AUSTRALIA–KOREA TRADE 1962–1981

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TO MY MOTHER

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ABSTRACT

The last decade or so witnessed spectacular growth in Australia–Korea trade. The growth of both countries' global trade contributed to the rapid growth of their bilateral trade, but the former accounts for only a part of the latter. The purpose of this thesis is to explain the residual component of their bilateral trade growth. In other words, it seeks to explain why Australia–Korea trade became more important to each country relative to each country's size in world trade.

In analysing the sources of the rapid increase in the relative importance of Australia–Korea trade, two factors were identified: trade complementarity, which measures the extent to which each country's export pattern matches the commodity composition of the other's imports; and country bias, which measures the influence of resistances to trade between Australia and Korea as compared with each country's trade with other countries. Indexes of both are calculated from trade statistics over the period 1962 to 1981, and econometric analysis is undertaken to identify explanatory factors affecting these indexes.

Three main sets of results emerge. The first is to do with changing complementarity. The broad commodity composition of Australia's exports and imports experienced relatively little change during the 1960s and 1970s, but the pattern of complementarity in her trade experienced considerable change because of the changes overseas both in patterns of comparative advantage and in agricultural protectionism. In contrast, Korea's export and import specialisation underwent huge shifts, and this induced major changes in Korea's complementarity with its trading partners. Korea's industrial restructuring toward heavy and chemical industries since the early 1970s resulted in the rapid growth in import demand for mineral raw materials, in which Australian exports had already been well established. The growth of, and structural changes in, complementarity between Australian and Korean trade were attributed mainly to Korea's dynamic industrial growth

but also to the changing pattern of Australia's comparative advantage and the redirection of its trade from Western Europe to East Asia.

The second set of results relates to the rapid decline in resistances to Australia–Korea trade. Despite the obvious trade potential between resource-rich Australia and resource-poor Korea, trade between them did not develop much before the 1970s. Up until that time, Korean trade had been strongly biased towards the United States and Japan. However, a number of institutional changes were undertaken from the mid-1960s to break down high resistances to Australia–Korea trade. Rapid growth in country bias in Australia–Korea trade subsequently resulted from these initiatives.

The third set of results has to do with imbalance in Australia–Korea trade. The nature of complementarity favoured Australian exports to Korea more than Korean exports to Australia. This is because Australian exports and Korean imports concentrated on the same few primary products, while Korean exports and Australian imports cover a diversified range of manufactures. The effect of differential complementarity was reinforced by differential country bias, resulting from asymmetry in economic (as distinct from geographic) distance: Australia is Korea's nearest source of raw materials, whereas Korea faces intense competition from nearer Asian countries in the Australian market for labour intensive manufactures. In addition, Australian exports are bulky and hence more sensitive to transport costs than Korean exports, so that country bias has been always higher in Australian exports to Korea than Korean exports to Australia.

To shed light on the future prospects for Australia–Korea trade, a comparison is made of the development of Australia–Korea trade in the 1970s with trade between Australia and Japan over the decade 1955–65. Given the similarity between factor endowments and industrial and trade structure of the Korean economy at present and those of the Japanese economy in the mid-1960s, Australia–Korea trade in the future is expected to duplicate in many ways Australia–Japan trade since the 1960s, though its impact on the Australian economy will be more moderate due to the smaller size of the Korean economy.

Research Declaration

This thesis contains no material previously submitted by me for a degree in any University, and, to the best of my knowledge and belief, contains no material previously published or written by another person, except when due reference is made in the text.

Young il Park

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INTRODUCTION

Since the 1960s, there has been spectacular growth in Australia–Korea trade. During the period 1962 to 1981 Australian exports to Korea increased at an annual rate of 30 per cent (in current prices), and Korean exports to Australia increased at an annual rate of 49 per cent. These growth rates in bilateral trade are very impressive compared with annual growth rates of about 13 per cent for total Australian trade and 32 per cent for Korean trade.

This spectacular growth in Australia–Korea trade is only partly due to the rapid growth in each country's total trade. This rapid increase in the importance of Australia in Korean trade occurred during the period when Australia's share in world trade dropped sharply from 1.9 to 1.2 per cent. Certainly, the rapid growth of Korea's total trade value — 37 per cent for exports and 25 per cent for imports per year between 1962 and 1981 in nominal terms — created an opportunity for increasing commercial contacts with Australia. However, Korea's trade growth was oriented toward Australia in particular for two reasons. One is that the trade of the resource-poor Korean economy became highly complementary to that of the resource-rich Australia. The other is that transport costs and related factors have biased Korean trade toward Australia. The effect of geographical proximity is magnified by Korea's gradual decline of aid-dependence. As a result, the growth in Australia–Korea trade was far beyond the growth rates in each country's total trade.

Korea did not even appear in the list of the 50 largest trading partners of Australia until 1970. However, one decade later Korea was the fourth largest market for Australian exports with its share of 3.5 per cent in 1981 and the sixteenth largest source of Australian imports with its share of 1.1 per cent. Alternatively, Australia was the fifth largest source of Korean imports with its share of 3.5 per cent and the fourteenth largest market for Korean exports with its share of 1.4 per cent.

Australia–Korea trade has far more importance for each economy than might be suggested by these shares in each country's trade, because the trade is highly concentrated on particular sectors. For example, Australian exports to Korea are mostly concentrated on industrial raw materials and agricultural commodities. By 1981, Korea became the second largest customer for Australian agricultural and mining industries, and Australia became the second largest source of Korean imports of foodstuffs and industrial raw materials. By contrast, Korea's exports to Australia were concentrated on various manufactured goods. For example, Korea became the third largest source of Australian imports in basic metal products and the fourth largest source of textile products.

Chapter 1 reveals that there were two other interesting features in the development of Australia–Korea trade during the past two decades. Between 1962 and 1970 the annual growth rate in Australian exports to Korea was only 11 per cent, but during the 1970s it accelerated to 45 per cent. As a result, Australia's share in Korean imports dropped considerably from 1.7 per cent in 1962 to 0.7 per cent in 1970, and dramatically rose to 3.5 per cent by 1981. Conversely, Korea's exports to Australia grew at an annual rate of 67 per cent until 1974, but have since slowed to a growth rate of 22 per cent, which is below the growth rate of 25 per cent in Korean total exports.

Second, Australia was always more important to Korea as an import source than as an export market, while Korea was more important to Australia as an export market than as an import source. Hence Australia's exports to Korea were at least twice as great as Korea's exports to Australia.

These features indicate that Australia–Korea trade provides a particularly interesting case study of a bilateral trade relationship. Leaving aside the questions as to why Korea's share in world trade grew so rapidly, and Australia's share fell during the period 1962 to 1981, this thesis aims to examine the following questions. Why did Australia–Korea trade become more important in either country's trade (relative to each country's share of world trade)? To what extent can the relatively fast rate of growth in this bilateral trade be explained by the changing commodity structure of each country's trade? Why is the growth of trade different over various subperiods? Why did bilateral imbalance persist throughout the period?

Answers to these questions are important not only for their own sake, but also for the light they shed on understanding the determinants of bilateral trade patterns in general. In addition, an understanding of the sources of recent Australia–Korea trade growth provides a basis for suggesting how that trade might develop in the future, and what policy responses might be appropriate to facilitate a mutually advantageous expansion in their economic relationship. It also provides a framework for examining other bilateral trade relationships and thereby for predicting changes in commodity composition, geographical distribution, and size of a country's foreign trade.

As we shall see in the literature review given in Chapter 2, there is now a considerable body of analysis on the determinants of bilateral trade flows. The studies, however, have been largely concerned with analysis of the effect of trade resistances on the geographical distribution of trade with little reference to the implications of international trade theory for bilateral trade flows. The theory provides important insights into the geographical distribution of a country's foreign trade: a country will trade more intensively with countries whose factor endowments are different from its own. This implies that changes in the relative importance of Australia–Korea trade result from differences in factor endowments as well as changes in trade resistances. An analytical framework for the present study is provided in Chapter 3.

