

THE PATTERN OF TRIANGULAR TRADE AMONG THE U.S.A., JAPAN, AND SOUTHEAST ASIA*

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I. PROBLEM

IT is possible to classify commodities traded internationally into natural-factor-intensive, labour-intensive and capital-intensive goods. In line with the theory of factor endowments (Heckscher-Ohlin theorem), it is also possible¹ to identify the pattern of international trade between two countries or between a country and the rest of the world as to whether it is determined by the relative abundance either of natural factors, skilled labour, or capital.

In this paper, we classify commodities into eight categories so as to correspond to differences in the determinants of comparative advantage, and using 1956-58 averages, find some interesting patterns of triangular trade in these eight commodities among the U.S.A., Japan, and Southeast Asia. By examining these trade patterns from a few theoretical points of view, we see some of their defects and difficulties, and thus we may suggest directions for improving them.

First, we depict the commodity composition of total exports and total imports of the U.S.A., Japan, and Southeast Asia respectively. This shows the pattern of comparative advantage of each country in relation to the rest of the world or, in brief, global comparative advantage. It is interesting that the outcome corresponds almost exactly to what we anticipated theoretically.

Second, we calculate the commodity composition of three sets of bilateral trade, i.e., U.S.A. and Southeast Asia, U.S.A. and Japan, and Japan and Southeast Asia. This shows the pattern of comparative advantage between two countries, or let us say, bilateral comparative advantage, which differs substantially from, though it depends basically upon, the pattern of global comparative advantage of each country. The difference between the two kinds of comparative advantage tells us that bilateral trade brings about either a more or less intensive relationship than the trade of a particular country in respect to the rest of the world. We may expect theoretically

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¹ It should be assumed that the order of intensity of a given factor of production for each commodity is the same in every country.

that a particular bilateral trade should be either more or less intensive according to the complementarity or similarity of the structure of industry and trade of the two countries, their geographical closeness, historical relations, etc. If the facts are different from, and opposite to, this theoretical expectation, we may find there defects and difficulties in the particular bilateral trade, and we must investigate the manner of correcting them.

Third, a clearer understanding of the defects and difficulties in the pattern of triangular trade is obtained, on the one hand, by dividing the three sets of bilateral trade into cases of strong comparative advantage (complete specialization) and those of reciprocal comparative advantage (incomplete horizontal specialization), and, on the other hand, by calculating a convenient coefficient which we call "intensity of trade".

It is hoped that the basic survey of triangular trade here presented will result in, as we attempted in the last section, a concrete proposal for building harmonious and expanding triangular trade among the U.S.A., Japan, and Southeast Asia, and for creating ways and means of an orderly adjustment of their trade and industrial structure. Remedies should differ according to the different kinds of trade and the determinants of comparative advantage.

II. STATISTICAL DATA

Statistical data are shown in the appendix, and their summary and other important indices are shown in Table 1. As can be seen in the appendix, we reclassify the SITC (Standard International Trade Classification) three digit classification into eight categories.

The comparative advantage of a country's N-goods is supposed to be determined mainly by the relative abundance of natural factors such as land and other natural resources, fertility, suitable climate, etc. N-goods are subdivided into four groups:

1. N_1 -goods: staple foods (rice, wheat, and other grains).
2. N_2 -goods: other foodstuffs, including manufactured goods.
3. N_3 -goods: agricultural raw materials.
4. N_4 -goods: minerals, metals, and fuels.

The comparative advantage of a country's L-goods is supposed to be determined by the relative abundance of labour with appropriate skills and the cheapness of its wages compared to its efficiency.

5. L_1 -goods: labour-intensive goods of light industry, both intermediate and final products.
6. L_2 -goods: labour-intensive final goods of heavy and chemical industry origin (cameras, sewing machines, bicycles,

Table 1. IMPORTANT INDICES

a. U.S.A.		Unit: million dollars (average of 1956-58)									
		Notation	N_1	N_2	N_3	N_4	L_1	L_2	C_1	C_2	Total
1. Total U.S. exports		X_a	1,349.5	1,329.8	1,770.7	1,962.5	1,943.4	1,251.6	2,504.6	6,567.7	18,679.8
Composition of total exports(%)		x_a	7.2	7.1	9.5	10.5	10.4	6.7	13.4	35.2	100.0
2. U.S. exports to Japan		X_{ab}	124.5	21.5	315.0	357.7	17.4	32.6	198.6	181.0	1,248.3
Composition of exports to Japan(%)		x_{ab}	10.0	1.7	25.2	28.7	1.4	2.6	15.9	14.5	100.0
Intensity of U.S. exports to Japan(%)		I_{ab}	110	28	79	92	108	173	142	181	100
Concentration of U.S. exports to Japan(%)		X_{ab}/X_a	9	2	18	18	1	3	8	3	6.7
Concentration of Jap. imports from U.S.(%)		X_{ab}/M_b	39	10	28	33	39	64	51	65	35.6
3. U.S. exports to S.E. Asia		X_{ac}	303.3	128.2	129.6	45.3	165.3	89.3	179.8	362.9	1,403.7
Composition of exports to S.E. Asia(%)		x_{ac}	21.6	9.1	9.2	3.2	11.8	6.4	12.8	25.9	100.0
Intensity of U.S. exports to S.E. Asia(%)		I_{ac}	179	239	167	100	69	73	60	91	100
Concentration of U.S. exports to S.E. Asia(%)		X_{ac}/X_a	22	10	7	2	9	7	7	6	7.5
Concentration of S.E. Asian imp. from U.S.(%)		X_{ac}/M_c	48.1	65.4	45.0	27.2	18.7	19.5	16.3	24.5	27.0
4. Total imports of U.S.		M_a	76.1	3,335.0	1,430.0	2,464.7	1,945.9	377.5	1,901.6	861.3	12,392.1
Composition of total imports(%)		m_a	0.6	26.9	11.5	19.9	15.7	3.0	15.3	7.0	100.0
b. Japan			N_1	N_2	N_3	N_4	L_1	L_2	C_1	C_2	Total
1. Total Japanese exports		X_j	2.3	197.7	107.2	10.6	1,240.1	162.3	379.0	565.1	2,664.3
Composition of total exports(%)		x_j	0.1	7.4	4.0	0.4	46.5	6.1	14.2	21.2	100.0
2. Japanese exports to U.S.		X_{ba}	0.2	67.2	40.1	2.3	346.1	59.7	48.9	46.0	610.5
Composition of exports to U.S.(%)		x_{ba}	0.03	11.0	6.6	0.38	56.7	9.8	8.0	7.5	100.0
Intensity of Jap. exports to U.S.(%)		I_{ba}	5	41	57	2	361	316	52	107	100
Concentration of Jap. exp. to U.S.(%)		X_{ba}/X_j	9	34	37	22	28	37	13	8	23
Concentration of U.S. imp. from Jap.(%)		X_{ba}/M_a	0.3	2.0	2.8	0.1	17.8	15.8	2.6	5.3	4.9
3. Japanese exports to S.E. Asia		X_{bc}	0.5	27.8	10.1	6.8	367.3	48.1	231.4	139.1	831.1
Composition of exp. to S.E. Asia(%)		x_{bc}	0.06	3.3	1.2	0.82	44.2	5.8	27.8	16.7	100.0
Intensity of Jap. exp. to S.E. Asia(%)		I_{bc}	0.5	87	22	26	260	66	131	59	100
Concentration of Jap. exp. to S.E. Asia(%)		X_{bc}/X_j	22	14	9	64	30	30	61	25	31
Concentration of S.E. Asian imp. from Jap.(%)		X_{bc}/M_c	0.1	14.2	3.5	4.1	41.6	10.5	21.0	9.4	16.0
4. Total Japanese imports		M_j	320.7	213.1	1,113.3	1,094.4	45.0	50.9	391.7	280.0	3,509.1
Composition of total imports(%)		m_j	9.1	6.1	31.7	31.2	1.3	1.5	11.2	8.0	100.0
c. Southeast Asia *			N_1	N_2	N_3	N_4	L_1	L_2	C_1	C_2	Total
1. Total exports of Southeast Asia		X_c	170.9	987.3	1,866.0	698.6	536.2	10.9	32.4	12.4	4,314.7
Composition of total exports(%)		x_c	4.0	22.9	43.3	16.2	12.4	0.2	0.8	0.3	100.0
2. S.E. Asian exports to U.S.		X_{ca}	0.2	236.9	451.5	114.9	129.0	3.7	7.0	2.3	945.5
Composition of exports to U.S.(%)		x_{ca}	0.02	25.1	47.8	12.2	13.6	0.39	0.74	0.24	100.0
Intensity of S.E. Asian exp. to U.S.(%)		I_{ca}	3	93	416	61	87	13	5	3	100
Concentration of S.E. Asian exp. to U.S.(%)		X_{ca}/X_c	0.1	24	24	16	24	34	22	19	22
Concentration of U.S. imp. from S.E. Asia(%)		X_{ca}/M_a	0.3	7.1	31.6	4.7	6.6	1.0	0.4	0.3	7.6
3. S.E. Asian exports to Japan		X_{cb}	58.0	58.2	255.5	192.5	3.8	0.2	2.2	1.0	571.4
Composition of exports to Japan(%)		x_{cb}	10.2	10.2	44.7	33.7	0.67	0.04	0.39	0.18	100.0
Intensity of S.E. Asian exp. to Japan(%)		I_{cb}	112	167	141	108	52	3	3	2	100
Concentration of S.E. Asian exp. to Jap.(%)		X_{cb}/X_c	34	6	14	28	0.7	2	7	8	13
Concentration of Jap. imp. from S.E. Asia(%)		X_{cb}/M_b	18	27	23	18	8	0.6	1	0.6	16.3
4. Total imports of S.E. Asia		M_c	631.0	195.9	287.8	166.3	882.1	458.4	1,102.3	1,478.9	5,202.7
Composition of total imports(%)		m_c	12.1	3.8	5.5	3.2	17.0	8.8	21.2	28.4	100.0

* Formosa, Hong Kong, South Korea, Burma, Ceylon, India, Pakistan, Malaya, Indo-China (Viet Nam, Laos, Cambodia), Indonesia, the Philippines and Thailand

Note: Compiled from the Statistical Appendix at the end of this article.

precision type equipment, medicine, etc.).

