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ECONOMIC REGIONALISATION AND INTRA-INDUSTRY TRADE: PACIFIC-ASIAN PERSPECTIVES

by

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RÉSUMÉ

Cette étude examine le développement des échanges dans les économies du Pacifique asiatique, dans une perspective d'intégration régionale, au cours des dix dernières années. L'aspect intra-régional et intra-industriel du développement des échanges constitue le thème principal de l'étude. Elle fournit certaines preuves statistiques qui accréditent l'image souvent évoquée à propos du surprenant développement des échanges dans la région du Pacifique asiatique pendant les années 80, image d'un schéma de développement dit "vol d'oies sauvages" et qui est, en fait, un développement de type inter-industriel. L'étude soutient cependant que depuis la seconde moitié des années 80, ces développements ont apporté un nouveau regard sur la répartition de la main- d'oeuvre, augmentant ainsi les opportunités pour les échanges intra-industriels (EII) dans les économies du Pacifique asiatique.

L'analyse empirique, basée sur l'indice de Grubel-Lloyd pour les produits manufacturés, indique que l'augmentation considérable des niveaux d'EII dans les économies en développement de la région est la conséquence d'une "globalisation" des activités des sociétés aux États-Unis et plus récemment au Japon et dans les NEI d'Asie. Les résultats de l'analyse régressive des déterminants de l'EII montrent que plus les similarités entre les structures de la demande et de la production sont grandes, et que les coûts de transports restent bas, plus le niveau des EII bilatéraux croît. Le maintien d'une croissance élevée dans les économies du Pacifique asiatique pendant les années 90 accentuera les opportunités d'EII dans la région. Néanmoins, la formation d'un bloc d'échanges *de jure* au sein des pays du Pacifique asiatique aurait un effet négatif ; un niveau généralement élevé d'EII entre l'Amérique du Nord et plusieurs économies de la région du Pacifique asiatique peut être considéré comme la marque d'une collaboration étroite dans la production de produits manufacturés des deux régions.

SUMMARY

The present paper examines the trade development of Pacific-Asian economies during the past decade from the perspective of regional integration. Its main focus is on the development of intra-regional and intra-industry trade. It provides some statistical evidence for the often-heard argument that the remarkable development of Pacific-Asian trade in the 1980s should be seen as a case for the "flying-geese" pattern of trade development, which is basically of inter-industry type. It argues, however, that developments since the mid-1980s have provided a new dimension to the regional division of labour — increasing the opportunities for intra-industry trade (IIT) among the Pacific-Asian economies.

The empirical analysis based on the Grubel-Lloyd index of IIT in manufactures suggests that large increases in the level of IIT in the developing economies of the region is a consequence of "globalisation" of corporate activities in the United States and, more recently, in Japan and the Asian NIEs. The results of the regression analysis of the determinants of IIT indicate that the greater the similarities in demand and production structures are and the lower transportation costs are between two countries, the higher is the level of bilateral IIT. The continued high growth of the Pacific-Asian developing economies in

the 1990s would provide greater opportunities for IIT within the region. However, the formation of a *de jure* trade bloc within Pacific Asia would be counter-productive; a generally high level of IIT between North America and many Pacific-Asian economies can be regarded as a sign of close integration in manufacturing production of the two regions.

PREFACE

The Development Centre is carrying out a major research project on Globalisation and Regionalisation as part of its 1990-1992 Work Programme. The Project aims to provide a better understanding of the economic and political forces that are working for, and against, the formation of regional economic groupings in Europe, the Western Hemisphere and Pacific Asia, and how those forces interact with the forces (essentially microeconomic) that are driving globalisation. The purpose is to assess their implications for the strategies and policies of various categories of developing countries.

The continuing failure to successfully conclude the Uruguay Round of multilateral trade negotiations, combined with the processes of regionalisation taking place in Europe and the Western Hemisphere, strengthens the temptation for Pacific-Asian economies to move towards the formation of a regional trade bloc. It is therefore important to have a balanced view of the issue of regionalisation in Pacific Asia, one based on a thorough empirical analysis of trade developments in the region

This Paper contributes to such an analysis by focusing on the development of intra-regional and particularly intra-industry trade among the Pacific-Asian economies. It shows that while there has been a recent surge in intra-regional trade, the economies in the region have also become closely integrated with North America. The continuing globalisation of US corporate activity, and more recently of firms in Japan and the Asian NIEs, is largely responsible for this phenomenon.

In providing new insights into the dynamics of trade in the fastest growing region in the world today, in shedding important new light on the widely discussed "flying geese" model of Pacific-Asian integration, and in arguing that the formation of a *de jure* bloc in Pacific Asia would be counter-productive, this Paper constitutes an important contribution to the Centre's research on Globalisation and Regionalisation.

Louis Emmerij
President of the OECD Development Centre
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I. INTRODUCTION

The present paper is concerned with the problem of economic regionalisation facing the industrial world, which has attracted much attention from economists and policy makers in recent years. Given the increased pace of the movement towards the formation of regional trade blocs in Europe and the Western Hemisphere, some analysts argue that the industrial world will be split into three major trading blocs in the 1990s, with a Pacific-Asian bloc emerging "by default — not as a formal free trade area, but because of the rising protection in the EC and North America and the falling protection" in Pacific Asia (Stoeckel, Pearce and Banks, 1990, p. ix). The recent policy initiative undertaken by Malaysia to set up a new regional group in Pacific Asia, known as East Asian Economic Grouping (EAEG), has induced mixed feelings among the "potential" member countries in the region[1]. On the one hand, they fear that the Malaysian initiative would prove counter-productive by aggravating the trans-Pacific economic relationship that has already become very tense on some occasions and by further inspiring economic regionalism in other parts of the world. On the other hand, it seems that Pacific-Asian economies, whose success since the Second World War owes much to the existence of a liberal world trading system, strongly feel that they have to protect their own economic interests, given the slow progress in the Uruguay Round trade negotiations and the current movement towards deeper and probably wider economic integration in Western Europe and North America.

The purpose of this paper is to examine the development of Pacific-Asian trade during the 1980s from the perspective of regional integration. It has been argued that the remarkable trade and growth performance of developing economies in Pacific Asia can be seen as a case for the "flying-geese" (FG) pattern of trade development, which will lead to closer economic integration among the regional economies in the 1990s[2]. In 1990 the ADB Outlook stated:

> Rapid growth in intra-Asian trade during the last few years has been accompanied by a phenomenal increase in intra-Asian direct foreign investment. The strong investment flows from Japan and the Asian NIEs to Southeast Asia are likely to reshape the regional structure of production over the next decade and sustain developing Asia's economic growth in the 1990s. Such investment is also likely to promote greater interdependence among the Asian economies and make the region a more cohesive entity in the world economy (Asian Development Bank, 1990, p. 39).

However, opinions differ on the future prospect for a *de facto* regional integration among Pacific-Asian economies. It is claimed that despite signs pointing in that direction in recent years, Pacific-Asian economic integration will be much more difficult to attain than it may appear[3]. For one thing, the FG pattern of trade development in Pacific Asia would not be sustainable without a large open market **outside** the region — above all, the US market. The macroeconomic conditions and the political climate on the other side of the Pacific will make it increasingly difficult for "Asian geese" to use the American market as an outlet for their manufactured goods. For another, Japan is unlikely to become the major absorber of manufactured exports from other Pacific-Asian economies, partly because Japan's

propensity to import manufactured goods is significantly lower than America's[4], and partly because Japan will maintain its technological lead over neighbouring competitors and remain cost-competitive in human capital and technology intensive products for many years to come. Therefore, the FG pattern of trade development may be discernible only in the case of unskilled labour-intensive industries, whereas human capital and technology intensive industries may not easily conform to this pattern[5].

The prospects for closer economic integration in Pacific Asia will also depend on the future development of intra-industry trade among Pacific-Asian economies. The Pacific-Asian economies differ widely in their relative factor endowments and stage of development. This is in sharp contrast with economic integration among "similar" countries, of which the European Communities are the best example. Based on the experience of the EC, EFTA and free trade arrangements among developing countries, it has been argued that the adjustment process following trade liberalisation would be less disruptive if industrial adjustment took the form of intra-industry rather than inter-industry specialisation[6].

The economic reasoning behind this argument is that when intra-industry trade dominates, the reallocation of resources mainly takes place within firms in the same industry rather than between firms in different industries, so the cost of intra-industry adjustment, other things being equal, will be lower than that of inter-industry adjustment[7]. Moreover, changes in income distribution arising from trade liberalisation would be less dramatic if industrial adjustment took the form of intra-industry rather than inter-industry specialisation. One might infer from this point of view that despite the recent progress in liberalising trade regimes, Pacific-Asian economies could face political opposition to the regional efforts towards closer economic integration in the future if the regional pattern of trade specialisation is basically of inter-industry type.

The paper is organised as follows. Section II first reviews some basic features of Pacific-Asian trade that are characterised by strong complementarity among several groups of the region's economies. This is followed by an analysis of the changing pattern of Pacific-Asian trade during the 1980s, based on a world merchandise trade matrix. A statistical test based on Balassa's "revealed comparative advantage" (RCA) index is used to determine whether the shift in the pattern of trade specialisation in manufactured goods among Pacific-Asian economies actually occurred during the 1980s, as suggested by the FG model. Section III is devoted to a detailed analysis of intra-industry trade (IIT) among Pacific-Asian economies. First, the emergence of IIT in the "North-South" context is briefly discussed to clarify various types of IIT. This is followed by a descriptive analysis of the level and pattern of IIT in Pacific-Asian economies, using the "Grubel-Lloyd" index of IIT. A regression analysis is then attempted to examine the main determinants of intra-industry trade among Pacific-Asian economies. Finally, the main conclusions of this paper are presented in Section IV. Trade data and product classification used in this paper are explained in the Appendix.

Throughout this paper "Pacific Asia" is defined, unless otherwise noted, as a region comprising twelve economies, i.e. the developed economies of Australia, Japan and New Zealand; the NIEs of Hong Kong, the Republic of Korea (hereafter, referred to as South Korea), Singapore and Taiwan; the next-tier NIEs (NNIEs) of Indonesia, Malaysia, the Philippines and Thailand; and China. While various "scenarios" are possible for regional groupings with respect to the Asia and Pacific region (e.g. the Pacific Basin, the Pacific Rim

and so on), whether or not North America should be included in this region seems to be the most contentious issue in the current debate on economic regionalism. Thus we will return to this problem in the concluding section.

II. DEVELOPMENTS IN PACIFIC-ASIAN TRADE DURING THE 1980s

The 1980s witnessed the emergence of Pacific Asia as the most dynamic growth centre of the world economy. The share of Pacific Asia in world merchandise trade increased substantially from 16 per cent in 1979 to 24 per cent in 1989 on the export side and from 15 to 20 per cent on the import side (Appendix Table 1-4). This development is based on sustained high growth of developing economies in Pacific Asia. While economic growth in other developing regions (with the notable exception of South Asia) fell sharply during the 1980s, the growth rate of the East and Southeast Asian economies increased from an annual average of 7.3 per cent in 1965-80 to 8.4 per cent in 1980-89[8]. With the dynamic growth of the region's developing economies and the respectable growth of Japan (4.1 per cent), Pacific Asia as a whole had a significantly higher growth of merchandise trade than the world average during the 1980s (Appendix Table 2).

Another important development of Pacific-Asian trade was the dynamic expansion of **intra**-regional trade, which began in 1986. The share of intra-regional trade in total exports of Pacific Asia increased substantially from 34 per cent in 1986 to 42 per cent in 1989. This is in sharp contrast to the development experienced during the first half of the decade when North America was the single most important market for Pacific-Asian exports (Appendix Table 1-2).

The increased importance of intra-regional trade in Pacific Asia is more striking if we look at the change in its **import** share during the 1980s; it grew from 40 per cent in 1979 to 51 per cent in 1989 (Appendix Table 1-3). Although the relative importance of intra-regional trade for Pacific Asia is far smaller than that for OECD countries of Europe[9], developments since 1986 seem to suggest that trade linkages among Pacific-Asian economies have now become much more cohesive and interdependent than just five years ago. In the following pages, we briefly discuss various aspects of the closer trade relationships among Pacific-Asian economies during the 1980s.

A. Complementarities among Pacific-Asian Economies

It should be noted at the outset that the pattern of Pacific-Asian trade is strongly influenced by complementarities among several groups of the region's economies. As Table 1 indicates, Pacific-Asian economies differ widely with respect to per capita income, the size of economy, exposure to external trade, the level of industrialisation, the commodity pattern of trade and so on.

It is generally expected that strong complementarities among Pacific-Asian economies give rise to the pattern of trade, which is primarily of the Heckscher-Ohlin type in which differences in the export structure among the economies basically reflect differences in relative factor endowments. It is evident that the availability of natural resources dictates the pattern of trade specialisation among Pacific-Asian economies; the commodity pattern of exports in resource-poor Japan and NIEs (except Singapore) is heavily biased towards manufactures, whereas the exports of Australia and New Zealand

Table 1. **Characteristics of Pacific-Asian Economies, 1988**

	GNP per capita	Population	Share of total trade in GDP[a]	Share of manufacturing in GDP	Structure of exports	
					Primary	Manufactures
	($)	(Million)	(%)	(%)	(%)	
Japan	21 020	122.6	23	29	2	98
Australia	12 340	16.5	35	18	75	25
New Zealand	10 000	3.3	53	23	76	24
Hong Kong	9 220	5.7	267	22	8	92
Singapore	9 070	2.6	339	30	26	74
Taiwan	6 443	19.9	90	38	8	92
South Korea	3 600	42.0	73	32	7	93
Malaysia	1 940	16.9	124	24	55	45
Thailand	1 000	54.5	70	24	48	52
Philippines	630	59.9	49	25	38	62
Indonesia	440	174.8	46	19	71	29
China	330	1 088.4	29	33	27	73

a. Exports and imports of goods and services.