Chapters 4 to 6 are concerned with the influence on the growth of Australia–Korea trade of differences in factor endowments and hence commodity composition of the two countries' total trade. Chapter 4 estimates the geographical redirection of each country's trade due to changes in commodity composition in the process of the changing comparative advantage. The redirection of both Australia's and Korea's trade produced a rapid growth of bilateral trade, as examined in Chapter 5. Most importantly, the rapid growth of Korean economy and its structural changes were such that Korean trade became increasingly complementary to Australia's. In particular, Korea's industrial restructuring towards heavy and chemical industries in the 1970s gave substantial impetus to the growth of Korea–Australia trade. However, the trade policies of each country have significant effect on commodity composition, resulting in a substantially lower bilateral trade flow than the one expected from differences in factor endowments, as discussed in Chapter 6.

Chapters 7 and 8 are concerned with the influence of trade resistances on the growth of Australia–Korea trade. Chapter 7, corresponding Chapter 4, analyses the geographical redirection of each country's trade due to changes in trade resistances (and their effects on trade). This reveals a huge redirection of both countries' trade relationships with the weakening of their imperial ties. These redirections, together with a variety of institutional arrangements to promote trade between the two countries, provide another important reason for the rapidly intensified trade relationship between Australia and Korea.

Chapters 9 and 10 examine the prospect for the future development of Australia–Korea trade. Chapter 9 confirms that despite increasing trade friction surrounding the bilateral imbalance, bilateral imbalance in Australia–Korea trade is not so much a consequence of policy discrimination as a consequence of the commodity structure of each country's total and bilateral trade. This suggests that bilateral imbalance will not be a severe obstacle to further development of this trade relationship, and that bilateral trade policy should be designed from a long-term, cooperative, and multinational perspective. Based on the understanding of the reasons for rapid growth of Australia–Korea trade discussed in the previous chapters, a prediction as to how this bilateral trade will develop in the future is made through a comparison of recent Australia–Korea trade with the development of Australia–Japan trade.

The main results are summarised in Chapter 11 along with an assessment of the methodology used in this thesis. Some implications for international trade theory and policy are then drawn, before concluding with some suggested areas for further research.

CHAPTER 1

OVERVIEW OF AUSTRALIA–KOREA TRADE

Changes in the size and commodity composition of a country's total trade have major impact on the level and commodity composition of its bilateral trade. Bilateral trade is the result of interaction between each country's foreign trade. This chapter describes the changes in relative size, commodity composition, and geographical distribution of Australian and Korean foreign trade over the period 1962 to 1981, and then points to the special significance which Australia–Korea trade bears to each country's trade.

1.1. Korean Trade Perfomance 1962 to 1981

The growth of the Korean economy over the last two decades is often cited as one of the most striking features of modern economic history (Linder, 1985). Only a quarter century ago the Korean economy was one of the poorest in the world, connected to the rest of the world only through foreign aid receipts. Now it is a major trading country. Korea is a major seller of manufactures as well as a major buyer of raw materials in world markets, and it also provides considerable assistance to other developing countries.

This transformation was possible only through successful promotion of manufactured exports. Her trade perfomance is illustrated in Table 1–1. Between 1962 and 1981 Korean exports grew at an annual rate of 37 per cent in value terms and 28 per cent in volume terms. This growth was more than twice as fast as world trade, which grew at an annual rate of 15 per cent in value terms. Similarly, Korean imports grew at an annual rate of 26 per cent in value terms and 16 per cent in volume terms.

Table 1–1

Trade Performance of Korea, 1962–1981

(Selected Three Year Averages)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Share in GDP (%) (current price)	5.3	21.3	32.1	15.4	27.4	38.8
Share in world trade (%)	0.08	0.44	1.01	0.30	0.70	1.24
Annual growth rate (%)	1962-64 to 1971-73	1971-73 to 1979-81	1962-64 to 1979-81	1962-64 to 1971-73	1971-73 to 1979-81	1979-81 to 1979-81
Value terms	41.6	31.8	36.9	23.8	28.6	26.0
Volume terms	35.6	19.1	27.6	20.1	12.5	16.4
Unit price	2.4	12.3	6.9	0.3	16.3	7.6

Source: IMF, *International Financial Statistics*, Supplement Series, various years.

These disproportionately high growth rates in Korean trade resulted in a huge increase in the relative size of Korea in world trade. Korea's share in world exports rose from 0.08 to 1.01 per cent, and in world imports rose from 0.30 to 1.24 per cent. In addition, the rapid growth of Korean economy through the promotion of foreign trade resulted in an increasing share of exports and imports in Gross Domestic Product (GDP). The share of exports in GDP rose from 5 to 32 per cent and that of imports grew from 15 to 39 per cent.

This spectacular growth accompanied huge changes in the commodity composition of Korean foreign trade, as seen in Table 1–2. Most notable in the changing pattern of Korean trade is the increasing importance of manufactures in exports and the increasing importance of minerals in imports.

In the early 1960s both Korean exports and imports were shared nearly equally between primary products and manufactures. Between 1962 and 1981, this commodity structure was heavily slanted towards manufactures in exports, and slightly inclined to primary products in imports. For example, at the beginning of 1980s, manufactures made up more than 90 per cent of Korean exports, and primary products accounted for 53 per cent of imports.

Table 1-2

Commodity Composition of Korean Trade, 1962-1981

(Selected Three Year Averages)

(%)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Primary products	47.8	16.4	9.9	47.7	42.6	53.0
Foods	19.1	8.1	7.4	18.8	15.6	9.6
Agric. materials.	11.2	5.1	1.1	18.8	14.6	11.3
Min. materials.	17.5	3.2	1.4	10.1	12.4	32.1
Manufactures	52.2	83.6	90.1	52.3	57.4	47.0
Lab. intensive	38.3	59.5	43.4	5.8	7.8	4.1
Other	13.9	24.1	46.7	46.5	49.6	42.9

Source: UN, *Yearbook of International Trade*, various years.

There were also substantial changes within each broad category. In the early 1960s labour intensive manufactures made up 38 per cent of Korean total exports, and this share increased to 60 per cent by the early 1970s. However, during the 1970s the share experienced a considerable drop to 43 per cent, whereas the share of capital and technology intensive manufactures rose to 47 per cent, to become most important in Korean exports. During the last two decades, Korean exports have continued to concentrate on manufactures — on labour intensive manufactures in the 1960s, and on capital and technology intensive manufactures in the 1970s.

However, the story is quite different in imports. The share of primary products rose considerably to 53 per cent by the end of 1970s after a decline from 48 to 43 per cent in the 1960s. This increase occurred solely due to the sharp increase in mineral materials which nearly tripled their share from 10 to 32 per cent, despite the decline in share of foodstuffs from 19 to 10 per cent and agricultural materials from 19 to 11 per cent. Capital and technology intensive manufactures had the largest share in Korean imports throughout the whole period, accounting for most manufacture imports. Their relative importance grew slightly from 47 to 50 per cent in the 1960s, but thereafter declined to 43 per cent by the beginning of 1980s.

Changes in the size and commodity composition of Korean trade accompanied the redirection of her trade relationships. In the early 1960s, more than three quarters of Korean export and import trade was oriented towards two markets, America and Japan, and this concentration continued until the early 1970s. However, during the 1970s there was a remarkable redirection of Korean exports. The share of those two markets combined dropped to below 50 per cent. The importance of developing countries increased rapidly and they took one-third of Korean exports by the beginning of 1980s. The share of Pacific Asian developing countries, such as the Association of South-East Asian Nations (ASEAN) members and Hong Kong and Taiwan rose from 9 to 13 per cent, and that of other developing countries rose from 5 to 20 per cent. In addition, European countries accounted for 17 per cent of Korean exports, up from 10 per cent in the early 1970s.

