STUDY OF ECONOMIC DEVELOPMENT OF INDONESIA

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INTERNATIONAL DEVELOPMENT CENTER OF JAPAN

STUDY OF ECONOMIC DEVELOPMENT

OF

INDONESIA

Manufactured Exports of Indonesia

Japan as a Market for Indonesian Products

Long-term Projection of the Indonesian Economy by a Macro-Model

PREFACE

This study was undertaken by the Overseas Technical Co-operation Agency as part of its activities financed by the fiscal 1972 budget item for Basic Overseas Pre-Investment Studies, of the Ministry of Foreign Affairs, Government of Japan. The Agency commissioned the International Development Center of Japan, a private, non-profit research institution, to carry out the work.

This study constitutes a part of the multi-lateral foreign-funded research program of BAPPENAS, which requested Japan to do research on the following three subjects:

- Manufactured exports of Indonesia
- Japan as a market for Indonesian products
- Long-term projection of the Indonesian economy by a macro-model

The results of the research are to be utilized in preparation of Indonesia's next five year-plan.

The International Development Center invited Professors Takao Fukuchi and Tsuneo Nakauchi, both of International Christian University, Tokyo, to serve as project managers; Fukuchi in charge of the team studying 'Long-term projection of the Indonesian economy by a macro model' and Nakauchi for the 'Manufactured exports of Indonesia' and 'Japan as a market for Indonesian products' teams.

This report marks the completion of the two-year (1971-1972) research, the preliminary findings of which were published as an interim report in April, 1972.

It is our sincere hope that the results of this research will be useful to Indonesia in planning its policies and programs for industrialization and economic development.

Keiichi Tatsuke
Director General
Overseas Technical Co-operation Agency
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LETTER OF TRANSMITTAL

Mr. Keiichi Tatsuke
Director General
Overseas Technical Cooperation Agency
The Government of Japan

Dear Mr. Tatsuke:

In accordance with the contract of August 1, 1972 concluded between the Overseas Technical Cooperation Agency and the International Development Center of Japan, the latter has undertaken and completed a study of economic development of Indonesia, and with this letter submits its report, as the final aspect of the work to be performed according to the contract.

The members of the project teams wish to acknowledge, on this occasion, their gratitude for the close cooperation and support provided during the teams' stay in Indonesia by both the Indonesian and Japanese officials and experts concerned, as well as the members of the Harvard Development Advisory Group. They would like also to reiterate their appreciation for the help and understanding extended to them by your agency at all times, which made possible the successful completion of this study.

Sincerely yours,

S. Okita

Saburo Okita
President

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INTRODUCTION TO PARTS I & II

Tsuneo Nakauchi

The Indonesian monetary situation has been stabilized at a remarkable rate in recent years, which has provided a very solid economic background for the implementation of the first five-year plan. Agriculture has also shown steady growth except for the consequences of the recent drought. Indonesia is now at an important strategical stage as the formulation of the second five-year plan is based on the achievement of the first five-year plan and will have a crucial impact on Indonesia's politics, economy and society in the future.

Parts One and Two incorporate the results of two kinds of research conducted by a Japanese research group on two subjects: (1) manufactured exports of Indonesia and (2) Japan as a market for Indonesian products.

This report includes the result of both interim and final reports. The interim report incorporates the study mainly oriented towards the part and descriptions of the present situation based on the analysis of the past data. The papers contained in the interim report are the summarized translation of much longer papers originally written in Japanese. The final report mainly emphasizes the study of the future perspective of the problems.

Part One includes the reports on the study of manufactured exports of Indonesia and has five chapters. Chapter One deals with the salient features of the exports by the manufacturing sector in Indonesia classified by commodities and by countries. It was intended to sort out those items of exports which have comparative advantage.

Chapter Two deals with the long-term aspects of manufactured exports. Need to coordinate the promotion of Indonesian manufactured exports with those of the neighboring countries, to avoid unnecessary competition is stressed. Also, it is shown that advanced countries should change their industrial structure so that they can increase their imports from the developing countries.

Chapter Three deals with the short-term analysis of Indonesia's exports of manufactured goods, and the broader background of the manufacturing industry as a basis for analysing the behavior of exports. Comments on some policy aspects follows the comparison of the past and present of this industry.

Chapter Four contains the analysis of a paper-pulp mill project, and palm oil plantation development, as well as their implication for the Indonesian economy. Attention is invited to the issue of price stability as well as the general trend of price movements. Emphasis is given to need to carefully consider the profitability of land utilization to achieve optimum utilization of land in the long-run.

Appendix I of Part One, written by the same author, deals with some policy aspects of electric power supply which has an important bearing on the development of the industrial sector. It may not be directly relevant to development of Indonesian manufactured exports perse, but because frequent break-downs in generating plants are serious problem for industry, radical improvement of this energy sector is a pre-requisite for future industrialization.

Chapter Five analyzes the possibilities of establishing petrochemical industry in Indonesia. Considering the geographic location of Indonesia relative to the competing Middle East suppliers of crude oil, and to the markets in Japan and the US, cost analysis is given to support the case for changing production and consumption pattern of petroleum in Indonesia. The advantage of low sulfur contents and less transport costs of Indonesian oil against her disadvantages of higher production costs will require careful comparison and study. In this report, it is concluded that these in general cancell out. The prospects for Japanese imports of Chinese oil are not considered in this analysis.

Appendix II of Part One deals with two case studies of a free port zone, and slightly different aspect of infrastructure for the development of manufactured exports. In the long-run, the increased supply of semiskilled and skilled labor will be a significant asset for accelerating the rate of growth of the Indonesian economy, as no nation of this size or population can rely solely on the natural resources and primary industry. More diversified expansion of exports based on labor-intensive industries will increase in importance. A free port will provide an effective incentive for the development of export-oriented manufactured exports. Indonesia, with her abundant sea coasts and favorable port sites, possesses ample potentiality for this sort of future-oriented developmental administration.

If the idea is combined with utilization of abundant labor supply which is of promising quality (a Japanese trading company has estimated that the labor productivity of Central Java could be raised to 80 - 90% of the Japanese textile industry with two years' training), there will be greater chance of success. The benefit of free port zone administration will have to be viewed not so much in the shorter perspective but in the longer perspective of its impact on Indonesia's quality of labor. Improved utilization of present marine transport carriers and facilities and further development in the future will have a significant impact on the development of the economy.

It is worth considering the possibility of developing industrial estates in combination with the development of the free port zone, to provide external economies in such areas as energy, water, transport and engineering know-how.

Appendix III gives a general analysis of the impact of science and technology on the development of the Indonesian economy. A judgement of priorities in the selection of the relevant technology in broad sectional order is shown.

These are examined by means of the chain effects of each line of technical know-how on the economy.

Part Two of this report covers the potentiality of Japan as a market of Indonesia. It includes an analysis of expected structural shift of the Japanese economy required to estimate the future trends of Indonesian exports to Japan. Chapter One gives some background description on the expected future change in the structure of the Japanese economy, which is to continue a fairely high rate of growth somewhat on the order of 10% per annum. The share of science - and technology - oriented sectors is to increase. Labor will become an increasingly scarce factor in Japan with the resulting increase in the wage level. In general, this will open a new frontier for Indonesian exports.

Chapter Two deals specifically with the trade relations between Japan and Indonesia. It is suggested to consider Chapters One and Two together, and to treat Chapter One as a background for Chapter II. I feel that I need to acknowledge here gratitude for the efforts of Prof. Sueo Sekiguchi of Osaka University who previously contributed a paper for our study, which we have incorporated in Chapter Two.

Chapters Three and Four analyze the past trends and certain perspectives in the future of trade relations between Japan and Indonesia. Imports from Indonesia are analyzed in broad regional and sectoral perspectives.

Perhaps it would be worth stating here something of policy aspects in connection with the structural shifts in Japanese economy. Continuous and stable guarantee of markets for Indonesia will serve as a substantial incentive for exporting manufactured goods from Indonesia. It will become increasingly favorable for the Indonesian exports to be shipped in processed rather than crude form. It will increase the value added of the Indonesian exports while Japan will be able to realize more efficient resource allocation over time by shifting towards a higher structure of industry with more emphasis on knowledge-oriented lines of production. It would even pay for the Japanese economy to embark upon a subsidy program at home to guarantee higher import prices for Indonesian products.

This subsidy could be understood as a kind of aid in the form of providing larger markets for Indonesia rather than as a protection of the knowledge-oriented exports to the competing advanced countries. In brief, we can not overly emphasize the aid effects of the structural policy of the Japanese economy. It would even be worth-while for Japan to pay somewhat in advance for the long-term contracts of crude and manufactured materials, particularly when foreign reserves are accumulated to the extent of threatening the stability of the yen. It is highly desirable for the flow of funds of capital aid to be channeled indirectly through multi-lateral aid organization for projects of developmental significance. To be able to map out the favorable and agreeable division of labor in the trade between Japan and Indonesia, Indonesia will have to find out what lines of production she can take up -- this will involve a careful evaluation of competitive trade relations among Southeast Asian countries.

Painstaking as it is, it is worth spending efforts to find the way towards harmonious regional operation. As for economic aid, if it is confined to the capital flow, it will sooner or later confront the limitation of the size of markets. The Japanese economy, it is strongly

urged, should open wider its markets for the developing countries by importing much more labor-intensive products.

Although it may look somewhat curious, we have come to feel a need for a new outlook of the aid policy of Japan, one putting more emphasis on the industrial policy at home so as to obtain more congenial trade relations with Asian countries.

Here, I would like to take this opportunity to express our thanks for the thoughtful arrangements provided by Dr. Widijojo and other leaders of the Indonesian Government and Harvard group led by Dr. Papanek. Thanks are also due to many capable professors and economists and our friends who enlightened us through three mission trips to the country.

PART I

MANUFACTURED EXPORTS OF INDONESIA

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CHAPTER I INDONESIA'S EXPORTS IN RECENT YEARS

Exports of Major Commodities

Indonesia's exports have expanded rapidly since 1970. The total value of exports is estimated to have reached $1.3 billion in 1971 (see Table 1).

This expansion has been due primarily to an increase in the exports of petroleum and non-traditional commodities. In 1971 the petroleum exports amounted to $541 million (an increase of 23% over 1970) and exports of non-traditional commodities $323 million (an increase of 60% over 1970). The expansion of the latter has largely been accounted for by the increased exports of lumber, which placed third after petroleum and rubber with the value exported of $168 million.

In spite of these new developments, Indonesia's export pattern has remained basically unchanged. It is still characterized by a primary commodity orientation, with the manufactured exports yet to occupy 5% of the total exports. Dependence on primary commodities for export usually implies that export performance is subject to price fluctuation in world markets. In the Indonesian case, this proved to be the case with traditional export commodities such as rubber and copra. The price of natural rubber declined during the 1961 - 1970 period at an annual average rate of 0.87 cent per pound, a rate at which it is difficult to compensate for an increase in the quantity exports.

The Indonesian government has advanced a variety of measures to cope with the problem of price fluctuation in her primary export commodities. A Copra Board (Badan Pengurusan Kopra) has been established to set a floor price in order to stabilize farmers' income and, furthermore, agents have been placed overseas with unified CIF sales conditions. For the promotion of rubber exports, the government introduced crumb-rubber technology and effected measures to encourage establishment of such plants, while prohibiting exports of low-quality rubber. Yet the most noteworthy measure has been the establishment of NIED (National Institute for Export Development) under the Ministry of Commerce, which, somewhat similar to Japan's JETRO, has been charged with the task of promoting exports.

However, these export policies are not likely to bring about a major upsurge in exports of Indonesia's traditional commodities. Perhaps Indonesia should make efforts once and for all to break away from her dependence on traditional commodity exports.

Country Destination of Indonesia's Exports

The most significant development in country destination of Indonesia's exports has been the expansion of exports to Japan. While in 1962 it constituted only 6% of Indonesia's total exports, in 1970 this proportion rose to 36.7% (Table 2). It is obvious that this supplier-consumer relationship evolved around natural resources. This trade relationship, amounting to $0.5 to 0.6 billion in 1970, is expected to expand further, reflecting Japan's increased need for petroleum, mineral resources, lumber, etc.

In addition, Table 2 indicates three other characteristics in Indonesia's export destination in recent years. First, exports to Singapore, which declined drastically as a result of the conflict with Malaysia and expropriation of British firms around 1964, have recovered to occupy about one-fifth of Indonesia's total exports. Second, exports to the communist block, and above all exports to China, showed a sharp decline from 13% in 1964 to a mere 3% of the total in 1970. Third, exports to the USA and EC countries experienced a decline in both absolute and relative terms.

These trends suggest that Indonesia will be increasingly dependent, for her exports, on Japan, Singapore and other Asian countries in the years ahead. And such trade no doubt will center around Indonesia's natural resources.

Export Potentials of Selected Commodities

Crude Oil (Low Sulfur Content)

Reflecting the world-wide increase in the demand for petroleum, the price keeps rising in this market. It will continue to be a seller's market. Although efforts are being made by Indonesia to expand her supply capacity, and significant results have been obtained, increase in output cannot keep up with the rising demand.

Lumber

The main users of lumber are plywood makers. Japan's plywood industry, although second in the world, has been in a slump for the past few years and has reduced its purchases of lumber in the Southeast Asian market. Although it is beginning to show a sign of recovery, this is a result of Japan's increased demand for needle-leaf wood, whose main suppliers are the U.S. and the U.S.S.R. and Canada. For this and other reasons, Japan's demand for lumber is not expected to increase significantly in the future. While Indonesia occupies a relatively favorable position among Southeast Asian countries, it will be necessary for Indonesia to counteract the subsequent downward pressure on the price by practicing planned felling and export control, as well as by strengthening her domestic lumbering industry.

Natural Rubber

As mentioned above, the price of natural rubber has declined sharply in recent years.

Neither is outlook of the future market very bright, for a variety of reasons. For one thing Japan will not be able to maintain the present (high) rate of increase in her demand for rubber owing to slow-downs in both bicycle production and rubber product exports. Furthermore, the Soviet Union's demand is shifting to synthetic rubber. However, some regions in Indonesia will continue to depend on rubber production in the absence of other cash crop alternatives.

Copra

World production of copra marked a historic high in 1971. Owing mainly to this factor on the supply side, the price of copra has shown a decline. In projecting copra exports' future, due consideration must be taken of the performance of other oils and petro-chemical products. Demand for oils and fats as a whole is expected to rise in the future and so will the demand for naturally produced oils including copra.

However, this should not encourage an optimistic expansion of copra production for Indonesia, as the world price of copra is also heavily influenced by the export performance of its largest single supplier, the Philippines.

Palm Oil

Production and export of palm oil enjoyed a steady increase in recent years. Outlook of demand in the future is also bright. In view of Indonesia's efforts to expand its production, export revenues of this commodity are expected to rise due to an increase in the quantity exported, even in the absence of any favorable changes in the price.

Figure I shows changes in trade intensity index for Japan and Asian countries, Iji, during the 1960's. From this Figure, it is observed that Iji's except for Hongkong, Singapore and Pakistan, are significantly greater than 1. In this sense, export patterns of most Asian countries may be said to be fairly well adapted to the import pattern of Japan. Especially in the case of Indonesia, the value of Iji has clearly increased in the 1960's and as a result from 1960 to 1969 the value of Iji rose from 2.4 to 9.8. This means that her trade relation with Japan has become quite close.

However, Asian countries' trade relation with Japan is not without problems. That is to say, firstly, especially in the case of Southeast Asian countries, their comparative advantage is heavily concentrated in only a few commodities, which belong to SITC 0-4, while it is extremely low for other commodities. Thus, in the case of Malaysia, relative slow-down in her resource exports (e.g., iron ore) to Japan has given rise to a secular declining trend in the trade intensity index.

Secondly, those commodities for which Asian countries enjoy comparative advantage in the Japanese market are those commodities, characterized by a low rate of growth of Japan's imports.

Japan's trade pattern with Asian countries is one of exporting industrial goods with

high income elasticity of demand and importing raw materials and some labor-intensive manufactures, for which the rate of growth of Japan's imports is, at the highest, the level of her economic growth rate. Therefore, the trade intensity index is decreasing year by year not only for Southeast Asia but also for Taiwan and Korea which have advanced rapidly by export-oriented industrial policy.

Indonesia' Comparative Advantage in Manufactures Trade

Indonesia's comparative advantage in the Japanese market typically lies in raw materials and mineral fuels, but because she has two major commodities, namely petroleum and lumber, trade intensity index has been rising in contrast with other Asian countries.

Judging from Japan's expanding demand for low sulfur petroleum and lumber, trade intensity for Indonesia and Japan will continue to rise so far as two major exports do not reach their limits.

On the other hand, as Indonesia's manufacturing industries are still in their early stages of development, all her manufactured exports to Japan are of negligible amount compared with other Asian countries. In 1970, it was about 9 million, reaching only 1.4% of her total exports to Japan. Indonesia has been promoting industrialization mainly relying on foreign investment since the latter half of the 1960's. Recently, however, the Government policy towards foreign investment has gradually strengthened its selective orientation towards foreign investment. For example, in 1970 foreign investment into 39 light industries was prohibited, and further in 1971 the galvanized iron sheet manufacture was added to this list. Such a series of measures seem to be based on the government's recognition that Indonesia can meet her domestic demands for manufactured goods by domestic capital and already established foreign capital. Therefore, the government policy towards foreign investment must be aiming at import-substitution. However, such a policy is not conductive to promotion of manufactured exports. There seems to be a general tendency among most developing countries to reconsider the effectiveness of import-substitution policy (e.g., Myint Report). Perhaps Indonesia should also re-examine her present trade policy and, in the process, at least, check the possibility of her manufactured exports. Then, in what type of manufacturing is Indonesia likely to have comparative advantage? According to the theory of trade, comparative advantage in international trade is determined by relative factor proportion. In this sense, such a country as Indonesia, where labor is relatively abundant, may be said to have comparative advantage in labor-intensive manufactures.

Kojima undertook a detailed examination of desired pattern of industrial specialization for countries in Southeast Asia, South Asia, and East Asia on the basis of Lary's work included in ADB's Report, "Southeast Asian's Economy in the 1970's".

In this study Kojima classifies labor-intensive manufactures into following three groups:

A) The most labor-intensive manufactures

A1: local manufactures -- SITC 551 (essential perfumes and oils), 667 (precious stones), 896 (works of art, etc.), 897 (gold, silverware, jewelry)

A2: Resources oriented manufactures -- 61 (leather, leathermanufactures), 63 (wood and cork manufactures), 512 (organic chemicals), 521 (crude chemicals from coal, petroleum and natural gas), 531 (synthetic organic dyestuffs and natural indigo)

A3: textiles and clothing -- 65 (textile yarn, fabrics, made-up articles), 84 (clothing)

A4: other light manufactures -- 821 (furniture), 851 (foot-wear)

B) Moderately labor-intensive manufactures

B1: resource-oriented manufactures -- 62 (rubber manufactures), 64 (paper and paper-board), 66 (non-metallic mineral manufactures excluding 667)

B2: foot-loose manufactures -- 831 (travel goods, handbags), 892 (printed matter), 893 (article of plastic), 894 (toys, sporting goods), 895 (office supplies)

C) Marginally labor-intensive manufactures

C1: manufactures of metal -- namely 69

C2: machinery -- 7 (machinery and transport equipment), 812 (sanitary, plumbing, heating and lighting fixtures), 861 (scientific and measuring instruments and apparatus), 863 (film), 864 (watches and clocks), 891 (musical instruments and recorders)

Table 3 arranges Japan's imports from Southeast Asia (Thailand, the philippines, Malaysia, Singapore, Indonesia), East Asia (Korea, Taiwan, Hongkong) and South Asia (India, Pakistan) in 1970, according to the above classification of labor-intensive manufactures. From this cable we can see the weak comparative advantage of Southeast Asia vis-à-vis other Asian countries in these manufactured exports.

But on the other hand, it shows that, although the share of Southeast Asia in the Japanese import market for labor-intensive manufactures is generally small, it varies considerably from commodity group to commodity group.

There are significant differences observed among Southeast Asian countries in the composition of Japan's labor-intensive manufactured imports from these countries.

An indication of each region's revealed comparative advantage in each commodity group relative to the region as a whole is given by the following:

$$\left(\frac{X^{h}_{i}}{Xi} / \frac{X^{h}}{X}\right) \cdot 100$$

where X^{h}_{i}: Japan's imports of commodity h from country i

Xi: Japan's total imports from country i

X^{h}: Japan's total imports of commodity h from Asian region

X: Japan's total imports from Asian region

Table 4 suggests that East Asia has greater comparative advantage in less labor-intensive manufactures, such as B1, B2, C1, C2, and also in manufactures such as A3, A4.

South Asia has greater comparative advantage in resource-oriented manufactures such as A2, B1 and local speciality manufactures, such as A1.

On the other hand, Southeast Asia's comparative advantage is heavily concentrated in most labor-intensive manufactures, such as A1, A2, while comparative advantage for other commodity groups is extremely limited relative to other Asian regions.

Table 4 shows the comparative advantage of Indonesia's manufactures in the Japanese market.

According to the table, Indonesia has greater comparative advantage in local speciality goods, such as 551 (essential perfumes and oils), 896 (works of art, etc.). In addition, she has comparative advantage in 65 (textile yarn, fabrics, made-up articles) and 821 (furniture) a little. But on the other hand, she has less comparative advantage in resource-oriented manufactures, such as A1 for which other Southeast Asian countries have greater comparative advantage.

In summary, examined in a comparative context of Asian countries, the present comparative advantage situation of Indonesia is not so favorable as far as manufactured exports are concerned, although she does have comparative advantage in her speciality goods and a few others.

In order to utilize more effectively her rich natural resources and expand her processed resource exports, for which she has only a limited comparative advantage at present, she will have to strengthen inputs complementary to labor, such as capital and technology.

If these factors are sufficiently available, Indonesia will almost definitely have comparative advantage in Asian resource-oriented manufactured trade. This suggests that Indonesia review her policy towards foreign corporations, which can provide the missing elements of capital and technology for her natural resource processing.

(Yoshio Sanaka)

Table 1 Exports of Major Commodities

(Unit: Million US$)

Commodity	1966		1967		1968		1969		1970		1971	
	Value exported	%	Value exported	%	Value exported	%	Value exported	%	Value exported	%	Value exported	%
Traditional commodities												
Rubber	235.3	38.8	189.3	28.6	175.5	23.5	220.8	26.5	259.9	23.5	221.6	16.9
Smaller-scale operation	147.3	24.3	124.5	18.8	116.7	15.6	163.2	19.6	187.9	16.9	156.3	11.9
Large-scale operation	88.0	14.5	64.8	9.8	58.8	7.9	57.6	6.9	72.0	6.5	65.3	5.0
Copra	24.3	4.0	14.4	2.2	40.1	5.4	18.7	2.2	29.3	2.6	14.3	1.1
Coffee	38.5	6.6	45.0	6.8	44.4	5.9	51.3	6.2	65.6	5.9	55.0	4.2
Tobacco	27.2	4.5	21.1	3.2	21.7	2.9	13.8	1.7	11.5	1.0	20.0	1.5
Palm oil	21.7	3.6	28.6	4.3	20.9	2.8	22.2	2.7	36.5	3.3	46.0	3.5
Coconut	2.1	0.3	4.0	0.6	4.7	0.6	4.0	0.5	5.0	0.4	5.5	0.4
Pepper	13.6	2.2	18.2	2.8	13.5	1.8	10.4	1.2	3.0	0.3	24.0	1.8
Tin	22.2	3.7	31.5	4.8	49.0	6.6	53.0	6.4	62.2	5.6	60.0	4.6
Total	385.0	63.6	352.2	53.3	370.0	49.5	394.1	47.4	473.0	42.4	446.1	34.0
Non-traditional commodities												
Tea	18.4	3.0	10.0	1.5	16.9	2.3	9.7	11.2	17.6	1.6	28.1	2.1
Copra (confectionary)	7.0	1.2	3.6	0.5	2.4	0.3	1.9	0.2	5.8	0.5	11.7	0.9
Lumber	3.6	0.6	6.3	1.0	12.5	1.7	26.0	3.1	100.5	9.0	168.4	12.9
Other	49.6	8.2	50.6	7.7	49.6	6.6	34.2	4.1	77.7	7.0	114.8	8.8
Total	78.6	13.0	70.5	10.7	81.4	10.9	71.8	8.6	201.6	18.1	323.0	24.7
Total excluding petroleum exports	463.5	76.5	422.7	64.0	451.2	60.4	465.9	56.0	674.6	60.5	769.1	58.7
Petroleum exports	142.1	23.5	238.0	36.0	296.4	39.6	366.4	44.0	439.8	39.5	541.1	41.3
Total exports	605.6	100.0	660.7	100.0	747.6	100.0	832.3	100.0	1,114.4	100.0	1,310.2	100.0

Source: Bank Indonesia

Table 2 Country Destination of Indonesia's Exports

(Unit: Million US$)

	1962		1963		1964		1965		1966		1967		1968		1969		1970	
	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%	Value	%
United Kindom	108.3	15.9	118.8	17.1	21.6	3.0	6.0	0.9	16.0	2.2	24.5	3.7	9.4	1.3	7.0	0.8	12.2	1.2
Netherlands	–	–	8.6	1.2	74.8	10.3	92.1	13.0	94.1	13.9	41.6	6.3	43.6	5.8	32.4	3.9	41.9	4.2
West Germany	33.5	4.9	41.3	5.9	46.4	6.4	54.3	7.7	77.1	11.4	56.6	8.5	48.0	6.4	33.1	4.0	44.7	4.4
Other W. Europe	24.4	3.6	27.2	3.9	30.8	4.3	26.3	3.7	36.8	5.4	24.2	3.6	20.0	2.6	16.1	2.0	28.9	2.9
Western Europe (Total)	166.3	24.4	195.9	28.1	173.6	24.0	178.7	25.3	224.0	33.0	146.9	22.1	121.0	16.1	88.6	10.7	127.7	12.7
USSR	34.9	5.1	25.1	3.6	20.5	2.8	26.3	3.7	25.9	3.8	14.8	2.2	16.7	2.2	10.8	1.3	19.5	1.9
Other E. Europe	18.6	2.7	20.5	2.9	22.5	3.1	19.4	2.7	20.3	3.0	11.8	1.8	3.8	0.5	4.5	0.5	6.5	0.7
China	34.4	5.1	42.2	6.1	52.2	7.2	40.0	5.7	9.5	1.4	0.7	0.1	–	–	–	–	–	–
Centrally Planned Economies(Total)	87.9	12.9	87.8	12.6	95.2	13.1	85.7	12.1	55.7	8.2	27.3	4.1	20.5	2.7	15.3	1.8	26.0	2.6
United States	93.2	13.7	85.4	12.3	172.8	23.9	152.8	21.6	138.4	20.4	102.7	15.4	112.7	15.0	107.3	12.9	110.7	11.0
Other America	2.2	0.3	5.2	0.7	1.6	0.2	6.4	0.9	5.3	0.8	2.3	0.4	2.3	0.3	3.0	0.4	3.4	0.3
Americas (Total)	95.4	14.0	90.6	13.0	174.4	24.1	159.2	22.5	143.7	21.1	105.0	15.8	115.0	15.3	110.3	13.3	114.1	11.3
Japan	41.0	6.0	67.1	9.6	122.1	16.9	112.8	15.9	121.1	17.8	194.5	29.2	172.2	22.9	243.9	29.3	297.0	29.4
Malaysia	59.7	8.8	27.1	3.9	–	–	–	–	–	–	1.4	0.2	27.7	3.7	26.6	3.2	16.1	1.6
Singapore	146.1	21.4	103.3	14.8	2.8	0.4	5.6	0.8	18.0	2.7	65.7	9.9	115.7	15.4	136.2	16.4	152.7	15.1
Other Asia	48.1	7.1	69.9	10.1	86.2	11.9	98.3	13.9	53.3	7.9	50.9	7.7	44.6	6.0	54.1		45.3	4.5
Asia (Total)	294.9	43.3	267.4	38.4	211.1	29.2	216.7	30.6	192.4	28.4	312.5	47.0	360.2	48.0	460.8	55.4	511.1	50.6
Australia	35.8	5.3	53.6	7.7	67.5	9.3	64.3	9.1	61.4	9.0	72.6	10.9	73.3	9.8	66.6	8.0	29.4	2.9
Africa	1.3	0.1	1.1	0.1	2.5	0.3	3.2	0.4	1.5	0.2	1.2	0.1	1.2	0.1	0.7	0.1	0.9	0.1
Others	–	–	–	–	–	–	–	–	–	–	–	–	59.6	8.0	89.0	10.7	200.0	19.8
Total	681.7	100.0	696.4	100.0	724.2	100.0	707.7	100.0	678.5	100.0	665.4	100.0	750.8	100.0	831.2	100.0	1,009.3	100.0

Table 3 Index of Specialization of Japan's Trade with Selected Asian Countries (1970)

	Taiwan	Korea	Philippines	Malaysia	Indonesia	Thailand	Singapore	Hong Kong	India	Pakistan	Growth rate of imports (%)
0	345	139	49	18	23	289	9	98	64	123	16.7
1	16	2	6	0	0	414	0	0	178	4	17.4
2	52	98	258	205	105	148	30	51	205	145	11.8
3	6	19	6	4	278	–	393	0	10	32	18.1
4	1	6	20	124	289	–	–	24	4	0	7.5
5	24	24	8	6	2	42	7	108	5	2	14.2
6	150	520	5	245	7	53	11	153	155	268	21.9
7	64	21	2	0	0	–	2	71	–	–	18.1
8	320	282	7	0	10	15	35	1,112	19	27	26.5
9	211	653	8	32	45	121	700	404	96	95	–

Note: Index of specialization is calculated by the following formula—

$$S^{c}_{j}{}^{i} = \frac{Mji}{Mj^{c}} / \frac{Mji}{Mj} \times 100$$

- $M^{c}_{j}i$: Japan's imports of commodity c from country i
- M^{c}_{j} : Japan's total imports of commodity c
- Mji : Japan's total imports from country i
- Mj : Japan's total imports

Source: *Japan Exports and Imports*, Ministry of Finance (Customs declaration base)

Table 4 Comparative Advantage in Each Commodity

	Commodity (SITC Code)		East Asia[a] (I) (US$ 1,000)	East Asia[a] (II) (%)	(III)	Southeast Asia[b] (I) (US$ 1,000)	Southeast Asia[b] (II) (%)	(III)	South Asia[c] (I) (US$ 1,000)	South Asia[c] (II) (%)	(III)	Indonesia (I) (US$ 1,000)	Indonesia (II) (%)	(III)	Total Asia[d] (I) (US$ 1,000	Total Asia[d] (II) (%)
A	A1	551	4,659	2.23	110	429.2	1.75	87	245.4	0.79	39	347.9	34.53	1,709.4	5,334.2	2.02
		667	6,436.0	3.08	50	3,656.3	14.88	243	6,093.6	19.59	320	12.5	1.24	20.26	16,185.9	6.12
		896	381.9	0.18	69	211.9	0.86	331	83.1	0.27	104	55.6	5.51	2,119.2	676.9	0.26
		897	1,629.6	0.78	100	228.2	0.93	119	235.4	0.75	96	5.9	0.58	74.4	2,093.2	0.78
		Sub	13,107.1	6.27	68	4,525.6	18.42	201	6,657.5	21.40	233	421.9	41.86	456.0	24,290.2	9.18
	A2	61	782.6	0.37	10	14.4	0.06	2	9,067.6	29.15	782	6.6	0.65	17.4	9,864.6	3.73
		63	28,914.6	13.84	87	12,565.2	51.14	323	437.9	1.41	9	83.8	8.31	52.5	41,917.7	15.84
		512	1,528.9	0.73	99	356.3	1.45	196	64.5	0.21	28	3.5	0.36	48.7	1,949.7	0.74
		521	146.0	0.07	140	0	0	0	0	0	0	0	0	0	146.0	0.01
		531	18.9	0.02	200	0	0	0	8.1	0.02	200	0	0	0	27.0	0.01
		Sub	31,391.0	15.03	74	12,935.9	52.65	259	9,578.1	30.79	151	93.9	9.32	45.8	53,905.0	20.37
	A3	65	63,354.7	30.33	102	3,419.8	13.92	47	12,122.6	38.97	131	422.1	41.89	140.5	78,897.1	29.82
		84	48,157.5	23.05	124	728.5	2.97	16	512.1	1.64	9	37.6	3.73	20.0	49,398.1	18.67
		Sub	111,512.2	53.38	110	4,148.3	16.89	35	12,634.7	40.61	84	459.7	45.62	94.1	128,295.2	48.49
	A4	821	696.0	0.33	92	21.4	0.09	25	241.1	0.77	214	5.7	0.56	155.6	958.5	0.36
		851	1,789.3	0.86	123	14.7	0.06	9	26.7	0.09	13	0	0.01	1.4	1,830.7	0.70
		Sub	2,485.3	1.19	112	36.1	0.15	14	267.8	0.86	81	5.7	0.57	53.8	2,789.2	1.06
	Total		158,495.6	75.87	96	21,645.9	88.11	111	29,138.1	93.66	118	981.2	97.37	123.1	209,279.6	79.10

	Commodity (SITC Code)		East Asia[a] (I) (US$ 1,000)	(II) (%)	(III)	Southeast Asia[b] (I) (US$ 1,000)	(II) (%)	(III)	South Asia[c] (I) (US$ 1,000)	(II) (%)	(III)	Indonesia (I) (US$ 1,000)	(II) (%)	(III)	Total Asia[d] (I) (US$ 1,000)	(II) (%)
B	B1	62	140.5	0.07	140	1.7	0.01	20	0	0	0	0	0	0	142.2	0.05
		64	148.5	0.07	117	4.5	0.02	33	5.5	0.02	33	0	0	0	158.5	0.06
		66	1,314.4	0.63	103	12.5	0.05	8	278.6	0.89	146	0	0	0	1,605.5	0.61
		Sub	1,603.4	0.77	107	18.7	0.08	11	284.1	0.91	126	0	0	0	1,906.2	0.72
	B2	831	1,929.4	0.92	74	233.1	0.95	76	1,144.3	3.68	294	0.8	0.08	6.4	3,306.8	1.25
		892	1,438.5	0.69	84	620.7	2.53	309	106.6	0.34	42	5.6	0.56	68.3	2,165.8	0.82
		893	1,049.8	0.50	125	2.2	0.01	3	0	0	0	0	0	0	1,052.0	0.40
		894	6,209.5	2.97	124	47.5	0.18	8	83.6	0.27	11	2.2	0.22	9.2	6,340.6	2.40
		895	511.8	0.25	132	0	0	0	0	0	0	0	0	0	511.8	0.19
		Sub	11,139.0	5.33	105	903.5	3.67	73	1,334.5	4.29	85	8.6	0.86	17.0	13,377.0	5.06
	Total		12,742.4	6.10	106	922.2	3.75	65	1,618.6	5.20	90	8.6	0.86	14.9	15,283.2	5.78
C	C1	69	2,053.7	0.98	113	68.4	0.28	32	171.2	0.55	63	9.8	0.97	111.5	2,293.3	0.87
	C2	7	30,964.5	14.82	120	1,608.8	6.55	53	130.6	0.42	3	1.9	0.19	1.5	32,703.9	12.36
		812	659.8	0.32	128	3.1	0.01	4	9.9	0.03	12	1.1	0.11	44.0	672.8	0.25
		861	1,431.9	0.69	126	7.5	0.03	6	11.4	0.04	7	0	0	0	1,450.8	0.55
		863	195.2	0.09	100	40.3	0.16	178	0	0	0	2.6	0.26	288.9	235.5	0.09
		864	1,781.2	0.85	110	263.1	1.07	139	0	0	0	0	0	0	2,044.3	0.77
		891	584.7	0.28	122	8.5	0.04	17	130.9	0.10	44	0.3	0.24	104.4	624.1	0.23
		Sub	35,617.3	17.05	120	1,931.3	7.86	55	182.8	0.59	4	5.9	0.80	5.6	37,731.4	14.25
	Total		37,671.0	18.03	119	1,999.7	8.14	54	354.0	1.14	8	15.7	1.77	11.7	40,024.7	15.12
			208,909.0	100.00		24,567.8	100.00		31,110.7	100.00		1,005.5	100.00		264,587.5	100.00

Source: Japan's Exports and Imports

Note:
a: Korea, Taiwan, Hongkong
b: Thailand, Malaysia, Singapore, Philippines, Indonesia
c: India, Pakistan
d: East Asia, Southeast Asia, South Asia

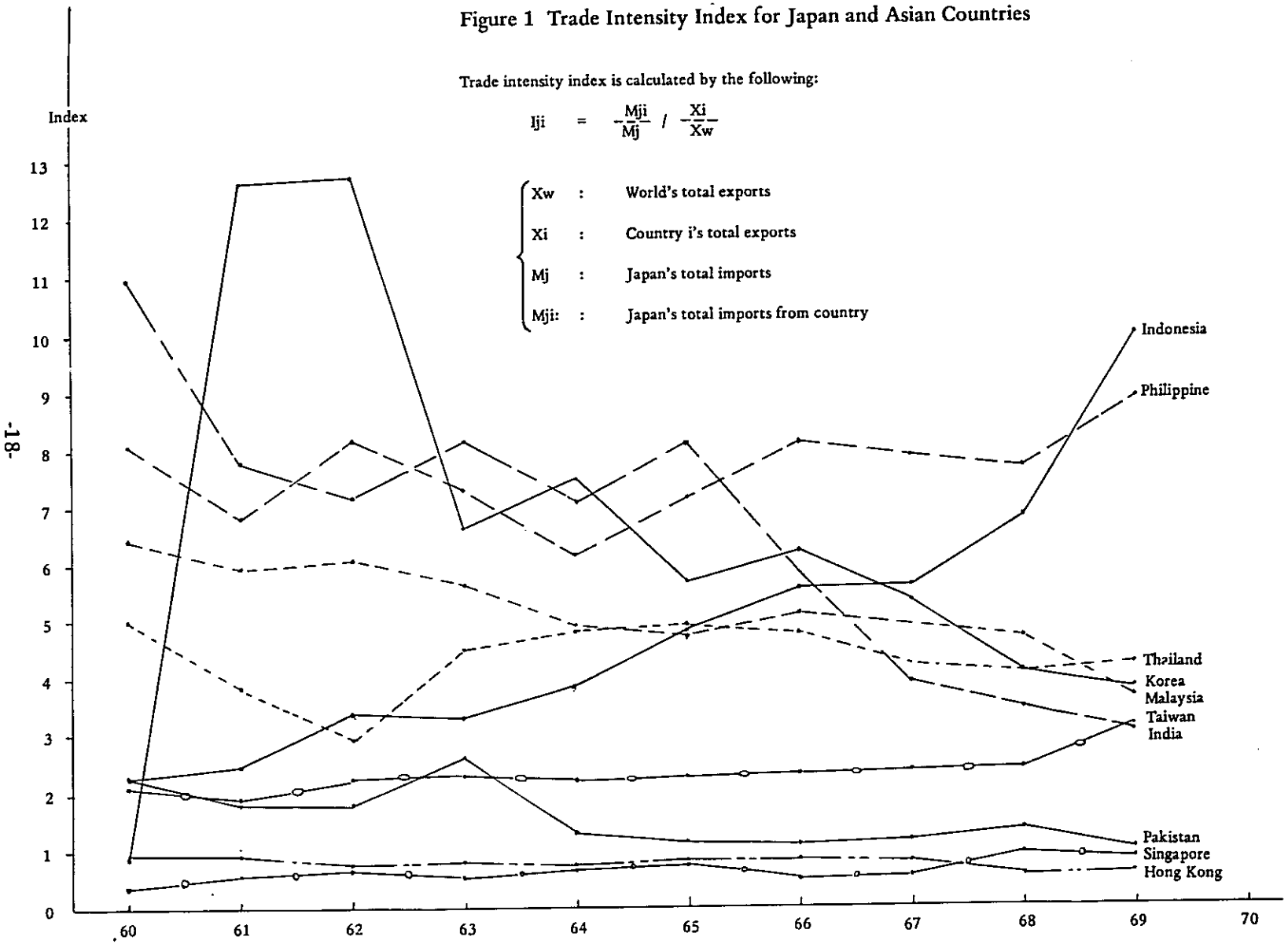
(I): Japan's total imports of commodity h from each region
(II): each commodities share of total imports
(III): each region's revealed comparative advantage in each commodity group relative to the region

Figure 1 Trade Intensity Index for Japan and Asian Countries

Trade intensity index is calculated by the following:

$$Iji = \frac{Mji}{Mj} / \frac{Xi}{Xw}$$

- Xw : World's total exports
- Xi : Country i's total exports
- Mj : Japan's total imports
- Mji: : Japan's total imports from country



CHAPTER II INDONESIA'S EXPORTS OF MANUFACTURED GOODS: LONG-TERM CONSIDERATIONS

Indonesia's manufacturing industries are still in their early stage of development. At present they only constitute 7 to 8% of the GNP. All Indonesia's manufactured exports except petroleum products are of negligible magnitude. Included in this negligible export category are some processed foods, cement, leather products, tires, textiles and folk-crafts.

In view of the strategic role played by manufactured exports in the process of industrialization, it is important to examine which industries can be developed in Indonesia as potential export industries. So far, however, no systematic research has been made on this subject. Relying on common sense knowledge, one can perhaps list the following as having export potential:

(a) Petorleum-related industries-petrochemical, plastic, synthetic fiber, chemical fertilizer

(b) Lumber-related industries-plywood, paper and pulp, furniture

(c) Agricultural and marine product-related industries--coffee, tea, fruits, processed food, refined sugar, tobacco, palm oil, rubber products

(d) Other industries--textiles, electric machines, leather, aluminum, tin, miscelaneous products.

According to a recent prefeasibility study by the IBRD on the viability of Indonesia's manufacturing industries, if petroleum- and lumber-related industries are developed systematically, there should be economic returns of 16 to 20% and they will have adequate potential as export industries. Indonesia is endowed with abundant natural resources and a large, low-wage, labor force. If these favorable factors are combined with capital, management and technology with the aid of appropriate industrial policies, the aforementioned industries will have a good chance to develop into export industries in the long run.

There are several practical problems to be faced by policy-makers. First of all, should foreign capital or domestic capital be at the core of such a development process? Foreign capital may play an important role, but should properly be subordinate to domestic capital. Domestic capital, however, is still weak and mostly controlled by Chinese merchants who have not yet been assimilated into Indonesian society. Moreover, government-owned factories have a bad reputation for their inefficiency. Indonesia, therefore, will have to foster the development of domestic capital, especially that of private enterpreneurs.

Secondly, how may such a development process be financed? To raise the GNP

growth rate to 7 to 8% (growth rate of industrial production being 13 to 15%), the rate of saving will have to rise to the magnitude of around 30%, assuming the capital coefficient to be 4. To achieve this, Indonesia will have to rely heavily on multilateral and bilateral aid, as well as on induction of private foreign capital. But these are external sources. Domestically, the agricultural surplus, and petroleum and lumber revenues, are the only feasible sources of funds. It is suggested that the government promote domestic saving and capital accumulation, by strengthening the tax collection system and capital market.

In addition, there is a wide variety of infrastructure-related problems to be dealt with, such as electricity, transportation, communication, education, training of the labor force, and modernization of legal and administrative systems.

In addition to these problems, there is also a more specific problem of choosing appropriate export policies. In this connection, provision of the following measures are among those suggested: favorable treatment in export finance, export subsidies, favorable tax treatment for priority industries, establishment of free trade zones, and utilization of foreign trading firms for introduction of foreign technology and use of market research.

Further, Indonesia's efforts to promtoe manufactured exports must be coordinated with those of neighboring countries to avoid unnecessary competition. Perhaps the IBRD, ADB and ECAFE can contribute to the establishment of a desirable pattern of division of labor among these countries.

Finally, it should be pointed out that advanced countries' import policies will have a bearing on efforts, such as Indonesia's, to expand manufactured exports. It is strongly advocated that advanced countries open their doors to industrial products of the developing countries, and if necessary change their own industrial structure in so doing.

(Jiro Yokoyama)

CHAPTER III INDONESIA'S MANUFACTURING INDUSTRY; PAST AND PRESENT

1. The Present Situation of Manufacturing Industry

There are two types of manufacturing industries in Indonesia: small-scale private industries and state operated large scale industries. But neither has shown much development even in the postwar period. Those in the former group, which have been able to survive, are found in those fields where (1) there is no foreign competition owing to the special tastes of the domestic consumers, (2) the price is much cheaper than import alternatives, (3) the product is not highly processed, but the materials required for production can be obtained locally and are abundant, (4) the production process involved does not require high level techniques, and (5) international transaction are difficult to conduct because of the nature of the product. The state-operated industries, on the other hand, include modern enterprises such as spinning, paper, fertilizer and so on. But their development is also limited because of weak or poor management, low technical standards, inappropriate production scale, etc. In the following, the present situation is examined with regard to each category mentioned above.

(1) Industries which rely on the special tastes of the domestic consumers

Even today Indonesian people maintain special tastes in everyday life to a varying degree. There are many products which face little foreign competition because of their peculiarness. For example, indigenous confectioneries, torasi (seasoning), taucho (bean paste), crudely processed coconut oil which retain a special smell and taste, etc., in the food industry; batik, sarongs, kai pandjang in the textile industry; the rottan products, and sculptures in the wood manufacturing industry; kretek tobacco etc. These products enjoy rather stable domestic demand but very little is exported.

(2) Industries characterized by low price

Some products survive solely because they are relatively cheap. The consumers of these products are usually in the lower economic brackets and the products are very low in quality. We can list the following as belonging to this category: bread, biscuits, macaroni, alcoholic and soft drinks in the food industry; textiles; furniture; leather products; rubber products; toilet goods; pharmaceuticals; metal products; office supplies etc. But because of the recent import liberalization and a new round of investments, these industries are becoming increasingly subject to competition from new products. Especially since 1970 the rapid advance of foreign capital has depressed domestic small enterprises. As typical of these new industries we can list the following: condensed milk, seasoning, beer, soft drinks, canned food, integrated textile mills, tires, pharmaceuticals, powdered soap and detergent, toothpaste, paint, toilet goods, electronics, galvanized iron sheets and so on. To compete with these new industries, the domestic capital investment has been stepped up in the same fields and private interests have also asked the government to take measures to protect them from foreign capital.

(3) Industries which take advantage of locally available raw material

There are some industries whose survival depends on the abundant supply of raw materials in the localities; for instance, canning of tropical fruits, metal products, molasses, chocolate, tobacco, coffee, rottan furniture, tapioca flour, rubber products, coconut oil etc. These products are cheap primarily because raw materials for their production are found abundantly but processing involved is rather simple and falls short of international quality standards.

(4) Industries whose products by nature are not conducive to overseas transactions

As shown in the accompanying tables, many of the main industries listed are industries whose products are rarely sold internationally. For example, rice milling, ice, building bricks, ceramics, etc. In summary, it may be said that the majority of Indonesia's industries today depend solely on the domestic market and are not very competitive vis-a-vis commodities of foreign origin. To promote industrial development and develop export industries, strong governmental supports are needed.

2. Evaluation of the Present Industrial Policy

In the past, especially during the first half of the 1960, the Indonesian economy was isolated from the international arena owing to anticapitalistic moves of political nature, the adverse balance of payments and the policy of economic self-reliance. New capital investments dwindled as a result of the stoppage of imports of both capital and material goods. The prohibition of foreign capital imports also led to a slow-down in the pace of industrial development. In such a situation, governmental assistance to the situation has been rapidly changing especially since around 1967 when the new government adopted a liberal economic policy. This open policy, in retrospect, was modified to allow domestic industries some degree of protection. Another cause of the industrial stagnation was the lack of an appropriate industrial promotion policy. The Five-year Development Plan, begun in 1955, did include some incentive measures for small-scale industries, but they did not last long. In the Eight-year Development Plan which started in 1961, the government made efforts only to promote state enterprises. The only exception was a protective policy extended to the textile industry through the establishment of a cotton yarn distribution system. But contrary to the original intention this only helped the traditional production system to remain unchanged. In 1970 the government announced the enactment of a new Industrial Fundamental Law to replace the first of the kind enacted in 1934. Main points of this new law are as follows.

1) The government will enact necessary regulation to improve the environmental facilities for industrial development; for instance, (a) to build infrastructure such as electric power, transportation and communication, (b) to provide necessary funds for industrial construction, (c) to institute tax and financial policies, and (d) to formulate a protection policy.

2) The government will appoint pioneer industries and extend favorable treatment to them.

3) Area to be supplied with electric power, water and communication will be determined and developed into industrial estates in the future.

4) The government will promote quality control measures for industrial goods in order to establish industrial standards.

5) An Industrial Development Council will be established, consisting of the Minister of Industry, Director of BAPPENAS and other ministers concerned with industrial development.

Of these measures, the following have been realized to date:

(1) The favorable tax treatment

According to the foreign and domestic investment laws, an investment approved as a priority project will be given a tax holiday for a period of one to six years for corporate tax, two years for dividend and sales taxes, capital stamp tax and title transfer tax of vessels.

To be approved as a priority project, the investment must be classified under one of the 14 types of industry stipulated by the Ministry of Finance as well as satisfy other requirements, such as investment scale (US$1 million seems to be required now), impact on employment effect and locational conditions. An investment which is not approved as a priority project can only obtain 20% tax credit from the investment expenditures.

These stipulations are considered as a good means to induce new investments into those areas yet to have industry. But at the same time they will work as disincentives to small scale investments not designated as priority projects because of the big differences between the two.

(2) The reduction of the corporation tax rate

In August, 1970, the corporate tax rate was fixed at 20% as a general tax rate and 25% as an additional rate which applies to the income above 5 million rupiah. This is a big change because formerly the tax rate was progressive in the order of 10-60%. If we take as an example one small scale enterprise with an income of 10 million rupiah, the tax to be paid is almost of the same magnitude as in Japan.

But if we view this in some detail, the assessable income is calculated so as to be much bigger, according to the accounting principles used in Indonesia, than in the developed countries, because the deductible items are quite limited.

As other tax incentives we can point out the extension of the carry-over period of losses from two to four years or the accelerated depreciation system.

As a rule, the tax policy and its administration can be said to be gradually improv-

ing. But in order to induce a greater number of new investments, more detailed provisions are needed. Great fear of foreign capital is the possibility of an inflation in the future. But in the present corporation tax regulation, the protective financial measures against such an inflation, such as a fixed percentage balance reduction in depreciation, adoption of "last-in, first-out" (LIFO) method in inventory control, are not approved. Also according to the revaluation law of 1971, in principle, fixed assets which were acquired between 1960 and 1970 were to be allowed to be depreciated, but, in actuality, the assets acquired after 1968 were not.

(3) Financial policy

The increasing business activities, especially new investments, require a greater financial provision and low interest rates. In 1968 the government instituted medium-term investment credits for which the term of loan was three or five years, the interest rate was 1% a month and the credit coverage 75% of the total investment expenditures required. But this arrangement is not enough to satisfy the increasing investment demands. The supply of credit is still too limited to meet demand and the interest rate is too high compared to international standards. As of November, 1971, the credit outstanding was only 70,760 million rupiah. Moreover, indigenous enterprises have scant chance to obtain loans. Therefore, more preferential measures should be given to promote export industries. By way of comparison, the export industries in Korea can get loans at 6% per annum.

3. The Possibility of Manufactured Exports

To date little effort has been made to promote industrial activities, still less manufactured exports. Below we will consider some measures to promote manufactured exports.

(1) Promotion of export of indigenous industries

Major efforts should be made to promote some indigenous industries which have demonstrated export potential. As these categories we can name, for example, torasi (seasoning), krupuk (cracker), batik, sculpture, rottan products, vegetable oils, molasses, cinchona bark, etc. But to increase these exports some difficult problems must be solved. Excluding the few industries which have had the export achievements, these industries solely depend on a narrow domestic market.

(a) Establishment of government-designated production areas

In general the industries in this field are very small and scattered geographically. Therefore, to develop them as export industries, it is necessary to unify the production units as seen in the batik cooperatives. It is also necessary to improve the distribution system because too many middlemen intervene in the process of makers' obtaining raw materials or selling their products. The government should establish proper production and distribution systems which will be given necessary governmental assistance, such as finance, transportation facilities, quality testing etc. And for the overseas marketing an export promotion organization will

have to be established.

(b) Financing

Small-scale industries especially in the rural areas have little access to the state banks which give loans, horizontal expansion of credit facilities is needed.

(c) Adoption of the industrial standards

Industrial standards have been adopted for only a few products. To promote exports of manufactures, the government should increase and expand quality testing and quality control activities for exports to a larger number of products.

(2) Promotion policy for newly organized industries

Stimulated by the preferential measures and incentives in the new investment regulations, investments are rapidly increasing in those light industries which 'create' new demands. As these industries usually import new production techniques, their products can meet the international quality standards if the companies are properly managed. And compared with older established industries, they are more favorably treated in financing and tax payments. In these categories are included plastic products, textiles, metalworking, electronics, chemicals, food, bicycles and automobiles assembly plants, etc. But these industries face the problem different from the indigenous ones. The domestic demand for these new products is so limited that in the near future it will be necessary to start marketing these products overseas. But these modern products face severe competition from other countries. Therefore, special care must be taken in addition to the financial and tax measures mentioned above.

One of the most important promotion measures would be the establishment of an export free zone. Most Asian countries show interest, though to a varying degree, in establishing such zones. But according to the experience of some, success depends on how smoothly the governmental control will be carried out and how easily a cheap and high quality labor force and infrastructure, can be mobilized for such undertaking.

Attention must also be given to the problem of smuggling. Many infant enterprises face price competition from smugglers. As a countermeasure to such competitive pressure, the government can give assistance to cut the price down. For example, it is desirable to cut the import or import sales taxes for the imports of the capital goods and raw materials or cut the domestic sales tax.

(3) Export possibilities of state enterprises

At the present stage the prime objective of the state enterprises seems to be import substitution. It will take longer for them to become internationally competitive, especially in

view of the low quality of present management and technology, and smallness of production scales, which prevail. Only in the field of the plantation economy can we find some export possibilities. This will involve processing of primary agricultural and mineral products. But for that, the step to take is to establish a new firm or enterprise in which the private sector can participate together with government and thereby contribute, in particular, to the improvement of management which will enable the new enterprises to export their products.

(Hiroshi Matsuo)

Table 1-A Top Twenty Manufacturing Industries
(Top 20 in Number of Establishments)

Weaving	3,148
Rice milling	2,200
Batik, Kain Pandjang	1,485
Dried tobacco leaves	749
Cleaning and Polishing of rice	603
Remilled rubber	584
Books	500
Tapioca flour	410
Sawn teakwood	296
Ice	339
Macaroni, spaghetti noodles, etc.	314
Coconut oil	311
Sawn wood	296
Bread, cakes, cookies etc.	252
Furniture	211
Building bricks	210
Krupuk	197
Tea processing and packing	194
Laundry soap	183
Glazed ceramics and rooftiles	175

Source: Survey of Manufacturing Industries 1970, Central Bureau of Statistics

Table 1-B Top Twenty Manufacturing Industries in Power Capacity
(Unit: Horse Power)

Raw sugar, dried and powdered	266,550
Shipyards and boatyards	220,236
Beer	130,000
Remilled rubber	90,221
Rice milling	72,153
Yarn spinning	49,775
Coconut oil	34,707
Ice	28,117
Sawn teak wood	18,524
Cleaning and polish	18,487
Books	17,455
Sawn wood	15,158
Passenber car tires	14,189
Tea processing and packing	13,627
Newsprint paper	13,059
Cardboard and straw paper board	8,835
Manufacturing, repairing of parts	7,752
Clean coffee beans	7,279
Writing and printing paper	6,977
Plastic utencils	6,364

Source: IBID

Table 1-C Top Twenty Manufacturing Industries in the Size of Labor Force
(Number Employed)

Remilled rubber	99,624
Tea processing and packing	80,627
Weaving	71,784
Raw sugar, dried and powdered	65,998
Dried tobacco leaves	52,613
Rice milling	43,368
Batik, kain pandjang	21,067
Clean coffee beans	16,608
Books	13,129
Cleaning and polishing rice	10,894
Tapioca flour	10,791
Rubber footwear, household supplies	9,804
Coconut oil	9,314
Yarn spinning	8,765
Cigarette manufacturing	8,436
Sawn teak wood	6,934
Macaroni, spaghetti, etc.	6,358
Sawn wild wood	4,612
Palm oil	3,828
Laundry Soap	3,802

Source: IBID

Table 3 Top Four Industries in Each Major Category of Industries (1961)

(Unit: Million Rupiahs)

			Industries	Number of enterprises	Production
1.	Foods	1)	Tapioca, gapleck flour	228	514
		2)	Edible oils	7	810
		3)	Beer	2	488
		4)	Biscuits	151	307
2.	Textiles	1)	Spinning	5	1,247
		2)	Textiles	756	2,284
		3)	Knitting	70	857
		4)	Batiks	3,401	798
3.	Furniture	1)	Wooden boxes	24	32
		2)	Plywoods	4	16
		3)	Furnitures	252	86
		4)	Iron furniture	63	86
4.	Paper	1)	Paper	26	200
		2)	Paper products	51	121
		3)	Cigarette papers	3	64
		4)	Printing	543	260
5.	Leather	1)	Tanning	100	479
		2)	Leather products	285	784
6.	Rubber	1)	Hardened rubber products	110	1,369
		2)	Remilled rubber	82	4,092
		3)	Soft rubber	23	31
7.	Chemical	1)	Vegetable oils	123	2,914
		2)	Soaps	207	1,504
		3)	Paints	28	265
		4)	Pharmaceuticals	52	532
8.	Ceramic	1)	Bricks, tiles	95	82
		2)	Glass products	40	275
		3)	Cements	2	630
		4)	Cement products	140	138
9.	Metal products				
		1)	Enamel ware	4	287
		2)	Machines	194	385
		3)	Assembly of radios	11	296
		4)	Assembly of auto-mobiles	5	2,000

Table 4 Industrial Distribution, 1964

	Number of establish-ments	Sales (Million rupiahs)	Labor force (1000 persons)
Foods	6,796	81,507	227
Beverages	314	4,662	7
Tobacco	2,603	76,485	162
Textiles	9,546	31,734	246
Clothing	259	2,365	7
Wood	1,284	4,580	21
Furniture	587	1,160	9
Paper	132	2,481	7
Printing	723	5,231	25
Leather	154	2,515	4
Rubber products	943	45,051	66
Chemicals	583	10,906	26
Non-ferrous metals	1,279	9,980	33
Metal products	832	6,112	23
Electrical goods	65	1,041	3
Transport industries	824	1,179	19
Others	378	2,167	10
Total	27,417	291,088	902

Source: The Industrial Census in 1964, Central Bureau of Statistics

Table 5 Manufactured Exports in 1968
(Unit: US$1,000)

Products	Exports
Torasi	43
Gaplek	738
Tapioka flour	26
Sugar, molasses	2,367
Chocolate	159
Sago flour	81
Corned beef	4
Krupuk (Crackers)	61
Vegetable oils	15,572
Bee wax	7
Terpene oils	15
Cinchona	417
Chemicals	7
Gambir	39
Vegetable dyes	1
Ethers	527
Rubber products	14
Charcoal	74
Paper, paper goods	--
Tanned leather	71
Leather products	5
Vegetable fibers	342
Batiks	775
Pandangs, bamboo	119
Rubber sandals	--
Toilet oils	31
Iron products	143
Copper products	0.7
Swords	0.3
Rattan products	689
Total	22,328
Contribution ratio of exports	2.56%

Table 6 Foreign Manufacturing Enterprises Approved as of May, 1970

		Number of establishments	Investments (US$ 1000)
(1)	Food		
	Condensed mild	3	2,635
	Instant noodles	1	401
	Chocolates	1	1,000
	Seasonings	2	2,800
	Beer	2	2,443
	Margarine	2	459
	Soft drinks	2	2,800
	Essences	2	1,206
	Instant coffee	2	2,500
	Sea weed processing	1	250
	Canned food	2	2,400
	Flour milling	1	6,000
	Biscuits	1	1,000
(2)	Textiles		
	Integrated mills		40,050
	Stretch nylon		2,500
	Knitting		750
	Tricots		
	Weaving	1	6,000
(3)	Chemicals		
	Tires	1	13,000
	Sulfuric alminium	3	2,500
	Insecticides	1	245
	Refractory bricks	1	1,500
	Plastic sandals	1	167
	Laundry powder	2	1,750
	Shoe black	1	200
	Toothpaste	1	1,000
	Toilet goods	4	1,500
	Paints	3	2,335
	PVC		
(4)	Pharmaceuticals		

		Number of establishments	Investments (US$ 1000)
(5)	Electrical goods		
	Electronics		
	G.I. sheets		
	Assembly of acooters		
	Assembly of misc. goods		
	Steelmaking		
	Household goods		
	Switchboards		
	Refrigerators		
	Rolling mills		
	Assembly of mobile parts		
	Assembly of auto-mobiles		
(6)	Others		
	Hairwigs	3	900
	Ball-point pens	1	650
	Ceramics	1	1,848
	Enamel, metal	3	1,750
	Cigarettes	3	6,517
	Shoemaking	2	917
	Dry batteries	2	2,982
	Containers	1	250
	Tubes	1	160
	Freezers	1	1,000
	Opticals	1	278
	Artificial rice	1	9,000
	Packing of fertilizer	1	1,000
	Feed	3	1,500
	Zip fastners	1	1,000
	Corrugated cardboard	2	1,100
	Cement	1	400
	Eyeglasses	1	400
	Watches	1	1,000
	Offet printing	1	500
	Iron framed windows	1	250

Sou[r]ce: Investment Board

Table 7 Domestic Investments Approved May, 1970

	Industries	Number of establishments	Investments	Types or areas
(1)	Djakarta			
	Plastic Goods	10	1,448	Sandals, plastic goods, cords
	Textiles	17	4,758	Knits, cotton yarns, false twists, fibers, canvas, spinning
	Oils	4	140	Peanut oil, coconut oil, soaps
	Metal products	17	3,410	G.I. sheets, iron, alminum goods nails, enamel ware, batteries
	Electrical	4	1,283	Motors, generators, radios, TV, air conditioners, fans
	Chemicals	14	1,733	Drugs, toilet goods, mosquito coils
	Printing	6	1,462	Printing, off-set printing, metal can printing
	Foods	17	421	Monosodium glutamate, flour, seasonings drinks, instant noodles, biscuits
	Bicycle assembly	3	4,362	
	Car assembly	2	652	
	Paper	5	855	Cartons, corrugated cardboards
	Others	12	2,658	Construction materials, gold working watches, paints, glasses etc.
(2)	West Java			
	Textiles	18	7,236	Weaving, finishing, (Ma jalaja, Garut, Bandung, Tjeribon)
	Batiks	2	310	(Tjiamis, Tasikmalaja)
	Printing	3	307	Off-set printing, printing (Bogor, Bandung)
	Bicycle parts	2	162	(Bogor)
	Coconut oil	1	28	(Tangeran)
	Paper	1	58	(Padalarang)
	Communication Equipment	1	26	(Bandung)
	Sandals	1	200	(Bandung)
	Biscuits	1	40	(Tangerang)
	Eyeglasses	1	115	(Bandung)
(3)	Djogjakarta			
	Batiks	4	166	
	Textiles	1	3	
	Tobaccos	3	788	

	Industries	Number of establishments	Investments	Types or areas
(4)	Central Java			
	Textiles	21	962	
	Cold storage	1	352	(Semarang)
	Seasonings	2	132	(Semarang, Pekalongan)
	Tobacco	3	652	(Salo)
	Machines	1	13	(Semarang)
	Pharmaceuticals	2	128	(Semarang)
	Ice	1	66	(Kedus)
	Printing	1	588	(Semarang)
(5)	East Java			
	Textiles	5	1,803	(Lawan, Malang, Surabaja)
	Paper	1	517	(Purbolingo)
	Cement	1	2,793	(Gresik)
	Pharmaceuticals	1	30	(Surabaja)
	Soda	1	453	(Surabaja)
	Plastic goods	1	128	(Surabaja)
	Matches	2	77	(Surabaja)
	Ice	1	227	(Surabaja)
	Asbestos	1	40	(Surabaja)
	Can-making	1	45	(Surabaja)
	Machines	1	100	(Surabaja)
	Tobacco	2	1,478	(Kediri, Malang)
	Hairwigs	1	50	(Surabaja)
	Peanut butter	1	40	(Surabaja)
	Tanning	1	422	(Surabaja)
	Chocolate	1	15	(Surabaja)
	Printing	1	150	(Surabaja)
(6)	Atjeh			
	Crumb rubber	1	166	
(7)	North Sumatra			
	Crumb rubber	7	9,779	(Medan, Simelungun)
	Fishing	2	548	Processing of shrimp and others
	Matches	2	136	(Medan, Pematansiantar)
	Plastic goods	1	38	(Medan)
	Confectioneries	1	85	(Medan)
	Plywood	1	73	(Langkat)
	Tobacco	1	147	(Pematansiantar)
	Ice	1	134	(Medan)
	Printing	1	37	(Medan)

	Industries	Number of establishments	Investments	Types or areas
	Spinning	1	100	(Medan)
	Coconut oil	1	261	(Medan)
	Mosquito coils	1	90	(Medan)
	Iron works	1	100	(Medan)
(8)	West Sumatra			
	Crumb rubber	3	565	(Padang)
	Oil refining	1	11	(Padang)
	Printings	1	6	(Padang)
(9)	South Sumatra			
	Crumb rubber	7	2,096	(Palembang)
	Rubber processing	1	75	(Palembang)
(10)	Bengkulu			
	Crumb rubber	1	242	(Bengkulu)
(11)	Lampong			
	Crumb rubber	3	417	(Lampong)
	Oil refining	2	211	Clove oil, coconut oil (Lampong)
(12)	Djambi			
	Crumb rubber	10	1,129	(Djambi)
	Ice	1	28	(Djambi)
(13)	Rian			
	Rubber processing	2	136	(Pakanbaru, Rengat)
	Crumb rubber	3	494	(Pakanbaru, Tandjing pinang)
	Wood processing	1	596	
(14)	South Sulawesi			
	Coconut oil	1	2,338	(Makasar)
(15)	West Kalimantan			
	Crumb rubber	7	2,097	(Pontianak, Sambas)
	Ice	1	91	(Pontianak)
(16)	Central Kalimantan			
	Crumb rubber	2	375	(Central Kalimantan, Kuala Kapuas)
(17)	South Kalimantan			
	Crumb rubber	3	566	(Bandjarmasin)

CHAPTER IV CASE STUDIES OF INDONESIA'S INDUSTRIAL DEVELOPMENT PROJECTS

1. Paper Industry in Special Relation to the Takengon Paper Mill Project Proposal

The comments presented here are of very tentative nature, in part because available data and information are insufficient, and in part becasue the whole range of the problem is beyond the commentator's capacity.

