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Trade Patterns and Factor use: Evidence for Asia-Pacific Countries

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ABSTRACT

Along with globalisation in world economy, an economic integration of Asia-pacific countries has accelerated since the 1980s. The purpose of this paper is to investigate the relationships between trade linkages among this region and factor use. To this purpose, we use Asian International Input-Output Tables for 1985 and 1990 compiled by the Institute of Developing Economies (IDE), Japan.

The major results are summarised as follows. First, during 1985 and 1990, employment linkages among the countries are increasing: for example, one-million US$ increase in Singaporean exports increase manufacturing jobs in China by 2.7, and by 1.4 in Japan and by 0.82 in Malaysia through its international procurement of intermediate products for export production. Second, to investigate trade position of each county in the context of division of labour, we made a tentative test of H-O theorem based on Leontief and Leamer tests. By and large, the results indicate that there is no room to make a paradox. For 1990, the US, Japan and Singapore are capital-abundant in general, but Korea, Malaysia and Indonesia are labour-abundant: though the labour-abundant position in Korea is eroding.

Introduction

The purpose of this paper is to characterise increasing economic linkages among Asian countries, Japan and the US in terms of factors use. To this purpose, we use Asian International Input-Output Tables for 1985 and 1990 published by the Institute of Developing Economies (IDE), Japan. The motivation of this paper is described as follows.

First, in spite of a general recognition on a positive role of international trade on global economic development, trade with developing countries has been frequently cited as a *principal* cause of shrinking domestic employment in manufacturing sectors in developed countries. Although such protectionist view on trade is not likely correct in general, a quantitative evaluation of the effects of expanding trade in Asia-pacific region on employment is necessary to avoid confusion on economic effects of international trade in this region. In actuality, given the great economic potential in this region, some people worry about negative impacts of increasing trade with mass-labour countries in Asia on domestic employment and industries, as shown in the arguments of manufacturing hollowing or global glut in production.

Second, in a more academic aspect, it is interesting to characterise trade of major Asian developing countries within the traditional trade theories. Many researchers have so far conducted empirical tests on whether a country's trade follows the Heckscher-Ohlin (HO) or Heckscher-Ohlin-Vanek (HOV) theorems or else, but most of their work focused on developed countries. Even an extensive multi-country study by Bowen, Leamer and Sveikauskas (1987) which covers 12 factors and the 27 countries (of which Asian countries are three: Hong Kong, Korea and Philippines), they used the US I-O data only to describe technology. Although their treatment on technology can be consistent with the HO theory on assuming the same technology among trading countries, it is still not persuasive to assume the same technology among countries in particular for developing countries. In fact, Trefler (1993) has indicated the importance of technological difference among countries to eliminate the Leontief paradox. It is therefore interesting to try some tests for major Asian countries by using input-output tables for individual countries that are consistently available from the IDE international input-output tables.

The content of this paper is as follows. Section 2 describes a brief feature of Asian economic development. Section 3 explain the Asian international I-O tables and using them we exhibit employment linkages among eight Asia countries (China, Korea, Taiwan, Singapore, Thailand, Malaysia, Indonesia and Philippines), the US and Japan. Section 4 focuses on examining Leontief paradox for four Asian countries (Korea, Singapore, Malaysia, and Indonesia), the US and Japan where both employment and capital stock data at sectoral level are available. Section 5 concludes our analysis.

1. Overviews of Asian Development

Post-war economic growth in Asia is remarkable as shown in Table 1 at least until currency crisis in 1997-1998. In particular since 1985, growth has accelerated in most countries mainly due to domestic investment boom along an incredible boom of foreign direct investment (FDI) and export expansion mainly to developed countries, notably, to the US and to some lesser extent to Japan.

As shown in figure 1, the ratio of domestic gross fixed investment to real GDP has shown an upward trend in every country and accelerated during the 1990. Similarly, as in Figure 2, the export dependency of Asian GDP rose dramatically in several countries such as Singapore and Malaysia and even for other countries the ratios are also high in world standards. Asian miracle growth was thus fuelled by both investment and export expansions, resulting in virtuous circle in growth. In other words, as is usually said, it is a process of incorporating Asian countries with cheaper labour into the international production process based on comparative costs considerations by firms in developed countries.

Rapid accumulation of fixed capital has contributed to the increase in capital-labour ratios in manufacturing sectors. As shown in Figure 3, however, manufacturing capital-labour ratios did not

increase so much before the 1990s at least for the four Asian countries where sectoral capital stock data are available. In particular, capital deepening in Korea is quite rapid during the 1990, even when compared with the other three countries.

[Table 1 herein]
[Figure 1 herein]
[Figure 2 herein]
[Figure 3 herein]

2. Interdependence among Asia-Pacific countries

3.1 The IDE International Input-Output Tables

It is a major challenge for researchers to trace the dynamic link among countries in particular between high economic growth, the rapid capital accumulation and changing trade patterns. Only a comprehensive economic modelling could provide some answer to this subject, but it is extremely difficult to conduct because of the lack of internationally comparable high-quality data for Asian countries. Alternatively, we will try to investigate Asian development from input-output perspectives by using the IDE international input-output data, though the data cover only until the year 1990.

Following IDE (1992, 1998), the Asian input-output tables include 10 major countries in Asia-Pacific region: Japan (J), the US (U) and eight Asian countries China (C), Korea (K), Taiwan (N), Singapore (S), Thailand (T), Malaysia (M), Indonesia (I), and Philippine (P). The basic industrial classification is rather rough to keep international comparability: 24 sectors in total of which 12 sectors belong to manufacturing. Figure 4 illustrates the basic structure of the table:

[Figure 4 herein]

Based on this data, the input-output coefficient matrix is then described as follows.

$$A=\left(X_{ij}^{\alpha\beta}\,/\,X_{j}^{\beta}\right)=\left(a_{ij}^{\alpha\beta}\right)=\begin{pmatrix} A^{JJ} & A^{JU} & A^{JC} & A^{JK} & A^{JN} & A^{JS} & A^{JT} & A^{JM} & A^{JI} & A^{JP} \\ A^{UJ} & A^{UU} & A^{UC} & A^{UK} & A^{UN} & A^{US} & A^{UT} & A^{UM} & A^{UI} & A^{UP} \\ A^{CJ} & A^{CU} & A^{CC} & A^{CK} & A^{CN} & A^{CS} & A^{CT} & A^{CM} & A^{CI} & A^{CP} \\ A^{KJ} & A^{KU} & A^{KC} & A^{KK} & A^{KN} & A^{KS} & A^{KT} & A^{KM} & A^{KI} & A^{KP} \\ A^{NJ} & A^{NU} & A^{NC} & A^{NK} & A^{NN} & A^{NS} & A^{NT} & A^{NM} & A^{NI} & A^{NP} \\ A^{SJ} & A^{SU} & A^{SC} & A^{SK} & A^{SN} & A^{SS} & A^{ST} & A^{SM} & A^{SI} & A^{SP} \\ A^{TJ} & A^{TU} & A^{TC} & A^{TK} & A^{TN} & A^{TS} & A^{TT} & A^{TM} & A^{TI} & A^{TP} \\ A^{MJ} & A^{MU} & A^{MC} & A^{MK} & A^{MN} & A^{CS} & A^{MT} & A^{MM} & A^{MI} & A^{MP} \\ A^{IJ} & A^{IU} & A^{IC} & A^{IK} & A^{IN} & A^{IS} & A^{IT} & A^{IM} & A^{II} & A^{IP} \\ A^{PJ} & A^{PU} & A^{PC} & A^{PKk} & A^{PN} & A^{PS} & A^{PT} & A^{PM} & A^{PI} & A^{PP} \end{pmatrix} \quad (1)$$

where α =a supplying country code of goods and services; β = a demanding country code of goods and services; i = industry i of country α ; j of country β , and $X_{ij}^{\alpha\beta}$ =an element of intermediate matrix; X_{j}^{β} = an element of gross output vector $X'=\left(X_1^J \cdots X_n^J,\ldots,\ @X_1^\beta \cdots X_n^\beta,\ldots@,X_1^P \cdot @X_n^P\right)$

In the IDE International I/O tables, the final demand components (private consumption, government consumption, gross domestic fixed capital formation, and increases in stocks) are also disaggregated for each country of the individual 10 countries. In addition, exports to the other regions except the 10 countries are distinguished into those to Hong Kong, the UK, France, (West and East) Germany, as well as those to the Rest of the World. Therefore, for example Japanese

exports are not only distinguished into each trading partners on the above, but also into each final demand category in each consuming country.