The trend is the same on the import side. The combined share of Japan and America has dropped from 70 to 52 per cent in the 1970s. The lost share was made up by developing countries. Unlike the case of exports, the share of Europe did not increase. Instead, Pacific

Asian developing countries grew from 10 to 12 per cent, and that of other developing countries more than tripled from 7 to 22 per cent. At the beginnig of the 1980s, one-third of Korean exports and imports was traded with developing countries. It is also notable that Oceanian countries made up 3.6 per cent of Korean imports at the end of 1970s, but accounted for only 1.5 per cent of exports. From the regional viewpoint, the combined importance of Western Pacific region (including Japan), Pacific Asian developing countries, and Oceania fell from 39 to 33 per cent in Korean exports, and from 53 to 44 per cent in imports. This occurred solely due to the decline in the share of Japan.

Table 1-3

Geographical Distribution of Korean Trade, 1962-1981

(Selected Three Year Averages)

(%)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Japan	29.7	29.4	18.7	29.7	40.5	27.8
North America	47.2	46.2	29.8	46.7	29.1	24.4
Europe	8.5	10.0	17.3	11.3	10.1	10.1
Oceania	0.5	0.9	1.5	1.8	2.1	3.6
Pacific-Asian developing countries	8.8	8.8	12.8	7.2	10.2	12.3
Other developing countries	5.3	4.7	19.9	3.3	7.0	21.8

Note: Pacific-Asian developing countries cover Hong Kong, Taiwan, China, and 5 ASEAN countries.

Source: UN, *Yearbook of International Trade*, various years.

1.2. Australian Trade Performance 1962 to 1981

Australia's overall economic performance between 1962 and 1981 was poor by world standards. It is often said that this was closely related to Australia's relatively poor trade performance (Krause, 1982; Kasper, 1978). Although it is true that foreign trade continued to play an important role in the Australian economy, there has been a declining trend in both the ratio of exports and imports to GDP, and the share of Australia in world trade.

Between 1962 and 1981 Australian exports increased at an annual rate of 12.7 per cent in value terms and 5.6 per cent in volume terms, and imports grew at an annual rate of 13.4 per cent in value terms and 6.7 per cent in volume terms respectively (see Table 1–4). These rates compare with an annual growth rate of 15 per cent in world trade. As a result, Australia's share in world exports fell from 1.89 to 1.16 per cent, and in world imports fell from 1.57 to 1.18 per cent. The ratios of exports and imports to GDP showed little change, experiencing the slight decline from 1962 until the late 1970s and a considerable rise from 1979.

Notwithstanding the relatively slow growth of Australian trade, there has been a considerable change in the commodity structure of Australian exports, especially in the 1960s (see Table 1–5). Although there was no change in the dominant importance of primary products in Australian exports, there was a considerable increase in importance of manufactures, mainly capital and technology intensive manufactures. The share of manufactures doubled from 11 to 22 per cent between 1962 to 1981. Most important changes occurred within primary products. The importance of agricultural materials, mainly wool, drastically dropped from 37 to 12 per cent between 1962 and 1981, while that of mineral materials tripled from 11 to 31 per cent. The share of foodstuffs also declined from 41 to 34 per cent.

Table 1-4

Trade Performance of Australia, 1962–1981

(Selected Three Year Averages)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Share in GDP (%) (current price)	16.2	15.4	17.1	16.1	13.5	18.3
Share in world trade (%)	1.89	1.60	1.16	1.57	1.24	1.18
Annual growth rate (%)	1962-64 to 1971-73	1971-73 to 1979-81	1962-64 to 1979-81	1962-64 to 1971-73	1971-73 to 1979-81	1979-81 to 1979-81
Value terms	10.9	14.7	12.7	9.5	17.9	13.4
Volume terms	7.7	3.3	5.6	8.5	4.6	6.7
Unit price	1.6	11.8	6.3	1.0	13.4	6.6

Source: IMF, *International Financial Statistics*, Supplement Series, various years.

The commodity structure of Australian imports, which was always dominated by manufactures, experienced little change. One interesting development was that the importance of labour intensive manufactures considerably rose until the mid-1970s, but thereafter declined slightly below that in the early 1960s. Conversely, the importance of capital and technology intensive manufactures increased their share despite the increased importance of oil.

Table 1–5

Commodity Composition of Australian Trade, 1962–1981

(Selected Three Year Averages)

(%)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Primary products	88.7	80.6	77.7	24.6	17.1	22.7
Foods	40.5	35.2	34.4	5.9	5.8	5.4
Agric. materials	37.2	19.9	12.2	5.9	4.6	2.7
Min. materials	11.0	25.5	31.1	12.8	6.7	14.6
Manufactures	11.3	19.4	22.3	75.4	82.9	77.3
Lab. intensive	1.3	1.6	2.4	13.8	15.4	13.5
Other	10.0	17.8	19.9	61.6	67.5	63.8

Source: UN, *Yearbook of International Trade*, various years.

The most notable development has been the change in Australia's trading partners, as presented in Table 1–6. In the early 1960s trade with Europe, especially the United Kingdom, made up 35 per cent of Australian exports and 44 per cent of its imports. At the beginning of the 1980s 15 per cent of Australian exports went to Europe, and 27 per cent of Australia's imports came from Europe. The shares lost by Europe were made up by Japan and Pacific Asian developing countries. But there was a different time pattern between Japan and Pacific Asian developing countries. In the 1960s Japan alone had absorbed the share to become the principal market, taking about one-third of Australian exports by the early 1970s. The increase in share of Asian developing countries occurred in the 1970s. In that decade, all developed markets, including Japan, lost their shares: Japan, from 30 to 26 per cent; North America, from 15 to 11 per cent; and Europe, from 22 to 15 per cent. Developing countries made up all the share lost by developed countries, with the increased shares from 11 to 20 per cent for Pacific-Asian developing countries, and from 8 to 15 per cent for other developing countries.

The picture is only slightly different on the import side. The share of Europe dropped to 27 per cent, though it was still the largest import source. Instead the shares of Japan and Pacific Asian developing countries more than doubled to 18 and 12 per cent respectively. Again, it is notable that the increase in Japan's share occurred in the 1960s, but that of Pacific Asian countries occurred in the 1970s. Consequently, by the beginning of 1980s, Western Pacific countries comprising Japan, Pacific Asian developing countries, and Oceania, became the Australia's largest trading partners, buying 54 per cent of Australian exports and supplying 34 per cent of Australian imports.

Table 1–6

Geographical Distribution of Australian Trade, 1962–1981

(Selected Three Year Averages)

(%)

	Exports			Imports		
	1962-64	1971-73	1979-81	1962-64	1971-73	1979-81
Japan	16.7	30.2	26.1	7.2	16.7	17.5
North America	12.5	15.3	11.5	26.8	25.5	25.3
Europe	34.9	22.1	14.8	44.4	38.8	27.0
Oceania	9.3	9.7	8.3	2.9	4.1	4.3
Pacific Asian developing countries	12.0	11.4	19.8	5.5	7.8	12.4
Other ceveloping countries	10.1	8.3	14.8	12.6	6.5	13.0
Others	4.5	3.0	4.7	0.6	0.6	0.5

Note: Pacific-Asian developing countries cover Korea, Hong Kong, China, Taiwan, and 5 ASEAN countries.

Source: UN, *Yearbook of International Trade*, various years.

1.3. The Significance of Australia–Korea Trade

The growth and changing pattern of each country's total trade provide an indication of the high growth in trade between Australia and Korea. However, it only begins to tell the full story.