The comparative advantage of a country's C-goods is supposed to be determined by the abundance of capital stocks, which are usually accompanied by a high quality of technology.

7. C_1 -goods: capital-intensive intermediate goods of heavy and chemical industry origin (pig-iron, steel, chemical fibre, fertilizer, etc.).

8. C_2 -goods: capital-intensive heavy machines and equipment.

The classification should be done carefully and exactly, but it is difficult and it is not possible to get rid of all arbitrariness. For example, L_2 -goods, which are relatively new goods and will be promising exports for Japan, cannot be accounted in statistics separately from other machines. Their number and amount in trade are underestimated. There is also a problem in that some manufactured food is included in N_2 -goods. A more careful classification would, therefore, be needed.

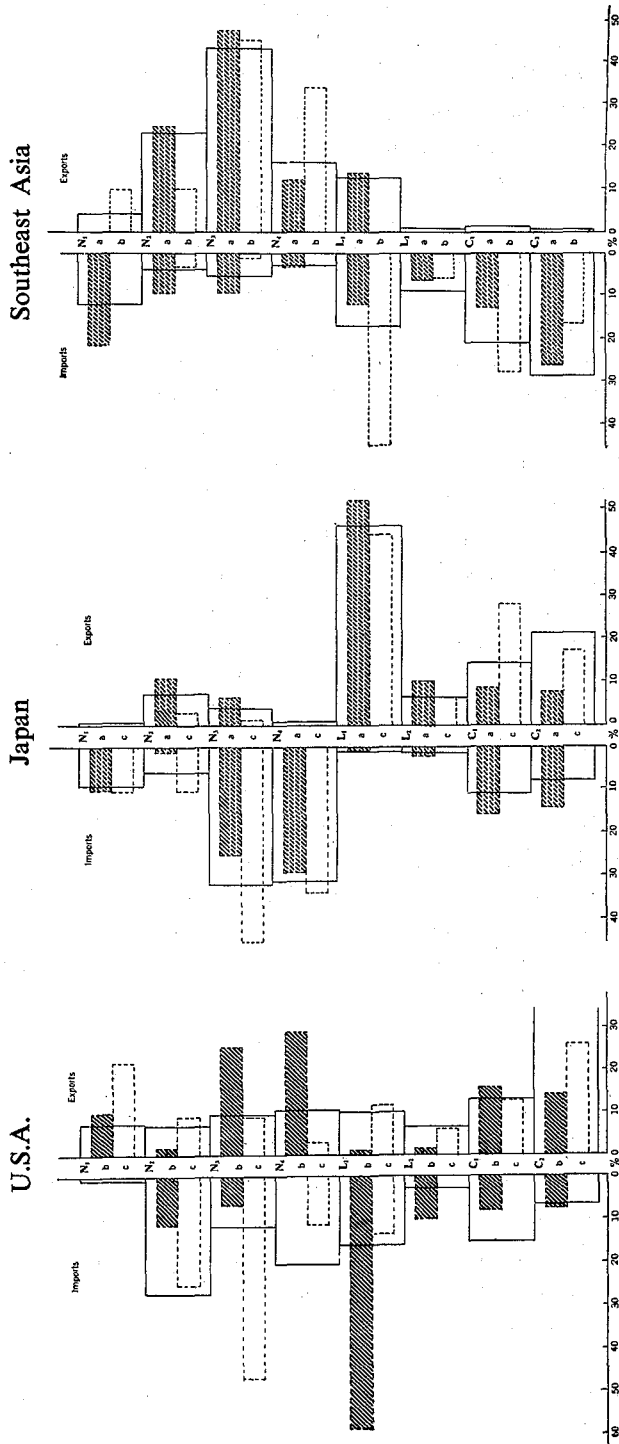
For our study, a trade matrix for each commodity among exporting and importing countries is needed. The Institute of Asian Economic Affairs, in *Asian Trade Statistics* (Tokyo, 1961), provides us with the trade matrix for fourteen Southeast Asian countries¹ (Formosa, Hong Kong, South Korea, Burma, Ceylon, India, Pakistan, Malaya, Indo-China [Viet Nam, Laos, Cambodia], Indonesia, Philippines, and Thailand), as well as Japan and U.S.A. It covers only the years 1956-58. In this paper, therefore, the average of these three years is used in the hope of lessening the influence of trade fluctuations due to business cycles. Trade of Asian countries with the U.S.A. and Japan is estimated from statistics of the latter countries and, therefore, Asian exports to them are overvalued at CIF price while Asian imports from them are undervalued at FOB price. Other necessary trade figures are supplemented from United Nations, *Commodity Trade Statistics*.

III. GLOBAL COMPARATIVE ADVANTAGE OF EACH COUNTRY

In Figure 1, the solid lines show the commodity composition of total exports on the right side and that of total imports on the left side for the U.S.A. (country *a*), Japan (country *b*), and Southeast Asia (country *c*) respectively. This can be seen as the reflection of comparative advantage of each country in relation to the rest of the world, or, in brief, the global comparative advantage.

¹ In our analysis these fourteen Asian countries are treated *in toto* and called the Southeast Asian Country.

Figure 1. COMMODITY COMPOSITION OF TRADE



Note: a=U.S.A., b=Japan, c=Southeast Asia Source: Table 1.

In the U.S.A., first, both exports and imports are well diversified among all commodity groups and are not concentrated in a few commodities. This shows that the American economy is of the non-international specialization type and, moreover, is of the self-sufficiency type, in view of the very small import/GNP ratio.

Second, in the commodity composition of exports, the top category is small, increasing gradually¹, and the largest is at the bottom, while the composition of imports has a reverse shape, if we exclude N_1 -goods. This tells us that, although the American economy is of the non-international specialization type, it has strong comparative advantage in C_2 - and C_1 -goods, strong comparative disadvantage in N_2 -, N_3 - and N_4 -goods, and reciprocal comparative advantage² in L_1 - and L_2 -goods. This reflects fairly well the global comparative advantage of the U.S., and coincides with what we expected from the theory of factor endowments. The exception is the fact that imports of N_1 -goods are negligible and their exports fairly large.

In Japan, exports are concentrated in L_1 -goods (46.5%), and imports in N_3 - and N_4 -goods (31.7% and 31.2%). Japan has a strong comparative advantage in labour-intensive goods and strong comparative disadvantage in primary products. She is an industrial country of the international specialization type. We have to recognize that Japanese exports of C_1 - and C_2 -goods reach a fairly large amount but at the same time she imports them also in fairly large amount. This is a reflection of horizontal specialization within the same commodity category. The same kind of specialization can be seen on a smaller scale in N_2 -goods.

In Southeast Asia, exports are concentrated in N_3 -, N_2 - and N_4 -goods and imports are concentrated in C_2 -, C_1 - and L_1 -goods. Southeast Asia is clearly a primary products producer of the international specialization type. The whole shape of the figure is roughly the reverse of the U.S. figure. Asia's strong comparative advantage is in primary products while its strong comparative disadvantage is in manufactured goods. An important exception is the fact that Asia imports a large amount of N_1 -goods (staple food) in spite of the fact that they are agricultural countries. This is really a dilemma in Asia. Asia seems to have reciprocal comparative advantage in L_1 -goods, although its exports include some Japanese goods through Hong Kong.

In short, there is in the pattern of global comparative advantage a characteristic difference: U.S. trade is much diversified, while the trade

- ¹ The share of L_2 -goods is exceptionally small, both in exports and imports, but this is due to the difficulty of classification.
- ² Reciprocal comparative advantage means that a country has comparative advantage as well as disadvantage in a certain commodity. This is a reflection of horizontal international specialization within the same commodity category.

of Japan and Southeast Asia is specialized in a few commodities. The cumulative percentages of the three largest categories of commodities amount to 59.1% in the U.S., 81.9% in Japan, and 82.4% in Southeast Asia in exports, and 62.5%, 74.1%, and 66.6% respectively in imports. The U.S. is of the non-international specialization type, while Japan and Southeast Asia are of the international specialization type in manufacturing industry and in primary production respectively. Furthermore, a strong comparative advantage is found in capital-intensive goods in the U.S., labour-intensive goods in Japan, and natural-factor-intensive goods in Southeast Asia. We believe that this is a good reflection of the global comparative advantage of three countries.

IV. BILATERAL COMPARATIVE ADVANTAGE IN TRIANGULAR TRADE

What pattern of triangular trade among the U.S.A., Japan, and Southeast Asia can be anticipated theoretically from the global comparative advantage of these three countries?

First, trade between Japan and Southeast Asia should be most harmonious and intensive, since both countries specialize in different lines, and are complementary to each other.