Let $F_{ik}^{\alpha\beta}$ be a category k final demand of country/region β for the product i of country/region α. Like the same manner as in intermediate matrices on the above, the final demand matrix in the IDE international input-output tables are described as follows.

$$F = F_{ik}^{\alpha\beta} = \begin{pmatrix} F^{JJ} & F^{JU} & F^{JC} & F^{JK} & F^{JN} & F^{JS} & F^{JT} & F^{JM} & F^{JI} & F^{JP} \\ F^{UJ} & F^{UU} & F^{UC} & F^{UK} & F^{UN} & F^{US} & F^{UT} & F^{UM} & F^{UI} & F^{UP} \\ F^{CJ} & F^{CU} & F^{CC} & F^{CK} & F^{CN} & F^{CS} & F^{CT} & F^{CM} & F^{CI} & F^{CP} \\ F^{KJ} & F^{KU} & F^{KC} & F^{KK} & F^{KN} & F^{KS} & F^{KT} & F^{KM} & F^{KI} & F^{KP} \\ F^{NJ} & F^{NU} & F^{NC} & F^{NK} & F^{NN} & F^{NS} & F^{NT} & F^{NM} & F^{NI} & F^{NP} \\ F^{SJ} & F^{SU} & F^{SC} & F^{SK} & F^{SN} & F^{SS} & F^{ST} & F^{SM} & F^{SI} & F^{SP} \\ F^{TJ} & F^{TU} & F^{TC} & F^{TK} & F^{TN} & F^{NS} & F^{TT} & F^{TM} & F^{TI} & F^{TP} \\ F^{MJ} & F^{MU} & F^{MC} & F^{MK} & F^{MN} & F^{MS} & F^{MT} & F^{MM} & F^{MI} & F^{MP} \\ F^{IJ} & F^{IU} & F^{IC} & F^{IK} & F^{IN} & F^{IS} & F^{IT} & F^{IM} & F^{II} & F^{IP} \\ F^{PJ} & F^{PU} & F^{PC} & F^{PK} & F^{PN} & F^{PS} & F^{PT} & F^{PM} & F^{PI} & F^{PP} \end{pmatrix} \quad (2)$$

It is then straightforward that the direct and indirect impact of final demand of country β on output, X^{β}, can be defined as:

$$X^{F^{\beta}} = (I - A)^{-1} F^{\beta} = BF^{\beta} \quad (3)$$

where $F^{\beta} = \left(F^{J\beta}, \ldots, F^{\beta\beta}, \ldots, F^{P\beta}\right)'$ and B is the Leontief Inverse whose elements $b_{ij}^{\alpha\beta}$ describes not only usual interindustry multiplier effects, but also those through international procurements of intermediate goods within the 10 countries.

As shown in Figure 4, the IDE tables record also vectors of (intermediate and final) exports to the rest of the world (ROW) as well as the vector of statistical discrepancy (SD) as components of final demand. Therefore, gross output vector can be obtained by:

$$X = (I - A)^{-1}[F^{J} + F^{U} + F^{C} + \cdots, + F^{p} + F^{ROW} + SD] \quad (4)$$

3.2 Impact of Trade on Factor Use

Using the IDE I-O tables outlined the above; let us examine the international repercussion effects on factor use. Because the IDE tables uses current US$ exchange rates to convert all the transactions, the use of monetary variables such as gross output or value added is somewhat misleading and figurers for 1985 and 1990 cannot be directly compared with each other. The use of factor demand such as labour, however, mitigate such difficulties and we focus on factors use to evaluate the multiplier effects throughout this paper.

For the data on factor demand, compatible data on primary factors such as labour and capital services are not available in the IDE database. Hence, we used the data from other sources such as the OECD STAN database for Japan and the US, and for Asian countries the UNIDO Industrial Statistics, though both databases covers only for manufacturing sectors. Also no capital stock data are available for both databases so that we had to construct capital stock series based on the data for gross fixed capital formation. However, since comparable investment series in UNIDO data are only available for Korea, Singapore, Malaysia and Indonesia, we had to focus only on employment.

Needless to say, the employment effects can be traced by various ways, thanks to massive information of the IDE tables. Since we have an interest in trade, we first estimate how many manufacturing jobs (workers) are created by exports of country β in both country β and other nine

countries in the table. To see these effects, we used the following model:

$$L^E = \hat{l}(I - A)^{-1}\hat{E} \tag{5}$$

where $\hat{l} = \begin{bmatrix} \hat{l}^J & 0 & \cdots & 0 \\ 0 & \hat{l}^U & \cdots & 0 \\ \vdots & \vdots & \hat{l}^\beta & \vdots \\ 0 & 0 & \cdots & \hat{l}^P \end{bmatrix}$ and $\hat{E} = \begin{bmatrix} \sum_{k \neq J} F^{kJ} & 0 & \cdots & 0 \\ 0 & \sum_{k \neq U} F^{kU} & \cdots & 0 \\ \vdots & \vdots & \sum_{k \neq \beta} F^{k\beta} & \vdots \\ 0 & 0 & \cdots & \sum_{k \neq P} F^{kP} \end{bmatrix}$.

$\hat{l}$ and $\hat{E}$ is a diagonal matrix of labour coefficients and exports by each country (notes $\sum_{k \neq \beta} F^{k\beta}$ that includes exports to the rest of the world)

L^E is an impact matrix of employment by final exports within the region and exports to the ROW. When we see a column of this matrix, the figures describe the number of jobs created by country β' final exports of $\sum_{k \neq \beta} F^{k\beta}$ (notes that this includes exports to the rest of the world) and looking row wise, it describes the number of jobs in a specific country that are created by exports of home country and of the other countries' exports.

The calculation results of L^E matrix for 1990 and 1985 are summarised in Table 2 and 3. It is clear that trade effects on employment among the countries concerned are increasing over time in terms of both influence and sensitivity. In terms of influential power to the other countries, the effect of Singapore and the US exports is stronger than the other countries. In particular, Exports from Singapore is large when compared with its smaller country size, implying that Singapore has a status of export platform in Asia. It is also shown that Chinese labour force is increasingly engaged in exports, though their exports do not create employment in other countries.

In terms of sensitivity, most countries except Korea have increased the direct and indirect dependency of exports. For Korea where its employment engaged in exports is decreasing in absolute values between 1985 and 1990, but external dependency has increased from□@3.5% of total employment in 1985 to 5.4% in 1990 (see Table 4).

[Table 4 herein]

Though the level of sensitivity differs across the countries, 3%(China) to 15% (Malaysia) of manufacturing employment, which engaged in exports, is generated by the exports of the other nine countries. In 1990, China has not yet being incorporated into international production chains. In contrast, Malaysia has obtained a status of major supplier of electric and electronic machinery products, Malaysian employment has become quite sensitive to exports by other countries.