Sources: World Bank, *World Development Report 1990*; ADB, *Asian Development Outlook 1990*; and *Taiwan Statistical Data Book 1990*.

are highly specialised in primary products. Exports of primary products are also very important for resource-rich countries in Southeast Asia as well as for China (Appendix Table 3)[10].

There are also important differences in the division of labour in trade in manufactures among Pacific-Asian economies (Table 2). As Riedel (1991) points out, the large differences in per capita income among Pacific-Asian economies originate chiefly from differences in per capita stocks of tangible and intangible capital (human skills and technology in a broad sense). This is why the exports of Japan, the most advanced economy in the region, involve a high concentration of human capital and technology intensive products; these products accounted for more than 90 per cent of Japan's manufactured exports in 1988. On the other hand, unskilled labour-intensive products constitute the bulk of manufactured exports in the NIEs (except Singapore), accounting for 40 to 50 per cent of their manufactured exports[11], whereas natural resource-intensive products hold an important share in resource-rich, next-tier NIEs.

It is also clear from Table 2 that export diversification has been taking place in the Pacific-Asian developing economies during the 1980s. The NIEs have reduced the export share of unskilled labour-intensive products in favour of technology and/or human capital intensive products. Similarly, the next-tier NIEs have been shifting away from heavy reliance on natural resource-based products towards an export pattern that is typical of the NIEs. In fact, in all developing economies in Pacific Asia (except Indonesia) the export share of technology intensive products increased significantly during the past decade.

Table 2. **Structure of Manufactured Exports in Pacific-Asian Economies, 1979 and 1988**

A. Developed countries	Japan		Australia		New Zealand	
	1979	1988	1979	1988	1979	1988
			(Million $)			
Natural resource-intensive products	2 452	3 899	1 293	3 016	275	660
Unskilled labour-intensive products	10 540	15 486	283	504	176	337
Technology intensive products	35 271	128 907	1 057	1 828	243	670
Human capital-intensive products	50 732	108 665	1 115	1 244	328	641
Above total (Sections 5 to 8)	98 995	256 957	3 748	6 592	1 022	2 308
			(Percentage)			
Natural resource-intensive products	2	2	34	46	27	29
Unskilled labour-intensive products	11	6	8	8	17	15
Technology intensive products	36	50	28	28	24	29
Human capital-intensive products	51	42	30	19	32	28
Above total (Sections 5 to 8)	100	100	100	100	100	100

B. NIEs	Hong Kong		South Korea		Singapore		Taiwan	
	1979	1988	1979	1988	1979	1988	1979	1988
				(Million $)				
Natural resource-intensive products	99	253	790	1 205	495	1 320	967	2 574
Unskilled labour-intensive products	6 954	13 727	6 835	23 343	1 329	3 491	7 027	23 796
Technology intensive products	1 103	6 482	2 160	13 443	3 223	17 863	3 534	18 518
Human capital-intensive products	2 579	6 214	3 540	18 720	1 533	5 556	2 309	11 003
Above total (Sections 5 to 8)	10 735	26 676	13 325	56 711	6 580	28 230	13 837	55 891
				(Percentage)				
Natural resource-intensive products	1	1	6	2	8	5	7	5
Unskilled labour-intensive products	65	51	51	41	20	12	51	43
Technology intensive products	10	24	16	24	49	63	26	33
Human capital-intensive products	24	23	27	33	23	20	17	20
Above total (Sections 5 to 8)	100	100	100	100	100	100	100	100

C. Next-tier NIEs	Indonesia		Malaysia		Philippines		Thailand	
	1979	1988	1979	1988	1979	1988	1979	1988
				(Million $)				
Natural resource-intensive products	464	3 007	1 303	962	308	547	698	1 004
Unskilled labour-intensive products	126	1 807	332	1 617	504	1 014	635	3 950
Technology intensive products	165	378	1 169	5 469	146	883	219	2 482
Human capital-intensive products	78	714	207	1 639	124	128	131	1 284
Above total (Sections 5 to 8)	833	5 906	3 011	9 687	1 082	2 572	1 683	8 720
				(Percentage)				
Natural resource-intensive products	56	51	43	10	28	21	41	12
Unskilled labour-intensive products	15	31	11	17	47	39	38	45
Technology intensive products	20	6	39	56	13	34	13	28
Human capital-intensive products	9	12	7	17	11	5	8	15
Above total (Sections 5 to 8)	100	100	100	100	100	100	100	100

Note: Exports refer to domestic exports only, except for Singapore where re-exports are included. (See Appendix for the definition of product classification.)

Source: UNSO, Comtrade Database.

B. Inter- versus Intra-regional Trade

As noted above, North America was (and has always been) the principal export market for Pacific-Asian economies, particularly Japan and the NIEs. Their reliance on the North American market became even greater during the first half of the 1980s. This was due to the strong growth of US import demand, which was reinforced by the strength of the dollar, and the weak import demand of developing economies in Pacific Asia and other areas (notably, the Middle East), which were badly hit by depressed commodity markets. This resulted in large trade imbalances between Pacific Asia and North America. In 1986, the aggregate value of the merchandise trade balance on a f.o.b.-f.o.b. basis (calculated from Appendix Table 1-1) stood at $89 billion in favour of Pacific Asia, of which Japan and the NIEs accounted for $56 billion and $33 billion, respectively (Table 3)[12].

Table 3. **Merchandise Trade Balance of Pacific Asia with North America and OECD countries of Europe 1986, 1989 and 1990**
($ billion)

A. With North America	1986	(%)	1989	(%)	1990[a]	(%)
Pacific Asia	88.8	100	85.9	100	76.4	100
Japan	56.4	64	48.7	57	41.0	54
ANZ	-3.3	-4	-4.7	-5	-4.3	-6
NIEs	33.1	37	37.8	44	35.5	46
NNIEs	3.6	4	6.5	8	5.4	7
China	-1.0	-1	-2.4	-3	-1.2	-2
NIEs + China	32.1	36	35.4	41	34.3	45

B. With OECD countries of Europe	1986	(%)	1989	%	1990[a]	%
Pacific Asia	21.6	100	33.1	100	32.3	100
Japan	24.0	111	28.3	85	25.9	80
ANZ	-3.4	-16	-4.7	-14	-4.8	-15
NIEs	3.6	17	10.4	31	9.8	30
NNIEs	0.5	2	1.8	5	1.4	4
China	-3.1	-14	-2.7	-8	0.0	0
NIEs + China	0.5	2	7.7	23	9.8	30

a. Figures for 1990 are preliminary estimates.

Source: Appendix Table 1; IMF Direction of Trade Statistics, March 1991. OECD Monthly Statistics of Foreign Trade, May 1991; and national statistics.

Since 1986, however, the regional pattern of Pacific-Asian trade has undergone a significant change with a surge in intra-regional trade among the Pacific-Asian economies.

The exchange rate realignment of the currencies of Japan, and subsequently of Taiwan and South Korea, which occurred during the second half of the 1980s, certainly played a central role in turning the Pacific-Asian economy towards new patterns of development. Not only did it encourage the dramatic shift of the Japanese economy, with domestic demand (i.e. private consumption and business investment) becoming the main source of economic growth, but also it provided new trade opportunities for developing economies in the region, particularly those in Southeast Asia. With the emergence of the NIEs and next-tier NIEs as dynamic exporters **and** importers of manufactures, Pacific Asia as a whole experienced a phenomenal increase in intra-regional trade between 1986 and 1989 (Appendix Table 2)[13].

The large real effective appreciation of the Japanese yen following the so-called "Plaza Accord" compelled Japanese firms to make rapid adjustments to remain internationally competitive. A large number of Japanese firms responded by relocating uncompetitive production processes or sub-processes in East and Southeast Asia through foreign direct investment (FDI) and by "outsourcing" parts and components from low-cost countries (Urata, 1990). This "globalisation" of Japanese firms has led to a surge in foreign direct investment in Pacific-Asian developing economies, and contributed to the recent expansion of their exports of manufactures, particularly to the Japanese market (Takeuchi, 1990 and Urata, 1990).

The globalisation strategy has also been adopted by NIE firms that have been facing a rapid rise in domestic wage costs over the past few years. While quantitative information is fragmentary and scarce, the recent rise in FDI outflows from the NIEs suggests that they have been undertaking industrial restructuring by relocating unskilled labour-intensive industries whose export competitiveness has been eroded by cost pressures at home and a real appreciation of their currencies (in the case of South Korea and Taiwan)[14].

As regards the changing pattern of **inter**-regional trade of Pacific Asia, a recent study points to the increasing importance of Pacific Asia to the United States as "a major expanding source of imports" and as "an expanding market for exports" (Hervey, 1990, p. 12)[15]. In fact, North America's exports to Pacific Asia grew by more than 20 per cent per annum between 1986 and 1989, which was more than twice the rate of growth of Pacific Asia's exports to North America (Appendix Table 2). Despite these developments since 1986, however, a substantial improvement in bilateral trade imbalances between Pacific Asia and North America has yet to be seen. It seems that the exchange rate changes since late 1985 had a significant impact on the geographical distribution of trade surpluses within the Pacific-Asian economies (i.e. from Japan to NIEs and to NNIEs), but not necessarily on the **size** of trade imbalances between the two regions (Table 3)[16]. The change in merchandise trade imbalances between Pacific Asia and the OECD countries of Europe was similar to that with North America, but the absolute size of Pacific Asia's trade surplus increased between 1986 and 1989[17].

Preliminary figures for 1990 show that the basic pattern of bilateral trade imbalances observed between 1986 and 1989 continued in 1990, though Pacific Asia's trade surplus with North America declined moderately. The persisting large trade imbalances between Pacific Asia and North America and the OECD countries of Europe will remain a major political factor that could destabilize the multilateral trading system by encouraging new market-sharing arrangements and prolonging the existing ones.

C. The China Factor

China's participation in international trade following the adoption of an "open-door" policy in 1979 has brought about two important changes in the pattern of trade in Pacific Asia. First, it has given an additional boost to intra-regional trade, since the bulk of China's external transactions are with its neighbours such as Japan, Hong Kong and Singapore. During the 1980s the coastal area of China, particularly Guangdong Province, emerged as a major supplier of manufactured goods through Hong Kong. Reflecting its relative abundance of natural resources and low-wage labour, China's main export items are predominantly natural resource-based products (e.g. food and mineral products such as crude petroleum and coal) and unskilled labour-intensive products, notably textiles, clothing, toys, sporting and travel goods and similar articles. More recently, China has been expanding exports of human capital and technology intensive products (e.g. watches and clocks and telecommunication equipment) by relying heavily on imported parts and components and specialising in labour-intensive processes in vertically integrated production (Zhao, 1990).

Another important and related change in Pacific-Asian trade is Hong Kong's role as the entrepôt for China, which has greatly increased in importance during the 1980s. In analysing "Hong Kong-China" trade relationships, it is important to distinguish between three types of trade: trans-shipment, entrepôt trade and direct trade. While trans-shipment refers to those goods that are "in transit" at an entrepôt for onward shipment, and thus not having customs clearance, entrepôt trade means that goods are imported (i.e. cleared customs) at an entrepôt for the purpose of being re-exported later to final destination. This "indirect" trade (i.e. imports for re-exporting) may include minor processing of imported goods before being re-exported (e.g. sorting, packing, decorating and so on) but not to the extent that it changes the "rule of origin". On the other hand, "direct trade" refers to domestic exports and imports for domestic use (or retained imports). In Hong Kong, "any manufacturing process that permanently changes the shape, nature, form or utility of the basic materials used in manufacture, would turn the product into a domestic export" (Sung, 1990, p. 4).

In 1979 about one-third of China's exports to Hong Kong were re-exported elsewhere, with the rest being retained for domestic use. By 1988 the share of re-exports had jumped to nearly three-quarters of China's exports to Hong Kong, which accounted for 30 per cent of China's total exports[18]. This reflects the fact that China (more precisely, Guangdong Province) became increasingly important as the main manufacturing base for Hong Kong during the 1980s[19]. It is important to note that entrepôt trade generates value added for Hong Kong traders who provide packing, marketing and other commercial services[20].

Sung (1990) argues that the increased importance of entrepôt trade in Hong Kong is a consequence of reforms in China moving towards a market economy[21]. This is because marketisation of the Chinese economy inevitably increases the demand for intermediary services that Hong Kong firms can furnish more efficiently than domestic firms in China[22]. Sung also points out that the increasing demand for intermediary services in Hong Kong is directly linked to the rapid diversification of China's export structure. This is because, compared with commodity trade, trade in manufactured goods requires more sophisticated services for marketing and product development, which can be obtained at lower cost in Hong Kong than in China.

D. Shifting Comparative Advantage in Manufactured Goods

It has been argued that the remarkable trade and growth performance of Pacific-Asian developing economies in the recent years can be best seen as the so-called, "flying-geese" (FG) pattern of trade development[23]. The basic idea is to portray the trade development of Pacific Asia as multiple "catching-up" processes within a cluster of economies at different stages of industrialisation and development: more advanced economies in Pacific Asia respond to the catching-up of their immediate followers by moving up the ladder of comparative advantage to exports of more human capital-intensive and/or more technologically sophisticated products, thereby leaving the room for imports of relatively unskilled labour-intensive, standardized products. Led by Japan as the leading economy in the region, and followed by the NIEs, next-tier NIEs and China, the Pacific-Asian economies advance together through trade expansion based on shifting comparative advantage over time. Although the formal presentation of the FG model has yet to be seen, Rana (1990) provides some statistical support for this view of trade developments of Pacific Asia, using Balassa's "revealed comparative advantage" (RCA) index for the 1965-84 period, particularly in the post-1973 period.

