contrary, the output level is constant and the price level changes corresponding to the effective demand level in inflation (over employment).(5) If other things are equal, it is reasonable that the economic authorities manage to attain full employment. So, G will be determined to attain full employment when there is no exogenous disturbance.

The mean of the real disposable income is

(4) The authorities behave so as to reduce the probability of reserves becoming negative below this level.

(5) The case that Y and p move simulateously can be analized in the similar way.

$$Ey = Y(K) + rA \tag{3}$$

where, $Y(K)$ is the domestic output level when real capital K is fully utilized. Substitute Ey for Yd in equation (2) the level of G is

$$G = Ey - C(Ey) + M(Ey) - X$$

Next, assuming the following behavioral rule to determine g, we investigate the standard deviations of the disposable-income and the balance of payments. The economic authorities behave so as to diminish the effects of the exogenous disturbances on the level of the disposable-income. We assume that the behavioral rule can be expressed as

$$g = (\alpha - 1)\,\varepsilon \tag{4}$$

If the authorities can make α zero, exogenous disturbances are fully offset and σ_y become zero. But, α may not be made zero because of the balance of payments restraints, as mentioned above. Postponing the determination of α to the next section, we express the standard deviations of Yd and B, using α.

Assuming the linearity of the expenditure function and the import function, we get from equation (4), (2)

$$Yd - Ey = \alpha\varepsilon/(s+m)$$

so, we get

$$\sigma_y = k\alpha\sigma_e \tag{5}$$

$$k \equiv 1/(s+m)$$

where k is the foreign trade multiplier. Similarly for the balance of payments, we get

$$B - E_b = (1 - mk\alpha)\varepsilon$$

$$\sigma_b = (1 - mk\alpha)\sigma_e \tag{6}$$

If parameter α is determined, σ_y, σ_b will be determined, assuming σ_e is given.

III. Stabilization Policy and the Balance of Payments Constraint

As already stated, the level of the foreign reserves cannot be negative. Note that the probability of reserves becoming negative due to exogenous disturbance, may not be zero. It is reasonable for the economic authorities to set the rule that the probability that reserves may become negative must be smaller than some positive percent.[6] The percentage may depend on the standpoint of the authorities whether optimistic or pessimistic, on the international monetary systems and on the international cooperation systems.

(6) In a similar way we can analyze the case that the probability of reserves becoming not negative but smaller than some positive level, must be smaller than some positive percent.

This balance of payments constraint is formulated as followed.[7]

$$\sigma_b \leqq P_R(R+E_b) \tag{7}$$

where, $(R+E_b)$ is the mean of the foreign reserves at the end of the period and the standard deviation of them is σ_b, which is also the standard deviation of B. This relation can be deduced, applying Čebyšev's inequality theory to the probability distribution of $(R+B)$, which is the level of the foreign reserves at the end of the term. These restraints mean that given $(R+E_b)$ and $P_R{}^2$, σ_b must be controlled by stabilization policy to satisfy them.

The authorities determine $\alpha(g)$ so as to minimize σ_y subject to the constraint (7). When there are enough foreign reserves, i.e.

$$\sigma_e \leqq P_R(R+E_b)$$

then, the balance of payment constraint is not effective and α can be made zero and σ_y will be zero. But, when there are not enough foreign reserves, i.e.

$$\sigma_e > P_R(R+E_b)$$

then, the balance of payments constraint is effective and

$$\sigma_b = P_R(R+E_b) \tag{8}$$

Taking account of equations (6), (8)

$$\alpha = \{\sigma_e - P_R(R+E_b)\}/mk\sigma_e$$
$$\sigma_y = \{\sigma_e - P_R(R+E_b)\}/m \tag{9}$$

IV. Optimum Conditions

The economic authorities determine the composition of wealth so as to maximize the social welfare level. Those policies of the second type are formulated as followed. The social welfare function is

$$U = U(E_y, \sigma_y, R) \tag{10}$$

where R shows the convenience yields. U is a continuous and differentiable function. U_e and U_R are positive and U_σ is negative, where

$$U_e \equiv \partial U/\partial E_y, \qquad U_R \equiv \partial U/\partial R, \qquad U_\sigma \equiv \partial U/\partial \sigma_y$$

The wealth constraint is

$$W = K + A + R \tag{11}$$

assuming that the domestic currency is not an international currency, the net foreign reserves and the gross foreign reserves are equal.