3. Relevance of H-O theory for Four Asian countries

Growing interdependence in factor use in Asia-Pacific region gives some pressure to employment in sunset manufacturing industries in advanced countries. In particular, involvement of a large-scale Chinese labour will cause severe pressure of labour intensive sectors in advanced, importing countries. It is therefore interesting to see how international division of labour has worked in Asia, and who is a major exporter of labour force, conversely who is major importer of scarce resource. We will see this issue from traditional trade theories.

.1 Leontief and Leamer Tests

According to the Heckscher-Ohlin (H-O) theorem, a country will export the good that uses relatively intensively its relatively abundant factor of production, and import the good that uses relatively intensively its relatively scarce factor of production. This conclusion follows logically from the familiar assumptions. In the two-country, two-factor case, the theory simply says that the capital-abundant country export the capital-intensive good and import the labour –intensive product and vice versa.

Although this theorem seems to accommodate reality, empirical tests often provided various contradictions with actuality -- which is known as the Leontief paradox (Leontief, 1953,1956). His simple test is follows.

Leontief Test

Using 1947 US input–output data, Leontief computed the following ratio, which is called the Leontief statistic:

where $\lambda = \frac{F_K^M / F_L^M}{F_K^E / F_L^E}$ refers to the capital-labour ratio used in a country to produce import-competing goods and F_K / F_L is the capital-output ratio used to produce exports.

According to the H-O theorem, a relatively capita-abundant country would have a Leontief statistic with a value less than 1.0 and a relatively labour-abundant country would have a Leontief statistic greater than 1.0

Leontief found that US exports used a capital-labour ratio of $13,991 per man-year, where import substitutes used a ratio of $18,184 per man-year, and then $\lambda = 18{,}184/13{,}991 = 1.30$. Given the presumption that the United States is relatively capital-abundant, this is just the reverse of what the H-O theorem predicts.

As is well known, His observation has invoked a wide-range of examinations on the theory: tastes and preference, factor intensity reversal, tariff structure, transportation costs, imperfect competition, factor immobility, human capital and heterogeneity of labour, R&D and technological difference among countries and natural resource endowments (Deardorff (1984) and Leamer and Levinsohn (1995)).

Subsequently, Leamer (1980,1984) criticised the above Leontief test to be inappropriate to test the H-O theory. According to his logically correct test to the Leontief's original data, the paradox was indeed disappeared. On the other hand, Trefler (1995) argued that if productivity differences across countries are appropriately incorporated in the test, the Leontief test was still effective in the sense that the US is abundant in labour-intensive goods. Following Trefler, the recent empirical exercise regarding the Leontief paradox, are more focusing on the role of technological difference among trading partners, which was formerly not taking into account explicitly. Work by Leamer and Trefler reminded of the importance of the procedures in testing the H-O theorem because the theory builds on the various unrealistic assumptions.

Since Leamer's critic, it becomes common in testing the H-O to use a theoretical formation known as the Heckscher-Ohlin-Vanek (HOV) theorem, whose is currently called the factor content approach. This theorem states that the relative factor abundance of a country is revealed through the factor services embodied in the country's trade flows. Therefore, if a country is capital abundant, it exports the services of capital and imports the services of factor whose supply is relatively scarce, say labour. Although this theorem is built on more strong assumptions than the original H-O theorem --notably, factor price equalization and identical homothetic utility function, the empirical implementation is relatively easier.

Leamer Test

The formula derived by Leamer (1980) to test the HOV theorem for a specific country's trade can be specified by the following inequality:

where F^E, F^M and F^C are factor embodiments in exports, imports and domestic final demand respectively and the subscript of them represents factors of production j and k. The numerators of $\frac{F_j^E - F_j^M}{F_j} > \frac{F_k^E - F_k^M}{F_k}$

each side of the inequality thus represent the factor content embodied in net exports, while for the denominators the factor content embodied in domestic final demand. If inequality (5) holds for factors j and k, the country is relatively abundant in factor j. The unique feature of this testing formula is that the sign of the numerators does not affect the county's trade position.

Like Leontief test, Leamer test itself does not explicitly take into account the factor abundance in light of actual data on the endowments. Rather, this test is conducted by *a priori* assuming the country's position of factor abundance.

We will try to conduct both Leontief and Leamer tests for major Asian countries. To do so, we reorganised the IDE international tables to derive national I-O tables for individual country. Because of the lack of capital stock data for several countries, our tests were performed only for six countries—Japan, the US, Korea, Singapore, Malaysia, Indonesia. Using the national I-O tables, estimates of the variables used to test are obtained from the following manner.

(1) Factor embodiment in domestic final demand for factor i

(2) Factor embodiment in exports to region j for factor i

(3) Factor embodiment in imports form region j

$$F_i^C = v_i'(I-A)^{-1}C_j$$

where A =input-output coefficients matrix in national-basis, v = direct factor input vector per unit of production for factor i.

$$F_{iE_j}^{M_j} = v_i'(I-A)^{-1}M_j$$
$$F_i^{E_j} = v_i'(I-A)^{-1}E_j$$

Before proceeding to test, various remarks should be made on the empirical implementation of H-O theory. First, the amount of each production factor should be measured in some common units across countries (called "efficiency units or productivity-equivalent units"). In our exercise, no adjustment was made for labour and simply used the number of human heads. Second, we do not use the identical technology data to calculate (1) to (3), but instead use country-specific data for input-output coefficients A and factor intensity vector v. This procedure contradicts the presumptions of the HOV model. This is because the difficulty to transform the value of output among the countries into common units (in dollar, PPP terms or else) to obtain the direct factor requirements per unit of output. In addition, it is felt that applying the identical I-O coefficients across countries are quite risky in practice even though the HOV theorem postulates it.

4.2 Empirical results

Before proceeding, we note the following point. The H-O theorem asserts a relationship between three sets of parameters: factor endowments, technology, and trade flows. Empirical tests typically employ data about two of these and infer the third. Both Leontief and Leamer tests use data on technology and trade flows, and infer factor endowments. The inference by Leontief was odds with prior brief—the US is capital-abundant, hence the "paradox". However, this procedure cannot judge whether it is the hypothesis that the world is adequately represented by the H-O model that is at fault, the prior brief on factor endowments, or both. In this sense, it is noted that current tests do not necessarily a correct "test" for the H-O theorem. Rather, it is a preliminary attempt or step to further complete tests.

The results of both Leontief and Leamer tests are summarised in Table 6 to 11. By and large, the results of both tests are what one would expect:

- Japan is capital-abundant in general, but intermediate trade with the US, it is a relative labour-abundant country. Japan exports capital-intensive intermediate products to Asian countries.
- The US is capital-abundant in trade with everywhere. The superiority of its capital abundance is performed in trade with Asian countries such as ASEAN4.
- Korea is labour-abundant country. However, it exports more capital-intensive products to Asian countries. In this sense, Korean trade in 1990 shows a dualistic nature like in past Japanese trade (Tatemoto and Ichimura, 1959)
- Singapore is capital –abundant. It is likely that its capital position is similar to Japan: it exports labour to the US and the rest of the world, and capital to Japan and Asian countries.

- Malaysia is labour-abundant in trade with everywhere. It is also true for Indonesia and its labour-abundant position is the highest among the six countries examined.

Our tentative results thus indicate that there is no room to make a paradox. Of course, however, further research is needed to incorporate other countries into the tests as well as including more production factors such as skill categories of labour and some technological variables like R&D.

5. Conclusion

This paper has tried to clarify the nature and characteristics of Asia-Pacific trade structures by focusing on factor use. The results show that international procurements of intermediate goods – electronic and automobile parts, etc. has some strong power in generating employment somewhere, which indicates that manufacturing employment is more and more exposed to international competition. If forthcoming 1995 data are used, it is sure that employment linkages will be much stronger than in 1990. In this sense, the exercise done in this paper should be an early attempt to analyse interdependence of Asian-Pacific economies.