Did the pattern of comparative advantage within manufactured goods among the Pacific-Asian economies continue to shift along the lines of the FG model during the 1980s? In order to answer this question, we used the methodology developed by Rana (1990)[24] with the trade data set involving 151 commodity categories of manufactured goods defined at SITC (Rev.2) 3-digit level for 11 Pacific-Asian economies (excluding China) as well as Canada and United States[25]. North American countries were included in this analysis to see whether the FG model can be extended to North America.

Following Rana's method, we first calculated changes in the RCA index between 1979 and 1988 for all 151 commodity categories with respect to a particular country (say, South Korea), and identified the vector of individual product categories in which the RCA index actually increased during the period. Then we correlated this RCA vector with the vector of changes in the RCA index calculated for the same set of product categories with respect to a possible "source" country (say, Japan) whose export competitiveness may have been eroded during the above period. A negative and statistically significant correlation between the two vectors would imply that the pattern of comparative advantage between the two countries actually shifted, as envisaged by the FG model. On the other hand, a positive and statistically significant correlation would indicate that the pattern of comparative advantage in both countries changed to the same direction.

The RCA index is defined as follows:

$$RCA = (Xij / Xwj) / (Xim / Xwm) \quad (1)$$

where X stands for the value of exports, i denotes a country, w the world[26], j a manufactured good and m total manufactures (Balassa, 1965 and 1971).

The RCA index means the relative export share of country i in world trade in product j divided by that country's share of world trade in total manufactures. If RCA = 1, it is usually

interpreted as indicating the "normal" export performance of country i in world trade in product j in terms of the size of that country as an exporter in world trade in total manufactures[27]. If RCA > 1 (< 1), then the country in question is considered to have comparative advantage (disadvantage) in the export of the product concerned.

A major difficulty we face in applying the RCA index to actual trade data is that the change in the market share on which the RCA index is based reflects not only the change in the underlying comparative advantage of the exporting countries but also the effect of the demand side in the importing countries. *A priori*, it is hardly possible to assume that the RCA index should indicate the *ex ante* comparative advantage of a country, which is determined by the pre-trade relative prices. Moreover, any summary index of trade performance, including the RCA index, is likely to be influenced by trade and other economic policies by governments at home and abroad.

While it is impossible to identify empirically the "true" measure of comparative advantage, the use of the RCA index provides a second-best solution for two reasons. First, theoretically, the RCA index can be interpreted in a distortion-free world as a measure indicating the degree of deviation of the actual from expected ("neutral") trade pattern (Vollrath, 1991). Second, the RCA index gives a much higher degree of consistency than alternative measures, thereby reducing significantly the sensitivity of empirical results to the choice of indices (Ballance, Forstner and Murray, 1987). When using a reasonably long span of time-series data, it appears that the RCA index reflects more of the impact of changes in comparative advantage than changes on the demand side.

Table 4 lists all the statistically significant correlations between the pairs of countries examined: eight of nine cases were found to be statistically significant with negative signs. The increase in Japan's RCA index between 1979 and 1988 was associated with the decrease in the US RCA index for the same product categories. A similar pattern of changes in the RCA index was also found between Japan on the one hand, and South Korea and Taiwan, on the other. Moreover, empirical results suggest that there were increases in the RCA indices of next-tier NIEs (notably, Indonesia, Philippines and Thailand) for product categories which indicated the more advanced economies in the region were losing export competitiveness during the 1980s.

In the case of Japan, manufactured exports with the highest increases in the RCA index during the 1980s were predominantly technology intensive products for which the United States showed the highest **decreases** in the RCA index (Appendix Table 4). This contrasts sharply with the case of South Korea and Taiwan, for which the gain of the RCA index with respect to Japan appeared least prominent in technology intensive industries.

Table 4. **Signs of Significant Correlations of Changes in RCA Vectors for Country Pairs, 1979-1988**

	Spearman Correlation Coefficient
North America and Pacific Asia	
United States — Japan (66)	- a
United States — Indonesia (101)	+ b
Canada — Malaysia (100)	- b
Japan and NIEs	
Japan — South Korea (89)	- a
Japan — Taiwan (95)	- a
Japan and NNIEs	
Japan — Philippines (73)	- a
NIEs and NNIEs	
South Korea and Indonesia (101)	- a
Singapore and Indonesia (101)	- a
South Korea and Thailand (113)	- b

a. Significant at the 5 per cent level.
b. Significant at the 10 per cent level.

Figures in parentheses indicate the sample size for each correlation test.

Source: The author's own calculation.

Under the FG model it is assumed that trade expansion among the Pacific-Asian economies takes the form of inter-industry specialisation. However, developments since the mid-1980s appear to have added a new dimension to the regional division of labour in Pacific Asia. It is widely believed among trade economists and regional experts that enhanced trade and investment linkages in the region since the mid-1980s have provided ample opportunities for **intra-industry** trade among Pacific-Asian economies. The importance of intra-industry and intra-firm trade in Pacific Asia has been pointed out in a number of recent articles, including Chen (1990), Ozawa (1990) and Urata (1990), but there is a paucity of quantitative information on this issue. In the next section, we focus on developments of intra-industry trade among Pacific-Asian economies during the 1980s.

III. INTRA-INDUSTRY TRADE: PACIFIC-ASIAN PERSPECTIVES

It is well-known that the bulk of trade in manufactured goods among developed countries takes the form of intra-industry trade (IIT), that is, mutual exchanges of goods within the same product category[28]. A classic example of IIT is trade of passenger cars between France and Germany, which is difficult to explain from differences in relative factor endowments between the two countries. In fact, the phenomenon of IIT is very common in trade of differentiated products between countries having similar per capita incomes and relative factor endowments.

While IIT has been discussed primarily in the context of "North-North" trade, empirical evidence indicates that the level of IIT in "North-South" and "South-South" trade is far from negligible and it can not be explained away simply as a statistical phenomenon caused by the level of aggregation. For example, IIT data on 44 developing countries reported by Havrylyshyn and Civan (1985) show that the average level of IIT for 13 more advanced developing economies was 42.0 in 1978 (as measured on the GL index), compared with 58.9 for industrial countries[29]. In fact, the level of IIT in the Asian NIEs was at least as high as in some European countries (e.g. Finland and Norway), and even higher than in Australia, Japan and New Zealand. As noted in the Introduction, the development of intra-industry trade among Pacific-Asian economies has important implications for the prospects of future *de facto* economic integration within the region. Thus, we begin this section by considering why IIT can become an important component of Pacific-Asian trade.

A. Why Intra-industry Trade?

Although it is theoretically possible to envisage the emergence of IIT under various circumstances[30], the product cycle theory of Vernon (1966) provides a useful model of IIT in the North-South context. The following two types of IIT seem particularly relevant to the case of Pacific-Asian trade. First, research and development in the North create a continuous flow of "new" products distinguished by certain characteristics or attributes that are considered technologically superior to existing, "old" products. Introduction of new products (e.g. colour TV sets and high-density memory chips) makes older varieties (e.g. black and white TV sets and low-density memory chips) obsolete and drives them out of the market over time. This will enable the North to enjoy (temporarily) a monopoly position in supplying new products. But as the technology becomes available to the South through imitation and/or technology transfer, the location of production will move to the South which enjoys a cost advantage due to lower wages. This will lead to intra-industry trade between the two regions, with the North exporting the latest versions of technologically differentiated products to the South and importing older versions in the same category from the South[31]. The quantitative significance of this type of IIT depends on how quickly new products replace old ones in the entire market in question.

In the North-South context, IIT may also occur at a later stage of the product cycle, as Northern firms adjust to competitive pressures stemming from the catching-up of Southern firms which differentiate products horizontally (by design, brand name, and so on) or vertically (by quality). This type of IIT appears quite important in the case of consumer goods (e.g. shoes, toys, clothing, calculators, cameras, watches, radios and TV sets) and industrial materials such as textiles and steel products. Developing countries tend to

specialise in exports of the lower end of products (e.g. small-screen TV sets and plain cotton fabrics), while developed countries tend to supply the upper end of differentiated products (e.g. large-screen TV sets and coloured synthetic fabrics)[32].

In fact, the rapid rise in the standard of living in many developing economies of Pacific Asia in recent years seems to provide ample opportunity for IIT in differentiated products either technologically or by quality. Presumably, there is much more overlapping of consumer tastes among the Pacific-Asian economies than implied by the level of per capita income because of the remarkable development of telecommunication and transportation networks within the region[33].

Another type of IIT that is considered to be important in the "North-South" context can occur in the context of "globalisation" of manufacturing activities, which involves assembly production based on imported parts and components in different countries[34]. It is this type of IIT that trade economists have recently referred to as "intra-industry, intra-firm and inter-processed" trade in relation to the FG pattern of trade development in Pacific Asia. While this type of IIT is often seen within the framework of multinational corporations, Northern firms can also make subcontracting arrangements with Southern counterparts, thereby enabling them to exploit economies of scale at various stages of production.

To the extent that the catching-up of the South through outward-oriented industrialisation is associated with the North's globalisation of corporate activities, the emergence of IIT can be regarded as a sign of closer integration in manufacturing production between the two. It seems that over the past decade this process has accelerated in Pacific Asia through foreign direct investment and other forms of corporate networking (see Oman, 1989).

Thus the emergence of IIT in the North-South context may be regarded as the emergence of a new form of interdependence between developed and developing countries. It goes beyond the conventional view of the North-South relationship based on the traditional factor proportions theory. Although the above types of IIT are difficult to distinguish from actual IIT data alone, a country's IIT index measured on a **bilateral** basis can be used as an indicator of the degree of economic integration with a particular country.

B. The Level and Pattern of Intra-industry Trade

In the following analysis, the Grubel-Lloyd (GL) index is used as a measure of IIT. For a particular industry (k), the multilateral GL index of a country (i) is defined as follows:

$$Bik = [\{(Xik + Mik) - |Xik - Mik|\} / (Xik + Mik)] \bullet 100 \qquad (2)$$

where X and M stand for the value of exports and imports, respectively, at a given level of statistical aggregation (k) - an "industry". IIT is defined as the value of total trade (Xik + Mik) minus net exports or imports $|Xik - Mik|$, that is, inter-industry trade of the industry k.

This is generally presented in its contracted form:

$$Bik = [1 - |Xik - Mik| / (Xik + Mik)] \bullet 100 \qquad (3)$$

Bik measures intra-industry trade as a percentage of total trade of industry k in country i, and its value ranges between zero (when either Xik or Mik is zero so that there is no IIT in industry k) and 100 (when Xik = Mik so that all trade in industry k is IIT).

Similarly, the bilateral GL index (Bij) of country i with country j is defined as follows:

$$Bij = [1 - ³Xij - Mij³ / (Xij + Mij)] \bullet 100 \quad (4)$$

where k is omitted for the sake of simplicity.

As regards the analytical relevance of IIT as measured above, it has been questioned whether the observed IIT is essentially a statistical phenomenon caused by the practical need to fit traded goods into official classification schemes[35]. Although empirical evidence on this point is mixed at the 3-digit industry level, simultaneous exporting and importing in a given "industry" or "product" remain quantitatively significant, even when trade data are disaggregated into the most narrowly defined categories (e.g. the 7-digit SITC level)[36]. More importantly, as we discussed above, the recent development of trade theories based on a continuum of commodities has demonstrated that the existence of **genuine** IIT is not inconsistent with the H-O-S model[37].

One way of handling this problem from a practical point of view is to take explicit account of the effect of categorical aggregation in the measurement of IIT. This is made possible by using an adjusted GL index of IIT as follows (Greenaway and Milner, 1983):

$$Ck = [1 - \Sigma l\ ³Xkl - Mkl³ / \Sigma l\ (Xkl + Mkl)] \bullet 100^{38} \quad (5)$$

where k = the kth of n industries at a given level of statistical aggregation, l = the lth of k sub-group categories at the k - 1 level of aggregation, and we have

$$0 \leq Ck \leq Bk \leq 100 \quad (6)$$

where $Bk = [1 - ³ \Sigma l\ Xkl - \Sigma l\ Mkl\ ³ / \Sigma l\ (Xkl + Mkl)] \bullet 100$
since $³ Xk - Mk\ ³ = ³ \Sigma l\ Xkl - \Sigma l\ Mkl\ ³$.

Ck is a trade-weighted average of sub-group indices calculated at the k - 1 level of aggregation. Clearly, when all trade imbalances (X - M) at the k - 1 level have the same sign, we have Ck = Bk, but if they have different signs, then we have Ck < Bk.

Table 5 presents the aggregate IIT index of manufactures for eleven Pacific-Asian economies[39]. This is the trade-weighted average of the IIT index calculated at SITC (Rev. 2) 3-digit level (Section 5 to 8)[40]. Information on IIT reveals a number of interesting characteristics on trade interdependence among the Pacific-Asian economies. First of all, a very high level of IIT in Hong Kong and Singapore is associated with the special status of these economies as entrepôts for China and the ASEAN countries. Inclusion of "re-exports" in both export and import statistics makes the level of IIT appear higher than what it may otherwise be[41]. However, as noted in the previous section, entrepôt trade usually involves minor processing and/or services such as packing and marketing. Sung (1990) argues that

"[p]rocessed re-exports can be regarded as a special form of intra-industry trade where the processes are confined to those that do not confer country of origin status" (p. 16).