In view of a great need for pulp and paper as well as of a great natural inventory to feed raw materials to the industry, there seems much possibility of development of the pulp and paper industry in Indonesia. In the present Five-Year Plan a rather ambitious plan is stipulated concerning the development of this industry so that the paper industry is expected not only to produce substitutes for imports but also to become an export industry in the future. At the present moment, however, this industry in Indonesia is suffering from many hampering factors such as shortage of spare parts, raw materials, working capital and the like. Production is naturally below capacity.

The first thing to do is rehabilitation and improvement of existing factories. Therefore, it is understandable that, during the most part of the plan period, seven existing factories, both completed and under construction, are to contribute increased production through increasing their operational capacity.

But it is rather surprising to see that at the final phase of the plan period, 1973/74, a very big addition to production amounting to 120 thousand tons through unnamed two factories is contemplated.

Beside the table regarding investment program, no details of the plan for establishing two more large factories are given in the Five-Year Plan. Commenting on them is impossible so far.

Firstly, as far as I know, all existing factories but one are using such hollow materials as rice stalk and bamboo. Only Pematang Siantar utilizes such solid material as pine wood. Needless to say, solid materials are better than hollow ones in any phase of handling, collecting and processing.

Among solid raw materials needle-leaved trees are known best for producing pulp and paper. Recently owing to increasing demand for raw materials for paper production, broad leaved trees come to be utilized. Waste wooden chips also are made much use of. According to a Japanese experience in 1956, about 85% of raw materials required in terms of cubic metre was supplied with needle-leaved trees, 14.5% with various broad-leaved trees and only 0.5%

with waste chips, while in 1960 relative share of three kinds of raw materials was 45%, 30%, and 25%, and in 1965 22%, 28% and 50%, respectively, thus waste wooden chips imported became a major source of supply. This may exemplify how fast the structure of supply of raw materials changes. Nevertheless, it is noteworthy that wooden materials are still dominant, and no other materials can compare with them.

Using such hollow raw materials as stalks and bamboo is disadvantageous as compared with solid ones like wood in the process of being collected and handled. Auxiliary equipments such as baling machines are needed to facilitate the collection of stalks.

Secondly, it is not understandable that the Martapura factory, which is cited as being under construction in the text of Five-Year Plan, is not figured in future production.

Initiation and implementation of any newly planned projects should wait until unfinished projects are completed in view of the principle 'rehabilitation first' which is considered one of the most practical approaches set in the Five-Year Plan. If it is the case, Martapura project ought to be examined before any new one is taken up.

Thirdly, in planning the concept of 'sunk' cost must be reflected. The sunk cost means a kind of cost which is already spent but regarded as making little contribution toward accomplishing an intended objective. It is a real economist's view that resources should be utilized in the most advantageous way, and therefore marginal productivity of each input must be equal in every use of it. Choosing among alternative projects to be carried out should be based on an equal or impartial comparison, apart from sticking to the sunk cost and the mere history of project preparation.

In order to achieve efficient use of economic resources including fund, alternative uses of a given resource should be always checked to one another to minimize opportunity cost, which reflects the value stemming from the second best use of it. If the concept of sunk cost were applied to the case of Takengon Paper mill Project, in comparative advantage studies, only the present state of conditions of the project would deserve to be considered, while the cost already spent provides no special right to selection of project, and at most can claim to be compensated in accordance with contracted terms.

Fourthly, much of the feasibility of paper mill in Indonesia depends on the availability of endogenous raw materials. In this respect, the proposed Takengon project is quoted as being favourably situated.

Approximately 130,000 ha of pine forest look available for supplying raw material. Forest as well as water represents typical types of renewal or circulating resource, which is never exhausted provided good conservation is practised. Deliberate cutting and replanting are most conducive to conservation of forest resources. Given a regeneration period of 40 years, the following simple calculation would show a possibility of supply per diem of timber from the area of 9 ha: 130,000 ha ÷ 40 (years) ÷ 360 (days) $\fallingdotseq$ 9 ha. And, given an average

volume of the growing stock of 100 cu.m. per ha, according to a report concerning this area, nine hectares would be equivalent to 900 cu.m in terms of the availability of timber.

Supply of wooden material of 900 cu.m, per diem is more than enough to feed the factory with capacity of 100 tons per diem. So far so good, the most important thing is to set up a forestation program geared with the utilization schedule, and execute it honestly and strongly, which calls for cooperation of the community.

Fifthly, one of the outstanding economic characteristics of paper mill is high capital intensiveness. According to a report on the survey conducted in July 1969, the Takengon mill will employ approximately 770 workers while requiring about 30 million dollars for construction of it.

After gestation period, fixed capital in use per head is calculated at about $39,000 (=$30,000,000 ÷ 770). In addition to that, another 1,000 workers will get job outside the mill in the field of related industries such as forestry, transportation and others.

The total 1,770 workers, adding 1,000 to 770 workers, is to be compared to the investment of 30 million dollars. As a result capital per head is at about $17,000, which still proves that pulp and paper mill is capital-intensive. Strictly speaking, as employment in the industries related to pulp and paper production would require more or less additional capital for itself, the above calculation should be regarded as being below the minimum capital requirement per head.

One of the creteria for investment under the condition of scarcity of capital is based on capital-output ratio. The smaller capital-output ratio, the higher productivity of capital or capital turn-over rate is meant under a certain production function. Assuming a Harrod-type growth formula, $\frac{\Delta Y}{Y} \cdot \frac{\Delta K}{\Delta Y} = \frac{S}{Y}$, where Y means output, K capital, S saving, it can be claimed that the lower the incremental capital coefficient ($\Delta K/\Delta Y$) the higher the growth rate ($\Delta Y/Y$), under the condition of constant saving ratio (S/Y), as proved by transforming the above expression into $\frac{\Delta Y}{Y} = \frac{S}{Y} / \frac{\Delta K}{\Delta Y}$.

This capital-output ratio criterion should be seriously affected if it were applied at sectoral or project levels instead of at national level. In technical terminology scalar type coefficient differs from vector type coefficient. The proof for it is possible from various angles. Here it may suffice to present an illustrative table showing difference between directly measured capital-output ratio for individual industry and ultimate or overall capital-output ratio, which takes into account full repercusion effects on capital requirement per output.

(Table 2). It appears conspicuous that for most industries ultimate capital-output ratios are three or more times as high as direct ones, and likely to alter their respective positions in the order of rank in the value of ratio.

According to Table 2, pulp and paper industry is characterised with not only a

relatively higher direct capital-output ratio but also a higher ultimate capital-output ratio. Degree of ultimate capital-output ratio is determined by the whole industrial structure reflected in the inter-industry relations. Nevertheless, a glance at the input items of the industry may give an explanation of the reason why ultimate capital-output ratio of it is so high.

Among the input items, according to Table 3, the sector of the agriculture, forestry and fishery ranks first (9.2%), which is very understandable because product of forestry is main raw material for the pulp and paper industry, and being followed by as essential inputs, electricity (8.3%) lumbering and woodworking (6.1%), transport and communication (5.6%), printing and publishing (5.6%), trade and retail (5.3%), and chemicals (4.6%). Generally speaking, the industries supplying the essential inputs have relatively high capital-output ratios, in other words being rather capital intensive. Paper and pulp industry finds big demand for its product among others in such industries as printing and publishing, which claims 31% of the total demand for it, chemical fibres (16.0%), commerce (10.2%), food processing (4.4%), ceramics and clay products (4.3%) and almost all of the other industries.

Every industry has its forward linkage with other industries on its input side and, at the same time, its backward linkage on its output side, according to A.O. Hirschman's thesis.

Anyhow, paper and pulp industry is really capital intensive and stands on the complicated industrial ground, particularly needing transport, communication and commercial activities to support it. It is worth noting, however, that the process of producing pulp and paper need not always be an integrated work, and can be decomposed into a number of partial processes at technically reasonable basis. From the locational point of view, each of the decomposed parts may be classified as resource-base oriented, market-area oriented and/or neutral. Could the production process be decomposed, parts of it could be separately located, too, in accordance with their locational characteristics. This and other considerations suggested need ot making more detailed investigations into alternatives and various aspects of the matter.

Finally, very important is the problem of infrastructure for consolidating the feasibility of the directly productive project. In the Takengon case it is said that roads and bridges are in need of being almost totally repaired. The roads include not only the route from Takengon to the outer world but also the roads to the forest. In addition, a fair size harbour which at least can afford to handle the amount of incoming consumable materials and outgoing product of the factory is said to be badly needed. Benefits from infrastructure can be enjoyed by not only the factory but also every sector of the community. Therefore, the feasibility of construction of infrastructure should be considered from the social point of view, which is necessarily broader than from the standpoint of a factory.

In general, coordination and harmonization between public work projects or social overhead investment and directly productive investment in plant and factory should be secured. If it were successful, gains from good operation of the plant or factory should be considered as an apparent indicator of the efficiency of resource allocation.

The comments stated above only refer to some aspects of the industry in question. It is needless to say that any decision making should take into consideration social needs, physical possibility, and economic feasibility and other related matters. It is hoped, however, that the comments presented here would be of some use for further consideration, though not purporting to suggest any final conclusion.

Table 1 Development of the Paper Industry
(in 1,000 tons)

	1968/69	1969/70	1970/71	1971/72	1972/73	1973/74
Letjes	3	4	9	12	12	12
Padalarang	3	3	4	4	4	4
Blabak	2	2.5	4	7.5	7.5	7.5
Pematang	1	1.5	3	4.5	4.5	4.5
Goa	0.5	1.5	6	9	9	9
Banjuwangi	-	3	9	9	9	9
Private	0.5	0.5	0.5	0.5	0.5	0.5
Unit 1 (Newsprint)	-	-	-	-	-	60
Unit 1 (Kraft & Writing Paper)	-	-	-	-	-	60
	10	16	35.5	46.5	46.5	166.5

Table 2 Gross Average Capital Output Ratios

		(A) Direct c/o ratio	(B) Ultimate c/o ratio	(C) (B) / (A)
1.	Agri, forest, & fish	0.130	0.636	4.9
2.	Mining	1.806	2.188	3.0
3.	Food processing	0.187	0.750	4.0
4.	Textile	0.587	1.823	3.1
5.	Paper & pulp	0.718	2.399	3.3
6.	Chemicals	0.825	2.144	2.6
7.	Petrol & coal products	0.632	1.671	2.7
8.	Ceramics	0.583	1.787	3.1
9.	Iron & steel	0.491	2.181	4.4
10.	Non-ferrous	0.491	1.823	3.7
11.	Metal work	0.317	1.458	4.6
12.	Machinery	0.217	1.307	6.0
13.	Electric appliances	0.357	1.529	4.3
14.	Transport equipments	0.454	1.576	3.5
15.	Other manufacturing	0.834	1.784	2.1
16.	Building	0.125	1.388	11.1
17.	Public utilities	5.614	6.313	1.1
18.	Commerce & transport	0.941	1.385	1.5
19.	Banking & real estate	0.432	0.707	1.6
20.	Services	0.146	0.551	3.8
21.	All Others	0.552	1.545	2.9

(Derived from the 1960 Simplified Interindustry Table of Japan).

Ultimate capital output ratios are obtained by multiplying the vector of direct capital output ratios for individual industries by Leontief inverse matrix derived from input-output relations. In mathematical expression, the calculation is as follows:

$$(K) \quad (1 - A)^{-1} = (K^t)$$

where (K) is the vector of capital output ratio, $(1 - A)^{-1}$ the Leontief inverse metrix, and (K') the vector of overall (or ultimate) capital output ratio for each industry.

Table 3 Compositional Percentage of Inputs to and Output from Pulp and Paper Industry (Japan, 1968)

		Inputs (%)	Output (%)
1.	Agriculture, forestry, fishery	9.2	0.7
2.	Mineral fuels	1.5	0.2
3.	Miscellaneous ores	0.7	0.1
4.	Cleaning & Milling	-	0.9
5.	Beverages & Tobacco	-	1.7
6.	Other food processing	0.2	4.4
7.	Spinning	-	0.4
8.	Textiles	1.0	1.6
9.	Lumbering & woodworking	6.1	0.7
10.	Pulp & paper	-	-
11.	Printing & publishing	5.6	31.0
12.	Coal & petrol products	2.4	0.4
13.	Chemicals	4.6	4.7
14.	Chemical fibres	0.6	16.0
15.	Rubber & leather products	0	0.1
16.	Ceramics & clay products	0.1	4.3
17.	Pig & crude iron	-	0.1
18.	Unfinished metal products	0	1.0
19.	Finished metal products	0.4	0.4
20.	Machinery	0.8	0.8
21.	Electric equipments & appliances	-	2.8
22.	Transport equipments	-	0.9
23.	Precision instruments	0	1.2
24.	Other manufacturing	0	4.1
25.	Construction	0.4	3.2
26.	Electricity	8.3	0
27.	Gas & water supply	0	0
28.	Trade & retail	5.3	10.2
29.	Finance & real estate	2.0	0.9
30.	Transport & communication	5.6	0.8
31.	Services	1.0	2.5
32.	Unclassifiables	2.3	6.9
33.	Business consumption expenditure	1.4	0.3

2. Palm Oil Plantation (Estate) Development

In examining the possibility of palm oil plantation development, a most appropriate initial step will be to compare its profitability with that of alternative ways of land use, specifically rival cropping, such as rubber.

Profitability of a plantation crop is determined primarily by movement of world market prices and efficiency in its production. Figure 1 shows changes in the export price index for the two crops during the 1950 - 1970 period. It is deemed that the long-run trend in the movement of prices is more favorable for palm oil. To compare economic returns per hectare per annum, a rough calculation on the basis of the past data gives $300 for rubber and $360 for palm oil. Again palm oil production is more favorable than rubber production. Perhaps additional consideration should be given to future price forecasts in the respective markets. Natural rubber faces strong competition from synthetic rubber which is being improved in quality and lowered in price. Palm oil has no such substitutes except other plant oils.

In Repelita, nationally-owned palm oil estate's plan for expansion and conversion is summarized as follows:

Year	Hectares	Investments needed (million rupiah)	Cost/ha	Rate of increase in cost
1969	10,390	884	85,000	-
1970	6,800	835	123,000	45
1971	4,520	823	182,000	47
1972	2,720	773	204,000	56
1973	1,550	483	310,000	9
	25,980	3,797	146,000 (average)	

In the case of the Atjeh project, the cost per hectare is estimated to be RP.230,000 – an amount considerably higher than average cost envisaged in Repelita. If an investment of RP.230,000 (about $610) per hectare were to give an annual return of $360 to $540, productivity of capital (rate of turnover of fixed capital) will be as follows:

(1) 2,000 kg/ha case (2) 2,500 kg/ha case (3) 3,000 kg/ha case

$$\frac{\$360}{\$610} = 0.59 \qquad \frac{\$450}{\$610} = 0.74 \qquad \frac{\$540}{\$610} = 0.89$$

Oil palm trees usually bear fruit five years after planting and continue to give oil for the following 15 to 20 years. An initial investment of RP. 230,000 per hectare deferred

for five years will have a value of:

If rate of interest (%)	RP
10.0	370,000
7.5	330,000
5.0	290,000

To recover this amount in 15 to 20 years, the amount of capital to be uniformly recovered per year is as follows:

If rate of interest (%)	Case of 15 years		Case of 20 years	
	c.r.f.*	a.r.** (PR)	c.r.f.	a.r. (PR)
10.0	0.1315	48,655	0.1175	43,475
7.5	0.1133	37,389	0.0981	32,375
5.0	0.0963	27,840	0.0802	23,258

* c.r.f.: capital recovery factor
** a.r.: amount to be recovered

If, for example, a 10% interest rate were to prevail, the initial investment of RP. 230,000/ha will imply a capital cost of RP.370,000/ha for the waiting period of five years; and in order to recover or repay both principal and interest in 15 years, annual payment should amount to RP. 48,655.

Unless the total of this capital recovery payment and operating cost come out to be less than the revenues calculated above, the project will not pay.

(Koichi Baba)

Figure 1 Estate Palm Oil Production and Export

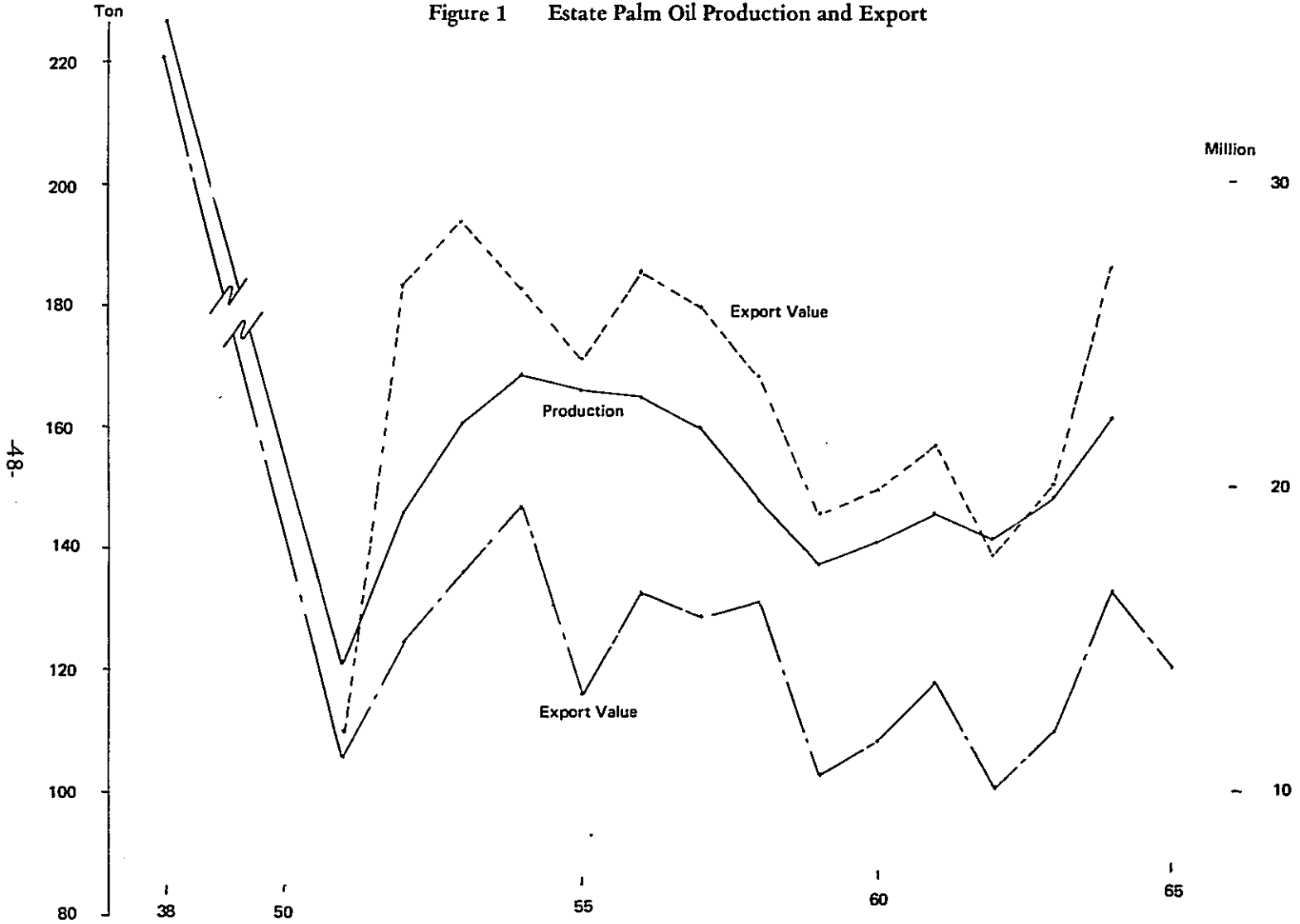
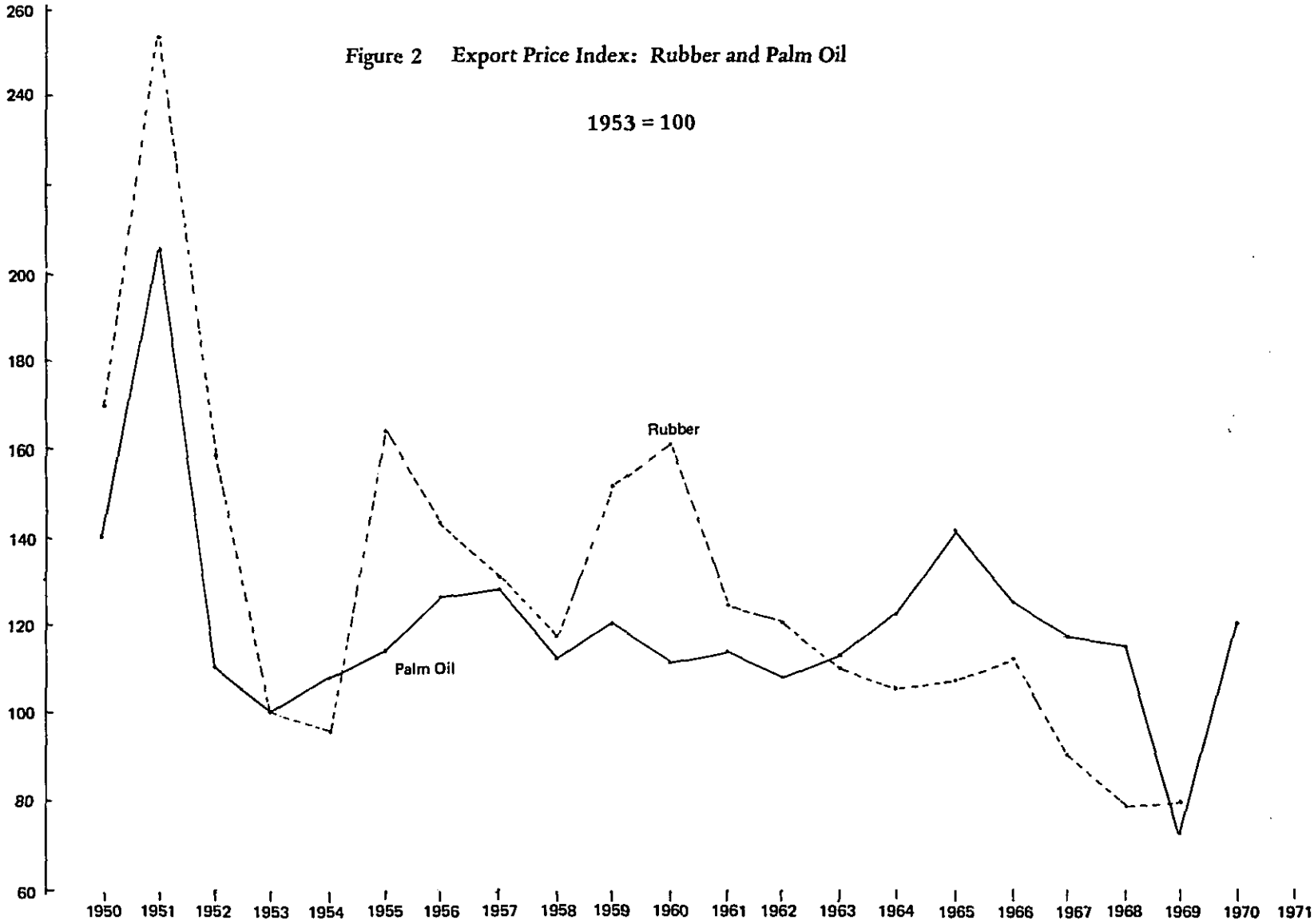


Figure 2 Export Price Index: Rubber and Palm Oil

1953 = 100



CHAPTER V ON THE POSSIBILITY OF BUILDING A PETROLEUM REFINERY AND PETRO-CHEMICAL INDUSTRIAL CENTER IN INDONESIA

Introduction

The Petro-chemical industry today is said to be in the declining phase of its grand cycle the world over. In the Japanese market, for example, this global trend has combined with excessive competition to produce a decline in the price of petro-chemical industry products. Yet, as is observed in Tables 1 and 2, the world's petro-chemical industry is expanding at an annual rate of more than 10%. This combination precludes any single-minded approach to the topic on hand, which is the possibility of constructing a petroleum refinery and petro-chemical industry in Indonesia. Rather what is required is an approach broad enough to allow an examination from various different angles. Thus, in what follows this topic is examined by answering the question, under what conditions and given what kind of assumptions will a petroleum refinery and petro-chemical industry be feasible for Indonesia.

At the start, it is necessary to recognize two factual conditions which make Indonesia unique in the cotext of this discussion. These conditions are: (1) That Indonesia has its own petroleum resources and is already involved in production and exportation of crude and processed petroleum and (2) that Indonesia is located at an intermediate point in terms of international shipping lanes between the oil-producing Middle East and oil-consuming Japan. It may tentatively be said that the economic significance of these conditions determines, to a great extent, the feasibility of a petroleum refinery and petro-chemical industry for Indonesia.

Examination of this question of feasibility is organized as follows: In Section I Indonesia's relative position in world's crude oil trade is evaluated. In Section II, the possibility of building a petroleum refinery and petro-chemical center in Indonesia is examined in the manner explained above. In Section III, the implication which construction of a petro-chemical industrial center in Indonesia may have on her competitive position is briefly considered. Finally in Section IV, 'Supplementary Comments', two separate questions of equal importance are raised: one is the question of coordination of industrial structure between Japan and Indonesia, the other is a comparison of the unit price which Indonesia's crude oil commands in the United States and Japanese markets.

I Indonesia's Relative Position in The World's Crude Oil Trade

1. Indonesia's crude oil in the Japanese market

Indonesia's crude oil in general has a sulfur content much lower than Middle East crude. In fact, most of the world's low-sulfur crude oil is produced in Africa and Indonesia. The total supply of low-sulfur crude, however, is rather limited in quantity, and this limitation has given

rise to a 'seller's market'. This situation has been carried to an extreme especially in those countries, such as Japan and the United States, where restrictive measures against environmental pollution by sulfurous acid gas have increased demand for low-sulfur crude.

At present Indonesia is exporting crude oil to Japan. But since more than 90% of the Japanese market for crude oil is occupied by Middle East oil, the latter must be used as a measuring rod in determining the value of Indonesia's crude oil.

Indonesia's crude oil is advantageous in the Japanese market relative to Middle East crude in terms not only of sulfur content but also of transportaton cost. The advantage in transportation cost is around US $0.20 per barrel, even discounting Indonesia's inferior harbor facilities.

The evaluation of the quality of crude oil is usually derived from the pattern of price formation for various products of crude oil. In recent years, as the price of low-sulfur heavy oil has risen quite sharply. Indonesia's crude oil which has a high yield ratio of low-sulfur heavy oil has come to be valued quite highly.

In Table 3, a comparison in Japanese market value terms is made between Indonesia's crude oil and that of the Middle East. To facilitate such a comparison, total 'final product' value for each is calculated per barrel of crude oil, assuming that refining is done in Japan and all the products hence manufactured are sold in the Japanese market. As can be seen in the table, Indonesia's crude oil fares better in total 'final product' value than Middle East crude by a per barrel margin of difference of US$0.40 to $1.00. That is to say, in terms of total 'final product' value, the margin of difference that Indonesia's crude oil enjoys is US$0.39 per barrel when compared to high quality (i.e., low sulfur content) Middle East oil and US$0.98 per barrel when compared to low quality (i.e., high sulfur content) Middle East oil.

If in addition difference in transportation costs is considered, the advantage of Indonesia's crude oil in value terms vis-a-vis Middle East oil will be around US$0.60 to $1.20 per barrel.

2. Comparison of FOB prices of Indonesian and Middle East crude

The FOB prices of Indonesia's crude oil is set so as to become approximately equal to the price of Middle East crude oil in the Japanese market, taking into consideration the aforementioned advantages in terms of quality and transportation costs. Its present FOB price of US$2.97 per barrel is, indeed, higher than the FOB price of Middle East oil by US$ 1.00 to $1.20.

In Table 4, an FOB price comparison is made between Minas oil, which typifies Indonesia's low sulfur crude oil, and Kuwaiti oil, which typifies Middle East's high sulfur crude oil. It is observed that the FOB price of Indonesia's crude oil is determined so as to account for the value advantage vis-à-vis Middle East oil of US$0.21 per barrel in transportation costs

and of $0.96 per barrel in quality (i.e., low sulfur content), which adds up to $1.17 in total.

3. Profitability of Indonesia's use of Middle East oil for domestic consumption

Such a premium given to Indonesia's crude oil as explained above emerges only because the oil is sold to a market in an industrialized country, like Japan and the United States, where there is a severe restriction on environmental pollution. One can hardly expect such a premium to accrue to Indonesia's oil in the Indonesian market itself. Therefore, from the point of view of efficient resource allocation,Indonesia's use of her own crude oil for domestic consumption is not to be recommended. Yet, at present (1970) Indonesia refines and consumes around 130,000 barrels per day of domestically-produced crude oil.

In Table 5 is calculated the dollar benefit which may accrue to Indonesia from exporting this 130,000 barrels per day of her own oil to the Japanese market and replacing for domestic consumption the same quantity of Middle East oil. The calculation takes account of the fact that the transportation from the Middle East to Indonesia is subject to an inferior harbor condition. Even with this taken into account, such a change-over will bring to Indonesia a net benefit of US$0.69 per barrel or more than $30 million in total.

II. On the Possibility of Building a Petroleum Refinery and Petro-chemical Industrial Center in Indonesia

In order to judge the possibility and feasibility of building a petro-chemical industry in Indonesia, it is necessary to examine all the factors involved on the basis of detailed data. In the following, an attempt is made only to discuss some basic principles behind such an examination without going into detail.

The first and most important question to be asked is: If a petro-chemical industrial center were to be built, what scale should it have Generally speaking, the market for petro-chemical industrial goods in less developed countries, though it may be potentially large, tends to be rather small, and accordingly the range of products to be produced is small. This has been the observed experience with petroleum refining in less developed countries. An oil refinery in these countries is usually of smaller scale than that found in Japan and other developed countries. The same may be said of the petro-chemicals.

Ideally speaking, a petro-chemical industrial center should have a scale large enough to produce 300,000 tons of ethylene a year, which is an established international standard. Also related to the question of scale, it is preferable that a plan to build such a center be comprehensive in character, encompassing a wide range of associated production schemes. Needless to say the reason for this is economies of large scale, on the one hand, and a higher ratio of value added, on the other.

Next to be examined is construction costs and operational balances of a petro-chemical industrial center. For the purpose of illustrating the accounting involved, in the following is examined a case for Japan. Granted it is necessary to modify various conditions

in order to apply it to Indonesia. However, in the absence of sufficient data on the size of market, construction capability, etc., for Indonesia, the one shown in Table 7 is used only to illustrate the basic principles involved.

As is shown in the table, the process which starts with a naphtha decomposition and leads subsequently along all the lines down to induced products (Figure 1) requires a total of US$263.31 million and a 759-man labor force. No doubt the rent to be paid on the land in Indonesia will be considerably less than the figure in the table. As noted in the footnote to the table, for a petro-chemical center having the scale of 300,000 tons of ethylene, the most appropriate scale of the petroleum refinery is estimated to be 100,000 barrels per day.

Turning to the question of operational balances, given the depressed condition of the market, operation of the center as described above would mean some loss (See Table 9 for unit sales price, etc.) Since this assumes full capacity operation of 300,000-ton-ethylene set-up, there can be no improvement in terms of production capacity. The question, then, is the price to be offered. Here, the price of ethylene is assumed to be 30 yen (or roughly US$0.10) per kilogram, and all other prices are set accordingly. Whether the price of ethylene and those of the related products remain as they are now or rise as in the following projection has a significant impact on the decision to construct and operate a petro-chemical industrial center.

In the main, it is expected that the market will, with the passage of time, regain spirit for the following two reasons. First, the demands for petro-chemical products are increasing, and second the present depression has been the result of excess supply of products owing to too-rapid expansion in capacities.

In the case of Japan, it is expected to take three years to absorb excess capacity. As to the behavior of prices in the markets for petro-chemical products, prices are maintained for the time being by means of a 'recession cartel'. In the longer run, however, as the naphtha price is showing a rising tendency reflecting an increase in the demand for naphtha (to be used as low-sulfur fuel), it is widely believed that this will force the prices of petro-chemical products to rise accordingly.

To summarize, it is the absorption of excess capacity which is expected to lead to stabilization and expansion of the market. Actually, however, the rise in naphtha price will induce a tightening of the markets for petro-chemical products and subsequently a recovery. It is reported also that profitability of major petro-chemical firms has gradually been improving (Table 6).

III Implications for Indonesia's Competitive Position

That in general the pattern of demand for petro-chemical products in countries east of the Suez is biassed towards intermediate products and that of Japan towards naphtha and heavy oil was mentioned in the Interim Report of this research project.

This situation has not changed basically. However, as mentioned earlier, in the Japanese fuel market of recent months, owing to the tightening of controls on environmental pollution -- above all, owing to the elaboration of the joint-liability concept for factories involved in environmental pollution since the court decision on the Yokkaichi case -- there is a growing tendency to re-evaluate the locational problem of petroleum refineries and petro-chemical factories.

Here the response of various Asian countries to such a trend in the Japanese market is briefly reviewed. Table11 summarizes the plans of various Southeast Asian countries for the expansion of their oil refinery capacities. One basic characteristic to be noted is the rapid pace of refinery construction. Though not included in the table, the countries on the Persian Gulf have already completed negotiations for 'capital participation' and some are even moving directly to participate in the consuming country's refinery sector. In such a case, although it is not conceivable that they try to participate directly in refining in Japan for obvious locational difficulties, they may attempt to build a refinery near Japan or between the Middle East and Japan. One such example is the Abdabi's plan to advance to Kuala Lumpur.

That these plans are ultimately related to the Japanese market is obvious from the projection of Southeast Asia's demand and supply for petroleum (Table 12); that is to say, whereas before Southeast Asian countries projections of surplus supply capacity as of the end of 1975 amounted to 1.3 million barrels per day, the recent re-evaluation of the situation places the figure at 3.1 million barrels per day. As far as Japan is concerned, as shown in Table 13, capacity expansion up till 1976 has been approved by 1972 but nothing has been approved for subsequent years. Thus, for the year 1976 a shortage of 111,000 barrels per day is projected.

Given such a situation, some countries have declared that they will construct a refinery with a purpose to supply petroleum products -- to those countries which, for pollution control and other reasons, are finding it difficult to expand petroleum refinery capacities.... ' (Petroleum Intelligence Weekly, Nov. 13, 1972).

With regard to Indonesia, it has been reported recently that Japan's Maruzen Oil, Daikyo Oil, Nissho and Mitsubishi group are going to participate in an Industrial Base Construction Plan on Batam Island. In view of the situation described above, this project will have a competitive relation with other countries' moves. (One point of reference: In the Interim Report, Royal Dutch Shell's plan in Indonesia was introduced as a plan which would take advantage of Indonesia's geographical position. According to a recent un-confirmed report, this project since has been replaced by one of a Japanese trading firm. In the absence of further information, the author would like to have the relevant section in the Interim Report considered as deleted.)

IV Supplementary Comments

1. Coordination of industrial structure between Japan and Indonesia

The petro-chemical industry of the world as a whole is expected in the near future

to follow the trend as described in the preceding sections -- that is, the situation will improve but only gradually. In the case of Japan, for example, the immediate objective is set to be the recovery of break-even situation at full costs via improvement of some conditions.
(Note: The recent decline in the prices of petro-chemical products is believed to be a situation where, reflecting excess capacity, only the variable cost, i.e., short-run marginal cost, is covered, but full costs are not covered).

For this reason, a petro-chemical industrial center to be built anew should not be thought of as a highly profitable undertaking. Nevertheless, to the extent that it implies (1) an increase in labor absorption capacity and (2) an expansion of opportunities for building up related industries, it will have a positive influence on the Indonesian economy.

To comment a little further, although not in detail, if a petro-chemical industrial center can break even, that is the best Indonesia can hope for. And it is most likely that such a possibility rests on combining a petroleum refinery with the change-over operation mentioned before, the derived benefit of which can in turn be utilized as supplementary funds in order to bring up the industry.

It should be noted also that operational balances of a petro-chemical industry are highly sensitive to production capacity utilized. In other words, it implies that demands for petro-chemical products must be of considerable quantity and that they should be smoothly absorbed into the market. If any line of products piles up in an idle inventory, either it will work as a bottleneck and lower the capacity of the whole operation or it will be shifted to another line of products of lower value in order to be disposed; in either case, the operational balance will rapidly deteriorate.

As a rule, such an excess is taken care of by exporting to overseas markets. Thus, in constructing a petro-chemical industrial center, a careful survey of the extent of both domestic and foreign markets should be made, and an intensive study should be made on marketing channels, etc. In practice, however, working with foreign corporations possessing such experiences will be of great help.

Table 14 shows Japan's exports of petro-chemical products to various regions for the 1965-1970 period. When a Southeast Asian country constructs a petro-chemical industrial center, it will first of all have to secure the domestic market through import-substitution by shutting out imports from developed countries, including Japan. This is the first step in market development. This applies to Indonesia as well. In constructing a petro-chemical industrial center, she must determine her relative position vis-à-vis petro-chemical industries in developed, industrialized countries --- that is to say, whether to compete with them; if competition is to be avoided, what form of complementary relationship should be sought; etc. As a matter of fact, there already exists a plan by which a petro-chemical center built by a Japan--Iran joint venture in the latter country exports intermediate products to Southeast Asian countries, where they may be further processed into final products. This indicates that any petro-chemical project in Southeast Asian countries in the future will almost by necessity involve international cooperation across many borders.

As was discussed in the Interim Report, Indonesia's crude oil exports to Japan are quite promising and there is as yet no upper limit in quantity. As will be shown later, export revenues derived from this trade fare no worse in comparison to her trade with the United States. With regard to petro-chemical products, Japan's market appears to be large enough to allow Indonesia's excess products to make inroads and occupy some share. This possibility as mentioned will be even greater in the longer run.

What determines "how big a share for Indonesia" in this case is the upper limit of market improvement, on the one hand, and Japan's prospective concerning her petro-chemical industry. With regard to the former, it may be said that the market situation will improve, but the question remains as to whether or not the net revenue per ton of petroleum products, after subtracting 10,000 yen (or US$33) for transportation (i.e., Indonesia's FOB export price), still is large enough to satisfy Indonesia's petro-chemical industrial center. The answer is negative.

As regards the second point, the issue involved is even less clear. It will definitely have some bearing on the trend observed in Japan that certain of the heavy and chemical industries seek an overseas location, which is a question of reformulating the entire industrial structure of Japan. Such is beyond the scope of this paper.

2. Indonesia's crude oil on the West Coast of the United States and in Japan: a comparison

The last question to be examined is: Which brings a larger return to Indonesia, sale of her crude oil to the Japanese market or to the West Coast of the United States. In the U.S. market, imported crude oil can be obtained $0.40 to $0.50 cheaper per barrel than domestic crude oil. This is because the United States, due to an import restriction measure, maintains domestic oil at a higher price. This should mean that American oil importers are making a large profit by bringing Indonesia's crude oil into the American market.

Indonesia's crude oil, when sold in the Japanese market, promises a considerably large return for reasons explained in the first part of this paper. Relatively speaking, it does not give as good a return when sold in the U.S. market west of the Rockies.

	U.S. domestic crude oil		Indonesia's crude oil (Minas)
	350 S : 0.3%		350 S : 0.1%
	3.56		2.97
Transportation Costs	0.15	Transportation Costs	0.64
	3.71	Tariff	0.10
			3.71

Unit: US$/barrel

As shown above, the price of Indonesia's crude oil is of the same order as that of American domestic oil. Although pollution control is just as strong, if not stronger, in the United States as in Japan, Indonesia's crude oil has a tendency to flow towards the latter.

Suppose, as has recently been suggested, the price of Indonesia's Minas crude oil is raised US$0.38 per barrel, to make its FOB price $3.35. Even then, Japan, who needs a certain absolute amount of Minas crude oil, would continue to import. On the other hand, such a price hike on the part of Indonesia in the American market would mean a loss of competitive standing. Thus, if indeed the price of Minas crude oil is raised to $3.35 per barrel, almost all of it would be brought into Japan. The real significance of this conclusion is that, just as Indonesia would significantly benefit by replacing for domestic consumption domestically produced oil by Middle East oil, the shifting of the crude oil presently exported to the U.S. West Coast market, which amounted to about 70,000 barrels per day in 1970, to the Japanese market would also produce a sizable benefit.

(Setsuo Takagaki)

Table 1 World's Production of Ethylene: 1960, 1965 and 1970

(Unit: Million tons)

	Quantity produced/Share.			Average Rate of Growth (per annum)	
	1960	1965	1970	1960-1965	1965-1970
Japan	0.1 (2%)	0.8 (11%)	3.0 (17%)	70.0	30.3
U.S.A.	2.5 (74%)	4.3 (60%)	7.8 (45%)	11.5%	12.6%
West Europe	0.7 (21%)	2.0 (28%)	6.0 (34%)	23.4%	24.6%
Others	0.1 (3%)	0.1 (1%)	0.7 (4%)	0%	63.0%
Total	3.4 (100%)	7.2 (100%)	17.5 (100%)	16.2%	19.4%

Note: Figures in the bracket represent relative share.

Table 2 Changes in Ethylene Production Capacity: Free World

Country	1968		1969		1970	
	Production capacity	Share (%)	Production capacity	Share (%)	Production capacity	Share (%)
U.S.A.	7,487	(47)	7,672	(40)	8,880	(39)
Japan	1,964	(12)	2,414	(13)	3,914	(17)
W. Germany	1,785	(11)	2,002	(11)	2,616	(12)
England	1,176	(7)	1,650	(9)	1,555	(7)
France	1,070	(6)	1,050	(5)	1,168	(5)
Italy	879	(6)	952	(5)	1,446	(6)
Holland	285	(2)	700	(4)	670	(3)
Canada	379	(2)	649	(3)	466	(2)
Belgium	225	(1)	523	(3)	525	(2)
Spain	127	(1)	197	(1)	267	(1)
Others	781	(5)	1,194	(6)	1,396	(6)
Free World's Total	16,108	(100)	19,005	(100)	22,903	(100)

Source: Sekiyu Kagaku Kyokai

Table 3 Prices in the Japanese Market: Indonesia's Crude Oil vs. Middle East Oil

(Unit: dollar/barrel)

(1) Indonesia's Crude Oil and Middle East Crude Oil: Properties, Yield ratio, Prices

	API	Sulfur content in crude oil (%)	Gasoline	Naphtha	Kerosene	Heavy oil	Sulfur content in heavy oil(%)	FOB Prices
Indonesia/Minas	35°	0.10	6	7	21	66	0.10	2.97
Iranian Light	34°	1.50	13	13	29	43	2.40	1.92
Iranian Heavy	31°	1.60	10	11	24	53	2.50	1.88
Arabian Light	34°	1.70	12	13	30	44	2.80	1.90
Kuwait	31°	2.50	10	10	24	53	3.80	1.80
Abdabi-Mahban	39°	0.80	12	12	35	40	1.60	2.10

(2) Prices of Petroleum Products in the Japanese Market (Refinery's shipment price)

Gasoline	6.36	Sulfur content in heavy oil	0.10%	4.77	(Minas)
Naphtha	3.34		1.60%	3.97	(Mahban)
Kerosene	4.40		2.40%	3.67	(Iranian Light)
Heavy Oil	3.67		2.50%	3.63	(Iranian Heavy)
			2.80%	3.52	(Arabian Light)
			3.80%	3.15	(Kuwait)

(3) Market Values of Indonesia's and Middle East Crude Oil

	Gasoline	Naphtha	Kerosene	Heavy Oil	Total 'Final Product' value	Margin of difference wiht Minas Oil		
						Total 'Final Product' Value	Transportation Cost	Total
Indonesia/Minas	0.38	0.23	0.92	3.15	4.68	- 0.56	- 0.22	- 0.76
Iranian Light	0.83	0.43	1.28	1.58	4.12	- 0.69	- 0.23	- 0.92
Iranian Heavy	0.64	0.37	1.06	1.92	3.99	- 0.62	- 0.20	- 0.82
Arabian Light	0.76	0.43	1.32	1.55	4.06	- 0.98	- 0.21	- 1.19
Kuwait	0.64	0.33	1.06	1.67	3.70	- 0.39	- 0.21	- 0.60
Abdabi-Mahban	0.76	0.40	1.54	1.59	4.29	- 0.65	- 0.21	- 0.86

Table 4 Comparison of FOB Prices: Indonesia's Crude Oil vs. Middle East Oil

			(Dollar/barrel)
FOB price of Kuwait's Crude Oil			1.80
Transportation Costs			
Kuwait-Yokohama	0.48	difference	
Indonesia-Yokohama	0.27		0.21
Difference in Specific gravity	0.06		
Low Sulfur Premium	0.90		0.96
FOB price of Indonesia/Minas Crude Oil			2.97

Table 5 Benefits to Accrue to Indonesia from the 'Change-over Operation'

	FOB Price	Transportation Costs (Middle East-Indonesia)	CIF Price of Indonesia	Price of Indonesia's Domestically Produced Crude Oil	'Change-over' Profit		
					Per barrel	Total value ($1,000)	Total Quantity (1,000 barrels)
Iranian Light	1.92	0.42	2.34	2.97	0.63		
Iranian Heavy	1.88	0.42	2.30	2.97	0.67		
Arabian Light	1.90	0.38	2.28	2.97	0.69		
Kuwait	1.80	0.41	2.21	2.97	0.76		
				average	0.69	32,465	47,050

Table 6 Recent Performance of Selected US Chemical Firms

	1971				Jan. – Mar., 1972			
	Total Sales (million US$)	Rate of growth over the previous year (%)	Net Profit (million US$)	Rate of growth over the previous year (%)	Total Sales (million US$)	Rate of growth over the previous year (%)	Net Profit (million US$)	Rate of growth over the previous year (%)
Dupont	3,848.2	+ 6	356.5	+ 8	1,045.0	+ 13.6	99.0	+ 33.8
Union Carbide	3,037.5	0	153.0	– 3	759.6	+ 1.5	50.1	+ 14.6
Monsanto	2,087.1	+ 6	93.7	+ 20	615.0	+ 13.4	47.5	+ 55.8
Dow Chemical	2,052.7	+ 7	154.4	+ 17	550.2	+ 13.0	41.0	+ 24.6
W. R. Grace	2,048.9	+ 7	49.5	– 3	523.8	+ 15.7	8.9	+ 12.2
Allied Chemical	1,325.9	+ 6	51.7	+ 20	349.3	+ 13	13.3	+ 19
American Cyanamide	1,283.5	+ 11	94.1	+ 9	323.6	+ 5.3	24.7	+ 7.4
Celanese Corp.	1,236.1	+ 19	59.5	+ 17	332.1	+ 16	12.2	– 11
Hercules	811.9	+ 2	53.4	+ 8	214.4	+ 12.8	15.1	+ 40.2
GAF	683.8	+ 14	21.9	+ 161	173.9	+ 16	5.2	+ 58.5
Koppers	598.4	+ 12	18.5	+ 58	128.3	+ 8.3	1.3	+ 38.2
Ethyl Corp.	577.1	+ 4	38.2	+ 7	150.3	+ 9.4	9.9	+ 15.8
D. Shamrock	573.1	+ 3	24.8	– 17	147.0	+ 11.5	6.1	+ 42.8
IMC	517.6	+ 2	12.9	+ 187	121.3	– 11.1	6.8	+ 37.7
Rohm Haus	507.3	+ 9	27.4	+ 8	142.7	+ 22.7	9.7	+ 60.9
Akzona	505.5	+ 40	25.7	+ 2	137.5	+ 9.9	5.4	– 29.2
Atauffer	492.8	+ 2	24.9	– 4	145.7	+ 11.4	9.4	+ 13.5

Figure 1 Family of Petro-Chemical Products (Per annum base)

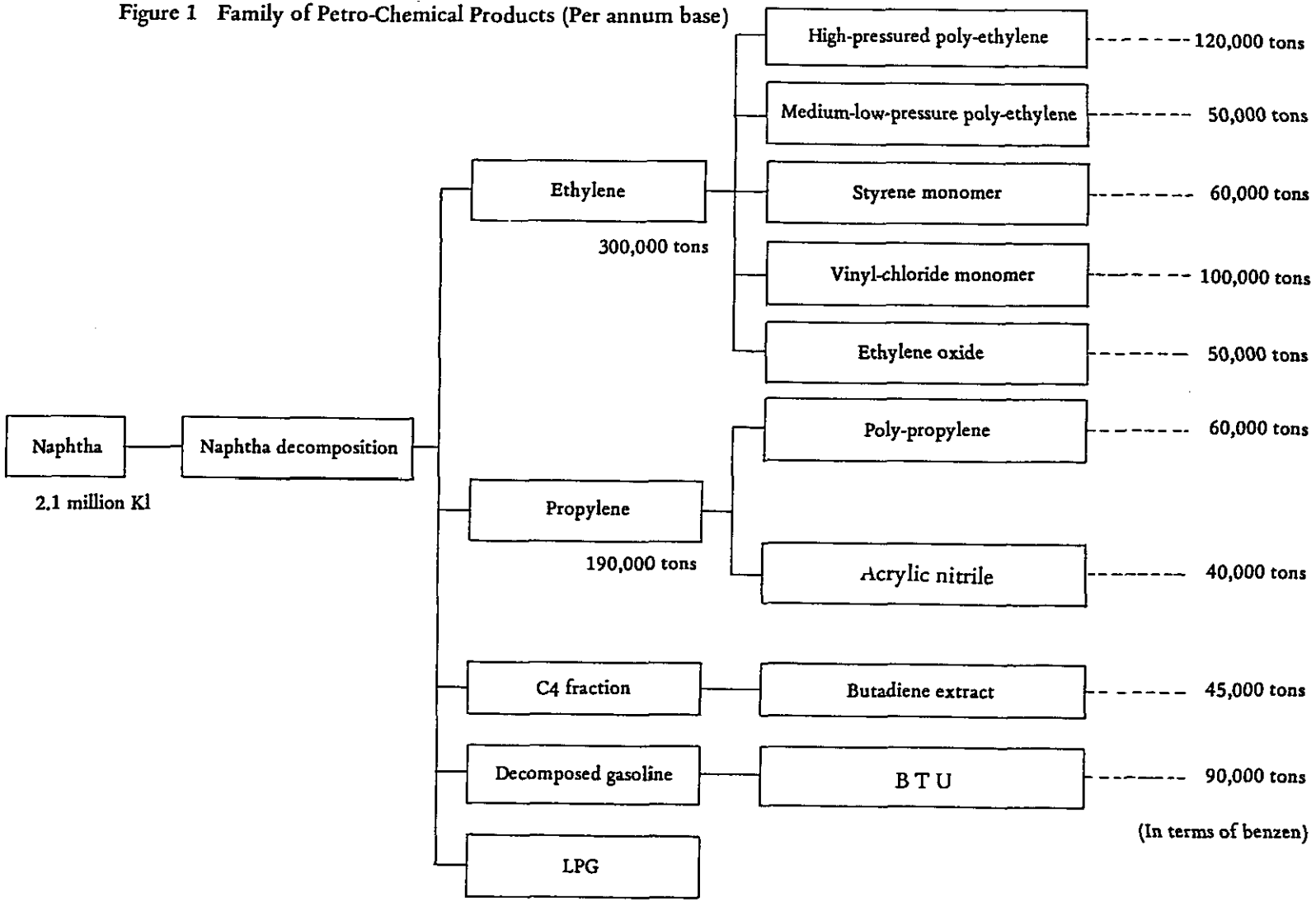


Table 7 Estimate of Construction Costs for a Petro-chemical Industrial Center

	Scale tons/Y	Construction costs (US$1,000)			Labor to be mobilized (Number of man)
		Major items	Subsidiary items	Total	
Naphtha decomposition	300,000	30,844	12,337	43,181	90
Medium-low pressured polyethylene	50,000	16,233	6,493	22,727	120
High-pressured polyethylene	120,000	32,467	12,987	45,454	200
Styrene monomer	60,000	5,844	2,597	8,441	30
Vinyl chloride monomer	100,000	7,142	2,922	10,064	28
Ethylene oxide	50,000	7,792	3,246	11,038	20
Ethylene glycol	50,000	1,623	649	2,272	6
Polypropylene	60,000	18,181	7,467	25,649	150
Acrylic nitrile	40,000	9,740	3,896	13,636	35
Butadiene extract	45,000	4,545	1,948	6,493	20
Aromatics	90,000	10,064	4,220	14,285	30
Cyclohexamin	35,000	974	649	1,623	5
Electrolysis	62,000	8,441	3,571	12,012	25
Overhead component				7,467	
Land	1,320,000 m^2			38,961	
Total		153,896	62,987	263,311	759

Note: 1. Production scale of ethylene

Supposing 7 kilo-liters of naphtha are required for every ton of ethylene to be produced, the quantity of naphtha required per annum will be 2.1 million kilo-liters. If the yield ratio of naphtha from one unit of crude oil were 12% (leaving aside automobile gasoline), the quantity of crude oil to be processed will be 17.7 million kilo-liters per annum. Thus, the appropriate scale of refinery for this petro-chemical compound is calculated to be 0.09 million barrels per day, and 0.101 million barrels per day in terms of design capacity.

2. Aromatics scale
3. Chloride scale
4. Including debt service charges and pre-operation reserve fund during construction

Table 8. Estimate of Balances for Each Product of Petro-Chemical Center

		Naphtha decomposition	Medium-low-pressured polyethylene	High-pressured polyethylene	Styrene monomer	Vinyl chloride monomer	Electrolytic vinyl chloride monomer	Ethylene oxide grycol	Polypropylene	Acrylic nitrile	Butadiene extract aromatics	Aromatics	Cyclohexan	Electrolysis
Total Sales		9,000	4,750	10,080	2,940	4,500	5,601	3,450	5,880	3,520	1,890	3,820	1,050	1,116
Variable cost	Raw material	naphtha 10,788	ethylene 1,650	ethylene 3,780	ethylene 576 benzen 1,145	ethylene 1,440 chloride 1,116	ethylene 1,440 industrial oxygen 489 electricity	ethylene 1,425 salt 235	propylene 1,368 1,368	propylene 988 ammonia 410	C4 1,322	crude SCN 2,248	benzen hydrogen 104	industrial salt 489 electricity 679
	Supplementary raw material	300	230	720	60	40	679	20	360					
	Supplementary raw material	300	230	720	60	40	257	20	360	320		90	11	217
	Labor service cost	1,644	370	1,224	448	478	497	200	402	276	198	468	14	19
	Technical service cost	-	150	240	36			80	210	120				
Sub-total		12,732	2,400	5,964	2,265	3,074	3,362	1,960	2,340	2,114	1,520	2,806	894	1,404
Fixed cost	Labor cost	254	340	566	84	80	151	74	424	101	56	84	13	71
	Repair cost	532	280	560	104	124	272	164	316	168	80	176	20	148
	Depreciation	1,330	700	1,400	260	310	680	410	790	420	200	440	50	370
	Administrative cost	373	260	492	86	98	208	121	304	130	64	131	16	110
Sub-total		2,489	1,580	3,018	534	612	1,311	769	1,834	819	400	831	99	699
Deducted items		C3 3,084 C4 1,320 SCN gas 3,450			toluene 63		hypo hydrochloric acid soda hydrogen 25		by-product 120	hydrocyanic acid 120	672	raphinate 720	11	caustic soda 1,101 hypo-hydrochloric acid soda hydrogen 25
Sub-total		7,854												
Manufacturing costs		7,390	3,980	8,982	2,736	3,686	4,648	2,729	4,054	2,813	1,248	2,917	982	977
Debt service charge	Facilities	266	140	280	52	62	136	82	158	84	40	82	10	74
	Operation	788	612	1,469	220	149	406	235	457	251	104	206	59	351
Sub-total		1,054	752	1,849	272	211	542	317	615	335	144	288	69	425
Total costs		8,444	5,207	11,739	3,008	3,897	5,322	3,205	5,551	3,324	1,676	3,205	1,072	1,534
Loss-profit balance		556	457	1,659	68	603	279	245	329	196	214	615	22	418
Remarks			Including sales cost of ¥475	Including sales cost of ¥1,008			Including sales cost of ¥132	Including sales cost of ¥159	Including sales cost of ¥882	Including sales cost of ¥176	Including sales cost of ¥284		Including sales cost of ¥21	Including sales cost of ¥132

Table 9 Production Scale, Unit Price and Total Value of Sales of Various Products Applied to Cost Accounting

Description	Quantity produced (tons/year)	Unit price (Yen/kg)	Total value of sales(1,000yen)
Medium-low pressured polyethylene	50,000	95	4,750
High-pressured polyethylene	120,000	84	10,080
Styrene monomer	60,000	49	2,940
Vinyl chloride monomer	100,000	45	4,500
Ethylene oxide	12,500	64	800
Ethylene glycol	50,000	53	2,650
Polypropylene	60,000	98	5,880
Acrilic nitrile	40,000	88	3,520
Butadiene	45,000	42	1,890
Toluene	60,000	15	900
Xylene	50,000	17	850
Cyclohexan	35,000	30	1,050
L P G	56,000	13	728
Caustic soda	69,000	16	1,104
			41,482

Table 10 Changes in Prices of Petro-Chemical Products: 1963-71

(Unit: 1,000yen/ton)

Product	1963	1965	1967	1969	1971
Polyethylene	210	156	59	116	108
high-pressured	204	151	111	101	100
medium-low-pressured	226	172	176	151	123
Ethylene oxide	151	114	97	82	80
Ethylene glycol	136	103	87	75	70
Polyethylene glycol	230	225	171	163	158
Ethanol amin	196	179	166	155	136
Styrene monomer	144	104	91	71	61
Polystyrene	149	200	161	145	130
(for molding)	258	165	125	109	106
(for expanding)	-	257	222	190	169
AS rasin	376	258	195	178	170
ABS rasin	-	293	241	214	198
Ethylene bichloride	-	36	36	32	29
Polypropylene	316	212	165	145	121
Acrylic nitrile	-	-	119	108	99
Benzene	39	33	30	28	25
Toluene	24	28	24	23	23
Xylene	26	26	24	22	21
Propylene	157	149	107	102	95

Table 11 Projection of Southeast Asia's Petroleum Refinery Capacity

(Unit: BPSD)

Country	End of Period							Comparison with 1971 projecting
	1972	1973	1974	1975	after 1976	N.A.	Country total	
Singapore	507,000	346,700	180,000				1,033,700	+ 131,700
Brunei-Malaysia	126,500					170,000	296,500	+ 171,500
Philippines	221,000					160,000	381,000	+ 84,800
Indonesia	420,000		20,000	100,000		50,000	590,000	+ 153,100
Hong Kong					400,000		400,000	0
Taiwan	220,000			100,000		20,000	340,000	+ 122,000
Korea	440,000	160,000		100,000		150,000	750,000	+ 315,000
Thailand	86,500					50,000	236,500	+ 53,000
Burma	26,300						26,300	0
Cambodia	13,200						13,200	— 300
Pakistan	83,140	48,000	80,000				211,140	+ 37,140
Ceylon	43,000				80,000	100,000	223,000	+ 189,100
India	616,500	50,000	45,000		25,000	120,000	856,500	+ 293,200
South Viet Nam	44,400					40,000	84,400	+ 40,000
Australia	699,000		130,000				829,000	+ 139,000
New Zealand	68,000			140,000			208,000	+ 145,000
Fiji Island			8,000				8,000	+ 8,000
Bangladesh	34,000	52,800					86,800	+ 86,800
							6,754,040	
Annual increment		657,500	643,000	440,000	505,000	860,000	(3,105,500)	
Cumulated total	3,648,540	4,306,040	4,949,040	5,389,040	5,894,040	6,754,040		+ 1,899,040

Source: *International Petroleum Encyclopedia* 1972, *PPS* 72-10, *OGJ* 72-9-18, 71-12-27, *PIW* 72-10-30, 71-8-9

Table 12 Projection of Southeast Asia's Demand for Petroleum

(Unit: 1,000 barrels/day, BPSD)

	End of 1970			End of 1975			
	Demand	Supply	Excess supply	Demand	Supply	Excess supply	Excess supply in terms of re-projection in Nov., 1971
Total							
Singapore	256	367			902	587	890.2
Brunei-Malaysia		125	236	440	125		
Philippines	160	205	45	240	296.2	56.2	141
Indonesia	155	325.8	170.8	225	436.9	211.9	345
Hong Kong	63	0	- 63	85	400	315	315
Taiwan	110	118	8	200	218	18	140
Korea	175	250	75	350	435	85	400
Thailand	130	100.2	- 29.8	165	183.5	18.5	71.5
Burma	24	26.3	2.3	37	26.3	- 10.7	- 10.7
Cambodia	35	13.5	- 21.5	40	13.5	- 26.5	- 26.8
Pakistan	97	115.1	18.1	125	174	49	172.9*
Ceylon	36	33.9	- 2.1	52	33.9	- 18.1	171
India	445	437.7	- 7.3	670	563.3	- 106.7	186.5
South Viet Nam	140	44.4	- 95.6	115	44.4	- 70.6	30.6
Australia	505	640	135	675	690.0	15	154
New Zealand	76	63	- 13	95	63	- 32	113
Okinawa	27	30	3	35	250	215	
Sub-total	(2,434)	(2,895)	(461)	(3,549)	(4,855)	(1,306)	(3,093)
Others	75			110			
China							

Note: Demand data is taken from *OGJ* 69-11-10; Supply capacity from *Petroleum Times* 71-5-7, *PIW* 71-8-9, 71-6-21 and *OGJ* 70-12-28, 71-6-28. Demand figure for Okinawa is US Civil Administration's estimate, and that for Cambodia U.S.A. Bureau of Mines' estimate.