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Table 1 Annual Real GDP Growth rates in Asian Countries (%)

	1960-73	*1974-85*	*1986-90*	*1991-95*	*1995-99*
China	3.8	7.0	5.5	8.3	8.1
Korea	8.4	8.1	9.8	7.0	3.9
Taiwan	9.9	8.1	8.4	6.3	5.4
Hong Kong	9.3	7.6	7.2	5.4	1.9
Singapore	9.5	7.4	8.1	8.3	5.0
Thailand	7.1	6.8	9.6	7.9	-0.2
Indonesia	4.4	5.1	6.1	6.9	-0.4
Malaysia	7.3	6.8	6.6	8.3	3.2
Philippines	5.3	3.2	4.4	2.3	3.3
United States	4.3	2.8	2.6	2.1	4.4
Japan	9.1	3.9	4.4	1.4	0.6

Figure 1 The Share of Gross Domestic Fixed Investment in Real GDP (%)

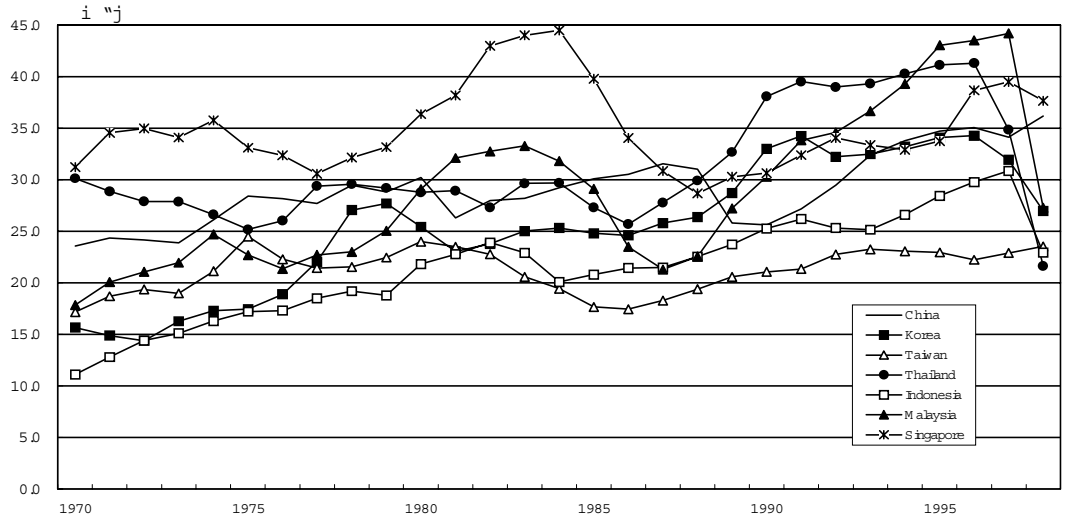


Figure 2 The Share of Exports in Real GDP (%)

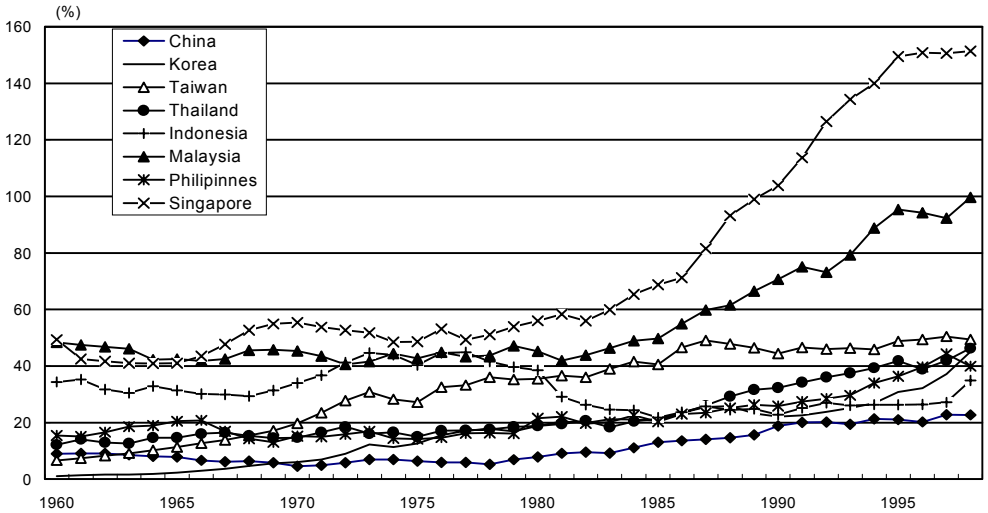
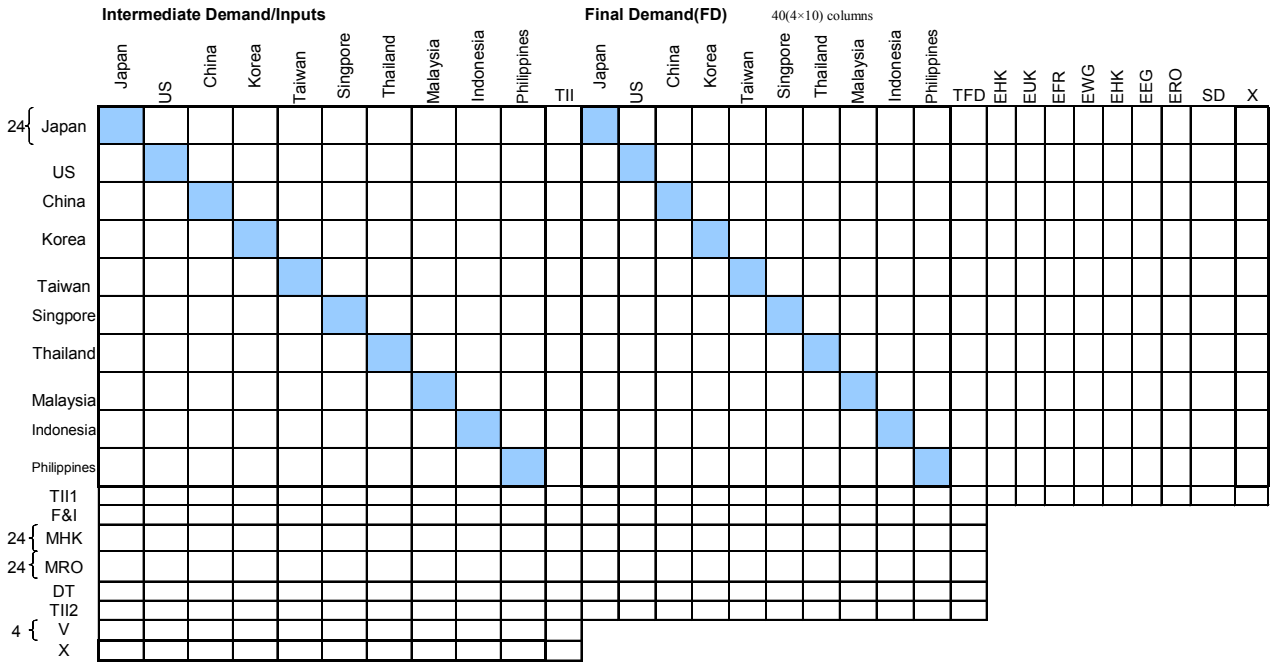


Figure 4 Basic Structure of the IDE-Asian International I-O Table

ASIAN INTERNATIONAL I-O TABLE 1985 (297×286) and 1990 (297×290)



TII1= Total intermediate inputs 1
F&I= Freight&Insurance
MHK= Imports From Hong Kong
MRO= Imports From ROW
DT= Import Duty and Sales Tax
TII2= Total intermediate inputs 2
V= Value Added Components
X= Total Inputs