Second, trade between America and Southeast Asia may also be harmonious since the shape of global comparative advantage is mutually complementary, but it may be hindered by the much diversified export pattern of the U.S.

Third, trade between the U.S. and Japan may not be harmonious, but rather competitive, since both are industrial countries.

Such expectations are based upon a simple comparative advantage theory for vertical specialization in primary products vs. manufactures. Later, we will have to take into consideration the more complex horizontal specialization within the same commodity category.

What is the actual character of triangular trade? In Figure 1, the commodity composition of trade of a country with a certain partner is shown in dotted lines. This shows bilateral comparative advantage. For example, American exports to Japan (trade $a \rightarrow b$) can be seen both on the exports (right) side of the American figure and on the imports (left) side of the Japanese figure. The bilateral comparative advantage should be compared with the global comparative advantage. The divergence between them will tell merits and defects of triangular trade.

1. *Trade between the U.S. and Southeast Asia*

In Asian imports from the U.S. (trade $a \rightarrow c$), the percentage share of all N-goods exceeds that of Asia's global imports, while the percentage share of all manufactures is less than that of Asia's global imports. This is also shown in the American exports to Asia in the same way, but not so clearly as above. In American imports from Asia (trade $c \rightarrow a$), only the percentage share of N_3 exceeds the global pattern but all other imports are less than the global figure. Therefore, the bilateral comparative advantage of Asia in respect to America is weakened or rather reversed by its global comparative advantage. Trade between the U.S. and Asia is unexpectedly disharmonious. First, since Asia is composed of agricultural countries, it should not import N_1 -goods (staple food) from the U.S., but it ought to export them. Second, America, instead of exporting so many primary goods to Asia, should rather increase their import. Third, America should, instead, increase the exports of manufactures, especially capital-intensive goods.

2. *Trade between Japan and Southeast Asia*

Trade $c \rightarrow b$ is, as we expected, the most harmonious and intensive. Asian exports to Japan are concentrated in four N-goods, and their share exceeds Asia's pattern of global comparative advantage as well as Japan's pattern of global comparative disadvantage. In this point, the bilateral comparative advantage between Japan and Southeast Asia is more intensive than the global comparative advantage.

Problems are found in Japan's exports to Asia (trade $b \rightarrow c$). First, Japanese exports are too concentrated in L_1 -goods, of which Asia intends in the near future to expand the production and exports. Second, among the other three manufactures, only in C_1 -goods does Japan obtain a greater bilateral share than the global share; but this is not the case in C_2 - or L_2 -goods. Thus, Japan should shift and diversify her exports to Southeast Asia from textiles to other goods produced by the heavy and chemical industries.

3. *Trade between Japan and the U.S.*

Japan's imports of N-goods from the U.S. except N_1 (trade $a \rightarrow b$) are less than the global pattern, but they are a fairly large amount and quite competitive with Japan's imports from Southeast Asia. As for the U.S., its exports of N-goods, except N_2 , to Japan very much exceed its global

comparative advantage. This means that Japan is depending upon the U.S. in the import of commodities of America's global disadvantage. Japan should shift her imports of primary products from the U.S. to Asia.

In its exports to the U.S. (trade $b \rightarrow a$), Japan concentrates too much on L_1 -goods, as in the exports to Asia. Japan's bilateral comparative advantage in regard to America is stronger than her global advantage only in L_1 - and L_2 -goods. In C_1 - and C_2 -goods, Japan's bilateral advantage is weak and she imports more from, than she exports to, the U.S. We have to expand this kind of horizontal specialization within the same category of C_1 - or C_2 -goods, so that a balance is maintained.

In the above, by comparing the bilateral comparative advantage of each country with its global comparative advantage, we have roughly located the defects and difficulties which should be remedied in the triangular trade among the U.S.A., Japan, and Southeast Asia. We must try to illuminate those defects from different aspects and to suggest some policies for improvement.

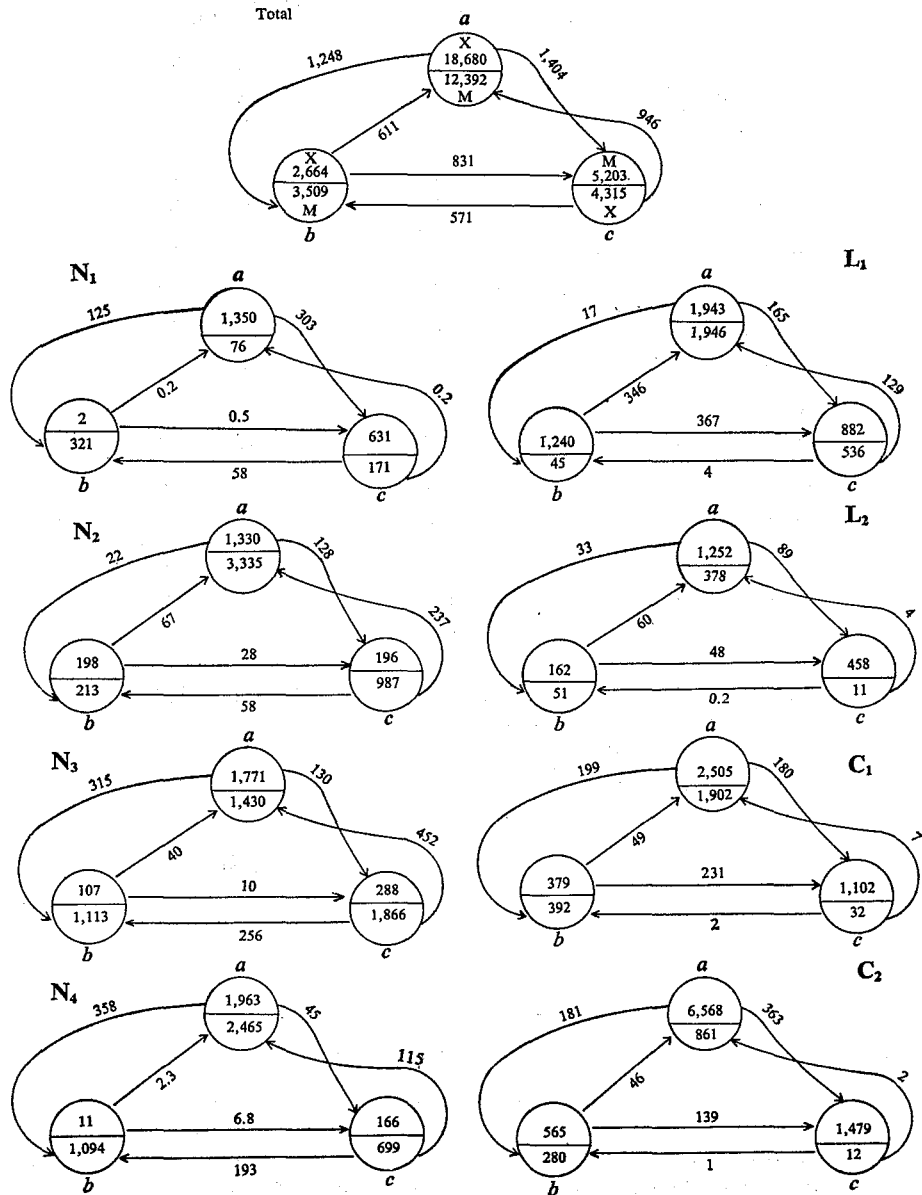
V. COMPLETE VS. RECIPROCAL SPECIALIZATION

In Figure 2, the three countries' total amount of exports and imports in total trade and in each of the eight commodities is shown in circles, and trade between two countries by arrows. In the circle, we can see whether a country is, in a given commodity, a net exporter or net importer with respect to the rest of the world. By the arrow, we can see whether a country is, in a given commodity, a net exporter or net importer with respect to a particular country. In a sense, Figure 2 shows the whole picture of triangular trade.

There are three bilateral trade relationships for each of the eight commodities, and the total amounts to 24 cases. If country i 's exports to country j (i and $j = a, b, c$, but $i \neq j$) are large, while the opposite exports from j to i are negligibly small, say, less than a quarter of the former, we may judge that country i is specialized in exports while country j is specialized in imports for this particular bilateral trade. In other words, they are in complete specialization either in exports or imports. If two countries export to each other a fairly large amount of a certain commodity, or, to put it more exactly, if country j 's export to country i is more than a quarter of i 's export to j , let us say that they are in reciprocal specialization. The complete specialization stems from the fact that one of two countries has strong comparative advantage and the other is in strong comparative disadvantage in a certain commodity, and there is little room for improvement by policy. Reciprocal specialization is a re-

flection either of competitive relationship or of horizontal specialization within the same category of commodity, and there remains much room for improvement by policy or mutual adjustment.