Table 5. **Aggregate IIT Index of Manufactures, 1979 and 1988**

Ranking 1988	Ranking 1979	Pacific-Asian Economies	1988	1979	Percentage change
1	2	Hong Kong[a]	74.6	52.3	+43
2	1	Singapore[a]	71.7	65.6	+9
3	5	Malaysia	54.8	33.4	+64
4	3	South Korea	41.0	35.4	+16
5	4	Taiwan	40.7	34.1	+19
6	8	New Zealand[a]	37.0	26.7	+39
7	9	Thailand	34.9	18.9	+85
8	7	Japan	30.2	28.2	+7
9	6	Australia[a]	28.4	31.5	-10
10	10	Philippines[a]	27.7	14.5	+91
11	11	Indonesia	17.3	9.1	+90
Unweighted average			41.7	31.8	+31

a. "Re-exports" are included in both export and import statistics.

Source: The author's own calculation.

Apart from Hong Kong and Singapore, Malaysia showed the highest level of IIT in 1988, followed by South Korea, Taiwan and New Zealand. A rapid rise in the share of IIT during the past decade placed Thailand ahead of Japan and Australia. By contrast, Indonesia and Philippines had the lowest level of IIT, although the percentage increase in their IIT during the 1980s was largest among the Pacific-Asian economies.

Table 6 provides information on the level of IIT by factor intensity in 1988. It is clear from this table that the aggregate level of IIT in Malaysia, and to a lesser extent, South Korea and Taiwan, was primarily a reflection of the level of IIT in technology intensive products. In fact, the **unweighted** average of IIT in technology intensive products for eleven Pacific-Asian economies stood at 47.5, which was significantly higher than that in other product groups (34.5 to 38.1). This is the product category in which the globalisation of corporate activities has been most significant in Pacific Asia[42].

Data on IIT by main partner is presented in Table 7. It confirms that special economic relationships between Hong Kong and China on the one hand, and Singapore and other ASEAN countries on the other, are reflected in the greater degree of bilateral IIT. Similarly, the exceptionally high level of bilateral IIT between Australia and New Zealand may reflect not only geographical proximity between the two countries but also the impact of the Closer Economic Relations Pact concluded in 1983[43].

Table 6. **IIT Index of Manufactures by Factor Intensity, 1988**

Pacific-Asian Economies	Factor Intensity							
	N-R[b]	(Rank)	U-L[b]	(Rank)	T[b]	(Rank)	H-C[b]	(Rank)
Hong Kong[a]	66.1	(1)	69.4	(2)	82.3	(1)	74.7	(1)
Singapore[a]	62.8	(2)	70.2	(1)	76.3	(2)	61.4	(2)
Malaysia	27.9	(8)	49.7	(3)	66.1	(3)	31.2	(7)
South Korea	34.0	(5)	20.1	(9)	58.5	(4)	37.5	(5)
Taiwan	41.5	(4)	14.7	(11)	57.8	(5)	42.1	(4)
New Zealand[a]	28.5	(7)	48.1	(4)	28.8	(10)	46.1	(3)
Thailand[a]	41.9	(3)	31.9	(6)	39.3	(7)	26.1	(9)
Japan	28.8	(6)	42.7	(5)	33.6	(8)	22.5	(10)
Australia[a]	24.4	(9)	24.6	(8)	30.5	(9)	28.3	(8)
Philippines[a]	13.6	(10)	18.0	(10)	40.3	(6)	13.4	(11)
Indonesia	9.5	(11)	28.3	(7)	9.2	(11)	35.3	(6)
Unweighted average	34.5		38.0		47.5		38.1	

a. "Re-exports" are included in both export and import statistics.
b. N-R: Natural resource-intensive products.
U-L: Unskilled labour-intensive products.
T : Technology intensive products.
H-C: Human capital-intensive products.

(See Appendix for the definition of product classification.)

Source: The author's own calculation.

Table 7. **IIT Index of Manufactures by Main Partner, 1988**

Pacific-Asian Economies	Partner						
	Japan	ANZ	NIEs	NNIEs	China	North America	OECD countries of Europe
Hong Kong[a]	21.9	21.6	42.0	31.0	*47.7*	24.5	35.2
Singapore[a]	21.3	31.2	43.2	*57.2*	19.2	43.8	37.8
Malaysia	22.2	19.3	46.0	43.5	11.2	*53.3*	27.9
South Korea	*36.0*	9.0	32.9	19.8	-	24.7	20.2
Taiwan	*31.8*	9.7	29.0	16.3	-	19.6	25.7
New Zealand[a]	4.8	*57.3*	10.4	13.5	1.7	22.2	13.9
Thailand[a]	10.6	15.1	32.1	20.9	20.2	*32.3*	19.6
Japan	-	7.2	27.0	11.4	14.5	26.7	*34.1*
Australia[a]	6.7	*51.0*	16.2	12.4	3.8	18.1	14.1
Philipines[a]	10.6	14.2	15.5	23.2	9.1	*28.7*	13.4
Indonesia	5.8	7.5	12.9	*21.2*	1.9	4.1	4.8
Unweighted average	17.2	22.1	*27.9*	24.6	14.4	27.1	22.4

a. "Re-exports" are included in both export and import statistics.

Source: The author's own calculation.

What is more important for the current discussion on *de facto* regional integration in Pacific Asia is the fact that the ASEAN countries (with the notable exception of Indonesia) had the highest level of bilateral IIT with North America, while the highest level of IIT for South Korea and Taiwan was with Japan. This may reflect a high degree of "intra-firm and inter-processed" trade between the United States and the ASEAN on one hand, and between Japan and East Asian developing economies on the other. In the latter case, the overlapping of consumer demand and tastes in these East Asian economies may also have become important enough to create an opportunity for IIT in differentiated products.

Data on the unweighted average level of IIT by main partner reveal that the bilateral level of IIT in the Pacific-Asian economies was highest with the NIEs, followed by North America and the next-tier NIEs. Finally, it should be noted that the bilateral level of Japan's IIT was particularly low in relation to Australia/ New Zealand and ASEAN countries. This may be primarily due to the (non-) availability of natural resources, which dominates the product pattern of trade between Japan and these resource-rich countries (see below).

In sum, the above analysis of IIT suggests that the rise in the level of IIT in the developing economies of Pacific Asia is a consequence of the globalisation of corporate activities along the **Pacific Rim** (i.e. the United States, Japan and to a lesser extent, the NIEs). This is most relevant to the case of intra-industry specialisation in technology intensive products. While globalisation has served as a force to "bind together" many economies of the region, a generally high level of IIT between the Pacific-Asian economies and North America indicates that the economies on both sides of the Pacific have become increasingly integrated over the past decade.

C. Determinants of Intra-industry Trade

In this section, we present the results of the regression analysis of the determinants of IIT in manufactures among the Pacific-Asian economies. Earlier econometric studies on the determinants of IIT between countries at different stages of development suggest that the extent of IIT in manufactures tends to be greater between two given countries with relatively small differences in per capita income (Tharakan, 1984 and 1986, Balassa, 1986 and Lee, 1989). Empirical evidence also suggests that low trade barriers and transportation costs tend to increase the share of IIT in total trade. However, empirical results are mixed with respect to explanatory variables such as product differentiation and economies of scale[44].

As discussed above, the theoretical model that has been used to explain the determinants of IIT in the "North-South" context is not inconsistent with the H-O-S model. The following regression analysis is confined to the **aggregate** level of IIT calculated on a bilateral basis, and thus only country characteristics are taken into account.

The basic model of IIT is shown as

$$Bij = F (RPCij, RFEij, DISij, DUMs) + Uij \quad (7)$$

where Bij denotes bilateral IIT of country i with country j; RPCij the relative difference in per capita income between countries i and j; RFEij the cross-country difference in relative factor endowments; DISij geographical distance between pairs of countries; DUMs dummy

variables to capture special bilateral trade relations as well as characteristics specific to particular countries; and Uij the disturbance term.

RPC is a proxy variable indicating similarities in demand and consumer tastes between two countries. The hypothesis is that similarities in demand and consumer tastes between two countries would create markets for differentiated products, thereby increasing IIT[45]. Actual data on RPC is defined as the absolute difference in per capita income divided by the average per capita income of the two countries concerned. The coefficient of this variable is expected to be negative: the smaller the relative difference in per capita income between two countries, the higher is the level of bilateral IIT.

RFE is included in the regression equation as a proxy variable representing similarities in the composition of relative factor endowments between two countries. It has been shown that the level of bilateral IIT is linked to the cross-country differences in relative factor endowments, that is, the greater the differences are in the composition of relative factor endowments, the larger is the share of inter-industry trade and the smaller is the share of IIT[46]. In a multi-factor model, however, it is difficult to test this hypothesis in a straightforward way. Moreover, even if one could measure capital-labour ratios in a simple two-factor model, the cross-country difference in capital-labour ratios would be highly correlated to the cross-country difference in per capita income. The existence of multicollinearity prevents these two variables from being included simultaneously in a regression equation (Lee, 1989). Given these problems, the indicator of RFE used in this analysis is the relative difference in the share of primary products in total merchandise exports. The choice of this proxy is justified by the fact that the (non-) availability of natural resources is the dominant factor determining the overall trade structure of the Pacific-Asian economies and also their pattern of trade specialisation **within** manufactures. The expected sign of this variable is negative.

DIS is also included as a proxy variable indicating relative "economic distance" between countries. Other things being equal, such factors as geographical proximity and transportation costs are considered to be important determinants of bilateral IIT; the shorter the geographical distance and the lower the transportation costs are, the greater the product differentiation is by location[47]. Thus the coefficient of this proxy variable is expected to be negative[48]. In the following regression analysis, data on world shipping distance between major ports are used[49].

Finally, the regression equation includes several dummy variables in order to capture special features of bilateral trade relationships as well as other country characteristics that are not specified by the explanatory variables noted above:

DUM1 for Australia-New Zealand bilateral trade (+);
DUM2 for ASEAN preferential trade arrangements (+);
DUM3 for Canada-United States bilateral trade (+);
DUM4 for entrepôt trade of Hong Kong (+);
DUM5 for entrepôt trade of Singapore (+);
DUM6 for Japan (-); and
DUM7 for North America (+).

Using the ordinary least squares (OLS) method, regression equations were estimated with 1979 and 1988 data, respectively, each having the sample size of 169 (i = 1 .....13 and j = 1.....14)[50]. North American countries were included in this analysis because of a generally high level of IIT with Pacific-Asian economies. The results of the OLS estimation are reported in Columns A and B of Table 8.

Table 8. **Determinants of Intra-industry Trade Results of the Regression Analysis**[a]

Independent Variables	OLS		Weighted Least Squares	
	(A) 1979	(B) 1988	(C) 1979	(D) 1988
Constant	49.211**	79.488**	46.695**	82.607**
	(4.41)	(6.60)	(4.62)	(7.27)
RPC	-2.299	-4.532**	-2.490*	-5.078**
	(-1.47)	(-2.76)	(-1.81)	(-3.41)
RFE	0.643	-2.385*	0.655	-2.533**
	(0.57)	(-1.86)	(0.675)	(-2.10)
DIS (LOG)	-4.617**	-6.763**	-4.338**	-7.128**
	(-3.49)	(-4.76)	(-3.60)	(-5.34)
DUM 1	16.752**	17.667*	17.649**	16.813**
	(2.01)	(1.89)	(2.66)	(2.16)
DUM 2	3.433	1.284	1.623	-0.290
	(1.02)	(0.35)	(0.52)	(-0.08)
DUM 3	31.932**	21.294**	34.260**	21.176**
	(3.57)	(2.16)	(4.04)	(2.11)
DUM 4	12.373**	7.960**	13.006**	8.203**
	(3.59)	(2.12)	(3.94)	(2.43)
DUM 5	16.594**	11.661**	17.619**	12.285**
	(4.96)	(3.12)	(4.90)	(3.47)
DUM 6	-0.458	-1.456	0.053	-0.842
	(-0.13)	(-0.39)	(0.02)	(-0.28)
DUM 7	7.107**	6.991**	5.423**	6.205**
	(2.63)	(2.36)	(2.14)	(2.10)
Adj R^2	0.404	0.384	0.428	0.437
F value	12.054	11.289	13.376	13.809
Sample size	166	166	166	166

a. Regression coefficients, with t-values in parenthesis.
* Statistically significant at the 10 per cent level.
** Statistically significant at the 5 per cent level.
Note: See the text for the definition of the independent variables and explanation of methodology.

In conducting the regression analysis based on cross-country data, the assumption of homoscedasticity with respect to the disturbance term may not be very plausible because of possible large variations in bilateral IIT from country to country. In order to see whether the assumption of homoscedasticity holds, the Goldfeld-Quandt test was applied to 1979 and 1988 data, respectively, and it was found that the null hypothesis for homoscedasticity was rejected for both years at the 5 per cent significance level[51].

Loertscher and Wolter (1980), Caves (1981), Bergstrand (1983) and others have used a weighted least-squares method with a logit transformation of IIT as the dependent variable. The logit model has some appeal in this exercise, because the IIT index is bounded by the value of 0 and 100 and the "weights" to be used for correcting heteroscedasticity can be derived directly from the model itself. However, a problem may arise when IIT data are transformed into the logit index, which is defined as ln [IIT / (1 - IIT)], where IIT data are first divided by 100. When the value of IIT (divided by 100) is less than 0.5, the logit index changes to a negative sign. This would cause a serious problem when OLS is used in the estimation of the logit model, since it involves such explanatory variables (RPC, RFE and DIS) that are **continuous**. In the case of the Pacific-Asian economies, the majority of bilateral IIT (divided by 100) takes the value of less than 0.5 (Table 7).

Given the above mentioned problems, we used an alternative weighted least-squares (WLS) method to avoid the problem of heteroscedasticity. Since there is no *a priori* information available on the nature of heteroscedasticity, we estimated the variances of the disturbance from the sample data by calculating $Si^2 = \Sigma \hat{U}ij^2/ 13$ for each i (i, j = 1.....13). Therefore, the weighting term can be expressed as $Wij = 1 / \sqrt{Si^2}$ for each i (i, j = 1.....13)[52].