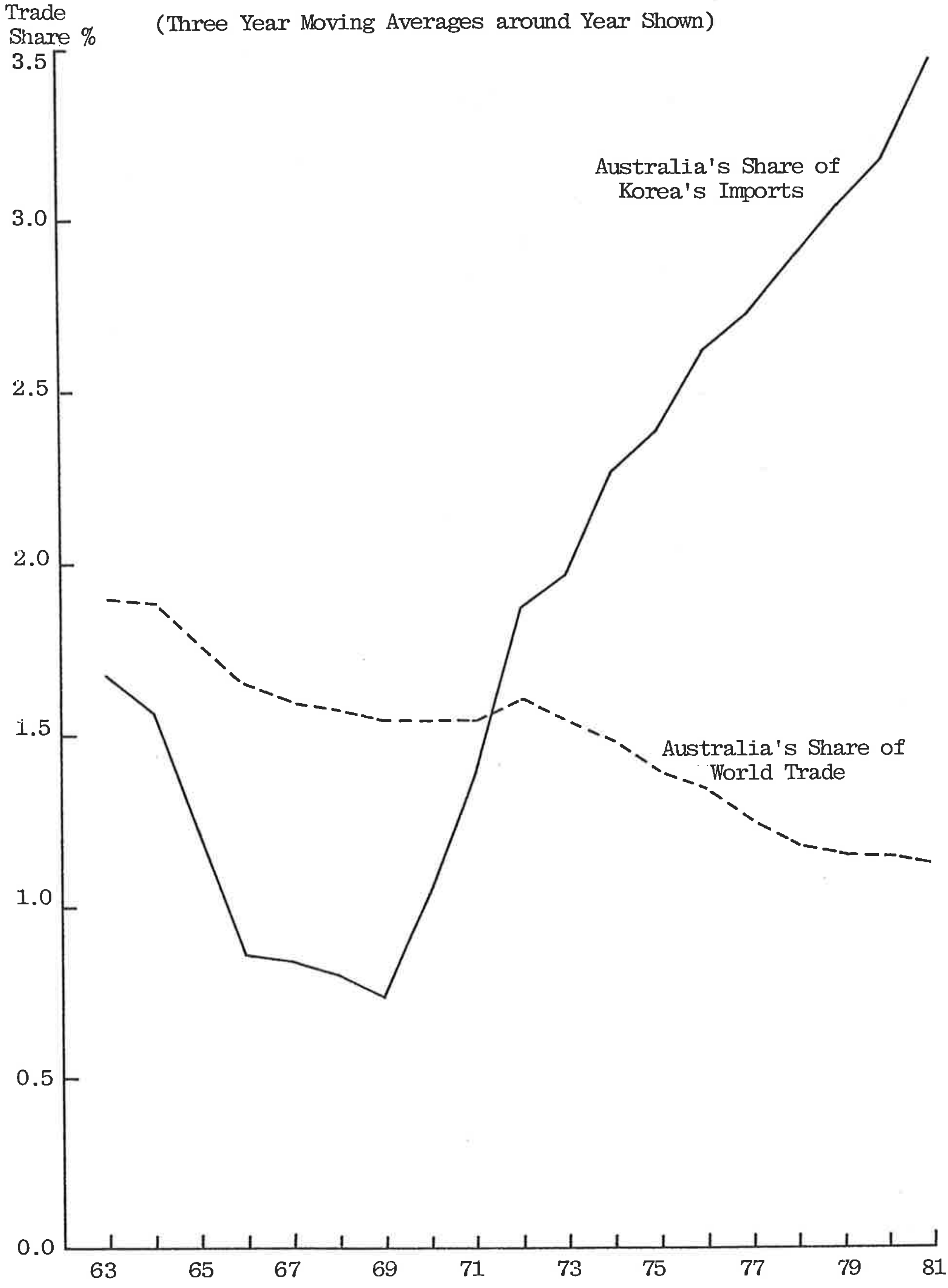
Figures 1–1 and 1–2 starkly illustrate the growth of importance of each country in the other's trade, defined as share in each country. Figure 1–1 illustrates the relative importance of Australia as a source of Korean imports. Between 1962 and 1981 Australia's share in Korean imports more than doubled from 1.61 to 3.50 per cent, meaning that Australian exports to Korea grew more than twice as fast as Korea's total imports. This occurred despite the differential growth rate between 25 per cent in Korean imports and 15 per cent in world trade. This rise was not uniform. After a considerable drop in the 1960s, Australia's share in Korean imports more than quadrupled in the 1970s.

The increasing importance of Australia in Korean imports is more striking when compared with Australia's importance in world trade, which is shown by the broken line. Australia's relative importance in world trade steadily declined from 1.85 to 1.14 per cent during the period 1962 to 1981. If growth of Australia's importance in Korean imports is solely attributable to the change in the relative size of Australian exports (or Korean imports) in world trade, the two lines in Figure 1–1 would be parallel. However, surprisingly, the relative importance of Australia in Korean imports grew in the 1970s despite the continuously decline in the relative size of Australian exports in world trade. This means that the change in relative size of each country played a marginal role in the growth in Australian exports to Korea. This is the most striking feature of the development of Australia–Korea trade over the last decade. Australia's share in Korean imports was less than half of her share in world trade throughout the 1960s, but from 1971 this reversed. By the end of 1970s, Australia's share in Korean imports became three times as large as

Figure 1-1

Australia's Exports as Share of Korea's Imports and World Trade

(Three Year Moving Averages around Year Shown)