* Including Bangladesh

Table 13 Expected Changes in the Excess-Deficiency Situation of Japan's Constantly-pressured Distillatory Apparatus: 1972 - 1976

		1972	1973	1974	1975	1976	Remarks
Processed crude oil	1,000 KL	233,531	251,109	274,913	299,139	324,913	
Processed crude oil	1,000 barrels per day	4,024	4,327	4,738	5,141	5,599	
Rate of operation	%	91.6	92.5	92.5	92.5	92.5	
Average required capacity	1,000 barrels per day	4,395	4,678	5,122	5,558	6,053	Calender Day = Stream Day x 0.95
Average design capacity	1,000 barrels per day	4,626	4,924	5,392	5,851	6,371	Stream Day
Capacity approved	1,000 barrels per day	4,626	5,350	6,070	6,260	6,260	Stream Day Including Okinawa
Excess-shortage situation	1,000 barrels per day	0	426	678	409	- 111	Stream Day

Table 14 Japan's Exports of Petro-Chemical Industrial Products

(Unit: US$1,000)

	1965	1966	1967	1968	1969	1970
Southeast Asia	230,876	272,647	317,052	375,921	429,602	481,954
West Asia	-	-	-	11,134	13,594	14,119
West Europe	83,780	94,624	80,384	88,671	143,179	211,031
EEC	54,687	59,010	34,040	51,233	90,640	132,894
EFTA	24,948	29,802	28,688	29,561	41,921	64,660
North America	50,247	78,029	74,283	95,088	136,574	171,913
U.S.A.	46,037	72,429	67,745	87,240	127,612	160,342
Latin America	18,441	26,800	28,117	31,392	41,949	63,064
Africa	6,535	12,132	10,179	12,651	18,613	29,468
Pacific	27,493	31,016	39,823	47,223	50,412	59,844
Centrally Planned Economies	123,407	146,215	125,705	141,420	176,787	198,142

Source: Tsusho Hakusho

APPENDIX I SOME SUGGESTIONS ON FORMULATION OF POLICY FOR ELECTRICITY SUPPLY

This memorandum is prepared to make some suggestions on formulating policy and planning of power supply. Admittedly neither complete nor all-round, it would be of some use for those who are concerned with this field.

In this connection, attention should be drawn to the fact that a Study Team on National Power in Indonesia presented their report on the development of power in this country December 1969. It should be fortunate if this memorandum, though not purposely designed to be geared with the report, would make a supplement to it.

1. Setting of the Problem of Power Supply

Power or electricity is primarily a kind of secondary (processed) energy, which is generated from such primary energies as:

a. hydraulic potential energy,

b. various sorts of fuels;
   - petroleum
   - coal
   - nuclear fuel

c. others;
   - volcanic action, tide, wind, etc.

It is to be noteworthy, furthermore, that there are exchangeability and substitutability among various sorts of energy available for human life.

In view of those complex characters of energy, policy formulation with regard to supply of energy should be considered and checked from many points of view such as:

a. security and reliability of energy supply (dependence upon foreign supply),

b. balance of international payments,

c. economies in supplying and consuming,

d. regionality of energy requirements and the resource endowments within a country.

Energy may be so compared to an essential staple food for industry, as transportation to blood circulation for human body. To secure firm and continuous supply of energy, therefore, would be an imperative to the management of national economy. This is a reason for citing security as the first viewpoint of consideration on energy supply, while expensiveness in securing it has to be avoided.

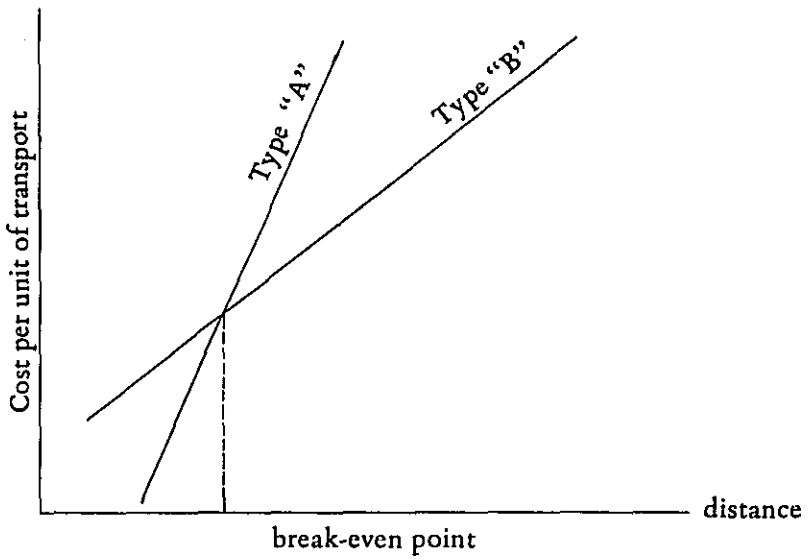
Inefficiency, imbalance, and or distortions in a national economy would sooner or later appear in the nation's account with the rest of the world. Whether energy supply is a burden or nor is likely to be felt on the balance of payments of a nation. The balance of payments, if inclined worse, could be improved in normal case no other means but through resorting to curtailing imports as well as to promote exports. Limited foreign exchange resources would sometimes affect importing fuels from foreign countries.

In every case, cheap energy sources are preferable. Cheapness is to be defined not only in terms of calory per unit of price but also in other terms such as easiness and conveniences in the processes of transport and consumption. Economies in energy supply and uses is worthy of taking many sided considerations. Particularly, it must be noted that in recent years liquidization becomes a world-wide tendency in the field of energy supply, which saves trouble and difficulty in handling it.

Requirements for consumption and energy endowments vary from place to place. This presents a unique problem as to transport between supplying places and consuming places. In order to minimize transport costs, how to get them near each other is the problem to be solved. Solution for it may come from the appropriate selection of supplying site, types of energy source, and/or transport means and methods. For example, some region might be endowed with hydraulic energy while having little demand for it, the other region might be featured with less energy sources but more demand for them.

In case of supplying a given area with power, choice between sorts of primary energy sources as well as between types of generating plants to install are to be simultaneously determined. Power can be carried on a long distance by transmission lines if transport means for carrying primary sources to power plants are not sufficient. Cost comparisons between types of transport means should be executed even in this case. There must be found a variety of break-even points in cost schedules according to distance among types of means of transport.

As shown on the expository diagram below, before reaching a break-even point type "A" of transport means is cheaper than type "B", in terms of unit cost, whereas after the point the type "A" turns more expensive than the "B". The position of break-even point depends upon relationships between types of transport means available in a given distance or route.



2. Some Characteristics of Installing Power Facilities

In order to achieve economies in installing electricity facilities, much considerations should be paid to attributes of the goods like electricity. The attributes particular to power are as follows:

a. Spontaneousness in production and consumption;

Power cannot be stored as it is. This gives a particular problem to power industry. One of them is how to manage to meet hourly, daily, weekly, monthly and seasonally fluctuating demand, in an economical way after deducted from a long-range trend. If installations are constructed enough to suffice peak load demand, it would be wastful in low load time and on the contrary if they are scarcely supplying only a average rate of load, it would lead to frequent shortage or, if the worst happen, stoppage of power supply. Adaptability is required not only in operating capacity but also in distribution networks.

Quick action for transmission facilities between surplus and wanting parts would contribute not only to sufficient accommodation but also to economizing of ultimate supply-costs. In short, complementarity in electricity supply system should be taken into account.

Thermal power plants, especially large scale ones require continuous operation without frequent stopping, in order to run economically and efficiently.

Where thermal power and hydro power are both made use of, they had better be set complementary so that fluctuating part above the base load is supplied by hydro power plant, while the base ones are to be met by thermal power, because hydro power plants are rather easy to run by fits and starts, but thermal power plants are not fitted to such operations.

b. Largeness in capital requirement;

Electricity industry is one of the most capital using industries where capital output ratio is very high, giving directly less employment as compared to capital invested.

Notwithstanding, electricity industry has to be developed on a pace keeping it with modernization of an economy, as electrification is a technological prerequisite for any type of industrialization for development.

On electrification, initial costs are to be born by not only suppliers but also by consumers, because at least end parts of distribution and electric appliances must be furnished by consumers themselves. The main problems on the side of supplier are how to forecast future demand and how to raise fund to finance the construction cost of generating plants and auxiliary installations and equipments to deliver smoothly and constantly power from generating points to final consumers. Special attention should be paid to the latter category of cost in order to achieve a balanced development of power.

Tables 1 and 2 which show cost composition of power development in Japan is cited only for reference, indicating importance of costs of transmission, transformation, distribution and others. As a typical capital using industry, depreciation and interest expenses and repair costs account for higher proportion. Table 3 purports to be only an example by which one would imagine how heavy the capital costs are in power industry which come to more than forty per cent.

c. Propensity to monopolize market;

Power would be very costly and inconvenient if it is generated and consumed by each individual consumers. This requires by its nature large scale production and sizable market, leading to monopolization of the market. Although in general monopolization is thought to distort the working of market mechanism, public-utilities serving the public might be allowed to monopolize a given market under certain publicly recognized regulations to prevent harmful effects of monopolization. This granted, power generation for self use by individual consumers should be restrained as low as possible so as to prevent wasteful operation of small scale self-owned plants. Economies of scale to be secured by monopolization would not take effect unless there are uniformity in the sphere of power

supply and standardization of electric appliances. The uniform service means reliability in supply and uniformity in voltage and cycle at the side of consumer.

Standardization is of vital importance in the process of electrification. It is well known among people that almost all electric instruments are standardised so that there may be few trouble in fitting electric appliances and instruments to one another. But great troubles occur sometimes in the quality of electricity supplied. Let us take an example of Japan. It is notoriously cumbersome that two sorts of electric cycle coexist, dividing the whole service area of the country into 50 cycle area and 60 cycle area. It may still be rather fortunate for Japan that such division of service area is drawn along the line expressed in a macroscopic terms, say, running through the central part of the country.

In some areas of developing countries very microscopic and minitute delineation of service area is often withnessed. For example, there is such a division even in a city, so that people would frequently meet difficulty in adapting their electric equipments to the new service area system when moving their home. Unification of cycle and voltage at every terminal is vitally necessary to economize total social cost of using electricity through taking advantages in exchangeability of spare parts and easiness in connecting various appliances.

In conclusion, monopolization of power supply may be allowable and justifiable provided that legitimate regulations, uniformity in service and standardization of parts, equipments and appliances are secured.

3. Energy Consumption and Economic Development

It could be said that energy consumption is closely correlated with economic development. Fig. 1 may depict the correlation by international comparison of the per capita income and energy consumption. Not only on the cross-sectional comparison but also on the time series aspect, relationships between economic and industrial development and energy consumption could be witnessed as in Table 4, in terms of elasticities, which denote ratio of growth rate of energy consumption to growth rate of national income and industrial production respectively. From a glimpse at the Table 4 it may be said that values of elasticities in industrially advanced countries are below two at most and about one if spoken roughly, though any definite or stable values can not be observable especially with regard to industrial production which is more likely to undergo structural changes than the economy as a whole is.

It may sound plausible to say that power development projects ought to deserve antecedent or leading investment, as power is indispensable for any kind of modern industry. In the long-run however, relationships between power supply and demand for it are not simple. Whether power is cheap or dear would inevitably affect volume and pattern of demand for power. Industrial structure also depends more or less on conditions of power and energy supply. It must be most usual that industrialization begins in the sphere of so-called light industry including food processing, weaving, sewing and the like, and gradually crawls into

heavy industry. Light industry consumers comparatively small amount of energy while heavy one needs much more.

Even in the heavy industry there are a variety of industry in relation to unit consumption of energy. Chemical and metallurgical process industries, especially electrolysis and electric furnace which are represented by ammonium, soda, carbide, etc., are a big consumer of power, demanding power for their own use as well as for other industrial sectors linked with them through input-output relations, as shown in the Table 5, which examplifies how much repercussion of demand for energy by the above mentioned industries are.

It might be, however, that the case facing developing countries differs from the examples mentioned herein, and that electricity industry would be expected to play a leading part among other industries which are consumers of it. Therefore, planning of electricity supply in a developing country should take into account not only such functional and material relations but also special features of the role of electricity supply in promoting industrialization and modernization.

Electrification has far reaching effects on the development of a country. It may not sound curious to say that electricity is not only a food necessary for industry but also a good nutrition for human brains, because it is needed to feed lighting, and various cultural activities including study, laboratory work, gathering for study or amusement and so on.

Expansion of electricity supply and distribution would lead scattering or dispersion of industry and electrification of traditional works in many fields. At the same time, how to dispose of surplus in electricity caused by various kinds of fluctuation in demand as already mentioned and sometimes by waiting for future increase in demand at the initial stage of completion of new electricity projects would become a problem on the suppliers side, which is obliged to keep constant operation of installations in order to minimize cost of electricity. The very nature of electricity that it can not be stored as it is requires special measures to adapt itself to the process of electrification. Installing factories using electrolysis and electric furnace, which are rather adaptable to utilize irregular supply of electricity would be desirable in order to make use of surplus power and to economize costs.

Anyhow, efforts to keep operation level of power plants and equipment above the break-even point must be beneficial. It could be achieved only by means of deliberately planned development of power resources and of adapting industrial structure to power supply.

In general, electricity if used as a source for driving power or lighting would be a more inducing element in increasing production in terms of value added than it is used as mere material in production process. Electricity supply would help small scale enterprises to become mechanised and thereby more efficient and profitable. Furthermore, mechanised small scale enterprises would prove a good foundation for components of larger scale industries deemed to be developed in the future. It may be a proverb applicable for expressing a natural stream of industrialization from small to large scale production that Rome was not built in a day.

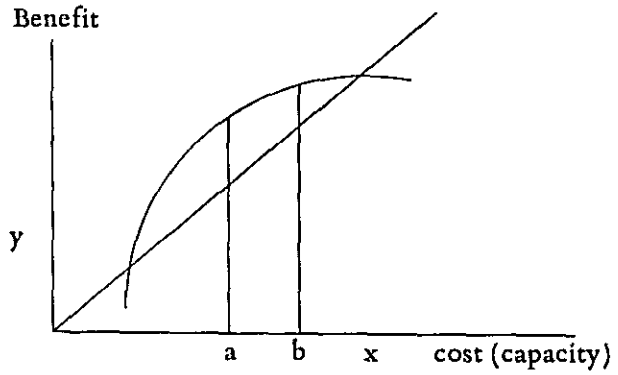
According to A.O. Hirschman's thesis on economic development, setting up of any industry may give effects on two distinct directions, namely, toward its input side and its output side. An industry creates demand for its inputs goods from other industries and at the same time supply its output or outputs to consumers including industries. Each industry is interrelated with one another through demand and supply. Effects through demand or input side are called forward linkage effects whereas effects through supply or output side are called backward linkage effects. These linkage effects may ultimately be exerted through complicated interindustry relations. A glance at an interindustry table may give first approximation of the linkage. Table 6 gives an example of the input components and the destinations of output of power industry.

The number of major inputs to power industry is relatively small. Prominent inputs are mineral fuels, electric equipments and appliances, construction, transport and communications, and some unclassified things. But output, electricity, is destined for every sector of an economy at remarkably even proportions.

It would be noticeable that in an industrially developed country like Japan demand for electricity by household sector or personal consumption accounts for only about one quarter of total output, and the remainder for the industrial use.

Another attention should be paid to the fact that there can be alternative measures and plans in developing a given power resources depending on criterion to be chosen. Take the Asahan Dam Project in the text of the Indonesian Five Year Development Plan for example. The Soviet Study Team recommends 160 MW-size plant while the Japanese one 460 MW-size plant. This difference might be caused by many factors but might be most reasonably explained by difference in criteria taken up.

At any rate, at the early stage of economic development small scale and quick-return expected projects would usually seem preferable in view of high interest rate coupled with low level of capital accumulation. From physical point of view, sometimes, a given site looking suitable for development would allow for alternatives instead of an unique development project.



Alternatives could be formulated on various grounds. Bigger scale project seems good for exhausting resources available and leaving no room to develop further. This would save initial costs that should have been incurred if the remaining potentials would become needed to be developed again. Theoretically speaking, wihtout budget constraint a giving site or resource should be developed to the extend that incremental benefit (ΔB) comes equal to incremental cost (ΔC), namely, $\frac{\Delta B}{\Delta C} = 1$, showing no more net benefit (gross benefit minus cost) to be gained. On the diagram above, the scale of development corresponding to b denotes such a saturation where there can be no more additional net benefit. With budget constraint, however the b denoting the saturation does not always coincide with the most desirable scale of development at that proposed site, because more beneficial alternative potential sites may yet be explored. In choosing among alternative proposed development projects a clue of choice may be to compare average benefit-cost ratios for respective ones, and to take up the project with highest B/C ratio at first and then successively according to descending order of B/C ratios until the budget is exhausted. In view of this kind of procedure for selection, it would be wise to confine the scale of development to the level that might assure the highest average B/C ratios concerning the project proposed on a given site, instead of enlarging the scale of project up to level that might take out all possible potentials (benefit net of cost), which implies incremental B/C ratio to be unity. Differences in the use of B/C ratio between the 'with budget constraint' case and the 'without budget constraint' case may be obvious. In the 'with' case, B/C ratio is used as a tool for choosing among alternatives, while in the 'without' case, B/C ratio is used for determining economically justifiable scale of project. But the economic justifiability depends on criterion to be chosen. From the overall and long range point of view, rational procedure for selecting most beneficial one is to be based on objective comparison of B/C ratios for respective projects admissibly maximized.

In this connecton, allocation of joint cost must be considered if a proposed project is of multiple purpose. There are many methods of joint cost allocation. Merits and demerits of each method also depend on the point of view or action to be taken. Therefore, there should be a need to decide officially some criteria so as to avoid arbitrary application of criteria one likes.

4. Running of a Power Supply Body

Power industry as a type of public utilities must be run on public as well as private basis. Power industry differs from genuine public works such as road, sewage and the like, because it produces and sells a very tangible output which can charge individual consumers with tariff to pay for, and at the same time, it inevitably needs a good deal of communities' cooperation in running its operation because installing and maintaining of the supply and distribution system of very large scale extending over service area would have physical, economic and social interactions with the community. Tariff of electricity affect strongly not only individual consumers but also overall social and economic development, and therefore, has to be as low as possible.

In order to secure low cost, power supply should be run with efficiency in all the system, which in turn must be secured by full awareness of costs. For managing electricity industry, self supporting accounting system under some public regulations seems the most

plausible device for reconciling both requirements of business efficiency and public nature. Forming tariff of power supply should be deliberate because power industry is a typical public utility with increasing return to scale, which is likely to distort rational allocation of resources, if it were let to go free. Self supporting accounting system would be deemed to be only a device for clearing up operational efficiency of the industrial activity. To stimulate or check it through subsidizing and/or taxation is conceivable even on such accounting basis. At the initial stage of development, self-finance resources for power industry would be so small that some financial support might be needed. Normal running of the business like electricity supply will bring about some unexpectedly large amount of gain. The use of the gain also poses a problem. A socially desirable solution must be on reinvestment. Where gain or loss comes from should be carefully checked. Otherwise, self supporting accounting system could not work as a checking system. What is always checked and righted is tariff, investment practice, maintenance and administration. No accounting should be based on rough estimates, of course. Very important in this connection is distinction between capital account and current account. Expenses on the current account at least have to be financed by currently incoming revenue. The capital account may be taken into separate consideration sometimes. After violent price movement, revaluation of existing assets would become needed in order to avoid bogus calculations. Setting up of rules for revaluation has to be geared with general economic policy based on a solid outlook on future trend.

Investment in plant and equipment for power supply must cover not only generating plants but also installations for transmission, transformation and distribution (see Table 2). Total of investments required to achieve a harmonious system of power supply would be about more than three times as much as that in generating plant. It must be kept in mind that construction cost of generating plants differs from a type of harnessing primary energy to another, say hydro or thermal etc., and from place to place (see Table 1). Power industry is a really capital intensive one so that as shown in Table 3, capital costs represented by depreciation charge and interest expense paid on borrowed capital may account for a large part of the sum of expense to be born by a power firms while direct labour cost represented by wage, salary and fringe benefits for workers claims a relatively small fraction. It is needless to say that percentage composition of the cost of power supply varies depending on price structure of productive factors, especially price ratio between labour and capital which in turn depends upon availability of capital and labour including skills in a given economy.

5. Conclusions

From the discussions stated above, the conclusions would be drawn as follows:

Firstly, development of power should be set in a broader framework of availabilities and development of primary energy sources.

Secondly, minimum standardization of electric parts, equipments and appliances to secure connectability and exchangeability of them and unification and maintenance of the quality expressed in voltage and cycle of power supplied should always be given careful attention.

Thirdly, the role of electrification and its effects ought to be properly assessed in the context of overall economic development.

Finally, supplying of power should be run in a sound and efficient way through making much use of the very nature of it that it is measurable and salable on the market, which would make it possible to form a controlling and accounting system with greater case than in any other field of public works.

(Koichi Baba)

Table 1 Per KW-Cost of Constructing Power Plants in Japan as of 1966 (US$/KW)

Hydro	
- Run-of-river	358
- Run-of-river with pond	361
- Reservoir	136
Thermal	
- Under construction	72 - 167
- Already finished	89 - 228

Table 2 Percentage Composition of Investment in Power Development in Japan

Year	1964	1965	1966
Generating plants	28	33	30
- Hydro	(6)	(8)	(10)
- Thermal	(22)	(25)	(20)
Transmission	15	16	17
Transformation	14	14	13
Distribution	21	18	19
Others	22	19	21
	100	100	100

Table 3 Percentage Composition of Consolidated Expenses of Power Companies in Japan, F.Y. 1966

Wages and salary	11.6
Retirement Allowance	3.4
Fuel costs	15.0
Repair	10.1
Power purchase expenses	11.6
Allowance for drought	0.5
Depreciation charge	18.8
Replaced assets	1.3
Taxes	6.6
Interest expense	12.3
Redemption	0.4
Others	8.4
	100.0

Table 4 Elasticities of Energy Consumption with regard to National Income and Industrial Production

	1950 - 1955	1955 - 1960	1960 - 1964
U. S.	0.651	1.136	0.884
	0.729	0.522	0.816
U. K.	0.593	-	0.143
	0.697	0.231	0.813
W. Germany	0.716	0.302	0.979
	0.739	0.400	0.500
France	0.977	0.667	1.185
	0.600	0.636	1.200
Italy	1.931	1.724	1.599
	1.575	1.319	1.027
Netherland	0.661	0.575	1.152
	0.667	1.169	1.099
Japan	1.104	0.870	0.750
	0.584	0.597	0.726

Note: Figures in the upper are with regard to national income, and ones in the lower with regard to industrial production.

Table 5 Percentage of Energy Cost in Production Costs of Selected Commodities

(%)

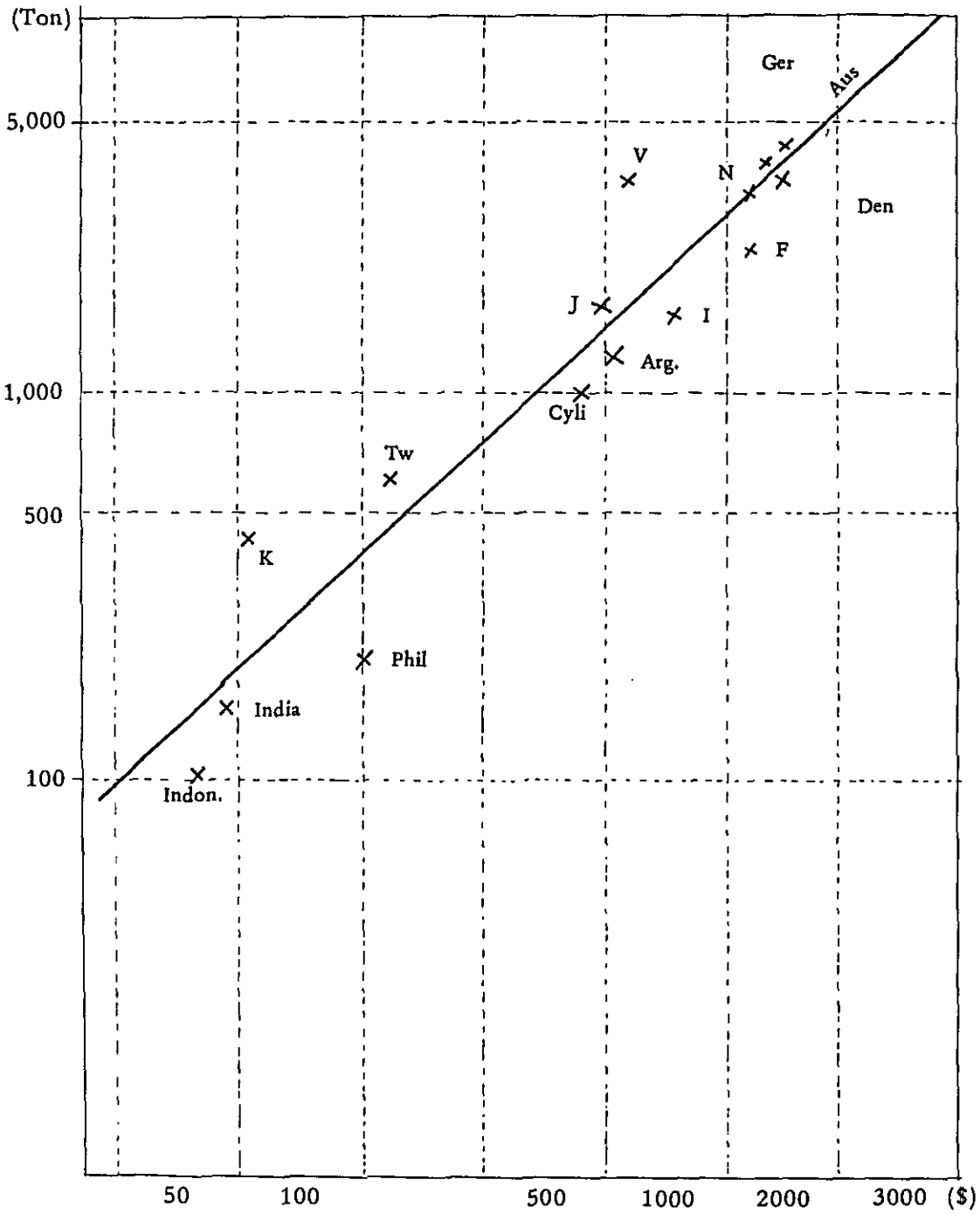
	Direct	Indirect	Total
Basic Chemicals	17.9	7.6	25.5
Iron and Steel	12.6	8.1	20.7
Ceramics & Clay Product	13.9	4.2	18.1
Chemical Fibres	6.0	6.4	12.4
Paper and Pulp	7.3	4.7	12.0
Non-ferrous Metals	6.5	5.0	11.5
Rubber Product	4.3	4.3	8.6
Spinning and Weaving	1.6	4.2	5.8
Electric Instruments	2.0	3.0	5.0

Note: Indirect costs of energy are calculated through the input-output technique.

TAble 6 Distributive Shares of Input and Output of Power Industry
1960 Japan (%)

		Input Components	Destination of Output
1.	Agriculture		0.7
2.	Mineral fuels	10.1	2.5
3.	Miscellaneous ores	0.1	0.9
4.	Cleaning and milling		0.3
5.	Beverages, tobacco	-	0.3
6.	Other foods	-	1.8
7.	Spinning	-	1.6
8.	Textiles	0.2	1.8
9.	Lumbering and wood working	0.1	0.9
10.	Pulp and papers	0.1	6.2
11.	Printing and publishing	0.2	0.3
12.	Coal and petrol products	2.2	0.7
13.	Chemicals	0	8.4
14.	Chemical fibers	–	2.0
15.	Rubber and leather products	-	0.7
16.	Ceramics and clay products	0.2	4.0
17.	Pig and crude iron	0.5	6.2
18.	Unfinished metal products	-	5.7
19.	Finished metal products	0.1	0.8
20.	Machinery	1.0	2.2
21.	Electric equipments and appliances	5.6	2.2
22.	Transport equipments	-	2.1
23.	Precision instruments	0	0.2
24.	Other manufacturing	0	0.7
25.	Construction	4.0	1.0
26.	Electricity	-	-
27.	Gas and water supply	0.1	1.2
28.	Trade and retail	1.0	4.7
29.	Finance and real estate	0.2	0.9
30.	Transport and communication	3.5	4.0
31.	Services	0.3	5.6
32.	Unclassified	12.5	3.8
33.	Business consumption	-	-
34.	Personal consumption	-	24.2
35.	Government consumption	-	1.1

Fig. 1 Relation between GNP and Energy Consumption per Capita



Arg	=	Argentina	F.	=	Finland	N.	= Norway
Aus	=	Australia	G.	=	West Germany	V.	= Venezuela
C.	=	Cyli	I.	=	Italy	Indon	= Indonesia
Tw.	=	Taiwan	J.	=	Japan	India	= India
D.	=	Denmark	K.	=	Korea		

APPENDIX II CASE STUDIES OF FREE EXPORT ZONES: TAIWAN AND KOREA

I. Outline of Kaohsiung Export Processing Zone

1. Location

Kaohsiung is located in the southern part of Taiwan, 117.75 km from Taipei, and has a population of 842,000 as of December, 1970. The Kaohsiung harbor is the largest international port in Taiwan, and handles more than two-thirds of Taiwan's annual volume of imports and exports. The nearby Hsiaokang Airport is 7 km from the Zone.

2. Scope

The Export Processing Zone itself is situated on land reclaimed for the Zone in Kaohsiung harbor, and at present covers an area of 68.5 ha. Within the Zone, the K.E.P.Z. Administration was established in 1965 as the only Government agency authorized to handle all business, such as recording registrations, issuing import and export licenses, and regulating foreign exchange and trade.

3. Objectives

The Kaohsiung Export Processing Zone was established with the purposes of (1) attracting more than 120 export-oriented factories, (2) inducing US$18 million of investment inflow, (3) creating employment opportunities for 30,000 persons, and (4) attaining a level of exports amounting to US$72 million per annum.

4. The following twenty categories of industries are admissible

1) Precision machinery and instruments
2) Electronics products
3) Optical products
4) Metal products
5) Plastic products
6) Manufacturing of machinery
7) Manufacturing of furniture
8) Handicrafts
9) Electrical appliances and products
10) Rubber products
11) Chemical products
12) Printing
13) Confections

14) Cosmetics
15) Leather products excluding the processing of raw-hides
16) Paper containers
17) Toys
18) Yachts
19) Knitted and woven goods. (Excluding those using cotton yarn or cotton twine as raw materials. Goods made of blended synthetic yarn, when considered as cotton goods, cannot be admitted.)
20) Garments. (Excluding those using cotton cloth as raw materials. Garments made of blened synthetic fiber, when considered as cotton goods, cannot be admitted. Chinese nationals in Taiwan having household registration cards will be given priority in investment in this category of industry.)
21) Other industries which are not listed above but have potential foreign markets and require intensive labor and imported raw materials, may also apply to the Government for special approval. Particularly high priority is given to Nos. 1-7. Prohibited industries are export industries which already have been established in Taiwan and export industries in which the labor cost is less than 20% of total manufacturing cost.

5. Privileges

Export-oriented enterprises in the Zone are exempt of import duty and surtaxes for the machinery, equipment, raw materials, and semifinished manufactured products imported for their own use. They are also exempt from business, sales and commodity taxes. Enterprises in the Zone are required to pay only the corporate income tax on profit-seeking enterprises, and stamp, house, temporary power and vehicle license plate taxes.

If the enterprises conform with requirements set by the Government for the purpose of assisting such enterprises, a five-year tax holiday is granted and the enterprises are entitled to "10%" reduction of the payable income tax starting in the sixth year.

The following remittances may be made through the appointed bank after the Administration's approval is granted.

1) Commissions and rebates
2) Royalties
3) Bid bonds and performance bonds
4) Advertisement expenses
5) Profits on investment by Overseas Chinese or foreign nationals in the Zone
6) Other approved outward remittances

The Government has already completed the construction and installation of such public utilities as roads, water and drainage systems and power supply systems within the Zone. Land is available for lease only. The enterprises may lease land from the Administration and construct factory buildings by themselves, or purchase standard factory buildings by install-

ment payments. The rent of land is NT$7.5 (equivalent to US$0.1875) per 3.3 m^2 per month. The longest lease is for ten years. To extend a lease, the leasee may apply to the Administration, at least three months before the lease expires.

6. Taiwan's Economy in the Fifties and Sixties

General Background

After the Japanese occupation, postwar reconstruction moved ahead rather slowly during the first stage, but progress gradually picked up speed as more resources became available. By 1952, both agricultural and industrial production had regained prewar levels. In 1953, the Government launched its first four-year economic development plan, making a policy shift from short-term stabilization to long-term development. This has been followed by four successive four-year plans. Since the launching of the nation's first four-year plan, Taiwan's productive capacity has grown rapidly.

In 1969 the Gross National Product and per capita income were respectively 400% and 220% higher than in 1952 in real terms. During these 17 years, their average annual growth rates have been 8.6% and 4.7% respectively. With regard to the GNP, by 1969 agricultural output was up by 220% and industrial output by as much as 940%. The average annual growth rates of agriculture and industry were respectively 4.9% and 14.1%.

Owing to the dynamic, fast growth of industry, there has been a marked change in the composition of the net domestic product. In 1969, the agricultural sector contributed 20.8% of the Net Domestic Product and industrail sector contributed 23.5%, whereas their respective shares in 1952 had been 35.7% and 10.8%.

The reasons for this change were as follows. In the industrial sector, initial efforts were made at production of essential consumer goods. Subsequently, the basis for industrial growth was broadened through diversification, namely emphasis in industrialization was shifted from simple, labor-intensive processing industries to industries calling for more advanced technology and larger inputs of skilled labor, such as electronics, petro-chemical intermediates, and precision equipment and instruments. In other words, priority was given to the continual development of the machinery industry, basic metal industry and other industries with a high export potential.

Labor Force

Taiwan's total labor force as of January, 1968, was approximately 4 million (including only those of age 15 or older, and excluding those in military service). Of the 4 million persons in the labor force, slightly over 3.9 million were employed and the remainder about 2.5% of the labor force were unemployed. About 1.6 million of those actually employed were engaged in agriculture, including fishing and forestry. The remaining 2.3 million employed were engaged in industry, 1.5 million in productin industries and 0.8 million in transportation, communications, and other services. There has been a significant increase in the relative size of

the industrial labor force in the past few years. Whereas this group represented only 48% of the labor force in 1963, it accounted for 57% in 1968.

Wages

Wages have steadily increased over the past decade. Wages in manufactuirng industries in 1965 were more than double the 1956 level, while real wages were 46% higher. Since 1962, wages have increased (through 1967) by 43%, while wages in real term by 20%.

Exports and Imports

Taiwan's exports and imports have expanded steadily during the past 20 years. Whereas the amount of exports and imports were equivalent respectively to 8% and 14% of the GNP in the early 1950s, by 1969 they grew to about 25% and 27% of the GNP, which had more than quadrupled in real terms. In this way, the importance of the trade sector in the economy of Taiwan had increased considerably. Except for 1963 and 1964, Taiwan's annual imports exceeded exports. This was due to the inflow of external resources in the form of economic assistance from the United States, which was phased out in 1965, and by international lending agencies, foreign governments, and private foreign investments. A favorable balance of trade has replaced trade deficits, substantially improving the nation's reserve position. The Republic of China's exports in 1969, which were US$1,111 million, showed an increase of 930% over exports in 1952 and 32% over exports in 1968. Exports were formerly dominated by agricultural products, but with the continuing rapid growth of industry, the importance of agricultural exports has waned. For instance, sugar and rice were 78% of total exports in 1952, but their share in 1969 dropped to only about 5% although their total foreign exchange earnings were much larger in 1969 than in 1952. On the contrary, industrial products increased their share remarkably to 72.5% of total exports in 1969 whereas they were only 4.8% in 1952. Government efforts for diversification and expansion of exports have thus paid handsome dividends. Taiwan's major export items were: textile products, metal products, plywood, bananas, sugar, chemicals and canned foods.

Total imports in 1969 was US$1,205 million which was an increase of 580% over that of 1952 and 17% over 1968, while the import structure remained largely the same. Raw materials occupied the largest share, 63%, and capital goods followed with 31%, while consumer goods accounted for only 6% of imports. Major items imported were chemicals, machinery and tools, ores, metals and manufactures, electrical supplies, raw cotton, crude oil and synthetic and natural fiber products.

As to import structure, it has gradually been liberalized as foreign reserves were built up, because the growing domestic industry needed plants and raw materials for higher industrialization.

Because of Taiwan's shortage of natural resources, industrial development called for ever-increasing imports of raw materials.

A simultaneous increase in the imports of intermediate products and capital goods was also necessary because of the inadequacy of domestic sources of supply.

Exports, on the other hand, provide not only the principal means to increase reserves which can be utilized to pay for imports, but also an important market for domestic industry, which could not do as well depending only on the small scale of the market.

The external sector played an important role in the economic development of Taiwan inasmuch as foreign resources and markets are both essential to the Taiwan economy.

As mentioned above, the economic growth of Taiwan was made possible mainly by the effective use of external resources in the form of private capital investments, loans, and technical assistance.

Therefore, encouragement of foreign investment for many years has been one of the basic policies of Taiwan for the acceleration of her economic growth. Specifically, the Government welcomes and encourages foreign investments in:

1. Industries whose products are needed domestically and have foreign markets;

2. Industries which call for large inputs of capital and technology; and

3. Industries wholly oriented to export markets

To provide short and long-term benefits to investors, the Government has been making continued efforts at improvement of the investment climate in Taiwan

In the light of these achievements, to further expand her economy, the Taiwan Government established in 1965 the Export Processing Zone in Kaohsiung.

7. Present Status

The Taiwan Government originally intended to invite 120 exporting enterprises, to create employment opportunities for 15,000 people, and so to achieve a level of exports of US$72 million per annum. However, as of September, 1970, 164 enterprises were approved by the Government of which 151 were already in operation, employing 35,700 persons. Actual exports have amounted to US$76 million for January to September alone, far surpassing the original targets.

Close observations of this performance are made as follows: Investment sources of the 164 approved enterprises are as in the attached Table 4. Foreign capital (excluding that in joint ventures) accounts for 35.4% of the number of enterprises, 52.8% of planned investment, 46.7% of annual exports, 36.7% of planned employment while domestic capital's shares are 23.8%, 13.9%, 15.0% and 18.7% respectively. Table 3 shows the categories of industries of

the 164 enterprises. Seventeen industrial categories are represented, except optical products, cosmetics, and confectionery manufacturing. Among them, the electronics industry occupies the largest share, 22.6%, in terms of number of enterprises, 41.9% of planned investment, 39.9% of planned annual exports, and 28.6% of planned employment. The garment industry follows with 9.8%, 15.0%, 14.9% and 19.3% respectively then by handicrafts with 12.8%, 8.1%, 10.8% and 10.9% and knitted and woven goods and plastics products follows. These five categories account for as much as 69.6% of the number of enterprises, 79.7% of planned investment, 79.2% of annual exports and 79.3% of planned employment.

The amount of exports was only US$270,000 in 1960, along with the accelerating growth of the Processing Zone, it increased to US$76 million for January to September, 1970, an increase of 280 times. On the other hand, imports amounted to US$64.7 million in 1970, 33 times as much as that of 1966. This was due to the increased needs of raw materials, machinery and equipment for the operation of the Export Processing Zone. In the early stage of operation of the Zone, from 1966 to 1968, imports exceeded exports, because of the high demand for raw materials and machinery and equipment for the construction of factories. However, since 1969, when the Zone started full operation, this situation reversed; exports have surpassed imports and Taiwan's international payments each year showed a favorable balance of considerable size. This favorable situation will continue and improve further because production will increase as the operation ratio of equipment and facilities increases and the level of exports approaches the planned level, and because regular imports of raw materials would come to be the main part of total imports and intermediate goods will be supplied from domestic sources rather than overseas sources. Exports will thus gradually expand.

In regard to the performance of exports by item and destination, beginning with performance by item, electronics products accounted for as much as 48.3% of the total amount in 1970, garments for 20.0%, knitted and woven goods for 8.1%, followed by plastic products and handicrafts. This pattern corresponds to the pattern shown in the categories of industries. As for the performance by destination, the principal market is the United States, which accounts for 56.7% of total exports. Asia makes up the second largest share, 26.6%, owing to Japan's 13.4% and Hongkong's 7.8%, while West Germany accounted for 5.1% and the Netherlands for 4.5%. Expansion of Taiwan's export areas had followed two courses; one was largely thorough simple industrial products to the markets of the developing countries, including the Philippines, Thailand and Vietnam, and the other was largely through shipping labor-intensive products to markets in the advanced countries. The former accounted for 14.5% and the latter for 85.5% of total exports in 1970. This indicates that the development of the Kaohsiung Export Processing Zone is characterized by heavy dependence upon labor-intensive light industry for exports to the United States and other advanced countries. The Zone imports mostly machinery, equipment and raw materials, the former accounting for 8.7% and the latter for 91.3% of total imports from January to September, 1970. Import sources mainly were advanced countries; the most important of which are Japan and the United States which normally supply more than 70% of Taiwan's total imports. In terms of exports, United States ranks top, taking more than twice the exports taken by Japan. In terms of imports, however, this is reversed, as imports from Japan accounted for 67.1% while those from the United States only 10.6% in 1970.

Nevertheless, here too, dependence on the advanced countries is still high. In spite of the impressive results of the Zone, the following problems still remain:

1) In the first phase of the Processing Zone plan, it was stated that enterprises would only have to contact the Administration for processing of all the required procedures beginning with the application for location and establishment in the Zone and ending with the routine production-related operations such as those related to import and export licenses, and regulation foreign exchange and trade. The administration was intended to simplify procedures. Actually, however, procedures have not been as smooth as had been intended. In the case of official permissions, for instance, it took very long time to obtain the permission from the Administration to import machinery and equipment. Furthermore, Administration over procedures was dispersed among many offices including the customs, the tax office, the quarantine office and the Bank of Taiwan. Each exercises autonomous administration, it has no authority or supervisory power itself but merely functions as an intermediary.

2) One of the attractions of the Processing Zone was that an abundant labor force requiring relatively low wages was available in Taiwan. However, wages have steadily increased in Taiwan during the past decade and this phenomenon was also true within the Zone as shown in the following table.

Wages per Month from 1968 - 1971

(Unit: NT$)

Wages per Month	Persons		Percentage	
	1968.7	1971.7	1968.7	1971.7
420 - 600	848	552	7.49	1.40
601 - 700	4,176	1,921	36.95	4.86
701 - 900	3,234	10,915	28.61	27.64
901 - 1,100	1,123	10,404	9.93	26.34
1,101 - 1,300	798	5,707	7.01	14.45
1,301 - 1,500	438	3,518	3.86	8.90
1,501 - 1,700	265	2,247	2.33	5.69
1,701 - 1,900	289	1,360	2.55	3.44
1,901 - 2,100	145	848	1.27	2.15
2,100 -	-	2,025	-	5.13
Total	11,311	39,497	100.0	100.0

In 1968, workers earning NT$601 to $700 made up the largest share of the total, 36.9%. However, this bracket accounted for only 4.8% as of January, 1971. Furthermore, workers earning NT$901 to 1,100 accounted for 26.3% in 1970, but 9.9% in 1968. The wage-hike situation in Taiwan, as in other developing countries, is expected to continue.

In regard to labor mobility, among all workers as many as 84% are female. Workers between 14 and 19 years of age account for 62% and workers between 20 and 24 years account for 24% of the total. As many as 86% of all workers are unmarried, so that they may move relatively easily from one enterprise to another in accordance with the conditions of its wages and welfare facilities. It is reported that the ratio of labor mobility is approximately 7.5% within the Processing Zone.

3) The present Zone area is on reclaimed land in the harbor of Kaohsiung. It is lacks ease of access, and moreover, accommodations for workers in the area were insufficient even before the Zone was created, and the increase in employment opportunities due to creation of the Zone has exacerbated housing conditions. Nearly 88% of workers commute by bicycle, while the remaining 12% use buses.

4) In the past, the developing countries in Southeast Asia adopted the policy of import-substitution. In recent years, however, developing countries have faced a problem in economic expansion as a consequence of this policy and they are now being forced to consider and pursue growth policies other than the strategy of inward-looking development. Toward that end, the Export Processing Zone would provide a brand-new course for development.

II. Outline of Masan Free Export Zone

(1) Location

The Masan Free Export Zone is located 68 km west of Korea's largest port, Pusan, southern tip of the Korean peninsula.

(2) Scale

The Free Zone site is devided into sections. I, II and III covering 167, 195 and 69 acres respectively. Within Section I, the industrial site, there is about 110 acres.

(3) Objectives

The basic purposes of the Zone are (1) to provide opportunities for highly profitable foreign investment and (2) from the Korean point of view, to encourage exports, expand employment opportunities, raise the level of technical skills, and help the development of local region. More concretely, plans for the Section I of the Zone call for 100 enterprises, a total investment of US$30 million, exports of US$100 million annually and employment of 30,000 workers.

(4) Eligible Types of Enterprises

1. Food processing (excluding processing of laver for export to Japan)
2. Cosmetics
3. Plastic products

4. Rubber products
5. Leather products
6. Packing materials
7. Art printing
8. High-grade pottery
9. Metal products (excluding spoons, forks and tableware)
10. Machinery and apparatus
11. Electrical appliances and equipment
12. Electronic products
13. Yachts and small boats
14. Optical appliances and instruments
15. Medical and scientific instruments and appliances
16. Precision machinery
17. Musical instruments (excluding guitars for export to the United States)
18. Furniture and decorative items
19. Handicrafts (excluding wigs and faise eyelashes)
20. Toys
21. Travel and sporting goods
22. Textile products

The categories of restricted products are determined by the Minister of Commerce and Industry in accordance with the ministry's trade policies.

(5) Requirements for Participation

Enterprises must be either 100% foreign-owned firms or joint ventures with Korean nationals.

Enterprises with good export performance prospects, capable of realizing net foreign exchange earnings of not less than 20% of the export value of a product.

Enterprises must be capable of employing superior technological standards and require the intensive use of labor.

The minimum investment amounts are US$150,000 for self-constructed factories and $50,000 for standard factories.

(6) Types of Participation

The Government has constructed four standard factory buildings for rental or sale to occupant enterprises. The Zone Administration is prepared to construct more of these buildings in response to the needs of prospective enterprises. Firms wishing to construct facilities to suit their own needs can rent land in the Zone from the Zone Administration for this purpose. Rental for land is 18.27 Won ($0.0492) per square meter.

(7) Advantages Granted Occupant-Enterprises

The Government has established the following legal and tax advantages for foreign firms operating in the Zone.

A. Legal Advantages

According to Korean Trade Transaction Law, all firms in the import or export business in Korea must first be licensed by the Ministry of Commerce and Industry. Zone occupants are exempted from this requirement. Except in a few special cases, MAFEZ firms are exempted from the inspection of export goods.

Foreign firms investing in other areas in Korea are required to go through the procedures such as investigation by the Government's Committee. In the Zone all such procedures are handled through the Zone Administration directly.

Prohibited goods may be brought into the Zone with the approval of the Zone Administrator.

B. Tax Advantages

Foreign firms resident in the Zone can receive the following tax privileges and exemptions.

Income, corporate, property and property acquisition taxes can be exempted during the first 5 years while a 50% reduction can be applied for the subsequent 3 years.

Taxes on the dividends and surplus distributions accruing to foreign investors will be exempted during the first 5 years and reduced by 50% for the subsequent 3 years.

Import duties and taxes on commodities and capital goods will be exempted and occupant-enterprises will be exempted from business taxes.

The remittance overseas of profits and dividends by foreign investors is guaranteed from the first year.

The remittance overseas of proceeds of the sale of stocks and shares owned by foreign investors is guaranteed up to 20% of the capital subscription every year from the third year of business operations. However in the case of liquidation of businesses, the entire proceeds may be repatriated immediately.

C. Simplification of Administrative Procedures

Most related administrative authority has been delegated to the Zone Administra-

tor by the Government offices in Seoul. Also, the Customs office and other agencies have established sub-stations within the Zone.

D. Public Services

Customs, postal services, a quarantine sub-station, a fire station and a health center for the welfare of the Zone employees are all in operation. Warehouses, water and power supply, harbor facilities and other public services are available.

As additional facilities, apartments for management personnel are ready for occupancy and the first employees' dormitory, capable of housing 3,000 residents, was scheduled to be completed by the end of 1972.

E. Labor Supply

Occupant-enterprises can easily find employees without offering high wages. More than 20,000 prospective employees have applied for positions in the Zone. In order to gather a work force suited to its needs, an enterprise need only submit a request to the Zone Administration to have its employment requirements fulfilled.

While wage levels vary according to sex, education and skill, salaries for general employees amount to only US$25 - $30 a month, about 50% that of wages in Hongkong, 30% of that in Japan and roughly the same as that in Taiwan.

(8) Present Status

Plans for the Section I for the Zone called for 100 enterprises, a total investment of US$30 million, annual exports of US$100 million and employment of 30,000 workers.

By the end of June, 1972, 34 firms, which invested a total of US$14,642,000, were either setting up facilities or in actual operation. When these firms are in full operation, exports will increase to $91.7 million. As of June 30, 1972, more than 3,000 persons were employed at the Zone. As of June, 1972, 67.7% of Zone enterprises are Japanese-owned, 8.8% are American-owned and remaining 23.7 are jointly owned by Koreans and either Japanese or Americans. This concentration of investment by only two countries is likely to change in the future as the Government's efforts to publicize the Zone opportunities around the world begin to pay off. As to enterprises by category, 29% of occupant-enterprises are involved in the manufacture of electronic or electrical equipment, 17% are in machinery or metal work and the remaining enterprises are involved with chemicals, furniture, textiles and other types of manufacturing. It is expected that electronic goods and machinery production will be greatly expanded in the future. Also, there are plans to expand the shipbuilding industry in the Zone.

At present most enterprises (58) are renting standard factory facilities, while a

smaller number have built or are building their own private factories. It is expected that this trend will change and that many private factories will be constructed in the future.

The total investment of enterprises which have applied for occupancy permitted in the Zone equals US$4.7 million. Such enterprises as those in the categories of electronics, chemicals, textiles and assembly of automobile parts are expected to increase. The number of large scale enterprises will show a relative increase from the present predominance of smaller companies.

(Kimihiro Kaku)

Table 1 Classification of Export Market by Shares: Kaohsiung

Term / Export Market	January to September, 1970		September, 1966 to September, 1970	
	US$	ratio	US$	ratio
North America	45,204,181	59.4	108,757,985	62.8
U S A	43,125,456	56.7	102,034,424	58.9
Asia	20,243,888	26.6	44,177,424	25.5
Japan	10,182,874	13.4	19,863,287	11.5
Hong Kong	5,906,075	7.8	17,838,375	10.3
West Europe	9,418,615	12.4	17,460,128	10.1
West Germany	3,882,807	5.1	6,604,721	3.8
Holland	3,389,036	4.5	6,220,207	3.6
Middle East	435,837	0.6	1,336,635	0.8
Latin America	351,003	0.5	586,396	0.3
Oceania	238,151	0.3	509,997	0.3
Africa	158,343	0.2	331,260	0.2
Total	76,050,018	100.0	173,159,825	100.0

Source: Export Processing Zones Essential Statistics, 1970.

Table 2 Details of Exported Goods: Kaohsiung

	January to September, 1970		September, 1966 to September, 1970	
	US$	Proportion	US$	Proportion
Electronic goods	36,720,005	48.3	80,336,036	46.4
Cloth	15,194,946	20.0	37,170,227	21.5
Knitted textile	6,192,732	8.1	13,502,058	7.8
Plastic textile	3,601,837	4.7	8,093,128	4.7
Handycraft goods	3,594,346	4.7	8,511,410	4.9
Leather goods	3,396,524	4.5	8,113,408	4.7
Metal goods	2,564,956	3.4	5,819,450	3.4
Electric equipment	1,381,421	1.8	2,509,047	1.5
Furniture	885,448	1.2	2,147,793	1.2
Toys	723,571	1.0	2,317,001	1.3
Others	1,794,232	2.3	4,640,266	2.6
Total	76,050,018	100.0	173,159,825	100.0

Source: Same as Figure 1.

Table 3 Classification of Industry in the Zone: Kaohsiung

Classification	Number of factories		Amount of planned investment		Planned export		Planned employees	
	Admitted	In operation	US$	%	US$	%	Persons	%
Electronic goods	37(22.6)	33	16,294,229	41.9	86,022,877	39.9	13,361	28.6
Knitted textiles	23(14.0)	22	2,765,630	7.1	15,737,360	7.3	5,418	11.6
Handycraft goods	21(12.8)	18	3,180,000	8.1	23,182,972	10.8	5,115	10.9
Plastic goods	17(10.4)	15	2,972,465	7.6	13,548,950	6.3	4,145	8.9
Cloth	16(9.8)	15	5,839,639	15.0	32,196,980	14.9	9,026	19.3
Metal goods	16(9.8)	15	2,993,500	7.7	14,908,096	6.9	2,536	5.4
Manufactured goods	10(6.1)	9	1,111,000	2.9	10,436,400	4.8	2,557	5.5
Toys	5(3.0)	5	894,069	2.2	3,218,068	1.5	1,285	2.8
Furniture	3(1.8)	3	525,000	1.3	2,540,000	1.2	535	1.1
Electric equipment	3(1.8)	3	860,000	2.2	6,151,670	2.9	827	1.8
Rubber goods	3(1.8)	3	175,000	0.4	2,391,350	1.1	538	1.2
Machines	2(1.2)	2	140,000	0.4	802,000	0.4	138	0.3
Paper goods	2(1.2)	2	398,150	1.0	1,314,068	0.6	294	0.6
Precision machinery	1(0.6)	1	150,000	0.4	198,000	0.1	63	0.1
Printing machinery	1(0.6)	1	152,000	0.4	955,920	0.4	363	0.8
Chemical goods	1(0.6)	1	50,000	0.1	720,000	0.3	140	0.3
Yacht building	1(0.6)	1	125,000	0.3	525,000	0.2	47	0.1
Packing materials	2(1.2)	2	285,000	0.7	755,670	0.3	304	0.7
Total	164(1.2)	151	38,910,682	100.0	215,605,381	100.0	46,692	100.0

Source: Same as Figure 1

Table 4 Details of Investment Ownership: Kaohsiung

Investment source		Number of admitted factories		Amount of planned investment		Amount of exports		Planned employees	
		Number of factories	%	US$	%	US$	%	Persons	%
Domestic Investment		39	23.8	5,400,650	13.9	32,335,736	15.0	8,753	18.7
Overseas Chinese Investment	Hong Kong	22	13.4	5,327,814	13.7	32,432,450	15.0	7,982	17.1
	Ryukyu	2	1.2	650,000	1.7	3,074,080	1.4	1,735	3.7
	Japan	1	0.6	125,000	0.3	840,000	0.4	200	0.4
	Indonesia	1	0.6	150,000	0.4	570,000	0.3	631	1.4
	Malaysia	1	0.6	212,500	0.5	630,670	0.3	217	0.5
	Total	27	16.5	6,465,314	16.6	37,547,200	17.4	10,765	23.0
Foreign Investment	Japan	47	25.6	9,927,600	25.5	73,965,578	34.3	12,553	26.9
	United States	12	7.3	7,534,429	19.4	19,522,850	9.1	3,100	6.6
	England	2	1.2	750,940	1.9	1,650,000	0.8	410	0.9
	Holland	1	0.6	2,150,000	5.5	4,610,200	2.1	558	1.2
	Turkey	1	0.6	190,000	0.5	1,000,000	0.5	540	1.2
	Total	58	35.4	20,552,969	52.8	100,748,628	46.7	17,161	36.7
Joint Venture	Japan, Taiwan	18	11.0	2,128,930	5.5	16,548,649	7.7	3,179	6.8
	USA, Taiwan, Chinese in H.K.	6	3.7	1,397,500	3.6	13,494,200	6.3	2,014	4.3
	Japan, USA	4	2.4	533,500	1.4	2,687,800	1.2	663	1.4
	JPN, Taiwan, Chinese in Japan	4	2.4	640,000	1.6	4,037,100	1.9	1,834	3.9
	USA, England, Hongkong	3	1.8	520,569	1.3	1,908,068	0.9	1,014	2.2
	JPN, Taiwan, Chinese in H H.K.	2	1.2	199,250	0.5	2,796,000	1.3	398	0.9
	USA, England, Chinese in H.K.	1	0.6	202,000	0.5	402,000	0.2	201	0.4
	JPN. Canada, USA, Chinese in H.K.	1	0.6	800,000	2.1	2,000,000	0.9	470	1.0
	USA, England, Canada, Brazil	1	0.6	70,000	0.2	1,100,000	0.5	240	0.5
	Total	40	24.4	6,491,749	16.7	44,973,817	20.9	10,013	21.4
Grand Total		164	100.0	38,910,682	100.0	215,605,381	100.0	46,692	100.0

Source: Same as Figure 1

Table 5 Sources of Investment in the Masan Free Export Zone
(as of June 30, 1972)

Sources of Capital		Approved Enterprises		Investment Amount	
		Number	%	(in US$)	%
Foreign Investment	Japan	23	67.7	8,609,716	62.6
	U S A	3	8.8	700,000	5.1
	Hong Kong	1	2.9	500,000	3.6
	Sub-total	27	79.4	9,809,716	71.3
Joint Ventures	Korea Japan	5	14.7	806,000	5.9
	Korea U S A	2	5.9	3,144,000	22.8
	Sub-total	7	20.6	3,950,000	28.7
Total		34	100.0	13,759,716	100.0

Source: Korea's Free Export Zone Quarterly, Jun. 1972

APPENDIX III SCIENCE AND TECHNOLOGY FOR ECONOMIC DEVELOPMENT

I. The Role of Science and Technology in National Development

Greater importance has been assigned in recent years to the role science and technology play as key factors for national development. The first Five Year Plan (REPELITA), for example, recognizes that science and technology are essential factors which will make a significant contribution to the development of Indonesia. This chapter therefore places particular emphasis on the application of science and technology, in relation to the development planning. Science is here taken to mean the discipline and the body of knowledge, and technology to mean the application of science. The fundamental role of science and technology in the development of the nation is to determine the appropriate combination of the production factors.

Need exists to make a plan of action for the application of science and technology to development, taking social needs into due consideration. To be effective and practicable, this plan of action must satisfy the following conditions.

The first condition is to work out and adopt policy for the application of science and technology to development. It is necessary to design research and development for satisfying social needs, and to supply necessary national R&D resources for the use of technology. Need also exists to increase investment in education, to thereby improve capacity to absorb foreign science and technology, and to remove and lessen social and cultural friction. In addition, it is important to forge stronger links between organizations related to 'science and technology" and 'social and economic development'; these organizations include, for example, LIPI, BAPPENAS, the Ministry of Industry, and the Ministry of Education.

Second is the necessity to achieve harmonization between the overall national development strategy and the policy for science and technology. Development will not benefit if the government carries out a policy for science and technology contradictory to the development policy.

Third is the need to modernize of transfer mechanism of science and technology. This is to foster desirable social effects of the application of science and technology in keeping with existing cultural patterns, value systems and social systems to develop or introduce and diffuse new technology. To increase the efficiency of the process of transfer of technology, moreover, requires the modernization of the national and public communication systems, the utilization of the national and public communication systems, the utilization of the modern mass-media, the improvement of transfer and information channels, etc.

Fourth is the need to increase supply and adequate use of 'science and technology

resources'. To increase the member of scientists and engineers without taking measures and making investments to ensure their abilities will be adequately utilized will result in diseconomies and under-utilization and even of these highly-trained persons.

The allocation of R&D resources for development is an important policy issue for the Government. To contribute to this aspect of policy-making, we have selected the main sectors influencing the economic development of Indonesia, and made a cross-impact analysis among those sectors. We fixed the rank of each sector taking into account the degree of importance for development and the degree of cross-impact. This rank is equivalent to the recommendation of policy priority among those sectors. The results are shown in Table 1.

Putting sectors in order of priority, they are Agriculture, Education, Public Works, Health & Family Planning, Industry, Mining. Putting sectors in order of the degree of the cross-impact, orders are Education, Public Works, Agriculture, Health & Family Planning, Industry, Mining. Cross-impact is remarkably great in Education and Public Works. Factors imparting large impact on other sectors are, in order of degree, vocational teacher education, inland transportation, higher education. And this direction of impacts is reversible. Family Planning has the highest rank and therefore the highest priority, although this sector gives and receives extremely small impact.

The REPELITA development budget reflects an appreciation of the relative priorities accorded the main factors and sectors of the Development Plan. In this Plan, high priorities are given to irrigation, transportation and communication, and industry. Education, although it can greatly contribute to development, receives barely 9% of the development budget. The ultimate motive force for development of a nation is the people of that nation, although capital, labor, natural resources and other factors are also important. Education improves the human resources – the lifeblood -- of a nation. Therefore, the budget for education should be increased to about 20% at least.

To what fields of sciences should the Government give priority for the development of Indonesia -- this is the key question which follows from the above.

We have selected main fields in agricultural and engineering sciences, calculated cross-support impacts on the development of Indonesia, and determined the order of priority based on those calculation and on the gap of scientific capacity between required levels and actual levels. The higher the rank, the larger 'scientific and technological' linkage the field has and the more important the sector is for development. The results are shown in Table 2.

Economic development of Indonesia depends on agricultural development and industrialization. Agricultural development contributes to industrialization, and industrialization contributes to agricultural development. Phytopathology and soil sciences have the highest rank for the development of Indonesia. They are the most effective sciences for development, directly in the case of agricultural development, and indirectly in the case of industrialization through its strong relation to chemistry. Such linkages among sectors through sciences and technology carry with them the need for integrated planning and plan implementation which

should be encouraged and supported.

II. Industry and Technology

The purpose of industrialization is to extend the industrial production capacity. Indonesia has persevered in efforts for industrialization. Since REPELITA, Indonesian Industrialization has progressed steadily, but the growth rate is very low. We think Indonesia must accelerate the process of industrialization. Industrialization involves a radical transformation of society in all its aspects, that is, economic, social, political and cultural. Therefore, strengthening of the infrastructure for industrialization can have a profound impact on a wide range of sectors.

As important issue is the choice of the most suitable technological systems to promote the Indonesian industrialization. In general, the adopted technology must satisfy the maximization of marginal social productivity in the national economy and the maximization of profits in the private sector. The adoption of technology depends primarily on:

(1) composition of production resources,

(2) level of science and technology, and

(3) size of market and optimum enterprise size.