Using the weighting term defined above, the regression equations were re-estimated by the WLS method and the results of estimation are reported in Columns C an D of Table 8. It should be noted at the outset that the regression coefficients estimated by the WLS method are quite similar as those estimated by the OLS method, though the former gives a higher R^2[53].

Using the WLS method, the estimated coefficients of RPC, RFE and DIS for 1988 are all statistically significant at the 5 per cent level, with the expected (negative) signs (Column D). The estimates for 1979 are less satisfactory (Column C). The estimated coefficient of RPC has an expected (negative) sign, but is statistically significant only at the 10 per cent level. Furthermore, the estimated coefficient of RFE is statistically insignificant, with a wrong sign. Concerning the dummy variables, the estimations are consistent for both years, with the expected (positive) signs, except for DUM2 (ASEAN) and DUM6 (Japan), which are statistically insignificant.

The above results of the regression analysis should be interpreted with great care, because of the choice of proxy variables and because the regression equations include only explanatory variables representing country characteristics. Nevertheless, the following three points need to be stressed.

1. The significance of RPC as an explanatory variable, which is separated from other "location" variables, may be regarded as indicating that the overlapping of consumer demand and tastes between the economies of the region is an important source of IIT.

2. Although the regression results do not provide direct information on the linkage between IIT and globalisation, the significance of DUM7 (North America) would suggest that the globalisation of US firms is an important factor behind the emergence of IIT in the region.

3. The **degree of bias** of a country's relative factor endowments may have exerted a significant impact on the level of IIT in manufactures of that country. A generally low level of Japan's IIT is a case in point. In the above regression analysis, the relative importance of natural resource endowments was chosen as a proxy variable for that. The regression results were rather mixed, statistically significant for 1988 but not for 1979. In the regression equations, the "Japan" dummy (DUM6) was also included to see whether there were any special characteristics related to Japan, as some argue (Lincoln, 1990). However, this dummy was found statistically insignificant for both years[54].

IV. CONCLUSIONS

The present paper examined the development of Pacific-Asian trade during the past decade from the perspective of regional integration, with special focus on the development of intra-regional and intra-industry trade among the economies of the region. The main conclusions of the paper can be summarised as follows:

1. The analysis based on a world trade matrix showed that Pacific Asia had emerged as the most dynamic region of the world economy during the 1980s. This was due largely to the sustained trade expansion of developing economies in the region. It also presented some statistical evidence, which indicates that the remarkable development of the Pacific-Asian developing economies may be seen as a case for the FG pattern of trade development. However, the macroeconomic imbalances have resulted in large trade imbalances between Pacific Asia and North America (and to lesser extent, with OECD countries of Europe), which could become a "threat factor" in this development process in the 1990s. Developments since 1986 have led to a surge in intra-regional trade in Pacific Asia, but this has so far brought about only moderate improvement in the merchandise trade imbalances between the two regions. Moreover, Japan's predominance as a supplier of technology intensive products certainly poses the question of how far the "flying-geese" pattern can go in the future.

2. The FG model of trade development in Pacific Asia presupposes that trade expansion among the Pacific-Asian economies takes the form of inter-industry specialisation. However, developments since the mid-1980s have added a new dimension to the regional division of labour in Pacific Asia, increasing the opportunities for intra-industry trade (IIT) among Pacific-Asian economies. Data on the Grubel-Lloyd index of IIT in manufactures calculated at the SITC 3-digit level revealed that the Pacific-Asian developing economies registered large increases in the level of IIT between 1979 and 1988.

3. Globalisation of corporate activities in the United States during the 1980s and more recently Japan and NIEs, stimulated in part by currency factors since late 1985, appears to have contributed to a significant increase in intra-industry trade among Pacific-Asian economies, particularly in technology intensive products. This development can be seen as a new form of trade interdependence among the economies of the region. The above analysis showed that intra-industry trade specialisation between ASEAN countries and North America has intensified. This would indicate that despite the recent surge in intra-regional trade in Pacific Asia, the economies of this region have become closely integrated with North America during the 1980s.

4. Results of the regression analysis supported the general hypothesis that the greater the similarities are in demand and production structures and the lower transportation costs are between two countries, the higher is the level of bilateral IIT. This would imply that the continued high growth of the developing economies in Pacific Asia in the 1990s would provide greater opportunities for IIT

within the region. It should be stressed, however, that the formation of a *de jure* trade bloc among the Pacific-Asian economies would be counter-productive because globalisation of North American firms and, more recently, Japanese and the NIEs' firms has closely integrated the economies on both sides of the Pacific.

NOTES AND REFERENCES

1. Recently EAEG has been renamed the EAEC (East Asian Economic Caucus).

2. See Section II.D for detailed discussion of the FG model.

3. See, for example, Park (1989 and 1990), Park and Park (1990) and Yoo (1990).

4. Despite the recent rise in manufactured imports, the annual value of manufactures imported by Japan (SITC 5 to 9) per person was $960 in 1990, less than two-thirds of the value of such imports per person by the United States ($1 560) (OECD, *Monthly Statistics of Foreign Trade*, July 1991).

5. See Lo, Salih and Nakamura (1988) and Park (1989).

6. See Balassa (1976 and 1979) and Grubel and Lloyd (1975). See also Greenaway and Milner (1986 and 1987) for a review of empirical evidence on the adjustment implications of intra-industry trade.

7. This is based on the assumption that some of the factors used in a particular industry are "sector-specific". It seems reasonable to argue that managers and experienced workers have incentives to stay in the same industry, since accumulated skills and technical know-how on management and production are difficult to utilise in other industries. It should also be recalled that in the standard Heckscher-Ohlin-Samuelson (H-O-S) model, firms reallocate resources "costlessly" and "instantaneously" so as to maximize profits in each time period. In such model, the "adjustment problem" would never happen.

8. World Bank, *World Development Report 1990*, p. 16.

9. Aside from cyclical changes, the share of intra-regional trade in total merchandise exports of OECD countries of Europe tended to increase steadily from about 50 per cent in the early 1950s to roughly 70 per cent in the late 1980s (See Japan Development Bank 1991, Table II-7).

10. Singapore's exports include (a) a large amount of petroleum products since it is a regional centre of oil refining, and (b) re-exports of primary products because of its role of entrepôt for ASEAN countries.

11. Singapore's exports are highly specialised in technology-intensive products, which accounted for roughly two-thirds of manufactured exports in 1988 (Appendix Table 3).

12. Data on bilateral trade balance should be used with great care, because they are sensitive to a number of factors, including the choice of reporter or partner statistics, the handling of re-exports, and differences in the "rules of destination and origin" used in trade statistics. There are large discrepancies between

China's trade statistics and those of its major partners, particularly the United States. This is largely due to re-exports of Chinese goods via Hong Kong (see Sung, 1990). Taking into account the problem of the growing importance of re-exports for Hong Kong, Table 3 reports figures on the bilateral trade balance of NIEs **plus** China with respect to North America and the OECD countries of Europe.

13. See also Riedel (1991).

14. See, for example, ADB (1990) and Riedel (1991) for the recent trend in intra-regional FDI among Pacific-Asian economies.

15. See also Hickok and Orr (1990) for a detailed review of the recent developments in the pattern of the US trade and investment *vis-à-vis* four Pacific-Asian economies (i.e. South Korea, Taiwan, Malaysia and Thailand).

16. To this should be added that the real effective exchange rate of the Japanese yen in the fourth quarter of 1990 was about 13 per cent **lower** than its peak level recorded in the fourth quarter of 1988 (IMF, *International Financial Statistics*, March 1991).

17. It should be noted, however, that Japan's **overall** trade surplus on a balance-of-payments basis did shrink from $93 billion in 1986 to $77 billion in 1989 and further to $ 64 billion in 1990. Accordingly, Japan's current account surplus stood at $36 billion (1.2 per cent of GDP) in 1990, down from $86 billion (4.4 per cent) in 1986.

18. The re-export figures are based on Hong Kong's customs statistics, quoted from Sung (1990), Table 2.

19. Hong Kong firms now employ two million Chinese workers in Guangdong Province, compared with 700 000 workers in Hong Kong (*The Economist*, 5 October 1991, p. 22).

20. Sung (1990, p. 4) quotes the result of a recent survey conducted by the Hong Kong Trade Development Council that the re-export margins for Chinese and other countries' products were estimated at 16 and 14 per cent, respectively, in 1988.

21. See also Vogel (1989) for a detailed account of economic and trade developments of the Guangdong Province.

22. Sung states that "[e]ven in the very long run, Shanghai is likely to be the only Chinese city capable of challenging the position of Hong Kong in intermediation, but Shanghai's transport and communication facilities lag considerably behind Hong Kong and her services industries are rudimentary" (*ibid.*, pp. 25-26).

23. The idea of the "flying-geese" pattern of trade development was first developed by Akamatsu and elaborated by Kojima and Yamazawa, based on Japanese

historical experience (see Yamazawa, 1984). For the relevance of the FG model in the context of Pacific-Asian developments, see Chen (1990), Ozawa (1990), Park (1989), Yamazawa (1990), and Yamazawa, Hirata and Yokota (1991).

24. The data set used by Rana (1990) involves 36 commodity categories of manufactured goods defined at SITC 2-digit level for Japan and 13 developing Asian economies (Hong Kong, South Korea, Singapore and Taiwan; Indonesia, Malaysia, Philippines and Thailand; India, Pakistan and Sri Lanka; and Fiji and Western Samoa).

25. See Appendix for an account of trade data and product classification used for this analysis.

26. In this paper, the "world" is defined as the aggregate of Pacific Asia (excluding China), North America and OECD countries of Europe.

27. Equation (1) can be interpreted as RCA = Xij / E (Xij), where E (Xij) denotes the **expected** level of the ith country's exports of product j, and it is assumed to be in proportion to the country's share of world trade in total manufactures, that is, E (Xij) = Xwj * (Xim / Xwm).

28. See, for example, Grubel and Lloyd (1975) and Greenaway and Milner (1986).

29. These 13 economies are Argentina, Brazil, Greece, Hong Kong, India, Israel, Korea, Mexico, Portugal, Singapore, Spain, Taiwan and Yugoslavia.

30. See Grubel and Lloyd (1975) and Kierzkowski (1985). The latter gives a concise survey of recent literature on IIT in both identical and differentiated products.

31. See Krugman (1979), Dollar (1986) and Grossman and Helpman (1989) for the formal presentation of the product cycle model.

32. Generally speaking, the pattern of IIT in quality-differentiated products may be explained by the Linder (1961) hypothesis: a country tends to specialise in the production and export of such quality products that have "representative demand" in its domestic market. More recently, Greenaway and Milner (1986) refer to this type of IIT through vertical product differentiation as "neo Hechscher-Ohlin-Samuelson (H-O-S) trade", in which both intra-industry and inter-industry trade can be modelled under the traditional assumptions of perfect competition and different factor endowments (see Falvey, 1981 and Falvey and Kierzkowski, 1984).

33. See Watanabe (1990) for an account of the emerging "middle class" in the Asian NIEs.

34. Dixit and Grossman (1982) provides a formal model of international trade with multi-stage production in which intermediate goods produced at each stage are traded for further processing at the next stage.

35. See, for example, Finger (1975) and Rayment (1976) in the case of United States and United Kingdom, respectively. However, the statistical findings reported by Lungberg and Hansson (1986) do **not** support the hypothesis that "categorical aggregation" is the major explanation of IIT in the case of Sweden. Moreover, some researchers have made an effort to rearrange the official trade classification on the basis of the best approximation to the concept of "industry" so as to obtain a good degree of homogeneity (Aquino, 1978, and Balassa, 1986). In these cases, too, the degree of IIT remains quantitatively important. It should be noted, however, that even if an "ideal" categorisation of industries or products could be made at one point of time, rapid progress in product and process innovations as well as changes in consumer tastes would sooner or later make it obsolete and necessitate continual recategorisation.

36. See, for example, Grubel and Lloyd (1975), Gray (1979) and Greenaway and Milner (1983).

37. See also Kol and Tharakan (1989) and Lloyd (1989) on this point.

38. The country subscripts i and j are omitted from the equation for the sake of simplicity.

39. China is excluded from this analysis, because China's trade data is incomplete in the UNSO Comtrade Database.

40. The country ranking of the aggregate IIT index of manufactures is somewhat sensitive to the choice of index itself. This is particularly so in the case of Australia, Japan, and New Zealand, when the GL index is applied, together with the adjustment procedure for overall trade imbalance as suggested by Aquino (1978). However, the Aquino-type adjustment procedure seems to be too mechanical for the purpose of inter-country comparison. (Data on the Aquino index for the Pacific-Asian economies are available from the author upon request.)

41. Hong Kong's import statistics include both retained imports for domestic use and imports for re-exports. The aggregate IIT index of Hong Kong calculated on the basis of domestic exports and the "hypothetical" retained imports (total imports minus re-exports) is 36.7 in 1979 and 46.6 in 1988 (see Appendix Table 5).

42. See, for example, Yamada (1990) for the case of the electronics industry in East Asia and Lim and Pang (1991).

43. See Globerman and Dean (1990) for more detailed discussion of this point.

44. Tharakan (1984 and 1986) found that product differentiation and economies of scale were important determinants of the IIT of the Benelux countries with the developing countries, but that this was no longer the case for the pooled sample of the five OECD countries (Germany, Italy, Japan, United Kingdom and United States). With respect to the IIT among economies in Pacific Asia plus North

America, Lee (1989) found that the proxy variables for product differentiation and economies of scale were statistically significant for 1980 but not for 1970.