Figure 2. TRIANGULAR TRADE BY COMMODITY



Note: *a*=U.S.A., *b*=Japan, *c*=Southeast Asia. Source: Table 1

As shown in Table 2, complete specialization accounts for 15 cases out of 24 cases of bilateral trade.¹ As a summary of Table 2, we obtain

Table 2. CASES OF COMPLETE SPECIALIZATION

Cases	Exports of Country Specialized in Export (\$ Million)	Imports of Country Specialized in Import (\$ Million)
1 $N_1, a \rightarrow c$	<i>a.</i> 303	<i>c.</i> 0.2
2 $N_1, a \rightarrow b$	<i>a.</i> 125	<i>b.</i> 0.2
3 $N_1, c \rightarrow b$	<i>c.</i> 58	<i>b.</i> 0.5
4 $N_3, a \rightarrow b$	<i>a.</i> 315	<i>b.</i> 40
5 $N_3, c \rightarrow b$	<i>a.</i> 256	<i>b.</i> 10
6 $N_4, a \rightarrow b$	<i>a.</i> 358	<i>b.</i> 2.3
7 $N_4, c \rightarrow b$	<i>c.</i> 193	<i>b.</i> 6.8
8 $L_1, b \rightarrow c$	<i>b.</i> 367	<i>c.</i> 4
9 $L_1, b \rightarrow a$	<i>b.</i> 346	<i>a.</i> 17
10 $L_2, a \rightarrow c$	<i>a.</i> 89	<i>c.</i> 4
11 $L_2, b \rightarrow c$	<i>b.</i> 48	<i>c.</i> 0.2
12 $C_1, b \rightarrow c$	<i>b.</i> 231	<i>c.</i> 2
13 $C_1, a \rightarrow c$	<i>a.</i> 180	<i>c.</i> 7
14 $C_2, a \rightarrow c$	<i>a.</i> 363	<i>c.</i> 2
15 $C_2, b \rightarrow c$	<i>b.</i> 139	<i>c.</i> 1

Source: Table 1

Table 3. STRONG BILATERAL COMPARATIVE ADVANTAGE

Exporting Country \ Importing Country	<i>a</i>	<i>b</i>	<i>c</i>
<i>a</i>	—	N_3, N_4, N_1	L_2, C_2, L_1, C_1, N_3
<i>b</i>	L_1	—	L_2, C_2, C_1, L_1
<i>c</i>	Naught	N_3, N_4, N_1	—

Source: Table 2

¹ We have to take into account the fact that in total trade the U.S.A. has a great export surplus both to Japan and Asia while Japan has a smaller export surplus to Asia. This fact may affect our dichotomy of complete vs. reciprocal specialization in degree but not in direction.

Table 3, which shows which country has a strong bilateral comparative advantage over which country and in what commodity. Table 3 tells us concisely the problems of triangular trade.

First, Japan has a strong comparative advantage over the U.S. only in L_1 -goods, while she is in strong comparative disadvantage in N_4 -, N_3 - and N_1 -goods. Therefore, Japan is apt to fall into an import surplus from the U.S. Japanese exports to the U.S. are too much concentrated in L_1 -goods. Japan should diversify her strong advantages into other manufactures.

Second, Southeast Asia has no strong advantage commodity in regard to the U.S., while Asia's strong disadvantage is spread not only in such manufactures as C_2 -, C_1 -, and L_2 -goods, but also in N_1 (staple food). Asia should, first of all, overcome her disadvantage in N_1 -goods, and create and diversify strong comparative advantage in primary products and in some labour-intensive manufactures, by improving their productivity.

Third, in Japanese imports, both the U.S. and Southeast Asia have a strong advantage in the same primary products, i.e., N_4 -, N_3 -, and N_1 -goods. This means that the competitive relationship between the U.S. and Asia in these products is quite keen and serious.

Fourth, there is also another strong competitive relationship in the exports of the U.S. and Japan to Asia. Both countries have strong advantage in the same goods of C_2 , C_1 , and L_2 , in addition to America's N_1 - and Japan's L_1 -goods.

Fifth, the U.S. has a strong bilateral advantage in primary products (N_4 , N_3 and N_1) over Japan, and in manufactures (C_2 , C_1 and L_2)—and in N_1 too—over Asia. In other words, America has an overwhelmingly strong advantage in all kinds of commodities, either over Japan or South-

Table 4. CASES OF RECIPROCAL SPECIALIZATION
(Exports of Respective Country to the other Country, \$ Million)

1. N_2 . $c \cdot a$	c . 237	a . 128
2. N_2 . $b \cdot a$	b . 67	a . 22
3. N_2 . $c \cdot b$	c . 58	b . 28
4. N_3 . $c \cdot a$	c . 452	a . 130
5. N_4 . $c \cdot a$	c . 115	a . 45
6. L_1 . $a \cdot c$	a . 165	c . 129
7. L_2 . $b \cdot a$	b . 60	a . 33
8. C_1 . $a \cdot b$	a . 199	b . 49
9. C_2 . $a \cdot b$	a . 181	b . 46

Source: Table 1

east Asia. This seems to us to be one of the deep rooted causes of difficulties and disharmonies of triangular trade.

Reciprocal comparative advantage is found in 9 out of 24 cases of bilateral trade, as shown in Table 4. We can also gather from Figure 2 cases of dual trade in which country *a* is net importer from *b*, but country *a* is at the same time net exporter to *c* in respect of a certain commodity. Table 5 shows these dual trades, which amount to 8 cases.

Table 5. CASES OF DUAL TRADE

1. $N_{1,c}$	from <i>a</i>	0.2-303=	-302.8
	to <i>b</i>	58-0.5=	57.5
			-245.3
2. $N_{2,b}$	to <i>a</i>	67-22=	45
	from <i>c</i>	28-58=	-30
			15
3. $N_{3,a}$	to <i>b</i>	315-40=	275
	from <i>c</i>	130-452=	-322
			-47
4. $N_{4,a}$	to <i>b</i>	358-2.3=	355.7
	from <i>c</i>	45-115=	-70.7
			285.7
5. $L_{1,a}$	from <i>b</i>	17-346=	-329
	to <i>c</i>	165-129=	36
			-293
6. $L_{2,a}$	from <i>b</i>	33-66=	-27
	to <i>c</i>	89-4=	85
			58
7. $C_{1,b}$	from <i>a</i>	49-199=	-150
	to <i>c</i>	231-2=	229
			79
8. $C_{2,b}$	from <i>a</i>	46-181=	-135
	to <i>c</i>	139-1=	138
			3

Source: Table 1

It is interesting to find that, except the case of $N_{1,c}$, each dual trade in Table 5 involves necessarily one or two of the reciprocal comparative advantage cases. The reciprocal specialization occurs when country *a*'s comparative advantage, say, to country *b* is not overwhelmingly strong but is close for such large categories as the eight commodities adopted in this paper. Within the same commodity category, horizontal specialization is carried out¹. It can be expected that horizontal specialization is apt

¹ Concerning horizontal specialization within the same category commodity, see P. J. Verdoorn, "The Intra-Block Trade of Benelux," in Austin Robinson, ed., *The Economic Consequences of the Size of Nations*, (London: Macmillan & Co., 1960) pp. 291-332.

to occur on the same side in the comparative advantage of two countries, for example, in primary exports between the U.S. and Asia and in manufacturing exports between the U.S. and Japan. One of the two countries falls, however, in a relationship of complete specialization to a third country whose comparative advantage is very dissimilar and thus a dual trade occurs.

As we mentioned above, there is little room for improvement in the trade of complete specialization, except Asia's imports of N_1 from the U.S., but there remains much room for improvement in the trade of reciprocal specialization by policy or mutual adjustment. It can be said that the possibilities of improvement in triangular trade are concisely expressed in Tables 4 and 5. In order to bring about a more harmonious and balanced growth, we can conceive of two principles. One is to recognize reciprocal specialization and dual trade as undesirable, and to liquidate them in favour of complete specialization. The other is to accept the reciprocal and horizontal specialization within the same commodity category and to foster its bilateral balanced growth. Which is better depends upon the kinds of commodity and the determinants of comparative advantage.

First, as far as primary products are concerned, the first principle is desirable and necessary, for the determinant of their comparative advantage is the abundance of natural factors, which are not easily changed. Second, the second principle is desirable and necessary in the area of capital-intensive goods, since there remains wide room in those industries for gains from horizontal specialization, which realizes reciprocally the economies of scale in two countries. Third, the case of labour-intensive goods is in an intermediate position, and difficult to judge definitely. However, considering the fact that there is a large difference in wages among the U.S.A., Japan, and Southeast Asia, and that it will not narrow for a very long time, we cannot hope for the attainment of horizontal specialization. In the case where there is a large difference in the labour-capital endowment ratio between two countries, it is unavoidable that the capital-abundant country should specialize in capital-intensive goods and the labour-abundant country in labour-intensive goods.

From the above criteria, let us examine Tables 4 and 5 in order to find the direction for improvement in triangular trade.

First, the dual trade $N_{1,c}$ in Table 5 should be so changed that Southeast Asia will be a net exporter of staple food not only to Japan but also to the U.S. As we noticed repeatedly, it is irrational, and a paradox that agricultural countries like those of Southeast Asia import a large amount of staple food. For the same reason, the reciprocal specialization of "other foodstuff" between Asia and America (denoted in Table 4 by

$N_{2,c,a}$) should be so changed that Asia will specialize in exports to America.

Second, two reciprocal specializations denoted in Table 4 by $N_{2,b,a}$ and $N_{2,c,b}$ and one dual trade denoted in Table 5 by $N_{2,b}$ are rather complex. The complexity stems partly from the commodity classification of N_2 in which both raw and manufactured foodstuff are included. The horizontal specialization within category N_2 is desirable, since its real context is vertical specialization between primary products and manufactures.

Third, two reciprocal specializations, $N_{3,c,a}$ and $N_{4,c,a}$, and two dual trades, $N_{3,a}$ and $N_{4,a}$, stem from the fact that Asia's comparative advantage in N_3 - and N_4 -goods is not, though it should be, overwhelmingly strong in respect to the U.S. This factor should be improved so that Asia will specialize in exports of these goods while America in imports.