Constraints on the selection of technological systems suitable for Indonesia are as follows. First, the Indonesian economy is a labor-intensive, capital-deficient economy. Therefore, labor-intensive technology is suitable for Indonesia. Second, there is a scarcity of scientifically and technologically skilled manpower in Indonesia, as is generally recognized. It is also important that internal brain drain has arisen through poor employment policy of scientific and technological manpower and because of under-financing and poor organization. Third, the transfer system for science and technology is underdeveloped. Indonesia needs to improve the transfer efficiency and to accelerate industrialization by promoting information services, quality control, standardization and maintenance work.

The balance of payments imposes a ceiling on economic development. A deficit balance of payments obviously hinders the economic development of Indonesia. The crucial foreign exchange shortage compelled that an emphasis in industrialization be given to stimulating export promotion and import substitution industries. Thus the development of natural resources was given particular attention.

Indonesia is richly endowed with many kinds of natural resources, such as oil, nickel ore, bauxite and iron ore. One of the principal tasks confronting the Indonesian Government is to make better use of these natural resources for the cause of national development. Government policies for the development of natural resources are mainly as follows:

(1) Programs for industrialization of natural resources based on regional development;

(2) Creation and improvement of national services;

(3) Systematic development of surveys and resource analysis;

(4) Increase and improvement of scientific and technological research activities;

(5) Strengthening programs for training and the diffusion of technology; and

(6) Pilot projects for utilizing natural resources.

In the development of natural resources, national institutions in this field should be prepared to carry out related programs, such as the training of research workers, experts and engineers, and the development of related industries. Neighboring countries of Indonesia have similar requirements. Further, the development of natural resources is a vital aspect of, and itself requries, international cooperation. Therefore, it will be useful for Indonesia if Indonesia and nearby related countries to establish an Asian Development Center of Natural Resources, in Indonesia, for the purpose of regional cooperation.

In Indonesia, agriculture figures significantly in performance of the economy and formulation of development policies, and hence improvement of the structure of agriculture is of great importance. A more effective structure of agricultural development may be attained by (1) making more effective use of fertile land, labor and capital in agriculture, (2) creating owner-farmers by the transfer and deconcentration of land ownership, (3) consolidating the distributive organization, (4) providing for institutions, services, conditions and inducement to quickly diffuse and adopt improved technologies.

The Green Revolution is capable of functioning as a mainspring of economic development. The purpose of adoption of the high-yielding varieties which is the essence of the Green Revolution is to expand agricultural production and decrease costs through the diffusion of improved technology. Ultimate benefits must be decreased prices for consumers and increased income for farmers without involving the sacrifice of others. However, the Green Revolution cannot attain its full measure of benefits without support through implementation of land reform, improvement of irrigation, fertilizer distribution and agricultural chemicals, etc. Indonesia has not obtained as much benefit from the Green Revolution as it should. As shown in Table 3, the rate of diffusion of new varieties in Indonesia is remarkably low compared with other South Asian countries.

In light of conditions existing in Indonesia, it is highly desirable that the Government develop a plan to make better use of available scientific resources by concentrating R & D efforts on a limited number of highly important problems, such as the calorie and protein shortage, protective foods, basic biology (genetics, pathology, entomology, etc.), forestry, soils-water-crops, processing, storage, marketing, import substitution and export promotion.

III. Policy for Technological Progress

Indonesia needs to make more concentrated efforts to expand its capability to apply science and technology for development, and for this purpose, needs to continue to increase expenditures on research and development and to endeavor to attain a minimum average level equivalent to 0.5 per cent of the gross domestic product as the United Nations has recommended to all developing nations.

It is better that the R & D program be oriented to the development of technologies that are in line with the circumstances and requirements of Indonesia, and be so oriented as to be related to the economic and social development plan. Innovation is created from the interrelationship or mutual approach between the R & D activities and the needs of people. The Government can often participate in not only the allocation of R & D resources but also in some large-scale investment programs of scientific and technological development that have influence on the pace and the direction of scientific and technological advancement. Therefore, the science policy of the Government is very important, and must be capable of being linked with the industrialization policy of the Government. The Government should make best efforts through its science policy by putting official or governmental R & D institutions to practical use, for example, by using them for coordination of R & D activities among institutes, strengthening of scientific and technological services, promotion of R & D activities, development of R & D manpower and communication between fields of scientific endeavor.

Both self-development and acquisition from overseas may be utilized for the advancement of science and technology; both are important and the major questions related to these two methods involve the cost/benefit relation of developing technology as compared to purchasing it in the international market, and specific points as to what areas of science and technology should be accorded high priority, etc.

All countries buy some of the technology they need; Indonesia would be no exception. And much of the body of knowledge which is secure knows no political barriers to international movement. Indonesia's major issues include, however, the need to form a more effective transfer system of science and technology. In promoting the introduction of advanced industrial technology, we can think of main transfer policies as being the following,

(1) Improvement of the centers of transfer of technology;

(2) Establishment of modern industrial laws (including an industrial property law, patent law, etc.);

(3) Establishment of a political and economic security system and protection policy;

(4) Adoption of financial and tax policies to promote goals related to sience and technology; and

(5) Establishment of government management of technology trade (including assessment of technology).

The transfer center of technology becomes a node connecting domestic channels with foreign sources of technology, and actively does the work of technology transfer. The role of the center is as follows:

(1) To guide and assist enterprises in selecting technology to be induced;

(2) Transmission of scientific and technological information to R & D institutions and to the users; and

(3) To help rationalization and smooth working of transfer process from determination of technological needs to the adoption of technology.

(Masaru Saito)

Table 1 Policy Priority for Economic Development

Rank	Sectors
1	Vocational education, Family planning
2	Teacher, Rice, Health
3	Higher education
4	Inland transportation, General education, Forestry
5	Irrigation
6	Animal Husbandry, Fertilizer Cement and Chemical Industry, Housing, Oil and Natural Gas, Fisheries
7	Railway Transportation, Sea Transportation, City Planning, Regional and Village Planning, Rubber and Palm Oil, Tea Tobacco etc.
8	Maize etc., Light and Cottage Industry, Tin, Bauxite, Textile,
9	River Transportation, Metal·Machine and Equipment Industry, Infrastructure, Pulp·Paper and Printing, Air Transportation, Pharmaceutical Industry, Gold and Silver
10	Sulphur, Coal

Table 2 R & D Priority for Development in Agricultural and Engineering Sciences

Rank	Science
1	Phytopathology, Soil Sciences
2	Industrial engineering, Processing engineering
3	Agricultural chemistry, Food sciences and technology, Instrument and control engineering
4	Chemical engineering, Crop production and Protection, Timber and wood technology, Construction engineering, Transportation engineering
5	Animal producton, Agronomy, Fisheries and wildlife
6	Horticulture, Mining engineering, Civil engineering, Agricultural engineering
7	Sanitary engineering, Welding engineering, Corrosion engineering & Preventive maintenance
8	Animal health, Hydraulics engineering, Fuels and combustion engineering, Materials engineering, Petroleum engineering
9	Forestry, Mechanical engineering, Electrical and combustion engineering, Textile engineering, Telecommunication engineering
10	Naval architecture and Marine engineering, Architectural engineering, Ceramics engineering, Aeronautical engineering

Data: Lembaga Ilmu Pengetahuan Indonesia
"The Application of Science and Technology to Development in Indonesia", 1971

Table 3 **The Total Area Planted with Rice, with New Varieties of Rice, and with New Varieties of Rice as a Percent of the Total Area Planted with Rice, in Selected South Asian Countries, 1968-1969**

Country	Rice		
	Total (1000hectares)	New varieties (1000hectares)	New varieties (% of total)
Ceylon	663	7	1.0
India	36,966	2,631	7.1
Indonesia	8,478	168	1.9
West Pakistan	1,514 *	308	20.3
Philippines	3,199	1,059	33.1
Others*	18,022	490	2.7
Total	68,842	4,663	6.7

* Burma, Laos, Malaysia, Nepal, East Pakistan and Republic of Viet Nam

Source: William J. Staub and Melvin G. Blase, 'Genetic Technology and Agricultural Development', *Science*, July 9, 1971

PART II

JAPAN AS A MARKET FOR INDONESIAN PRODUCTS

PART II JAPAN AS A MARKET FOR INDONESIAN PRODUCTS

CHAPTER I THE DIRECTION OF STRUCTURAL CHANGE OF THE JAPANESE ECONOMY

The purpose of this chapter is to provide some background information on the Japanese economy with regard to

(1) the overall performance including basic structural changes

(2) the shift from the extensive to the intensive growth pattern

The presented general outline should make it easier to put into proper perspective the shifts taking place in various markets of the Japanese economy as they will be taken up in the chapters to follow.

Performance of the Japanese Economy - Growth and Structure

I. Methodology

The analytical concept of an epoch of Modern Economic Growth (MEG) (la) is useful for (a) a systematic distinction between the epoch of the Pre-Meji-Restoration (before 1868) and the epoch of the Post-Meji-Restoration, (b) for forming phases of economic growth within the epoch of the Post-Meji-Restoration.

The criteria most relevant when referring to (b) are:

(1) Growth of real product per capita

(2) Transformation of sectoral structure (changing dual structure)

(3) Transformation of industrial production structure

Based on these criteria we can classify the past economic development of Japan (2a) into three phases of MFG:

(1.) Phase: 1868–1905, the traditional economy is paramount as a basis for development of a modern sector.
(2.) Phase: 1906–1953, the modern economy grows on its own base establishing a light and semilight industry complex.

(3.) Phase: 1953 – present, completion of industrialization through the propagation of heavy industries and a modern service sector.

The (3.) phase will give the economic development of Japan its characteristics also in the foreseeable future as can be shown referring to the criteria mentioned before.

II. Projection of GNP

According to the projections of the Japan Economic Research Center, the Japanese economy will continue its growth at an yearly rate of 12.4% in real values in the period from 1970 to 1975. (1)

According to the OECD projection the real economic growth of GNP between 1970 and 1980 will amount to 10% yearly on the average. The same OECD estimates are for USA 4.3%, West Germany 4.5%, France 6%, UK 3.1% and Italy 6.6%.

The Economic and Social Development Plan of the Japanese Government projects an average growth rate in real terms of 10.6% per annum from 1969 until 1975.

III. Changing Dual Structure

The changes in the dual structure characterized by the shift from the traditional, that is to say agricultural sector, to the modern, that is to say industrial sector, which has taken place in the Japanese economy particularly since 1930 will continue in the future. Of the total labour force in 1968, the agricultural sector employed 19.8%, the industrial sector 34%, and the tertiary sector 44% while, according to the estimates of the New Economic and Social Development Plan, of the total labour force in 1985, the agricultural sector will employ 9%, the industrial sector 41 to 43%, and the tertiary sector 46 to 48%.

With regard to the GNP in 1968, the agricultural sector produced 8.4%, the industrial sector 42.4% and the tertiary sector 49.3%. In 1985 the corresponding share for the agricultural sector should be 5%, for the industrial sector 47%, and for the tertiary sector 48%.

In 1985 there will be no differential structure in the sense of traditional and modern sectors. The 9% of the work froce still employed by the agricultural sector will work in a highly mechanized sector. In 1985 there will only be the modern sector. If there is to be any dual structure, it will be a new dual structure between the industrial and tertiary sectors with features distinctively different from the old dual structure. The criteria for such a classification will have to be more specific than the criteria for the broad categories for the dual structure between traditional and modern sectors.

IV. Changing Industrial Production Structure

Besides the sectoral changes within the industrial sectors, the light and semi-light industries like paper, pulp, textile, lumber, food-stuffs industries are constantly losing their relative weight compared with heavy and chemical industries like iron and steel, metal products, machinery, mining, manufacturing, chemical industry and so on.

This trend indicated in the statistics below is expected to continue in the future. In particular it is anticipated that highly developed machinery industries like electronics, aircrafts, industrial machinery, computer industry and so on willl play a key role in the development of Japan's industrial structure within the next decade.

From Extensive To Intensive Growth

(A) The logic of the shift

At the Meji-Restoration in 1868 MEG became the national goal the first time. In 1968, hundred years after the Meji-Restoration, the objective of economic growth as a national goal has been officially questioned the first time. It is clear that such a change in economic policy indicates a significant change in the development of the Japanese economy. We might say that a Second Revolution is taking place in the present day Japanese economy with no less long run impact than the First Revolution.

Besides the acclamation of new policy goals this revolution has its real background based on changes with regard to the availability of production factors. While hitherto labor and capital were relatively redundant without any major "social" constraints imposed on them, labor and capital will become relatively scarcer in the future. To describe the logic of this broad shift we refer to the analytical distinction between extensive and intensive growth. Extensive growth is defined as a state of relative redundancy of production factors leading to an extensive use of available production factors; intensive growth is defined as a state of relative non-redundancy of production factors leading to an intensive use of available production factors.

The theoretical question whether this shift in the growth pattern constitutes two phases within the third phase of MEG, or two phases within the last two phases of MEG, or even suggests the distinction of two broad phases of MEG, is of no particular interest in this study. The decade to come, however, must be seen as a period of transition similar to the period of transition after the Meji-Restoration in 1868. The growth rates of changes indicated might provide some idea of the speed of the transition process and the length of the transition period.

(B) Labor

I. Increased Scarcity of Labor

1. Population

According to the NESDP, there will be a decline in the birth rate in the 70s. Despite increasing life expectancy there will be a slight decrease in the population growth rate.

2. Labor Force

The growth rate of the labor force which reached its peak with an average annual rate of increase of 12% when the postwar baby-boom had its effect in the years 1961 to 1965 decreased steadily and reached 0.8% in 1970.

According to the projections of the Japna Economic Research Center, the average annual growth rate of the labor force between 1971 and 1975 will be 1.0%. According to the estimates of the Naitonal Comprehensive Development Plan, the rate between 1965 and 1985 will be only 0.7% annually.

Besides the decline in the population growth rate, the increase in the number of people remaining in school for longer periods and the increasing share of elder people in total population are also responsible for the lower rate of increase in the labor force. According to the NESDP (4), the share of people with university-college degrees in the total population will increase from 11% in 1965 and 22% in 1970 to 27% in 1975. The share of the population over 65 years to total population was in 1965 6.3%, in 1970 7.0% and will be according to the Ministry of Welfare 7.9% in 1975 and 8.9% in 1980.

An additional scarcity of labor becomes apparent when relating the total labor force to a working hour index. In 1960 the total working hours per month were 207, in 1970 they were reduced to 187.7 – about 20 hours in ten years. Since Japan has not reached the international average, working hours will decrease further, and will be an additional factor leading to the scarcity of labor.

3. Shift from Agricultural Sector to Industrial and Service Sector

The main source of labor supply for the modern sector in the first and, in particular, second industrialization phases was the labor force coming from the agricultural sector. With the increase of the modern sector, the labor force in the agricultural sector decreased steadily and dropped in 1967 below the 100 million level. The relative share of agricultural workers to total employees amounted in 1962 to 29%, in 1968 to 19.8%, in 1970 to 16.5% and will reach in 1985, as is evident from the sectoral analysis presented earlier, 9.0%.

The agricultural sector will continue in the future to be a labor source for the modern sector. However, while the decrease of the relative share of the agricultural sector within ten years between 1960 and 1970 was 12.5% and thus supplied the modern sector with a considerable amount of additional labor. The decrease in the next fifteen years from 1970 to 1985 will amount only to 7.5% and thus will lead to a decrease in relative average yearly transfer of labor from the agricultural sector to the modern sector.

Taking into account all variables determining the labor force, it will be recognized that all of them tend to point to a decrease.

II. Increasing Cost of Labor

The scarcity of labor in the last decade under the condition of a persistent high demand for labor led to a completely new situation in the labor market. While the problem in the two first phases of MEG and at the beginning of the third phase of MEG consisted of providing adequate employment for agricultural workers, in the industrial sector, the problem now in the second part of the third phase of MEG consists of providing the modern sector with enough labor.

The turning point was 1968 when for the first time in Japan's economic history the number of jobs open exceeded the number of job seekers. The ratio of effective job offers and effective job seekers increased steadily since 1968 and amounted to 1.4 in 1970.

The production function which was characterized in the extensive phase of industrialization by the extensive use of labor will be characterized in the intensive phase of industrialization by a high input of capital in the form of labor saving techniques. Departing from the widely-held view that the forces on the side of demand for labor (domestic and foreign) will be prevalent to a similar extent in the future, it is evident that the trend towards increased scarcity of labor will lead to an increase in the price of labor in the future.

The changes in the cost structure will have significant repercussions on the production structure. There will be a shift from labor intensive industries to capital intensive industries. The labor intensive industries are located mainly in the sectors of light and semi-light industries. The shift from these industries to the heavy industries which are supported by the comparatively higher income elasticities of demand and productivity differentials will be determined to a considerable extent by the forceful factors on the labor supply side.

(C) Capital Supply

I. Private Savings Ratio

The extremely high investment ratio of the last two decades was, following the Keynesian Economics, only possible by a corresponding exceptionally high saving rate. Indeed, both the household savings and business savings have contributed to the high saving ratio. The saving ratio of private household belong to the highest of the world despite comparatively low per capita income. The high saving rate is mainly due to saving for social security, for future purchasing of houses and consumer durables, due to the unequal income distribution and the Japanese people's attitudes towards life. (5)

A significant contribution to the high savings rate comes from the business side. Statistical evidence reveals that the private fixed investments in major manufacturing sectors were correlated much less with the value of product sales or with the rate of operation than with profit (after tax). (6) The constant gains in productivity at a relatively constant domestic wholesale price level in the last two decades were absorbed either by higher wages or by higher profits. Since in the extensive phase there is a relatively higher availability of labor, wages followed slowly the increases in productivity while the main share of the gains in productivity was absorbed by increased profits. With increasing scarcity of labor in the intensive phase of industrialization, profit rents which could be enjoyed due to the weak position of labor will not be realized in the future intensive phase of industrialization where the scarcity of labor will lead to a quick adjustment of the price of labor and where institutional changes push towards an increase in the price of labor. The higher wages will partly compensate for the losses in savings by business and also stimulate investment due to increased demand.

II. Constraints on the Increase of Private Savings Ratio

A high savings and investment ratio will continue to be a feature of the Japanese economy. However, there will be a basic shift which could be called a shift from a capital accumulation without major social and external constraints to a capital accumulation with major social and external constraints. For the first time since the Meji-Restoration, it has been explicitly stated that economic growth does not have first priority any more but is only one goal among others. (7)

1. Two Major Social Constraints to Private Capital Accumulation

a) Increasing Income Redistribution

The expected trend towards improvement of the income distribution among persons as well as among regions will have a retarding effect on the increase of private savings. A decrease in the growth of income on the part of high income earners accompanied by a relative increase in income on the part of

low income earners will lead to a relative increase in demand for consumer goods.

b) Increasing Social Security

The average annuity amount per aged person in Japan in 1970 was 160 US dollars while the corresponding value for the USA was 871 US dollars and for Germany who has approximately the same per capita income, the corresponding value was 906 US dollars. (8)

As to the payments for labor, it will lead to an additional increase of labor cost since at a full employment level higher taxes can be swallowed by higher demands for wages. The pressure will be felt particularly by the labor intensive industries. The improved social security will induce a decrease in the household savings rate. The entrepreneurs will balance the higher taxes with increased productivity or higher prices or they will have a decrease in profits and, consequently, their savings.

An additional pressure on the private savings ratio independent of the provisions for income redistribution and social security derives from the change in the age structure of the population. The younger generation saves relatively more than the older generation which uses up money saved in their youth. Since there will be a shift from the younger to the older age groups, there will be a relative decrease in household savings.

2. External Constraints to Private Capital Accumulation

a) Increasing Consideration for External Diseconomies

Environmental disruption is a function of population density, the degree of concentration, and the level of economic activity. Japan's population density stood in 1970 at 280/km^2 – one of the highest in the world. (9) Industrial output has risen since 1947, for example, in crude steel 100 fold, in heavy oil 2500 fold. (10) The energy consumption level of Japan per land area is eight times the level of the USA. The number of automobiles owned per land is seven times the level of the USA. (11) The industrial areas are concentrated along the Pacific coast and the large urban areas such as Tokyo, Osaka, and Nagoya.

Considering these three factors, it is not surprising that the environmental disruption in Japan might be stronger than in other industrialized countries.

At present we can witness a basic change in the attitude of Japanese people towards environmental disruption. In the basic law concerning "measures for

environmental disruptions and the establishment of principles for burdening the expenditure for works to prevent environmental disruptions", for the first time in 1968 the priority of prevention of environmental disruptions over industrial development has been firmly recognized. In the futuer an increasing amount of formerly privately used capital will be used up for external investments. The government will increase the tax burden in order to accomplish the environmental equilibrium with public investment and private enterprises will have to internalize the hitherto external consumption as a cost factor in their calculation for producing private goods.

b) Increasing Social Overhead for Establishing a Society of Information

In the intensive phase of industrialization, the efficiency of the economy must be secured by increasing labor and capital productivity which calls for additional social overhead. In the NESDP as one of the most important tasks for the future, it is considered to improve social overhead capital so as to foster new communication net works, science and technology, the ability for inventive research and development as well as the balance between individual character and social adaptability. (12) The shift from private to public capital accumulation in order to improve the efficiency of the economy will lead to a decrease in the relative availability of private capital, but also to an increase in the productivity of private investment. In fact the optimistic projection with regard to the growth rate for the 70s is based on the realistic assumption that the shift will come about as described above.
The shift from private savings towards consumption on the one hand and channeling of more investment into public purposes on the other hand will lead to a relative decrease of capital available for private investment. This in turn will increase the price of capital for private investment. This will induce the second shift in the production function. The first shift was the shift from labor intensive to capital intensive production, the second shift will be the shift from capital intensive production with low level of know-how to capital intensive production with high level of know-how.

(D) Conclusion

The main features of the economic development of Japan until about 1985 can be summarized as follows:

I General MEG Criteria

1. The growth of GNP will continue in the next decade at a rate in the neighbourhood of 10%, one of the highest in the world.
2. The industrial and service sectors which will be producing in 1985 95% of

the GNP and will be employing 91% of total employed, will give the future economic structure of Japan its characteristic shape.

3. This shift in the production structure from the light and semi-light industries to the heavy industry will continue in the future.

II Refined MEG Criteria

1. Due to the decrease in population growth, the decrease in working hours and exhaustion of the supply potential of the agricultural sector, labor will become more scarce and more expensive in the future.
2. Due to the increase in demand for labor absorbing investments and social overhead, capital for private investment will be more scarce and more expensive in the future.
3. Japanese economy in the future will be characterized by a technologically and scientifically highly developed production capacity where the production factors will be used intensively and not extensively and which will produce a highly differentiated and subtle assortment of industrial products which will require considerable capital and sophisticated know-how.

III The Relevance of the Shift in Japan's Production Structure to her Trade with Indonesia

A) Market Potential

1. Total Import Value

According to the National Income Statistics of the Economic Planning Agency Japan's nominal GNP in 1970 amounted to 70,618 billion yen or 196 billion US dollars. With a GNP growth rate of 17.2% nominal or of about 10% real (OECD projection) from 1970 until 1980, Japan's share in the world GNP will amount to 10% in the near future.
The total import value in 1970 was 15.7 billion US dollars. In 1980 Japan's import value is expected to be 75.5 billion US dollars. (13)

2. Structural Aspects

a) Import Dependency

The ratio of reliance on imports is relatively low compared with other major countries and is not expected to increase greatly. (14) However, the overall dependency ratio is somewhat misleading. In order to evaluate the overall dependency ratio properly, we might introduce the distinction between changeable and unchangeable dependency. Changeable dependency refers to imports which can be replaced by domestic production while unchangeable dependency refers to imports which can

not be replaced by domestic production. The changeable dependency ratio is characterized by a high potential import substitution, the unchangeable dependency ratio by a low potential import substition. Since Japan pursued quite rigorously an import substitution policy in the past, the share of imports with changeable dependency in total imports is relatively small. Because of the high dependency of Japan's economy on raw material, the unchangeable dependency is relatively high. With regard to the unchangeable import dependency ratio, Japan might have one of the highest import dependency ratios when compared with other industrialized countries.

b) Export-Import-Ratio

In the past Japan's considerable export performance was even more impressive. Japan's export ratio has been expanding at twice the speed of the average export growth of the whole world during the last five to ten years. A similar trend is to be expected in the future favouring a permanent surplus in the balance of payments. This situation will lead to a number of problems for the Japanese economy in the future. However, it has a favourable effect on exporting countries in so far as there will be hardly any significant import restrictions in Japan in the future. The surplus situation gave rise recently, in fact, to a number of liberalization measures and led to a new policy for the future with regard to foreign trade, foreign investment and foreign aid as will be shown in the chapter on external relations

B) Shift in Japan's Import Situation

The excellent growth performance as well as the shift in Japan's production structure as indicated in the two previous sections lead to significant changes in the import structure of the Japanese economy.
There will be three basic shifts.

1. Shift in natural resource import
2. Shift in agricultural import
3. Shift in manufactured import

1. Shift in natural resource import

Japan has almost no natural resource deposits. Due to the high future growth rate, the requirement of the Japanese economy will be growing almost twice as quickly as the world's requirements with respect to almost all resources. The requirement for petroleum will increase from 146 million tons in 1969 to 560 million tons in 1980 which corresponds to an average yearly change of

13% during this period. (14) Due to the environmental pollution and the shift in the production structure typical of the intensive phase of industrialization, Japan will be revising her pattern of resources imports. While in the past emphasis was given to natural resources imports in the form of raw materials, in the future heavy emphasis will be given to imports of semi-finished or finished raw materials.

2. Shift in Agricultural Imports

With the growth of population and GNP, the demand for foodstuffs will grow. According to the study by the Asian Development Bank, Japan's food imports will rise significantly between 1966 and 1975. For example meat will rise from 1.7 to 2.8, dairy products and eggs from 1.1 to 1.8, fish from 2.7 to 4.9, fruits and vegetables from 6.6 to 10.1, coffee and tea 1.0 to 1.4, taking the low variant of the estimates (figures indicating per capita food import measured in kilograms). (15)

Increasing population density and increasing scarcity of labor and capital will lead to a continuous reduction of the agricultural production. This will induce a shift in the import pattern of agricultural products in so far as in the future a number of products now being produced in Japan and not yet liberalized will be imported.

3. Shifts in Manufactured imports

Out of an average rate of increase of 17% of total imports between 1970 and 1980, a considerable share will go to imports of manufactured products. Manufactured imports accounting for 30% of Japan's total imports in 1970 will grow in their relative importance to 50% of total imports by 1980. (16)

However, even more important than the increase in the growth rate of manufactured imports with regard to the need of LDCs is the shift in the structure of manufactured imports. This shift can be fully explained by the shift of the Japanese economy from extensive to intensive production.

The influences of the shift in the production structure on the imports structure are three-fold:

a) Higher labor cost in Japan will increase considerably the share of labor intensive products in total imports. The average rate of Japan was 30% of that of the USA in 1970. It will be about 80% of that of the USA in 1980. Compared with the projected wage levels of the LDCs mentioned in the statistics below. In the future Japan will not be competitive in the production of labor intensive manufactured products with LDCs. (17)

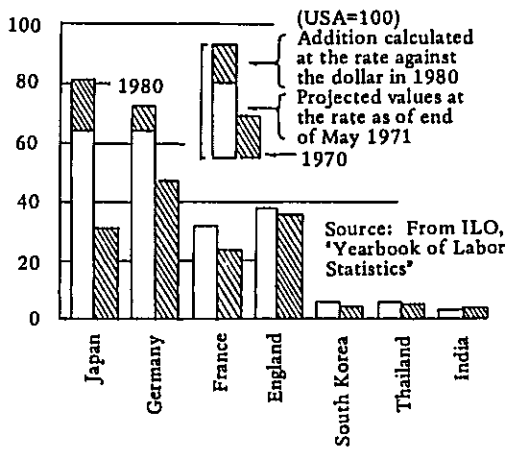
b) Due to the scarcity of capital, the substitution of labor by capital will prove to be, if technologically possible at all, disadvantageous in economic terms. The shift from labor intensive industries to capital and technology intensive industries is supported by both the scarcity of labor and the scarcity of capital. Thus there will be a market for LDCs in Japan not only with regard to labor intensive products but also with regard to capital intensive products without highly-developed technology.

c) The internalization of environmental pollution costs into the private production cost and deficiency with regard to own natural resources will lead to a decrease in the competitiveness of industries involved in such activities.

As to the commodities imported, there will be a considerable increase in import of textiles, light industrial manufactures and metal goods, while Japan will be focusing in the future on her production of chemical goods, general-purpose machinery, electrical transportation, precision machinery and so on - areas where she can prove competitive.

(Kurt Dopfer)

Projected Wage Levels



FOOTNOTES

(1) Okita, S., Japan and the World Economy, JERC, Center Paper No. 15, p. 50/51.

(2) Comp. Okita, S., op. cit., p. 116; Furthermore New Economic and Social Development Plan; 1970-1975, May 1970, abbreviated in the text to NESDP; and Japan's Economy in 1980 in the Global Context, JERC, March 1972, p. 4.

(3) NESDP, p. 140

(4) NESDP, p. 142.

(5) Shinohara, M., Growth and Cycles in the Japanese Economy, Tokyo, 1962, p. 280.

(6) Tsuru, S., Essays on Economic Development, Tokyo, 1968, p. 164.

(7) NESDP 1969/70.

(8) White Paper on Japanese Economy 1971, p. 63.

(9) Japan Economic Yearbook 1971, p. 141.

(10) White Paper, op. cit., p. 50.

(11) Japan Economic Yearbook, op. cit., 145.

(12) NESDP, p. 15.

(13) Japans Economy in 1980, op. cit., p. 25, and p. 7.

(14) Op. cit., p. 52.

(15) Japan's Food Imports by Commodity Group, Occasional Papers, Number 2, ADB, November 1969, p. 13.

(16) Japan's Economy, op. cit., p. 4 and p. 34.

(17) Japan's Economy, op. cit., p. 5.

FOOTNOTES (for page 116)

(1a) as defined by Kuznets; comp. Ohkawa K., Rosovsky H., A Century of Japanese Economic Growth; in Lockwood, W. U. (ed.), The State and Economic Enterprise in Japan, Princeton, New Jersey 1965, p. 53.

(2a) Comp. Ohkawa, K., Rosovsky, H., op. cit., p. 88.

CHAPTER II JAPAN'S FOREIGN ECONOMIC POLICY AND ITS IMPLICATION FOR INDONESIA'S EXPORTS

I. *Introduction*

The economy of present day Japan is undergoing a major change, both internally and externally, after a quarter-century of rapid economic development. The nature of the expected change is best summarized by the phrase "from a growth-pursuing economy to a growth-utilizing one", to cite an expression from the 1972 edition of White Paper on International Trade and Industry. In others words, Japan's economy in the future will not be concerned so much with purely quantitative achievement as with qualitative content of the growth achieved.

As the preceding paper has dealt with the internal aspect of this change, it is the purpose of this paper to deliberate on its external aspect as it relates to Japan's foreign economic policy and, then, to examine the implications of this policy for Indonesia's economic development, or more specifically for her export development. The paper is divided into two sections. In Section I, the present situation of Japan-Indonesia trade is examined with a primary focus on analysis of the trade flow, as well as on its evaluation in a comparative context of Japan-Southeast Asia trade. In Section II, Japan's foreign economic policy is defined in perspective and its implications for Indonesia's exports examined. In the course of the discussion, a suggestion is made to alter Japan's economic assistance policy so as to strengthen development of Indonesia's exports.

II. Japan-Indonesia Trade

1. Quantitative Characteristics

According to Japan Exports and Imports statistics based on customs clearance declarations (i.e., exports are measured FOB and imports CIF), in 1971 Japan's total volume of trade with Indonesia amounted to US$1,339 million. Given the figure of US$958 million for the year 1970, this meant a rate of increase of 39.9%. The annual total for 1972 has been estimated to reach US$1,500 million, or an increase of roughly 15% over 1971. This rapid pace of expansion in total volume of trade in recent years is the foremeost characteristic to be noted in Japan-Indonesia trade.

Turning to the composition of these totals, which is shown in Table 1, Japan's imports from Indonesia accounted for 67% (or US$640 million) of the total volume of bilateral trade in 1970 and for 66% (or US$877 million) in 1971. Japan's exports to Indonesia, on the other hand, were US$317 million and US$462 million in 1970 and 1971 respectively. This means that Japan is now importing from Indonesia nearly 1.5 dollars worth of goods for every dollar

of her exports to Indonesia, which is an exceptional case for Japan's trade relationship with a less developed country.

That this second characteristic of the present situation of trade between the two countries is not just an irregular phenomenon of the immediate past is clearly illustrated by Figure 1, which charts Japan's trade balance with Indonesia for the last decade and a half. It is observed that, while until the middle of the 1960s the trade balance was, on the whole, slightly in favor of Japan, ever since 1966 it has been markedly in favor of Indonesia, leaving Japan, in 1971, in a net-importer position to the extent of about US$400 million. This may tentatively be explained by a combination of two factors. One is that, around the middle of the 1960s, Japan's economy entered into the period of sustained growth at a stable rate of 12-13% per annum (i.e., 1965-70), thereby constantly expanding her demand for imports in the subsequent period. The other is that Indonesia's economy was stabilized and order restored in the second half of the 1960s.

Another important question to be asked of the quantitative aspect of Japan-Indonesia trade concerns its relative importance for the respective economies. Table 2 shows relative weights that the trade occupies in total exports and imports of the two countries. In the case of Indonesia, it is observed that trade with Japan gained in importance during the 1960s and came to occupy, in 1969, around 30% of both her exports and imports. Thus, Indonesia's trade performance may be said to depend heavily on her trade with Japan. Furthermore, this dependency implies that Indonesia's economy is subject to cyclical influences originating in Japan.

On the other hand, in the case of Japan, the relative importance of the trade remained unchanged, if it did not decline, for the greater part of the 1960s. In the case of exports, the same index of the relative importance as above, after marking 2.7% in 1960, steadily declined and hit the low mark of 1.5% in 1969. In 1971, however, the figure rose to 1.9%, reflecting the expansion of trade flow between the two countries. In the case of imports, the index of the relative importance was 1.6%, 1.8% and 1.7% respectively for the years 1960, 1965 and 1967, showing a stagnating trend. The rapidly expanding volume of Japan-Indonesia trade, however, is more significantly reflected here as the figure rose in subsequent years -- to 2.7% in 1969 and 4.3% in 1971. Significant though the recent developments may be, they are not of such a magnitude to make Japan's trade performance dependent on Indonesian trade. This is to be explained primarily by the fact that the denominators, i.e., Japan's total exports and imports, have expanded as well -- the annual average growth rate of Japan's total trade for the period 1965 - 1970 was 18% for both exports and imports.

It is important to recognize that the trade has a different quantitative impact on each of the two economies. No doubt Indonesia's economy is more vulnerable to fluctuations in the size of trade flow between the two countries. This, however, is not the total picture of the present situaiton of trade between the two countires. For a more complete picture, the qualitative aspect of the trade must also be examined.

2. Qualitative characteristics

Table 1 summarizes, by 1-digit SITC categories, the commodity composition of Japan-Indonesia trade for 1970, 1971 and the first half of 1972. As is expected, the table depicts a striking contrast in the commodities exported by the two countries. Most of Indonesia's exports to Japan, i.e., Japan's imports from Indonesia, are primary goods which fall under SITC Sections 2, 3 and 4. These three categories, combined, accounted for more than 93% of Indonesia's total exports to Japan both in 1970 and 1971. Of these three categories, SITC Section 3 or mineral fuels (e.g., petroleum) alone occupied 57.5% and 55% of the total for 1970 and 1971 respectively. SITC Section 2 or non-fuel crude materials showed in 1971 an increase in the volume traded of 40% over the previous year and came to occupy nearly 39% of Indonesia's total exports to Japan -- and the single most important commodity in this category has been lumber. It is Indonesia's increasing exports of these two categories of goods to Japan which brought about the rapid expansion of the trade flow. It should also be noted that they signify non-changeable dependency on the part of Japan whose domestic endowment of these resources is quite limited. Moreover, in the case of petroleum, Japan is 'qualitatively' dependent on imports from Indonesia since there are no substitutes for the latter's high quality (i.e., low-sulfur content) oil.

Japan's exports to Indonesia, on the other hand, are mainly manufactured goods, which fall under SITC Sections 5, 6, 7 and 8. Above all the categories 6 and 7 -- that is, manufactured goods classified by materials and machinery and transport equipment -- combined, constituted 75% in 1970 and 80% in 1971 of Japan's total exports to Indonesia.

The pattern of trade described above suggests the presence of a vertical division of labor between the two countries along the line of the traditional theory of comparative advantage; that is to say, the more richly endowed with capital (i.e., Japan) exports industrial goods and the less endowed (i.e., Indonesia) exports primary goods to the other party. This, however, is a static observation requiring further analysis, as well as evaluation, in the dynamic context. A closer look at Table 1 reveals, for example, that Indonesia's export performance in SITC Section 6, though still insignificant in magnitude relative to the flow in the other direction, is expanding at a considerable pace. While growth of manufactured exports may not be a necessary nor a sufficient condition for economic development, especially for a country of Indonesia's size, its potential contribution as a source of foreign exchange cannot easily be dismissed in view of the fact that primary exports are subject to wide price fluctuations and also that someday petroleum and mineral deposits will be exhausted.

The question of Indonesia's potential to export manufactures raises two related issues: (1) How competitive is Indonesia, say in the Japanese market, in comparison with other Southeast Asian countries? (2) What is Indonesia's present policy with regard to her export trade? We shall briefly dwell on these two questions before turning to the main topic of Japan's foreign economic policy and its implication for Indonesia.

3. Japan's imports from Southeast Asian countries

In 1971 Japan's imports from Southeast Asian countries (including all the countries east of Pakistan, as well as Hong Kong and Okinawa, but excluding Mainland China) totaled US$3,404 million. Of this total, Indonesia accounted for the largest share with US$877 million or 25.8%, followed by the Philippines (15.1%), India (11.1%), Malaysia (10.0%), Taiwan (8.4%), Korea (8.0%) and Thailand (6.8%). In 1964 the market share situation among these countries was quite different, and Indonesia's share was only 9.9%, falling behind all the countries mentioned above except for Korea. The average rate of growth per annum of Japan's imports from Indonesia during the 1964-1971 period was 31.7%, which surpassed that of any other Southeast Asian country.

Figure 2 illustrates commodity composition by SITC Section of Japan's imports from various Southeast Asian countries, including China, for 1964 and 1971. It shows, first of all, that Indonesia is unique in having petroleum exports (i.e., SITC Section 3) to Japan; the latter's imports from Singapore in the same category, at least partly, are the result of primary processing of Indonesian oil. This, combined with Japan's heavy imports of crude materials (i.e., SITC Section 2), of which Indonesia had the second largest share after the Philippines in 1971, gave Indonesia her dominant position among Southeast Asian countries in the Japanese market.

With regard to manufactured goods (i.e., SITC Section 5-8), however, Indonesia is far from being competitive vis-à-vis other Southeast Asian countries. Japan's imports of these goods from the nine countries in Figure 2 totaled US$479.4 million in 1971. Indonesia's respective share of US$14.9 million was only good for 3.1% of this total. Korea, Malaysia, Taiwan and China led the field, each with US$125.6 million, $99.1 million, $93.0 million and $77.1 million respectively for 1971.

Almost all of Indonesia's manufactured exports to Japan in 1971 were in SITC Section 6 (i.e., manufactured goods classified by material). This is a category generally charaterized, along with SITC Section 8 (i.e., miscellaneous manufactured articles), by a relatively labor-intensive technology. During the 1964-1971 period, Indonesia's exports to Japan in this category expanded more than 30 times. Nevertheless, her share of the market among the nine countires mentioned above in 1971 remained 4.3%. Thus, it is clear that, as far as manufactured exports are concerned, Indonesia's competitive position vis-à-vis other Southeast Asian countries is far from being established.

4. Indonesia's present export policy

Indonesia's export sector has been given the burdensome task of producing a steady flow of foreign exchange to enable imports of raw and intermediary materials and capital goods to be used for industrial development, as well as to meet accumulating debt service requirements on official loans and remittance of profits on private foreign investments. Thus, her export policy must be based on a careful examination of all the factors involved, on the demand side as well as on the supply side, and in the short run as well as in the long run.

As a matter of fact, Indonesia in the past depended rather heavily on primary exports and achieved an average rate of growth of 8.7% per annum for the 1964-1971 period. That Japan's imports from Indonesia have been the dominant causal factor on the demand side behind this Indonesia's trade performance is obvious if one considers the fact that its average rate of growth for the same period was 31.7%. Whether or not the Japanese market in the future will continue to provide such an outlet for Indonesia's primary products is to be examined in the next section from the viewpoint of Japan's foreign economic policy. Nevertheless, it can be said tentatively that in the near future, at least, the situation will not be altered and consequently the factors on the supply side are to hold the key for success or failure of primary exports -- that is, agricultural and natural resource development, which receives top priority in the present five-year plan of the Indonesian Government.

In the longer run, however, Indonesia's export trade will be more dependent on manufactured exports. This is duly recognized in the present five-year plan, which brings forward an export strategy of "increased processing". Here the task of export policy is primarily one of strengthening supply capability of maufactured goods to make them more competitive in the international market. This is an area where Japan's economic cooperation and direct investment have a greater role to play than trade policy per se.

III. Japan's Foreign Economic Policy and Its Implication for Indonesia's Exports

Japan's foreign economic policy can affect Indonesia's exports in three ways: (1) through trade policy, (2) through economic cooperation and (3) through direct investments in Indonesia. In this section, first the general orientation of Japan's foreign economic policy is examined in perspective and, then, the effects of Japan's specific policies on Indonesia's export development are considered with regard to each of the three categories mentioned above.

1. Japan's foreign economic policy in perspective

In examining Japan's foreign economic policy, it is essential to recognize the fact that Japan's economic viability is heavily dependent on the non-changeable component of her imports, i.e., natural resources. This non-changeable dependence compels Japan to adopt a trade policy of multilateral nature in order to spread risks inherent in such dependence as widely as political considerations allow. Hence comes the global or universal orientation of Japan's foreign economic policy, or, to put it simply, the principle of universalism. The real substance of this principle is that it prevents Japan from entering into any economic arrangements favoring a particular country over another except, as in the case of resource development in Indonesia, when Japan may directly gain more than it loses by making the commitment.

In this connection, resource trade will continue to occupy the attention of her foreign economic policy makers. Japan has been second after the United States in the amount of resources consumed ever since 1967 and the first in the amount of resources imported since 1966. Now her share of world's resource imports reaches almost 20%. In order to deal with increasing difficulty in resource procurement abroad, on the one hand, and to meet the demand

of resource-rich less developed countries to do the primary processing in their countries, on the other, Japan's imports of natural resources in the future will increasingly take the form of processed raw materials.

All this has traditionally been fundamental to Japan's foreign economic policy. The strong performance of Japan's economy during the 1950s and early 1960s, however, introduced a new dimension to this. As is shown in Figure 3, which maps Japan's international balances for the 1960-1971 period, her trade balance turned significantly in her favor in 1965 and further improved in subsequent years, except for a slight decline in 1967. This was a new experience for Japan, whose postwar development had been persistently plagued by balance of payments crises. Now with an excessively large surplus in her over-all balance of payments, US$7,677 million in 1971, Japan is obliged to reformulate her trade policy to make it more in accord with the new "growth-utilizing" orientation of her economy. This will call for a greater emphasis to be placed on imports than exports. Though systematic efforts will no doubt be continued in order to strengthen the quality of her export structure in line with her changing industrial structure, even greater efforts will be made to utilize imports to meet such domestic needs as diversification of consumption patterns, stabilization of prices and improvement of living environment. Above all, this will mean a significant expansion in manufactured imports.

Japan's rapid economic growth has induced yet another dimension to her foreign economic policy. As she has risen to the position of a major economic power, she is expected, if not pressured, by other countires to play a major role in economic cooperation. This, the Japanese Government indeed will do through: (1) the quantitative and qualitative improvement of her assistance program and (2) the provision of all-round preferential tariff in accordance with the UNCTAD resolution.

One missing element in the present foreign economic policy of Japan with special reference to economic cooperation is the consideration that her own experience with technology in the course of economic development may be systematically transferred to less-developed countries to aid their efforts at industrialization. Granted Japan's assistance program does include what is called technical assistance, it is not founded on the basis of any systematic study of her own scientific and technological development, which may prove to be relevant for the less-developed countries today. However, in view of the intensity and scope of the current discussion on the role of science and technology in economic development, as well as on the possiblity of technological transfer, a new set of technological assistance programs will at some future date be included in Japan's economic cooperation.

(1) Japan's trade policy and its implication for Indonesia's exports

On account of the principle of universalism, which eliminates the possibility of taking a discriminatory trade policy in favor only of Indonesia, Japan is left with three trade policy alternatives to stimulate Indonesia's exports. They are: (1) liberalization of trade (i.e., abolishment of quantitative restriction on imports), (2) all-round tariff reduction and (3) provision of all-round preferential tariffs.

As of April, 1972, Japan exercised import restrictions on 33 commodities -- 8 manufacturing, 1 mining and 24 agricultural products. Prime Minister Tanaka has recently made a statement that he is intent on stepping up liberalization of trade with regard to these products. If Indonesia were to derive benefits from such liberalization, it will be limited to the agricultural commodities, which are, for instance, milk, cream, processed cheese, beef, rice flour, wheat flour, malt, citrus fruits, fruits juice and other processed tomatoes, starch, etc. Of these rice, wheat, barley and butter are state-controlled trade products of which liberalization is rather doubtful in view of the strong opposition from the domestic producers. As to liberalization of imports of other items, there is expected to be a severe competition from the United States, Canada and Australia, as well as Southeast Asian countries. Moreover, as the list above includes processed food, they are not necessarily the commodities presently exported by Indonesia. Thus it may be concluded that the effect of Japan's liberalization for Indonesia's exports will be of negligible order.

With regard to the second alternative of all-round tariff reduction, the effect again. will be of minor order since, as Table 3 shows, Indonesia's chief exports are already enjoying a relatively low rate of tariff. The only commodity to gain from such a reduction for Indonesia is parched coffee for which the rate of tariff, at present, is 35%.

As to the third alternative, provision of an all-round preferential tariffs, Japan effected the first round of such a schedule in the summer of 1971 with the following main characteristics: (1) With regard to agricultural products, designation of 20 commodities as being free of tariff and of 39 more commodities with a tariff reduction of at least 20%, accompanied by an escape clause to protect domestic producers; (2) With regard to mining and manufacturing products, designation of a ceiling for all commodities (except for 10) with a free rate (except for 57 sensitive commodities which receive a 50% tariff reduction). This scheme has further been improved by removal of ceilings for certain commodities and changes in commodity categorization.

Yet, the effect of the provision of all-round preferential tariff on Indonesia's exports to Japan is limited, partly because the former's manufacturing industries are yet to reach the stage where they start benefiting from such an arrangement and also partly because her agricultural exports are not necessarily the ones designated as free. No doubt there are exceptional cases, such as palm oil and cotton fabrics, in which Indonesia's exports do receive some benefits. But, even then, there are too many competing exporters of cotton fabrics. As to

palm oil, Indonesia has a quasi-monopoly position in the Japanese market at any rate. Thus, the over-all effect of this arrangement cannot but be concluded insignificant, if not negligible.

Now given that Japan's trade policies will not have a significant effect on her imports from Indonesia, the porjected growth of Japan's commodity imports in the future may be examined to enable a judgement on the future of Indonesia's exports to Japan. Table 4 shows actual and projected vlaue of Japan's imports for selected commodities in selected years, as well as actual and projected growth rates of the imports between those years. It is observed that the relative share of Japan's imports of food and non-fuel crude mateirals in her total imports is to decline and that of machinery and other manufactured goods to rise during this decade. The projected growth rates for the 1970-1980 period of Japan's import demand for Indonesia's chief exports besides mineral fuel, food and crude materials, (12.6% and 11.3% respectively) are significantly lower than that for all commodities (16.8%). Even the rate for mineral fuel (15.6%) is slightly below the rate for all commodities.

It should be noted, on the other hand, that the projected growth rate of Japan's imports of miscellaneous manufactured goods for the same period is relatively high (24.5%). Of special relevance for Indonesia are textile products and non-ferrous metals, for which the growth rates are projected to be 25.7% and 23.8% respectively. Granted that these are only projections in terms of commodity groups, nevertheless they show a certain direction.

As a final note, the regional distribution of Japan's imports may be considered briefly. Table 5 compares actual distribution of Japan's commodity imports by regional origin in 1969 with a projected distribution in 1980. It shows, first of all, that Southeast Asia's share in the Japanese market for food and beverages will decline quite sharply in this decade,while that of centrally planned economies will rise. Combined with the observation made above, this implies that Inodnesia's chance for exporting food to Japan will be significantly diminished. The same pattern prevails for crude materials, but, in this case, the loss of share is not expected to be so large for Southeast Asia. The increased shares attributed to centrally planned economies should raise a concern for Indonesia, especially in view of the normalization of Japan-China relations. It is, however, still too early to pass any conclusive judgement on the future of Japan-China trade relations. Let it suffice to say that China will prove to be a formidable competitor for Indonesia in the Japanese market. As far as mineral fuel is concerned, Indonesia's export share in the Japanese market will rise significantly. Since Indonesia is the only country in Southeast Asia endowed with mineral fuel, the share figures of 9.3% (1968) and 14.0% (1980) in Table 5 should accrue to Indonesia, although strictly speaking Singapore's export share of petroleum products to Japan should be subtracted. As Japan's imports of petroleum will increasingly take the form of refined oil, Indonesia will be forced to make a decision concerning petroleum refining.

Table 5 also shows that Southeast Asia's share in Japan's imports of miscellaneous manufactured goods to rise from 15.4% in 1969 to 18.3% in 1980. How much of this 18.3% share Indonesia is to occupy will depend on her development of exportability of manufactured goods in the next six or seven years, which in turn may be influenced by Japan's economic cooperation and direct investments.

(2) Japan's economic cooperation and its implication for Indonesia's export development

The above analysis has made clear that (1) Indonesia's primary exports to Japan will continue to expand in the future, though admittedly at a more moderate rate of growth, and (2) Japan's trade policies will not provide a strong inducement factor on the demand side for Indonesia's manufactured exports. It was also suggested that Japan would increasingly favor imports of processed, rather than crude, raw materials. All these point to the need for Indonesia to pay more attention to the supply side of her present, as well as potential, export commodities. In this respect, Japan's economic cooperation may play a significant role. In the following, a quantitative assessment of Japan's economic aid to Indonesia is made, followed by a discussion of the need for "technological" cooperation to foster Indonesia's export development.

A. Japan's economic aid to Indonesia

Tables 6 and 7 contrast Japan's aid efforts to Indonesia with those of other developed countries. According to Table 6, Japan is top among the list of donor countries in 1971 in terms of aid commitment made. With $155 million committed, Japan's share almost reached 30% of the total aid commitments extended to Indonesia during that year. Table 7 shows Japan to be second after the United States in aid implemented in 1970 (US$126 million and $186 million respectively). In either case, Japan no doubt is one of the major donor countries for Indonesia. It should also be noted that Indonesia is the single most important recipient of Japan's yen-credits; the amount received is $614 million (24.8% of the total yen-credits extended as of September, 1971)

It is expected that Japan, with a projected 9% annual average growth rate of real GNP for the 1970s (according to an estimate made by the Japan Economic Research Center), will expand her official aid program to $6,220 million in 1980, compared with $658 million in 1970. If such were the case, Indonesia's absolute share will also expand quite significantly.

B. "Technological" cooperation for Indonesia's export development

According to Table 7, the proportion of technical assistance in Japan's total grants for Indonesia, in value terms, in 1970 was 10.3% (or US$2.9 million). Program-wise, Japan's technical assistance consisted of training of experts, in such fields as agriculture, public administration, transportation and public health; provision of scholarships for Indonesian students: and conducting of surveys and feasibility studies for the development of such industries as paper and pulp, fishing and natural resource extraction, as well as of regional river-basin projects. Japan's private sector has also provided technical assistance for training of skilled labor and conducting of surveys.

No doubt these piece-meal technical assistance programs have been of some help to Indonesia's human resource development and economic planning. But the opportunity cost of such a program may prove to be rather high if one also considers the possibility of "technological" cooperation directly tied to export development. The concept of "technological" cooperation

may be defined as a means to transfer a set of capacities, including those of managerial and engineering nature as well as production-line skills, required for construciton and operation of an industrial plant. Essential to such a transfer process is the mutually complementary combination of private sector's and government's resources of the donor country, on the one hand, and active participation by private enterpreneurs in the recipient country, on the other.

The role of the donor country's private sector is to provide a set of highly skilled services (i.e., managerial and engineering capabilities and skilled labor) to build and operate a plant, as well as train local personnel at various levels, in return for a share of the profits to be derived from such operation. Its involvement is crucial but limited in length of time, which is to be specified by an agreement of all the parties involved.

The role of the donor country's government, on the other hand, is to conduct surveys and feasibility studies in cooperation with the recipient country's government or private sector, and to contract a domestic producer for the undertaking on the basis of competitive bidding. It is essential that such a contract include a clause to compensate for the loss incurred by the donor's private sector owing to the difference between social and private costs; training of local personnel is one such case.

As to the participation of the recipient country's private enterprises, it should be left up to the donor country's private sector to work out all the arrangements, provided that the equity shares and managerial decision-making be gradually turned over to the recipient country's individuals. The primary motivating factor for the indigenous enterprise will be the expectation of profits and the desire to expand its activities.

Thus conceived, "technological" cooperation is a joint-venture project, sponsored by an aid-donating country, to transfer new technology to an aid-receiving country. Such a scheme will have a considerable practicability if it is combined with a promising outlet for the product. Hence comes the suggestion "technological" cooperation for Indonesia's export development. For instance, Indonesia's need for "increased processing" of her natural resource exports and Japan's increasing preference for processed raw materials may both be accommodated through the former's natural resource development via "technological" cooperation. Agricultural development may prove to be equally promising. In the longer run, the same scheme may even apply for manufactured exports as well.

Needless to say implementation of such a program will involve a great deal of difficulty for both donor's and recipient's governments, as well as for private sectors of both countries. But the fact is that Japan's private sector is making a significant amount of direct investments in Indonesia and, at the same time, her government is extending a significant amount of technical assistance. In view of Indonesia's need for strengthening her supply capability of export commodities and, no less important, in recognition of the crucial role played by the technology factor in such a process, it may even be said that Japan's "technological" cooperation is not just a possibility but a need, admittedly yet to be recognized, for Indonesia.

(3) Japan's direct investments in Indonesia

Japan's first private direct investment in Indonesia dates back to 1955. But it was not until 1969 that her private capital started to flow into Indonesia in significant quantity. As is shown in Table 8, the total private capital invested by Japanese firms in Indonesia amounted to US$45.4 million for the January, 1968 to January, 1971 period, which is second only to the United States.

To look at the industry break-down of these investments, it is observed that a significant portion has been concentrated in textiles (40.1%), fishing (14.4%) and forestry (13.1%). They are followed by metalwork industry (7.5%) and petroleum industry (6.7%). In the case of the textile industry, Japan's investments in Indonesia have been motivated, as elsewhere in Southeast Asia, by locational consideration of low wages. For most other industries, the basic motive has been to create sources of supply for import purposes. This is not only of natural resource-oriented investments but also of such investments as those in fishing and maize (feed purpose) production, for which Japan's domestic demand is rapidly expanding.

This creates certain problems for the Indonesian economy, as the production activities in these industries will be subject to Japan's import demand fluctuation. It is doubtful that the companies in these industries, be it joint venture or subsidiary, possess sufficient managerial capability to cope with the various situations and problems. This calls for "technological" cooperation.

However, there is another problem to be solved in order to effect such a program -- this is the problem of high equity shares kept in the hands of the Japanese side. To take the ratio of capital financed by the Japanese firms as an indicator of its equity shares, Table 8 shows that Japan's share is estimated to be around 70%, excluding the petroleum industry. In view of nationalistic sentiments pervading Southeast Asia, this situation, if maintained, may develop into a serious conflict between the two countries. Only an enlightened initiative on the part of both governments can solve these conflicts, and 'technological' cooperation provides one such solution.

VI. Conclusion

Since the middle of the 1960s, Japan's imports from Indonesia has been expanding at an annual average rate of 31.7%. As a result, Indonesia has become heavily dependent upon her trade with Japan. This has been a result primarily of the latter's rapidly increasing demand for imports of raw materials - above all, crude oil and lumber. On the other hand, Indonesia's imports from Japan has expanded at a much more moderate rate, thereby producing a large surplus in her trade balance with Japan, i.e., US$400 million in 1971.

Although, thanks to this expansion, Indonesia occupies the largest share of the Japanese market among Southeast Asian countries, she is far from being competitive with regard to manufactured trade. While Japan's imports of raw materials are expected to further expand, they will increasingly take a processed form. At the same time, Japan's imports of manufactured goods will significantly expand, reflecting the transformation of her domestic economy. This, coupled with Indonesia's own need for foreign exchange, compels her to look to the possibility of increased processing for her export commodities.

As Japan's trade policies are not likely to affect Indonesia's exports significantly—this partly because of the former's global orientation in trade policy and partly also because of the limited nature of the latter's export menu—the stimulus for Indonesia's export development must come from strengthened supply capability via Japan's economic cooperation and private direct investments. In this connection, it is suggested that the parties concerned pay due attention to the possibility of "technological" cooperation, which is a means to transfer new technology—or a set of capabilities required for industrial operation—to Indonesia, utilizing resources of both Japan's government and private sector.

(Masafumi Nagao)

Table 1. Commodity Structure of Japan's Trade with Indonesia

(Unit: 1,000 US$)

SITC Section	Description	1970[a] Exports[d]	1970[a] Imports[e]	1971[b] Exports[d]	1971[b] Imports[e]	1972(Jan.–June)[c] Exports[d]	1972(Jan.–June)[c] Imports[e]
0	Food and live animals	23,022	19,513	19,396	38,969	5,703	26,432
1	Beverages and tobacco	90	1	80	26	40	34
2	Crude materials (except fuel)	498	235,587	1,485	330,094	1,131	135,114
3	Mineral fuels	5,614	368,469	3,366	482,824	1,479	343,327
4	Animal and vegetable oils and fats	26	7,671	268	8,377	151	2,888
5	Chemicals	37,901	658	52,019	872	26,305	232
6	Manufactured goods (Classified by materials)	124,787	4,774	166,401	12,618	93,608	8,688
7	Machinery and transport equipment	118,058	2	205,847	33	112,519	–
8	Miscellaneous manufactured articles	6,076	2,188	9,127	1,385	6,445	848
9	Others	1,552	1,408	4,262	1,554	1,947	905
	Total	317,624	640,270	462,249	876,751	249,322	518,468

Source: Nihon Boeki Geppyo (Japan Exports & Imports), Dec. 1970, Dec. 1971, June 1972.

Notes: a–c, Yen-to-dollar conversion is made using the average rates of exchange for the respective periods – that is, $1= ¥ 357.9 for 1970
$1= ¥340.95 for 1971 and $1= ¥ 306.27 for Jan. – June, 1972.
The rates of exchange are derived from International Financial Statistics, June 1972.
d, Japan's exports (FOB) to Indonesia
e, Japan's imports (CIF) from Indonesia

Table 2 Relative Importance of the trade between Japan and Indonesia

	1960	1965	1967	1969	1971
Indonesia (%)					
(1) Exports to Japan / Total exports	4.1	15.9	29.2	31.5	–
(2) Imports from Japan / Total imports	16.1	25.4	28.1	28.9	–
Japan (%)					
(1) Exports to indonesia / Total exports	2.7	2.4	1.5	1.5	1.9*
(2) Imports from Indonesia / Total imports	1.6	1.8	1.7	2.7	4.3*

Source: UN Yearbook of International Trade Statistics 1962, 1967, 1969

* MITI, White Papaer 1972 (in Japanese)

Note: Per-cent calculation was made in Rupiah for Indonesia and in Yen for Japan.

Table 3 Japan's tariffs on Indonesia's major exports to Japan

Commodity	B T N	Standard	Agreement	Temporary rate
Sugar	17.01 – 1	63.5 yen/kg		
Coffee beans	09.01 – 1 – (1)	35%	free	
	09.01 – 1 – (2)	35%		
Frozen shrimp	03.03 – 1 – (1)	10%	5%	5%
Maize (feed)	10.05	10%	free	
Palm kernel	12.01 – 2 12	free	free	
Natural rubber	40.01	free		
Latex	40.01		7.5%	
Bauxite	26.01 – 3	free	free	
Lumber	44.03	free		
Crude oil		530 yen/kl		

Source: Japan Tariff Association, Effective Tariff Schedule 1971

Table 4 Japan's Commodity Imports : Projection for 1980

	1960 Value (millions $)	%	1970 Value (millions $)	%	1980 Value (millions $)	%	annual average (%) rate of growth 1960–70	1970–80
Food	548	12.2	2,574	13.6	8,431	9,5	16.7	12.6
Crude material	2,209	49.2	6,677	35.4	19,503	21.9	11.7	11.3
Texitile raw material	762	17.0	963	5.1	1,167	1.3	2.3	2.0
Metal material	673	15.0	2,696	14.3	7,029	7.9	14.9	10.0
Others	774	17.2	3,018	16.0	11,307	12.7	14.6	14.1
Mineral fuel	742	16.5	3,905	20.7	16,676	18.8	18.1	15.6
Chemical products	265	5.9	1,000	5.3	5,074	5.7	14.2	17.6
Machinery	435	9.7	2,298	12.2	16,938	19.0	18.1	22.1
General machinery	281	6.3	1,262	6.7	9,028	10.2	16.2	21.5
Electric machinery	34	0.8	478	2.5	2,959	3.3	19.3	20.0
Transport machinery	87	1.9	406	2.2	3,716	4.2	16.7	24.2
Precision machinery	32	0.7	151	0.8	1,235	1.4	16.8	23.3
Other manufactured goods	294	6.5	2,427	12.8	23,300	25.1	23.5	24.5
Steel	88	2.0	276	1.5	1,022	1.1	12.1	14.0
Textile products	19	0.4	314	1.7	3,854	4.3	32.4	25.7
Non-ferrous metals	104	2.3	945	5.0	7,961	9.0	24.7	23.8
Total	4,491	100.0	18,881	100.0	88,922	100.0	15.4	16.8

Note: CIF base

Source: Japan Economic Research Center, Japan's Economy In 1980 In the Global Context

Table 5 Regional distribution of Japan's imports by commodity group: Projection for 1980

(%)

	SITC	Developed Countries		Centrally Planned Economies		Developing Countries											
								Southeast Asia		West Asia		Latin America		Africa		Other	
	Code	1969	1980	1969	1980	1969	1980	1969	1980	1969	1980	1969	1980	1969	1980	1969	1980
Food & beverages	(0,1)	60.5	57.3	3.8	18.1	35.6	24.6	20.3	7.3	0.3	0.3	12.4	13.8	2.4	2.9	0.3	0.3
Crude materials	(2,4)	52.3	50.7	8.2	16.6	39.5	32.9	23.7	22.8	0.4	0.5	10.2	6.7	3.9	2.0	1.4	0.9
Mineral fuels	(3)	19.5	15.5	3.3	6.7	77.2	77.8	9.3	14.0	66.1	61.4	0.9	0.7	0.2	1.4	0.6	0.3
Chemicals	(5)	90.0	91.6	2.9	3.4	5.8	4.9	4.2	4.0	0.3	0.3	1.0	0.3	0.1	0.3	0.1	–
Machinery, equipment	(7)	97.0	95.2	0.9	2.2	2.0	2.6	1.6	2.1	–	–	–	0.2	0.4	0.3	–	–
Other manufactured goods	(6,8)	54.5	54.6	5.3	10.1	40.3	35.4	15.4	18.3	1.5	1.6	6.0	4.4	16.8	10.9	0.5	0.2
Total		54.0	56.0	5.4	9.7	40.6	33.9	15.4	13.6	13.8	12.1	6.3	4.0	4.2	4.0	0.7	0.2

Source: Japan Economic Research Center, Japan's Economy In 1980 In the Global Context (Tokyo, 1972)

Table 6 Economic Aid Commitments to Indonesia

(Unit: million US$)

Country	Indonesian accounting year			
	1968	1969	1970	1971
Japan	110.00	120.00	140.00	155.00
U. S. A.	168.40	223.30	235.00	125.00
Netherlands	25.01	60.55	30.30	36.60
West Germany	23.00	31.95	36.17	40.49
France	11.15	14.20	13.30	13.50
England	5.15	5.36	10.40	23.28
Australia	14.50	17.82	31.24	20.00
Canada	0.80	2.99	7.30	8.00
Belgium	0.40	2.90	5.80	4.00
Denmark	–	4.00	–	–
Italy	–	0.40	1.40	–
New Zealand	–	–	0.60	0.50
World Bank	7.00	89.00	74.90	80.00
Asian Development Bank	–	13.39	30.00	30.00
Total	365.41	585.86	616.41	536.43

Source: World Bank data (1968 – 1970); Bank Indonesia data (1971); Ministry of International Trade and Industry, "Keizai Kyoryoku no genjo to mondaiten" (Outline and problems of economic cooperation), 1971.