45. See Helpman and Krugman (1985, Chapter 8) for a theoretical exposition of this hypothesis.

46. *Ibid.*, pp. 169-170.

47. See Grubel and Lloyd (1975), pp. 73-77.

48. The regression analysis was performed after converting this proxy variable into the log form.

49. The original source is British Petroleum, *Distance Tables for World Shipping*, quoted from Yamazawa and Nohara, eds. (1985), *Ajia Taiheiyo Shokoku no Boeki to Sangyo Chosei* (*Trade and Industrial Adjustment in Asia-Pacific Countries*), Table 5-8, p. 128, Institute of Developing Economies, Tokyo.

50. Thirteen reporter countries are Australia, Canada, Hong Kong, Indonesia, Japan, South Korea, Malaysia, New Zealand, Philippines, Singapore, Taiwan, Thailand and the United States. Fourteen partner countries are the above thirteen plus China. In fact, the total number of samples used for estimation is 166, because three samples (i.e. South Korea-China, Taiwan-China and Singapore-Indonesia) are excluded. There is no direct official trade between South Korea/Taiwan and China, while Singapore's trade statistics do not report bilateral trade with Indonesia.

51. The results of the Goldfeld-Quandt test are available from the author upon request. For the standard procedure of the Goldfeld-Quandt test, see Pindyck and Rubinfeld (1981), pp. 148-150.

52. See Kmenta (1971), pp. 264-267.

53. Even if the assumption of homoscedasticity is not satisfied, the OLS estimators of the regression coefficients are known to be unbiased and consistent (but not efficient). However, when the disturbance is heteroscedastic, the estimated variances of the regression coefficients obtained from the OLS estimators are biased, so that the confidence limits and the significance tests calculated from the conventional formulas do not apply (*ibid.*, pp. 249-256).

54. In a recent study on Japan's IIT, Hosen, Ito and Kainuma (1991) found that the (non-) availability of natural resources (including land and energy) is the dominant factor behind a generally low level of Japan's IIT in manufactures.

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APPENDIX:

TRADE DATA AND PRODUCT CLASSIFICATION

Trade data used in this paper is extracted from UNSO, Comtrade Database based on SITC Rev. 2 at 3-digit level. Product classification so defined consists of 233 commodity groups from Sections 0 through 9.

For calculation of RCA and IIT indices, the narrow definition of manufactures are used in this paper by referring to SITC Sections 5 to 8. The total number of manufactures amounts to 151.

The following lists specify four product groups of manufactures classified in terms of their factor intensities based on the commodity classification system developed by Krause (1987). While his classification is based on SITC Rev. 1 (Sections 0 to 9) at 2- to 4-digit levels, our product classification refers only to manufactures as defined above.

I. Natural resource-intensive products (20)

SITC Rev. 2	*Commodity Description*
611	Leather
612	Manufactures of leather
613	Furskins, tanned or dressed
633	Cork manufactures
634	Venners, plywood and other wood worked
635	Wood manufactures, n.e.s.
661	Construction materials (other than clay)
662	Clay construction materials
663	Mineral manufactures, n.e.s.
667	Precious stones
671	Pig iron
681	Silver/platinum, unwrought or manufactured
682	Copper, unwrought or manufactured
683	Nickel, unwrought or manufactured
684	Aluminium, unwrought or manufactured
685	Lead, unwrought or manufactured
686	Zinc, unwrought or manufactured
687	Tin, unwrought or manufactured
688	Uranium
689	Miscellaneous non-ferrous metals

II. Unskilled labour-intensive products (28)

SITC Rev.2	*Commodity Description*
651	Textile yarn
652	Cotton fabrics, woven
653	Woven fabrics of man-made fibre
654	Other woven fabrics
655	Knitted or crocheted fabrics
656	Tulle, lace, embroidery, etc.
657	Special textile fabrics.
658	Made-up textile articles
659	Floor coverings
664	Glass
665	Glassware
666	Pottery
793	Ships
812	Sanitary, plumbing, heating and lighting fixtures
821	Furniture
831	Travel goods
842	Outer garments, men's and boys'
843	Outer garments, women's, girls' and infants'
844	Under garments of textile fabrics
845	Outer garments, knitted or crocheted
846	Under garments, knitted or crocheted
847	Clothing accessories of textile fabrics
848	Other clothing accessories
851	Footwear
893	Plastic articles
894	Toys
895	Office and stationary supplies
899	Other miscellaneous manufactured articles

III. Technology intensive products (60)

SITC Rev.2	*Commodity Description*
511	Hydrocarbons and their derivatives
512	Alcohols, phenols and their derivatives
513	Carboxylic acids and their derivatives
514	Nitrogen-function compounds

515	Organo-inorganic and heterocyclic compounds
516	Other organic chemicals
522	Inorganic chemical elements
523	Other inorganic chemicals
524	Radio-active materials
541	Medicinal and pharmaceutical products
562	Fertilizers, manufactured
572	Explosives
582	Polyesters, polyamides, silicones, etc.
583	Polyethylene, polypropylene, etc.
584	Regenerated cellulose
585	Other artificial resins and plastics
591	Disinfectants, insecticides, etc.
592	Starches and glues
598	Miscellaneous chemical products
711	Steam and other vapour generating boilers
712	Steam engines
713	Internal combustion piston engines
714	Non-electric engines and motors
716	Rotating electric motors and generators
718	Other power generating machinery
721	Agricultural machinery (excluding tractors)
722	Tractors
723	Civil-engineering machinery
724	Textile and leather machinery
725	Paper mill and pulp mill machinery
726	Printing and bookbinding machinery
727	Food-processing machinery
728	Other machinery and equipment
736	Machine tools for working metals
737	Metal-working machinery (other than machine tools)
741	Heating and cooling equipment
742	Pumps for liquids
743	Other pumps
744	Mechanical handling equipment
745	Other non-electrical machinery
749	Non-electrical parts and accessories

751	Office machines
752	Automatic data processing machines
759	Parts and accessories of 751 and 752
764	Telecommunication equipment
771	Electric power machinery
772	Electrical controlling equipment
773	Electrical insulating equipment
774	Electric apparatus for medical use
776	Semi-conductor devices, etc.
778	Electrical machinery and apparatus, n.e.s.
792	Aircraft
871	Optical instruments and apparatus
872	Medical instruments and appliances, n.e.s.
873	Meters and counters, n.e.s.
874	Other scientific instruments and apparatus
881	Photographic apparatus and equipment, n.e.s.
882	Photographic and cinematographic supplies
883	Cinematograph film
884	Optical goods, n.e.s.

IV. Human capital-intensive products (43)

SITC Rev. 2	***Commodity Description***
531	Synthetic organic dyestuffs
532	Dyeing and tanning extracts
533	Pigments, paints and related materials
551	Perfume and flavour materials
553	Perfumery, cosmetics, etc.
554	Soap and cleansing preparations
621	Materials of rubber
625	Rubber tyres
628	Articles of rubber, n.e.s.
641	Paper and paperboard
642	Articles of paper or paperboard

672	Primary forms of iron or steel
673	Iron and steel bars, rods, angles, etc.
674	Universals, plates and sheets
675	Hoop and strip, hot- or cold-rolled
676	Rails and railway trucks
677	Iron or steel wire
678	Tubes, pipes and fittings
679	Castings, forgings, etc.
691	Metal structures, n.e.s.
692	Metal containers for storage and transport
693	Wire products
694	Nails, screws, nuts, bolts, etc.
695	Tools for use in hand or in machines
696	Cutlery
697	Household equipment of base metal, n.e.s.
699	Manufactures of base metal, n.e.s.
761	Television receivers
762	Radio-broadcast receivers
763	Gramophones and sound recorders
775	Household electric equipment
781	Passenger motor cars
782	Trucks and lorries
783	Buses, etc.
784	Parts of road motor vehicles
785	Motorcycles
786	Trailers
791	Railway vehicles
885	Watches and clocks
892	Printed matter
896	Works of art and antiques
897	Jewellery
898	Musical instruments

Appendix Table 1-1 - World Merchandise Trade Flows, 1979, 1986 and 1989

From\ To	Pacific Asia	(Japan)	(ANZ)	(NIEs)	(NNIEs)	(China)	North America	OECD Countries Europe	ROW	World
					(Billion dollars)					
Pacific Asia										
1979	90.6	28.7	7.3	34.2	15.0	5.4	56.9	39.9	48.8	236.2
1986	153.0	37.6	12.6	64.2	18.6	20.0	155.9	72.3	64.0	445.2
1989	287.8	68.6	20.5	126.1	41.4	31.2	206.5	120.7	78.4	693.4
(Japan)										
1979	30.6	-	3.1	16.9	6.9	3.7	28.2	16.4	27.1	102.3
1986	54.2	-	6.5	30.3	7.5	9.9	87.5	37.9	31.1	210.7
1989	86.7	-	9.1	52.5	16.6	8.5	100.7	56.3	30.9	274.6
(ANZ)										
1979	11.2	5.8	1.5	1.8	1.2	0.9	3.4	4.2	4.5	23.4
1986	14.3	6.9	2.0	3.0	1.2	1.3	3.8	4.8	5.5	28.5
1989	25.2	11.3	3.6	6.6	2.6	1.1	5.8	7.4	7.6	45.9
(NIEs)										
1979	21.0	8.0	1.7	5.4	5.3	0.6	17.3	11.6	10.4	60.3
1986	44.4	13.5	3.3	11.9	7.6	8.1	52.8	18.7	16.3	132.2
1989	102.7	30.9	5.9	28.2	17.7	20.0	79.5	39.6	24.6	246.4
(NNIEs)										
1979	20.7	12.1	0.7	6.5	1.1	0.3	7.3	5.7	2.9	36.6
1986	23.2	12.0	0.8	8.1	1.6	0.7	8.9	6.6	3.8	42.5
1989	39.6	18.2	1.6	15.1	3.1	1.6	16.1	12.2	6.9	74.8
(China)										
1979	7.1	2.8	0.2	3.6	0.5	-	0.7	2.0	3.9	13.7
1986	17.0	5.1	0.2	11.0	0.7	-	2.9	4.4	7.0	31.4
1989	33.6	8.2	0.4	23.6	1.4	-	4.4	5.3	8.5	51.8
North America										
1979	45.2	21.1	4.7	12.5	4.7	2.2	70.8	60.7	63.6	240.3
1986	67.1	31.1	7.1	19.7	5.3	3.9	112.5	67.6	59.8	307.0
1989	120.6	52.0	10.5	41.7	9.6	6.8	163.6	111.4	88.9	484.5
OECD Countries Europe										
1979	31.4	8.4	5.9	8.8	4.9	3.4	46.9	468.3	149.9	696.5
1986	50.8	13.9	8.2	15.1	6.1	7.5	95.8	637.0	153.4	937.0
1989	87.7	28.0	12.1	29.2	10.4	8.0	113.6	940.4	190.3	1,332.0
ROW										
1979	60.3	37.6	2.6	12.6	4.3	3.2	77.3	155.5	60.5	353.6
1986	47.1	28.1	1.8	10.0	2.4	4.9	53.5	116.1	67.7	284.4
1989	73.4	39.6	3.2	17.6	6.3	6.7	83.8	156.0	89.0	402.3
World										
1979	227.6	95.7	20.7	68.1	28.9	14.2	251.9	724.5	322.6	1,526.6
1986	318.0	110.7	29.5	109.1	32.4	36.3	417.7	893.1	344.8	1,973.6
1989	569.5	188.2	46.3	214.6	67.6	52.8	567.4	1,328.5	446.8	2,912.2

(Continued)

Appendix Table 1-2 - World Merchandise Trade Flows, 1979, 1986 and 1989 (Continued)

From\ To	Pacific Asia	(Japan)	(ANZ)	(NIEs)	(NNIEs)	(China)	North America	OECD Countries Europe	ROW	World
					(Percentage)					
Pacific Asia										
1979	38	12	3	14	6	2	24	17	21	100
1986	34	8	3	14	4	4	35	16	14	100
1989	42	10	3	18	6	4	30	17	11	100
(Japan)										
1979	30	-	3	17	7	4	28	16	26	100
1986	26	-	3	14	4	5	42	18	15	100
1989	32	-	3	19	6	3	37	21	11	100
(ANZ)										
1979	48	25	6	8	5	4	15	18	19	100
1986	50	24	7	11	4	5	13	17	19	100
1989	55	25	8	14	6	2	13	16	17	100
(NIEs)										
1979	35	13	3	9	9	1	29	19	17	100
1986	34	10	2	9	6	6	40	14	12	100
1989	42	13	2	11	7	8	32	16	10	100
(NNIEs)										
1979	57	33	2	18	3	1	20	16	8	100
1986	55	28	2	19	4	2	21	16	9	100
1989	53	24	2	20	4	2	22	16	9	100
(China)										
1979	52	20	1	26	4	-	5	15	28	100
1986	54	16	1	35	2	-	9	14	22	100
1989	65	16	1	46	3	-	8	10	16	100
North America										
1979	19	9	2	5	2	1	29	25	26	100
1986	22	10	2	6	2	1	37	22	19	100
1989	25	11	2	9	2	1	34	23	18	100
OECD Countries Europe										
1979	5	1	1	1	1	0	7	67	22	100
1986	5	1	1	2	1	1	10	68	16	100
1989	7	2	1	2	1	1	9	71	14	100
ROW										
1979	17	11	1	4	1	1	22	44	17	100
1986	17	10	1	4	1	2	19	41	24	100
1989	18	10	1	4	2	2	21	39	22	100
World										
1979	15	6	1	4	2	1	17	47	21	100
1986	16	6	1	6	2	2	21	45	17	100
1989	20	6	2	7	2	2	19	46	15	100