If we maximize U subject to the wealth constraint, we get the following necessary

(7) See Clark, P. B. [4] pp. 362–363.

conditions. The equations (3), (9), (11) and

$$U_e Y_k + U_\sigma P_R Y_k - \lambda = 0 \qquad (Y_k \equiv dY/dK) \tag{12}$$

$$U_e r + U_\sigma P_R (1 - 1/m) - \lambda = 0 \tag{13}$$

$$U_R - U_\sigma P_R / m - \lambda = 0 \tag{14}$$

where λ is the Lagrange multiplier. These mean that the marginal utility of each asset must be equal in the optimum situation. Defining the matrix D as

$$D \equiv \begin{vmatrix} (U_e + U_\sigma P_R) Y_{kk} & 0 & (U_{eR} + U_{\sigma R} P_R) Y_k, & -1, & (U_{ee} + U_{\sigma e} P_R) Y_k, & (U_{e\sigma} + U_{\sigma\sigma} P_R) Y_k \\ 0 & 0 & (U_{eR} + U_{\sigma R} P_R) r - U_{\sigma R} P_R r/m, & -1, & (U_{ee} + U_{\sigma e} P_R) r - U_{\sigma e} P_R r/m, & U_{e\sigma} + U_{\sigma\sigma} P_R) r - U_{\sigma\sigma} P_R r/m \\ 0 & 0 & -U_{\sigma R} P_R/m + U_{RR}, & -1, & -U_{\sigma e} P_R/m + U_{RR}, & -U_{\sigma\sigma} P_R/m + U_{R\sigma} \\ -1 & -1 & -1 & 0 & 0 & 0 \\ -Y_k & -r & 0 & 0 & 1 & 0 \\ 0 & P_R r/m & P_R/m & 0 & -P_R & 1 \end{vmatrix}$$

We can express the sufficient conditions as

$$\Delta < 0 \tag{15}$$

$$\Delta_{ii} > 0 \qquad (i = 1, 2, 3) \tag{16}$$

where Δ is the determinant of D and Δ_{ij} are the miner-determinants of D.

Using necessary conditions, we can get the equilibrium value of K, A, R. The demand functions for assets can be expressed abstractly as

$$K = K(W, X, \sigma_e, P_R, r)$$
$$A = A(W, X, \sigma_e, P_R, r)$$
$$R = R(W, X, \sigma_e, P_R, r)$$

V. Properties of the Demand Functions

The properties of those demand functions can be investigate by differentiating the necessary conditions.

$$D \begin{pmatrix} dK \\ dA \\ dR \\ d\lambda \\ dE_y \\ d\sigma_y \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \\ 0 \\ -1 \\ 0 \\ 0 \end{pmatrix} dW + \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ -P_R/m \end{pmatrix} dX + \begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1/m \end{pmatrix} d\sigma_e + \begin{pmatrix} 0 \\ -U_\sigma P_R + U_\sigma P_R/m \\ 0 \\ 0 \\ A \\ -P_R A/m \end{pmatrix} dr + \begin{pmatrix} -U_\sigma Y_k \\ -U_\sigma r + U_\sigma r/m \\ U_\sigma/m \\ 0 \\ 0 \\ -(R + E_b)/m \end{pmatrix} dP_R$$

We get following relations.