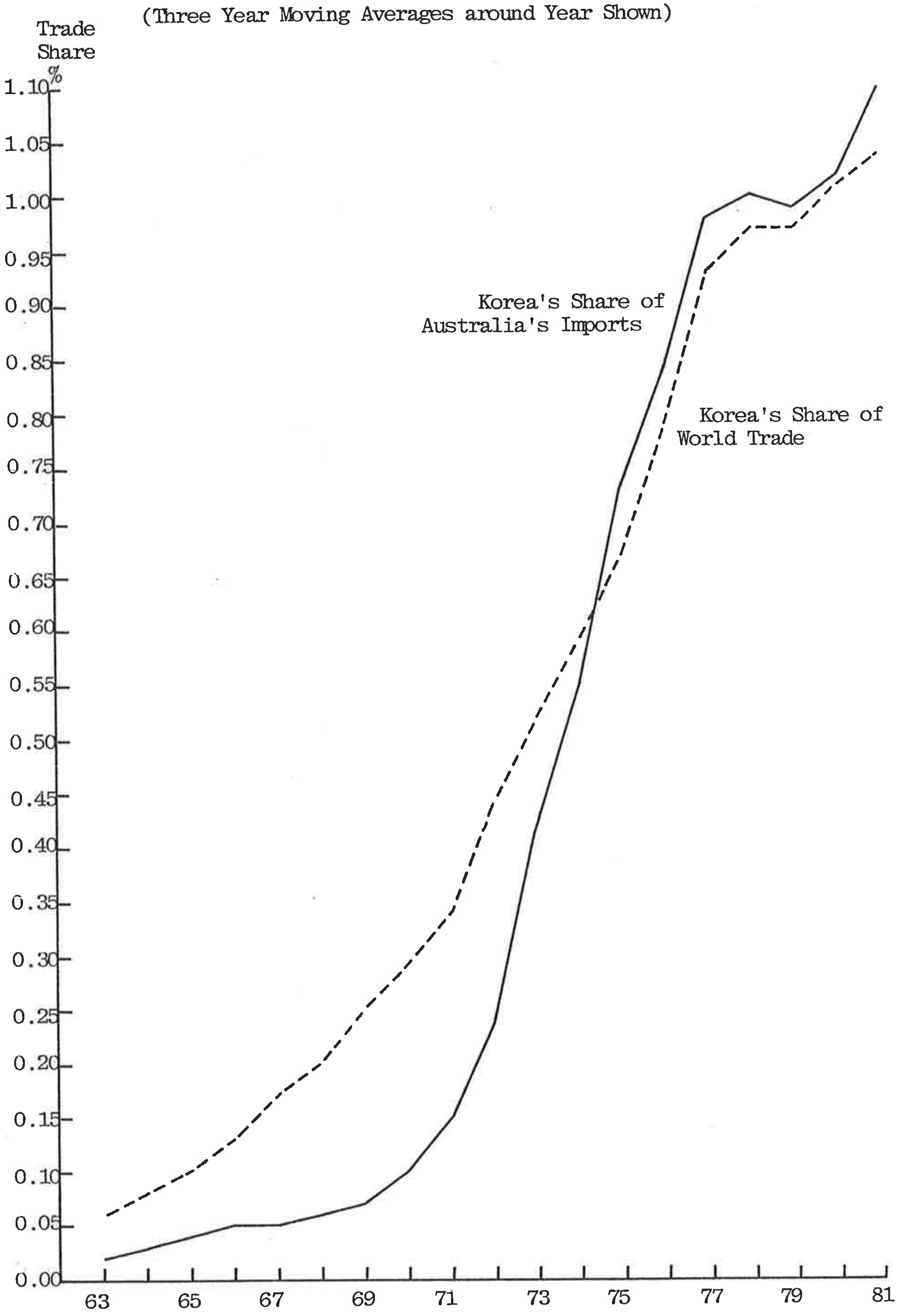


Source: International Economic Data Bank, RSPacS, A.N.U.

Figure 1-2

Korea's Exports as Share of Australia's Imports and World Trade

(Three Year Moving Averages around Year Shown)



Source: International Economic Data Bank, RSPacS, A.N.U.

that in world trade. This indicates that Korea became a much more important market for Australian exports than the rest of the world on average.

Similarly, Figure 1–2 shows the trend of relative importance of Korea as a source of Australian imports. Korea's share in Australian imports rose by fifty times over the period 1962 to 1981, though the absolute magnitude is still small. Again, this compares with the change in the relative size of Korean export in world trade. Apparently, the two lines are so parallel that one may suspect that the growth of Korean exports to Australia is solely attributable to the rapid growth in the relative size of Korea in world trade. However, this is only partly the case, because the appearance is merely a consequence of the rapid growth of Korea's relative size in both world trade and in Australian imports from the extremely low level in the 1960s. Indeed, Korea's share in Australian imports grew more than twice as fast as her share in world trade. Accordingly, Korea's share in Australian imports was less than half her share in world trade until the early 1970s, but this reversed in 1974, so that the former became slightly larger than the latter.

Comparison between Figures 1–1 and 1–2 also reveals other important features of the Australia–Korea trade relationship. First, Australia's share in Korean imports sharply dropped in the 1960s, and rose steeply in the 1970s, whereas Korea's share in Australian imports steadily increased until the mid-1970s, and thereafter stagnated. Second, the relative importance of Australia as a source of Korean imports was always much higher than the reverse, as shown by the different scale of the figures. The difference implies the large scale bilateral imbalance in Australia–Korea trade during the period 1962 to 1981, even after netting out the difference in the absolute size of Australian and Korean imports until the mid 1970s.

The disproportionately increased relative magnitude of Australia–Korea trade accompanied huge changes in commodity composition in either direction, as seen in Figure 1–3.

Almost all Australian exports to Korea were made up of primary products, while the opposite trade was increasingly dominated by manufactures. This feature continued throughout the whole period 1962 to 1981. the only exception was that manufactures in Australia's exports to Korea had risen to make up 17 per cent in the early 1970s from 3 per cent in 1963–65, before again retreating to 7 per cent over the 1970s.

However, within the broad sectors, there were huge changes in either direction, particularly in the 1970s. In Australian exports to Korea the dominant importance of agricultural raw materials, mainly wool, was replaced by mineral materials. In the early 1960s the former accounted for more than half of Australian exports to Korea, but lost their importance to make up only 19 per cent by 1979–81. The lost share was made up by foodstuffs and manufactures (metal products) in the 1960s and subsequently by raw minerals. In the 1970s mineral materials more than quintupled their importance to account for 43 per cent at the expence of all other commodity group. On the other hand, technologically more sophisticated and capital intensive manufactures increased their importance in Korean exports to Australia from 1 to 46 per cent between 1962 to 1981, whereas labour intensive manufactures steadily lost their share from 74 to 50 per cent.

The commodity composition and its change in Australia–Korea trade is comparable with those of each country's total trade in Tables 1–2 and 1–5. Australian exports to Korea were dominated by primary products far beyond their share in both Australian total exports and Korean total imports. Similarly, Korean exports to Australia were dominated by labour intensive manufactures far beyond their share in both Korean exports and Australian imports.

This comparison shows that the commodity structure of Australia–Korea trade was more concentrated on products in which each country had comparative advantage than was the case in each country's global trade. However, changes in the commodity composition

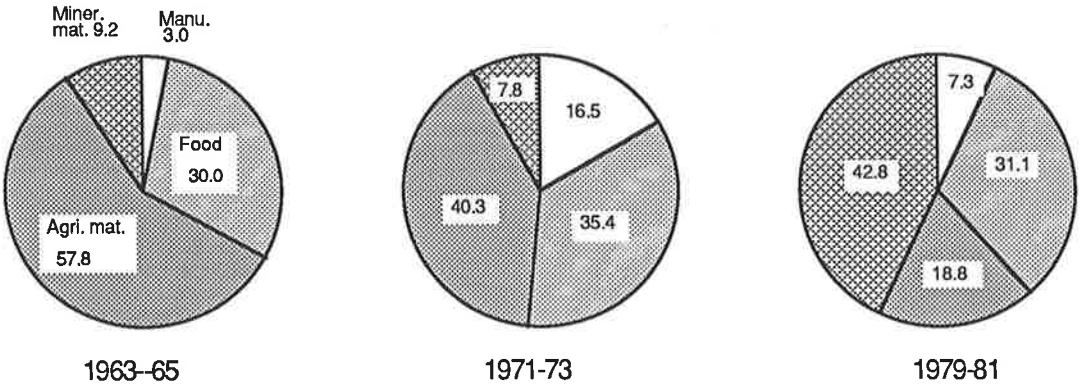
Figure 1-3

Commodity Composition of Australia-Korea Trade, 1962-1981

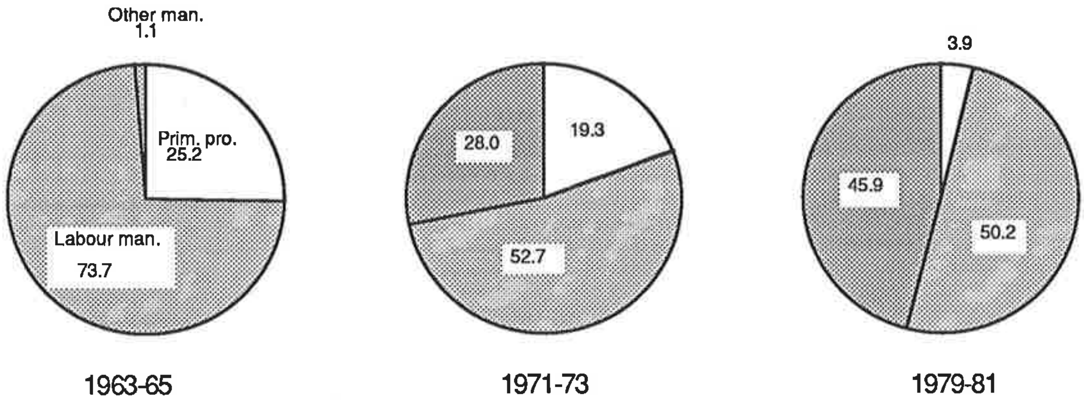
Selected Three Year Averages

(%)

A. Australia's Export Trade with Korea



B. Korea's Export Trade with Australia



Source: International Economic Data Bank, RSPacS, ANU.

in bilateral trade occurred in the same direction as that of each country's global trade.