Table 7 Economic Aid to Indonesia: DAC Countries in 1970

(Unit: US$1,000)

Donor country	Fulfilled commitments			
	Grants	Technical assistance	Loans	Total
Australia	17,992	(1,400)	–	17,992
Austria	–	(–)	–	–
Belgium	1,201	(129)	2,500	3,701
Canada	3,124	(124)	–	3,124
Denmark	7	(7)	632	639
France	–	(–)	14,800	14,800
West Germany	6,722	(4,407)	17,905	24,627
Italy	8	(8)	18,723	18,731
Japan	27,048	(2,893)	98,788	125,837
Netherlands	25,593	(4,866)	21,397	46,990
Norway	27	(27)	–	27
Sweden	25	(–)	–	25
Switzerland	261	(9)	–	261
England	474	(385)	5,842	6,316
U. S. A.	15,000	(4,000)	171,100	186,000
DAC Total	97,483	(18,315)	341,587	439,070

Source: Development Assistance Committee, in Ministry of International Trade and Industry, 'Keizai Kyoryoku no genjo to mondaiten, 1971'

Note: Net base

Table 8 Japan's Direct Investments in Indonesia Jan. 1968 – Jan. 1971

(Those approved by the Japanese Government)

(Unit: US$1,000)

	Total capital (a)	Amount invested for the projects by Japan (b)	Average investment ratio (b)/(a)	(%)
Forestry	8,759	5,930	67.7%	13.1%
Wood chip	500	400	80.0	0.9
Fishing	7,150	6,520	91.2	14.4
Food & agricultural products	2,611	1,151	44.1	2.5
Beverages	1,800	1,080	60.0	2.4
Petroleum extraction & refining	387,700	3,047	8.0	6.7
Textiles	22,700	18,231	80.3	40.1
Miscellaneous goods	300	150	50.0	0.3
Metal work	5,300	3,399	64.1	7.5
Machinery	4,050	2,195	54.2	4.8
Printing	2,050	1,124	54.8	2.5
Pharmaceuticals	1,000	550	55.0	1.2
Construction	500	250	50.0	0.6
Marketing; services	2,726	1,342	49.2	3.0
Transportation	200	75	37.5	0.2
Total	447,346	45,444	10.2	100.0
Excluding petroleum	59,646	42,397	71.1	–

Source: Keizai Chosa Kyokai, "Kigyobetsu Kaigaitoshi"

Figure 1 Japan's Trade Balance vis-à-vis Indonesia

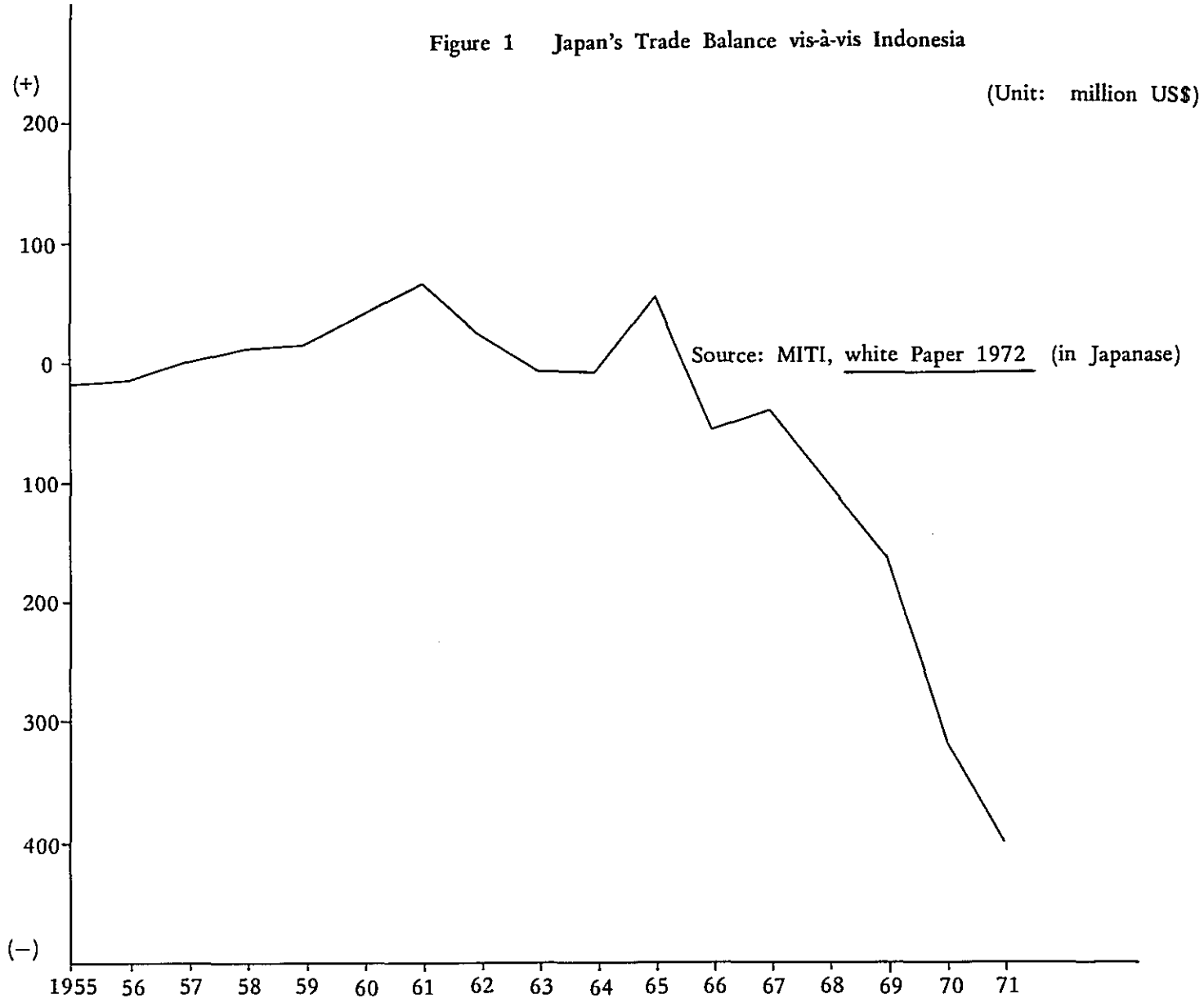
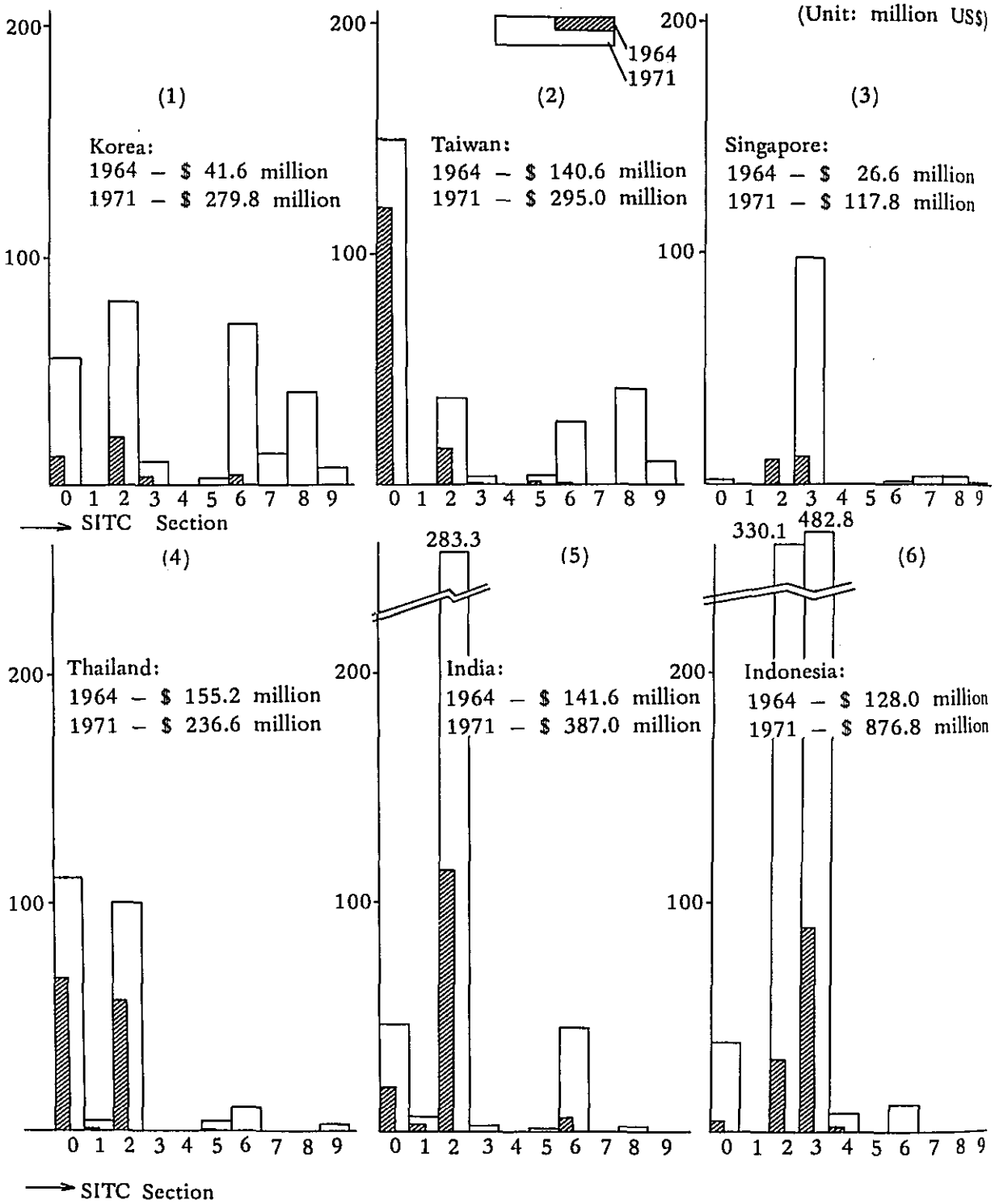
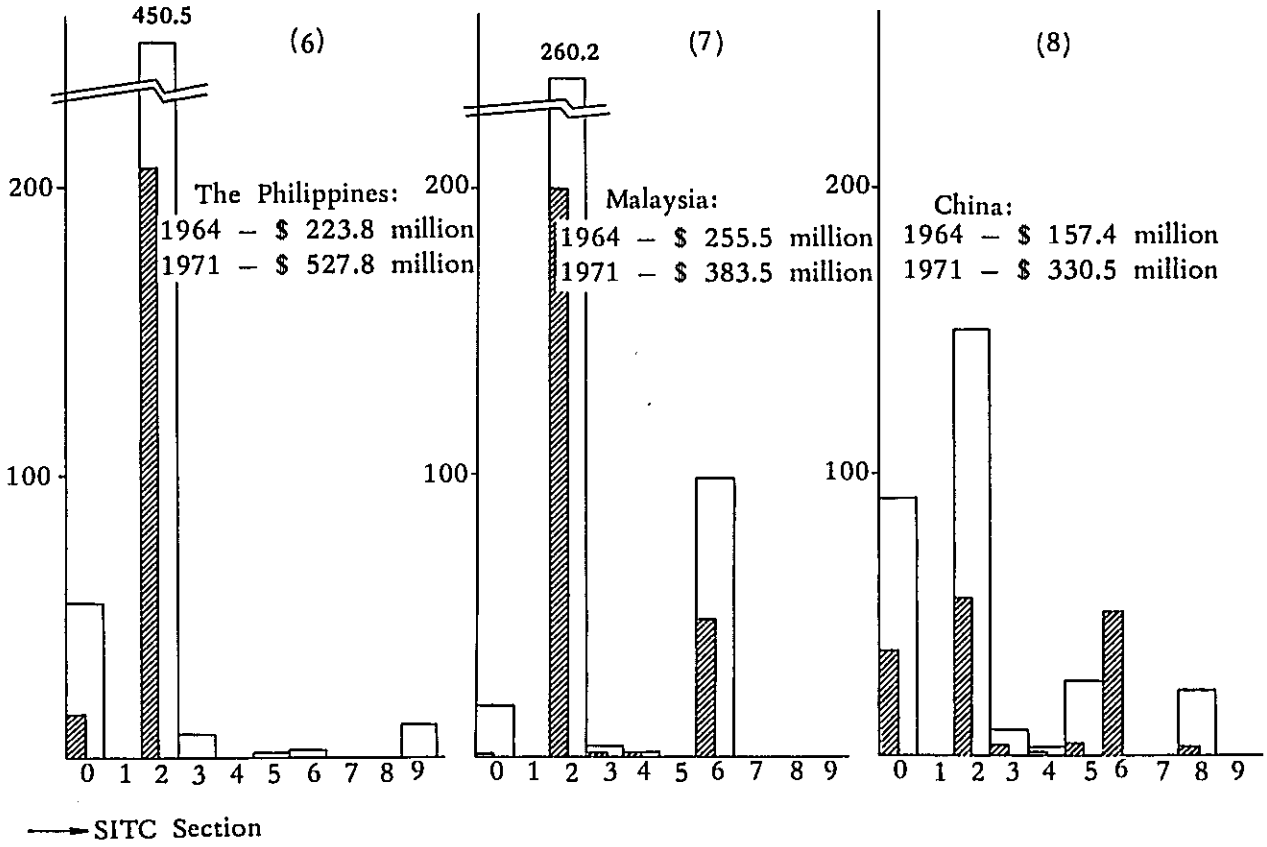


Figure 2. Japan's Imports from Southeast Asian Countries 1964, 1971



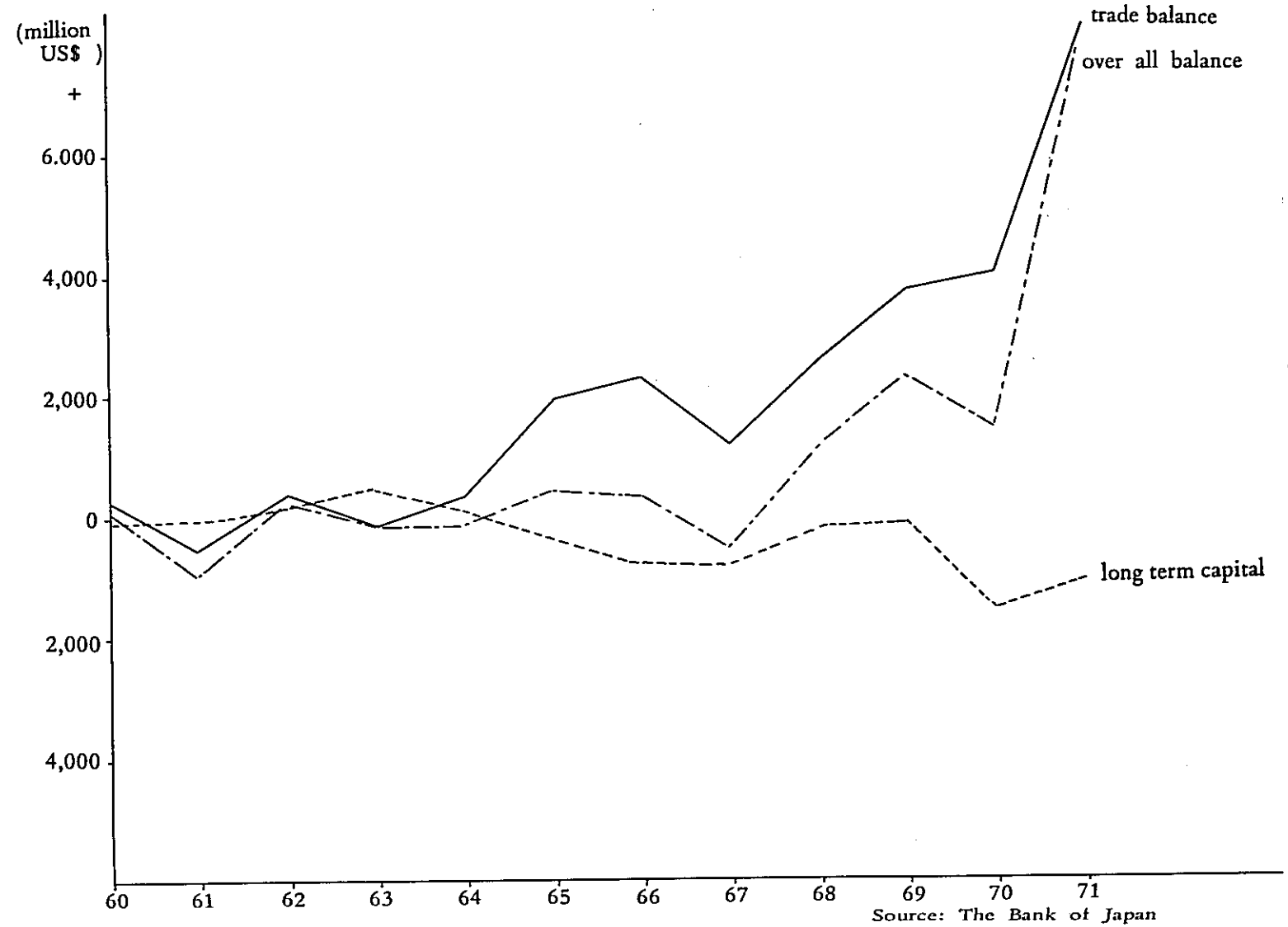


Source: Japan, Exports & Imports, 1964, Dec. 1971

Note: a Exchange rate used for yen-to-doller conversion are $1 = ¥ 360.875 for 1964 and $1 = ¥ 340.75 for 1971.

b For a description of SITC Sections, see Table 1.

Figure 3 International Balances Japan, 1960 – 71 (IMF formula)



CHAPTER III INDONESIA'S EXPORTS TO JAPAN

Japan as a Market for Indonesia's Exports

Indonesia's exports to Japan

After recording a total value exported of $840 million in 1960, Indonesia's export trade entered a period of stagnation. Her exports declined in value terms through 1963 and, then, stagnated until 1967 at around the 1962 level of $680 million. Since 1968, however, Indonesia's exports have shown a steady expansion. In 1969, with a total value exported of $830 million, it almost recovered the level achieved in 1960, and in the following year, 1970, it reached the one billion dollar mark.

During the same period, Indonesia's exports to Japan expanded steadily, except a major set-back in 1962 and minor set-backs in 1965 and 1968. This fact, combined with the stagnation of her total exports, suggests that Indonesia experienced a major change in her export structure (Table 1.).

To see how much relative weight Indonesia's exports occupied in Japan's total trade, one can examine the ratio of Japan's imports from Indonesia (Mji) to Japan's total imports (Mj) --- i.e., Mji/Mj. It is shown to be as follows:

	1955	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
$\frac{Mji}{Mj}$ (%)	3.3	2.8	1.5	1.2	1.6	1.6	1.5	1.6	1.6	1.6	1.8	1.9	1.7	2.0	2.6	3.4

In spite of the expansion in Indonesia's exports to Japan, as mentioned above, the ratio remained around 1.5% for much of the period from 1955 to 1970. This implies that Japan's total imports grew even more rapidly.

As to the commodity composition of Japan's imports from Indonesia, Figure 2 shows the relatvie proportion among Indonesia's three major export commodity groups ---- namely, food (SITC 0 & 1), raw materials (SITC 2 & 4) and mineral fuels (SITC 3). It is observed that the proportion for mineral fuels is dominant, reaching 80% of the total in 1963. The proportions for minearl fuels and raw materials move in the opposite directions, while that for food is stable at slightly below 10%. For the year of 1970, $M_j^c i/Mji(M_j^c i$ stands for Japan's import of Indonesia's commodity c) was 3.0% for food, 38.0% for raw materials and 57.5% for mineral fuels. In comparing this with the corresponding composition of Japan's total imports, 13.6%, 35.4% and 20.7% respectively, one can see that Indonesia specializes quite heavily in her trade with Japan.

Trade intensity index for Japan and Indonesia

Trade intensity index is a useful means for evaluating trade between two specific countries. It is defined as:

$$Iji = \frac{Mji}{Mj} / \frac{Xi}{Xw} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Xw stands for world total exports; Xi for Indonesia's total exports; Mj for Japan's total imports; and Mji for Japan's imports from Indonesia. If trade patterns were to be determined purely by the structure of comparative advantages, and if transportation costs, effects of tariffs, etc. could be ignored, the flow of a particular commodity from Indonesia to Japan would then be equal to the value of Japan's total imports of that commodity, multiplied by the relative share of Indonesia's exports in the total value exported of this commodity in the world. Such a figure may be regarded as Japan's potential import from Indonesia of that commodity.

One can calculate the potential value for each commodity, and add them to obtain the total value of Japan's potential imports from Indonesia ($\bar{M}ji$):

$$\bar{M}ji = Mj \cdot \frac{Xi}{Xw} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

Trade intensity index in terms of the value of potential imports is naturally equal to 1. The actual value of Japan's imports from Indonesia (Mji) differs from the potential value ($\bar{M}ji$) owing to the existence of some unique factors in the trade between the two countries. Total effect of the operation of these factors — that is, the degree of bias associated with the trade between the two countries — may be measured by the ratio of Mji to $\bar{M}ji$. ($Mji/\bar{M}ji$). If this ratio is greater than 1, trade between the two countries may be said to be intense; and if smaller than 1, not intense. Although the analysis here is limited to the trade between Japan and Indonesia, it is more desireable that the analysis be made in terms of multilateral trade.

Trade intensity index for a commodity is expressed as:

$$I^c_{ji} = \frac{M^c_{ji}}{M^c_j} \frac{X^c_I}{X^c_w} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

(subscript c stands for commodity c)

An index of specialization for a commodity may be given by associating the relative share of Indonesia in Japan's total imports of commodity c($M^c_j i/M^c_j$) with the relative share

of Indonesia in Japan's total imports (Mji/Mj):

$$S_{ji}^{c} = \frac{M_{ji}^{c}}{M_{j}^{c}} \Big/ \frac{Mji}{M_{j}} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

This specialization index for commodity c (S_{ji}^{c}) expresses the degree of Indonesia's specialization in the particular export commodity c, with the assumption that she is equally competitive with other countries for all the commodities traded. Japan's potential import of commodity c from Indonesia, $\bar{M}_{ji}^{c}$, is, thus given by the following:

$$\bar{M}_{j}^{c} = M_{j}^{c} \cdot \frac{M_{ji}}{Mj} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

The extent of specialization may be given by comparing $\bar{M}_{ji}^{c}$ to M_{ji}^{c}, actual imports of commodity c by Japan from Indonesia. If the ratio, $M_{ji}^{c}/\bar{M}_{ji}^{c}$, is greater than 1, Indonesia's exports are specialized in commodity c; and if smaller than 1, they are not specialized in commodity c.

Figure 3 depicts changes in the trade intensity index for Japan and Indonesia, Iji, during the period of 1955 – 1969. It is observed that Iji is significantly greater than 1 throughout the period. Except the 1957 – 1959 period, Iji is recorded to have a value greater than 2 for all years. It is important to note that the value of Iji has been rising since 1959. Iji for 1969 was 9.8, signifying a close trade relationship between Japan and Indonesia. To be more precise, this index should be understood more as an indicator of importance of the Japanese import market for Indonesia's exports than as an indicator of importance of imports from Indonesia for Japan. This can be shown by an examination of Indonesia's relative position in world trade. The relative share of Indonesia's exports in world total reached 1% only in 1955, and has been declining ever since. In 1969 it was only about 0.3%. This relative stagnation of Indonesia's export in the world scene reinforces the importance of the Japanese market for Indonesia.

Table 2 gives a time-series on specialization index for selected commodities (S_{ji}^{c}). With regard to crude oil, it marked a peak value of 7.9 in 1961, followed by a decline until 1966, when it was 3.4. Since 1967 it has remained around 3.9 (Figure 4). The 1970 figure of 3.9 is not necessarily high in view of the trade intensity index fo · that year, 9.8. Perhaps this means that Indonesia has other competing sources fo crude oi supply and that she is required to make more effort in promoting exports.

As to lumber's specialization index (Figure 5), it was of negligible magnitude until 1966. But since 1967 it has increased quite significantly to reach 4.2 in 1970. This is slightly more than that of crude oil. The same may be said about the need for export efforts here as mentioned above for petroleum.

Figure 6 shows changes in natural rubber's specialization index. Until 1966 there was almost no direct import of natural rubber from Indonesia to Japan, since the rubber trade depended on Singapore's role as an intermediary. As a result of her confrontation policy vis-à-vis Malaysia in 1963, Indonesia began to export directly to Japan, and the index soared through 1966, when it was 22. Then, as Singapore's intermediary trade resumed and Indonesia's own supply capacity of rubber stagnated, the subsequent decline brought the figure down to 3.5 in 1970.

In the case of nickel (Figure 7), the specialization index was insignificant up to 1959, but started to show an increase in the following year. It reached a peak value of 5.7 in 1966, but declined subsequently to mark 3.3 in 1970. It is believed the additional exports will lead to an increase in the index.

The specialization index for copra (Figure 8) fluctuated during the 1960s. Although it recorded a vlaue of more than 2 for all years except for 1958, there was a big down-swing in 1963 and again in 1967. The level of the index for 1969 and 1970 neared that of trade intensity index.

Finally with regard to bauxite (Figure 9), the index remained high from 1957 on through 1968. Like copra's case, it neared the level of trade intensity index. M_{ji}^c/M_j^c for this commodity is quite high, around 30 to 40%. Whether or not Indonesia can maintain such a high share in the future remains to be seen.

Some Further Considerations on Japan's Imports from Indonesia

In this section some detailed consideration is made of two selected commodities -- natural rubber and copra. (The original research design included an examination of six other commodities; namely, crude oil, lumber, frozen shrimp, molasses, bauxite and nickel. For the purpose of this report, two commodities have been chosen).

Japan's improts of natural rubber from Indonesia

Until 1963 Japan's imports of natural rubber from Indonesia were almost always below the level of 3,000 tons (Figure 10). It was mostly limited to latex import. As mentioned before, Indonesia's conflict with Malaysia in 1963 resulted in a drastic cut in her natural rubber export to Singapore and Malaysia, which had been a relay station for processing and concentrating of Indonesian natural rubber, and subsequently Indonesia started to export directly to final consumption spots. Increase in Japan's import of Indonesian natural rubber starting 1964 reflected this (Table 3).

Japan's total imports of natural rubber have been expanding at an annual rate of 5 to 10%, not including minor set-backs in 1963 and 1965. In sharp contrast to this, her imports from Indonesia expanded much more rapidly until 1966. In the case of crude rubber, the quantity imported from Indonesia reached 95,000 tons, or 40% of Japan's total imports of cruded rubber. In 1967 Japan's total imports of natural rubber increased in quantity terms but showed a decline in value terms as a result of price reductions in the world market. The reduction in Japan's rubber imports from Indonesia was due to the resumption of Singapore's and Malaysia's relay function. The same pattern was repeated in 1968.

In 1969 the price of natual rubber soared and this resulted in an increase of 51.0% in Japan's total imports of natural rubber in value terms, while there was only a 8.9% increase in quantity terms. The price remained high through 1969. Japan's imports from Indonesia recorded a cut in quantity terms of 15.7%, but still increased 22.6% in value terms. The quantity reduction was due to freight cost consideration, namely, that imports via Singapore were cheaper than direct imports.

In 1970 Japan's total imports of natural rubber increased 3.8% in quantity. The price, however, was lowered to the 1968 level to cause a decline in value terms of 9.4%. The imports from Indonesia declined in both quantity and value terms -- 19.1% and 31% respectively. During this year, Japan's rubber imports from Thailand surpassed those from Malaysia and Indonesia and came to occupy the largest share in Japan's total imports of natural rubber.

Japan's imports of copra from Indonesia

Japan's total imports of copra in 1970 amounted to about 127,000 tons or $2.7 million. Indonesia accounted for about 32% of this total in quantity terms and came in first among the countries supplying copra to Japan (Figure 11). The Philippines used to occupy the first place with the market share of about 40%. In addition to these two largest copra suppliers, the list of copra exporters vis-à-vis Japan includes New Guinea, the Marianas, the Caroline Islands and Malaysia.

Japan's imports of copra have been characterized by irregular and wide fluctuations. Indonesia's copra exports to Japan have been expanding steadily, though with occasional set-backs (e.g., 1958, 1963 and 1967). The reason for these set-backs has been Indonesia's own export limitation, as well as major export expansion of her chief competitor, the Philippines. The Philippines presented Japan with an opportunity to take advantage of a copra surplus, created by reduction of United States purchases, and of more convenient transportation. In 1963 and 1967, when Indonesia experienced a cut in her copra exports to Japan, the latter's total imports of copra still expanded over the previous year by 22% and 4% respectively. Yet, while the annual average growth rate since 1960 of Japan's total copra imports has been 5%, the rate for the copra imports from Indonesia, except 1963 and 1967, has almost reached 30%. This expansion

meant a significant increase in Indonesia's relative market share — from 5.4% in 1960 to 31.7% in 1970.

Copra production is easily influenced by climatic conditions. If this influence could be eliminated by adopting an appropriate production system, Indonesia would be able to export under planned production, without having to resort to emergency export limitation for meeting her domestic demand.

Japan's edible oil consumption is reported to be about 10 kg per person/year, which is around 30% of the Western countries' average. It is expected that this demand will expand in the future. Furthermore, Japan does not have her own sources of oil supply and, as a result, has been forced to import in the form of either raw materials or oils and fats. In 1970 the import composition of plant oil material was: soy-beans (68%), rape seeds (7.6%), copra (4.9%) and cotton seeds (4.5%). While copra's relative weight is still very low , it is believed that it will have a more important role in the years to come, especially since the supply of oil materials is unstable throughout the world.

(Kimimaru Yoneda)

Table 1 Japan's Imports from Indonesia by Commodity Groupings

(Unit: US$1,000)

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Total value					55,047	70,315	85,175	92,175	104,808	130,740	149,282	175,864	196,635	253,582	398,899	636,553
Food (SITC 0,1)					1,093	1,951	3,134	3,886	4,854	5,158	5,390	12,892	15,937	9,767	14,143	19,400
Weight (%)					1.99	2.78	3.68	4.20	4.63	3.95	3.61	7.33	8.10	3.85	3.54	3.05
Raw materials (SITC 2,4)					18,116	18,873	18,932	16,852	15,711	34,654	57,556	73,956	69,857	82,193	131,859	241,846
Weight (%)					32.91	26.84	22.23	18.21	14.99	26.51	38.56	41.85	35.53	32.41	32.96	37.97
Mineral fuel (SITC 3)					34.881	49,291	62,285	71.646	83,598	89,717	84,431	87,420	107,260	156,627	244,457	366,330
Weight (%)					63.37	70.10	73.13	77.43	79.76	68.62	56.56	49.71	54.55	61.77	61.11	57.51
Others					957	194	824	147	645	1,211	1,905	1,956	3,581	4,995	8,440	8,977
Weight (%)					1.74	0.28	0.97	0.16	0.62	0.93	1.28	1.11	1.82	1.97	2.11	1.41
							(Trend in Trade)									
Japan's total imports Mj	2,472	3,230	4,284	3,033	3,600	4,492	5,811	5,637	6,737	7,938	8,169	9,523	11,663	12,987	15,024	18,881
Rate of growth (%)		30.66	32.63	-29.30	18.69	24.78	29.36	3.0	19.51	17.83	2.91	16.57	22.47	11.35	15.68	25.67
Imports from Indonesia Mij	81.2	89.0	62.9	36.1	55.0	70.3	85.2	91.2	102.5	128.3	149.3	175.9	196.7	253.6	398.9	63.66
Rate of growth (%)		9.61	-29.33	-42.61	52.35	27.82	21.19	7.04	12.39	25.17	16.37	17.82	11.82	28.93	57.29	59.59
Mji/Mj	0.0328	0.0276	0.0147	0.0119	0.0157	0.0157	0.0147	0.0162	0.0152	0.0162	0.0183	0.0185	0.0169	0.0195	0.0264	0.0337
Indonesia's total exports Xi	946	924	955	791	931	840	784	664	698	724	708	679	665	689	742	1,211
Rate of growth (%)		-2.33	3.55	-17.18	17.70	-9.78	-6.67	-15.31	5.12	3.72	-2.21	-4.10	-2.07	3.61	7.69	
World exports Xw	93,600	103,800	111,830	107,880	115,370	127,810	133,850	141,320	153,850	172,120	185,400	203,410	214,190	239,400	272,600	
Rate of growth (%)		10.90	7.74	3.53	6.94	10.78	4.73	5.58	8.87	11.88	8.30	9.13	5.30	11.77	13.87	
o Xi/Xw	0.0101	0.0089	0.0085	0.0073	0.0081	0.0066	0.0059	0.0047	0.0045	0.0042	0.0038	0.0033	0.0031	0.0029	0.0027	
o $\frac{Mji}{Mj}/\frac{Xi}{Xw}$	3.2475	3.1011	1.7294	1.6301	1.9383	2.3788	2,4915	3.4468	3.3778	3.8571	4.8158	5.6061	5.4516	6.7241	9.7778	

Table 2 Specialization Index for Selected Commodities (S_{ji}^{c})

		1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Crude oil	M_{ji}^{c}/M_{j}^{c} (%)	6.59	5.86	9.85	11.24	11.64	11.08	10.26	9.15	7.34	6.22	6.33	7.73	10.30	13.19
	S_{ji}^{c}	(4.48)	(4.92)	(6.27)	(7.16)	(7.92)	(6.84)	(6.75)	(5.65)	(4.01)	(3.36)	(3.75)	(3.96)	(3.90)	(3.91)
Lumber	M_{ji}^{c}/M_{j}^{c} (%)	0.34	0.12	0.17	0.29	0.13	0.27	0.44	0.76	0.90	0.98	1.91	3.25	7.64	14.02
	S_{ji}^{c}	0.23	0.10	0.11	0.18	0.09	0.17	0.29	0.47	0.49	0.53	1.13	1.67	2.89	4.16
Natural rubber	M_{ji}^{c}/M_{j}^{c} (%)							0.89	16.05	37.67	40.43	31.29	19.43	15.04	11.73
	S_{ji}^{c}							0.59	9.91	20.58	21.85	18.51	9.96	5.70	3.48
Copra	M_{ji}^{c}/M_{j}^{c} (%)	32.69	0.76	5.82	5.37	10.42	13.81	3.36	20.28	24.74	31.45	8.55	37.80	26.93	31.70
	S_{ji}^{c}	22.24	0.64	3.71	3.42	7.09	8.52	2.21	12.52	13.52	17.0	5.06	19.38	10.20	9.41
Nickel	M_{ji}^{c}/M_{j}^{c} (%)			0.69	1.41	1.42	2.22	4.55	3.46	8.22	10.52	7.74	8.62	7.86	11.19
	S_{ji}^{c}			0.44	0.90	0.97	1.37	2.99	2.14	4.49	5.69	4.58	4.42	2.98	3.32
Bauxite	M_{ji}^{c}/M_{j}^{c} (%)	27.70	46.00	33.00	27.35	36.02	43.73	39.98	37.91	33.66	33.14	36.99	30.91	24.59	32.70
	S_{ji}^{c}	18.84	38.66	21.02	17.42	24.50	26.99	26.30	23.40	18.39	17.91	21.89	15.85	9.31	9.70
Frozen shrimp	M_{ji}^{c}/M_{j}^{c} (%)											0.03	1.88	5.33	6.45
	S_{ji}^{c}											0.02	0.96	2.02	1.91

Table 3 Japan's Imports from Indonesia, Selected Commodities

(Units: Metric ton/US$ 1,000)

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Natural rubber														
Japan's total imports														
(Quantity)	148.3	138.5	171.9	183.5	197.1	205.8	198.8	227.3	221.9	241.5	256.2	271.1	295.3	306.5
Mj (Rate of growth) %		-6.61	24.12	6.75	7.41	4.41	-3.41	14.34	-2.40	8.83	6.29	5.82	8.93	3.79
(Value)	89.7	72.2	113.1	143.0	111.5	108.9	101.0	107.9	101.3	107.9	98.5	92.4	139.5	126.4
(Rate of growth) %		-19.51	56.65	26.44	-21.03	-2.34	-7.26	6.83	-6.12	6.52	-8.71	-6.20	50.97	-9.10
Japan's imports from														
Indonesia (Quantity)	427	673	3,585	3,277	2,252	2,793	1,765	36,475	83,600	97,627	80,157	52.667	44,416	35,949
(Rate of growth) %										16.78	-17.90	-34.30	-15.67	-19.06
(Value)	267	261	1,696	1,809	1,044	1,076	723	14,901	34,492	41,639	30,715	16,563	20,303	13,999
(Rate of growth) %										20.72	-26.24	-46.08	22.58	-31.05
$\frac{Mji}{Mj}$ (%)							0.89	16.05	37.67	40.43	31.29	19.43	15.04	11.73
Copra														
Japan's total imports														
(Quantity)	45,871	47,831	54,682	85,271	80,420	88,520	108,250	85,561	94,231	107,612	112,059	126,066	108,751	126,939
(Rate of growth) %		4.27	14.32	55.94	- 5.69	10.07	22.29	-21.00	10.13	14.20	4.13	12.50	-13.74	16.72
(Value)	8,715	9,119	13,141	17,117	12,709	13,833	18,750	15,599	18,963	19,390	20,165	27,186	20,275	26,780
(Rate of growth) %		4.64	44.11	30.26	- 25.75	8.84	35.55	-16.91	21.57	2.25	4.00	34.82	-25.43	32.08
Japan's imports from														
Indonesia (Quantity)	14,997	365	3,181	4,582	8,376	12,228	3,635	17,351	23,310	33,842	9,582	47,650	29,290	40,239
Mji (Rate of growth) %		-97.57	771.50	44.04	82,80	45.99	-70.28	377.33	34.34	45.18	-71.69	397.29	-38.53	37.38
(Value)	3,124	68	666	1,126	1,328	1,879	605	3,096	4,316	5,777	1,640	10,588	5,446	8,524
(Rate of growth) %		97.83	879.41	69.07	17.94	41.49	67.81	411.74	39.41	33.85	71.62	545.61	-48.57	56.52
$\frac{Mji}{Mj}$ (%)	32.69	0.76	5.82	5.37	10.42	13.81	3.36	20.28	24.74	31.45	8.55	37.80	26.93	31.70

Figure 1 Indonesia's Exports by Country Destination

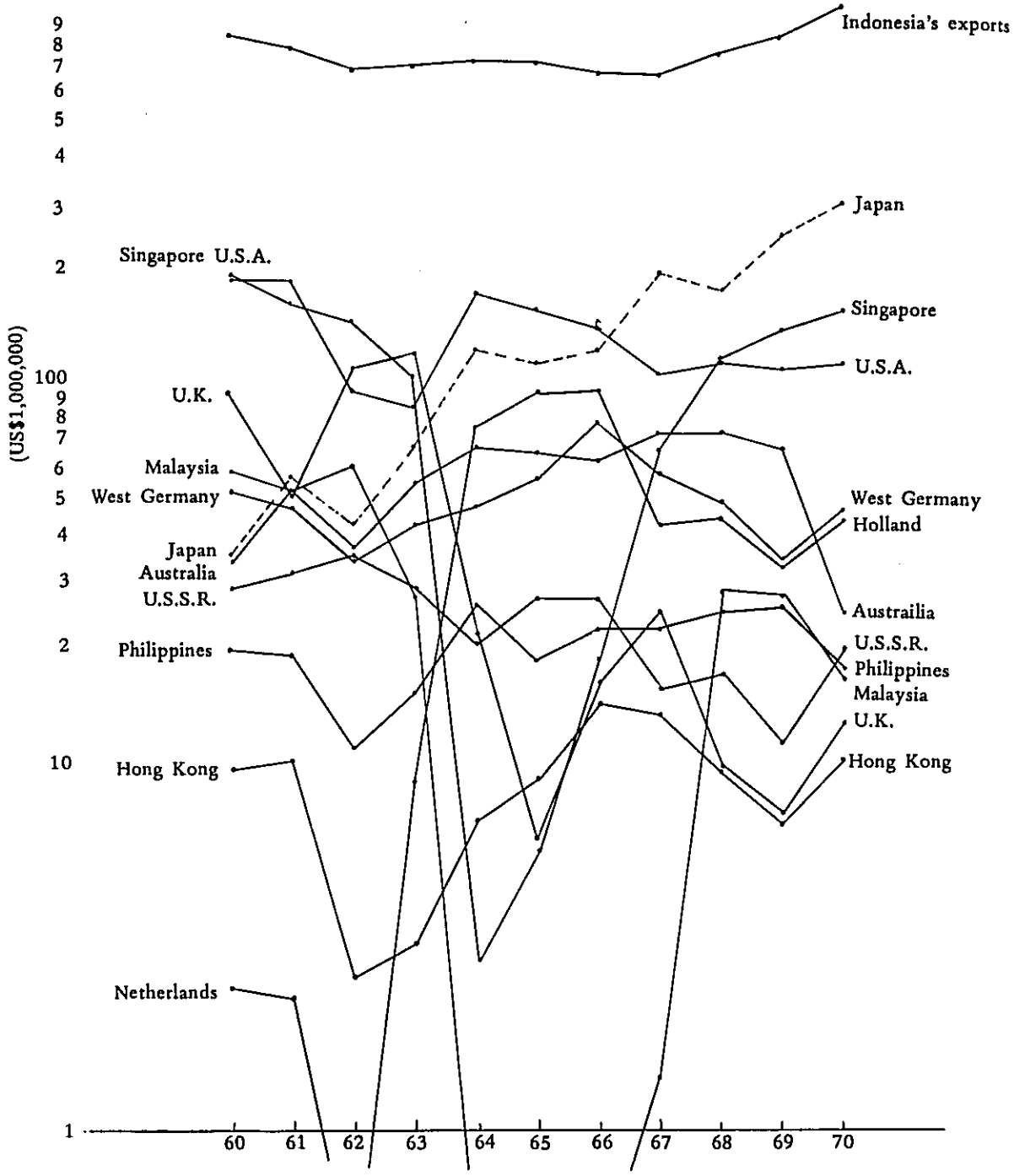


Figure 2 Commodity Composition of Japan's Imports from Indonesia

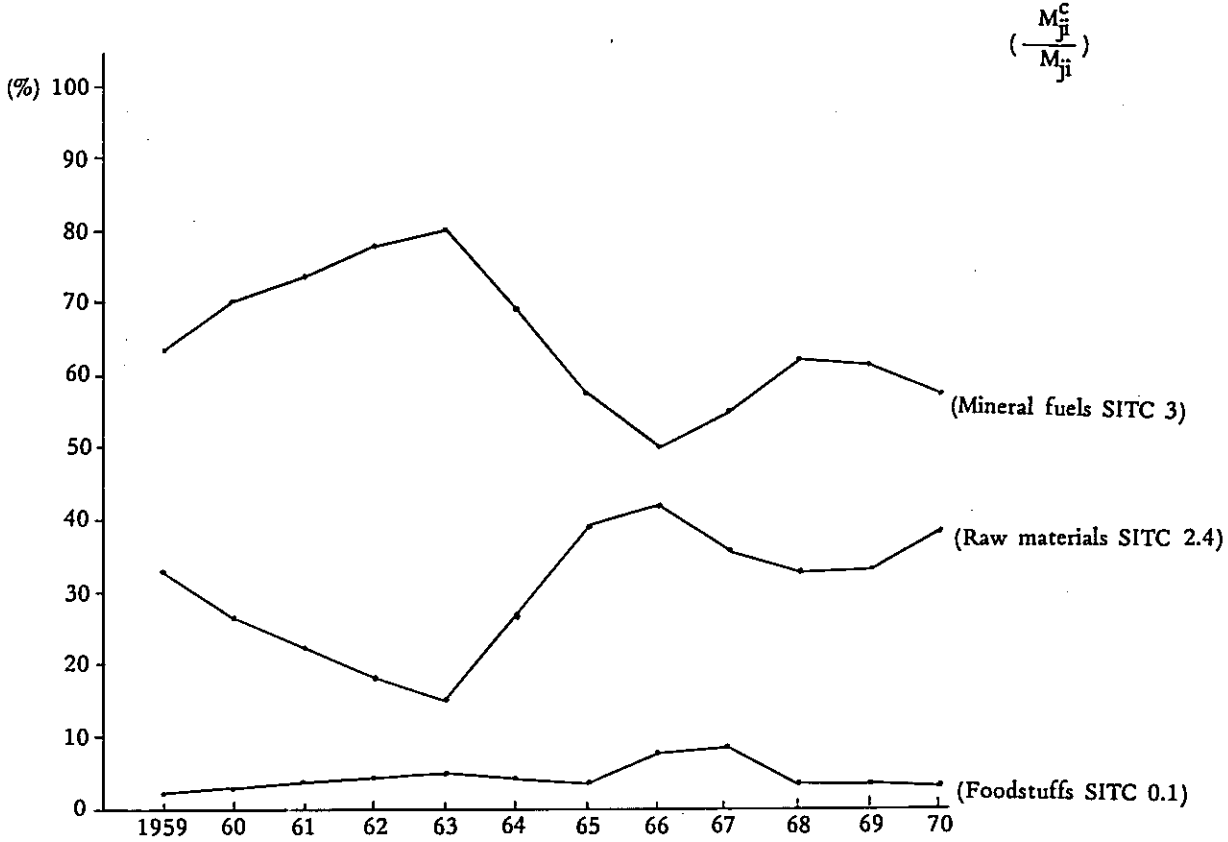


Figure 3 Trade Intensity Index $\left(\frac{Mji}{Mj} \Big/ \frac{Xi}{Xw}\right)$

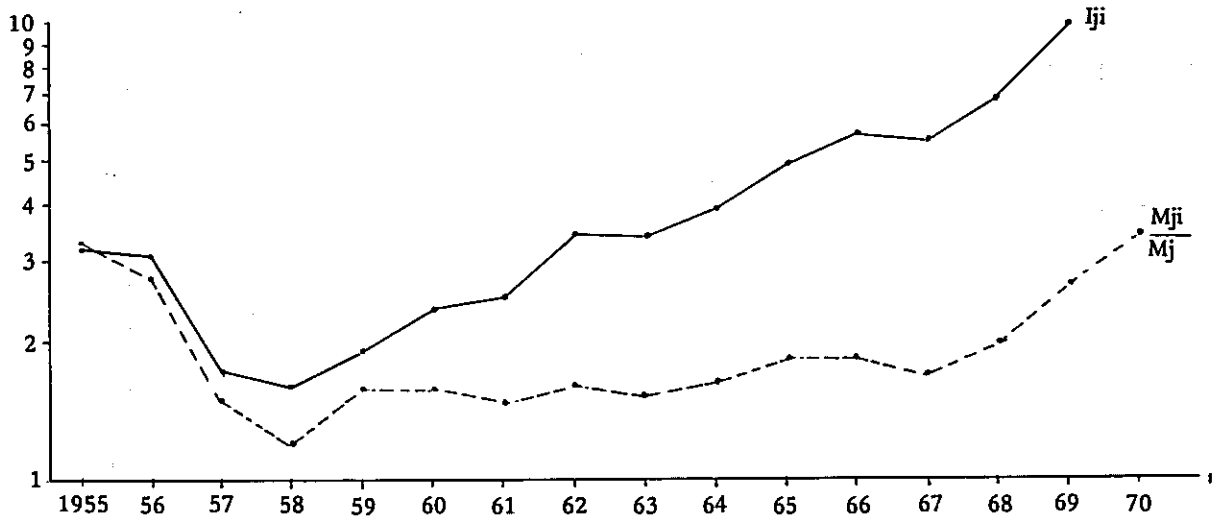


Figure 4 Specilization Index for Crude Oil

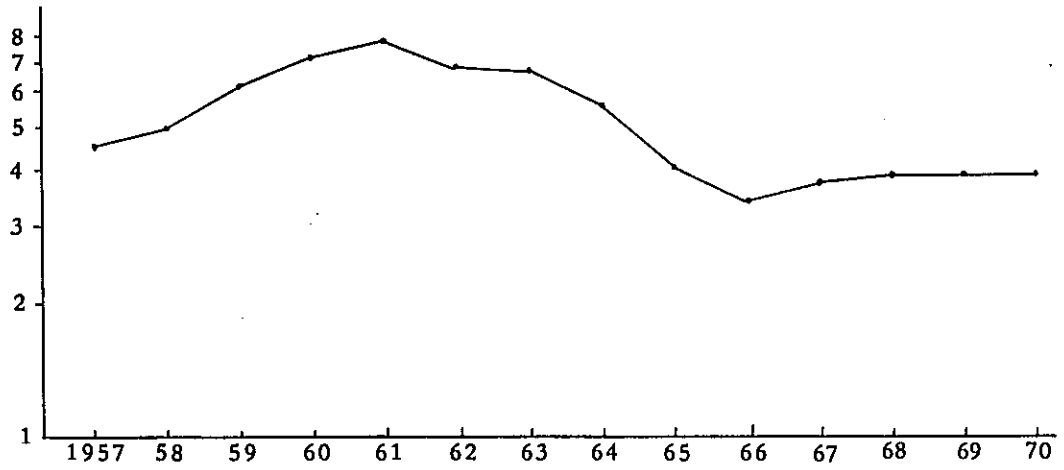


Figure 5 Specialization Index for Lumber

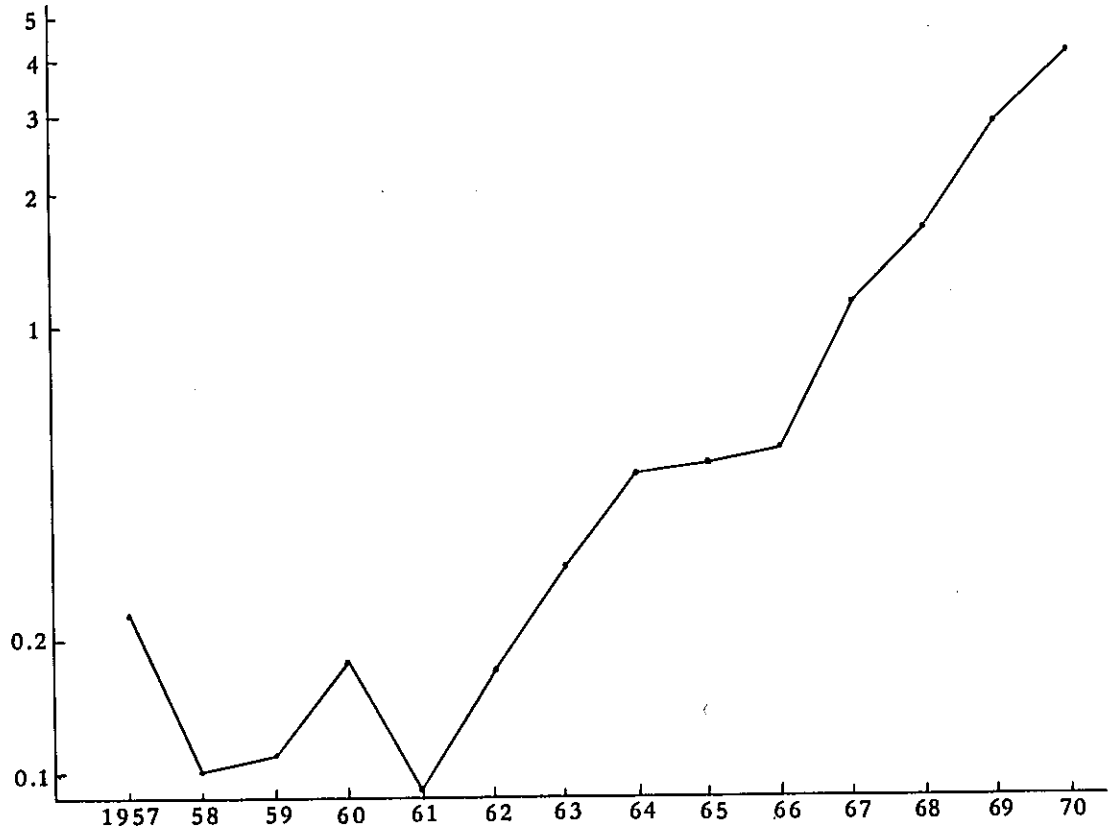


Figure 6 Specialization Index for Natural Rubber

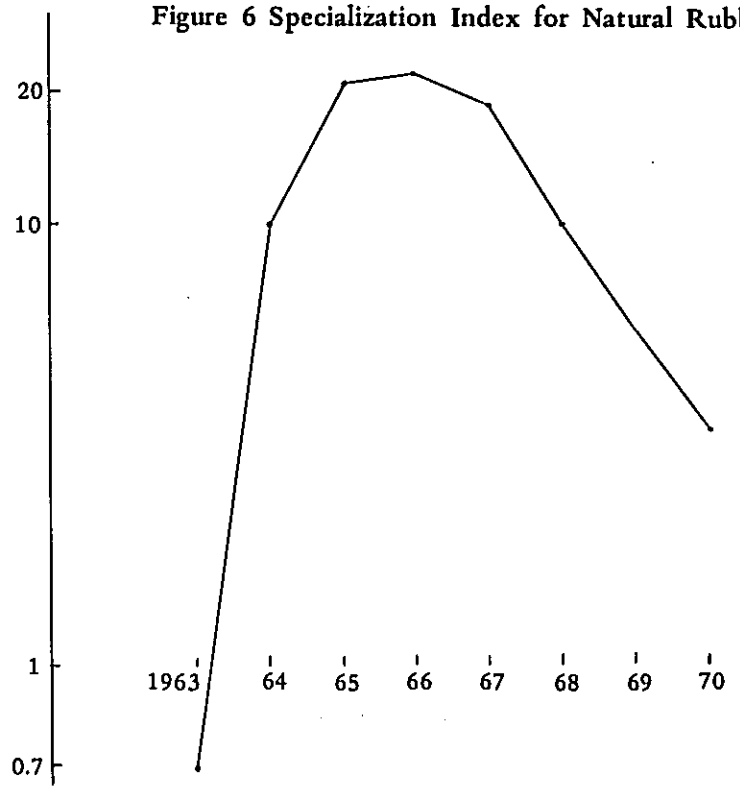


Figure 7 Specialization Index for Nickel

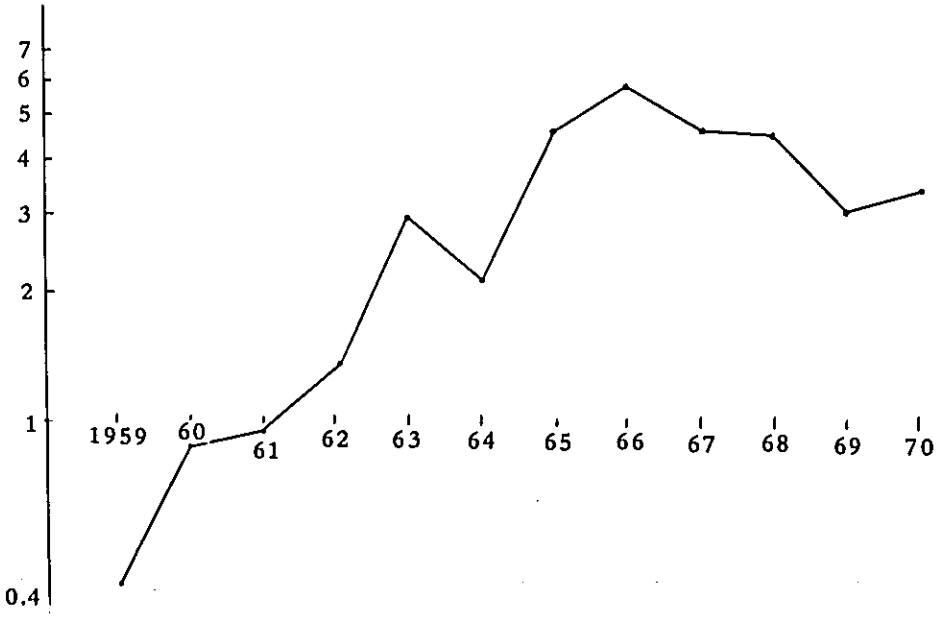


Figure 8 Specialization Index for Copra

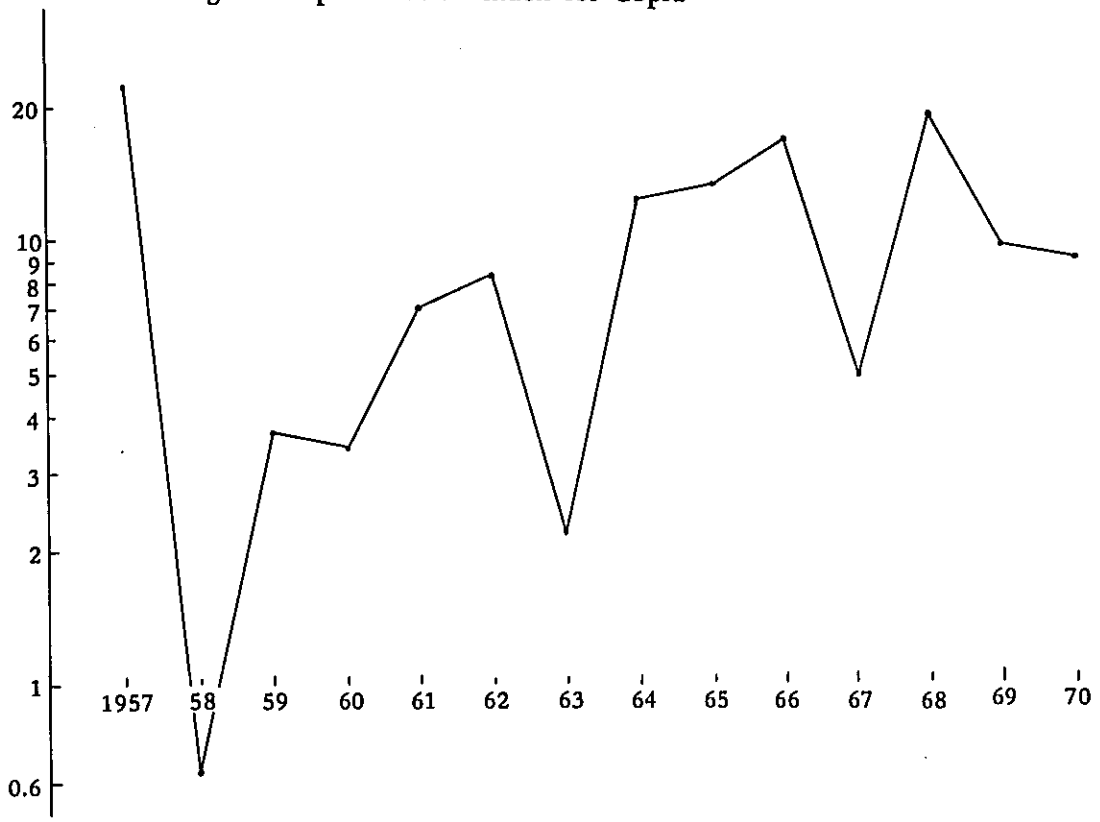


Figure 9 Specialization Index for Bauxite

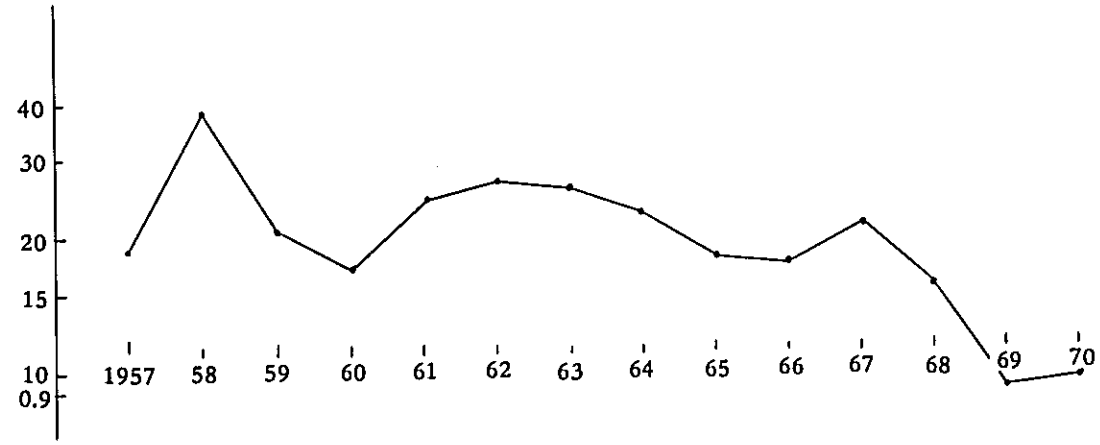


Figure 10 Japan's Imports of Natural Rubber

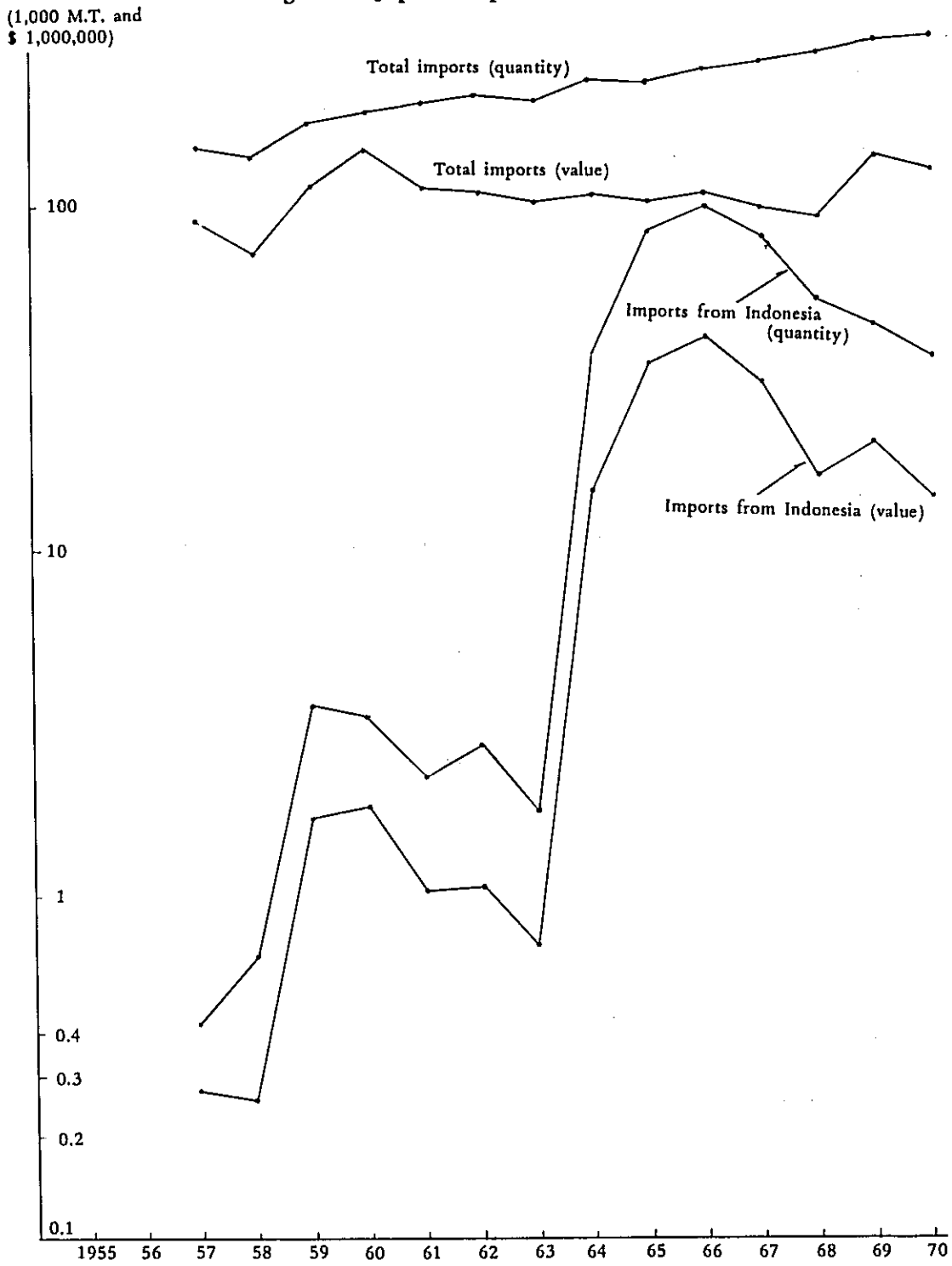
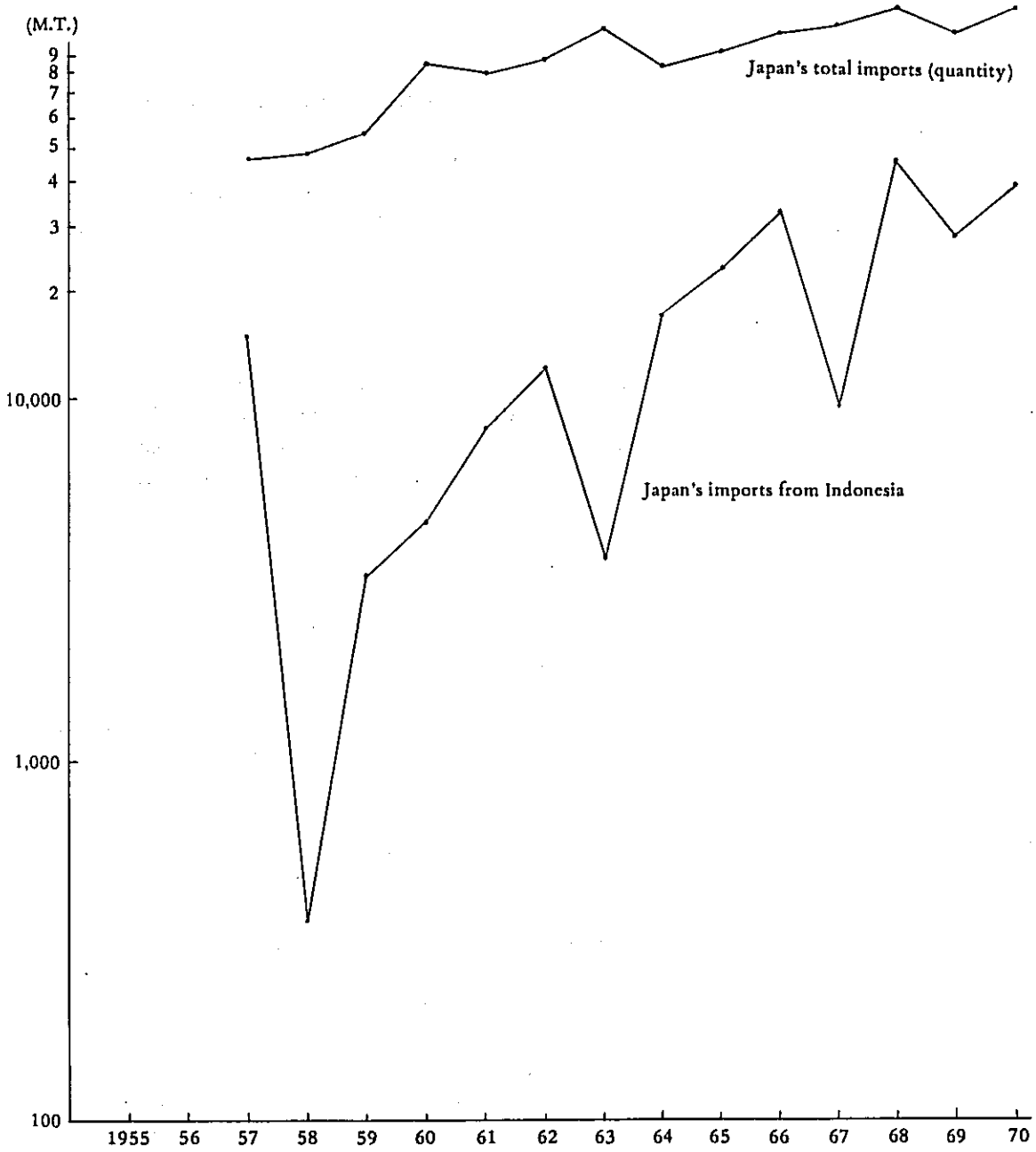


Figure 11 Japan's Imports of Copra



CHAPTER IV LONG-TERM PROJECTION OF JAPAN'S IMPORT DEMAND FOR INDONESIA'S EXPORTS

INTRODUCTION

Japan's import demand depends on (1) industrial structure, (2) consumer demand for goods and services, and (3) productive capacity of domestic industries.. Change in industrial structure, which can be expected to accelerate through the 1970s, will be closely related to those in raw material imports. The diversification of consumer demand and the intensification of pollution reduction efforts will also strongly affect the change in import composition of goods and services.