$$\partial K / \partial W = (-1)^{441} / \Delta \tag{17}$$

$$\partial A / \partial W = (-1)^{442} / \Delta \tag{18}$$

$$\partial R / \partial W = (-1)^{443} / \Delta \tag{19}$$

$$\partial K/\partial X=(-P_R/m)\Delta^{61}/\Delta \tag{20}$$
$$\partial A/\partial X=(-P_R/m)\Delta^{62}/\Delta \tag{21}$$
$$\partial R/\partial X=(-P_R/m)\Delta^{63}/\Delta \tag{22}$$
$$\partial K/\partial \sigma_e=(1/m)\Delta^{61}/\Delta \tag{23}$$
$$\partial A/\partial \sigma_e=(1/m)\Delta^{62}/\Delta \tag{24}$$
$$\partial R/\partial \sigma_e=(1/m)\Delta^{63}/\Delta \tag{25}$$
$$\partial K/\partial r=(-U_\sigma P_R+U_\sigma P_R/m)\Delta^{21}/\Delta+A_{\Delta 51}/\Delta-(P_R A/m)\Delta^{61}/\Delta \tag{26}$$
$$\partial A/\partial r=(-U_\sigma P_R+U_\sigma P_R/m)\Delta^{22}/\Delta+A_{\Delta 52}/\Delta-(P_R A/m)\Delta^{62}/\Delta \tag{27}$$
$$\partial R/\partial r=(-U_\sigma P_R+U_\sigma P_R/m)\Delta^{23}/\Delta+A_{\Delta 53}/\Delta-(P_R A/m)\Delta^{63}/\Delta \tag{28}$$
$$\partial K/\partial P_R=(-U_\sigma Y_k)\Delta^{11}/\Delta+(-U_\sigma r+U_\sigma r/m)\Delta^{21}/\Delta+(U_\sigma/m)\Delta^{31}/\Delta-\{(R+E_b)/m\}\Delta^{61}/\Delta \tag{29}$$
$$\partial A/\partial P_R=(-U_\sigma Y_k)\Delta^{12}/\Delta+(-U_\sigma r+U_\sigma r/m)\Delta^{22}/\Delta+(U_\sigma/m)\Delta^{32}/\Delta-\{(R+E_b)/m\}\Delta^{62}/\Delta \tag{30}$$
$$\partial R/\partial P_R=(-U_\sigma Y_k')\Delta^{13}/\Delta+(-U_\sigma r+U_\sigma r/m)\Delta^{23}/\Delta+(U_\sigma/m)\Delta^{33}/\Delta-\{(R+E_b)/m\}\Delta^{63}/\Delta \tag{31}$$

In determining the signs of equations (17)~(31), we use some or all of the following assumptions, (A–1)~(A–3).

(A–1) $U_{e\sigma}(U_{\sigma e})$, $U_{eR}(U_{Re})$, $U_{\sigma R}(U_{R\sigma})$ are negligibly small. This means that marginal utility of the elements of U have little dependence each other.

(A–2) U_{ee}, $U_{\sigma\sigma}$, U_{RR} are negative. This means that the marginal utility (disutility) of the element of U decreases (increases) as the size of the element increases.

(A–3) $|U_{ee}|$ is sufficiently smaller than $|U_{\sigma\sigma}|$ and $|U_{RR}|$

There is some type of risk aversion behavior and the marginal utility of R rapidly decreases when R increases.

(1) Effects of W

When W increases the demand for the assets will change correspondingly. We call these effects "Wealth effects". By the wealth constraint

$$\partial K/\partial W+\partial A/\partial W+\partial R/\partial W=1$$

Then, some or all of $\partial K/\partial W$, $\partial A/\partial W$, $\partial R/\partial W$ must be positive. Normally, we can expect these to be positive. Those are positive when $\Delta_{41}\sim\Delta_{43}$ are positive, because Δ is negative.