One is tempted to look at this disproportionately rapid growth in Australia–Korea trade from the regional viewpoint that Australian foreign trade has been redirected toward the so-called Pacific basin countries over the last three decades. Indeed, most Australian economists regarded Australia–Korea trade as a branch of Australia's trade relationship with Asian-Pacific developing countries.[1] In a sense this is true, but it overlooks the significantly different aspects of Australia–Korea trade.

First distinctive feature is the change in Korea's share in Australian trade. Between 1968-69 and 1981-82, Korea's share in Australian exports rose from 0.4 to 3.5 per cent. This compares with the growth in share of other three Asian newly industrialising countries (NICs), such as Taiwan, Hong Kong, and Singapore from 3.9 to 6.6 per cent, that of other four ASEAN countries from 4.1 to 5.8 per cent, and that of China from 2.2 to 2.9 per cent.[2] Surprisingly, Korea alone accounted for nearly 40 per cent of the increased share of Asian-Pacific developing countries in Australian exports, which was the most significant redirection of Australian export trade in the 1970s, as seen in the previous section.

Alternatively, between 1970 and 1980, Korea is the only country among Pacific-Asian countries, in whose imports Australian share gained during the 1970s. Australia's share in Korean imports increased from 1.1 per cent in 1970 to 3.5 per cent in 1980. This contrasts with the decline in Australia's share in other regional countries during the same period: from 8.4 to 5.3 per cent in Japan's imports; from 6.0 to 5.2 per cent in China's imports; from 3.2 to 2.8 per cent in Taiwan's imports; from 2.7 to 1.6 per cent in Hong Kong's imports; and from 4.3 to 3.0 per cent in ASEAN countries.[3]

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[1] Edwards (1980) noted distinctive features of Australian trade with Korea from its trade with other Asian developing countries. He emphasised the major structural changes in the Korean economy which have had significant impact on the Australian economy, and concluded that this resembled that of the Japanese economy on Australia in earlier years.

[2] Source: Australian Industries Assistance Commission (1985), Table 2.4.

[3] Source: Australian Bureau of Intustry Economics (1984b), Table 2.1.

On the other hand, in the case of Australian imports, the share of Korea rose from 0.1 to 1.3 per cent between 1968–69 and 1981-82. This compares with the growth in share of other three Asian NICs from 2.1 to 7.8 per cent, that of other four ASEAN countries from 3.0 to 3.9 per cent, and that of China from 0.9 to 1.2 per cent.[4] Korea accounted for less than 10 per cent of the increased share in Australian imports. These figures confirm the fact that Korea became much more important as a market for Australian products than as a source of Australian imports. This contrasts with Australia's trade with other Asian NICs which are much more important as sources of Australian imports rather than as markets for Australian exports.

Another important difference concerns the different commodity structure of trade. Figure 1–4 highlights the distinction of commodity composition of Australian export and import trade with Korea and other regional countries. Australia's exports to Korea are dominated by primary products, and mineral materials, in particular, make up a high proportion. Conversely, manufactures account for a higher proportion of Australia's exports to four ASEAN countries and other Asian NICs than in Australian total trade. The commodity structure of Australian exports to Korea is more similar to that of Australian exports to Japan than to that of Australian exports to other developing countries.

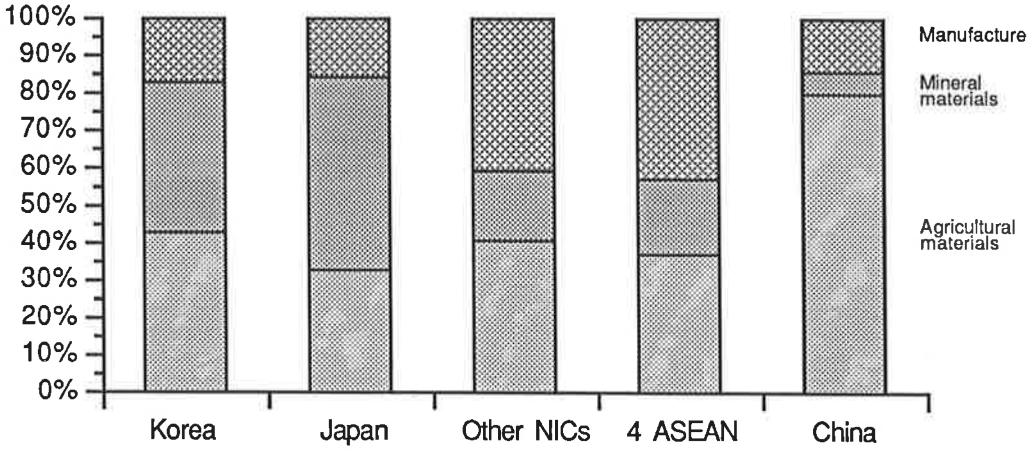
The lower graph shows the commodity structure of Australia's imports from the regional country groups. Higher concentration on manufactures of Australia's imports from Korea distinguishes Australian imports from other developing countries. In addition, within manufactures, the share of capital and technological intensive manufactures is particularly high in Australia's imports from Korea. Though the proportion is not comparable with Australia's imports from Japan, it should be noted that these manufactures rapidly increased their importance in Australia's imports from Korea. These comparisons indicate that in many respects Australia–Korea trade strongly resembles

[4] **Source: Australian Industries Assistance Commission (1985), Table 1.6.**

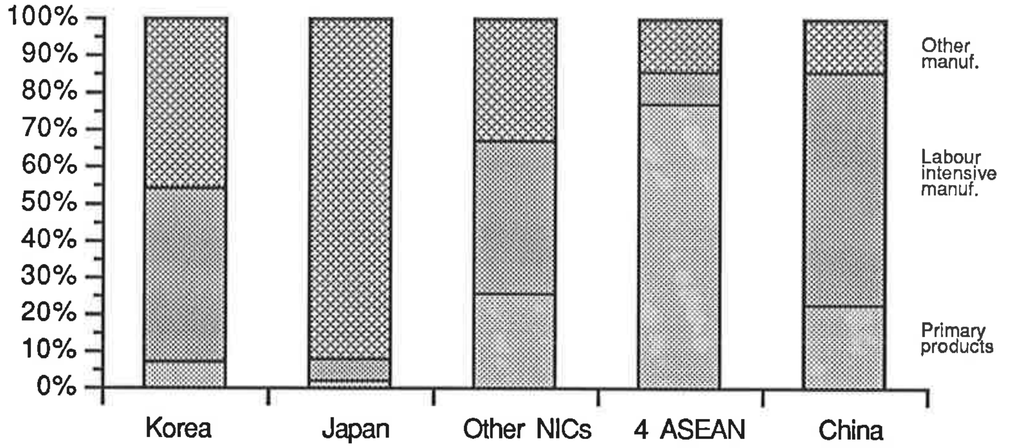
Figure 1-4

Commodity Composition of Australia's Trade with Pacific-Asian Countries
1981/82

A. Australia's Exports



B. Australia's Imports



Source: Australian Bureau of Statistics, Overseas Trade Australia: Comparative and Summary Tables, 1981-82, Cat. no. 5410.0

Australia–Japan trade.

In this context, Australia–Korea trade is particularly significant for the Korean economy, since Australia provides almost all the natural resources critical to Korea's industrialisation. At the same time, this bilateral trade has great importance for Australia because her primary exports, especially minerals, are increasingly facing the necessity to diversify from Japan where the relative importance of metal processing industries started to decline from the mid-1970s.