(Continued)

Appendix Table 1-3 - World Merchandise Trade Flows, 1979, 1986 and 1989 (Continued)

From\ To	Pacific Asia	(Japan)	(ANZ)	(NIEs)	(NNIEs)	(China)	North America	OECD Countries Europe	ROW	World
					(Percentage)					
Pacific Asia										
1979	40	30	35	50	52	38	23	6	15	15
1986	48	34	43	59	57	55	37	8	19	23
1989	51	36	44	59	61	59	36	9	18	24
(Japan)										
1979	13	-	15	25	24	26	11	2	8	7
1986	17	-	22	28	23	27	21	4	9	11
1989	15	-	20	24	25	16	18	4	7	9
(ANZ)										
1979	5	6	7	3	4	6	1	1	1	2
1986	4	6	7	3	4	4	1	1	2	1
1989	4	6	8	3	4	2	1	1	2	2
(NIEs)										
1979	9	8	8	8	18	4	7	2	3	4
1986	14	12	11	11	23	22	13	2	5	7
1989	18	16	13	13	26	38	14	3	6	8
(NNIEs)										
1979	9	13	3	10	4	2	3	1	1	2
1986	7	11	3	7	5	2	2	1	1	2
1989	7	10	3	7	5	3	3	1	2	3
(China)										
1979	3	3	1	5	2	-	0	0	1	1
1986	5	5	1	10	2	-	1	0	2	2
1989	6	4	1	11	2	-	1	0	2	2
North America										
1979	20	22	23	18	16	15	28	8	20	16
1986	21	28	24	18	16	11	27	8	17	16
1989	21	28	23	19	14	13	29	8	20	17
OECD Countries Europe										
1979	14	9	29	13	17	24	19	65	46	46
1986	16	13	28	14	19	21	23	71	44	47
1989	15	15	26	14	15	15	20	71	43	46
ROW										
1979	26	39	13	19	15	23	31	21	19	23
1986	15	25	6	9	7	13	13	13	20	14
1989	13	21	7	8	9	13	15	12	20	14
World										
1979	100	100	100	100	100	100	100	100	100	100
1986	100	100	100	100	100	100	100	100	100	100
1989	100	100	100	100	100	100	100	100	100	100

Sources: IMF, Direction of Trade Yearbook 1986 and 1990; UNSO, Comtrade Database.

Appendix Table 1-4 - World Merchandise Trade Flows, 1979, 1986 and 1989 (Continued)

From\ To	Pacific Asia	(Japan)	(ANZ)	(NIEs)	(NNIEs)	(China)	North America	OECD Countries Europe	ROW	World
					(Percentage)					
Pacific Asia										
1979	5.9	1.9	0.5	2.2	1.0	0.4	3.7	2.6	3.2	15.5
1986	7.8	1.9	0.6	3.3	0.9	1.0	7.9	3.7	3.2	22.6
1989	9.9	2.4	0.7	4.3	1.4	1.1	7.1	4.1	2.7	23.8
(Japan)										
1979	2.0	0.0	0.2	1.1	0.5	0.2	1.8	1.1	1.8	6.7
1986	2.7	0.0	0.3	1.5	0.4	0.5	4.4	1.9	1.6	10.7
1989	3.0	0.0	0.3	1.8	0.6	0.3	3.5	1.9	1.1	9.4
(ANZ)										
1979	0.7	0.4	0.1	0.1	0.1	0.1	0.2	0.3	0.3	1.5
1986	0.7	0.3	0.1	0.2	0.1	0.1	0.2	0.2	0.3	1.4
1989	0.9	0.4	0.1	0.2	0.1	0.0	0.2	0.3	0.3	1.6
(NIEs)										
1979	1.4	0.5	0.1	0.4	0.3	0.0	1.1	0.8	0.7	3.9
1986	2.2	0.7	0.2	0.6	0.4	0.4	2.7	0.9	0.8	6.7
1989	3.5	1.1	0.2	1.0	0.6	0.7	2.7	1.4	0.8	8.5
(NNIEs)										
1979	1.4	0.8	0.0	0.4	0.1	0.0	0.5	0.4	0.2	2.4
1986	1.2	0.6	0.0	0.4	0.1	0.0	0.5	0.3	0.2	2.2
1989	1.4	0.6	0.1	0.5	0.1	0.1	0.6	0.4	0.2	2.6
(China)										
1979	0.5	0.2	0.0	0.2	0.0	0.0	0.0	0.1	0.3	0.9
1986	0.9	0.3	0.0	0.6	0.0	0.0	0.1	0.2	0.4	1.6
1989	1.2	0.3	0.0	0.8	0.0	0.0	0.2	0.2	0.3	1.8
North America										
1979	3.0	1.4	0.3	0.8	0.3	0.1	4.6	4.0	4.2	15.7
1986	3.4	1.6	0.4	1.0	0.3	0.2	5.7	3.4	3.0	15.6
1989	4.1	1.8	0.4	1.4	0.3	0.2	5.6	3.8	3.1	16.6
OECD Countries Europe										
1979	2.1	0.6	0.4	0.6	0.3	0.2	3.1	30.7	9.8	45.6
1986	2.6	0.7	0.4	0.8	0.3	0.4	4.9	32.3	7.8	47.5
1989	3.0	1.0	0.4	1.0	0.4	0.3	3.9	32.3	6.5	45.7
ROW										
1979	3.9	2.5	0.2	0.8	0.3	0.2	5.1	10.2	4.0	23.2
1986	2.4	1.4	0.1	0.5	0.1	0.2	2.7	5.9	3.4	14.4
1989	2.5	1.4	0.1	0.6	0.2	0.2	2.9	5.4	3.1	13.8
World										
1979	14.9	6.3	1.4	4.5	1.9	0.9	16.5	47.5	21.1	100.0
1986	16.1	5.6	1.5	5.5	1.6	1.8	21.2	45.3	17.5	100.0
1989	19.6	6.5	1.6	7.4	2.3	1.8	19.5	45.6	15.3	100.0

Sources: IMF, Direction of Trade Yearbook 1986 and 1990; UNSO, Comtrade Database.

Appendix Table 2 - Trends in World Merchandise Trade Flows, 1979 - 1989

From\ To	Pacific Asia	(Japan)	(ANZ)	(NIEs)	(NNIEs)	(China)	North America	OECD Countries Europe	ROW	World
					(Average annual percentage change in value)					
Pacific Asia										
1979-89	12.3	9.1	10.9	13.9	10.7	19.2	13.8	11.7	4.9	11.4
1979-86	7.8	3.9	8.1	9.4	3.1	20.6	15.5	8.9	3.9	9.5
1986-89	23.4	22.2	17.6	25.2	30.6	16.0	9.8	18.6	7.0	15.9
(Japan)										
1979-89	11.0	-	11.4	12.0	9.2	8.7	13.6	13.1	1.3	10.4
1979-86	8.5	-	11.2	8.7	1.2	15.1	17.6	12.7	2.0	10.9
1986-89	17.0	-	11.9	20.1	30.3	-5.0	4.8	14.1	-0.2	9.2
(ANZ)										
1979-89	8.4	6.9	9.1	13.9	8.0	2.0	5.5	5.8	5.4	7.0
1979-86	3.6	2.5	4.2	7.6	0.0	5.4	1.6	1.9	2.9	2.9
1986-89	20.8	17.9	21.6	30.1	29.4	-5.4	15.1	15.5	11.4	17.2
(NIEs)										
1979-89	17.2	14.5	13.3	18.0	12.8	42.0	16.5	13.1	9.0	15.1
1979-86	11.3	7.8	9.9	11.9	5.3	45.0	17.3	7.1	6.6	11.9
1986-89	32.3	31.8	21.4	33.3	32.6	35.2	14.6	28.4	14.7	23.1
(NNIEs)										
1979-89	6.7	4.2	8.6	8.8	10.9	18.2	8.2	7.9	9.1	7.4
1979-86	1.6	-0.1	1.9	3.2	5.5	12.9	2.9	2.1	3.9	2.2
1986-89	19.5	14.9	26.0	23.1	24.7	31.7	21.8	22.7	22.0	20.7
(China)										
1979-89	16.8	11.3	7.2	20.7	10.8	-	20.2	10.2	8.1	14.2
1979-86	13.3	8.9	0.0	17.3	4.9	-	22.5	11.9	8.7	12.6
1986-89	25.5	17.2	26.0	29.0	26.0	-	14.9	6.4	6.7	18.2
North America										
1979-89	10.3	9.4	8.4	12.8	7.4	11.9	8.7	6.3	3.4	7.3
1979-86	5.8	5.7	6.1	6.7	1.7	8.5	6.8	1.5	-0.9	3.6
1986-89	21.6	18.7	13.9	28.4	21.9	20.4	13.3	18.1	14.1	16.4
OECD Countries Europe										
1979-89	10.8	12.8	7.4	12.7	7.8	8.9	9.2	7.2	2.4	6.7
1979-86	7.1	7.5	4.8	8.0	3.2	12.0	10.7	4.5	0.3	4.3
1986-89	20.0	26.3	13.8	24.6	19.5	2.2	5.8	13.9	7.4	12.4
ROW										
1979-89	2.0	0.5	2.1	3.4	3.9	7.7	0.8	0.0	3.9	1.3
1979-86	-3.5	-4.1	-5.1	-3.2	-8.0	6.3	-5.1	-4.1	1.6	-3.1
1986-89	15.9	12.1	21.1	20.7	37.9	11.0	16.1	10.3	9.5	12.3
World										
1979-89	9.6	7.0	8.4	12.2	8.9	14.0	8.5	6.3	3.3	6.7
1979-86	4.9	2.1	5.2	7.0	1.6	14.3	7.5	3.0	1.0	3.7
1986-89	21.4	19.4	16.2	25.3	27.8	13.3	10.7	14.2	9.0	13.8

Source: See Appendix Table 1.

Appendix Table 3 - Product Composition of Exports in Pacific-Asian Economies, 1979 and 1988
(Percentage)

A. Developed Countries	Japan		Australia		New Zealand	
	1979	1988	1979	1988	1979	1988
SITC (Rev.2) Section:						
0 (Food)	1	1	32	18	46	43
1 (Beverages and tobacco)	0	0	0	0	0	0
2 (Crude materials exc. fuels)	1	1	28	25	29	26
3 (Fuels)	0	0	12	17	1	1
4 (Animal and vegetable oils)	0	0	1	0	1	1
Sub-total (0 to 4)	3	2	74	61	77	71
5 (Chemicals)	6	5	2	2	4	5
6 (Material-based manufactures)	25	13	12	13	13	15
7 (Machinery and transport equipment)	57	70	5	5	3	4
8 (Miscellaneous manufactured goods)	8	9	2	2	2	3
Sub-total (5 to 8)	96	97	20	22	22	27
9 (Not classified elsewhere)	1	1	6	17	0	2
Total	100	100	100	100	100	100

B. NIEs	Hong Kong		South Korea		Singapore		Taiwan	
	1979	1988	1979	1988	1979	1988	1979	1988
SITC (Rev.2) Section:								
0 (Food)	2	1	7	4	5	4	9	5
1 (Beverages and tobacco)	0	1	1	0	0	1	0	0
2 (Crude materials exc. fuels)	1	1	2	1	14	5	2	2
3 (Fuels)	0	0	0	1	24	13	2	1
4 (Animal and vegetable oils)	0	0	0	0	3	1	0	0
Sub-total (0 to 4)	3	3	11	6	47	24	13	7
5 (Chemicals)	1	2	3	3	4	7	2	3
6 (Material-based manufactures)	12	12	32	21	9	8	26	21
7 (Machinery and transport equipment)	17	25	21	39	27	48	24	35
8 (Miscellaneous manufactured goods)	67	57	32	31	7	9	35	33
Sub-total (5 to 8)	96	96	89	93	46	72	87	93
9 (Not classified elsewhere)	1	1	0	0	7	4	0	0
Total	100	100	100	100	100	100	100	100

C. Next-tier NIEs	Indonesia		Malaysia		Philippines		Thailand	
	1979	1988	1979	1988	1979	1988	1979	1988
SITC (Rev.2) Section:								
0 (Food)	8	10	4	5	19	15	47	34
1 (Beverages and tobacco)	0	0	0	0	1	0	1	0
2 (Crude materials exc. fuels)	20	14	37	22	27	10	17	9
3 (Fuels)	65	40	18	16	0	2	0	1
4 (Animal and vegetable oils)	1	3	12	10	16	6	0	0
Sub-total (0 to 4)	94	67	73	54	63	34	65	44
5 (Chemicals)	0	2	1	2	2	4	1	2
6 (Material-based manufactures)	4	22	14	8	9	10	22	14
7 (Machinery and transport equipment)	1	1	10	28	2	10	4	16
8 (Miscellaneous manufactured goods)	1	6	2	7	10	14	6	23
Sub-total (5 to 8)	6	31	27	46	24	37	32	55
9 (Not classified elsewhere)	0	2	0	0	13	29	3	1
Total	100	100	100	100	100	100	100	100

Note: Exports refer to "domestic exports" only, except for Singapore where re-exports are included.
Source: UNSO, Comtrade Database.