TID= Total intermediate demand
TFD= Total final demand
EHK= Exports to HongKong
EUK= Export to the United Kingdom
EFR= Export to France
EWG= Export to West Germany
EHK= Export to HongKong
EEG= Export to East Germany
ERO= Export to the Rest of the World
(No separation for four European countries for 1985)
SD= Statistical Discrepancy
X= Total Outputs

Table 2 Employment Impacts of Trade in Asia-Pacific Region in 1990

Employment Impact of the Exports of final goods to the region and of exports to the ROW in 1990

	Employment impacts by the exports in the row country (1,000 man-year)										Total	Part to	% of
	Japan	USA	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines	Influence	aboroad	abroad
Japan	2,385.6	32.1	103.7	12.1	14.9	1.7	7.1	4.1	9.8	3.2	2,574.2	188.6	(7.3)
USA	59.6	3,150.3	95.6	15.5	28.4	6.2	4.9	10.2	10.2	6.0	3,387.0	236.6	(7.0)
China	9.6	4.5	11,560.3	2.4	9.7	0.5	1.8	2.7	5.0	0.3	11,596.8	36.6	(0.3)
Korea	40.2	21.4	4.3	982.8	10.0	1.1	2.3	5.5	6.5	1.3	1,075.3	92.5	(8.6)
Taiwan	50.9	25.9	5.9	7.8	1,172.9	2.8	2.4	5.3	6.6	3.0	1,283.5	110.5	(8.6)
Singapore	48.7	26.8	96.5	7.9	16.5	222.6	7.5	29.5	12.8	4.3	473.1	250.5	(52.9)
Thailand	12.2	6.4	41.2	4.2	16.5	2.7	517.8	2.1	2.6	0.6	606.4	88.6	(14.6)
Malaysia	10.8	4.8	21.7	2.2	6.7	5.7	1.6	333.2	3.3	0.7	390.9	57.7	(14.8)
Indonesia	2.3	1.5	10.7	2.0	2.0	0.3	0.2	0.3	574.5	0.1	594.1	19.6	(3.3)
Philippines	4.9	3.5	5.2	2.0	5.0	0.8	0.4	0.6	1.4	305.4	329.1	23.7	(7.2)
Total Sensitivity	2,624.7	3,277.2	11,945.2	1,038.9	1,282.6	244.5	546.0	393.6	632.5	325.0	22,310.3	1,104.8	(5.0)
Total Domestic Employment	15,414.8	19,111.0	54,430.0	2,957.9	2,445.0	351.7	1,596.9	830.7	2,649.4	1,108.6	100,896.1		
% of domestic empoyment	17.0	17.1	21.9	35.1	52.5	69.5	34.2	47.4	23.9	29.3	22.1		
% from abroad	9.1	3.9	3.2	5.4	8.5	9.0	5.2	15.3	9.2	6.0	(5.0)		

Employment Impacts of a per million US$ Increase in final exports to the region and of exports to the ROW in 1990

	Employment impacts by the exports in the row country (man-year)										Total	Part to	% of
	Japan	USA	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines	Influence	abroad	abroad
Japan	9.49	0.13	0.41	0.05	0.06	0.01	0.03	0.02	0.04	0.01	10.2	0.7	(7.3)
USA	0.13	6.78	0.21	0.03	0.06	0.01	0.01	0.02	0.02	0.01	7.3	0.5	(7.0)
China	0.18	0.08	211.41	0.04	0.18	0.01	0.03	0.05	0.09	0.01	212.1	0.7	(0.3)
Korea	0.71	0.38	0.08	17.40	0.18	0.02	0.04	0.10	0.11	0.02	19.0	1.6	(8.6)
Taiwan	0.91	0.46	0.11	0.14	21.00	0.05	0.04	0.10	0.12	0.05	23.0	2.0	(8.6)
Singapore	1.36	0.75	2.69	0.22	0.46	6.20	0.21	0.82	0.36	0.12	13.2	7.0	(52.9)
Thailand	0.54	0.29	1.83	0.19	0.73	0.12	23.02	0.09	0.12	0.02	27.0	3.9	(14.6)
Malaysia	0.76	0.34	1.53	0.16	0.47	0.40	0.12	23.47	0.23	0.05	27.5	4.1	(14.8)
Indonesia	0.21	0.14	0.98	0.18	0.19	0.03	0.02	0.02	52.48	0.01	54.3	1.8	(3.3)
Philippines	0.57	0.40	0.60	0.24	0.57	0.09	0.04	0.07	0.16	35.14	37.9	2.7	(7.2)
Total Sensitivity	14.8	9.7	219.8	18.7	23.9	6.9	23.6	24.8	53.7	35.5	431.4	25.0	(5.8)
% from abroad	36.1	30.4	3.8	6.7	12.1	10.7	2.3	5.2	2.3	0.9	(5.8)		

Table 3 Employment Impacts of Trade in Asia-Pacific Region in 1985

Employment Impact of the Exports of final goods to the region and of exports to the ROW in 1985

	Employment impacts by the exports in the row country (1,000 man-year)										Total	Part to	% of
	Japan	USA	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines	Influence	abroad	abroad
Japan	2,168.4	23.7	41.3	11.2	10.7	1.5	7.5	2.9	5.8	2.2	2,275.2	106.8	(4.7)
USA	39.7	1,832.0	13.6	14.6	27.7	4.1	2.1	7.1	2.4	3.9	1,947.3	115.3	(5.9)
China	4.9	1.5	2,712.0	0.1	1.9	0.1	0.6	0.2	0.9	0.1	2,722.4	10.4	(0.4)
Korea	28.0	10.8	1.7	965.0	5.6	0.7	0.7	1.2	1.6	0.5	1,015.7	50.7	(5.0)
Taiwan	26.0	9.0	1.5	1.7	1,359.5	1.5	1.4	2.5	3.6	1.1	1,407.9	48.4	(3.4)
Singapore	13.8	8.0	53.0	4.1	9.0	148.5	3.0	14.3	6.7	1.4	261.8	113.4	(43.3)
Thailand	2.6	0.7	4.0	0.9	9.0	0.4	213.8	0.4	0.4	0.1	232.3	18.5	(8.0)
Malaysia	5.9	3.1	6.2	1.5	2.3	2.7	2.1	156.3	1.2	1.2	182.6	26.3	(14.4)
Indonesia	1.1	0.5	1.0	0.4	0.5	0.2	0.1	0.1	165.2	0.0	169.3	4.1	(2.4)
Philippines	0.8	1.0	4.8	0.7	0.5	0.2	0.1	0.8	0.8	140.2	150.0	9.8	(6.5)
Total Sensitivity	2,291.4	1,890.4	2,839.1	1,000.3	1,426.8	159.9	231.5	185.7	188.7	150.8	10,364.5	503.7	(4.9)
Total Domestic Employment	14,780.0	19,104.1	29,743.0	2,395.4	2,462.4	254.0	907.4	473.3	1,672.0	618.8	72,410.4		
% of domestic empoyment	15.5	9.9	9.5	41.8	57.9	62.9	25.5	39.2	11.3	24.4	14.3		
% from abroad	5.4	3.1	4.5	3.5	4.7	7.1	7.6	15.8	12.4	7.0	(4.9)		

Employment Impacts of a per million US$ Increase in final exports to the region and of exports to the ROW in 1985