CHAPTER 2

THEORY AND EMPIRICAL METHODOLOGIES

There is now a considerable body of literature aimed at analysing the determinants of bilateral trade flows. Whilst traditional trade theory has focussed on the size and commodity composition of a country's total trade, studies of bilateral trade flows have made little reference to traditional trade theory. This chapter suggests there is scope for integrating the two for the purpose of understanding better the determinants of bilateral trade flows. The first section examines the bilateral trade implications of the pure theory, first in the absence of transport costs and other trade resistances, and then incorporating the influence of resistances. The second section surveys the methods used in earlier empirical studies of bilateral trade flows, firstly the gravity approach, and then the intensity approach. With this background the final section discusses the approach adopted for the present study, and presents trends in intensity of trade between Australia and Korea over the period 1962 to 1981.

2.1. Implications of Trade Theory for Bilateral Trade

The level and pattern of a country's total trade is determined by the country's relative factor endowments, its consumption pattern, and its trade resistances compared with the rest of the world. Since a country's particular bilateral trade relationship evolves as an aspect of its global trade, those determinants are fundamentally relevant to determining the level and pattern of its individual bilateral trade flows.

2.1.1. Implications in the Absence of Resistances to Trade

Unlike the Ricardian model of comparative advantage, where the trade pattern is determined exclusively by international differences in production functions (*i.e.*, by comparative factor (labour) productivities), in the neo-classical (Heckscher–Ohlin) model international difference in factor endowments is the crucial and sole factor determining comparative advantages on the explicit assumption of identical production function across countries.

Accordingly, the neo-classical theory of comparative advantage regards international trade as a mechanism making up national deficiency in factor endowments, since it assumes away mobility of factors between countries. That is, dissimilarity of factor endowments is the mainspring of international trade between countries. Hence, at a given point of time, one would expect that the greater the difference in factor endowments of a pair of trading countries, the higher the potential trade between them.[1]

This implication can be illustrated by the theorem of trade patterns according to comparative advantage. Given the standard assumptions in addition to identical production function,[2] comparative advantage theory in the neo-classical tradition demonstrates that comparative advantage is the outcome of the interaction between two variables which are independent of each other (Hirsch, 1974): factor endowment (which is a country charac-

[1] This discussion relies on the traditional theory of comparative advantage. According to Linder (1961) who regards international trade as a mere extension of the internal market, the story is different: the greater the similarity in factor endowments between a pair of trading countries, especially between the richer countries, the higher the potential trade between them. However, Linder's hypothesis is not relevant to Australia–Korea trade because endowments of natural resources play a dominant role.

[2] In addition to the internationally identical production function, neo-classical comparative advantage theory needs such basic assumptions as: perfect competition in commodity and factor markets; the homogeneity of factors of production domestically and internationally; no reversals of factor intensity; identical tastes; absence of tariffs and other trade barriers; identical production functions for the same good between countries with constant returns to scale; and decreasing marginal productivity.

teristic) and factor intensity (which is an industry or product characteristic). This interaction produces comparative advantage in the two-country, two-factor, two-commodity framework: the relatively capital-abundant country has a comparative advantage in (and exports) the relatively capital-intensive commodity, and the relatively labour-abundant country has a comparative advantage in (and exports) the relatively labour intensive commodity.

In a multi-factor, multi-commodity framework, as long as the two-country assumption is maintained, this proposition with regard to trade patterns holds, but it becomes weaker. For there will be a chain in which all commodities are ranked in terms of their comparative factor productivity in Ricardian theory, or factor intensity in the H-O theory. For example, the H-O theorem proposes that in a multi-commodity, multi-factor, two-country world, a country has a comparative advantage in commodities which requires relatively intensively factors with which the country is relatively well endowed.[3] In an empirical study, Hufbauer (1970) sought to explain actual international trade patterns in a multi-factor, multi-commodity, two-country framework, and concluded that *"a country tends to have a comparative advantage in commodities which contain several characteristics suitable to the nation's economic structure"*.

Focus, then, is given to multilateral trade to imply a theory of bilateral trade. Neither Ricardian theory nor the H-O theory is relevant to this study. The Ricardian approach of adopting the single factor (labour) has real difficulty in explaining the trade patterns in a multi-factor real world. It is also difficult to apply the neo-classical theory to trade

[3] In such a model, the formal theory grows very complicated not only because of the numerical addition, but also and more importantly because of substitution and complementarity in both consumption and production. This seems to be the main reason for the criticism levied against the "two-ness" of the traditional theory, much of which is aimed most specifically at the two-ness of factor and commodity of the model and not at the two-ness of country, directed with regard to such positions as the Stolper–Samuelson tariff theorem, the Rybczynski theorem, the factor price equalisation theorem, rather than the prediction of trade patterns. See Jones (1977), Chipman (1969), and Uekawa (1971).

in natural resource goods because it is concerned with manufactured goods. This is so, particularly in the context of a discussion of bilateral trade between natural resource-abundant Australia and -scarce Korea. Some elements of the implications for this study are provided by a theoretical model popularized by Jones (1971).

In Jones' model the manufacturing sector produces two goods (labour intensive and capital intensive manufactures), and the primary sector produces natural resource (land) intensive goods. There are three factors of production: capital, which is specific to the manufacturing sector;[4] land, which is specific to the primary sector; and labour, which is required in both sectors. Labour moves freely between sectors depending on the wage level, which is equal to the diminishing marginal product of labour. Hence, the composition of production between the manufacturing and primary sectors is determined by the marginal product of labour in two sectors, and that within manufacturing sector is determined by the relative factor prices for labour and capital, according to the proposition of the H–O theory.

Let us consider first a given geographical distribution of trade flows and then turn to the redirection of trade as a consequence of changing comparative advantage. Assume away any resistance to trade. Suppose three countries in the trading world that can be ranked by their endowments of three factors: land (natural resources), labour, and capital, in the way shown below.[5]

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[4] Capital may well be defined as Johnson's synthetic concept of physical capital in the neo-factor proportion theory and human capital in the neo-technology theory. See, Johnson (1968).

[5] This illustration is the simplest version of the pattern of world factor endowments. Country A may be Australia, Country B, Korea, and Country C, the rest of the world. It should be noted that no country necessarily completely specialises in one commodity, and the extent to which each country incompletely specialises depends on the relative size of each country's trade. For example, if Country A's capacity to export the land intensive commodity is small relative to the import demand of Country C, Country B also exports the land intensive commodity. Nonetheless, this will not change the basic pattern of each country's trade.

Aust Korea Jap.

Relative Factor Endowments	Country A	Country B	Country C
Abundant	Land	Labour	Capital
Moderate	Capital	Land	Labour
Scarce	Labour	Capital	Land

Each country trades numerous commodities with the others under purely competitive conditions. According to the theory of comparative advantage, each country is the most competitive in the commodity which embodies most intensively the factor with which it is best endowed, and the least in the commodity which embodies most intensively the factor with which it is least endowed. Hence, Country A specialises its exports in the land-intensive goods and its imports in the labour-intensive; B specialises its exports in the labour-intensive products and its imports in the capital-intensive; C specialises its exports in the capital intensive goods and its imports in the land-intensive.

This illustration reveals two important aspects of bilateral trade relationships. First, it reveals the "asymmetric" distribution of trade flows, since in competitive markets with no resistances to trade, a country which is the most competitive in a particular good exports it most intensively to another country which is the least competitive. Thus, Country A exports the land-intensive goods to Country C but imports the labour-intensive goods from Country B. In the same way, B exports to A but imports from C; and C exports to B but imports from A. If each country's total trade is balanced, the result also reveals the bilateral trade imbalances among those countries: Country A is likely to have a trade surplus with C but a deficit with B; B has a trade surplus with A but a deficit with C; and C has a trade surplus with B but a deficit with A.