By assumptions (A–1)~(A–3), $\partial K/\partial W$, $\partial A/\partial W$ are positive. By assumptions (A–1), (A–2) and the assumption that $(U_{ee}r^2)$ is approximately equal to $(U_{\sigma\sigma}P_R{}^2(1-1/m)\ r/m)$, $\partial R/\partial W$ is positive. These assumptions are not over-restrictive when the social welfare function consists of only three elements. So, we can normally expect that the demand for each asset increases when the wealth increase.

(2) Effects of X and σ_e

We call these effects as "risk effects", because σ_y is directly affected by the change of σ_e and X. The signs of the effects of X on any assets are opposite to the case of σ_e.

When the standard deviation of the exogenous disturbance becomes large, the authorities will increase the foreign reserves because of the balance of payments restraints. Taking account of the wealth constraint, either (or both) of the assets K and A must be decreased. That is to say, Δ_{63} is negative and either (or both) of Δ_{61} and Δ_{62} must be positive.

Using assumptions (A–1) and (A–2), $\partial K/\partial\sigma_e$ is negative and also assuming (A–3), $\partial R/\partial\sigma_e$ is positive.
The sign of $\partial A/\partial\sigma_e$ cannot be determined without further assumptions.

Using similar reasoning, we can expect that the demand for R decreases and demand for K increases when X increases.

(3) Effects of r

When the rate of interest of the foreign securities increases, we can expect that the demand for them increases and the demand for other assets decreases due to substitution of assets.

Using the following relations, which can be deduced by expanding the determinant Δ.

$$-\Delta_{51}+(P_R/m)\Delta_{61}=(1/r)\Delta_{41}$$
$$-\Delta_{52}+(P_R/m)\Delta_{62}=(1/r)\,(\Delta_{42}+\Delta)$$
$$-\Delta_{53}+(P_R/m)\Delta_{63}=(1/r)\Delta_{43}$$

We can rewrite the equations (26)$\sim$(28) as

$$\partial K/\partial r=(-U_eP_R+U_eP_R/m)\Delta_{21}/\Delta-A(1/r)\Delta_{41}/\Delta$$
$$\partial A/\partial r=(-U_eP_R+U_eP_R/m)\Delta_{22}/\Delta-A(1/r)\,(\Delta_{42}+\Delta)/\Delta$$
$$\partial R/\partial r=(-U_eP_R+U_eP_R/m)\Delta_{23}/\Delta-A(1/r)\Delta_{43}/\Delta$$

By the sufficient conditions Δ_{22} is positive. By assumptions (A–1) and (A–2), Δ_{21} and Δ_{23} are negative. By the wealth effect, $\Delta_{41}\sim\Delta_{42}$ may be expected to be positive and smaller than $(-\Delta)$ and A may be positive, negative or zero. So, we can say that if A is negative or wealth effects multiplied by A is sufficiently small, $\partial K/\partial r$, $\partial R/\partial r$ are negative and $\partial A/\partial r$ is positive.

(4) Effects of P_R

We cannot determine the signs $\partial K/\partial P_R$, $\partial A/\partial P_R$, $\partial R/\partial P_R$ without further assumptions, though the sign of Δ_{ij} $(i,j=1,2,3)$ can be determined by the sufficient conditions and assumptions (A–1), (A–2).

If we can assume that the effects through risk effects Δ_{6i}/Δ $(i=1, 2, 3)$, multiplied by $(R+E)/m$ are dominant we can expect that $\partial K/\partial P_R>0$ and $\partial R/\partial P_R<0$ as $(R+E)$ is positive. As $P_R{}^2$ increases, it is better to increase K and decrease R, taking account of the balance of payment restrictions.

VI. Concluding Remarks

We must note that the analysis above depend on the specifications of the social welfare function and the government policies.[8]

Here, we must mention about other policies, such as monetary policy and the foreign exchange rate policy, which might be used for the balance of payments adjustment. When the balance of payments is adjusted perfectly, the stabilization policy can be applied without restraint and σ_y is zero. But, balance of payments is adjusted only partly for some reason, the analysis in this paper will be applicable.