Changes in Japan's Import Demand

In view of the uncertainty associated with international monetary and trade arrangements, the expected second yen revaluation, and in the absence of 1971 data, the scope of the following discussion is limited mostly to reflection on past change in Japan's import demand. An attempt is also made to present some tentative discussion as to its future.

Japan's import demand by area and by commodity

Japan's import demand for the past ten years (1961–1970), by area and by commodity, is summarized in Tables 1 and 2.

Statistical data are all from Tsusho Hakusho (White Paper on International Trade) for each year unless specifically noted otherwise. The total imports over the sample period more than tripled, while Asia, Western Europe, North America, Latin America, Africa, Oceania and the centrally-planned economies increased their exports to Japan over the same sample period by 4.3, 3.5, 2.7, 2.8, 5.8, 3.4 and 4.1 times, respectively. The same figure for Southeast Asia was only 3.1 times.

In terms of trade composition by area, Japan's imports from North America (mainly from the United States) accounted for 40.6 to 34.4% of the total, showing the latter to be the most important partner for the former in spite of the decline. North America was followed by Southeast Asia (16.8% to 16.0%) and West Asia (8.6 to 12.0%). The relative weight of the United States, therefore that of North America, is not expected to change significantly in the future, nor is the composition as a whole. However, the relative weights of those areas other than Western Europe, North America, and Africa are showing an upward trend, causing one to believe that Japan will increase her dependence on these areas for imports. The sole most important factor in the future

may prove to be China, which has both raw materials to export and geographical advantage.

To examine Japan's imports by commodity, four commodity groupings have been introduced; they are foodstuffs, raw materials, mineral fuels and manufactured goods, as shown in Table 2.

In the case of foodstuffs, the total imports increased 3.8 times from 1961 to 1970 in comparison with 3.2 times of the total value imported over the same sample peirod. In terms of relative share, it increased from 11.5% (1961) to 18.0% (1965) and then declined somewhat to 13.6% (1970). This latter trend is expected to continue, since many of the commodities included in this category have a low income elasticity of demand and show a downward tendency of their prices in the international markets. If Japan, however, abolishes import restrictions currently in force for protection of domestic agricultural products, foreign-produced foodstuffs may increase their relative share to reverse this declining trend.

As for raw materials, the rate of growth and the relative share show a declining trend throughout the observation period (except 1967), from 48.0% (1961) to 35.4% (1970). It should be noted, however, that this is the most important import commodity group for Japan, as it occupies more than one-third of the total value imported. The declining trend in its relative share can be explained by a long term constancy of imported raw materials for textile.

The relative weight of mineral fuels was quite stable, around 20%. But a break-down into coal and crude oil showed varying movements. Coal imports were characterized by high and increasing tendency in the rate of growth and an upward trend in its relative share. Crude oil imports were marked by a high rate of growth and a large but downward trend in its relative share.

The relative share of chemical products and machinery showed the opposite tendency to that of foodstuffs; it declined from 20.9% in 1961 to 15.5% in 1966 and then increased to 18.5% in 1970.

Foodstuffs and raw materials were imported from both developed and less developed countries,. With regard to food, the weights occupied by the United States, Australia and Canada come close t0 50%. This also was the case with metals (raw material). In other words, Japan's imports of primary goods, except mineral fuels, were heavily biased toward the developed countries. As expected, Japan's imports of manufactured goods such as chemical products and machinery also had a bias toward the developed countries. This tendency can be expected to continue with regard to chemical products and machinery. Light industry goods, on the other hand, will be increasingly imported from the less-develped countries, as well as foodstuffs such as sea food.

Japan's imports from Southeast Asia by Commodity

Table 3 shows Japan's imports form Southeast Asia by six main items with some sub-items; food, raw materials, mineral fuel, chemical products, machinery and others from 1963 to 1970. Total imports from this area increased 2.5 times over the observation period.

Food imports increased only 1.6 times, which results in a sharp decline in the relative share of food in total value imported in 1970. The top three items of food in terms of US dollars in 1970 are shown in the table; frozen shrimp made a remarkable rise both in terms of growth rate and relative share; sugar had a sharp declining trend up to 1970; and banana fluctuated widely, reflecting the supply of competitive domestic fruits.

Raw material imports increased 2.1 times with a rather constant value of textiles and steady rising trends of metals and others.

The rate of growth increased significantly for mineral fuel, chemical products, machinery and others, owing to an expansion in Japan's imports of petroleum and light industry goods such as textiles.

The relative share of foodstuffs declined as exported above from 23.0% (1963) to 14.8% (1970). The relative share of raw materials showed a similar pattern to that of food, with one difference that the level of its share was much higher; 62.7% (1963) to 53.1% (1970). As to mineral fuels, the market share showed an upward trend in contrast to the earlier case of all areas' market share, which was rather stable; 9.0% (1963) to 15.7% (1970). The relative share of chemical products, machinery and others showed an increasing trend; 5.5% (1963) to 16.3% (1970). This seemed to be the chief characteristic in commodity composition of Japan's imports from Southeast Asia.

Changes in Japan's Import Demand: Case of Food Items

In this section, attention is focused specifically on Japan's import of food items as relevant to Indonesia. Other item such as raw materials is to be discussed in the following section.

Food items

Before entering an analysis of Indonesia-related food items, frozen shrimp and corn, some elaboration concerning food is perhaps in order.

Table 4 summarizes Japan's imports of various food items from 1963 to 1970. Those items with the largest relative weights were crops and feed. They show an upward trend in value terms. In terms of relative weights, these two items were

followed by marine products, fruits and vegetables, and sugar, all of which but the last one were characterized by an upward trend in value terms.

Japan's imports of food, by supplying country, are shown in Table 5. Countries are listed in order of size of their food trade vis-a-vis Japan in 1970. Indonesia is in the last place. As mentioned before, the United States, Australia and Canada were the top three food exporting countries to Japan. Among other countries to be noted are Argentina and Cuba, whose exports to Japan expanded rapidly during the past three years; South Africa, whose exports have gradually been declining; and Taiwan, whose exports fluctuated very widely.

Frozen shrimp

Table 6 is a supplying country break-down of Japan's frozen shrimp imports. In terms of value traded in 1970, Indonesia placed seventh. From 1967 to 1968 Japan's imports of frozen shrimp from Indonesia expanded nearly 40 times in value terms, from 1968 to 1969 more than 4 times, and from 1969 to 1970 nearly 1.5 times.

Since Japan's domestic production of shrimp has been increasingly limited by pollution and lack of resources, her import demand for frozen shrimp will expand in the future. All the countries ahead of Indonesia in the ranking, except for Mexico, are located relatively closer to Japan than other main importing countries and may be thought of as Indonesia's direct competitors. In this field, however, Indonesia is a late-comer. As can be seen in the table, the relative position of Indonesia vis-a-vis Malaysia was reversed in 1969.

From Table 6 we can derive a sort of unit price of frozen shrimp for each exporting country in terms of US dollars per metric ton and of indices taking average unit prices as a base for the period of 1967–1970. Since there are many varieties included under the classification, "Frozen Shrimp", the term unit price is not to be taken in a strict sense. Unit prices here vary from time to time and from country to country, but there are three cases; Case 1 denotes the countries like Mexico, China (Mainland), Australia, and Hong Kong where unit prices were above the averages; Case 2 is opposite to Case 1 where they were below the averages; and Case 3 includes such countries as Indonesia and China (Taiwan) where they were at times higher than the averages (in 1967 and 1968) and at times lower than the averages (in 1969 and 1970).

Indonesia's market share of 6.7% (1970) was not so far from that of first place Mexico, 14.6%. If Indonesia takes advantage of her favorable natural conditions by intensifiying her efforts in building motor-powered boats, improving fishing tools, adopting new methods of cultivating and fishing and acquiring processing technology, she will stand a chance to enlarge her relative market share, as well as start exporting processed marine products, thereby increasing her exports to Japan. To do so, education and research facilities must be built to train the manpower needed to carry out

the tasks mentioned above.

Corn (feed)

Total corn (feed) imports of Japan became 2.0 times in value terms and 1.8 times in quantity terms for the period of 1963–1970. Corn imports of Japan from Indonesia and the United States increased 8.6 and 1.6 times in value terms and 8.4 and 1.6 times in quantity terms respectively from 1965 to 1970. The market share of the United States, however, remained at a high level of 69.5% (1965) to that of 74.1% (1970), while that of Indonesia kept a low level of 0.1% (1965) to 0.7% (1970). Thailand had kept the second top ranking throughout the observation period.

From Table 7 we can obtain unit prices in terms of US dollars per metric ton for each period and country. The average price of corn for feed remained constant throughout the observation period, 1963–1970, although there were some discrepancies among countries, Corn imports of Japan seem to be dependent on export capacity whcih includes notl only physical capacity but also 'software' technology such as marketing.

Changes in Japan's Import Demand: Case of Raw Materials

Raw material imports from Indonesia consist of baxite, nickel ore, copra, rubber, lumber and crude oil, the last of which has been discussed in the interium report and will be omitted here.

Bauxite

Table 8 has relevant data for Japan!s imports fo bauxite from 1963 to 1970. Indonesia was the second in ranking throughout the period except 1967. Total bauxite imports increased 2.4 times in value terms and 2.2 times in quantity terms over the observation period. Over the same observation period Japan's imports from Indonesia increased 1.7 and 1.8 times respectively.

Average unit price kept at almost the same level over the period; unit prices of Australia, Indonesia and Malaysia were quite similar to average one, while that of Ghana had two different shapes from the above ones, showing upward trends and higher level showing more than 4 times of the average level. These differences may be attributable to the high quality of bauxite, that is, high aluminum contents.

The relative share of Indonesia as an exporting country of bauxite to Japan declined from 35.8% to 25.5% over the sample period with some ups and downs. In terms of relative share Australia had an increasing trend, 7.0% (1963) to 48.6% (1970); Indonesia and Malaysia had a declining one; and Ghana kept less than 10% except 1964 (14.4%).

Nickel ore

Japan's total imports of nickel ore increased 12.4 times in value terms and 6.9 times in quantity terms for the period of 1963–1970, while Indonesia's exports of nickel to Japan increased 22.4 and 17.0 times repsectively. The most rapid increase was obtained by Australia, which started exporting to Japan in 1967, reached the second position in 1969 and kept the same position in 1970. New Caledonia remained in the top position throughout the period but her relative share declined very sharply in 1970.

Copra

Japan's total imports of copra increased only 1.4 times in value terms for the period of 1963–1970, while her imports from Indonesia rose 14.1 times for the same period. This sharp rise in export led Indonesia to the top ranking of the exporting countries in 1970, replacing the Philippines who had kept it up to 1969.

Unit price of copra was almost the same among countries, which means that Indonesia's high expansion can be attributable to her supply capacity increase. The price of copra had ups and downs but almost no trend is observable.

Rubber

Crude rubber is another item in which Indonesia made a great spurt in exporting to Japan, 76.9 times in value terms and 102.1 times in quantity terms, while Japan's total imports of crude rubber increased only 1.3 and 1.6 times respectively. Indonesia kept the top rank among exporting countries from 1965 to 1967, and then slipped into the third place thereafter, which denotes that her supply capacity might decline due to the changes in the age composition of rubber trees.

Unit price had wide fluctuations and no time series trend is seen, and there was no distinct discrepancy among exporting countries.

Lumber

Japan's total imports expanded 3.9 times in value terms and 3.1 times in quantity terms for the period of 1963–1970, while Japan's imports from Indonesia increased 110.0 and 95.8 times respectively, which enabled Indonesia to occupy 11.2% of the Japanese market in 1970.

The unit price of lumber showed a rising trend over the sample period. The unit price of the United States was higher than that of other exporting countries by more than 20%, while unit price of the Soviet Union was the lowest throughout the sample period.

Japan's Imports from Indonesia: Some Conclusive Remarks

Items exported from Indonesia to Japan have been mainly so-called primary products. Economic development may change the contents of such export items in the long run, although for the coming five years or so Indonesia will probably continue to depend on the goods now being exported. Prices of primary products fluctuated very widely, but their long run trend is rather stable. Much or most of the expansion of Indonesia's exports to Japan are likely to be primary goods. The rate of such expansion will depend primarily on Indonesia's export capacity for each of these commodities.

Food items

Frozen shrimp is a good example for a new export item which showed a good combination of Indonesia's natural resources and foreign technology. This kind of success can be extended to other sea food products. These items have a high income elasticity in Japan and their supply will become more and more limited due to pollution of Japanese waters. Canned tuna, for example, has good possibility to be made a new export item.

Raw materials

As noted above, since prices of primary products have not shown a declining trend, high dependency on these items in export does not necessarily mean an unfavorable condition for Indonesia. In fact, Indonesia had a high dependency on primary products in exports in the past and will also have such a dependency in the future. Considered as initial conditions for economic development this situation is a favorable one.

The question is whether foreign reserves obtained by exporting these items can be channeled into economic development, which requires great amounts of imported capital goods and technology as well as domestic resources.

Light industry goods

Past records show that light industry goods did not play an important role in Indonesia's exports to Japan, but this situation will change rapidly if Indonesia adopts technology appropriate to her domestic factor endowment.

It is widely acknowledged that science and technology play an important role in modern economic growth. The term technology covers a wide range of knowledge and information; from basic scientific knowledge to information on production facilities or from "software" technology to "hardware" technology.

One of the most exciting, and perhaps the most important, areas of study relating technology to growth in production capacity is that of technology transfer,

which has to do with transfer of technical knowledge, technology-embodying machinery, between countries, scales of operation, as well as with linkage effects created by such transfers.

In the case of Indonesia, technology transfer possibilities have a particular bearing on her choice of industries and techniques. Granted that industrialization is the most fundamental condition of economic development, it does not have to be associated with heavy industry orientation. On the contrary, development of light industries should precede that of heavy industries. To take the case of textile industry, the most important of the light industries, Indonesia has ready demand for its products in her domestic market. At present, both state-owned and joint-venture enterprises rely totally on borrowed technology, i.e., modern production facilities and management techniques imported from the developed countries. In view of her huge potential market, utilization of modern technology is inevitable. But in some plants in Indonesia, an attempt is being made to combine native technology with borrowed technology, no doubt not the latest but nevertheless still modern technology, adjusting their operations to relative factor price and demand conditions. By necessity their scale of operation is very small. But it seems that success of technology transfer in Indonesia's textile industry depends on the performance of these plants.

Indonesia's efforts to establish centers for dissemination of information such as the Craft Products Center and Industrial Center, are quite appropriate in view of the increased need for modification of imported technology and for improvement of native technology. In addition, systematic collection of marketing information will be needed.

Natural silk and wooden furniture can have good possibilities to be a new items for export to Japan among the category of light industry goods.

(Shigeru Ishiwata)

Table 1. Japan's Total Imports by Area

(Unit: US$1,000,000)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Total	5,810	5,637	6,736	7,938	8,169	9,523	11,663	12,987	15,024	18,881
Asia (Communist bloc excluded)	1,475	1,551	1,969	2,212	2,480	2,835	3,302	3,767	4,312	6,287
Southeast Aisa	975	967	1,211	1,293	1,406	1,613	1,795	1,984	2,381	3,013
West Asia	500	583	758	919	1,074	1,222	1,507	1,783	1,931	2,273
Western Europe	555	604	670	813	726	858	1,178	1,278	1,474	1,934
E C	312	344	395	444	392	447	655	737	821	1,117
E F T A	223	245	261	339	302	368	465	493	612	750
North America	2,362	2,064	2,396	2,715	2,723	3,109	3,846	4,188	4,760	6,489
Latin America	482	477	564	692	707	781	855	961	1,162	1,373
South America	257	226	279	356	391	446	529	610	759	976
Africa	190	218	266	380	353	420	661	839	982	1,099
Oceania	530	493	596	681	652	832	951	1,115	1,485	1,812
Communist bloc	217	227	275	444	527	688	868	837	848	888

Table 1–A Japan's Total Imports by Area

(Unit: per cent)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1979
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Asia (Communist bloc[1] excluded)	25.4	27.6	29.2	27.9	30.3	29.8	28.3	29.0	28.7	28.0
Southest Asia	16.8	17.2	18.0	16.3	17.2	16.9	15.4	15.3	15.8	16.0
West Asia	8.6	10.4	11.3	11.6	13.1	12.8	12.9	13.7	12.9	12.0
Western Europe	9.6	10.7	10.0	10.2	8.9	9.0	10.1	9.8	9.8	10.2
E C	5.4	6.1	5.9	5.6	4.8	4.7	5.6	5.7	5.5	5.9
E F T A	3.8	4.4	3.9	4.3	3.7	3.9	4.0	3.8	4.1	4.0
North America	40.6	36.6	35.6	34.2	33.3	32.6	33.0	32.2	31.7	34.4
Latin America	8.3	8.5	8.4	8.7	8.7	8.2	7.3	7.4	7.7	7.3
South America	4.4	4.0	4.1	4.5	4.8	4.7	4.5	4.7	5.1	5.2
Africa	3.3	3.9	3.9	4.8	4.3	4.4	5.7	6.5	6.5	5.8
Oceania	9.1	8.7	8.8	8.6	8.0	8.7	8.2	8.6	9.9	9.6
Communist bloc	3.7	4.0	4.1	5.0	6.4	7.2	7.4	6.4	5.6	4.7

Table 2 Japan's Total Imports by Commodity, 1961 - 1970

(Unit: US$1,000,000)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Total	5.810	5,637	6,736	7,938	8,169	9,522	11,663	12,987	15,024	18,881
Foods	669	740	1,088	1,386	1,470	1,676	1,805	1,879	2,141	2,574
Wheat	179	181	217	262	251	279	308	289	297	318
Corn (feed)	103	127	146	190	197	207	219	242	248	294
Sugar	122	118	239	249	156	126	122	147	198	284
Raw materials	2,787	2,393	2,788	3,099	3,220	3,873	4,493	4,865	5,401	6,677
Textiles	951	741	884	874	847	923	898	951	927	963
Metals	956	713	767	972	1,019	1,208	1,600	1,649	1,972	2,696
Others	880	939	1,137	1,253	1,354	1,742	1,995	2,265	2,502	3,018
Mineral fuels	932	1,041	1,211	1,407	1,626	1,804	2,239	2,675	3.044	3,905
Coal	188	211	181	211	270	303	401	518	675	1,010
Crude oil	539	621	789	829	1,047	1,200	1,457	1,685	1,907	2,236
Chemical products	336	300	369	458	408	497	611	689	783	1,000
Machinery	877	1,101	1,082	1,110	931	980	1,272	1,648	1,993	2,788
Others	441	352	426	706	684	852	1,462	1,551	2,020	2,335

Table 3. Japan's Imports from Southeast Asia by Commodity

(Unit: US$1,000,000)

	1963	1964	1965	1966	1967	1968	1969	1970
Total	1,211	1,293	1,406	1,613	1,795	1,984	2,381	3,013
Foods	278	330	360	365	374	382	402	447
Frozen Shrimp	–	–	–	–	34	43	64	66
Sugar	138	116	84	67	46	59	57	63
Bananas	8	32	55	54	63	56	60	44
Raw materials	759	766	837	1,006	1,074	1,139	1,346	1,601
Textiles	93	68	71	62	69	73	74	98
Metals	268	297	336	381	383	419	476	583
Others	397	400	430	562	621	648	797	919
Mineral fuels	109	109	111	116	148	225	318	472
Coal	4	4	3	2	–	–	–	–
Crude oil	86	87	80	82	98	136	209	321
Chemical products	9	9	10	9	13	14	15	21
Machinery	1	1	2	4	6	8	19	37
Others	56	78	86	112	180	217	280	434

Table 4. Japan's Imports of Food by Item

(Unit: US$1,000,000)

	1963	1964	1965	1966	1967	1968	1969	1970
Total	1,090	1,390	1,470	1,676	1,805	1,879	2,141	2,574
Meats	33	53	45	77	88	106	164	145
Marine products	35	57	71	110	132	144	201	262
Frozen shrimp	23	31	36	60	79	78	122	137
Crops	285	390	486	496	499	469	449	514
Fruits & vegetables	93	126	148	161	194	231	274	309
Sugar	239	249	156	126	145	180	227	317
Molasses	20	23	20	23	33	32	24	29
Coffee	26	32	32	36	30	35	49	74
Cocoa	30	31	22	36	38	43	50	41
Feedstuffs	245	317	373	437	458	475	516	671
Alcohol	3	5	4	7	8	10	12	17
Tobacco	37	55	50	68	64	57	74	74
Others	45	64	63	99	99	77	76	82

Table 5. Japan's Imports of Food by Country

(Unit: US$1,000,000)

	1963	1964	1965	1966	1967	1968	1969	1970
Total	1,090	1,390	1,470	1,676	1,804	1,879	2,141	2,574
U. S. A.	317	435	563	621	568	575	677	812
Australia	94	121	89	109	139	141	208	232
Canada	101	120	115	133	152	127	99	158
Argentina	22	38	34	30	26	20	76	131
China (Taiwan)	106	120	138	118	69	107	115	114
Cuba	23	53	29	22	26	33	68	110
Ecuador		23	6	12	12	40	44	84
Okinawa	60	58	77	70	69	81	82	83
South Africa	77	75	27	16	83	142	81	79
Thailand	41	70	65	81	87	74	63	76
China (Mainland)	20	38	81	125	91	73	54	67
Brazil		10	8	16	19	20	36	65
New Zealand	15	18	19	37	58	43	51	55
South Korea	7	13	15	27	30	33	35	42
India					14	17	25	36
Philippines	9	16	15	13	21	21	22	34
England					12	19	27	31
Netherlands		13	15	19	23	22	21	25
Ghana		13	7	16	16	22	27	23
Mexico	8	10	24	31	55	40	54	23
France					8	30	38	22
Indonesia		5	5	13	16	10	14	19

Table 6. Japan's Improts of Frozen Shrimp by Country

(Units: Metric ton & US$1,000)

	1967		1968		1969		1970	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Total	34,466	79,732	35,204	78,079	48,886	121,748	57,146	137,026
Mexico	7,995	19,440	5,769	14,577	5,511	15,705	7,210	19,962
China (Mainland)	5,004	10,314	3,769	8,242	4,136	11,466	6,248	19,280
India	2,147	4,614	3,164	6,567	4,864	11,957	6,387	14,690
Thailand	5,090	10,344	4,581	11,142	6,395	15,150	5,983	14,023
Australia	966	2,567	925	2,600	3,383	10,190	3,665	11,262
Hong Kong	3,002	7,412	3,628	9,551	4,230	12,853	3,058	9,241
Indonesia	15	38	661	1,497	2,604	6,405	3,684	8,800
Malaysia	1,465	2,936	1,910	3,860	2,801	6,179	3,157	6,460
Pakistan	1,200	2,729	1,635	3,601	2,646	6,518	2,276	5,416
China (Taiwan)	759	2,049	853	2,401	1,305	2,741	2,487	4,716
Cuba	–	–	–	–	964	1,893	1,986	3,867

Table 7. Japan's Imports of Corn (feed) by Country

(Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	2,433,932	146,070	2,945,899	189,893	2,946,186	197,433
U. S. A.	1,055,566	64,575	1,492,164	97,646	2,017,673	137,187
Thailand	428,328	24,889	717,277	44,870	569,811	36,162
Argentina	75,489	4,527	10,999	695	9,212	599
Brazil	24,212	1,424	11,992	745	6,848	456
Indonesia	–	–	–	–	3,692	256
South Africa	640,045	38,522	465,774	30,931	29,571	2,164
Australia	–	–	–	–	–	–
Cambodia	5,755	387	23,573	1,486	23,560	1,629

	1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	3,065,052	206,980	3,184,896	219,002	4,042,154	241,786
U. S. A.	2,017,433	137,945	1,511,495	104,763	2,397,424	144,578
Thailand	758,342	49,739	691,199	46,925	623,246	36,243
Argentina	17,218	1,210	59,040	4,079	0	0
Brazil	31,189	2,222	57,829	4,011	225	16
Indonesia	44,200	2,777	100,978	6,428	8,762	514
South Africa	–	–	562,240	38,519	750,241	44,870
Australia	–	–	–	–	–	–
Cambodia	24,027	1,687	17,273	1,197	9,614	642

	1969		1970	
	Quantity	Value	Quantity	Value
Total	4,172,128	248,303	4,382,702	293,962
U. S. A.	2,939,522	174,971	3,273,038	217,734
Thailand	450,571	25,670	513,449	35,383
Argentina	169,586	10,321	426,066	28,948
Brazil	12,974	805	108,557	7,569
Indonesia	35,092	2,039	30,861	2,192
South Africa	528,413	32,291	23,291	1,618
Australia	–	–	5,231	354
Cambodia	10,130	643	2,468	164

Table 8. Japan's Imports of Bauxite by Country

(Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	1,421,423	15,602	1,621,932	18,278	1,675,404	17,165
Australia	109,147	1,099	257,482	2,543	418,717	4,017
Indonesia	568,316	5,586	614,869	5,599	563,952	5,054
Malaysia	607,861	6,163	599,218	5,960	624,828	6,190
Ghana	–	–	67,183	2,639	25,807	1,089

	1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	1,821,875	18,977	2,085,923	21,769	2,449,856	25,703
Australia	533,269	5,216	643,799	6,339	915,419	9,062
Indonesia	603,760	5,496	771,648	7,000	757,310	6,796
Malaysia	629,326	6,138	607,780	5,778	687,017	6,436
Ghana	29,360	1,309	39,826	1,811	35,242	1,614

	1969		1970	
	Quantity	Value	Quantity	Value
Total	3,121,799	32,447	3,160,126	36,682
Australia	1,558,039	14,814	1,845,086	17,827
Indonesia	767,741	6,845	1,033,245	9,249
Malaysia	669,337	6,330	690,788	6,774
Ghana	64,828	2,965	23,956	1,134

Table 9. Japan's Imports of Nickel by Country

(Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	679,496	13,849	1,143,228	21,584	966,742	19,711
New Caledonia	617,408	10,412	1,085,529	18,576	862,829	15,077
Australia	–	–	–	–	–	–
Canada	19,679	2,612	17,817	2,260	20,481	2,596
Indonesia	30,913	539	39,500	679	79,450	1,364

	1966		1967		1968	
Total	Quantity	Value	Quantity	Value	Quantity	Value
Total	1,269,943	23,953	1,660,587	33,447	2,712,207	57,979
New Caledonia	1,114,333	18,574	1,500,677	26,319	2,418,137	45,807
Australia	–	–	5,903	1,102	22,564	4,160
Canada	18,069	2,538	23,740	3,774	23,500	3,994
Indonesia	133,653	2,048	128,455	1,968	234,960	3,774

	1969		1970*	
	Quantity	Value	Quantity	Value
Total	3,395,420	74,661	4,688,617	173,067
New Caledonia	3,077,097	60,747	4016,731	108,716
Australia	32,642	5,961	107,006	26,305
Canada	17,582	3,532	91,013	25,556
Indonesia	268,099	4,421	524,543	12,091

Note:

* Including nickel mat.

Table 10. Japan's Imports of Copra by Country

(Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	108,250	18,750	85,561	15,599	94,231	18,963
Indonesia	3,635	605	17,351	3,096	23,310	4,316
Philippines	41,189	7,146	23,369	5,179	41,278	8,400
Terr. of New Guinea	3,664	635	2,341	434	1,830	410
Mariana, Marshall & Caroline Is.	9,411	1,662	8,057	1,498	10,170	2,098

	1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	107,612	19,390	112,059	20,165	126,066	27,186
Indonesia	33,842	5,777	9,582	1,640	47,650	10,588
Philippines	47,772	8,823	74,440	13,485	54,150	11,141
Terr. of New Guinea	1,743	328	2,823	496	6,409	1,509
Mariana, Marshall & Caroline Is.	10,267	1,880	11,512	2,101	10,677	2,305

	1969		1970	
	Quantity	Value	Quantity	Value
Total	108,751	20,275	126,939	26,780
Indonesia	29,290	5,446	40,239	8,524
Philippines	40,352	7,566	37,842	7,951
Terr. of New Guinea	16,576	3,052	23,306	4,910
Mariana, Marshall & Caroline Is.	11,533	2,168	7,347	1,581

Table 11. Japan's Imports of Rubber by Country (Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Crude Rubber	172,486	89,491	199,481	95,061	198,368	90,972
Thailand	58,957	30,316	81,101	39,377	57,946	28,592
Malaysia	102,871	53,378	62,130	30,768	36,016	17,858
Indonesia	325	171	34,817	14,308	82,575	34,088
Ceylon	4,063	2,469	3,287	1,837	4,457	2,385
Singapore	481	252	9,547	4,713	5,962	3,011
Natural Rubber Latex	25,740	10,238	26,582	10,280	22,795	8,964
Malaysia	23,689	9,441	20,294	7,888	16,090	6,377
Indonesia	1,440	552	1,658	593	946	337
Cambodia	393	156	1,054	388	1,789	686

	1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value
Crude Rubber	212,179	97,149	225,198	88,657	239,167	83,296
Thailand	59,860	28,359	72,945	28,372	77,262	25,922
Malaysia	40,200	19,795	54,691	21,924	88,587	32,906
Indonesia	94,869	40,750	76,525	29,635	49,539	15,660
Ceylon	5,264	2,716	5,084	2,324	4,812	2,098
Singapore	2,238	1,064	5,447	2,242	9,053	3,288
Natural Rubber Latex	28,672	10,440	30,992	9,808	31,928	9,099
Malaysia	22,624	8,326	25,493	8,158	27,077	7,745
Indonesia	2,668	889	3,632	1,080	3,034	833
Cambodia	1,999	699	1,617	482	1,815	520

	1969		1970	
	Quantity	Value	Quantity	Value
Crude Rubber	260,925	126,522	272,160	115,341
Thailand	98,494	46,103	135,944	56,403
Malaysia	96,426	48,806	89,953	39,787
Indonesia	41,698	19,329	33,175	13,144
Ceylon	4,077	2,369	4,104	2,125
Singapore	12,172	6,049	4,362	1,825
Natural Rubber Latex	34,401	12,997	34,382	11,069
Malaysia	30,583	11,572	31,384	10,102
Indonesia	2,708	968	2,774	856
Cambodia	996	393	217	77

Table 12. Japan's Imports of Lumber by Country

(Units: Metric ton & US$1,000)

	1963		1964		1965	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	13,892	405,541	15,302	438,572	16,921	492,532
U. S. A.	2,683	99				
U. S. A.	2,683	99,097	3,430	123,974	4,594	137,602
Philippines	5,506	153,912	5,289	137,637	5,618	154,291
U. S. S. R.	1,817	33,946	2,397	50,576	2,636	58,308
Malaysia	2,533	64,306	2,700	64,832	3,474	86,023
Indonesia	62	1,604	116	2,699	152	3,376
Canada	920	34,428	779	32,222	642	25,668
New Zealand	234	5,520	324	8,090	413	10,273
China (Taiwan)	74	5,860	124	9,151	111	8,047
Solomon Is.	–	–	–	–	–	–
India	–	–	–	–	–	–

	1966		1967		1968	
	Quantity	Value	Quantity	Value	Quantity	Value
Total	21,949	676,560	28,279	943,357	33,566	1,160,839
U. S. A.	4,594	184,063	6,818	285,328	9,301	405,855
Philippines	6,743	201,220	7,229	231,460	7,437	235,344
U. S. S. R.	3,607	76,463	5,073	119,553	5,861	164,038
Malaysia	4,850	129,217	5,738	161,913	6,078	166,782
Indonesia	202	5,970	541	15,596	1,091	30,645
Canada	904	37,661	1,617	70,178	1,882	84,965
New Zealand	–	–	661	16,858	1,378	38,452
China (Taiwan)	–	–	106	15,726	87	14,600
Solomon Is.	–	–	62	1,604	105	2,448
India	11	2,045	12	2,844	10	2,617

	1969		1970	
	Quantity	Value	Quantity	Value:
Total	35,807	1,274,933	42,366	1,572,081
U. S. A.	8,604	426,232	10,262	517,791
Philippines	8,320	263,000	7,907	264,886
U. S. S. R.	6,151	170,199	7,095	197,712
Malaysia	6,420	178,560	6,290	188,830
Indonesia	2,734	79,670	5,942	176,411
Canada	1,180	63,541	2,249	113,314
New Zealand	1,708	45,988	1,770	50,195
China (Taiwan)	107	20,723	136	28,913
Solomon Is.	161	3,741	191	4,513
India	14	4,439	13	4,485

PART III

LONG-TERM PROJECTION OF THE INDONESIAN ECONOMY BY A MACRO MODEL

PART III LONG-TERM PROJECTION OF THE INDONESIAN ECONOMY BY A MACRO MODEL

CHAPTER I INTRODUCTION

The Macro-Econometric Model-Group engaged in these two years in constructing an econometric model of the Indonesian economy and calculating the basic figures of main economic indicators for 1974/5 - 78/9, the period of the second five year economic development plan, as a part of the projects of International Development Center of Japan. As the Indonesian Government is interested in constructing the second five year plan as a multi-purpose development plan which aims to achieve the growth (increase of GNP), equity (decrease of the inequality of income distribution), employment (increase of the employment in the modern sector) targets, we wanted to construct a quantitative framework with sufficient decompositions by sector and by region. But because of the limitation of the availability of the reliable statistical data, we were enforced to concentrate mainly on the construction and the manipulation of a macro-aggregate model with sectoral decomposition of 6 sectors.

In 1972, our working group mainly engaged in the evaluation of the past empirical studies, the theoretical discussions about the possible alternative frameworks, and the collection of the available statistical data passed upon the field trips (March - April, 1972 and also August - September, 1972).

In 1973, we continued to enrich the data information, and to test the various versions of the empirical models, running the various conditional forecasts up to 1978. We made an interim report about the model and the conditional forecast in Djakarta in September, 1972, and received many useful encouraging comments and proposals. We tried to incorporate these suggestions in the final version of the model contained in this report.

In chapter 2 we summarize the preceding studies centering around the econometric models. In chapter 3 we summarize the availability of the raw data and the process of the new sectoral data, which were necessary to the sectoral decomposition of our model. In chapter 4 we present the theoretical background of the model, the framework of the alternative versions of the model, the results of the final test. In chapter 5 we present the results of the various conditional forecasts up to 1978, the end year of the second five-year plan. Chapter 6 contains some suggestions about the first and second five-year plans based upon the results of simulations. The compact summary of the utilized data is attached as an appendix.

CHAPTER II EVALUATION OF THE PRECEDING MODELS

Table 1 summarizes the titles, data periods, number of equations, and other basic features of the preceding six models (econometric model or system model). Out of five econometric models the ECAFE Model No. II and the International Christian University Model No. II (I.C.U Model No. II) were the most relevant preceding models to this study. The equations of the ECAFE No. II Model and the ICU No. II Models were as follows:

Table 1 The Preceding Models

Items / Model	Data Period	Number of Equations	Features
ECAFE No. 1 Model	1952 - 59	8 (5)	Supply-ceiling-type real model with investment as a residual
IDE* No. 1 Model	1953 - 59	7 (5)	Supply-ceiling-type real model with investment as a residual
ECAFE No. 2 Model	1951 - 59	18 (14)	Supply-ceiling-type real and monetary model with consumption as a residual
ICU** No. 1 Model	1952 - 59	13 (9)	Supply-ceiling-type real and monetary model with consumption as a residual
I C U No. 2 Model	1952 - 59	30 (20)	Supply-ceiling-type real and monetary model with three sectors with consumption as a residual
IBRD Model	—	64 (30)	A system model

Remark: The figure in the parenthesis in the second column shows the number of the equations with estimated parameters.

* Institute of Developing Economies (TOKYO)

** International Christian University (TOKYO)

Preceding Econometric Analysis by Various Institutions

ECAFE NO. 2 Model [1]

1) U.N. Review of Long-term Economic Projections for Selected Countries in ECAFE Region. "Development Programming Techniques Series". No. 5, 1964, pp 204 - 245.

1) $R_t = 2.71 + \underset{(0.08225)}{0.09358}\ (V + M_r + M_c + M_s)_{t-1}$ $\quad r = 0.8266$

2) $(G_c - D_e)_t = -11.76 + \underset{(0.660)}{1.500}\ R_t$ $\quad r = 0.9350$

3) $H_t = 71.97 + \underset{(5.55)}{10.63}\ (G_c + G_i - R)_t$ $\quad r = 0.9082$

4) $Y_{1t} = 57.52 + \underset{(0.1107)}{0.2854} \sum_{j=0}^{-1} I_{p,j}$ $\quad r = 0.9479$

5) $Y_{2t} = -4.52 + \underset{(0.441)}{5.293}\ M_{rt} + \underset{(0.06684)}{0.04313} \sum_{j=0}^{-1} (I_p + G_i)_j$ $\quad R = 0.9627$

6) $Y_{3t} = 11.52 + \underset{(0.2205)}{0.3221}\ (Y_1 + Y_2)_t$ $\quad r = 0.8560$

7) $V_t = -5.28 + \underset{(0.117)}{1.111}\ (Y_1 + Y_2 + Y_3 + Y_n)_t$ $\quad r = 0.9957$

8) $P_t = 55.84 + \underset{(0.0703)}{0.4899}\ \left[\frac{H \cdot P}{H_{55} \cdot P_{55}} \times \frac{V_{55}}{V} \times 100\right]_{t-1}$ $\quad r = 0.9307$

9) $E_{mt} \quad 1.76 + \underset{(0.0304)}{0.1548}\ Y_{2t-1} + \underset{(2.625)}{1.867}\ \Delta \left(\frac{PE_m}{P}\right)_t$ $\quad R = 0.9405$

10) $E_{ot} = 6.84 + \underset{(0.7785)}{0.5465}\ \left(\frac{PA}{P}\right)_t + \underset{(0.10373)}{0.02630}\ \Delta Y_{1t}$ $\quad R = 0.6744$

11) $M_{st} = -5.95 + \underset{(1.2198)}{0.8324}\ (E_m + E_o)_t$ $\quad r = 0.6282$

12) $M_{ct} = 2.05 + 0.01137\ F_{t-1}$ $r = 0.9196$
(0.00635)

13) $M_{rt} = -2.94 + 0.6288\ (E_m + E_o)_t + 0.001002\ \Delta E^*_{t-1}$
(1.2806) (0.004209) $R = 0.6936$

14) $(I_p + G_i)_t = 1.51 + 2.853\ M_{st}$ $r = 0.9681$
(1.095)

15) $C_t = V_t - (G_c + I_p + G_i + E_m + E_o - M_s - M_c - M_r)_t$

16) $E^*_t = (P_{Em}\ E_m + P_{Eo}\ E_o)_t$

17) $F_t = E^*_t - (P_M\ [M_s + M_c + M_r])_t + W_t + F_{t-1}$

18) $A_t = \left(\frac{C}{N}\right)_t$

Name of Symbols

Endogenous variables

R: Government revenue
G_c: Government consumption
H: Money supply
Y_1: Value added of primary sector
Y_2: Value added of secondary sector
Y_3: Value added of tertiary sector
V: GNP
P: GNP implicit deflator
E_m: Exports of mineral products
E_o: Exports of other products
M_s: Imports of capital goods
M_c: Imports of consumer goods
M_r: Imports of raw materials
I: Private investment
C: Private consumption
E*: Total exports (current US$)
F*: Foreign exchange holdings (current US$)
A: Per-capita consumption

Exogenous variables

D_e: Defense expenditure
G_I: Government investment
Y_n: Net factor income from abroad
P_{Em}: Exports price of mineral products
P_A: World price of agricultural products
P_{Eo}: Exports price of other products
P_M: Imports price
W: Net capital inflow
N: Population

Observation period: 1951 - 1959
Unit: Billion Rp at 1955 price

I C U No. 2 Model [2]

[2] Takao Fukuchi, 'An Econometric Analysis of the Indonesian Economy' The Developing Economies, Vol. VI. No. 3. Sept. 1968, pp. 324 - 355.

1) $Y_t^1 = \underset{(0.0205)}{55.91 + 0.1736 \sum_{j=o}^{-1} I_{pj}}$ $\quad r = 0.955$

2) $Y_t^2 = \underset{(0.1027)\ (0.0800)\ (0.0913)}{-11,49 + 0.3693\ M_{rt} + 0.1558\ I_{pt}^2 + 0.2746\ G_{It}}$ $\quad R = 0.889$

3) $Y_t^3 = \underset{(0.01746)}{26.33 + 0.07291 \sum_{j=o}^{-1} I_{pj}^3} \underset{(0.0543)\ (0.0817)}{+ 0.2000\ G_{It} + 0.2947\ (\Delta O_m)_t}$
$R = 0.946$

4) $Y_t = Y_t^1 + Y_t^2 + Y_t^3$

5) $V_t = \underset{(0.108)}{4.15 + 1.066\ Y_t}$ $\quad r = 0.966$

6) $C_t = V_t - I_t - G_{ct} - X_t + M_t$

7) $I_{pt}^1 = \underset{(0.2272)\ (1.049)\ (0.00956)}{-7.11 + 0.3719\ M_{st} + 2.197\ M_{rst} + 0.03349\ F_{t-1}}$
$R = 0.847$

8) $I_{pt}^2 = \underset{(0.01459)\ (0.267)}{30.18 + 0.06509\ F_{t-1} + 1.048\ (\Delta O_m)_t}$ $\quad R = 0.916$

9) $I^3_{pt} = -8.76 + 0.4385\, G_{it} + 0.1372\, I^2_{pt}$ $R = 0.899$
(0.0811) (0.0764)

10) $I_{pt} = I^1_{pt} + I^2_{pt} + I^3_{pt}$

11) $I_t = I_{pt} + G_{it}$

12) $X_{mt} = -7.75 + 0.3591\, G_{it} + 0.1675\, (O_m)_t + 0.2577\, I^2_{pt-1}$
(0.1281) (0.0509) (0.1094)
$R = 0.883$

13) $X_{ot} = 65.92 + 0.3597\, (\Delta G_I)_t + 0.1078\, P_{xt}$ $R = 0.901$
(0.1006) (0.0535)

14) $X_t = X_{mt} + X_{ot}$

15) $M_{st} = -1.58 + 0.3211\, G_{it} + 0.03727\, F_{t-1}$ $R = 0.908$
(0.0849) (0.00703)

16) $M_{rct} = 55.55 - 0.3176\, D_{et-1} - 0.1629\, P_{mt}$ $R = 0.883$
(0.0722) (0.0526)

17) $M_{rst} = 0.82 + 0.07026\, G_{it} + 0.001791 \sum_{j=o}^{-1} I_{pj} + 0.1022\, (\Delta O_m)_t$
(0.02228) (0.000987) (0.0339)
$R = 0.887$

18) $M_{cft} = -84.69 + 0.07102\, F_{t-1} + 0.09293\, N_t$ $R = 0.874$
(0.01498) (0.03300)

19) $M_{cot} = -1.77 + 0.02321\, F_{t-1} + 0.1954\, G_{it}$ $r = 0.874$
(0.00526) (0.0635)

20) $M_t = M_{st} + M_{rst} + M_{rct} + M_{cft} + M_{cot}$

21) $F_t = \frac{1}{11.48}[P_{xt} X_t - P_{mt} M_t] + W_t + F_{t-1}$

22) $G_{ct} - D_{et} = -28.32 + 1.049\, D_{et} + 0.6237\, R_{t-1}$ $r = 0.941$
(0.182) (0.2598)

23) $G_t = G_{ct} + G_{it}$

24) $\Delta G_{it} = G_{it} - G_{it-1}$

25) $T_{it} = 3.31 + \underset{(0.270)}{1.026}\, M_t + \underset{(7.74)}{57.42}\, Q_t$ $\quad r = 0.943$

26) $T_{dt} = -0.19 + \underset{(0.01738)}{0.07453}\, G_{ct} + \underset{(0.0453)}{0.1423}\, Y_{t-1}$ $\quad r = 0.918$

27) $R_{ot} = -50.10 + \underset{(0.1156)}{0.2942}\, I_{t-1} + \underset{(0.671)}{2.131}\, M_{st-1} + \underset{(0.0554)}{0.1822}\, G_{ct-1}$

$r = 0.939$

28) $R_t = T_{it} + T_{dt} + R_{ot}$

29) $H_t = 70.03 + \underset{(0.1042)}{0.9091}\,(G_t - R_t) + \underset{(0.0355)}{0.3278} \sum_{j=0}^{-1} (G_j - R_j)$

$r = 0.992$

30) $P_t = -96.06 + \underset{(0.0866)}{0.3321}\, H_t + \underset{(0.383)}{1.170}\, V_t$ $\quad r = 0.951$

Data observation period; 1952 - 1959

Unit: Billion Rp at 1955 prices

Name of Symbols

Y_1: Value added of primary sector
Y_2: Value added of secondary sector
Y_3: Value added of tertiary sector
Y: GDP
V: GNP
I_P^1: Private investment of primary sector
I_P^2: Private investment of secondary sector
I_P^3: Private investment of tertiary sector
I_p: Private investment
$\bar{G}_i$: Government investment
I: Total investment
G_c: Government consumption
T_i: Indirect taxes
T_d: Direct taxes
R_o: Other revenue
R: Total government revenue
X_m: Export of mineral products
X_o: Export of other products
M_s: Import of capital goods
M_{rc}: Import of raw materials for consumer goods
M_{rs}: Import of raw materials for capital goods
M_{cf}: Import of foods
M_{co}: Import of other consumer goods
M: Total import
$\bar{N}$: Population
C: Private consumption
$\bar{O}_m$: Production index of mining and manufacturing sector
X: Total export
F: Foreign exchange holdings
$\bar{P}_x$: Export price
$\bar{P}_M$ Import price
$\bar{D}_e$: Defense expenditure
$\bar{Q}$: Dummy variable
H: Money supply
P: GNP implicit deflator
G: Government expenditure
$\bar{W}$: Net capital inflow

– indicates exogenous variables

The ICU No. II model was applied to the projection up to 1970, and showed the projected rate of growth for 1960 - 70 between 3.09 and 1.71 per cents. This model consists of 30 equations, and the causal ordering of determining the variables are export and import by categories, expenditure and revenue of the governmental sector by categories, then components of expenditure side and so on. The export and import by categories are explained by the equations with distinct characteristics. The financial items of the government are decomposed in detail compared with the ECAFE No. II Model. The money supply is the function of the past and current deficit of the governmental sector. The results of the estimation were satisfactory, i.e., in most cases the multiple correlation coefficients were over than 0.85 and the coefficients are significantly different from zero by 10 per cent level.

The basic features of the preceding models (especially the ICU No. II Model) are as follows:

(a) GDP or GNP is specified by the aggregate or sectoral production function, and the models are supply-oriented-type, quite different from the demand-oriented-type models in which the current income level is determined by the sum of the projected values of expenditure items.

(b) The output of each sector or GDP is mainly determined by the accumulated private (or total) investment, and sometimes additional explaining variables are added, i.e., the governmental investment to indicate its external economy effect; the increment of the mining production index to indicate the increase of income generated by the change of the petroleum production; raw material import to indicate the change of the utilization rate by the shortage of the raw materials. Sometimes the net output of tertiary sector is explained by the market equation, i.e., by the net outputs of primary and secondary sectors.

(c) The private consumption expenditure is determined as the residual in most cases, except the ECAFE No. I Model and IDE No. 1 Model which include the consumption function and determine the investment as the residual.

(d) In large models the public consumption and investment are separated from the private ones. The governmental investment is always treated as an exogenous variable, and the governmental consumption is explained by the governmental revenue and the defense payment, etc. The revenue is explained sometimes by the GNP plus import, in other cases divided into direct and indirect tax revenues and others and explained by the import, income, and other variables.

(e) The export is sometimes treated as an exogenous variable, and in other cases explained by the income and the general price. In large models the total export is divided into the mining export and others and explained by the supply factors such as governmental investment or mining production index or income and the export price or the parity of the internal price to the world price.

(f) The import is explained by the GDP, foreign currency reserve, export, and increment of GNP, etc. In ECAFE No. II, Model the import is divided into three categories (investment goods, consumption goods and raw materials), and in ICU No. II Model into five categories, and are explained by the purchasing-power variable such as the foreign currency reserve and other variables.

(g) ICU No. II and ECAFE No. II Models include the money supply and the general price equations, where the money supply is explained mainly by the (accumulation of) governmental deficit. These linear equation well fitted to the data of 1950's.

The equations in these models are specified in the linear form and sufficiently well fitted to the data of 1950's, and adequately described the basic trend of the economy, which received the heavy pressure of the increasing defense payment and also suffered from the shortage of the foreign currency holding. As we construct the new model by the new (more long-term) data which includes the great structural change from the confrontation period to the development period the specification must be revised in the various equations.

The new planning model to run the conditional forecasts must also satisfy the various postulates, i.e., to pursue the multi-purposes, to widen the scope of the model and to decompose the variables further. Based upon these terms of reference the basic limitations and shortages of the preceding models are summarized as follows:

(1) Decomposition of sectors: The economy was at most divided into three sectors. But from the various needs, for example, to estimate the sectoral employment, exports in detail, etc, the further decomposition in detail must be tried within the availability of the data.

(2) Decomposition of regions: As one of the purpose of the second plan is to realize a more equal distribution of income, the new model must include a framework by which we could estimate the trend of the per-capita income inequality between regions. For this purpose the model must contain the equations to calculate the regional income and population.

(3) Decomposition of public investment: As the IndonesianGovernment concentrates on the economic stabilization and development the explicit decomposition of public expenditure, especially the public investment, will greatly increase the applicability of the planning model to formulate the development plan.

(4) Decomposition of private investment: ,The decomposition of the sectoral output necessitates the decomposition of private investment by sectors, even if we expect a great difficulty in obtaining the necessary statistical data.

(5) Introduction of the rice economy: As the Indonesian economy is preparing for the self-sustained growth for the coming decade and the government is keen to achieve the self-sufficiency of rice in the near future, and the demand and supply

balance of rice has a strong influence, for example, on the consumption import, the explicit description of demand and supply of rice will greatly enrich the applicability of the model.

(6) Introduction of demographic factors: The total population is introduced as an exogenous variable to explain the food import. The empirical determination of the causal relationships between the birth & death rates and other economic variables, e.g., the per-capital income, are very difficult. But even the tentative introduction will be an useful trial and can be a basis for the concrete study in the future.

(7) Introduction of the (sectoral) employment: The trend of the labor economy occupied the central part of the development model, e.g., the Ranis-Fei Model and the Jorgenson Model, but was out of the scope of the econometric models listed, mainly because of the lack of the adequate data. But as the government aims to provide the sufficient employment opportunities in the future, so the trial adoption of some equations to forecast the sectoral employment, especially the employment in the manufacturing sector.

We also carefully studied the framework and the parameters of the system model of the Indonesian economy by the IBRD experts. The model consisted of 59 euqations (out of total 64 equations, (1) (2) (34) (35) (39) can be interpreted as the specification as the exogenous variables), 34 equations contain the structural parameters.

The general framework consists of the division of the expenditure component (export, investment, consumption, import and also some intermediate demand), the income formation and the capital inflow and aid. The formation of the income is explained sometimes by the market equation, i.e, from the demand, and in other cases by the production function, i.e., from the supply side. The equations and the list of variables are listed below:

I B R D Model [3]

3) IBRD Report. "Indonesia: Investment and Growth Perspectives in the 1970's" Report No. EAP 22, ANNEX 1. pp. 3 - 15.