	Employment impacts by the exports in the row country (man-year)										Total	Part to	% of
	Japan	USA	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines	Influence	abroad	abroad
Japan	13.68	0.15	0.26	0.07	0.07	0.01	0.05	0.02	0.04	0.01	14.4	0.7	(4.7)
USA	0.17	7.91	0.06	0.06	0.12	0.02	0.01	0.03	0.01	0.02	8.4	0.5	(5.9)
China	0.20	0.06	113.54	0.00	0.08	0.01	0.03	0.01	0.04	0.01	114.0	0.4	(0.4)
Korea	1.13	0.44	0.07	39.13	0.23	0.03	0.03	0.05	0.06	0.02	41.2	2.1	(5.0)
Taiwan	0.98	0.34	0.06	0.07	51.04	0.05	0.05	0.10	0.14	0.04	52.9	1.8	(3.4)
Singapore	0.95	0.55	3.63	0.28	0.62	10.16	0.21	0.98	0.46	0.10	17.9	7.8	(43.3)
Thailand	0.33	0.09	0.50	0.12	1.12	0.05	26.75	0.05	0.04	0.02	29.1	2.3	(8.0)
Malaysia	0.84	0.45	0.89	0.22	0.33	0.39	0.31	22.40	0.18	0.17	26.2	3.8	(14.4)
Indonesia	0.24	0.11	0.21	0.09	0.11	0.05	0.02	0.01	34.68	0.01	35.5	0.9	(2.4)
Philippines	0.19	0.22	1.09	0.16	0.12	0.04	0.03	0.19	0.17	31.81	34.0	2.2	(6.5)
Total Sensitivity	18.7	10.3	120.3	40.2	53.8	10.8	27.5	23.8	35.8	32.2	373.5	22.4	(6.0)
% from abroad	26.9	23.4	5.6	2.7	5.2	6.0	2.6	6.0	3.2	1.2	(6.0)		

Table 4 Employment Coefficients in Asia-Pacific Countries

Labour Coefficients 1990 (Persons/million US$)

	Japan	US	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines
Food,beverage and tobacco	6	4	72	5	7	8	15	9	29	20
Textile and leather products	16	13	129	19	18	23	34	37	95	84
Timber and wooden products	12	16	111	17	24	16	24	34	83	86
Pulp,paper and printing	8	8	127	12	13	13	32	25	37	49
Chemical products	3	3	103	5	6	3	21	6	31	18
Petroleum and petro products	1	1	58	1	3	0	1	1	0	1
Rubber products	38	38	78	24	29	12	23	13	74	56
Non-metallic mineral products	9	9	122	12	15	9	26	35	77	45
Metal products	5	7	99	7	12	10	28	18	25	23
Machinery	7	9	175	12	15	8	15	23	22	46
Transport equipment	4	6	116	8	10	10	9	16	14	39
Other manufacturing products	4	4	117	14	20	16	19	38	95	51
Total	6	7	116	10	13	7	20	19	40	32

Labour Coefficients 1985 (Persons/million US$)

	Japan	US	China	Korea	Taiwan	Singapore	Thailand	Malaysia	Indonesia	Philippines
Food,beverage and tobacco	10	5	69	10	12	11	19	9	28	17
Textile and leather products	29	16	87	41	39	42	55	66	122	116
Timber and wooden products	26	21	44	40	51	30	67	54	77	88
Pulp,paper and printing	16	10	81	27	30	24	40	54	69	45
Chemical products	6	5	116	9	10	6	29	9	41	21
Petroleum and petro products	1	1	43	2	3	0	0	1	0	1
Rubber products	68	44	56	58	61	14	41	12	65	62
Non-metallic mineral products	17	11	122	28	43	16	48	36	65	59
Metal products	9	9	92	15	25	18	42	18	29	20
Machinery	15	10	160	28	35	18	22	37	29	38
Transport equipment	8	5	86	25	26	20	18	11	12	21
Other manufacturing products	9	7	49	39	46	23	21	60	73	100
Total	12	8	97	22	28	11	30	19	36	29

	1985		1990	
	Labor coef. (man/mil$)	Productivity (US=100)	Labor coef. (man/mil$)	Productivity (US=100)
Japan	12.1	65.3	6.4	104.2
US	7.9	100.0	6.7	100.0
China	96.5	8.2	116.2	5.7
Korea	22.0	36.0	10.1	66.4
Taiwan	28.0	28.2	13.3	50.4
Singapore	11.1	71.5	7.4	90.6
Thailand	30.1	26.2	20.3	32.9
Malaysia	19.4	40.8	18.7	35.7
Indonesia	35.9	22.0	39.8	16.8
Philippines	29.1	27.2	32.2	20.8

Table 5 Ranking of Capital-Labour Ratio in Asia-Pacific Countries

Rank of Capital-Labour Ratio 1990

	Japan	US	Korea	Singapore	Malaysia	Indonesia	Average
Food,beverage and tobacco	8	4	6	4	5	9	7
Textile and leather products	11	12	10	12	12	8	12
Timber and wooden products	12	11	12	11	11	7	11
Pulp,paper and printing	7	7	8	6	3	1	5
Chemical products	3	2	2	2	2	3	2
Petroleum and petro products	1	1	1	1	1	-	1
Rubber products	10	10	11	5	7	10	10
Non-metallic mineral products	6	5	5	3	4	4	3
Metal products	5	3	3	8	6	5	4
Machinery	9	8	7	7	8	6	8
Transport equipment	4	6	4	10	9	2	6
Other manufacturing products	2	9	9	9	10	11	9

Table 6 H-O Tests for Japan 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(mil. PPP$ in 1985 prices)	0.8	0.5		
	Labour	(man-years)	10.3	6.8		
		Capital/Labour	0.077	0.070	0.915	L < K
Intermediate goods	Capital	(mil. PPP$ in 1985 prices)	0.8	0.5		
	Labour	(man-years)	11.3	7.5		
		Capital/Labour	0.075	0.068	0.910	L < K
Trade with US	Capital	(mil. PPP$ in 1985 prices)	0.9	0.6		
	Labour	(man-years)	11.8	7.4		
		Capital/Labour	0.073	0.075	1.035	L > K
Trade with China	Capital	(mil. PPP$ in 1985 prices)	0.8	0.5		
	Labour	(man-years)	10.7	8.0		
		Capital/Labour	0.079	0.057	0.721	L < K
Trade with NIES3	Capital	(mil. PPP$ in 1985 prices)	0.8	0.2		
	Labour	(man-years)	11.0	3.9		
		Capital/Labour	0.072	0.046	0.636	L < K
Trade with ASEAN4	Capital	(mil. PPP$ in 1985 prices)	0.9	0.3		
	Labour	(man-years)	10.8	5.3		
		Capital/Labour	0.084	0.059	0.701	L < K
Final goods	Capital	(mil. PPP$ in 1985 prices)	0.9	0.7		
	Labour	(man-years)	11.6	12.4		
		Capital/Labour	0.078	0.058	0.740	L < K
Trade with ROW	Capital	(mil. PPP$ in 1985 prices)	0.7	0.4		
	Labour	(man-years)	9.3	5.5		
		Capital/Labour	0.077	0.076	0.992	L < K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(mil. PPP$ in 1985 prices)	122,202.0	941,810.0	0.130	
	Labour	(man-years)	1,426,000.0	13,995,000.0	0.102	L < K
Intermediate goods	Capital	(mil. PPP$ in 1985 prices)	28,713.0	941,810.0	0.030	
	Labour	(man-years)	336,000.0	13,995,000.0	0.024	L < K
Trade with US	Capital	(mil. PPP$ in 1985 prices)	8,249.0	941,810.0	0.0088	
	Labour	(man-years)	122,000.0	13,995,000.0	0.0087	L < K
Trade with China	Capital	(mil. PPP$ in 1985 prices)	589.0	941,810.0	0.0006	
	Labour	(man-years)	-9,000.0	13,995,000.0	-0.0006	L < K
Trade with NIES3	Capital	(mil. PPP$ in 1985 prices)	22,052.0	941,810.0	0.023	L < K
	Labour	(man-years)	285,000.0	13,995,000.0	0.020	
Trade with ASEAN4	Capital	(mil. PPP$ in 1985 prices)	5,097.0	941,810.0	0.005	L < K
	Labour	(man-years)	30,000.0	13,995,000.0	0.002	
Final goods	Capital	(mil. PPP$ in 1985 prices)	51,181.0	941,810.0	0.054	
	Labour	(man-years)	547,000.0	13,995,000.0	0.039	L < K
Trade with ROW	Capital	(mil. PPP$ in 1985 prices)	42,308.0	941,810.0	0.045	
	Labour	(man-years)	543,000.0	13,995,000.0	0.039	L < K