Fourth, concerning L_1 -goods, Asia's expansion of textile and other light industries is reflected in reciprocal specialization $L_{1,a,c}$, and dual trade $L_{1,a}$. Southeast Asia should promote further its textile industry, and become a net exporter to America, while America should specialize in imports both from Asia and Japan. Here is the important and complex problem of adjustment in textile industry among the U.S.A., Japan, and Southeast Asia.

Fifth, there is reciprocal specialization in labour-intensive final goods of heavy and chemical industry origin between Japan and the U.S. (denoted in Table 4 by $L_{2,b,a}$). Since L_2 -goods are most suited to Japan, she should be a strong net exporter of L_2 -goods both to Southeast Asia and the U.S.

Sixth, concerning capital-intensive goods, there are two reciprocal specializations, $C_{1,a,b}$ and $C_{2,a,b}$, but the Japanese position is still weak and characterized by a great import surplus, since her exports are just a quarter of American exports. Horizontal specialization within these goods between Japan and America should be expanded rapidly and kept in balance.

In short, it is desirable that Asia should have a strong comparative advantage in primary products both in regard to Japan and the U.S., that the U.S. should specialize in imports of labour-intensive goods from both Japan and Southeast Asia, and that the balanced growth of horizontal specialization in capital-intensive goods and, on a smaller scale, N_2 -goods should be promoted between Japan and the U.S. and in their exports to Southeast Asia.

VI. INTENSITY OF TRADE

As shown in Figure 3, we have calculated a coefficient, called "inten-

sity of (bilateral) trade,¹ which is a useful and precise indicator for finding the merits and defects of triangular trade between the U.S., Japan and Southeast Asia.

Intensity of country i 's exports of commodity h to country j (denoted by I_{ij}^h) is calculated as follows:

$$(1) \quad I_{ij}^h = \frac{i\text{'s exports of } h \text{ to } j}{i\text{'s total exports to } j} \quad \left(\text{denoted by } \frac{X_{ij}^h}{X_j^h} \right) \\ \div \frac{j\text{'s imports of } h}{j\text{'s total imports}} \quad \left(\text{denoted by } \frac{M_j^h}{M_j} \right) \times 100,$$

or, in other way,

$$(2) \quad I_{ij}^h = \frac{i\text{'s exports of } h \text{ to } j}{j\text{'s imports of } h} \quad \left(\text{denoted by } \frac{X_{ij}^h}{M_j^h} \right) \\ \div \frac{i\text{'s total exports to } j}{j\text{'s total imports}} \quad \left(\text{denoted by } \frac{X_j^h}{M_j} \right) \times 100,$$

where² i and j = country a , b , and c , but $i \neq j$; and h = N_1 , N_2 , ... C_2 -goods.

According to the first method of calculation, the composition of country i 's exports to country j (viz. X_{ij}^h / X_j^h) is compared with the composition of country j 's imports from the world (viz. M_j^h / M_j), which represents the structure of country j 's import demand³. Therefore, an intensity of trade of more than 100 shows that in a certain commodity, country i is more successful than in other commodities in adapting its export to country j , overcoming the competition of third countries. This is because of the two countries' closeness of complementarity, geographical distance, and historical relations. If the intensity is less than 100, on the other hand, it shows that the third countries are more successful in competition.

¹ "Intensity of trade" was first used, so far as we know, in A. J. Brown, *Applied Economics, Aspects of the World Economy in War and Peace*. (London: George Allen & Unwin Ltd., 1947) pp. 212-226.

² The necessary data are easily found in Table 1, except the last coefficient X_{ij} / M_j , which is shown in the last column (denoted by total) of the row of "concentration of j 's imports from i ".

³ Our main analytical method is to compare bilateral with global comparative advantage (or disadvantage), finding the difference between them, and to investigate causes of the difference. Intensity of trade here mentioned is the percentage ratio of bilateral to global comparative disadvantage, since X_{ij}^h / X_j^h represents bilateral comparative disadvantage of country j 's imports from country i , while M_j^h / M_j is global comparative disadvantage of country j 's imports from the rest of the world. We can also calculate the percentage ratio of bilateral to global comparative advantage or intensity of trade in respect to a country's exports. This is omitted, however, to avoid the complexity of description.

According to the second method of calculation, concentration of country j 's imports from country i by commodity (viz. X_{ij}^h/M_j^h), or, in other words, the different importance by commodity of country i 's exports to country j , is compared with the aggregate importance of country i 's exports to country j (viz. X_{ij}/M_j). Since the latter item is common to all commodities in this calculation, the intensity of trade is proportional to the former item (see Table 6). This means also that country i is either more or less successful in some exports to country j than in its average export strength.

Table 6. INTENSITY OF TRADE AND ASSOCIATED INDICES

(1) $b \rightarrow a$				(2) $a \rightarrow b$			
	Intensity of Trade I_{ij}	Composition of Partner's Imports m_j	Concentration of Imports to Partner X_{ij}/M_j		Intensity of Trade I_{ij}	Composition of Partner's Imports m_j	Concentration of Imports to Partner X_{ij}/M_j
L ₁	361	15.7%	17.8%	C ₂	181	8.0%	65%
L ₂	316	3.1	15.8	L ₂	173	1.5	64
C ₂	107	7.0	5.3	C ₁	142	11.2	51
N ₃	57	11.5	2.8	N ₁	110	9.1	39
C ₁	52	15.3	2.6	L ₁	108	1.3	39
N ₂	41	26.9	2.0	N ₄	92	31.2	33
N ₁	5	0.6	0.3	N ₃	79	31.7	28
N ₄	2	19.9	0.1	N ₂	28	6.1	10
(3) $b \rightarrow c$				(4) $c \rightarrow b$			
L ₁	260	17.0	41.6	N ₂	167	6.1	27
C ₁	131	21.0	21.0	N ₃	141	31.7	23
N ₂	87	3.8	14.2	N ₁	112	9.1	18
L ₂	66	8.8	10.5	N ₄	108	31.2	18
C ₂	59	28.4	9.4	L ₁	52	1.3	8
N ₄	26	3.2	4.1	C ₁	3	11.2	1
N ₃	22	5.5	3.5	L ₂	3	1.5	0.6
N ₁	0.5	12.1	0.1	C ₂	2	8.0	0.6
(5) $c \rightarrow a$				(6) $a \rightarrow c$			
N ₃	416	11.5	31.6	N ₂	239	3.8	65
N ₂	93	26.9	7.1	N ₁	179	12.1	48
L ₁	87	15.7	6.6	N ₃	167	5.5	45
N ₄	61	19.9	4.7	N ₄	100	3.2	27
L ₂	13	3.1	1.0	C ₂	91	28.4	25
C ₁	5	15.3	0.4	L ₂	73	8.8	20
C ₂	3	7.0	0.3	L ₁	69	17.0	19
N ₁	3	0.6	0.3	C ₁	60	21.0	16

We can expect a particular trade to be intensive or not from the complementarity or competitiveness of the pattern of bilateral comparative advantage. If the real situation is different from, or opposite to, our expectation, we must conclude that something is wrong, and invent adjustments to remedy the situation.

Let us look at Figure 3. First, the intensity of Southeast Asia's exports to the U.S. in primary products should be high, but it is unexpectedly low, except in N_3 -goods. The intensity of American exports to Asia in primary products should be low, but it is very high without exception. These situations should be reversed.

Second, the intensity of American exports to Asia should be low in primary products and high in manufactures. The situation is quite the opposite. The fact that the intensity of American exports to Asia in manufactures is not high, means that third countries are more successful in their exports to Asia than America and, therefore, that there remains a market in Asia for American manufactures, particularly in capital-intensive goods, if she shifts her exports to Southeast Asia from primary products to manufactures.

Third, the intensity of Japanese imports from Southeast Asia in primary products is, as we expected, high without exception. Japan should increase this intensity by reducing the intensity of her primary products imports from the U.S.