Exports

1) $E_o^1 = \text{given}$

2) $E_e^1 = \text{given}$

3) $E_m^1 = E_{m_{t-1}}^1 \left[1 + 2 \left\{ \left(Ysm_{t-1} + Ydm_{t-1} \right) / \left(Ysm_{t-2} + Ydm_{t-2} \right) - 1 \right\} \right] \left[1 + \Delta X \right]$

Investment

4) $I_a = 1.8 \left(Y_{a_{t+1}} - Y_a \right)$

5) $I_e = 2.3 \left\{ 0.7 \left(E_{e_{t+1}} - E_e + D_e - D_{e_{t-1}} \right) \right\}$

6) $I_o = 1.5 \left(Y_{o_{t+1}} - Y_o \right)$

7) $I_{mn} = 2.5 \left\{ 0.6 \left[E_{e_{t+1}} - E_o + D_o - D_{o_{t-1}} \right) \right\}$

8) $I_{dm} = 2.5 \left(Ydm - Ydm_{t-1} \right)$

9) $I_{sm} = 3 \left(Ysm - Ysm_{t-1} \right)$

10) $I_c = Y_c - Y_{c_{t-1}}$

11) $I_{tc} = 5 \left\{ 2.5 \left(g_{t-1} - 1 \right) Ytc_{t-1} \right\}$

12) $I_p = 8 \left\{ 2.8 \left(g_{t-1} - 1 \right) Yp_{t-1} \right\}$

13) $I_s = 2.0 \left\{ 1.5 \left(g_{t-1} - 1 \right) Ys_{t-1} \right\}$

14) $I = I_a + I_e + I_o + I_{mn} + I_{dm} + I_{sm} + I_c + I_{tc} + I_p + I_s$

Consumption

15) $C = Y + T - S$

16) $C_a = \left\{ 0.45 \left(C/C_{t-1} - gp \right) + gp \right\} C_{a_{t-1}}$

17) $C_m = \left\{ 1.65 \left(g_{t-1} - gp_{t-1} \right) + gp \right\} \left\{ 1 - 0.25 \Delta X \right\} C_{m_{t-1}}$

18) $C_n = C - C_a - C_m$

Intermediate demand

19) $D_e = D_{e_{t-1}} + 0.10 \left(Y_{dm} - Y_{dm_{t-1}} \right)$

20) $D_f = D_{f_{t-1}} + 4 \left(Y_a / Y_{a_{t-1}} - 1 \right) D_{f_{t-1}}$

21) $D_o = D_{o_{t-1}} \left\{ 1.5 \left(g - 1 \right) + 1 \right\}$

Import demand

22) $M_a = M_{a_{t-1}} + C_a - C_{a_{t-1}} - 1.15 \left(Y_a - Y_{a_{t-1}} \right)$

23) $M_{cm} = 0.09 \left\{ 1 + 0.5 \left(g_{t-1} - g_{p_{t-1}} \right) \right\} C_m \left\{ 1 - 2 \left(\frac{X - Xo}{Xo} \right) - 2 \left(\bar{t}_m - 1 \right) \right\}$

24) $M_r = 0.30 \left\{ Y_{dm} + Y_{sm} \right\} \left\{ 1 - 0.5 \left(\frac{X - X_o}{X_o} \right) \right\}$

25) $M_i = \left\{ M_{i_{t-1}} + 0.44 \left(I - I_{t-1} \right) \right\} \left(1 - 0.5 \Delta X \right)$

26) $M_s = M_{s_{t-1}} \left\{ 1 + 1.2 \left(g - 1 \right) \right\} \left\{ 1 - 0.5 \Delta X \right\}$

27) $M_f = \left(M_{f_{t-1}} + D_f - D_{f_{t-1}} - S_f + S_{f_{t-1}} \right) \left(1 - \Delta X \right)$

28) $M_a^1 = M_a / X_o$

29) $M_{cm}^1 = M_{cm} / X_o$

30) $M_r^1 = M_r / X_o$

31) $M_r^1 = M_i / X_o$

32) $M_s^1 = M_s/X_o$

33) $M_f^1 = M_f/X_o$

Income

34) Y_a = given

35) Y_o = given

36) $Y_{mn} = 0.6 (E_o + D_o)$

37) $Y_e = 0.73 (E_e + D_e)$

38) $Y_{dm} = 0.3 \left\{ (C_m - M_{cm}) + (0.70I - M_I) + S_f + \bar{E}_m \right\}$

39) $Y_c = 0.25I$

40) $Y_{tc} = Y_{tc_{t-1}} + (I_{tc_{t-3}} / 5.0)$

41) $Y_p = Y_{p_{t-1}} + (I_{p_{t-3}} / 8.0)$

42) $Y_s = Y_{s_{t-1}} + (I_{s_{t-2}} / 2.0)$

43) $Y_{sm} = 0.25 (M_a^1 + M_{cm}^1 + M_r^1 + M_I^1 + M_s^1 + M_f^1 + M_y^1 + M_o^1 - M^1) X_o$

44) $Y = Y_a + Y_e + Y_o + Y_{mn} + Y_{dm} + Y_{sm} + Y_c + Y_{tc} + Y_p + Y_s$

45) $T = 0.26 \bar{t}_m (M_{cm} + M_r + M_i + M_o) + 0.03t_d Y - U$

Savings

46) $S = S_{t-1} + \left\{ 3.2 (g_{t-1} - gp_{t-1}) + 0.08 \right\} \left\{ Y - Y_{t-1} \right\} + 0.32 (T - T_{t-1})$

GNP growth rate

47) $g = Y / Y_{t-1}$

Resource gap

48) $B = I - S$

49) $B' = B/X$

Available foreign exchange for imports

50) $M' = E' + B'$

Exchange rate

51) $X = X_{t-1} (1 + \Delta X)$

Actual imports of goods and non-factor services

52) $AM^1 = M_a^1 + M_{cm}^1 + M_r^1 + M_i^1 + M_s^1 + M_f^1 + M_o^1 - (Y_{sm} / 0.25 X_o)$

Increase in reserve

53) $M_y^1 =$ given (investment income abroad)

54) $D_R{}^1 = M^1 - AM^1 - M_y^1$

Debt service payments

55) $P = P_a^1 + P_o^1 + P_h^1 + P_d^1 + P_s^1 + P_b^1$

Gross capital inflow

56) $G^1 = B^1 + P^1$

Aid requirements

57) $K^1 =$ given (private capital inflow)

58) $Q^1 =$ given (suppliers' credits)

59) $A^1 = G^1 - K^1 - Q^1$

60) $A_d^1 = 0.85A^1$ (DAC terms)

61) $A_s^1 = 0.12A^1$ (IDA terms)

62) $A_b^1 = 0.03A^1$ (Bank terms)

63) $A^1_{pJ} = 0.65 (M^1_i - K^1 - Q^1)$ (Maximum absorption of project aid)

64) $A^1_{pm} = A^1 - A^1_{pJ}$ (Minimum requirement of program aid)

List of Variables

		Endogenous variables	Exogenous variables
1.	Gross value added in agriculture, foodcrops		Y_a
2.	Ditto,Livestock, forestry, fishing		Y_o
3.	Population growth (index base = 1.00)		g_p
4.	Export of crop products ($)		E_e^1
5.	Export of mineral products		E_o^1
6.	Tariff rates (per unit)		$\bar{t}_m$
7.	Exchange rate (Rp per $) in base year		X_o
8.	Goods imports for minerals operations ($)		M_o^1
9.	Investment income payments ($)		M_y^1
10.	Private capital inflow ($)		K^1
11.	Suppliers' credits ($)		Q^1
12.	Domestic production of agricultural input		S_f
13.	Domestic indirect tax incidence (per unit)		$\bar{t}_d$
14.	Maximum limit of import substitution		MX_{sm}
15.	Subsidy payments		U
16.	Debt service, Abs arrangement ($)		P_a^1
17.	Debt service, other pre-1967		P_o^1
18.	Debt service, suppliers' credits		P_h^1

		Endogenous variables	Exogenous variables
19.	Debt service, new aid, DAC		P_d^1
20.	Debt service, new aid, IDA		P_s^1
21.	Debt service, new aid, IBRD		P_b^1
22.	Export of manufactures ($)	E_m^1	
23.	Total exports ($)	E^1	
24.	Investment, foodcrops	I_a	
25.	Investment, other agriculture	I_o	
26.	Investment, mining	I_{mn}	
27.	Investment, exports crops	I_e	
28.	Investment, domestic-type manufacturing	I_{dm}	
29.	Investment, import substituting manufacturing	I_{sm}	
30.	Investment, construction	I_c	
31.	Investment, transport, communication	I_{tc}	
32.	Investment, public utilities	I_p	
33.	Investment, other services	I_s	
34.	Total fixed investment	I	
35.	Total consumption expenditures	C	
36.	Consumption expenditures, food	C_a	
37.	Consumption of manufactures	C_m	
38.	Other consumption expenditures	C_n	

		Endogenous variables	Exogenous variables
39.	Domestic use of export crops	D_e	
40.	Intermediate demand of agricultural inputs	D_f	
41.	Domestic use of oil products	D_o	
42.	Food imports (Rp)	M_a	
43.	Manufactures imports for consumption (Rp)	M_{cm}	
44.	Imports of industrial raw materials (Rp)	M_r	
45.	Imports of investment-related goods (Rp)	M_i	
46.	Imports of ("non-oil") services (Rp)	M_s	
47.	Imports of agricultural inputs (Rp)	M_f	
48.	Food imports ($)	M_a	
49.	Manufactures imports for consumption ($)	M_m^1	
50.	Imports of industrial raw materials ($)	M_r^1	
51.	Imports of investment-related goods ($)	M_i^1	
52.	Imports of ("non-oil") services ($)	M_s^1	
53.	Imports of agricultural inputs ($)	M_f^1	
54.	Gross value added, mining	Y_{mn}	
55.	Ditto, export crops	Y_e	
56.	Ditto, construction	Y_c	
57.	Ditto, domestic-type manufacturing	Y_{dm}	
58.	Ditto, import substituting manufacturing	Y_{sm}	

		Endogenous variables	Exogenous variables
59.	Ditto, transport, communication	Y_{tc}	
60.	Ditto, public utilities	Y_p	
61.	Ditto, other services	Y_s	
62.	Gross National Product at factor cost	Y	
63.	Indirect tax receipts (not of subsidies)	T	
64.	Gross national savings	S	
65.	Current account deficit (= +) (Rp)	B	
66.	Current account deficit (= +) ($)	B^1	
67.	Foreign exchange available for imports ($)	M^1	
68.	Growth of GNP	g	
69.	Change of exchange rate (percentage)	ΔX	
70.	Exchange rate (Rp per $)	X	
71.	Actual imports of goods and non-factor services ($)	AM^1	
72.	Increase in foreign exchange reserves ($)	DR^1	
73.	Total debt service payments ($)	P^1	
74.	Gross capital inflow ($)	G^1	
75.	Public capital inflow (gross, $)	A^1	
76.	Aid on DAC terms	A_d^1	
77.	Aid on IDA terms	A_s^1	

		Endogenous variables	Exogenous varaibles
78.	Aid on IBRD terms	A_b^1	
79.	Maximum absorption of project aid ($)	A_{pl}^1	
80.	Minimum requirement of program aid ($)	A_{pm}^1	

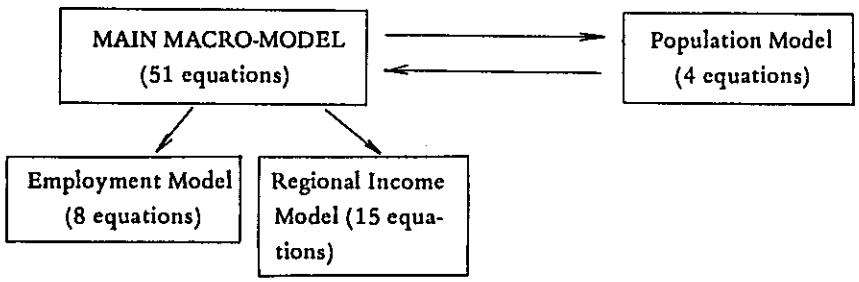
The model mainly concentrated on the access to the effects of the various types of aids upon the income growth of the Indonesian economy. For this purpose the equations are set flexibly and include various important decisions by the government (or postulates) expressed by the special variables, and also some interesting new variables like the intermediate demand, etc. But the scope of the model is rather limited, not including the explicit governmental variables, the rice economy, the demographic factors, the employment, and the regional decompositions. The parameter values are set from the comprehensive judgement, the observation of the data, the deep insight of the Indonesian economy, and the experiences of the relevant developing countries, etc, i.e., not from the direct validity or fittness to the past data. So we considered this model also as one of the important references, while our group continuously seeks to find out the basic structure by the usual econometric methodology.

CHAPTER III CONSTRUCTION OF THE NEW PLANNING MODEL

The Second Five Year Plan aims to achieve several important economic targets as well as some non-economic targets, such as the sufficiently high economic growth of GNP ("the growth target"), the decrease of the inequality of the distribution of per-capita distributive income ("the equality target"), the creation of sufficient employment opportunities for employment in the modern manufacturing sector ("the employment target"), and others, implicitly assuming that by the end of the First Five Year Plan the minimum needs of rice will be provided ("the self-sufficiency of rice target"). The planning model must provide a quantitative framework by which all the relevant targets and the important constraints, for example, the international balance of payments constraint, can be explicitly expressed, and the important causal relationships between the important economic variables can be described. In this section a new comprehensive framework of the model will be presented. This model will be applied to various simulations to produce the conditional forecast under the different sets of assumptions up to 1978, the results of which will be summarized in the next section.

Fig. 1 shows the general framework of the new planning model, which consists of four parts; (a) the main macro-aggregate model with 51 equations, (b) the population submodel with 4 equations, (c) the employment sub-model with 8 equations, and (d) the regional income submodel with 15 equations. The main macro model and the population model are connected to each other overtime by some causal relations with time-lags, while the employment and regional income submodels are influenced by the macro-model without the repercussions. The main macro-aggregate model aims to provide the forecasted figures of the important aggregate indices. The population submodel is attached to supplement and enrich the forecast of

Fig. 1 Comprehensive Framework of the New Model



population, considering the importance of the demographic factors in Indonesia. The employment model and the regional income model are attached to forecast the trends of the two target variables: the employment in the manufacturing sector and the inter-regional inequality of the per-capita income. The symbols of the variables and the estimated equations are listed below.

List of Endogenous Variables

Symbol	Name	Unit
Y	GDP	Million New Rp. (real)
Y_1	Value Added of Primary Sector	"
Y_2	Value Added to Construction	"
YY_2	Value Added of Secondary Sector	"
Y_{3+4}	Value Added of Manufacturing & Public Utilities	"
YY_3	Value Added of Tertiary Sector	"
Y_5	Value Added of Transportation	"
Y_{6+7}	Value Added of Services and Mining	"
Y_7	Value Added of Mining	"
$RICE^P$	Production of Rice	Thousand tons
$RICE^C$	Consumption of Rice	"
I_{p1}	Gross Capital Formation of Primary Sector	Million New Rp. (real)
I_{p2}	Gross Capital Formation of Construction	"
I_{p3+4}	Gross Capital Formation of Manufacturing & Public Utilities	"
I_{p5}	Gross Capital Formation of Transportation	"
I_{p6+7}	Gross Capital Formation of Services and Mining	"
I_p	Total Private Gross Capital Formation	"
K_1	Private Gross Capital Stock of Primary Sector	"
K_2	Private Gross Capital Stock of Construction	"
KK_2	Private Gross Capital Stock of Secondary Sector	"
K_{3+4}	Private Gross Capital Stock of Manufacturing and Public Utilities	"
KK_3	Private Gross Capital Stock of Tertiary Sector	"
K_5	Private Gross Capital Stock of Transportation	"
K_{6+7}	Private Gross Capital Stock of Services and Mining	"
K_p	Total Private Gross Capital Stock	"
G_t	Total Government Expenditure	"
I_g	Total Government Investment	"
I	Gross Domestic Capital Formation	"
IGK_A	Government Investment for Agriculture	"
IGK_I	Government Investment for Industries	"
IGK_W	Government Investment for Welfare	"
GK_A	Government Gross Capital Stock for Agriculture	"
GK_I	Government Gross Capital Stock for Industries	"
GK_W	Government Gross Capital Stock for Welfare	"
K_G	Total Government Gross Capital Stock	"
R_T	Total Government Revenue	"
T_d	Direct Taxes	"
T_i	Indirect Taxes	"
R_o	Other Revenue	"

Symbol	Name	Unit
X	Export of Goods & Non-factor Services	Million New Rp. (real)
X**	Exports of Goods & Non-factor Services	Million US$ (nominal)
M_I	Import of Capital Goods	Million New Rp. (real)
M_R	Import of Raw Materials	"
M_C	Import of Consumer Goods	"
M	Import of Goods and Non-factor Services	"
M**	Import of Goods and Non-factor Services	Million US$ (nominal)
(X* − M*)	Trade Balance	"
BPT*	Balnce of Payment	"
F*	Foreign Exchange Holdings	"
C	Private Consumption	Million New Rp. (real)
N	Population	Thousand persons
L	Labor Force	"
E_1	Employment for Primary Sector	"
E_2	Employment for Construction	"
E_3	Employment for Manufacturing Sector	"
E_4	Employment for Public Utilities	"
E_5	Employment for Transportation	"
E_{6+7}	Employment for Services and Other Sectors	"
BR	Birth Rate	Permillage (1/1000)
DR	Death Rate	"
DM_i	Death Rate (Male, *i*th age group)	"
DF_i	Death Rate (Female, *i*th age group)	"

List of Exogenous Variables

Symbol	Name	Unit
G_C	Government Current Expenditure	Million New Rp. (real)
X_O	Export of Oil	"
X_{MIN}	Export of Mineral Products other than X_O	"
X_A	Exports of Agricultural Products	"
X_{OT}	Exports of other Products	"
SDR*	SDR	Million US$ (nominal)
Z_P*	Net Private Capital Inflow	"
Z_g*	Net Official Transfer & Capital	"
LAND	Cultivated Land	Thousand ha.
Def X	Deflator of Export of Goods & Services	1960 . . . 1.000
Def. M	Deflator of Import of Goods & Services	1960 . . . 1.000
rX	Exchange Rate of Export	Rp./$
Crd	Total Bank Credits	Million New Rp. (nominal)
D^t	Dummy Variables (Suffix *t* indicates the year)	1 or 0
Ω*	Statistical Discrepancy of B/P	Million US$ (nominal)
S*	Net factor Services	"
rM	Exchange Rate of Import	Rp./$
IFOC	Income from Oil Companies	Million US$ (nominal)
R_{01}	Other Revenue (excluding R_{02})	Million New Rp. (real)
R_{02}	Development Revenue	"
X_i	Average year of *i*th age group	year
D_X	Japan Dummy	Permillage (1/1000)

Main Macro Model

* 1. $\log Y_1 = 5.014 + 0.003565 (G_{KA} + G_{KI\ t-1} + 0.06737 \log K_{1,\ t-1} + 0.1515D^{60-2} + 0.1410D^{58}$
(11.8) (3.45) (7.23) (4.23)

$\hat{R} = 0.9883$
$\hat{S} = 0.03078$

* 2. $\log YY_2 = 2.900 + 0.005311G_{KI,\ t-1} + 0.1204 \log KK_{2,\ t-1} + 0.2144D^{55-7} + 0.2128D^{60-2} - 0.1076D^{67}$
(6.62) (3.84) (5.15) (5.00) (-1.79)

$\hat{R} = 0.9785$
$\hat{S} = 0.05623$

3. $\log YY_3 = 4.0752 + 0.1275 \log KK_{3t-1} + 0.005383GK_{I,t-1} + 0.1883D^{60-62} - 0.1794D^{58,\ 59}$
(3.58) (6.02) (6.02) (4.23)

$\hat{R} = 0.9827$
$\hat{S} = 0.05981$

* 4. $\log Y_{3+4} = 2.889 + 0.006407GK_{I,t-1} + 0.06429 \log K_{3+4,t-1} + 0.2913D^{55-57} + 0.2358D^{60-2}$
(7.00) (1.82) (6.10) (4.86)

$\hat{R} = 0.9709$
$\hat{S} = 0.06433$

5. $\log Y_{6+7} = 4.0902 + 0.1377 \log K_{6+7,t-1} + 0.005904GK_{I,\ t-1} + 0.1949D^{60-62} - 0.2510D^{58,\ 59}$
(7.12) (6.03) (3.91) (-4.35)

$\hat{R} = 0.9822$
$\hat{S} = 0.06521$

6. $\log Y_7 = 1.2470 + 0.3413 \log K_{6+7,t-1} + 0.008144GK_{I,t-1} - 0.2906D^{65-68} - 0.3796D^{59} + 0.4153D^{56-57}$
(4.14) (4.17) (-2.96) (-2.40) (3.57)

$\hat{R} = 0.9586$
$\hat{S} = 0.1451$

7. $Y_2 = YY_2 - Y_{3+4}$

8. $Y_5 = YY_3 - Y_{6+7}$

9. $Y = Y_1 + YY_2 + YY_3$

10. $\log\left(\frac{RICE^P}{LAND}\right) = 0.03617 + (0.8060 + 0.2826D^{67}) \times \log\left(\frac{RICE^P}{LAND}\right)_{t-1}$

R = 0.9387
S = 0.02663

*11. $\log RICE^c = 6.257 + (0.3176 + 0.01921(RICE^P/N) \log(Y - Td - Ti)$
(7.22) (6.78)

R = 0.9672
S = 0.03779

*12. $I = 19.62 + 1.017MI_{,t-1} + 0.00009347Crd + 9.901D^{66}$
(6.64) (3.19) (2.58)

R = 0.9511
S = 3.710

13. $\log K_1 = -4.2559 + 0.8907 \log Y_1 + 0.4745 \log K_{I,t} + 0.1429D^{58}$
(6.14) (11.03) (2.43)

R = 0.9933
S = 0.05714

14. $I_{p2} = 0.6126 + 0.02750I_p + 0.04320 (Y_2 - Y_{2,t-1})$
(4.09) (1.32)

R = 0.07512
S = 0.1894

15. $I_{p3+4} = -0.6181 + 0.47151_p$
(9.77)

R = 0.9247
S = 1.421

*16. $I_{p,5} = I_p - (I_{p1} + I_{p2} + I_{p3+4} + I_{p6+7})$

17 $I_{p1} = K_1 - K_{1,t-1}$

*18. $I_{p,6+7} = 0.3978 + 1.678D^{64} + 0.08151I_p$
(4.60) (6.77)

$\hat{R} = 0.8978$
$\hat{S} = 0.3535$

19. $I_p = I - I_G$

20. $K_2 = K_{2,t-1} + I_{p2}$

21. $K_{3+4} = K_{3+4,t-1} + I_{p3+4}$

22. $KK_2 = K_2 + K_{3+4}$

23. $KK_3 = K_5 + K_{6+7}$

24. $K_5 = K_{5,t-1} + I_{p5}$

25. $K_{6+7} = K_{6+7,t-1} + I_{p6+7}$

26. $K_p = K_1 + K_2 + K_{3+4} + K_5 + K_{6+7}$

*27. $M_I = -17.56 + 0.16000(Y-Y_1) + 0.007992F^*_{t-1} - 4.2964D^{66} + 6.185D^{62}$
(14.1) (1.97) (-2.19) (3.21)

$\hat{R} = 0.9744$
$\hat{S} = 1.842$

*28. $M_R = -24.64 + 0.4483YY_2 + 0.1426YY_3 + 0.02920F^*_{t-1} - 3.522D^{58\text{-}9}$
(2.42) (2.84) (4.97) (-1.78)

$\hat{R} = 0.9655$
$\hat{S} = 2.414$

29. $M_C = -25.070 + 0.5201N - 0.001295RICEP + 0.01748F^*_{t-1} - 7.294D^{50\text{-}58} - 11.91D^{59}$
(4.0) (-1.40) (3.50) (-4.11) (-6.44)

$\hat{R} = 0.9779$
$\hat{S} = 1.577$

30. $X = X_A + X_0 + X_{MIN} + X_{OT}$

31. $M = M_I + M_R + M_C$

32. $X^{**} = Def_X \cdot X/R_X$

33. $M^{**} = Def_M \cdot M/R_M$

34. $(X^* - M^*) = X^{**} - M^{**} + S^{**}$

35. $BPT^* = (X^* - M^*) + Z_p^* + Z_g^* + SDR$

36. $F^* = F^*_{t-1} + BPT^* + \Omega^*$

37. $GK_A = -3.577 + 0.1255R_T + 0.190M_{I,t-1} + 0.9287GK_{A,t-1} - 2.825D^{68}$
(8.25) (2.62) (14.44) (2.83)

$\hat{\bar{R}} = 0.9952$
$\hat{S} = 0.942$

38. $GK_I = -17.52 + 0.1029D^{65} + 0.8851GK_{I,t-1} + 0.04601 + 0.4689M_{I,t-1} + 0.1717RT$
(5.06) (25.26) (2.81) (3.33) (5.11)

$\hat{\bar{R}} = 0.9990$
$\hat{S} = 1.805$

39. $GK_W = -12.67 + 1.725D^{65} + 0.8918GK_{W,t-1} + 37.35(\frac{Y}{N}) + 0.08070M_{I,t-1} + 0.07624RT$
(2.46) (35.67) (5.33) (1.67) (7.24)

$\hat{\bar{R}} = 0.9993$
$\hat{S} = 0.622$

40. $IGK_A = GK_A - GK_{A,t-1}$

41. $IGK_I = GK_I - GK_{I,t-1}$

42. $IGK_W = GK_W - GK_{W,t-1}$

43. $I_G = IGK_A + IGK_I + IGK_W$

*44. $R_T = T_d - T_i + R_{01} + R_{02}$

*45. $T_d = -9.244 - 5.732D^{62\text{-}4,66} - 8.100D^{65} + 0.03174Y + 0.09175IFOC$
(-6.27) (-5.48) (5.05) (4.03)

$\hat{\bar{R}} = 0.9653$
$\hat{S} = 1.366$

*46. $T_I = -26.43 + 0.1020C + 0.2672M + 11.32D^{50} - 9.926D^{62\text{-}4} - 4.952D^{65}$
(3.69) (1.83) (3.75) (-6.49) (-2.02)

$\hat{\bar{R}} = 0.9659$
$\hat{S} = 2.094$

47. $R_o = R_{01} + R_{02}$

48. $K_G = GK_A + GK_I + GK_W$

49. $G_T = I_G + G_C$

50. $C = Y - G_C - I - X + M$

*51. $N = \Sigma N_i$ (from Population Model)

* Employment Model

*52. $L = -2470.0 + 37.65_{N,t-1}$
(15.3)

R = 0.9999
S = 0.3587 ('53 - '70)

*53. $E_1 = 4701.7 + 0.5362\ L + 56.71\ \Delta Y_1$

R = 0.9851
S = 314.9 ('60 - '70)

*54. $E_2 = -744.7 + 0.3366\ L + 51.76\ \Delta Y_2$
(2.66) (2.36)

R = 0.8627
S = 96.21 ('60 - '70)

*55. $E_3 = -1623.7 + 0.09737\ L + 37.08\ \Delta Y_3$
(6.75) (1.98)

R = 0.9573
S = 106.18 ('60 - '70)

*56. $E_{3+4} = -1308 + 0.08898\ L + 6.883\ \Delta Y$
(5.43) (2.01)

R = 0.9505
S = 111.7 ('60 - '70)

*57. $E_4 = E_{3+4} - E_3$

*58. $E_5 = 57.39 + 0.7660\ E_{5,t-1} + 124.0\ \Delta Y_5$
(4.64) (1.27)

R = 0.8281
S = 465.9 ('61 - '70)

*59. $E_{6+7} = 1996.6 + 0.7382\ E_{6+7,t-1} + 25.28\ \Delta Y$

(4.06) (1.34)

R = 0.8787

S = 708.1 ('61 - '70)

* Population Model

*60. $BR = 74.6 - 8.459 \log (Y/N)_{-1}$
(-11.2)

$\hat{R} = 0.8997$
$\hat{S} = 3.017$

*61. $DR = 10.79 - 0.6976 \log (Y/N)_{-1}$

$\hat{R} = 0.7412$
$\hat{S} = 0.2348$

*62. $\log DM_i = -0.25 - 0.00003214 X_i^3 + 0.004571 X_i^3 + 0.004571 X_i^2$
(5.57) (7.27)

$- 0.1295 X_i + 1.243 \frac{1}{X_i} + 0.8554 \log DR$
(- 6.55) (11.2) (4.07)

$- 0.004884 DX$
(-1.91)

$\hat{R} = 0.9571$
$\hat{S} = 0.3543$

*63. $\log DF_i = -1.61 - 0.00002904 X_i^3 + 0.004119 X_i^2$
(-4.48) (5.83)

$- 0.1171 X_i + 1.231 \frac{1}{X_i} + 1.426 \log DR$
(5.28) (9.88) (6.04)

$- 0.006927 DX$
(-2.41)

$\hat{R} = 0.9391$
$\hat{S} = 0.3978$

The asterisk symbol (*) indicates the models or the equations revised or added after September, 1972, i.e., the tentative report of the model at BAPPENAS. The estimation mainly based upon the time-series data for 1954 - 70, and the nominal figures were converted to the 1960 basis real figures by the adequate deflation, while in some cases the dollar basis figures are used without the deflation procedures. The parameters were estimated by the least-squares Method, and the criteria for estimation was set as (1) the multiple-correlation coefficient over than 0.8 and (2) the t-value over than 2.0. Originally the monetary submodel and also the debt-service sub model were scheduled to construct and to be incorporated into the general framework, but actually were not constructed reflecting the shortages of the available data and the clear specification of certain conditions, i.e., the schedule of future debt service.

The macro model consists of total 51 equations, which we want to summarize their features blockwisely.

The Block of Production (equations (1) - (9))

The sectoral output, of seven sectors are, in principle, explained by the private capital stock represented by the accumulation of private investment by sectors, and also by the social overhead capital. The dummy variables supplemented these variables, sometimes expressing the non-economic influences and in other cases the statistical errors. Another important factor of production, labor force, was skipped mainly because the poor reliability and also rather short observation period (only 1960's) of the employment data by sectors.

The Block of Rice Economy (equations (10) - (11))

Two equations were introduced to describe the balance of rice economy and to estimate the target of self-sufficiency in the near future. The supply equation was specified as the average-land-productivity equation, where the current average productivity was explained by the one of the previous year. Upto 1966 the coefficient of the past productivity is 0.8060, expressing the dominance of the Law of Decreasing Marginal Returns and the shortage of the replacement investment, etc. After 1967 (the sum of) the coefficient increased to 1.089, expressing the effects of the accumulated development expenditure in the agricultural sector. We wanted originally to adopt the accumulation of these expenditures in place of the dummy variable, but gave up by the lack of the data. The demand was specified as a function of the disposable income with the elasticity over than 0.3, which is supported by other studies as a normal elasticity. Our equation suggests that a part of the demand is pent-up, and will apear as the effective demand when the production of rice increases and the supply condition is improved, and the elasticity will remain more higher in the near future. There is no fixed saturation level for per capita consumption of rice whether the demand will saturate at 120 kg or 130 kg per-capita. We tentatively adopted these equations for the projection. We need the additional informations to consider the possible change of the parameter in the future. The increase of the rice production will decrease the excess internal demand, and the consumption import in our model.

The Block of Investment and Capital (equations (12) - (26))

The capital formation is mainly supplied by the import, and then the public investment for the development purpose is decided, and the residual resource is devoted for the private investment purpose. In our model the total investment is decided by the one demand factor (the output increase) and the two supply factors of the investment goods import and the investment fund, and is distributed to public and private parts, then to each sector. As the data of depreciation is very limited, the capital stock is defined as the accumulation of gross-investment.

The Block of International Trade Sector (equations (27) - (37))

The three components of import (investment goods, consumption goods, and raw material) are explained by the foreign currency constraint expressed by the initial foreign currency reserve and the trend of export, and various demand factors, i.e., the levels of output, it's increment, capital, and population. The import of consumption good is set as the increasing function of the size of the population while the increase of the production of rice suppresses the import demand.

The total export is divided into four components: export of agricultural goods (X_A), oil (X_0), mineral product other than oil (X_{MIN}), and other manufactured goods (X_{OT}), all of which are specified exogenously. Originally we tried many equations to explain the trend of export. But the poor results of estimation and the importance of the export projection upon the whole result of projection finally we specified in this way. The foreign currency reserve is defined considering the commodity and service trade balance, capital transactions, and SDR.

The Block of Public Sector (equations (37) - (49))

First seven equations explain the expenditure items. The current expenditure is treated as exogenous. The first three equations explain the public investments by the revenue constraint (R_t), the investment goods import (M_I), and other demand factor (Y/N). The equations can be interpreted the increment (ΔGK) as the explained various and the lagged stock ($GK_t - 1$) as one of the explaining variable to express the influence of the past stock upon the current level of investment. The total revenue is divided into four items: the direct tax revenue as a function of GDP and the income from the oil company which emphasizes the importance of the revenue levied on the foreign oil company; the indirect tax revenue as a function of the consumption and the import; other revenue and the revenue from the program aid newly appeared after the late stage of 1960's.

Other Equations (equations (50) - (51))

The private consumption expenditure is defined as the residual after subtracting the governmental consumption, investment, export and adding the import from GDP. This formulation emphasizes the feature of supply-ceiling-type economy as the preceding models. Finally the size of total population is defined as the sum of the population by age-groups.

Employment Submodel (equations (52) - (59))

After estimating the labor force (L), the employment in each sector is explained based upon the labor force and the increment of GDP (or it's sectoral breakdown. Each sectoral employment equation can be interpreted as one of the reduced-form equations which are deducted by the demand and supply equilibrium in the sectoral labor market, the labor force as the supply-shift factor and the increment of output of the demand-shift factor. As the employment data was limited to 1960's and showed the instability, which may be caused by the discontinuity of the manufacturing samples we decided to attach this submodel to the main macro model without the explicit repercussions from the employment to the macro indicators. The reason why the demand-shift factor is specified as the increment is also due to the instable data of employment. But this submodel is highly useful to estimate the future possible employment opportunities, even of a very tentative nature.

Population Submodel (equations (60) - (63))

The equations (60) and (61) give the birth rate and the death rate as the function of per-capita income level. Then (62) and (63) give the death rate of male and female by age groups. The preliminary estimates of 1970 population census was already partly available for us, but the limited amount of available data enforced us to adopt a pooling estimation of birth rate and death rate as a function of per-capita income. So (60) and (61) were estimated by the pooling sample of Philippine, Thailand, Taiwan, Indonesia, and Sri Lanka. Then the birth rate was divided into male and female as 0.55 and 0.50. After that the death rates by age-groups are calculated by the average year of group (Xi), and the overall death rate (DR). The governmental development expenditure in the field of family planning and health improvement must have a systematic influence upon the demographic trend, but was not handled in our tentative estimation by the lack of data and the long gestation period.

The Analysis of Interregional Income Difference

As the preliminary estimates of regional GDP with sectoral decompositions are available in the six regions in principle for, 1966 - 69 by 1969 price. We wanted to construct a framework by which the trend of the inequality of interregional income distribution can be estimated, but the lack of the data of inter-regional transaction, regional employment or investment etc enforced us to adopt a very simple framework: (1) Calculate the logarithmic linear regressions between the regional and global per-capita income, and predict the regional per-capita income and (2) assume the constant share of regional population out of total population, and (3) calculate the variation coefficient of the interregional per-capita income difference. The result of the projection will be strongly restricted by the rigid two assumptions of constant elasticity and regional share. But this tentative framework could, at least, calculate the future trend of the interregional inequality, one of the keen policy issues in the future plan.

The Result of the Final Test

The next table summarizes the result of the final test of the model for 1954 to 1970

by the cross-table of the relative error at the final year and the maximum relative error through the observation period. About the 80 percent of the whole variable was interpolated with less than 10 percent relative error at the final year. The variables which accompany the larger errors at the final year and through the observation period were the flow or stock variables which express the balnce of variables and can take the negative figure, i.e., X* - M*, BPT* and F*, and the variables of small absolute values and of minor importance, i.e., Y_2, I_5 and I_1. So we judged that the model successfully satisfied the reasonable fitness to the actual trend. Of course the introduction of the various dummy variables contributed greatly to the good fitness, but without the sufficient theoretical supports. So we admit that the result of the final test is rather formal, and the judgement must base upon the over-all behavior of the model from the past to the future period.

Table 2 The Result of Final Test

The maximum relative error / The relative error at the final year	1 %	5 %	10 %	15 %	20 %	30 %	More than 30%
1 %	N	Y	Kp K5 K2 K6+7 K3+4 GKW	YY3 Y6+7	GKA		MC
5 %		L	C RiceP KG RiceC	Y3+4 K1	GKI GT	Y7 RT	M IGKI M** IG IGKW MR Td
10 %			Y1 YY2	YS E			I IGKA I2 Ti I3+4
15 %							IP MI I6+7
20 %							
30 %							Y2 I5 X* - M*
More than 30 %							I1 BPT* F*

Remark: Observation period, 1954 - 1970. The figure show the relative error ratio of error to the actual figure.

CHAPTER IV CONDITIONAL FORECASTS UP TO 1978

1. Assumption of the Future Trends of Exogenous Variables

Projections based on the econometric model are subject to the exogenous factors and conditions included in the model. Therefore, the assumption of exogenous variables is of paramount importance for the projection. First, we prepared several sets of assumptions of exogenous variables after a careful consideration of the future trend of the exogenous factors gathered during the several visits to Jakarta and in Japan. Then, manipulating the model, we obtained various cases of projections corresponding to the sets of exogenous variables.

It may not be wise to include all the results of projections in this report, since some of the projections are unrealistic. That is, the projected results are subject to certain boundary conditions surrounding the Indonesian economy. For example, we may expect the increase in the development expenditure by 50 per cent per annum in order to obtain rapid growth of GDP neglecting the accumulation of governmental deficit.

Since the balanced budget is the fundamental principle of the Government of Indonesia, this type of projection can not be accepted. This may be the same in case of import projections.

Finally, we fixed two sets of assumption of exogenous variables which were regarded as reasonable. Table 2 includes the assumed figures of exogenous variables. Case 5 or the higher case may be interpreted as the optimistic case, while case 6 or the lower case as the pessimistic case. Differences between case 5 and case 6 are in the assumption of the growth rate of exports and related variables and the amounts of foreign aid and loans.

It is better to explain how to treat the recent international monetary problems in this study. The devaluation of U.S. dollar was followed by a devaluation of rupiah by the same rate of 10 per cent. While the revaluation of other currencies, especially that of yen will have considerable effects on the Indonesian economy, for Japan is the biggest partner of Indonesia both in commodity trade and in aid and loans.

Actually, we were informed of the revaluation of yen by 16.88 per cent late in 1971. Indonesian development finnancing was much disturbed by the sudden decrease in the quantity of commodities through program aid. However, this type of disturbance can be regarded as the disturbance in the short run, while our study is mainly concerned with the long term conditional projections up to 1978. Thus, it may be admissible not to add the revaluation of yen as an additional assumption of exogenous variables. Of course, if we want to analyze the effects of revaluation in detail, we have to construct the comprehensive model including equations of exports and imports by country, by commodity, and by the conditions of contracts at the sub model. This is a problem yet to be solved and should be challenged in the future.

2. Results of Conditional Forecasts

Based on the future trends of exogenous variables mentioned above, conditional forecasts up to 1978 were attempted. The summary of projections is in the following Table 3 and Table 4 to Table 12 and Figure 3 include forecasted value of various economic indicators.

Table 3 Summary of Projection

Targets	Simulation case	First Five Year Plan (1968 - 1973)	Second Five Year Plan (1973 - 1978)
Economic Growth Increase in GDP (per capita)	H	7.1% (4.9%)	8.3% (6.1%)
	L	6.5% (4.3%)	7.1% (4.9%)
Regional Income Equity (Decrease In V.C.)	H	0.2001	0.2060
	L	0.2021	0.1987
Expansion of Employment in Strategic Sector (Secondary Sector)	H9	7.3%	7.6%
	L	6.2%	6.2%
Autarky of Rice Economy (Rice Production/Rice Consumption)	H	108.2%	100.0%
	L	109.6%	103.9%
Balance of Payments Equilibrium (BPT* $\geq$ 0)	H	68.0 mil.US$ in 1973	46.9 mil. US$ in 1978
	L	8.5 mil. US$ in 1973	−7.3 mil. US$ in 1978
Expansion of Social Welfare (Increase in GKw)	H	14.3%	14.3%
	L	13.6%	13.1%
Industrialization (Increase in the share of Manufacturing sector to total GDP)	H	13.2%	16.0%
	L	11.9%	14.0%

We will explain the results in the following order; first, results of macro economic indicators and sectoral employment, secondly, population by sex and by age group and finally, regional income.

1) Macro economic indicators and sectoral employment

During the First Five-year Plan period, the average rates of growth of GDP are expected to be 7.1 per cent in case 5 (H) and 6.5 per cent in case 6 (L), while for the period of the Second Five-year Plans it will be 8.3 per cent in case 5 (H) and 7.1 per cent in case 6 (L). As the population growth rate is to be a little over 2 per cent through the periods of First and Second Five-year Plans, we can expect the steady growth of per capita GDP by 5 to 6 per cent.

The self-sufficiency in rice production, which is one of the main targets of First Five-year Plan, will be accomplished by the end of the Plan. In the terminal year of the Second Five-year Plan per-capita consumption of rice is to be about 120 kg. Rice will remain as the

superior goods for Indonesian people, that is, the income elasticity will remain greater than unity up to 1978, however, even in case of optimistic assumption of exogenous factors out of high income growth; the self sufficiency of rice will be maintained.

The target to achieve equilibrium of the international balance of payments will be accomplished in the optimistic case (H) supported by the abundant flow of foreign aid, and loans and bright future of Indonesian exports. However, in the pessimistic case, in which the decreasing rate of growth of capital inflow and decline in the export of strategic commodities are assumed, the balance of payments deficits will be significant by the end of the Second Plan.

Further efforts will be required to reach the level of self sustained growth of the economy, which is defined as maintaining certain rate of growth of GDP, say, over 7 per cent per annum, without foreign aid .

Efforts towards the industrialization, which is defined as the increase in the percentage share of secondary industry in total GDP, will succeed in achieving 16 per cent and 14 per cent in case 5 (H) and in case 6 (L) respectively. It was around 10 per cent in 1968. At the same time, the sectoral share of primary sector which was over 50 per cent in 1968, will maintain the high level of 44 to 46 per cent of total GDP.

It can be interpreted that the core of policy is to promote industrialization, but the role of primary sector also remains important as before.

Another target is to promote employment opportunities in the strategic sector i.e., secondary industry. According to our projection the growth rate of labor force employed in the sector will be around 6 to 7 per cent per annum. However, the employment in the primary sector still occupy over 60 per cent of total employment which was about 70 per cent in 1968. Hence, we can expect that the process of industrialization will be able to absorb considerable amount of labor force formerly engaged in primary sector.

2) Population by sex and by age group

As we have already mentioned before, it may be reasonable to suppose that the effort of family planning will not be realized fully during the period of the Second Five-year Plan. Results of the population projection are the follwoing; population by age group of 0 year old to 14 years old will be 40.6 per cent of the total population by the end of the Second Plan. It was 44 per cent in 1971. Population of old age of over 60 years will increase slightly from 4.6 per cent of total population in 1971 to 4.8 per cent in 1978, while the share of working age from 15 years old to 60 years old will increase from 51.4 per cent in 1971 to 54.6 per cent in 1978. These are the characteristics of structural changes in the population by age group.

As for the structure of population by sex, number of females, which were 50.8 per cent of total population in 1971, will slightly decline to 50.4 per cent in 1978. Finally, total population which was registered as 118 million persons in the latest population census, will increase to 142 million persons in 1978. We did not observe much difference in the projected

results of population by case 5 and by case 6.

The problem of population pressure will be slightly diminished by decreasing number of family dependants, while the inrease in the working age population still remains as the main cause of population pressure in the labor market. Here, we can emphasize the importance of utilizing this labor force for economic development.

3) Regional income equity

As already mentioned in Chapter 5 the methodology adopted in our study is not adequate to examine fully the possibility of accomplishing regional income equity because of data scarcity. Therefore we may not be able to draw any persuasive conclusion from the results of projection. However, the variation coefficient of regional income itself (hereafter abbreviated as V.C.) is suitable indicator to examine regional income equity. Here, we will make a brief analysis concerning the calculated V.C. with these reservations in mind.

The V.C. which was 0.231 in 1968 will decrease to 0.199 in pessimistic case and to 0.206 in optimistic case. These results show that the regional income inequity will be partially amended.

The difference between case 5 and case 6 is interesting to note. In the optimistic case V.C. will decrease to 0.200 by 1973, then slightly increase to 0.206 by 1978, while in the case of pessimistic assumption V.C. will decrease steadily up to 1978. This can be interpreted that the political effort to pursue over-all economic growth, if it goes beyond a limit, will make regional income inequality larger.

On the other hand, the policy to emphaisze regional income equity will delay the economic growth of Indonesia as a whole. Of course, in the strict sense, these findings should be examined fully by more advanced method like the regional econometric model.

CHAPTER V EVALUATION OF THE CURRENT FIVE-YEAR PLAN

First Five-year Development Plan document1/ in English version consists of six voluminous pieces of work. Vol. I is mainly concerned with general summary of the whole plan of which targets and policies are described in Chapter I, financing the plan appears in Chapter 2; Chapter 3 deals with the international balance of payments; the regional and rural development are the main topics of Chapter 4; Chapter 5 includes government administration, plan implementation and annual operational plan. In Vol IIa problems of agriculture and irrigation are fully discussed while in Vol IIb. mining, manufacturing and electricity are the main subjects of Chapter 7, communication and tourism are discussed in Chapter 8. Vol IIc deals with the social aspects of the plan, such as religion in Chapter 9, education and manpower in Chapter 10, health and family planning in Chapter 11, housing and social welfare in Chapter 12, legal order and information in Chapter 13, transmigration and cooperatives in Chapter 14, national defense and security in Chapter 15 and in the last chapter research and statistical development are fully discussed. Vol. III includes the implementation of the plan by region under the title of specification according to regions. The last volume is an appendix which includes related materials such as the proceedings to integrate the plan and presidential speech.

Among these six volumes, Vol I, Vol IIa, Vol IIb and Vol IIc are relevant to our study of macro econometric projection.

In this chapter we will compare the planed figures of main economic indicators up to the third year of the plan with relevant actual figures available in the latest issues of IFS(B.I.) and I.E(CBS) for the evaluation of the current plan2/ and to try to point out the problems envisaged in the plan.

Table 13 is concerned with the evaluation of the achievement level of the agricultural production, table 14 for mining, table 15 for manufacturing, table 16 and table 17 for exports of main categories and for the sectoral imports respectively and comparison of the budget and the realization of the public finance are in the last table 18.

1/ The First Five-Year Development Plan (1969/70 - 1973/74) Vol. I, Vol. IIa, IIb, IIc, Vol. 3. Related Materials, Department of Information, Republic of Indonesia

2/ In the last visit to Jakarta, Feb. 1973, we noticed the preparation of the evaluation report by the Government called Nota Keuangan. Preceeding works concerning the evaluation of the current plan are the following:

1) Suhadi Mangkasumonda 'The Indonesian Development Effort, EKONOMI DAN KEUANGAN INDONESIA No. 1, 1971.

2) Unknown auther, Survey of Recent Development, Bulletin of Indoneisan Economic Studies Nov. 1971.
Prof. Suhadi's report is relevant to the first year's achievement of the plan, while in the Bulletin of Indonesian Economic Studies, achievement of the plan of agriculture and public finance up to August 1971 are discussed.

Care must be taken to compare the plan figures with the actual figures, for the plan figures are in the fiscal year terms. while the actual figures are on calendar year basis. Furthermore, some of the plan figures are expressed in 1968 constant price. To make an accurate comparison, such commodities and items expressed in quantity terms or in nominal U.S. dollar terms were chosen.

1. Agricultural Production

The target of rice production as of the end of 1971 has been achieved, while the production of other food crops could not reach the plan targets; it remained as low as 70 to 90 per cent of the target value. The government subsidies such as the BIMAS program may have contributed greatly to the increase of production of rice, and the increase of per capita consumption over 100 kg per year, while the governmental efforts fell short in the other fields and the actual production of other food crops was significantly behind the schedule.

2. Mining Production

Production target of tin, crude oil, bauxite, gold and silver are available in the plan document. Actual figures of crude oil, gold and silver are available up to November 1972, while the tin and bauxite statistics are up to December 1972. Hence, we can examine the achievement level of tin and bauxite production in the fourth year of the Plan ad the ones of the other commodities up to the third year of the Plan.

Production of tin, bauxite and gold exceeded the target level of the fourth year of the plan. On the other hand, the third year target of production of crude oil and silver could not be achieved; it remained as low as 80 to 90 per cent of the target.

The discoveries of new veins of bauxite and a new oil field were announced.3/ Since for Indonesia rice and oil have the fundamental importance for the achievement of the current plan, the discovery of this new oil field is very encouraging.

3. Manufacturing Production

Here we will discuss the effort to achieve the production targets of cement, fertilizer (urea), paper, textiles and cotton yarn. Statistical data of these commodities are available up to the end of 1971.

Only the production of fertilizer could mark the target level of production. It may be interpreted that the rapid increase in fertilizer production played an important role in the successful rice production. While the government has nearly achieved the target in textile production, the fact that the paper production was less than half of the target calls for more of the governmental efforts.

3/ Reference (2) P. 18

4. Exports

Exports of commodities can be integrated into three categories; (1) traditional exports as category A, (2) oil exports and (3) exports other than category A and oil as category B.

As shown in Table 16 in 1971 exports in category B and oil exports could exceed the target value, while the exports in category A were little behind the target. However, the rapid increase in the exports in category B could make the sum of exports in categories A and B higher than plan target.

The fact that the share of exports of category B is increasing in the total export of Indonesia is quite encouraging since it is one of the main targets of the plan.

5. Imports

In the past three years except in 1971 total imports exceeded the plan target, which is one of the main causes of the balance of payment problem. If we examine the sectoral aspects of imports, we can reveal the details of the problem. Imports of consumption goods marked 30 per cent over the target while the import of capital goods was about 20 per cent less than target. As we studied in section 3 above, set back in the production of manufacturing goods except fertilizer is imposed to be the cause of this rapid increase in import of consumption goods, while the failure in achieving the target of import of capital goods made the progress in manufacturing production far behind the schedule. Here we can observe the existence of a vicious circle of the Indonesian economy.

In order to break out of this vicious circle, efforts should be made to hold stable trade relationship with other countries, while the realization of foreign aid and loans should be on schedule.

6. Public Finance

Indonesian government accounting system has current budget and development budget. Our main concern is in the development expenditure, especially the development expenditure by industries. However, the statistics of realization of development expenditure are not prepared by industries but by administrative offices. Therefore we decided to analyze the public finance as a whole.

One of the characteristics of Indonesian public finance is that the current budget surplus was obtained in 1969 for the first time and the amount of this surplus is increasing year by year. As this surplus is one of the main sources of financing the development expenditures, this trend of increasing current budget surplus is very encouraging, for since the beginning of Suhasto Regime, high dependence of development financing on foreign aid and loan has been one of the deficiencies in Indonesian economic development. In this sense, although the amount of current budget surplus is not sufficient, efforts towards self help in economic development by Indonesian people are remarkable.

As for the foreign aid and loans, the problem is the delay of disbursement. When we realize the fact that about 70 per cent of total development financing is still from foreign countries, this delay of realization of commitment by donating countries will postpone the achievement of the Plan.

CHAPTER VI SUMMARY AND CONCLUSIONS

In these two years we engaged in the construction of the macro-aggregate planning model with some sectoral and regional decompositions and the simulation study by this model to clarify the growth potential of the Indonesian economy in the period of the Second Five-year Plan and the economic effects of the various policy measures.

Finally we presented in this report a planning model of 63 equations, which showed a reasonably good fit to the past trend of the decades of the 1950's and the 1960's, and had a sufficiently wide scope i.e., the wide list of variables to express the targets and political instruments and other variables. But of course we met with various difficulties in the course of the study, which forced us to leave some problems for the future, we want to list some important problems which suggest some important improvement in the future studies.

[1] The deepening of the planning-model:

We faced with many data constraints: the inconsistency of the national income statistics between the ones in the 1950's and the others in the 1960's, the inconsistency of the population censuses of 1960 and 1970, the weakness of the public and private investment data as they were tentatively estimated by the public finance data and the data of the investment goods imports, the inconsistency of the national income data with other production data, etc. The largest difficulty was the lack of the recent data after 1967, i.e., the data of the recent normal development period, which forced us the adoption of many dummy variables and greatly increased the difficulty to clarify the basic true structure of the Indonesian economy. The systematic preparation and the improvement will be, more than in the usual case, highly useful and effective to increase the reliability and the applicability of the model to forecast. We want to call this improvement of the equations of the model by the addition of new data as 'the deepening' of the model.

[2] The widening of the planning-model:

Our macro model is mainly based upon the currently available national income statistics. The scope and applicability of the planning model will be enriched and widened greatly by the utilization of statistical information of the other sources and the addition of the new equations and the sub models. In our current study we tried to incorporate three submodels of 'the regional income and population submodel', 'the demographic birth and death submodel by age-groups' and 'the sectoral employment submodel' to increase the applicability of the model and also to express the important political targets of 'the increase of the employment opportunity' or 'the decrease of the regional inequality of the per-capita income distribution'. But the construction of 'the monetary submodel' to explain the trends of

prices, fund supplies, etc. and 'the debt-servicing sub model' faced with various data problems and was left as a future task to tackle. There is a good possibility to construct these new submodels and to enrich the planning model in the future. We want to call this addition of the new equations and submodels as 'the widening' of the model.

[3] **The improvement of the coordination :**

The original schedule of the current research study was to present the well-balanced final versions of the conditional forecasts, after repeating the discussions with the Indonesian government, the incorporation of the results of other research groups. But mainly the delay of the over-all research schedule forced us to present this final report before we can refer to and study the reports of other group. One of the important necessary conditions to present the good conditional forecasts is the correct specification of the future trends of the exogenous variables, which requires collection of the wide data and informations. For example the estimate of the export of the petroleum and it's price has an essential influence upon the future trend of the economy. These postulates rather exceeded the working capacity of the macro group, and the results of our group were restricted by these limitations. We want to emphasize the good coordination as having key importance in the future group study, and to pursue the possibility of improving our results by incorporating further the results of other groups hereafter. We want to call this improvement as 'the better coordination'.

It is the hope of our group that the macro projection could be enriched and improved further through these procedures of deepening, widening, better coordination and serve better for the future planning of the Indonesian government.

APPENDIX I DATA AVAILABILITY

In this chapter data utilized to construct the econometric model are explained. Like the other developing countries, Indonesia has poor data availability. Hence, most of the original data were processed or reorganized in order that the model can analyze the various aspects of the Indonesian economy. Sometimes non-availability of statistical data was supplemented by the method of international comparison. All the statistical data utilized are in Table 22 to Table 32 (appear in appendix 2).

Followings are the main sources of statistical data:

i) Statistical Research and Development Center
Central Bureau of Statistics;
'National Income of Indonesia, 1960 - 1968', 1970 (Here-after abbreviated as N.I.I.)

ii) Central Bureau of Statistics;
'Statistical Pocketbook of Indonesia,' 1958, 1959, 1961, 1963, 1968 (Here-after abbreviated as P.B.)

iii) Bank Indonesia;
"Indonesian Financial Statistics," Feb. 1972 (Here-after abbreviated as I.F.S. (BI))

iv) Central Bureau of Statistics;
'Indikator Ekonomi' Jan. 1973. (Here-after abbreviated as I.E.)

1. Industrial Origin of GDP (Y)

Data for the years of the 1950s from the United Nations, 'Yearbook of National Accounts Statistics', and that of the years of the 1960s from N.I.I.

GDP is devided into the following seven sectors; Y_1, agriculture; Y_2, construction; Y_3, manufacturing; Y_4, public utilities; Y_5, transportation and communication; Y_6, other services; Y_7, mining.

2. Gross Capital Formation (I) and Capital Stock (K)

They are also from the U.N. 'Yearbook of National Account Statistics' and N.I.I., Sectoral breakdown of the gross capital formation will be described later.

3. Exports (X) and Imports (M)

Total exports and imports have the same sources of origin as GDP. The breakdown of total exports and imports of the years from 1953 to 1959 are based on the data available in P.B. published in 1958 and 1961 and that of the years from 1960 to 1970 are available in I.F.S. (BI). Total exports are decomposed into four sectors and total imports into three sectors.

4. **International Balance of Payments**

1) Exports and imports in dollar terms (X**, M**)

For the year of 1954, from Nugroho, 'Indonesia Facts and Figures'
From 1955 to 1959, I.F.S. (IMF)
From 1961 to 1970, I.F.S. (BI)

2) Current Accounts in dollar terms

From 1951 to 1959, the United Nations, ECAFE, 'Economic Survey of Asia and the Far East' of each year.
From 1961 to 1970, I.F.S. (BI)

3) Exports of services minus imports of services (S*)

These can be obtained by subtracting data of commodity trade described in 1) above, from the figures of current account mentioned in 2) above.

4) Other components of International Balance of Payments (Z_P*, Z_G*, SDR*, Ω*)

Data of these components are obtained from ECAFE and I.F.S. (IMF)

5) Foreign Exchange Reserves (F*)

From 1951 to 1960, I.F.S. (IMF)
From 1961 to 1970, I.F.S. (BI)

5. **Central Government Total Revenue (R_T)**

From 1951 to 1968, P.B.
From 1969 to 1970, I.E. (CBS)

Total government revenues are composed of four sectors of direct taxes (T_D), indirect taxes (T_I), other revenue than development receipts (R_{01}) and development receipts (R_{02}).

6. **Population (N), Rice (Ricep, Rice^c) and Cultivated Land (Land)**

Population; From 1951 to 1959, P.B.

From 1960 to 1970, Data prepared by Dr. Sajuti Hasjibuan of BAPPENAS, Government of Indonesia.

Rice; From 1951 to 1968, P.B.
From 1969 to 1970, I.F.S. (BI)

Cultivated Land; From 1951 to 1968, P.B.
From 1969 to 1970, Department of Information, "The First Five-year Development Plan" Vol. II, 1968

7. Total Bank Credits (C_{rd})

From 1954 to 1965, N. Mihira. "Formation of Indonesian Monetary System and the Economy of 1960s" Azia Keizai, (in Japanese) April and May 1972, Institute of Developing Economies, Tokyo.

From 1966 to 1970, I.F.S. (BI)

8. Deflator of Exports and Imports (DefX, DefM) and Foreign Exchange Rates (rX, rM)

Deflators of exports and imports are available in U.N. Yearbook of National Accounts Statistics and N.I.I. In Indonesia the multiple foreign exchange rate system is observed from deviding exports in R_p terms by that in dollar terms. Exchange rate of imports is also obtainable by the same way mentioned above.

9. Gross Capital Formation and Capital Stock

Gross capital formation consists of the gross private capital formation (I_p) and the gross public capital formation (I_G). Each of I_p and I_G is devided into six sectors and three sectors respectively.

1) Gross public capital formation

In N.I.I. only total gross capital formation is available. In order to obtain I_g the following way of processing the data is applicable; since the total government expenditures (G_T) in P.B. (1958 - 1968) and in I.F.S. (1969, 1970) are the sum of I_G and G_C, by definition, I_G can be obtained by subtracting G_C available in the national income statistics from total government expenditures (G_T). Then the total gross public capital formation is decomposed into three categories of gross public capital formation for agriculture (IGA), for industry (IG_I) and for welfare (IG_W). Each sectoral gross public capital formation includes the corresponding expenditures which are described below:

IG_A consists of expenditures for agriculture and agrarian affairs, IG_I corresponds to the expenditures of trade, industry, communication, navigation, public works and power and IG_W includes the expenditures of high colleges of state, education, institution and culture, reli-

gious affairs, health and social affairs.

2) Sectoral gross private capital formation

In Indonesia more than 95 per cent of total capital goods are imported. If the share of industrial use of these imports of capital goods to total imports of capital goods are obtainable, we can estimate the sectoral breakdown of gross private capital formation by multiplying the share to total gross private capital formation. Fortunately, Central Bureau of Statistics is now undertaking to prepare the sectoral investment in the same way as mentioned above and we could obtain the list of the national code of imported commodity of capital goods corresponding to the capital formation by industrial use as shown in table 19. Then the percentage share of import of capital goods by sector was calculated as shown in Table 21. Finally, total gross private capital formation was disaggregated by this percentage share into sectoral gross private capital formation.

3) Capital stock

By adding up the gross capital formation year by year, we can obtain the capital stock or the summation of capital formation. Since the data of depreciation is not available, this is gross capital stock.

10. Sectoral Employment (E_i)

The employment data for the period of the 1960s which were prepared by BAPPENAS, have sectors of agriculture, mining, manufacturing, construction, public utilities, commerce, transportation and communication services and others. Although the reliability of this data is much doubtful, for it is based on the data of the Population Census in 1961 and the Social Economic Sample Survey in 1964 and on the assumption of the constant labor-output ratio. However this is all we could obtain at this moment.

11. Population by Sex and Age Group

Owing to the preparation of 1971 Population Census by CBS available in Hasil Sementara Sensus Penduduk, we could include in this report the study of population by sex and age group. However, the results of population census itself are the static picture of the population and to study the dynamics of the population, the death rate and the birth rate of Indonesia are necessary. Here the method of international comparison was utilized, for reliable data of both death rate and birth rate of Indonesia are not yet prepared. Main sources of data for international comparison are the following:

Birth rate and death rate of the Philippines, Thailand, Sri Lanka, China, Taiwan and Japan from the U.N. 'Population Yearbook' and per capita income of the countries mentioned above are from U.N. 'Yearbook of National Accounts Statistics'.

12. Regional Statistics

One of the main targets of the Second Five-year Plan is to improve the regional income inequity. For this purpose such regional economic indicators as production, investment and migration among the regions are necessary. However, the project to prepare the regional income statistics has just started in Indonesia. The data of regional investment, migration and commodity transactions are not yet sufficient.

We will mainly discuss the regional gross income and its components.

1) Estimates of regional GDP by sector

We could obtain the provisional results of regional income estimates headed by Dr. Swasono of BAPPENAS and the interim report on the same topics by Leknas-Kyodai Projects. Followings are the main sources of regional income estimates so far available;

Regional income estimates by BAPPENAS:

(1) Pendapatan Regional Propinsi Daerah Istemewa Atjeh 1967 - 1969, 398/ BAPP/ SAC/III/72, pp. 1 - 10.

(2) Kesimpulan dari Perkambangan Pendapatan Regional Propinsi Sumatera Barat 1966 - 69,368/BAPP/III/B.VII/1972. pp. 1 - 13.

(3) Pendapatan Regional D.C.I. Djakarta 1966 - 1969, 399/BAPP/SAC/III/ 72, pp. 1 - 17.

(4) Perkiraan Pendapatan Regional Djawa Barat Untuk: Tahun2 1967 - 1969, 396/BAPP/SAC/III/72, pp. 1 - 14.

(5) Beberapa Kesimpulan dari Perkiraan Pendapatan Regional Djawa Tengah Dan D.I. Jogjakarta 1966 - 69, 387/BAPP/B.VII/III/1972, pp. 1 - 24.

Regional income estimates by Leknas-Kyodai

(6) Julian Luthan, 'Conclusion of the findings on: The Contribution of Value Added in the Mining Sector in South Sumatra to the Regional Income of the Province', 1970, Leknas, Djakarta, March 1972 pp. 1 - 26.

Table 22 shows area, population and population density by province (as of 1961). Based of the data available in these two projects, regional income in seven provinces of Jakarta, Central Java, West Java, Jogjakarta, Atjeh, South Sumatra and West Sumatra were collected (Table 25 - Table 30).

About 47 per cent of the population and 10 per cent of the area of Indonesia are covered by these seven provinces. Observation periods of regional income are from 1966 to 1969 in

current price which are integrated in Table 23. In Table 24 regional gross income in 1969 price for Central Java, West Java, Jogjakarta, Atjeh, West Sumatra and Jakarta are included.

Per capita income of Indonesia as a whole was 20469 Rp in 1966, decreased a little in 1967 and increased steadily up to 1969. While Jakarta and Atjeh have higher per capita income than as a Indoneisa, whole the lowest is observed in West Java of which per capita income in 1969 was lower than that in 1968.

APPENDIX II STATISTICAL DATA AND SIMULATION

Table 2 Assumption of Exogenous Variables

Case 5 (higher)	Value			Growth Rate (%)		
	1968	1973	1978	1973/1968	1978/1973	1978/1968
Serv*	-328.0	-472.5	-600.0	7.6	4.9	6.2
Z_p*	45.0	171.0	300.0	30.0	11.9	21.0
Z_g*	234.0	376.0	500.0	9.9	5.9	7.9
SDR*	0	35.0	35.0	-	-	-
DefX/rX(1)	14.23	14.24	14.24	-	-	-
DefM/rM(1)	13.34	13.18	13.18	-0.3	-	-0.1
Ω*	-9.0	5.4	5.4	22.0	-	10.3
X_A	27.8	45.8	58.5	10.5	5.0	7.7
X_{oil}	23.8	60.3	127.6	20.0	16.2	18.3
X_{MIN}	3.6	2.8	3.6	-5.2	5.2	-
X_{OT}	6.1	4.6	6.7	-5.8	7.8	1.0
Crd(2)	95560	359370	578768	30.0	10.0	19.7
R_o1	1.1	3.0	4.8	22.0	9.8	15.9
R_o2	8.5	27.5	44.3	26.0	10.0	18.0
IFOC	74.0	221.1	550.4	25.0	20.0	22.0
Gc	37.2	48.9	62.3	5.6	5.0	5.3
Case 6 (lower)	Value			Growth Rate (%)		
	1968	1973	1978	1973/1968	1978/1973	1978/1968
Serv*	-328.0	-472.5	-600.0	7.6	4.9	6.2
Z_p*	45.0	171.1	300.0	30.0	11.9	21.0
Z_g*	234.0	319.4	352.7	6.4	2.0	4.2
SDR*	0	35.0	35.0	-	-	-
DefX/rX(1)	14.23	14.24	14.24	-	-	-
DefM/rM(1)	13.34	13.18	13.18	-0.3	-	-0.1
Ω*	-9.0	5.4	5.4	22.0	-	10.3
X_a	27.8	43.3	50.2	9.2	3.0	6.1
X_{oil}	23.8	55.8	103.6	18.6	13.2	15.8
X_{MIN}	3.6	2.6	3.1	-6.7	3.6	-1.5
X_{OT}	6.1	4.2	5.3	-7.8	4.8	-1.4
Crd(2)	95560	340122	499751	29.0	8.0	18.0
R_o1	1.1	3.0	4.8	22.0	9.8	15.9
R_o2	8.5	27.5	44.3	26.0	10.0	18.0
IFOC	74.0	210.3	481.1	23.0	18.0	20.0
Gc	37.2	48.9	62.3	5.6	5.0	5.3

Unit: * million US$

(1) million US$/million new Rp (in 1960 price)

(2) million new Rp (nominal)

million new Rp (in 1960 price)

Figure 3 Rate of Growth - - G. D. P.