Appendix Table 4 - Changes in RCA Index, 1979-1988

A. South Korea - Japan

Ranking	SITC Code	Changes in RCA Index	
		South Korea	Japan
1	775 (H-C)	2.190	-0.182
2	786 (H-C)	2.103	-0.727
3	883 (T)	2.091	-0.083
4	762 (H-C)	1.590	-2.524
5	679 (H-C)	1.466	-0.029
6	763 (H-C)	1.446	-0.697
7	752 (T)	1.050	1.109
8	676 (H-C)	1.048	0.100
9	898 (H-C)	0.846	-0.153
10	851 (U-L)	0.838	-0.030
11	691 (H-C)	0.795	-0.501
12	672 (H-C)	0.783	-0.991
13	655 (U-L)	0.722	-0.404
14	781 (H-C)	0.703	0.087
15	686 (N-R)	0.656	-0.139
16	611 (N-R)	0.589	-0.369
17	895 (U-L)	0.495	0.174
18	582 (T)	0.481	0.133
19	682 (N-R)	0.478	-0.127
20	677 (H-C)	0.431	-0.476

B. Taiwan - Japan

Ranking	SITC Code	Changes in RCA Index	
		Taiwan	Japan
1	688 (N-R)	3.762	0.034
2	762 (H-C)	3.761	-2.524
3	655 (U-L)	3.058	-0.404
4	761 (H-C)	2.800	-1.399
5	752 (T)	2.362	1.109
6	812 (U-L)	1.715	-0.009
7	785 (H-C)	1.695	-1.839
8	612 (N-R)	1.691	-0.029
9	771 (T)	1.629	0.162
10	675 (H-C)	1.615	-1.282
11	663 (N-R)	1.556	0.337
12	883 (T)	1.236	-0.083
13	694 (H-C)	1.086	-0.637
14	786 (H-C)	0.963	-0.727
15	679 (H-C)	0.934	-0.029
16	697 (H-C)	0.930	-0.195
17	656 (U-L)	0.918	-0.384
18	881 (T)	0.851	-0.046
19	657 (U-L)	0.790	-0.098
20	772 (T)	0.745	0.267

C. Japan - United States

Ranking	SITC Code	Changes in RCA Index	
		Japan	United States
1	752 (T)	1.109	-1.041
2	764 (T)	0.751	-0.022
3	882 (T)	0.695	-0.713
4	759 (T)	0.677	-0.282
5	774 (T)	0.666	0.464
6	873 (T)	0.524	-0.319
7	776 (T)	0.506	-0.381
8	784 (H-C)	0.473	-0.149
9	743 (T)	0.467	-0.428
10	713 (T)	0.463	-0.401
11	723 (T)	0.431	-0.312
12	728 (T)	0.428	0.224
13	664 (U-L)	0.424	-0.279
14	737 (T)	0.410	-0.113
15	726 (T)	0.376	-0.505
16	778 (T)	0.343	0.011
17	663 (N-R)	0.337	-0.025
18	515 (T)	0.280	0.053
19	742 (T)	0.268	-0.327
20	772 (T)	0.267	0.117

Notes:
N-R - Natural-resource-intensive Products
U-L - Unskilled-labour-intensive products
T - Technology-intensive products
H-C - Human-capital-intensive products

Source: The author's own calculation based on UNSO, Comtrade Database.

Appendix Table 5 - Aggregate IIT Index of Manufactures in Pacific-Asian Economies, 1979 and 1988

	(A) 1979	1988	(B) 1979	1988
Japan	28.2	30.2	-	-
Australia	28.2	24.2	31.5	28.4
New Zealand	24.0	33.8	26.7	37.0
Hong Kong	36.7	46.6	52.3	74.6
Singapore	-	-	65.6	71.7
Taiwan	34.1	40.7	-	-
Korea, Rep.	35.4	41.0	35.9	-
Malaysia	33.4	54.8	-	-
Thailand	18.5	34.7	18.9	34.9
Philippines	14.3	27.2	14.5	27.7
Indonesia	9.1	17.3	-	-
[Reference]				
United States	57.5	60.4	58.4	61.9
Canada	59.0	61.9	-	-

(A) The calculation of IIT refers to domestic exports only. When import statistics include both retained imports and imports for re-exports, the IIT index was calculated by subtracting the value of re-exports from import statistics.
(B) ''Re-exports'' are included in both export and import statistics

Source: The author's own calculation based on UNSO, Comtrade Database.

Appendix Table 6 - [a,b]
IIT Index of Manufactures by Factor Intensity in Pacific-Asian Economies, 1979 and 1988

	N-R	U-L	T	H-C
Japan	42.3	40.0	39.8	12.7
	28.8	42.7	33.6	22.5
Australia	27.0	25.0	34.7	32.1
	24.4	24.6	30.5	28.3
New Zealand	18.4	37.0	19.8	32.3
	28.5	48.1	28.8	46.1
Hong Kong	56.9	41.3	64.8	57.5
	66.1	69.4	82.3	74.7
Singapore	47.1	69.4	70.9	56.2
	62.8	70.2	76.3	61.4
Taiwan	16.5	12.2	52.8	43.5
	41.5	14.7	57.8	42.1
Korea, Rep.	19.0	23.8	40.3	49.1
	34.0	20.1	58.5	37.5
Malaysia	4.9	51.7	46.4	20.3
	27.9	49.7	66.1	31.2
Thailand	13.3	38.8	17.1	14.4
	41.9	31.9	39.3	26.1
Philippines	8.9	21.9	13.0	14.7
	13.6	18.0	40.3	13.4
Indonesia	7.3	22.4	7.6	8.5
	9.5	28.3	9.2	35.3
[Reference]				
United States	55.0	46.8	60.1	60.5
	50.5	33.0	76.7	52.2
Canada	43.6	36.4	55.9	67.1
	52.6	51.1	59.6	66.7

a. "Re-exports" are included in both export and import statistics.
Upper (lower) figures indicate IIT in 1979 (1988).
b. Appendix A provides the definition of product classification:
N-R - Natural-resource-intensive products
U-L - Unskilled-labour-intensive products
T - Technology-intensive products
H-C - Human-capital-intensive products
Source: The author's own calculation based on UNSO, Comtrade Database.

Appendix Table 7 - IIT Index of Manufactures by Main Partner in Pacific-Asian Economies, 1979 and 1988[a]

	Pacific Asia	Japan	ANZ	NIEs	NNIEs	China	North America	OECD Countries Europe
Japan	13.6	-	5.8	19.5	5.6	6.6	25.9	36.2
	21.1	-	7.2	27.0	11.4	14.5	26.7	34.1
Australia	14.3	7.3	36.1	16.5	9.5	1.8	15.7	10.8
	15.0	6.7	51.0	16.2	12.4	3.8	18.1	14.1
New Zealand	19.5	2.7	36.6	11.0	5.0	2.0	10.5	6.2
	28.3	4.8	57.3	10.4	13.5	1.7	22.2	13.9
Hong Kong	25.7	20.5	16.3	36.9	29.8	21.3	25.8	33.0
	39.3	21.9	21.6	42.0	31.0	47.7	24.5	35.2
Singapore	28.1	11.8	31.9	33.7	47.1	8.0	41.1	30.9
	38.6	21.3	31.2	43.2	57.2	19.2	43.8	37.8
Taiwan	18.5	20.8	8.1	19.6	6.6	-	16.5	21.0
	28.5	31.8	9.7	29.0	16.3	-	19.6	25.7
South Korea	22.7	24.1	9.2	23.1	6.6	-	26.9	17.3
	33.3	36.0	9.0	32.9	19.8	-	24.7	20.2
Malaysia	19.0	9.4	12.2	35.3	36.4	2.1	45.4	14.9
	34.9	22.2	19.3	46.0	43.5	11.2	53.3	27.9
Thailand	7.2	4.5	7.9	13.8	14.1	8.0	11.4	5.8
	18.7	10.6	15.1	32.1	20.9	20.2	32.3	19.6
Philippines	10.6	8.4	9.0	18.4	9.4	0.0	4.8	5.3
	13.8	10.6	14.2	15.5	23.2	9.1	28.7	13.4
Indonesia	3.2	1.0	2.8	9.0	5.5	0.0	1.5	4.2
	8.8	5.8	7.5	12.9	21.2	1.9	4.1	4.8
[Reference]								
United States	22.8	24.1	10.0	22.2	29.3	6.0	60.1	54.1
	26.5	25.7	16.0	28.2	40.7	11.2	64.9	56.5
Canada	8.8	10.4	12.2	7.2	5.8	1.1	59.1	33.1
	9.3	7.0	23.6	12.5	4.6	5.7	62.8	35.1

a. "Re-exports" are included in both export and import statistics.
Upper (lower) figures indicate IIT in 1979 (1988).
Source: the author's own calculation based on UNSO, Comtrade Database.

Appendix Table 8 - IIT Index by Factor Intensity and Main Partner in Pacific-Asian Economies, 1988[a,b]

		Pacific Asia	Japan	ANZ	NIEs	NNIEs	China	North America	OECD Countries Europe
Japan	N-R	14.6	-	4.0	26.0	4.1	23.9	33.6	18.8
	U-L	23.4	-	35.0	22.4	30.2	23.1	53.2	46.6
	T	19.3	-	6.3	23.2	12.0	13.2	38.1	33.6
	H-C	24.5	-	6.5	37.8	8.8	7.3	9.6	33.6
Australia	N-R	8.5	4.0	52.6	7.1	5.0	3.0	30.0	22.7
	U-L	16.7	20.9	60.6	9.5	11.2	1.6	27.8	13.2
	T	18.8	7.3	51.8	26.3	22.1	12.2	17.0	15.6
	H-C	13.6	5.8	44.9	16.9	13.4	7.8	16.6	8.6
New Zealand	N-R	16.8	1.3	50.1	4.8	12.5	0.2	24.3	22.6
	U-L	35.3	13.4	64.5	6.7	10.6	1.0	43.7	8.3
	T	32.4	3.1	63.8	18.7	22.2	6.4	16.3	13.4
	H-C	26.7	7.3	50.3	9.3	11.0	1.8	34.3	15.5
Hong Kong	N-R	46.4	42.0	21.2	46.4	30.5	54.6	62.2	42.3
	U-L	38.9	35.8	10.7	29.6	30.5	44.2	5.9	27.0
	T	37.9	13.7	40.4	50.9	28.0	44.8	52.5	39.9
	H-C	40.7	20.7	21.7	38.4	38.9	59.7	24.7	41.9
Singapore	N-R	34.4	29.6	7.8	46.1	41.1	30.8	23.6	12.8
	U-L	26.8	16.7	42.0	22.7	42.5	6.4	16.5	48.2
	T	45.4	23.4	38.2	52.0	66.4	24.1	51.9	46.0
	H-C	28.5	16.3	28.7	40.0	40.1	17.9	18.7	19.7
Taiwan	N-R	23.0	29.3	8.4	31.2	8.2	-	21.1	29.1
	U-L	20.0	27.8	8.7	14.2	12.3	-	4.7	15.1
	T	31.9	31.7	12.7	38.1	20.2	-	35.9	33.4
	H-C	32.0	35.7	8.4	30.4	17.9	-	16.9	20.6
South Korea	N-R	22.2	26.1	3.8	37.1	11.5	-	23.7	14.5
	U-L	21.0	22.0	12.0	20.3	19.4	-	6.6	13.5
	T	33.3	30.0	21.0	46.3	34.3	-	48.6	27.0
	H-C	47.8	64.7	4.4	19.6	2.9	-	11.8	18.0
Malaysia	N-R	14.0	5.5	5.6	21.8	23.3	2.1	8.2	21.0
	U-L	30.9	28.4	24.9	34.1	27.5	15.6	6.5	20.1
	T	43.6	28.0	29.4	55.9	54.7	7.9	67.1	37.4
	H-C	21.9	11.2	18.3	33.8	24.8	15.1	14.3	12.2
Thailand	N-R	8.6	4.2	6.6	17.3	6.6	2.2	32.1	41.6
	U-L	21.8	27.0	9.6	21.4	26.7	14.7	8.4	10.3
	T	23.8	13.4	37.8	39.0	19.8	26.8	45.4	21.3
	H-C	10.4	4.2	19.1	27.1	27.4	30.3	15.8	18.6

(Continued)

Appendix Table 8 (Continued)

		Pacific Asia	Japan	ANZ	NIEs	NNIEs	China	North America	OECD Countries Europe
	N-R	7.5	7.9	3.3	8.4	3.8	0.1	11.9	6.3
Philippines									
	U-L	14.3	18.4	11.7	13.7	15.0	2.9	5.2	9.1
	T	18.7	14.3	25.4	21.1	26.4	3.4	46.3	18.2
	H-C	8.3	5.1	9.8	10.7	24.9	23.7	13.0	2.5
Indonesia	N-R	4.6	3.8	3.1	7.3	4.9	0.1	1.4	1.0
	U-L	21.7	25.9	9.2	21.2	25.3	5.2	3.6	11.3
	T	6.1	1.8	9.4	10.5	25.5	0.9	2.3	2.8
	H-C	11.6	8.6	9.0	18.5	15.3	12.2	17.3	8.7
[Reference]									
United States	N-R	34.2	43.7	23.0	35.8	14.3	22.4	41.9	44.1
	U-L	10.5	40.5	31.2	6.4	5.6	2.8	61.4	45.4
	T	41.2	37.7	11.5	47.9	62.1	23.6	69.5	64.6
	H-C	11.9	9.5	26.1	17.1	16.7	9.7	65.1	43.1
Canada	N-R	7.8	5.0	11.1	12.3	2.5	17.3	51.9	35.0
	U-L	6.8	26.2	33.9	4.3	2.2	3.4	66.5	27.2
	T	13.9	9.1	26.4	23.6	8.3	7.7	63.4	38.0
	H-C	5.8	3.6	17.5	10.3	1.7	6.0	63.2	32.6

a. "Re-exports" are included in both export and import statistics.
b. Appendix provides the definition of product classification:
N-R - Natural-resource-intensive products
U-L - Unskilled-labour-intensive products
T - Technology-intensive products
H-C - Human-capital-intensive products
Source: The author's own calculation based on UNSO, Comtrade Database.