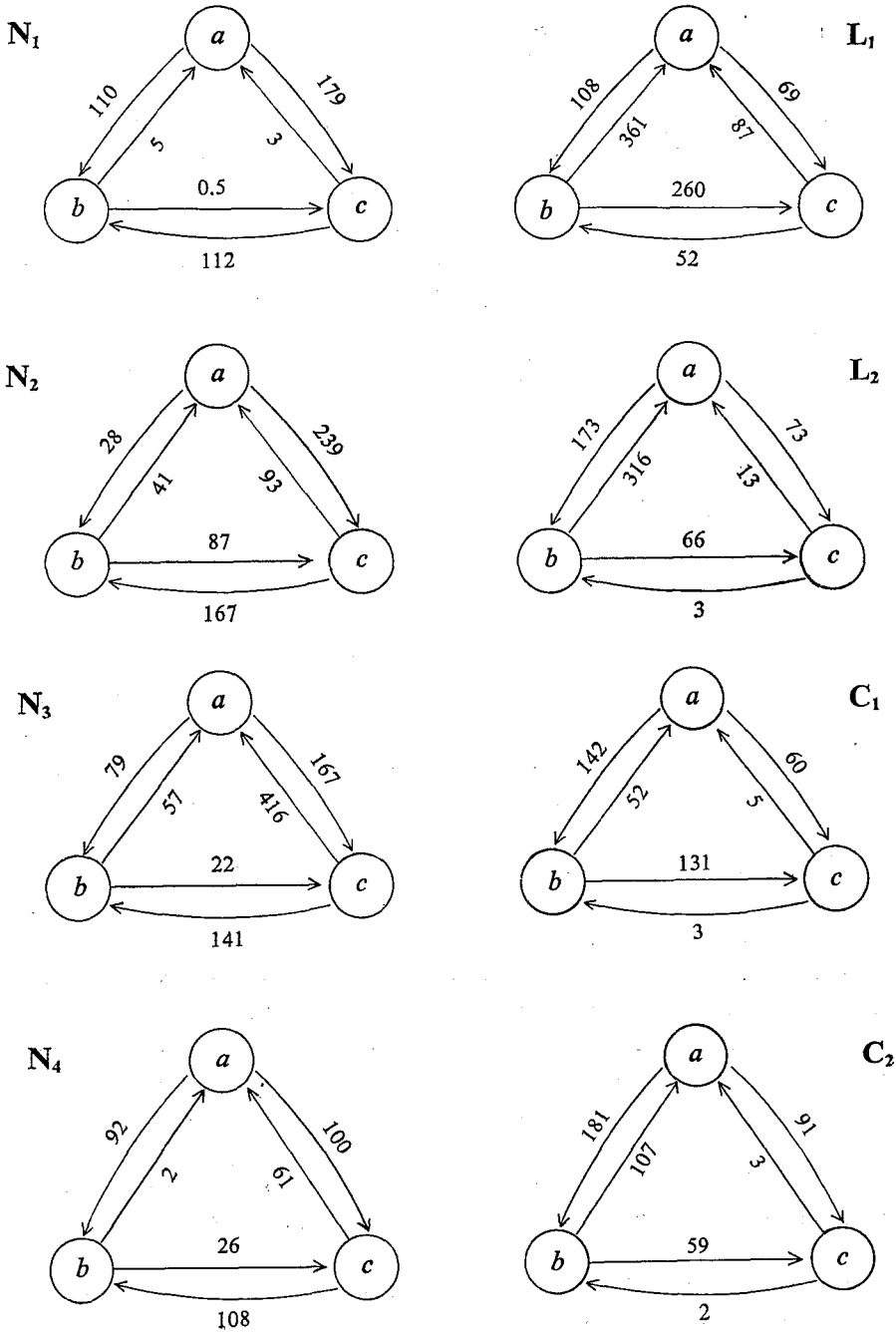
Fourth, the intensity of Japanese exports to Southeast Asia in manufactures is highest in L_1 -goods, and next in C_1 -goods, but, in the other two, L_2 and C_2 , less than 100. Japan should increase the latter three by decreasing the first.

Fifth, the intensity of Japanese imports from the U.S. in primary products is not as low as we expected. As mentioned in the third point above, this intensity should be reduced.

Sixth, both Japan's exports to and imports from the U.S. have a high intensity, with the exception of Japanese exports of C_1 . This reflects the expansion of horizontal specialization within the same category commodity between industrial countries. The high intensity of Japanese imports of L_1 - and L_2 -goods is not a serious problem because these imports are very limited. The intensity of Japanese exports is lower in capital-intensive goods than in labour-intensive goods. This is consistent with what we should expect from the large difference of labour/capital endowments between the two countries. Japan should endeavour to increase the exports of capital-intensive goods so as to equalize her intensity of exports relative to that of imports.

If Japan succeeds in keeping balanced the trade with the U.S. in

Figure 3. INTENSITY OF TRADE BY COMMODITY



Source: Table 1

capital-intensive goods, then she can also attain overall trade balance with the U.S. by covering her import surplus in primary products with her export surplus in labour-intensive manufactures.

In what commodity is it better and more worth-while for a country to expand exports to a certain partner country? It is certainly a commodity in which the partner country has greater and more increasing import demand than in other commodities. Let us compare the intensity of trade (denoted by I_{ij}) and the composition of the partner's imports (denoted by m_j) in Table 6. In almost all triangular trades, the intensity is high in those commodities for which the partner's demand is rather small. The only exception is Asian exports to Japan. We should try to increase the intensity of trade in those commodities for which the partner's demand is large and increasing.

VII. SUGGESTIONS FOR POLICY

We have examined the defective and difficult areas of triangular trade among the U.S.A., Japan, and Southeast Asia, from three different aspects, viz., the divergence between global and bilateral comparative advantage, complete vs. reciprocal specialization, and the intensity of trade. The problems boil down to the three intermingled trade relations.

First, the U.S. and Southeast Asia are competitive in their exports of primary products to Japan. The U.S. products have a stronger competitive power, and are superior in quality, delivery, etc. This tends to make Japan's trade liberalization result in an increase in imports of primary products from the U.S. and a decrease in imports from Southeast Asia. Thus, Japan's trade liberalization is apt to "turn its back" on Southeast Asia. Second, Japan, India, Hong Kong, Singapore and other Asian areas have to find a way for survival and growth in textile exports. Some adjustment in the competitive relations of textile industries between Japan and the Southeast Asian countries and between these countries and the U.S. appears to be necessary. Third, the problem of the kind of specialization necessary between the U.S. and Japan in the field of heavy and chemical industry products, and of the best allocation between them of exports to Southeast Asia must be solved.

One solution may be that the U.S. specializes in the export of capital-intensive manufactures by decreasing the exports of primary products and labour-intensive manufactures, while Japan and Southeast Asia specialize in the exports of labour-intensive manufactures and primary products respectively. This is the simplest solution based upon the theory of strong comparative advantage for vertical specialization. It may be too simple.

We have to add horizontal specialization for obtaining reciprocally the economies of scale. Horizontal specialization should be expanded, and is most needed in capital-intensive manufactures for reciprocal exports between the U.S. and Japan and for their exports to Asia, as well as in the exports of labour-intensive manufactures from Japan and Asia to the U.S.

We believe that the world economy must be further organized and advanced toward the accomplishing of an orderly adjustment step by step. As the less-developed countries endeavour to quicken industrialization, the advanced countries have to provide the less-developed countries with plenty of markets not only for primary goods but also for some manufactures. As for heavy and chemical industry products, there is another problem of how to formulate an international specialization for obtaining mutual and reciprocal economies of scale.

Expressed in a more concrete manner; first, voluntary adjustments of the industrial structure and the trade pattern of the U.S. is most desirable. The U.S. is, no doubt, the largest and the most advanced industrial country in the world, and she still has a great share in the export market for primary products, together with textile products. This hampers other countries' performance in international specialization. If the U.S. would curtail the production of primary and textile goods, it would give a greater market to the less-developed countries and Japan. Or, if the U.S. would keep the production of primary products and textile goods unchanged at the present level, it would allow the less-developed countries and Japan to export to the U.S. to meet increasing demand. We strongly recommend the abolition of the U.S. protectionist policy for the agriculture and textile industry. The U.S. should dynamically shift her industrial structure to the more profitable heavy and chemical industries as well as the service industries. As for the competition between Japan and Southeast Asia in textile exports, it can be said that there is ample room for adjustment if Japan places more weight in its exports on higher quality textile products. It will be desirable for Japan in the near future to rectify the heavy concentration of her exports on textiles and to provide Southeast Asia with a proper role in the textile industry. We are in favour of an international conference on textile trade to implement this.

Second, the primary industry of Southeast Asia, especially the productivity of rice culture, should be improved. Primary exports from Southeast Asia are more expensive than those from the U.S. because of very low productivity. Southeast Asia consists of primary goods producing countries, and yet they fall short of foodstuff, the importation of which constitutes a heavy pressure upon their balance of payments. Without

improvement in productivity of staple food, the national income cannot be raised. The economic development of less-developed countries is apt to tend toward industrialization, but the improvement of productivity of food should be given priority since it will be the most important factor in the economic development of Southeast Asia for the coming ten years or so.

Increase in population and a considerable increase in consumption per capita will double the demand for rice in Southeast Asia during the next twenty years. How to procure it is a serious problem. The increasing demand for rice should be met by the improvement of agricultural productivity through fertilizing and irrigation. The yield of rice per hectare in Japan is four tons or more, while in Korea and Formosa it is approximately three tons, and in the other areas the yield is as low as one ton or less than that. This ranking of productivity is obviously correlated to the quantity of fertilizer used, and the low productivity is mostly due to non-fertilizing. Doubling the yield in twenty years is feasible if chemical fertilizer is used. An international aid of fertilizer to the Southeast Asian countries should be promoted.

Third, as for the trade of heavy and chemical industry products between Japan and the U.S., and their exports to Southeast Asia, an agreed specialization within the same category of products should be expanded. Some goods can be manufactured at lower cost in Japan, if mass production is promoted. And in order to promote mass production the two countries should come to an agreement, reciprocally furnishing the other with markets. For this purpose, capital cooperation between Japan and the U.S. will play an important role. Capital cooperation would expand and secure mutual markets and obtain reciprocally the gains of mass production. It is also clear from our analysis that there remains an ample market for the exports of capital-intensive products from the U.S. and Japan to Southeast Asia, provided that they improve their triangular trade and invest aid and capital in the right direction.

(A statistical appendix is given on the following pages.)