Table 7 H-O Tests for the US 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(mil. PPP$ in 1985 prices)	0.7	0.8		
	Labour	(man-years)	7.5	9.4		
		Capital/Labour	0.096	0.087	0.910	L < K
Intermediate goods	Capital	(mil. PPP$ in 1985 prices)	0.8	1.1		
	Labour	(man-years)	7.7	12.1		
		Capital/Labour	0.104	0.089	0.859	L < K
Trade with Japan	Capital	(mil. PPP$ in 1985 prices)	0.7	1.1		
	Labour	(man-years)	7.4	12.2		
		Capital/Labour	0.099	0.092	0.930	L > K
Trade with China	Capital	(mil. PPP$ in 1985 prices)	0.8	0.9		
	Labour	(man-years)	6.8	10.1		
		Capital/Labour	0.122	0.090	0.736	L < K
Trade with NIES3	Capital	(mil. PPP$ in 1985 prices)	0.8	0.2		
	Labour	(man-years)	8.0	2.8		
		Capital/Labour	0.105	0.071	0.678	L < K
Trade with ASEAN4	Capital	(mil. PPP$ in 1985 prices)	0.9	0.8		
	Labour	(man-years)	8.1	10.7		
		Capital/Labour	0.111	0.078	0.704	L < K
Final goods	Capital	(mil. PPP$ in 1985 prices)	0.9	1.1		
	Labour	(man-years)	10.2	13.7		
		Capital/Labour	0.090	0.080	0.883	L < K
Trade with ROW	Capital	(mil. PPP$ in 1985 prices)	0.7	0.7		
	Labour	(man-years)	7.3	8.0		
		Capital/Labour	0.095	0.090	0.945	L < K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(mil. PPP$ in 1985 prices)	-102,003.0	1,872,953.0	-0.054	
	Labour	(man-years)	-1,563,000.0	20,679,000.0	-0.076	L < K
Intermediate goods	Capital	(mil. PPP$ in 1985 prices)	-11,880.0	1,872,953.0	-0.006	
	Labour	(man-years)	-218,000.0	20,679,000.0	-0.011	L < K
Trade with Japan	Capital	(mil. PPP$ in 1985 prices)	-10,513.0	1,872,953.0	-0.0056	
	Labour	(man-years)	-132,000.0	20,679,000.0	-0.0064	L < K
Trade with China	Capital	(mil. PPP$ in 1985 prices)	274.0	1,872,953.0	0.0001	
	Labour	(man-years)	-7,000.0	20,679,000.0	-0.0003	L < K
Trade with NIES3	Capital	(mil. PPP$ in 1985 prices)	16,972.0	1,872,953.0	0.009	L < K
	Labour	(man-years)	146,000.0	20,679,000.0	0.007	
Trade with ASEAN4	Capital	(mil. PPP$ in 1985 prices)	-1,541.0	1,872,953.0	-0.001	L < K
	Labour	(man-years)	-39,000.0	20,679,000.0	-0.002	
Final goods	Capital	(mil. PPP$ in 1985 prices)	-78,891.0	1,872,953.0	-0.042	
	Labour	(man-years)	-1,037,000.0	20,679,000.0	-0.050	L < K
Trade with ROW	Capital	(mil. PPP$ in 1985 prices)	-11,232.0	1,872,953.0	-0.006	
	Labour	(man-years)	-308,000.0	20,679,000.0	-0.015	L < K

Table 8 H-O Tests for Korea 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(10,000 won in 1990 prices)	46,277.9	39,068.5		
	Labour	(man-years)	20.9	14.1		
		Capital/Labour	2215.7	2765.0	1.248	L > K
Intermediate goods	Capital	(10,000 won in 1990 prices)	51,945.3	43,519.5		
	Labour	(man-years)	19.8	15.5		
		Capital/Labour	2625.2	2808.8	1.070	L > K
Trade with Japan	Capital	(10,000 won in 1990 prices)	47,164.6	53,904.2		
	Labour	(man-years)	17.2	19.0		
		Capital/Labour	2741.0	2844.3	1.038	L > K
Trade with US	Capital	(10,000 won in 1990 prices)	55,449.3	38,278.8		
	Labour	(man-years)	22.6	12.9		
		Capital/Labour	2457.6	2964.3	1.206	L > K
Trade with Asia	Capital	(10,000 won in 1990 prices)	54,372.4	29,517.6		
	Labour	(man-years)	19.9	12.7		
		Capital/Labour	2737.4	2330.9	0.851	L < K
Final goods	Capital	(10,000 won in 1990 prices)	51,654.4	50,977.7		
	Labour	(man-years)	26.9	20.6		
		Capital/Labour	1921.2	2476.6	1.289	L > K
Trade with ROW	Capital	(10,000 won in 1990 prices)	41,093.9	32,188.5		
	Labour	(man-years)	18.4	11.3		
		Capital/Labour	2236.6	2848.8	1.274	L > K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(mil. won in 1990 prices)	4,988,131.9	65,643,622.6	0.076	
	Labour	(man-years)	483,583.0	2,474,314.0	0.195	L > K
Intermediate goods	Capital	(mil. won in 1990 prices)	-4,395,440.9	65,643,622.6	-0.067	
	Labour	(man-years)	-135,028.0	2,474,314.0	-0.055	L > K
Trade with Japan	Capital	(mil. won in 1990 prices)	-3,957,891.4	65,643,622.6	-0.060	
	Labour	(man-years)	-135,107.0	2,474,314.0	-0.055	L > K
Trade with US	Capital	(mil. won in 1990 prices)	-1,171,154.5	65,643,622.6	-0.018	
	Labour	(man-years)	-16,752.0	2,474,314.0	-0.007	L > K
Trade with Asia	Capital	(mil. won in 1990 prices)	733,605.0	65,643,622.6	0.011	L < K
	Labour	(man-years)	16,831.0	2,474,314.0	0.007	
Final goods	Capital	(mil. won in 1990 prices)	5,140,569.4	65,643,622.6	0.078	
	Labour	(man-years)	320,991.0	2,474,314.0	0.130	L > K
Trade with ROW	Capital	(mil. won in 1990 prices)	4,243,003.3	65,643,622.6	0.065	
	Labour	(man-years)	297,620.0	2,474,314.0	0.120	L > K