Considering the optimum foreign reserves of just one country is not sufficient, taking account of the present international financial system. It is necessary to adjust the volume of the existing international liquidity to equate the total sum of the optimum foreign reserves of all the countries. Changing either the price level or the volume of the international liquidity are alternative way to accomplish this.

Furthermore, it might be important to extend the analysis to a long-run framework where the time schedules of the accumulation of the real capital, the foreign reserves and the foreign securities are made explicit.

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THE RESEARCH INSTITUTE FOR ECONOMICS AND BUSINESS ADMINISTRATION, KOBE UNIVERSITY

HISTORICAL SKETCH

In 1919, a research organization named the Institute for Commerce was founded in Kobe Higher Commercial School, one of the chief predecessors of Kobe University, with a gift made by F. Kanematsu & Company, a leading mercantile firm in Kobe. The organization was designed to carry on and facilitate integrated research on business and commerce and to formulate and publish the results of these studies and investigations in such form as to make them available to the business community.

With the founding of Kobe University of Commerce, successor of Kobe Higher Commercial School, in 1929, the Institute extended its research activities by adding several divisions. One was the famous Latin-American Library, which soon became the center of research in this field in Japan. A room for statistics equipped with various computing machines was established and began publication of *Juyo Keizai Tokei* monthly and *Sekai Boeki Tokei* annually. A filing room was prepared to deposit press clipping files systematically arranged by topics and dates. Another room was designed to become the center of all possible original records and data having to do with the beginning and progress of Japanese business.

On the campus of Kobe University of Commerce, another organization named the Institute for Business Mechanization was founded in 1941 utilizing

business machines donated by the IBM Corporation and others. With Professor Yasutaro Hirai as its head a broad and forward-looking plan for business mechanization in Japan was developed.

In 1944, Kobe University of Commerce changed its name to Kobe University of Economics. After the war, however, the University was consolidated with three other colleges in Hyogo Prefecture to become Kobe University. With this development, the two Institutes were also amalgamated into the Research Institute for Economics and Business Administration, Kobe University. At present, the Institute, with its twenty one full-time professional staff members, carries on studies and investigations in international economy, business administration, and information systems in Japan.

LOCATION AND BUILDINGS

The Research Institute for Economics and Business Administration is located on the campus of Kobe University, Rokko, Kobe. It is a three-storied building named the Kanematsu Kinenkan and has a floor space of about 2,900 square meters, which includes a president's room, forty-one offices, six rooms used as a library, a room for statistics, three conference rooms, etc. Adjoining is a one-story building recently built to install business machines.

ORGANIZATION

Under the directorship of the president, the Institute operates with two research groups, each has five sections respectively. Each research group and its sections are as follows:

A Group of International Economy

(1) International Trade
(2) International Finance
(3) Maritime Economy
(4) Economy of Latin-America
(5) International Law of Economy

B Group of Business Administration

(1) International Management
(2) Business Administration and Information Systems
(3) Accounting
(4) Business Statistics
(5) International Labor Problems

Besides the regular work of the Institute, research committees may be created

to carry on any special work requiring the joint study of academic and business circles. At present, there are three committees, that is, International Finance Committee, Research Committee of Structure of International Division of Labour and Information Systems Committee.

For convenience and greater efficiency in carrying out its research activities, the Institute has a general office which is responsible for 1) the collection and preservation of a comprehensive collection of books, periodicals, pamphlets, and original records and data of finance, trade, commerce, industry and business generally; 2) the classification, cataloguing, indexing, arranging, annotation and compilation of these research materials; and 3) the formulation and publication of the results of the investigations and studies accomplished by the professional staff members of the Institute.

As an affiliated institute, the Documentation Center for Business Analysis has been established. It is the first systematic information facility in the field of business administration in Japan that has been recognized and authorized by the Ministry of Education. The purpose is to collect and to make intensive control of all kinds of materials on business administration and to make them available to scholars, universities, governments, and business world with the aid of modern documentation techniques.