STATISTICAL APPENDIX

GLOBAL AND BILATERAL EXPORTS AND IMPORTS BY COMMODITY

— U.S.A., JAPAN, AND SOUTHEAST ASIA —

(Million Dollars, average of 1956-58)

a : U.S.A.

c : Southeast Asia

b : Japan

T : Total amount

	Exports						Imports					
	aT	a→b	a→c	bT	b→a	b→c	cT	c→a	c→b	aT	bT	cT
N1	Staple food											
041	1,349.5	124.5	303.3	2.3	0.2	0.5	170.9	0.2	58.0	76.1	320.7	631.0
042	666.2	81.7	187.7	—	—	—	—	—	—	14.3	161.0	234.8
043	119.3	1.2	64.2	—	—	—	142.3	—	51.8	1.1	76.4	85.7
044	53.6	21.1	14.4	—	—	—	13.0	—	5.9	29.7	53.3	14.3
045	223.3	16.0	2.2	—	—	—	0.1	—	—	2.2	22.6	2.2
046	84.0	0.6	1.9	—	—	—	—	—	—	15.7	1.0	2.1
047	125.1	3.9	28.4	1.1	—	0.5	0.7	—	0.3	0.2	5.2	79.7
048	10.2	—	3.0	0.1	—	—	0.5	—	0.3	—	0.3	3.1
	27.8	—	1.5	1.1	0.2	—	1.3	0.2	—	12.9	0.9	13.6
N2	Other foodstuff											
001	1,329.8	21.5	128.2	197.7	67.2	27.8	987.3	236.9	58.2	3,335.0	213.1	195.9
011	16.0	0.1	0.1	0.5	—	0.2	2.7	—	—	69.4	0.6	2.9
012	52.7	—	1.3	1.4	1.0	0.2	0.2	0.1	—	73.6	5.3	8.9
013	18.8	—	—	—	—	—	0.1	—	—	14.2	—	0.8
021	26.6	—	5.4	0.2	0.1	—	1.9	0.3	0.1	137.5	0.2	11.4
022	0.7	—	0.1	—	—	—	—	—	—	—	—	0.2
023	98.8	8.1	44.0	0.5	—	0.3	—	—	—	0.2	8.5	117.3
024	11.0	—	0.2	—	—	—	—	—	—	0.4	0.2	5.8
025	23.7	—	0.8	—	—	—	—	—	—	26.9	0.6	2.7
026	17.9	—	1.0	1.0	0.1	—	2.8	0.1	—	0.8	—	1.0
029	2.8	—	—	—	—	—	0.1	—	—	0.5	—	0.1
031	9.9	—	3.2	0.1	—	—	0.1	—	—	—	—	15.0
032	4.6	—	0.1	38.0	24.5	4.6	9.4	2.7	1.4	190.5	2.9	7.6
051	16.4	—	5.9	99.9	33.4	9.0	1.2	0.3	—	62.3	17.2	62.3
052	120.9	1.4	3.8	4.7	—	2.1	64.8	37.6	4.1	148.3	6.1	17.1
053	39.5	0.1	1.0	1.6	—	—	0.2	—	—	4.3	2.0	1.4
	96.9	0.7	1.6	16.9	2.6	0.2	30.8	8.4	1.8	45.3	3.4	3.4

THE PATTERN OF TRIANGULAR TRADE

	Exports										Imports			
	aT	a-b	a-c	bT	b-a	b-c	cT	c-a	c-b	aT	bT	cT		
054	87.3	0.2	0.6	2.2	—	1.7	11.6	0.2	4.3	38.7	10.8	7.5		
055	42.2	0.1	2.7	5.5	1.6	2.7	13.3	5.8	1.2	22.1	1.4	8.2		
061	27.6	0.8	11.9	1.2	—	0.8	169.3	106.8	40.4	517.9	143.7	28.4		
062	11.2	—	1.1	0.6	0.1	0.2	0.3	0.1	0.1	10.9	0.2	4.1		
071	16.2	0.3	0.7	—	—	—	61.2	3.5	0.7	1,335.5	7.1	5.2		
072	1.9	0.1	0.2	—	—	—	1.7	0.3	0.3	171.2	6.2	2.3		
073	2.3	—	0.4	—	—	—	—	—	—	10.5	0.4	2.8		
074	—	—	—	5.4	1.0	0.1	467.3	44.7	1.5	49.8	1.5	0.5		
075	1.9	—	—	1.2	0.4	0.7	49.1	18.6	0.9	33.6	1.3	5.6		
081	56.3	3.4	1.0	3.2	0.2	0.3	40.6	2.4	0.2	34.3	9.0	3.4		
091	73.0	0.1	0.6	0.1	0.1	0.2	0.2	—	0.6	2.2	2.2	2.2		
099	17.3	0.3	1.9	10.5	1.5	3.7	0.8	0.2	—	4.9	0.5	9.2		
111	0.6	—	0.1	0.2	—	0.2	—	—	—	0.1	—	0.5		
112	7.6	0.1	0.4	1.6	0.3	0.5	0.7	0.1	0.1	210.5	1.3	21.6		
121	349.0	5.5	31.2	2.1	—	0.2	53.5	0.6	0.2	97.2	6.2	32.6		
122	74.9	0.1	7.9	0.2	—	—	—	—	—	4.1	0.1	43.4		
921	3.3	0.1	—	0.5	0.5	—	3.4	2.0	—	18.7	0.4	1.1		
N3	1,770.7	315.0	129.6	107.2	40.1	10.1	1,866.0	451.5	255.5	1,430.0	1,113.3	287.8		
211	60.9	16.6	1.2	0.2	0.1	—	21.5	7.3	2.2	56.2	27.5	2.3		
212	31.5	—	0.1	1.2	1.0	—	3.7	1.9	—	79.5	—	0.1		
221	239.8	74.2	14.6	—	—	—	194.7	43.6	15.4	51.6	136.5	22.6		
231	117.3	9.1	2.3	—	—	—	992.2	285.9	76.9	340.3	92.2	39.8		
241	0.2	0.2	—	—	—	—	2.2	0.1	—	0.7	0.2	0.3		
242	22.1	6.8	0.2	1.2	—	0.9	65.0	1.9	56.4	49.5	77.0	1.1		
243	81.4	4.8	5.0	24.5	8.1	2.8	32.2	6.6	0.6	270.7	5.8	9.8		
244	—	—	—	—	—	—	0.3	—	—	2.2	2.2	0.5		
261	0.5	—	—	39.0	22.6	1.7	2.9	1.2	0.5	27.2	1.3	1.7		
262	19.9	0.8	94.3	3.2	0.8	0.2	40.2	18.3	0.4	247.0	261.3	73.1		
263	840.3	179.1	—	0.6	0.1	—	144.3	4.6	68.1	35.1	429.8	95.1		
264	—	—	—	—	—	—	114.2	12.4	8.1	12.5	18.2	—		
265	0.3	—	—	—	—	—	58.1	17.2	14.7	45.2	8.7	1.2		
291	7.4	0.6	0.2	2.4	1.0	0.1	22.1	4.9	2.7	23.3	6.8	1.1		
292	35.0	0.6	3.1	6.2	1.6	1.5	59.5	18.6	4.7	84.5	11.8	9.2		
411	126.2	20.8	5.1	23.3	4.7	—	0.1	—	0.2	10.5	25.0	9.7		
412	192.4	1.3	3.3	5.3	0.1	2.9	111.3	27.0	4.3	68.9	8.0	18.0		
413	5.5	0.1	0.2	0.1	—	—	1.4	—	—	18.0	1.0	2.2		
N4	1,962.5	357.7	45.3	10.6	2.3	6.8	698.6	114.9	192.5	2,464.7	1,094.4	166.3		
271	29.2	24.7	0.6	—	—	—	2.0	—	—	21.6	36.8	3.9		
272	83.9	4.7	4.1	0.8	—	0.7	34.6	8.2	13.6	188.2	53.1	9.4		

THE DEVELOPING ECONOMIES

	Exports										Imports			
	aT	a→b	a→c	bT	b→a	b→c	cT	c→a	c→b	aT	bT	cT		
281	44.1	19.0	—	—	—	—	80.9	0.5	75.7	255.7	158.4	0.2		
282	239.9	125.1	2.7	—	—	—	28.1	—	24.9	10.9	177.6	4.2		
283	38.1	5.6	—	0.2	0.1	—	209.6	51.9	34.9	461.8	85.1	1.0		
284	55.1	19.5	1.9	0.1	—	—	11.5	—	9.7	17.8	47.8	3.1		
285	—	—	—	—	—	—	—	—	—	11.8	—	—		
311	707.8	94.1	5.5	4.5	—	4.4	11.3	—	8.5	4.4	121.5	11.6		
312	94.0	5.7	—	—	—	—	104.6	54.1	17.0	94.1	292.9	—		
313	644.8	59.3	30.5	5.0	2.2	1.7	216.0	0.1	8.2	542.7	121.2	132.9		
314	25.6	—	—	—	—	—	—	—	—	8.7	—	—		
L1	1,943.4	17.4	165.3	1,240.1	346.1	367.3	536.2	129.0	3.8	1,945.9	45.0	882.1		
267	44.4	2.0	1.1	2.9	1.3	—	2.0	0.6	0.4	17.2	2.2	1.2		
611	21.3	0.1	4.0	0.1	—	0.1	47.0	0.8	2.5	29.7	4.8	8.5		
612	—	—	0.8	0.6	0.1	0.3	0.2	—	—	2.6	—	2.6		
613	5.2	—	—	—	—	—	—	—	—	3.5	—	0.1		
621	4.2	—	—	—	—	—	—	—	—	2.7	—	3.7		
629	5.4	1.0	1.0	1.4	—	0.9	1.3	0.1	—	2.7	1.0	1.0		
631	111.2	0.9	21.4	23.4	0.4	13.6	0.2	0.1	—	17.4	1.1	75.5		
632	6.0	0.2	0.3	53.1	42.2	1.1	5.2	4.9	—	101.0	0.2	6.5		
633	30.4	—	0.9	13.3	8.0	2.1	2.1	0.7	—	24.3	0.1	4.3		
641	4.5	—	0.5	0.1	—	—	—	—	—	3.7	—	2.1		
642	155.4	0.6	18.7	24.8	1.1	18.3	0.6	0.1	—	692.0	1.0	91.6		
651	59.0	0.4	3.1	6.3	3.0	1.4	1.1	0.1	—	12.1	0.5	13.4		
652	66.7	1.7	7.8	78.6	3.7	54.3	16.8	1.4	—	18.0	5.9	125.1		
653	165.6	—	35.4	286.9	23.7	131.4	65.4	1.1	—	55.2	0.3	205.0		
654	113.8	0.4	25.6	300.4	39.1	83.8	110.5	71.7	—	209.0	9.0	148.2		
655	9.9	0.9	0.9	8.0	0.9	3.2	1.5	0.1	—	12.4	0.1	7.5		
656	33.0	0.9	5.1	22.2	3.7	8.9	7.6	2.4	0.5	44.2	1.9	22.8		
657	61.4	0.6	9.5	29.4	9.6	7.0	42.0	1.8	—	17.0	0.8	19.2		
658	6.1	0.1	12.4	10.3	0.3	—	19.0	3.1	—	37.8	0.1	2.4		
659	44.9	0.5	1.6	9.8	2.9	—	1.0	—	—	15.3	0.9	11.3		
666	3.1	—	—	49.6	26.3	7.3	0.7	0.2	—	43.6	—	8.4		
672	4.5	0.8	0.1	16.3	6.2	1.1	6.2	3.0	0.2	164.0	2.0	9.8		
673	31.2	—	0.5	12.2	7.9	0.8	1.8	0.3	—	25.2	0.1	3.0		
831	5.6	—	0.1	3.5	1.6	0.5	0.7	0.1	—	17.3	—	1.5		