Table 9 H-O Tests for Singapore 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(S$ in 1990 prices)	8,277.0	9,668.9		
	Labour	(man-years)	13.2	15.8		
		Capital/Labour	625.3	611.7	0.978	L < K
Intermediate goods	Capital	(S$ in 1990 prices)	9,698.9	9,757.1		
	Labour	(man-years)	13.3	17.4		
		Capital/Labour	726.7	561.9	0.773	L < K
Trade with Japan	Capital	(S$ in 1990 prices)	8,684.6	10,797.2		
	Labour	(man-years)	9.2	19.6		
		Capital/Labour	940.9	550.6	0.585	L < K
Trade with US	Capital	(S$ in 1990 prices)	10,608.3	9,964.5		
	Labour	(man-years)	18.8	17.1		
		Capital/Labour	564.3	582.2	1.032	L > K
Trade with Asia	Capital	(S$ in 1990 prices)	9,562.7	8,644.8		
	Labour	(man-years)	11.9	15.4		
		Capital/Labour	806.1	562.8	0.698	L < K
Final goods	Capital	(S$ in 1990 prices)	10,536.1	10,177.4		
	Labour	(man-years)	19.8	20.6		
		Capital/Labour	531.5	493.3	0.928	L < K
Trade with ROW	Capital	(S$ in 1990 prices)	6,716.4	9,279.6		
	Labour	(man-years)	10.8	11.2		
		Capital/Labour	623.9	825.5	1.323	L > K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(1,000 S$ in 1990 prices)	-4,159.4	194,828.9	-0.021	
	Labour	(man-years)	-21,295.0	359,000.0	-0.059	L < K
Intermediate goods	Capital	(1,000 S$ in 1990 prices)	-51,275.6	194,828.9	-0.263	
	Labour	(man-years)	-144,116.0	359,000.0	-0.401	L < K
Trade with Japan	Capital	(1,000 S$ in 1990 prices)	-54,741.1	194,828.9	-0.281	
	Labour	(man-years)	-115,476.0	359,000.0	-0.322	L < K
Trade with US	Capital	(1,000 S$ in 1990 prices)	-1,924.3	194,828.9	-0.010	
	Labour	(man-years)	-1,106.0	359,000.0	-0.003	L > K
Trade with Asia	Capital	(1,000 S$ in 1990 prices)	5,389.8	194,828.9	0.028	L < K
	Labour	(man-years)	-27,534.0	359,000.0	-0.077	
Final goods	Capital	(1,000 S$ in 1990 prices)	14,110.7	194,828.9	0.072	
	Labour	(man-years)	13,802.0	359,000.0	0.038	L < K
Trade with ROW	Capital	(1,000 S$ in 1990 prices)	33,005.5	194,828.9	0.169	
	Labour	(man-years)	109,019.0	359,000.0	0.304	L > K

Table 10 H-O Tests for Malaysia 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(10,000 M$ in 1990 prices)	67.3	96.4		
	Labour	(man-years)	27.0	34.9		
		Capital/Labour	2.5	2.8	1.110	L > K
Intermediate goods	Capital	(10,000 M$ in 1990 prices)	53.2	92.2		
	Labour	(man-years)	20.7	32.7		
		Capital/Labour	2.6	2.8	1.100	L > K
Trade with Japan	Capital	(10,000 M$ in 1990 prices)	28.5	93.5		
	Labour	(man-years)	11.4	35.0		
		Capital/Labour	2.5	2.7	1.072	L > K
Trade with US	Capital	(10,000 M$ in 1990 prices)	89.2	93.8		
	Labour	(man-years)	35.0	31.5		
		Capital/Labour	2.5	3.0	1.169	L > K
Trade with Asia	Capital	(10,000 M$ in 1990 prices)	55.0	90.7		
	Labour	(man-years)	21.2	31.3		
		Capital/Labour	2.6	2.9	1.113	L > K
Final goods	Capital	(10,000 M$ in 1990 prices)	96.7	101.7		
	Labour	(man-years)	41.6	38.4		
		Capital/Labour	2.3	2.7	1.142	L > K
Trade with ROW	Capital	(10,000 M$ in 1990 prices)	76.6	94.1		
	Labour	(man-years)	30.5	32.7		
		Capital/Labour	2.5	2.9	1.144	L > K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(mil. M$ in 1990 prices)	-5,173.4	26,349.5	-0.196	
	Labour	(man-years)	-108,431.0	939,134.0	-0.115	L > K
Intermediate goods	Capital	(mil. M$ in 1990 prices)	778.4	26,349.5	0.030	
	Labour	(man-years)	56,044.0	939,134.0	0.060	L > K
Trade with Japan	Capital	(mil. M$ in 1990 prices)	-1,379.6	26,349.5	-0.052	
	Labour	(man-years)	-47,964.0	939,134.0	-0.051	L > K
Trade with US	Capital	(mil. M$ in 1990 prices)	1,278.6	26,349.5	0.049	
	Labour	(man-years)	57,172.0	939,134.0	0.061	L > K
Trade with Asia	Capital	(mil. M$ in 1990 prices)	879.3	26,349.5	0.033	L > K
	Labour	(man-years)	46,836.0	939,134.0	0.050	
Final goods	Capital	(mil. M$ in 1990 prices)	-5,941.5	26,349.5	-0.225	
	Labour	(man-years)	-202,712.0	939,134.0	-0.216	L > K
Trade with ROW	Capital	(mil. M$ in 1990 prices)	-10.3	26,349.5	0.000	
	Labour	(man-years)	38,237.0	939,134.0	0.041	L > K

Table 11 H-O Tests for Indonesia 1990

1) Leontief test

Types of trade	Production factors	Units	Factor requirements per mil. US$ of exports	Factor requirements per mil. US$ of imports	Test values	Judgements
Total Trade	Capital	(10,000 Rph in 1990 prices)	37,133.6	58,344.0		
	Labour	(man-years)	39.2	47.6		
		Capital/Labour	947.2	1224.5	1.293	L > K
Intermediate goods	Capital	(10,000 Rph in 1990 prices)	24,056.8	68,261.0		
	Labour	(man-years)	24.3	53.2		
		Capital/Labour	991.9	1283.0	1.294	L > K
Trade with Japan	Capital	(10,000 Rph in 1990 prices)	15,189.3	67,880.7		
	Labour	(man-years)	15.5	50.6		
		Capital/Labour	978.2	1340.6	1.370	L > K
Trade with US	Capital	(10,000 Rph in 1990 prices)	37,875.0	67,695.8		
	Labour	(man-years)	44.1	54.6		
		Capital/Labour	859.2	1239.7	1.443	L > K
Trade with Asia	Capital	(10,000 Rph in 1990 prices)	40,739.4	68,858.9		
	Labour	(man-years)	37.4	55.2		
		Capital/Labour	1088.7	1246.5	1.145	L > K
Final goods	Capital	(10,000 Rph in 1990 prices)	68,865.8	61,595.3		
	Labour	(man-years)	80.1	56.0		
		Capital/Labour	859.7	1100.7	1.280	L > K
Trade with ROW	Capital	(10,000 Rph in 1990 prices)	53,878.0	53,929.7		
	Labour	(man-years)	56.9	43.3		
		Capital/Labour	946.2	1244.7	1.315	L > K

2) Leamer test

Types of trade	Production factors	Units	Factor content in net exports	Factor content in domestic consumption	Test values	Judgements
Total Trade	Capital	(mil. Rph in 1990 prices)	-5,093,178.0	31,456,172.8	-0.162	
	Labour	(man-years)	-168,301.0	2,817,738.0	-0.060	L > K
Intermediate goods	Capital	(mil. Rph in 1990 prices)	189,889.7	31,456,172.8	0.006	
	Labour	(man-years)	108,055.0	2,817,738.0	0.038	L > K
Trade with Japan	Capital	(mil. Rph in 1990 prices)	20,312.6	31,456,172.8	0.001	
	Labour	(man-years)	46,966.0	2,817,738.0	0.017	L > K
Trade with US	Capital	(mil. Rph in 1990 prices)	175,064.5	31,456,172.8	0.006	
	Labour	(man-years)	42,477.0	2,817,738.0	0.015	L > K
Trade with Asia	Capital	(mil. Rph in 1990 prices)	-5,487.4	31,456,172.8	0.000	L > K
	Labour	(man-years)	18,612.0	2,817,738.0	0.007	
Final goods	Capital	(mil. Rph in 1990 prices)	-1,077,887.3	31,456,172.8	-0.034	
	Labour	(man-years)	-53,136.0	2,817,738.0	-0.019	L > K
Trade with ROW	Capital	(mil. Rph in 1990 prices)	-4,205,180.4	31,456,172.8	-0.134	
	Labour	(man-years)	-223,220.0	2,817,738.0	-0.079	L > K