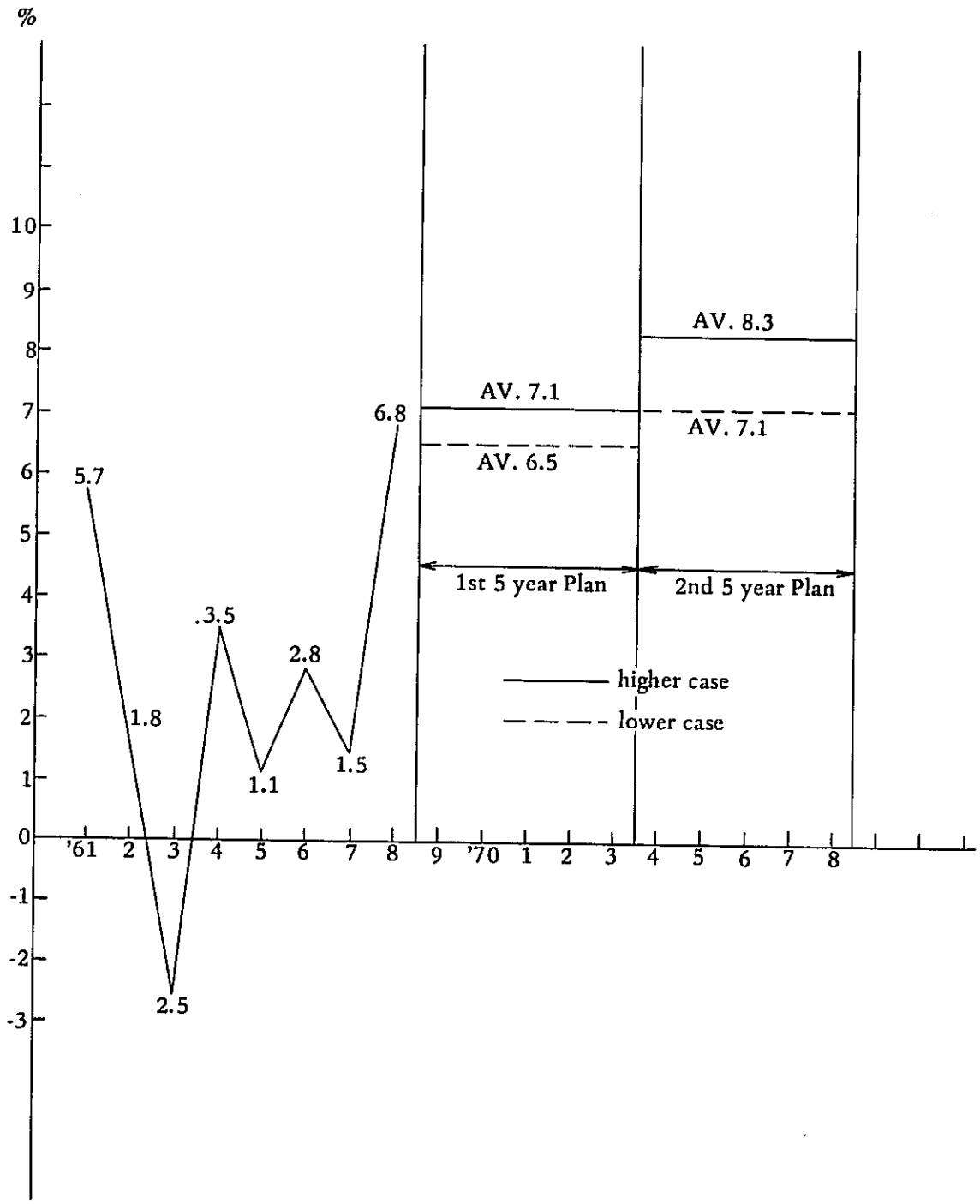


Table 4 Simulation Results -- Case No. 5 (Higher Case)

	1968		1973		1978		Rate of Growth			
	Value	Share	Value	Share	Value	Share		73/68	78/73	78/68
Y	478,800	100.0	675,235	100.0	1,008,640	100.0	Y	7.1	8.3	7.7
I	46,300	9.6	95,790	14.1	153,685	15.2	I	15.6	9.9	12.7
C	396,300	82.7	542,865	80.3	822,675	81.5	C	6.4	8.6	7.5
X	61,300	12.8	113,445	16.8	196,374	19.4	X	13.1	11.5	12.3
M	62,300	13.0	125,718	18.6	226,442	22.4	M	15.0	12.4	13.7
Y_1	248,200	51.8	323,315	47.8	444,440	44.0	Y_1	5.4	6.5	5.9
YY_2	51,900	10.8	89,715	13.2	162,141	16.0	YY_2	11.5	12.5	12.0
YY_3	178,700	37.3	262,204	38.8	402,058	39.8	YY_3	7.9	8.9	8.4
KP	380,780	100.0	580,104	100.0	813,340	100.0	KP	8.7	6.9	7.8
K_1	3,356	0.8	4,963	0.8	8,533	1.0	K_1	8.1	11.4	9.7
KK_2	190,388	49.9	290,490	50.0	408,101	50.1	KK_2	8.8	7.0	7.9
KK_3	187,047	49.1	284,650	49.0	396,705	48.7	KK_3	8.7	6.8	7.8
KG	164,568	100.0	364,568	100.0	771,458	100.0	KG	17.2	16.1	16.7
GKA	22,729	13.8	71,530	19.6	174,880	22.6	GKA	25.7	19.5	22.6
GKI	98,457	59.8	208,038	57.0	430,210	55.7	GKI	16.1	15.6	15.8
GKW	43,381	26.3	84,998	23.3	166,367	21.5	GKW	14.3	14.3	14.3
RT	44,507	100.0	112,965	100.0	217,765	100.0	RT	20.4	14.0	17.2
TD	12,499	28.0	32,481	28.7	73,267	33.6	TO	21.0	17.6	19.3
TI	22,571	50.7	49,962	44.2	95,344	43.7	TI	17.2	13.7	15.4
RO	9,677	21.7	30,521	27.0	49,154	22.5	RO	25.8	9.9	17.6
M_1	17,200	27.6	41,868	33.3	78,631	34.7	M_1	19.4	13.4	16.4
MR	21,900	35.1	53,609	42.6	107,553	47.4	MR	19.6	14.9	17.2
MC	23,200	37.2	30,240	24.0	40,258	17.7	MC	5.4	5.8	5.6
F*	-95,000	100.0	464,017	100.0	793,040	100.0	F*	37.3	11.3	23.6
RICEp	10,166,000	95.0	12,769,117	108.2	16,611,722	100.0	RICEp	4.6	5.4	5.0
ET	39,652,007	100.0	44,996,453	100.0	54,183,226	100.0	ET	2.5	3.7	3.1
E_1	27,358,003	68.9	29,781,402	66.1	33,424,171	61.6	E_1	1.7	2.3	2.0
EE_2	2,955,000	7.4	4,217,598	9.3	6,110,474	11.2	EE_2	7.3	7.6	7.5
EE_3	9,315,001	23.4	11,464,355	25.4	14,145,371	26.1	EE_3	4.2	4.2	4.2

Table 5 Simulation Results – Case No. 6 (Lower Case)

	1968		1973		1978			Rate of Growth		
	Value	Share	Value	Share	Value	Share		73/68	78/73	78/68
Y	478,800	100.0	656,204	100.0	927,416	100.0	Y	6.5	7.1	6.8
I	46,300	9.6	91,254	13.9	132,981	14.3	I	14.5	7.0	11.1
C	396,300	82.7	527,98	80.4	752,340	81.1	C	5.9	7.3	6.6
X	61,300	12.8	105,870	16.1	162,201	17.4	X	11.5	8.9	10.2
M	62,300	13.0	117,753	17.9	182,454	19.6	M	13.5	9.1	11.3
Y1	248,200	51.8	320,037	48.7	428,072	46.1	Y1	5.2	5.9	5.6
YY2	51,900	10.8	78,686	11.9	130,299	14.0	YY2	8.6	10.6	9.6
YY3	178,700	37.3	257,480	39.2	369,044	39.7	YY3	7.5	7.4	7.5
KP	380,780	100.0	580,104	100.0	801,152	100.0	KP	8.7	6.6	7.7
K1	3,356	0.8	4,895	0.8	8,090	1.0	K1	7.8	10.5	9.1
KK2	190,388	49.9	290,075	50.0	401,108	50.0	KK2	8.7	6.6	7.7
KK3	187,047	49.1	285,133	49.1	391,953	48.9	KK3	8.7	6.5	7.6
KG	164,568	100.0	353,502	100.0	707,950	100.0	KG	16.5	14.9	15.7
GKA	22,729	13.8	69,310	19.6	160,314	22.6	GKA	24.9	18.2	21.5
GKI	98,457	59.8	201,933	57.1	395,275	55.8	GKI	15.4	14.3	14.9
GKW	43,381	26.3	82,258	23.2	152,360	21.5	GKW	13.6	13.1	13.3
RT	44,507	100.0	108,513	100.0	194,305	100.0	RT	19.5	12.3	15.8
TD	12,499	28.0	30,879	28.4	64,336	33.1	TD	19.8	15.8	17.8
TI	22,571	50.7	47,112	43.4	80,815	41.5	TI	15.8	11.3	13.6
RO	9,677	21.7	30,521	28.1	49,154	25.2	RO	25.8	9.9	17.6
MI	17,200	27.6	39,177	33.2	65,536	35.9	MI	17.8	10.8	14.3
MR	21,900	35.1	48,689	41.3	82,458	45.1	MR	17.3	11.1	14.1
MC	23,200	37.2	29,887	25.3	34,460	18.8	MC	5.1	2.8	4.0
F*	-95,000	100.0	383,126	100.0	398,633	100.0	F*	32.1	0.7	15.4
RICEP	10,166,000	95.0	12,769,117	109.6	16,611,722	103.9	RICEP	4.6	5.4	5.0
E T	39,652,007	100.0	44,171,953	100.0	51,776,382	100.0	E T	2.1	3.2	2.7
E1	27,358,003	68.9	29,740,414	67.3	33,253,523	64.2	E1	1.6	2.2	1.9
EE2	2,955,000	7.4	3,999,840	9.0	5,414,527	10.4	EE2	6.2	6.2	6.2
EE3	9,315,001	23.4	11,199,503	25.3	13,037,289	25.1	EE3	3.7	3.0	3.4

Table 6 Population by Age and Sex Groups - 1971

Age Group	Males	Females	Both Sexes	Per Cent
0 - 0	1,931.0	1,902.0	3,833.0	3.235
1 - 4	7,722.0	7,606.0	15,328.0	12.939
5 - 9	9,577.0	9,295.0	18,872.0	15.931
10 - 14	7,326.0	6,902.0	14,288.0	12.010
15 - 19	5,643.0	5,748.0	11,391.0	9,615
20 - 24	3,556.0	4,406.0	7,962.0	6.721
25 - 29	4,033.0	5,009.0	9,042.0	7.633
30 - 34	3,664.0	4,230.0	7,894.0	6.663
35 - 39	4,019.0	4,061.0	8,080.0	6.820
40 - 44	3,004.0	3,026.0	6,030.0	5.090
45 - 49	2,399.0	2,248.0	4,647.0	3.922
50 - 54	1,888.0	1,947.0	3,835.0	3.237
55 - 59	1,074.0	1,061.0	2,135.0	1.802
60 - 64	1,034.0	1,189.0	2,223.0	1.875
65 - 69	535.0	586.0	1,121.0	0.946
70 - 74	491.0	570.0	1,061.0	0.895
75 - 79	382.0	395.0	777.0	0.655
Total	58,278.0	60,181.0	118,459.0	100.0

Table 7 Population by Age and Sex Groups - 1973

Age Group	Males	Females	Both Sexes	Per Cent
0 - 0	2,112.8	1,941.0	4,053.9	3.242
1 - 4	7,804.8	7,560.6	15,365.5	12.291
5 - 9	9,552.2	9,327.7	18,879.9	15.102
10 - 14	8,108.2	7,745.6	15,853.8	12.681
15 - 19	6,317.5	6,240.3	12,557.9	10.045
20 - 24	4,359.3	4,920.0	9,279.3	7.422
25 - 29	3,928.3	4,828.1	8,756.5	7.004
30 - 34	3,757.1	4,465.7	8,222.9	6.577
35 - 39	3,875.6	4,127.0	8,002.6	6.401
40 - 44	3,316.6	3,375.0	6,691.7	5.352
45 - 49	2,610.7	2,536.1	5,146.8	4.117
50 - 54	2,039.7	2,046.7	4,086.4	3.268
55 - 59	1,331.9	1,354.4	2,686.4	2.148
60 - 64	1,018.6	1,134.1	2,152.7	1.722
65 - 69	661.6	759.8	1,421.5	1.137
70 - 74	477.8	565.7	1,043.6	0.834
75 - 79	380.5	430.8	811.4	0.649
Totals	61,653.9	63,359.4	125,013.3	100.0

BIRTH RATE = 34.8588

DEATH RATE = 7.5126

PER CAPITA Y = 109.7372

Table 8 Population by Age and Sex Groups - 1973

Age Group	Males	Females	Both Sexes	Per Cent
0 - 0	2,125.4	1,952.4	4,077.8	3.260
1 - 4	7,814.6	7,569.5	15,384.1	12.302
5 - 9	9,552.1	9,327.5	18,879.7	15.097
10 - 14	8,108.1	7,745.5	15,853.7	12.677
15 - 19	6,317.5	6,240.3	12,557.8	10.041
20 - 24	4,359.3	4,919.9	9,279.2	7.420
25 - 29	3,928.3	4,828.0	8,756.4	7.002
30 - 34	3,757.1	4,465.7	8,222.8	6.575
35 - 39	3,875.6	4,126.9	8,002.5	6.399
40 - 44	3,316.5	3,374.9	6,691.5	5.350
45 - 49	2,610.6	2,536.0	5,146.7	4.115
50 - 54	2,039.6	2,046.6	4,086.2	3.267
55 - 59	1,331.8	1,354.3	2,686.1	2.148
60 - 64	1,018.4	1,134.0	2,152.5	1.721
65 - 69	661.6	759.7	1,421.3	1.136
70 - 74	477.7	565.6	1,043.4	0.834
75 - 79	380.4	430.8	811.2	0.648
Totals	61,675.2	63,378.3	125,053.6	100.0

BIRTH RATE = 35.0638

DEATH RATE = 7.5295

PER CAPITA Y = 107.1101

Table 9 Population by Age and Sex Group - 1978

Age Group	Males	Females	Both Sexes	Per Cent
0 - 0	2,254.0	2,071.4	4,325.5	3.044
1 - 4	8,416.4	7,842.2	16,258.6	11.443
5 - 9	9,863.5	9,434.1	19,297.7	13.582
10 - 14	9,098.1	8,783.7	17,881.8	12.586
15 - 19	7,849.7	7,617.9	15,467.6	10.886
20 - 24	6,178.1	6,248.2	12,426.3	8.746
25 - 29	4,799.0	5,289.7	10,088.8	7.101
30 - 34	4,060.3	4,770.2	8,830.6	6.215
35 - 39	3,812.2	4,402.1	8,214.3	5.781
40 - 44	3,581.1	3,913.2	7,494.4	5.275
45 - 49	3,103.3	3,226.2	6,329.6	4.455
50 - 54	2,488.4	2,534.1	5,022.5	3.535
55 - 59	1,531.9	1,885.8	3,717.8	2.616
60 - 64	1,277.2	1,378.3	2,655.6	1.869
65 - 69	862.6	997.3	1,860.0	1.309
70 - 74	575.5	710.6	1,286.1	0.905
75 - 79	402.5	514.1	916.7	0.645
Totals	70,454.5	71,619.9	142,074.5	100.0

BIRTH RATE = 32.6202

DEATH RATE = 7.3279

PER CAPITA Y = 142.9848

Table 10 Population by Age and Sex Groups - 1978

Age Group	Males	Females	Both Sexes	Per Cent
0 - 0	2,297.0	2,110.7	4,407.8	3.096
1 - 4	8,491.7	7,911.0	16,402.7	11.521
5 - 9	9,894.0	9,461.8	19,355.8	13.596
10 - 14	9,105.1	8,789.9	17,895.0	12.570
15 - 19	7,850.5	7,618.5	15,469.0	10.866
20 - 24	6,178.0	6,247.9	12,425.9	8.728
25 - 29	4,798.8	5,289.4	10,088.3	7.086
30 - 34	4,060.1	4,769.8	8,830.0	6.202
35 - 39	3,811.9	4,401.6	8,213.5	5.769
40 - 44	3,580.7	3,912.7	7,493.4	5.263
45 - 49	3,102.8	3,225.5	6,328.4	4.445
50 - 54	2,487.7	2,533.3	5,021.1	3.527
55 - 59	1,831.2	1,885.0	3,716.3	2.610
60 - 64	1,276.4	1,377.5	2,654.0	1.864
65 - 69	861.9	996.5	1,858.5	1,305
70 - 74	574.9	709.9	1,284.9	0.902
75 - 79	402.0	513.6	915.6	0.643
Totals	70,605.4	71,755.2	142,360.7	100.0

BIRTH RATE = 33.2015

DEATH RATE = 7.3759

PER CAPITA Y = 133.4886

Table 11 Gross Income by Region

Province	Per Capita Gross Income (Rp)			
	1966	1967	1968	1969
1. D. C. I.	37,836	37,094	38,401	39,459
2. Central Java	17,877	16,630	18,026	18,416
3. West Java	-	12,309	13,855	13,409
4. D. I. J.	15,920	16,208	18,223	18,749
5. Atjeh	-	17,005	19,903	25,238
6. West Sumatra	17,202	16,807	17,464	19,943
7. Others	-	23,400	22,032	24,989
Indonesia	20,469	20,267	21,118	22,052

Unit: New Rp at 1969 price

Table 12 Result of Projection of Regional Income Variation Coefficient

Case No.	1967	1968	1973	1978
Case 5 (Higher)	0.2741	0.2312	0.2001	0.2060
Case 6 (Lower)			0.2021	0.1987

Note: Variation Coefficient of Regional Income

$$V.C. = \sqrt{\sum_{i=1}^{7} \left\{ \left(\frac{Y}{N}\right) / \left(\frac{Y}{N}\right) - 1 \right\}^2 \quad \frac{N_i}{N}}$$

$\left(\frac{Y}{N}\right)i$: Per capita Income of ith region

$\frac{Y}{N}$: Per capita Income of Indonesia

Table 13 Evaluation of the Plan; Agriculture

Commodities	1969/70			1970/71			1971/72			1972/73		
	Plan	* Actual	Achieve-ment	Plan	* Actual	Achieve-ment	Plan	* Actual	Achieve-ment	Plan	* Actual	Achieve-ment
Milled Rice	10,520	10,641	101.2	11,430	11,994	104.9	12,520	12,770	102.0	13,810	-	-
Maize	3,370	2,293	68.0	3,510	2,825	80.5	1,700	2,632	71.1	3,940	-	-
Cassava	12,287	10,917	88.9	12,655	10,478	82.8	12,963	10,042	77.5	16,710	-	
Sweet Potatoes	3,363	3,021	89.8	3,325	3,029	91.1	3,393	2,154	63.5		-	-
Beans	948	697	73.5	995	732	73.6	1,078	755	70.0	1,210	-	-

Unit: 1,000 ton

Achievement = (Actual/plan) x 100

* Calendar year

Source: Plan value from First 5 year Plan Document Vol. 2A. PP. 53 - 59
Actual figure from INDIKA 7012 EKONOMI JAN 1973 P. 107

Table 14 Evaluation of the Plan; Mining

Commodities (Unit)	1969/70			1970/71			1971/72			1972/73		
	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment
Tin (1000 ton)	16.16	17.4	107.7	16.79	19.1	113.8	17.58	19.7	112.1	18.70	21.40	114.4
Crude Oil (Million bl.)	293.0	271.0	92.5	358.0	311.6	87.0	364.0	325.7	89.5	401.0	359.5[1]/	-
Bauxite (1000 ton)	1,000.0	765.3	76.5	1,050.0	1,229.2	117.1	1,200.0	1,237.6	103.1	1,200.0	1,276.5	106.4
Nickel (1000 ton)	-	254.1	-	-	600.0	-	-	900.0	-	-	1,935.8	-
Coal (1000 ton)	-	191.7	-	-	172.4	-	-	197.9	-	-	179.2	-
Gold (kg)	222.5	246.6	110.8	232.5	236.7	101.8	240.0	329.7	137.4	240.0	305.4[1]/	-
Silver	9,715	10,591	109.0	10,000	8,803	88.0	10,500	8,876	84.5	10,200	7,588[1]/	-

[1]/ Jan. - Nov.

* Calendar Year

Achievement = (Actual/plan) x 100

Source: Plan value from Final 5 Year Development Plan Document Vol. 2B, PP 58 - 63
Actual Figure from INDIKATOR EKONOMI Jan 1973 P. 111

Table 15 Evaluation of the Plan; Manufacturing

Commodities (Unit)	1969/70			1970/71			1971/72			1972/73		
	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment
Cement (1000 ton)	600.0	535.4	89.2	675.0	553.4	82.0	850.0	546.8	64.3	125.0	-	-
Fertilizer (Urea) (1000 ton)	46.5	84.2	181.1	88.5	98.4	111.2	102.5	104.8	102.2	267.5	-	-
Paper (1000 ton)	16.0	15.6	97.5	35.5	18.5	52.1	46.5	29.5	63.4	46.5	-	-
Type (1000 piece)	-	370.0	-	-	368.0	-	-	445.3	-	-	-	-
Tube (1000 piece)	-	227.3	-	-	237.0	-	-	259.5	-	-	-	-
Textiles (Million m^2)	450.0	413.2	91.8	575.0	556.0	96.7	675.0	-	-	775.0	-	-
Cotton yarn (1000 BL)	200.0	160.0	80.0	260.0	205.8	79.2	290.0	209.5	72.2	340.0	-	-

Achievement = (Actual/plan) x 100

Source: Plan Value from First 5 Year Plan Document Vol. 2B PP. 15 - 37
Actual Figure from INDIKATOR EKONOMI Jan. 1973 , P. 110

* Calendar year

Table 16 Evaluation of the Plan; Exports

Category	1969/70			1970/71			1971/72			1972/73		
	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment
Category A	447.0	394.0	88.1	460.0	472.3	102.7	474.0	447.9	94.5	488.0	-	-
Category B	148.0	71.8	48.5	166.0	201.6	121.4	192.0	322.6	168.0	234.0	-	-
A + B	595.0	465.8	78.3	626.0	673.9	107.7	666.0	768.5	115.4	724.0	-	-
Oil (Net)	77.0	-	-	149.0	-	-	118.0	-	-	103.0	-	-
Oil (Gross)	358.0	366.0	102.2	485.0	434.0	89.5	458.0	515.0	112.4	475.0	-	-

Unit: Million US$

* Calendar Year

Achievement = (Actual/plan) x 100

Source: Plan Value from First 5 Year Plan Document Vol. PP. 81 - 82
Actual Figure Indonesian Financial Statistics July 1972, PP. 134 - 137

Table 17 Evaluation of the Plan; Imports

Category	1969/70			1970/71			1971/72			1972/73		
	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment	Plan	Actual*	Achieve-ment
Consumption goods	266.0	301.9	113.5	259.0	348.5	134.6	202.0	262.4	129.9	155.0	-	-
Raw Materials	335.0	344.5	102.8	437.0	390.0	89.2	539.0	466.9	86.6	628.0	-	-
Investment goods	275.0	274.4	99.8	362.0	396.6	109.6	453.0	369.0	81.5	527.0	-	-
Total	876.0	920.8	105.1	1,058.0	1,135.1	107.3	1,194.0	1,098.3	92.0	1,310.0	-	-

Unit: Million US$

* Calendar year

Achievement = (Actual/plan) x 100

Source: Plan Value from First 5 Year Plan Document Vol. 1 P. 86
Actual Figure from Indonesian Financial Statistics July 1972 PP. 142 - 143

Table 18 Evaluation of the Plan; Public Finance

Sector	1969/70			1970/71			1971/72			1972/73		
	(1) Plan	(2) Actual	(2) - (1)	(1) Plan	(2) Actual	(2) - (1)	(1) Plan	(2) Actual	(2) - (1)	(1) Plan	(2) Actual[1]	(2) - (1)
Current Account												
Current Receipts	228.0	243.7	15.7	320.6	344.6	24.0	415.9	428.0	12.1	573.6	265.7	-
Current Expenditure	204.0	216.5	12.5	283.5	288.2	4.7	343.3	349.1	5.8	437.5	178.5	-
Balance	24.0	27.2	3.2	37.1	56.4	19.3	72.6	78.9	6.3	136.1	87.2	-
Development Account												
Receipts												
Surplace of Current Account	24.0	27.2	3.2	37.1	56.4	19.3	72.6	78.9	6.3	136.1	87.2	-
Project Aid	36.2	25.3	-10.9	45.6	41.6	-4.0	66.2	40.6	-25.6	83.0	36.1	-
Program Aid	63.2	65.8	1.4	78.7	79.0	1.3	103.1	90.5	-12.6	95.0	39.8	-
Total	123.4	118.3	-5.1	161.4	177.0	15.6	241.9	210.0	-31.9	314.1	163.1	-
Expenditure												
Project Aid	36.2	25.3	-10.9	45.6	41.6	-4.0	66.2	40.6	-25.6	83.0	36.1	-
Others	87.2	92.9	5.7	115.8	128.2	12.4	175.7	150.9	-24.8	231.1	88.3	-
Total	123.4	118.2	-5.2	161.4	169.8	8.4	241.9	191.5	-50.4	314.1	124.4	-
Grand Total												
Receipt	327.4	334.8	7.4	444.9	465.1	20.2	585.2	559.1	-26.1	751.6	341.6	-
Expenditure	327.4	334.7	7.3	444.9	457.9	13.0	585.2	540.6	-44.6	751.6	302.9	-
Balance	0	0.1	0.1	0.1	7.2	7.2	0.0	18.5	18.5	0.0	38.7	-

Unit: Million New Rp

1/ First Half of the Year

Source: INDIKATOR EKONOMI Jan 1973, PP 61 - 64

Table 19 List of National Code of Import Corresponding to Industrial Sector

Agriculture	Construction	Public Utilities	Manufacturing	Transportation	Others
8,740	9,390	9,790	9,310	9,350	9,320
8,750	9,400	9,800	9,330	9,360	9,420
8,760	9,500	9,830	9,340	9,760	9,430
9,410	8,770	9,890	9,520	9,770	9,440
5,650		9,900	9,530	9,860	9,450
		9,910	9,540	10,130	9,480
		9,920	9,560	10,140	9,580
		9,930	9,570	10,150	9,130
		9,940	9,600	10,170	10,810
		9,950	9,610	10,180	10,820
		9,960	9,620	10,190	10,830
		9,970	9,640	10,200	10,840
		10,060	9,660	10,210	10,850
		10,070	9,650	10,220	8,620
		10,080	9,670	10,230	8,910
		10,100	9,680	10,240	3,970
		10,040	9,690	10,260	8,610
		10,041	9,700	10,250	
		10,050	9,710	10,270	
		10,030	9,720	10,290	
		10,045	9,730	10,300	
		10,120	10,010	10,310	
		10,100	10,020	10,380	
			7,250	10,400	
			8,780	10,320	
			8,790	10,330	
			9,230	10,370	
			9,220	10,410	
			6,930	10,430	
			8,810	10,440	
				10,450	
				10,465	
				10,000	

Table 20 Utilization Rate of Imports as Capital Formation

Code	%	
9,830	80%	
9,900	50%	
9,540	30%	
9,360	80%	
9,760	80%	
9,860	80%	
10,240	1960	35%
	1961	40%
	1962	45%
	1963	50%
	After 1964	60%
10,310	80%	
10,330	40%	

Table 21 Percentage Share of Capital Goods Import by Industrial Use

Year	Agriculture	Construction	Public Utilities	Manufacturing	Transportation	Others
1951	1.59	8.39	27.09	17.37	30.74	14.83
1952	1.81	8.44	21.45	16.36	36.39	15.58
1953	1.82	6.34	28.02	12.74	41.46	9.62
1954	0.62	5.13	33.31	15.84	34.49	10.61
1955	1.42	6.13	32.80	17.57	30.24	11.85
1956	1.10	6.74	37.07	13.02	30.98	11.10
1957	0.59	7.54	34.64	12.99	31.41	12.84
1958	0.44	6.94	30.04	16.88	34.11	11.59
1959	0.74	7.53	25.07	15.04	38.83	12.79
1960	0.73	7.02	31.53	15.63	34.87	10.23
1961	1.38	4.93	22.93	9.02	52.02	9.71
1962[1)]	1.08	4.97	30.24	10.64	44.14	8.94
1963	0.79	5.00	37.55	12.24	36.25	8.17
1964	0.56	5.31	20.20	11.54	45.75	16.64
1965	0.70	6.52	28.00	13.88	43.75	7.15
1966	0.39	4.21	36.10	13.04	38.50	7.75
1967	0.41	4.01	26.81	17.60	42.68	8.49
1968	0.45	4.64	27.60	21.84	34.79	10.68
1969	0.71	6.53	22.52	20.18	39.32	10.75
1970	0.57	4.95	26.72	14.51	43.66	9.59

Table 22 Population Density

(by 1961 Population Census)

Province	Population (x 1000)	Area (km^2)	Population density (Persons/Km^2)
Jakarta	2,973	577	5,152
Western Java	17,615	46,300	380
Central Java	18,407	34,206	558
Jogyakarta	2,241	3,169	707
Eastern Jawa	21,823	47,922	455
Java & Madura	63,059	132,174	477
Southern Sumatra	4,847	158,163	31
Riau	1,235	94,562	13
Jambi	744	44,924	17
Western Sumatra	2,319	49,778	47
Northern Sumatra	4,965	70,787	70
Aceh	1,629	55,392	29
Sumatra	15,739	473,606	33
Western Kalimantan	1,581	146,760	11
Central Kalimantan	497	152,600	3.3
Southern Kalimantan	1,473	37,660	39
Eastern Kalimantan	551	202,440	2.7
Kalimantan	4,102	539,460	7.6
Northern Sulawesi	2,003	88,578	23
Southern Sulawesi	5,076	100,457	51
Sulawesi	7,079	189,035	37
Bali	1,783	5,561	321
Western Nusa Tenggara	1,808	20,177	90
Eastern Nusa Tenggara	1,967	47,876	41
Bali & Nusa Tenggara	5,558	73,614	76
Maluku	790	74,505	11
Western Irian	758	421,951	1.8
Indonesia	97,085	1,904,345	51

Biro Pusat Statistik, Statistical Pocketbook of Indonesia, 1963. P. 13, Table 3.

Table 23 Regional of Gross Income (1966 - 1970)

(Current Value)

Year	Gross Income (Million New Rp.)					Per Capita Income (Rp.)					Population (1000 persons)				
Province	1966	1967	1968	1969	1970	1966	1967	1968	1969	1970	1966	1967	1968	1969	1970
1. Jakarta	25,663	64,986	140,213	187,507	229,628	6,224	14,974	31,152	39,459	47,142	4,123	4,340	4,501	4.752	4,871
2. Western Java	-	108,637	275,101	278,229	-	-	5,449	13,524	13,409	-	-	19,938	20,341	20,750	-
3. Central Java	60,278	137,833	341,722	410,094	-	2,911	6,499	15,773	18,416	-	20,708	21,209	21,729	22,268	-
4. Jogyakarta	8,166	15,845	35,816	47,774	-	3,312	6,346	14,223	18,749	-	2,451	2,497	2,518	2,547	-
5. Western Sumatra	7,861	16,157	40,520	53,447	-	3,095	6,263	15,407	19,943	-	2,540	2,580	2,630	2,680	-
6. Aceh	-	15,672	31,129	47,447	-	-	8,659	16,827	25,238	-	-	1,810	1,850	1,880	-
7. Southern Sumatra	-	-	-	-	126,979	-	-	-	-	*	-	-	-	*	-
8. Indonesia	315,900	847,800	1,993,900	2,604,400	3,196,200	2,883	7,549	17,319	22,061		109,600	112,300	115,100	118,100	121,089

Sources: 1, 3, 4, 5, 8; Material (5) P. 9 table AB, I,
6; material (1) P. 1 table 1, I
2; material (4) P. 7.
7; material (6) P. 26.

Table 24 Regional Gross Income (1966 - 1969)

Province \ Year	Gross Income (Million New Rp)				Per Capita Gross Income (Rp)			
	1966	1967	1968	1969	1966	1967	1968	1969
1. Jakarta 1)	155,987 (25,663)	160,994 (26,484)	172,644 (28,435)	187,507 (30,847)	37,836 (6,224)	37,094 (6,102)	38,401 (6,317)	39,459 (6,491)
2. Central Java	370,188	352,714	391,692	410,094	17,877	16,630	18,026	18,416
3. Western Java	-	245,407	381,830	278,229	-	12,309	13,855	13,409
4. Jogyakarta	39,005	40,471	45,904	47,774	15,920	16,208	18,223	18,749
5. Aceh	-	30,779	36,821	47,447	-	17,005	19,903	25,238
6. Western Sumatra	43,694	43,361	45,930	53,447	17,202	16,807	17,464	19,943
7. Indonesia	2,243,430	2,275,990	2,430,690	2,604,400	20,469	20,267	21,118	22,052

Source: 1; Material (3) P. 9, 2; Material (5) P. 14, 3; Material (4) P. 7, 4; Material (5) P. 19, 5; Material (1), P. 1, 6; Material (2) P. 4.

1) Singapore Parenthesis in 1966 price.

Table 25 Gross Regional Products - DCI JAKARTA

(Current Million New Rp)

Sector \ Year	1966	1967	1968	1969	1970
Agriculture	3,005.7	6,758.3	13,831.3	17,558.4	21,058.4
Mining	-	-	-	-	-
Manufacturing	2,223.0	6,155.3	13,845.5	17,473.8	21,093.0
Construction	1,355.2	3,897.1	9,104.2	11,290.6	13,388.1
Electricity & Gas	37.2	917.2	2,286.4	2,692.7	3,327.6
Transportation & Communication	1,320.0	4,629.7	8,518.0	14,899.5	18,588.9
Trade	15,462.9	37,870.9	81,953.8	108,549.3	132,887.1
Banking	1,323.6	2,744.8	7,831.6	8,946.0	10,699.5
Ownership & Dwelling	1,388.0	3,961.0	6,509.5	8,112.2	9,666.1
Public Services	1,946.7	5,185.5	12,469.6	18,902.4	25,582.0
Services	502.8	1,033.6	2,768.0	4,977.2	6,103.9
Total	28,565.1	73,153.4	159,117.9	213,402.1	262,394.6

Source: Material (3) P. 1 Table 1

Table 26 Gross Regional Products - Central Java

(Current Million New Rp)

Sector \ Year	1966	1967	1968	1969
Agriculture	26,917.6	65,326.8	171,323.0	175,656.0
Mining	1,662.6	7,465.4	24,515.2	42,119.2
Manufacturing	7,456.9	18,651.7	46,960.9	69,614.9
Construction	2,380.2	4,532.6	9,925.3	10,579.7
Electricity & Gas	19.1	412.2	1,237.4	1,980.4
Transportation & Communication	796.3	1,920.1	2,872.8	4,726.5
Trade	9,994.3	19,399.7	50,069.5	67,676.9
Banking	156.2	313.8	852.7	1,012.1
Ownerships & Dwelling	1,425.6	2,496.0	5,547.6	6,261.6
Public Services	5,688.0	8,271.0	9,683.0	10,569.0
Services	3,781.5	9,043.5	18,734.9	19,897.9
Total	60,278.2	137,832.8	341,722.3	410,094.2

Source: Material (5) P. 13, Table A, II

Table 27 Gross Regional Products - West Java

(Current Million New Rp)

Sector \ Year	1966	1967	1968	1969
Agriculture	-	66,582.2	181,676.5	166,382.5
Mining	204.6	136.2	159.8	104.6
Manufacturing	3,652.5	10,355.1	19,260.8	19,953.6
Construction	1,240.9	3,601.4	8,907.5	9,394.0
Electricity & Gas	-	636.2	1,595.9	2,044.3
Transportation & Communication	103.9	1,149.7	2,309.8	2,934.1
Trade	-	10,311.2	25,758.7	35,410.9
Banking	55.7	138.4	311.7	383.7
Ownership & Dwelling	966.4	2,785.2	6,826.4	7,166.5
Public Services	-	1,156.4	3,393.2	5,323.9
Services	4,473.0	11,784.9	24,900.2	29,150.7
Total	-	108,636.9	275,100.5	278,228.8

Source: Materials (4) P. 3

Table 28 Gross Regional Income - West Sumatra

(Current Million New Rp)

Sector \ Year	1966	1967	1968	1969
Agriculture	4,337.19	8,987.40	23,872.93	28,138.18
Mining	8.92	66.93	157.07	189.99
Manufacturing	525.83	1,046.63	2,823.94	3,829.02
Construction	2.72	8.36	35.75	98.11
Electricity & Gas	1.90	7.07	12.21	22.58
Transportation & Communication	153.11	433.00	1,510.34	1,896.16
Trade	2,725.24	4,901.96	10,628.78	15,553.53
Banking	11.18	92.60	290.51	500.24
Ownership & Dwelling	871.12	1,619.23	3,410.28	5,953.64
Public Services	296.89	897.60	2,277.32	4,010.04
Services	36.81	54.00	76.28	189.32
Total	8,970.91	18,114.78	45,095.41	60,380.81

Source: Material (2) P. 9 Table 1.7

Table 29 Gross Regional Income - Atjeh

(Current Million New Rp)

Sector \ Year	1967	1968	1969
Agriculture	5,641.93	11,101.55	17,131.89
Mining	-	-	-
Manufacturing	1,849.80	3,744.73	6,083.45
Construction	58.22	124.85	217.11
Electricity & Gas	24.32	76.22	118.14
Transportation & Communication	387.00	740.10	1,694.64
Trade	3,265.59	6,304.39	8,902.98
Banking	52.56	155.92	202.84
Ownership & Dwelling	723.10	1,299.72	2,210.44
Public Services	491.28	910.71	2,864.40
Services	55.96	92.43	149.32
Total	16,341.80	32,487.09	49,641.70

Source: Material (1) P. 6 Tab.e 1.7

Table 30 Gross Regional Income - South Smatra

(Current Million New Rp)

Sector \ Year	Million Rupiah	Percentage	
		South Smatra (1970)	Indonesia (1970)
Agriculture	40,000	31.5	47.6
Mining	22,383	17.6	5.4
Manufacturing	23,220	18.3	9.8
Construction			2.8
Electricity & Gas	1,087	0.9	0.5
Transportation & Communication	2,243	1.8	2.6
Trade	20,874	16.4	18.6
Banking	943	0.7	0.4
Ownership & Dwelling	6,240	5.0	2.0
Public Services	5,500	4.3	5.0
Services	4,489	3.5	5.3
Total	126,979	100.0	100.0

Source: Julian Luthau, 'Conclusion of the Finding' Material (6) P. 26

Table 31-(1) Data Table – Exogenous

	(1) JAPUS	(2) SERV*	(3) KP*	(4) AID*
1951	416.735	128.000	-8.000	1.000
1952	431.105	-251.000	-19.000	7.000
1953	450.690	-121.000	1.000	3.000
1954	446.189	219.000	-1.000	2.000
1955	480.564	279.000	2.000	1.000
1956	491.182	-258.000	2.000	1.000
1957	500.218	-281.000	3.000	12.000
1958	496.604	-225.000	5.000	189.000
1959	529.332	-210.000	1.000	139.000
1960	546.961	216.000	20.000	163.000
1961	563.180	231.000	-11.000	365.000
1962	600.248	-222.000	11.000	109.000
1963	627.739	-282.000	10.000	113.000
1964	666.850	-272.000	25.000	103.000
1965	707.906	-272.000	18.000	253.000
1966	756.559	-286.000	50.000	124.000
1967	784.593	-285.000	100.000	241.000
1968	829.581	-328.000	45.000	234.000
1969	860.143	-396.000	56.000	283.000
1970	866.977	-395.000	93.000	301.000

	(5) SDR*	(6) DEFX	(7) DEFM	(8) DATEX
1951	0.000	0.301	0.301z	0.000
1952	0.000	0.362	0.362	0.000
1953	0.000	0.359	0.359	0.000
1954	0.000	0.367	0.367	0.011
1955	0.000	0.466	0.466	0.012
1956	0.000	0.528	0.528	0.014
1957	0.000	0.575	0.575	0.017
1958	0.000	0.583	0.583	0.021
1959	0.000	0.771	0.771	0.020
1960	0.000	1.000	1.000	0.059
1961	0.000	0.793	0.969	0.058
1962	0.000	1.332	1.112	0.097
1963	0.000	5.975	6.315	0.472
1964	0.000	16.036	18.027	1.382
1965	0.000	22.259	28.631	1.973
1966	0.000	724.820	1,534.000	56.442
1967	0.000	1,340.500	2,452,800	96.620
1968	0.000	3,717,700	5,242,300	261,340
1969	0.000	3,507,800	5,411,200	246.420
1970	35.000	5,195.600	6,287.200	364.530

Table 31-(2) Data Table – Exogenous

	(9) RATEM	(10) LAND	(11) D50	(12) D58
1951	0.000	5,815,000	1.000	0.000
1952	0.000	6,114.000	1.000	0.000
1953	0.000	6,465.000	1.000	0.000
1954	0.008	6,613.000	1.000	0.000
1955	0.013	6,570.000	1.000	0.000
1956	0.014	6,702.000	1.000	0.000
1957	0.016	6,798.000	1.000	0.000
1958	0.017	6,990.000	1.000	1.000
1959	0.015	7,153.000	1.000	0.000
1960	0.065	7,285,000	0.000	0.000
1961	0.060	6,857.000	0.000	0.000
1962	0.097	7,283.000	0.000	0.000
1963	0.533	6,713.000	0.000	0.000
1966	1.579	6,980.000	0.000	0.000
1965	2.229	7,328.000	0.000	0.000
1966	115.550	7,691.000	0.000	0.000
1967	177,630	7,516.000	0.000	0.000
1968	393.010	7,964.000	0.000	0.000
1969	405.430	7,600.000	0.000	0.000
1970	489.320	7,960.000	0.000	0.000

	(13) D59	(14) D60	(15) D61	(16) D65
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	0.000	0.000	0.000
1954	0.000	0.000	0.000	0.000
1955	0.000	0.000	0.000	0.000
1956	0.000	0.000	0.000	0.000
1957	0.000	0.000	0.000	0.000
1958	0.000	0.000	0.000	0.000
1959	1.000	0.000	0.000	0.000
1960	0.000	1.000	0.000	0.000
1961	0.000	0.000	1.000	0.000
1962	0.000	0.000	0.000	0.000
1963	0.000	0.000	0.000	0.000
1964	0.000	0.000	0.000	0.000
1965	0.000	0.000	0.000	1.000
1966	0.000	0.000	0.000	0.000
1967	0.000	0.000	0.000	0.000
1968	0.000	0.000	0.000	0.000
1969	0.000	0.000	0.000	0.000
1970	0.000	0.000	0.000	0.000

Table 31-(3) Data Table -- Exogenous

	(17) D6266	(18) D6670	(19) D6770	(20) D6870
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	0.000	0.000	0.000
1954	0.000	0.000	0.000	0.000
1955	0.000	0.000	0.000	0.000
1956	0.000	0.000	0.000	0.000
1957	0.000	0.000	0.000	0.000
1958	0.000	0.000	0.000	0.000
1959	0.000	0.000	0.000	0.000
1960	0.000	0.000	0.000	0.000
1961	0.000	0.000	0.000	0.000
1962	1.000	0.000	0.000	0.000
1963	1.000	0.000	0.000	0.000
1964	1.000	0.000	0.000	0.000
1965	1.000	0.000	0.000	0.000
1966	1.000	1.000	0.000	0.000
1967	0.000	1.000	1.000	0.000
1968	0.000	1.000	1.000	1.000
1969	0.000	1.000	1.000	1.000
1970	0.000	1.000	1.000	1.000

	(21) TIME	(22) PGC D	(23) D66	(24) CRD N
1951	1.000	0.301	0.000	0.000
1952	2.000	0.362	0.000	0.000
1953	3.000	0.359	0.000	0.000
1954	4.000	0.367	0.000	0.551
1955	5.000	0.466	0.000	1.169
1956	6.000	0.528	0.000	1.040
1957	7.000	0.575	0.000	0.483
1958	8.000	0.583	0.000	2.420
1959	9.000	0.771	0.000	6.811
1960	10.000	1.000	0.000	6.647
1961	11.000	1.319	0.000	10.663
1962	12.000	2.465	0.000	19.557
1963	13.000	6.715	0.000	40.568
1954	14.000	12.710	0.000	131.669
1965	15.000	45.860	0.000	828.799
1966	16.000	689.300	1.000	5,388.000
1967	17.000	1,746.000	0.000	24,853.000
1968	18.000	3,858.000	0.000	95,560.015
1969	19.000	4,711.000	0.000	117,556.015
1970	20.000	5,964.000	0.000	118,041.015

Table 31-(4) Data Table -- Exogenous

	(25) D57	(26) D6062	(27) D55	(28) D56
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	0.000	0.000	0.000
1954	0.000	0.000	0.000	0.000
1955	0.000	0.000	1.000	0.000
1956	0.000	0.000	0.000	1.000
1957	1.000	0.000	0.000	0.000
1958	0.000	0.000	0.000	0.000
1959	0.000	0.000	0.000	0.000
1960	0.000	1.000	0.000	0.000
1961	0.000	1.000	0.000	0.000
1962	0.000	1.000	0.000	0.000
1963	0.000	0.000	0.000	0.000
1964	0.000	0.000	0.000	0.000
1965	0.000	0.000	0.000	0.000
1966	0.000	0.000	0.000	0.000
1967	0.000	0.000	0.000	0.000
1968	0.000	0.000	0.000	0.000
1969	0.000	0.000	0.000	0.000
1970	0.000	0.000	0.000	0.000

	(29) OMEGA	(30) GC	(31) XOIL*	(32) XMIN*
1951	0.000	31.670	0.000	0.000
1952	55.000	37.420	0.000	0.000
1953	-4.000	40.190	5.620	2.501
1954	8.000	35.160	6.620	1.891
1955	-31.000	28.980	5.325	1.587
1956	66.000	30.980	6.513	1.817
1957	40.000	36.280	8.253	1.712
1958	8.000	55.460	9.536	1.234
1959	-77.000	53.760	6,585	0.928
1960	-86.000	45.100	13.653	3.541
1961	0.000	42.000	18.824	2.964
1962	100.000	33.800	16.397	2.908
1963	-5.000	34.000	18.789	1.689
1964	69.000	40.000	20.060	2.919
1965	-47.000	29.000	21.596	3.339
1966	-2.000	40.300	16.669	2.736
1967	-22.000	36.200	19.983	4.552
1968	-9.000	37.200	23.815	3.577
1969	64.000	38.000	31.351	3.741
1970	-4.000	42.200	36.679	2.410

Table 31-(5) Data Table -- Exogenous

	(33) D1968	(34) D1969	(35) D1963	(36) RO**
1951	0.000	0.000	0.000	19.817
1952	0.000	0.000	0.000	14.513
1953	0.000	0.000	0.000	19.832
1954	0.000	0.000	0.000	14.730
1955	0.000	0.000	0.000	14.034
1956	0.000	0.000	0.000	18.875
1957	0.000	0.000	0.000	19.640
1958	0.000	0.000	0.000	21.094
1959	0.000	0.000	0.000	22.731
1960	0.000	0.000	0.000	29.668
1961	0.000	0.000	0.000	26.507
1962	0.000	0.000	0.000	9.304
1963	0.000	0.000	1.000	7.362
1964	0.000	0.000	0.000	4.621
1965	0.000	0.000	0.000	2.200
1966	0.000	0.000	0.000	1.148
1967	0.000	0.000	0.000	0.687
1968	1.000	0.000	0.000	1.141
1969	0.000	1.000	0.000	0.626
1970	0.000	0.000	0.000	2.250

	(37) RS**	(38) IFOC	(39) XA*	(40) XOT*
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	0.000	14.760	0.198
1954	0.000	0.000	16.635	0.112
1955	0.000	40.000	16.319	0.097
1956	0.000	47.000	15.176	0.082
1957	0.000	75.000	15.963	0.100
1958	0.000	67.000	13.090	0.058
1959	0.000	71.000	13.833	0.112
1960	0.000	65.000	34.594	0.209
1961	0.000	74.000	34.767	0.144
1962	0.000	82.000	32.378	0.114
1963	0.000	71.000	28.050	0.169
1964	0.000	53.000	31.073	0.445
1965	0.000	66.000	30.403	0.860
1966	0.000	40.000	33.581	2.612
1967	13.056	62.000	28.546	2.417
1968	8.536	74.000	27.822	6.084
1969	18.010	105.000	26.572	8.234
1970	20.681	128.000	39.595	3.614

Table 32-(1) Data Table – Endogenous

	(1) Y	(2) I	(3) GC	(4) C
1951	246.100	18.300	31.670	191.000
1952	244.600	24.870	37.420	177.500
1953	256.100	24.070	40.190	183.600
1954	272.700	22.830	35.160	203.000
1955	280.500	22.600	28.980	219.800
1956	293.800	26.780	30.980	233.100
1957	313.100	30.340	36.280	239.100
1958	324.400	19.440	55.460	239.900
1959	293.600	19.420	53.760	210.800
1960	390.200	30.700	45.100	311.400
1961	412.600	44.100	42.000	335.800
1962	420.200	40.100	33.800	359.200
1963	410.800	30.600	34.000	345.000
1964	425.300	34.800	40.000	347.700
1965	429.900	36.200	29.000	356.000
1966	441.900	40.700	40.300	350.800
1967	448.300	33.200	36.200	381.700
1968	478.800	46.300	37.200	396.300
1969	513.000	53.100	38.000	426.400
1970	548.400	63.200	42.200	446.000

	(5) Y	(6) M	(7) P	(8) H
1951	20.830	15.700	0.301	16.720
1952	22.280	17.470	0.362	18.240
1953	23.080	14.840	0.359	20.860
1954	25.260	13.550	0.367	30.290
1955	23.330	14.210	0.466	26.250
1956	23.590	20.650	0.528	25.370
1957	26.030	18.650	0.575	32.890
1958	23.920	14.320	0.583	50.370
1959	21,460	11.840	0.771	45.240
1960	52.000	49.000	1.000	47.840
1961	56.700	66.000	1.140	59.340
1962	51.800	64.700	3.177	42.780
1963	48.700	47.500	7.811	33.720
1964	54.500	51.700	16.770	43.230
1965	56.200	47.500	55.150	46.640
1966	55,600	45.500	714.900	31.060
1967	55.500	58.300	1,891.000	27.220
1968	61.300	62.300	4,163.000	27.360
1969	69.900	74.400	5,056.000	35.600
1970	82.300	85.300	5,828.000	41.360

Table 32-(2) Data Table -- Endogenous

	(9) IP	(10) IG	(11) XA*	(12) XO*
1951	14.671	3.628	0.000	0.000
1952	20.785	4.084	0.000	0.000
1953	20.642	3.427	14.760	5.620
1954	16.052	6.777	16.635	6.620
1955	16.565	6.034	16.319	5.325
1956	19.853	6.926	15.176	6.513
1957	22.083	8.256	15.963	8.253
1958	14.329	5.110	13.090	9.536
1959	15.657	3.762	13.833	6.585
1960	15.255	15.444	34.594	13.653
1961	21.766	22.333	34.767	18.824
1962	28.289	11.810	32.378	16.397
1963	17.757	12.842	28.050	18.789
1964	24.458	10.341	31.073	20.060
1965	15.819	20.380	30.403	21.596
1966	38.811	1.888	33.581	16.669
1967	21.032	12.167	28.546	19.983
1968	36.950	9.349	27.822	23.815
1969	24.262	28.837	26.572	31.351
1970	28.240	34.959	39.595	36.679

	(13) XM*	(14) MI	(15) MR	(16) MC
1951	0.000	3.750	6.900	5.050
1952	0.000	4.780	4.270	8.420
1953	2.501	3.730	6.780	4.330
1954	1.891	3.430	6.300	3.820
1955	1.587	3.390	6.890	3.930
1956	1.817	4.920	8.070	7.660
1957	1.712	4.400	8.090	6.160
1958	1.234	2.700	5.750	5.870
1959	0.928	2.570	4.850	4.420
1960	3.541	10.700	19.900	18.400
1961	2.964	16.000	28.700	21.300
1962	2.908	21.500	25.500	17.700
1963	1.689	14.400	16.900	16.200
1964	2.919	17.400	13.300	21.000
1965	3.339	15.100	16.600	15.800
1966	2.736	10.500	15.600	19.400
1967	4.552	16.000	21.500	20.800
1968	3.577	17.200	21.900	23.200
1969	3.741	22.800	30.600	21.000
1970	2.410	30.500	33.100	21.700

Table 32-(3) Data Table -- Endogenous

	(17) Y1	(18) YY2	(19) Y2	(20) Y3&4
1951	132.700	26.400	3.100	23.300
1952	141.400	23.300	2.800	20.500
1953	144.800	26.900	4.600	22.300
1954	155.000	27.500	4.800	22.700
1955	157.700	36.200	4.400	31.800
1956	159.500	36.400	5.200	31.200
1957	161.100	40.400	5.700	34.700
1958	196.800	34.700	8.400	26.300
1959	170.600	32.200	8.400	23.800
1960	210.400	41.599	7.900	33.700
1961	213.900	48.000	10.200	37.800
1962	220.900	47.000	8.600	38.400
1963	212.700	44.400	6.500	37.900
1964	223.600	44.099	6.500	37.600
1965	225.300	44.700	7.400	37.300
1966	236.100	46.400	8.400	38.000
1967	232.100	47.000	7.300	39.700
1968	248.200	51.900	8.800	43.100
1969	251.000	60.700	11.500	49.200
1970	261.800	68.100	14.100	54.000

	(21) YY3	(22) Y5	(23) Y6&7	(24) Y7
1951	87.000	7.700	79.300	6.000
1952	79.900	7.700	72.200	5.700
1953	84.400	10.700	73.699	5.800
1954	90.200	11.600	78.600	5.900
1955	86.600	11.000	75.600	6.500
1956	97.900	11.500	86.400	11.700
1957	111.600	12.200	99.399	15.800
1958	92.900	16.000	76.900	9.900
1959	90.800	15.400	75.400	7.400
1960	138.200	14.500	123.699	14.400
1961	150.700	14.500	136.200	14.600
1962	152.300	14.900	137.400	15.400
1963	153.700	15.300	138.400	14.900
1964	157.600	14.800	142.800	15.600
1965	159.900	15.100	144.800	16.000
1966	159.400	15.200	144.200	15.400
1967	169.200	15.700	153.500	16.700
1968	178.700	15.900	162.799	19.700
1969	201.300	16.500	184.799	27.700
1970	218.500	17.400	201.100	32.200

Table 32-(4) Data Table – Endogenous

	(25) I1	(26) I2	(27) I3&4	(28) I5
1951	0.233	1.230	6.522	4.509
1952	0.376	1.754	7.858	7.563
1953	0.375	1.308	8.413	8.558
1954	0.099	0.823	7.890	5.536
1955	0.235	1.015	8.343	5.009
1956	0.218	1.338	9.944	6.150
1957	0.130	1.665	10.518	6.936
1958	0.063	0.994	6.723	4.887
1959	0.115	1.179	6.280	6.079
1960	0.111	1.070	7.194	5.319
1961	0.300	1.073	6.954	11.322
1962	0.305	1.405	11.564	12.486
1963	0.140	0.887	8.841	6.437
1964	0.136	1.298	7.763	11.189
1965	0.110	1.031	6.625	6.921
1966	0.151	1.633	19.072	14.942
1967	0.086	0.843	9.340	8.976
1968	0.166	1.714	18.268	12.855
1969	0.172	1.584	10.359	9.539
1970	0.160	1.397	11.643	12.330

	(29) I6&7	(30) KP	(31) KG	(32) K1
1951	2.175	14.671	3.628	0.233
1952	3.238	35.456	7.713	0.609
1953	1.985	56.098	11.141	0.985
1954	1.703	72.151	17.918	1.084
1955	1.962	88.715	23.953	1.319
1956	2.203	108.568	30.880	1.538
1957	2.835	130.651	39.137	1.668
1958	1.660	144.980	44.248	1.731
1959	2.002	160.638	48.010	1.847
1960	1.560	175.894	63.454	1.958
1961	2.113	197.661	85.788	2.259
1962	2.529	225.950	97.599	2.564
1963	1.450	243.707	110.442	2.705
1964	4.069	268.166	120.783	2.842
1965	1.131	283.986	141.163	2.952
1966	3.007	322.798	143.051	3.104
1967	1.785	343.830	155.219	3.190
1968	3.946	380.780	164.568	3.356
1969	2.608	405.043	193.406	3.528
1970	2.708	433.283	228.365	3.689

Table 32-(5) Data Table – Endogenous

	(33) K2	(34) K3&4	(35) K5	(36) K6&7
1951	1.230	6.522	4.509	2.175
1952	2.985	14.381	12.073	5.414
1953	4.293	22.795	20.631	7.399
1954	5.117	30.685	26.168	9.102
1955	6.132	39.029	31.177	11.065
1956	7.470	48.973	37.328	13.269
1957	9.135	59.491	44.264	16.105
1958	10.130	66.214	49.151	17.765
1959	11.309	72.495	55.231	19.768
1960	12.380	79.689	60.551	21.329
1961	13.453	86.644	71.874	23.442
1962	14.859	98.208	84.361	25.971
1963	15.747	107.050	90.798	27.422
1964	17.046	114.813	101.988	31.492
1965	18.077	121.438	108.909	32.623
1966	19.711	140.510	123.852	35.631
1967	20.554	149.851	132.828	37.417
1968	22.269	168.119	145.683	41.363
1969	23.853	178.479	155.223	43.971
1970	25.251	190.123	167.553	46.679

	(37) IGKA	(38) IGKI	(39) IGKW	(40) GKA
1951	0.611	1.998	1.018	0.611
1952	1.438	1.720	0.926	2.050
1953	1.115	1.309	1.002	3.165
1954	2.175	2.424	2.177	5.341
1955	0.775	2.972	2.286	6.116
1956	1.526	2.752	2.647	7.643
1957	1.648	3.428	3.180	9.291
1958	1.021	2.069	2.019	10.313
1959	0.698	1.858	1.205	11.011
1960	3.269	7.827	4.347	14.280
1961	2.782	13.079	6.471	17.063
1962	0.798	7.657	3.354	17.861
1963	0.791	9.685	2.366	18.653
1964	0.800	7.924	1.616	19.454
1965	1.293	16.033	3.053	20.748
1966	0.154	1.379	0.354	20.902
1967	1.172	8.330	2.665	22.074
1968	0.654	6.007	2.687	22.729
1969	7.870	15.630	5.330	30.599
1970	8.840	19.050	7.060	39.439

Table 32-(6) Data Table -- Endogenous

	(41) GKI	(42) GKW	(43) RT	(44) TD
1951	1.998	1.018	39.239	4.485
1952	3.719	1.944	33.831	4.461
1953	5.028	2.947	37.857	4.941
1954	7.452	5.125	32.122	5.912
1955	10.425	7.411	30.530	5.976
1956	13.178	10.059	34.946	5.314
1957	16.606	13.239	35.775	5.565
1958	18.676	15.259	39.919	6.602
1959	20.534	16.464	39.651	6.674
1960	28.361	20.812	53.648	8.195
1961	41.441	27.284	54.577	10.135
1962	49.099	30.638	23.298	5.549
1963	58.784	33.004	20.756	4.260
1964	66.708	34.621	16.898	4.247
1965	82.741	37.674	17.420	2.355
1966	84.120	38.029	18.383	2.504
1967	92.450	40.694	44.897	8.893
1968	98.457	43.381	44.507	12.499
1969	114.087	48.711	66.211	18.091
1970	133.137	55.771	79.811	20.868

	(45) TI	(46) RO	(47) X*=M*	(48) BPT*
1951	14.937	19.817	128.000	121.000
1952	14.856	14.513	-251.000	-263.000
1953	13.083	19.832	-121.000	-117.000
1954	11.479	14.730	-29.000	-28.000
1955	10.520	14.034	103.000	106.000
1956	10.757	18.875	-159.000	-156.000
1957	10.569	19.640	-85.000	-70.000
1958	12.223	21.094	-65.000	129.000
1959	10.245	22.731	25.000	165.000
1960	15.784	29.668	-84.000	99.000
1961	17.935	26.507	-521.000	-167.000
1962	8.444	9.304	-248.000	-128.000
1963	9.133	7.362	-228.000	-105.000
1964	8.030	4.621	-230.000	-102.000
1965	12.864	2.200	-248.000	23.000
1966	14.731	4.849	-176.000	-2.000
1967	22.261	21.006	-320.000	21.000
1968	22.571	14.684	-287.000	-8.000
1969	29.484	19.903	-394.000	-55,000
1970	36.012	29.123	-390.000	39.000

Table 32-(7) Data Table -- Endogenous

	(49) F*	(50) RICEC	(51) RICER	(52) X**
1951	445.000	6,597.000	6,223.671	0.000
1952	237.000	7,243.000	6,641.699	0.000
1953	116.000	7,511.000	7,313,071	0.000
1954	96.000	7,915.000	7,831.615	801.000
1955	171.000	7,456.000	7,504.847	881.000
1956	81.000	8,185.000	7,601.775	843.000
1957	51.000	8,014.000	7,631.987	848.000
1958	188.000	8,499.001	7,979.035	647.000
1959	276.000	8,706.001	8,294.000	817.000
1960	289.000	9,537.001	8,767.199	881.000
1961	122.000	8,850.001	8,268.052	766.000
1962	94.000	9,237.001	8,897.875	711.000
1963	-16.000	8,243.001	7,943.363	616.000
1964	-49.000	9,315.001	8,419.683	632.000
1965	-73.000	9,466.001	8,877.335	634.000
1966	-77.000	9,411.001	9,339.251	714.000
1967	-78.000	8,900.001	9,047.064	770.000
1968	-95.000	10,692.001	10,166.000	872.000
1969	-86.000	10,879.001	10,641.279	995.000
1970	-51,000	12,299.001	11,993.279	1,173.000

	(53) M**	(54) XO*XM*	(55) XOT*	(56) E3
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	8.121	0.198	0.000
1954	611.000	8.512	0.112	0.000
1955	499.000	6.912	0.097	0.000
1956	744.000	8.331	0.082	0.000
1957	652.000	9.966	0.100	0.000
1958	487.000	10.771	0.058	0.000
1959	582.000	7.514	0.112	0.000
1960	749.000	17.195	0.209	1,653.000
1961	1,056.000	21.788	0.144	1,856.000
1962	737.000	19.306	0.114	1,884.000
1963	562.000	20.479	0.169	1,846.000
1964	590.000	22.980	0.445	2,059.000
1965	610.000	24.935	0.860	2,014.000
1966	604,000	19.406	2.612	2,085.000
1967	805,000	24.536	2.417	2,153.000
1968	831.000	27.392	6.084	2,344.000
1969	993.000	35.092	8.234	2,677.000
1970	1,096.000	39.089	3.614	2,944.000

Table 32-(8) Data Table – Endogenous

	(57) E4	(58) E5	(59) E6&7	(60) ET
1951	0.000	0.000	0.000	0.000
1952	0.000	0.000	0.000	0.000
1953	0.000	0.000	0.000	0.000
1954	0.000	0.000	0.000	0.000
1955	0.000	0.000	0.000	0.000
1956	0.000	0.000	0.000	0.000
1957	0.000	0.000	0.000	0.000
1958	0.000	0.000	0.000	0.000
1959	0.000	0.000	0.000	0.000
1960	47.000	961.000	5,378.000	31,636.003
1961	51.000	961.000	6,011.000	32,977.007
1962	55.000	712.000	5,880.000	33,325.007
1963	73.000	729.000	5,783.000	32,182.003
1964	17.000	426.000	8,163.000	35,598.007
1965	17.000	427.000	8,278.001	36,086.007
1966	17.000	438.000	8,261.001	37,432.007
1967	23.000	420.000	8,608.001	37,228.007
1968	24.000	458.000	8,857.001	39,652.007
1969	27.000	466.000	9,413.001	41,015.007
1970	30.000	491.000	9,803.001	43,058.007

	(61) L	(62) N	(63) GTREAL	(64) Y3
1951	0.000	787.400	35.299	0.000
1952	0.000	803.300	41.505	0.000
1953	0.000	819.700	43.618	0.000
1954	0.000	836.800	41.937	0.000
1955	0.000	854.400	35.015	0.000
1956	0.000	872.700	37.907	0.000
1957	0.000	891.600	44.537	0.000
1958	0.000	911.200	60.571	0.000
1959	0.000	931.500	57.522	0.000
1960	33,500.007	951.300	60.544	32.600
1961	34,578,007	973.900	77.650	36.600
1962	34,920.007	996.600	38.432	37.100
1963	35,840.007	1,020.100	42.222	36.400
1964	36,760.007	1,044.500	40.627	35.900
1965	37,680.007	1,069.700	45.808	35.600
1966	38,600.007	1,095.900	41.170	36.300
1967	39,640.007	1,123.100	46.300	37.500
1968	40,680.007	1,151.300	44.507	40.800
1969	41,720.007	11,80.500	66.192	46.600
1970	43,800.007	1,210.900	78.573	51.100

Table 32-(9) Data Table – Endogenous

	(65) E1	(66) E2
1951	0.000	0.000
1952	0.000	0.000
1953	0.000	0.000
1954	0.000	0.000
1955	0.000	0.000
1956	0.000	0.000
1957	0.000	0.000
1958	0.000	0.000
1959	0.000	0.000
1960	23,146.003	451.000
1961	23,516.003	582.000
1962	24,303.003	491.000
1963	23,401.003	350.000
1964	24,574.003	359.000
1965	24,831.003	519.000
1966	26,037.003	594.000
1967	25,504.003	520.000
1968	27,358.003	611.000
1969	27,632.003	800.000
1970	28,810.003	980.000