	Exports												Imports			
	aT	a→b	a→c	bT	b→a	b→c	cT	c→a	c→b	aT	bT	cT				
841	87.5	1.9	4.4	137.9	72.9	7.3	66.8	29.3	—	161.9	2.2	19.1				
842	1.7	—	—	0.2	0.2	1.6	—	—	—	0.6	—	—				
851	15.7	—	0.4	16.6	8.3	1.6	14.8	1.7	—	31.9	0.1	4.8				
891	40.9	0.3	1.6	2.5	0.8	0.9	0.4	—	—	20.0	1.0	8.1				
892	109.0	3.5	7.0	5.2	1.0	1.6	2.5	0.3	—	30.7	6.9	21.5				
899	695.8	1.7	13.4	127.4	70.3	13.9	118.8	5.1	—	135.6	2.8	54.5				
L2																
541	1,251.6	32.6	89.3	162.3	59.7	48.1	10.9	3.7	0.2	377.5	50.9	458.4				
691	270.7	0.6	36.9	12.4	1.9	0.3	2.2	0.1	—	31.6	10.5	105.3				
699	32.0	0.6	0.2	0.3	0.2	0.3	—	—	—	3.1	1.0	36.8				
733	372.0	7.4	24.8	73.2	29.6	21.9	—	—	—	153.1	11.7	165.3				
811	23.7	0.3	1.0	8.0	0.3	5.5	0.2	0.2	—	23.0	0.4	31.1				
812	8.6	—	0.7	0.7	—	0.1	—	—	—	0.8	—	9.2				
821	67.2	0.3	2.9	9.7	4.2	2.3	2.6	—	—	4.0	0.5	17.9				
861	42.7	0.2	1.1	1.4	0.7	0.3	3.7	3.1	—	14.6	0.2	5.2				
862	158.4	14.2	15.1	48.5	22.3	7.1	0.6	0.1	—	51.7	19.4	46.1				
863	45.7	2.4	4.8	1.5	0.1	1.9	—	—	—	16.0	3.1	18.9				
864	16.5	1.0	1.0	1.7	0.4	1.4	1.5	0.2	—	2.4	1.4	3.7				
	8.2	0.2	0.8	2.2	0.2	1.2	0.1	—	—	68.2	2.7	18.9				
C1																
251	2,504.6	198.6	179.8	379.0	48.9	231.4	32.4	7.0	2.2	1,901.6	391.7	1,102.3				
266	90.3	15.0	4.2	0.6	—	0.5	0.3	—	0.3	282.6	28.5	14.8				
511	23.4	1.1	0.2	4.4	—	2.8	0.2	0.1	—	24.7	1.4	10.1				
512	133.4	6.4	7.1	18.5	2.3	5.2	0.2	—	—	114.6	10.6	49.8				
521	237.4	21.3	8.0	6.8	0.9	2.3	6.3	1.7	0.1	36.0	30.5	41.0				
531	14.6	3.0	0.3	0.7	0.3	0.4	—	—	—	27.5	6.3	1.4				
532	20.2	1.4	2.1	3.6	—	2.4	0.1	—	—	7.3	12.2	29.9				
533	2.6	0.1	0.1	—	—	—	—	—	—	15.6	5.1	1.4				
551	107.3	3.6	8.1	1.9	0.1	1.3	1.2	—	—	6.5	5.9	24.6				
552	33.8	0.6	4.4	0.8	0.1	0.3	13.4	4.6	1.2	24.4	6.2	9.7				
561	55.3	0.2	8.1	2.6	—	1.1	0.5	—	—	5.7	0.2	29.7				
591	90.8	10.5	25.4	60.1	—	42.4	0.2	—	—	77.0	35.4	140.3				
599	21.8	0.1	1.4	2.2	0.4	1.2	0.6	0.3	—	2.2	0.2	13.1				
661	370.7	32.2	27.2	14.0	1.1	7.5	4.1	0.1	0.2	29.7	47.9	77.6				
	20.8	0.1	2.7	35.2	—	23.3	0.4	—	—	21.8	0.3	43.0				

THE DEVELOPING ECONOMIES

	Exports						Imports					
	aT	a→b	a→c	bT	b→a	b→c	cT	c→a	c→b	aT	bT	cT
662 Clay construction materials and refractory construction materials	32.8	1.0	1.1	6.1	2.3	2.4	0.7	—	—	15.0	1.1	12.1
663 Mineral manufactures, n.e.s., (not including clay and glass)	66.2	1.9	4.2	6.1	0.4	1.8	0.8	—	—	5.3	2.2	13.7
664 Glass	30.7	0.1	0.5	5.9	1.6	3.1	—	—	—	39.4	1.4	8.8
671 Silver and platinum group metals	3.2	0.4	0.2	0.3	—	—	2.1	—	—	27.6	3.9	2.0
681 Iron and steel	850.2	75.5	62.3	227.6	21.5	124.0	0.8	—	—	230.1	129.9	489.1
682 Copper	211.7	20.7	7.6	8.2	2.4	4.4	—	—	—	316.2	28.4	34.3
683 Nickel	19.1	0.6	0.1	9.6	1.1	3.2	—	—	—	128.8	1.6	2.2
684 Aluminium	35.9	0.9	3.6	6.2	1.0	3.2	—	—	—	128.6	2.8	27.3
685 Lead	2.6	0.7	0.4	0.1	—	—	—	—	—	85.5	6.7	3.2
686 Zinc	5.1	0.1	0.4	3.1	0.7	1.5	—	—	—	55.1	1.6	1.3
687 Tin	1.6	0.1	—	—	—	—	—	—	—	122.4	15.7	10.9
689 Miscellaneous non-ferrous base metals employed in metallurgy	23.1	1.0	0.1	14.4	12.7	0.1	—	—	—	68.0	5.7	1.0
C2 Capital-intensive heavy machines and equipment	6,567.7	181.0	362.9	565.1	46.0	139.1	12.4	2.3	1.0	861.3	260.0	1,478.9
711 Power generating (except electric) machinery	290.3	29.0	19.9	3.6	0.2	5.9	1.8	—	—	31.3	118.7	3.9
712 Agricultural machinery and implements	327.3	0.2	2.5	1.4	—	0.7	—	—	—	78.4	0.5	3.1
713 Tractors other than steam	190.1	1.4	20.0	0.7	—	0.2	—	—	—	13.7	2.1	36.1
714 Office machinery	135.8	13.3	6.2	0.9	0.2	0.4	—	—	—	31.6	18.1	16.7
715 Metal working machinery	281.9	25.5	9.3	3.3	—	2.5	0.1	—	—	29.7	45.2	68.9
716 Mining, construction and other industrial machinery	1,808.5	64.3	137.1	111.5	20.9	52.3	1.0	0.1	0.1	119.5	102.5	462.0
721 Electric machinery, apparatus and appliances	947.1	19.6	61.1	78.7	23.5	29.4	4.5	1.9	0.1	147.6	24.9	301.0
731 Railway vehicles	546.3	0.4	22.0	23.7	1.0	23.1	—	—	—	0.4	1.1	113.1
732 Road motor vehicles	1,377.6	11.3	72.3	24.7	1.0	11.0	1.4	—	—	357.3	14.8	233.9
734 Aircraft	941.9	12.6	10.2	0.8	—	0.7	0.9	—	—	69.4	30.0	58.5
735 Ships and boats	148.5	1.4	2.3	308.8	0.2	12.9	2.7	0.1	0.7	5.4	9.0	63.3

Note: Compiled from the Institute of Asian Economic Affairs, *Asian Trade Statistics 1956-58*, Tokyo, 1961