Hansson (1952) pioneered this idea, suggesting it as the pattern of bilateral trade balances observed among major trading areas up to World War I. He noted that trade balances between those regions were relatively stable and agreed closely with the theoretical prediction. Caves and Jones (1973, p. 195), quoting Hansson's empirical study, stated that *"the pattern is a causal "test" of the theory and it illustrates the richness of the neo-classical comparative advantage theory for explaining historical patterns".*

The framework also has analytical and predictive power when applied to the relationship between a changing pattern of commodity composition and redirection of geographical distribution of trade flows as a result of changing comparative advantage.[6] Krueger (1977) applied Jones' three-factor, two-sector model to account for the pattern of trade and its change over time as a relatively labour-abundant country accumulates capital more rapidly than the rate of growth of its labour force, while international prices and other countries' factor endowments are constant. More recently, Garnaut and Anderson (1980) applied the Jones–Krueger model to explain increasing intra-regional trade in the Western Pacific region, induced by the rapid industrialisation of the labour-abundant economies in the region which resulted in the rapid accumulation of capital in those economies.

Garnaut and Anderson's application implies a close association between change in commodity composition and change in geographical distribution. Our illustration is useful to cover some important issues in a Krueger–Garnaut-Anderson analysis. Assume the relatively labour intensive country B accumulates capital more rapidly relative to labour, while other countries' factor endowments are constant. Initially, Country B was endowed moderately well with land because it had an extremely low capital/labour ratio, despite its poor endowment of per capita land compared with other countries. However, as capital accumulates in country B, land/labour becomes low relative to capital/labour ratio, and

[6] Once again, traditional theory focusses on the effect of change in relative factor endowments (economic growth through increase in factor supplies or technological progress) upon the degree of trade dependence, through the influence upon commodity composition and upon the welfare of each country via the influence on terms of trade. See Rybczynski (1955), Johnson (1958), and Takayama (1964).

consequently, land becomes scarcer relative to capital.[7] As a result of capital accumulation in Country B, the relative factor endowments of each country would change as follows.

Factor Endowments after Growth	Country A	Country B	Country C
Abundant	Land	Labour	Capital
Moderate	Labour	Capital	Land
Scarce	Capital	Land	Labour

The changed comparative advantage brings about change in the commodity composition of each country's trade: Country A exports the land-intensive products but now imports the capital-intensive instead of the labour-intensive in the earlier situation; Country B exports the labour-intensive products but imports the land-intensive instead the capital-intensive; and Country C exports the capital-intensive goods, but imports the labour-intensive instead of the land-intensive.[8]

The most important point with regard to bilateral trade is that the changing pattern of commodity composition is associated with the redirection of trade flows. Country A

[7] This means that the economy initially had a greater land/capital ratio (ratio of land/labour ratio to capital/labour ratio) compared with other economies. However, the more rapid capital accumulation in Country B relative to labour, the position of country B has changed to have a lower land/capital ratio. It should be noted that the supply of natural resource is given by natural locations, while the endowments of labour and capital, especially capital stock, is changeable over time.

[8] Gaunaut and Anderson (1980) suggested that this pattern is more likely when considering reality. Although Country A may have a higher capital/labour ratio than Country B because abundant resources themselves are a source of high income (capital), the development of natural resources requires a large scale of capital investment and further developments demand more and more capital inputs. In addition, the higher land/labour ratio of country A means high marginal product of labour in primary sector, and hence, requires greater capital accumulation per worker for A to switch its production to manufacturing sector. By comparison, although Country B's capital/labour ratio may be still lower than that of country A, a switch from primary to manufacturing sector occurrs because maginal product of labour in primary sector is low because of lower land/labour ratio, and its comparative advantage within manufacturing sector will be determined by comparison with country C, according to the proposition of the H–O theory.

now exports to Country B instead of Country C as in the earlier years, and imports from Country C instead Country B. In the same way, the export market of Country B has changed from Country A to Country C and its import source from Country C to Country A. Country C now exports to Country A instead of Country B, and imports from Country B instead of Country A. Note that the commodity composition of each country's exports remains unchanged but their destination has changed. This is the most important feature of the trade relationship in a multilateral trade network. The changing commodity composition of a country's trade as a consequence of changing comparative advantage is closely associated with the redirection of its trade relationships.

This theoretical framework is consistent with the changing pattern of Australian and Korean trade, described in Chapter 1. In the process of continuous accumulation of capital, Korea's export pattern (our Country B) became increasingly concentrated on labour intensive manufactures and away from primary products, and subsequently exports shifted toward capital intensive manufactures. On the other hand, Korea's imports shifted toward capital intensive manufactures in the 1960s, and then increasingly concentrated on primary products in the 1970s. At the same time, Australia's export pattern is consistently specialised in primary products, while its imports tend to concentrate further on capital intensive manufactures.

Most importantly, this theoretical framework explains why Korea continued to concentrate on trade with the advanced industrial countries in the 1960s, and diversified toward developing countries in the 1970s, especially in its import trade. At the same time, it reveals why developing countries became more important in Australian exports, but not so much as sources of its imports. This also explains the differential growth rates in Australia–Korea trade between directions and between subperiods. In this study, the theoretical framework formulates hypothesis to test the effect of the changing commodity composition on the redirection of Australia's and Korea's trade in the absence of influence of trade resistances.

2.1.2. Implications of Resistances to Trade

In a theoretical world with perfectly competitive and free international trade, the actual (commodity and geographical) pattern of a country's trade depends solely on its comparative advantage (comparison of production costs) reflecting relative factor endowments, and world price ratios will be equalized in terms of the producer's valuation. Perfect competition is not the case in the real world, however. Though it is often said that a distinction between domestic and foreign markets according to the degree of market imperfections would be of only marginal concern (see, Caves and Jones, 1973, Ch.11), there are imperfections peculiar to international trade. These imperfections are not merely the product of international factor immobility and national sovereignty over economic policy, but are also the product of differences in politics, customs, languages, history, and geographical and psychic distance. These resist the free flows of commodities by causing prices received by exporters to divert from prices paid by importers by the costs of international transactions.

For the explanation of influence of trade resistances on trade flows, it is useful to divide the influence into two categories: those which are uniform across all trade flows (or an average or normal level of trade resistances for every trade flow); and those which differ between trade flows (or a deviation from the average or normal level of individual trade flows). The former cause domestic prices of traded goods to divert from prices in foreign markets as a whole (this means that prices for imported goods are the same for an identical good regardless of its sources) and brings about a diversion of transactions between domestic and foreign markets as a whole. This diversion reduces total international trade flows below what would be expected in their absence.[9]

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[9] The importance of trade resistances varies considerably across commodities. Hence, the

One important implication of this case is that the differential effect of trade resistances across commodities influences the geographical distribution of a country's trade by modifying the commodity composition of trade. For example, a country's biased protection against imports of foodstuffs will result in discrimination against imports from food exporting countries. Warr and Lloyd (1982) termed this effect as "indirect discrimination", and analysed the discriminatory effect of the inter-commodity differences in Australian assistance to different industries on her bilateral trade relationships.

However, in reality, the degree of resistance to trade and hence, transaction costs of overcoming those resistances are not the same, but differ greatly between individual trade flows. This has a profound impact on the geographical distribution of trade. For the price received by exporters varies from market to market, and the price paid by importers varies from source to source, when transaction costs are netted out (Drysdale and Garnaut, 1982; Geraci and Prewo, 1977). This is because the price of a certain good faced by consumers is the sum of production costs and transaction costs.[10] Hence, if the differential in transaction costs between its alternative sources is large enough to compensate for the differential in production costs, the market will be supplied by a source bearing lower transaction costs, even if the source has comparative disadvantage in production. This results in deviation of a country's actual trade pattern from the one expected from its comparative advantage in production costs.

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resistances prohibit trade in some goods (non-traded goods). Since the theory of comparative advantage assumes no trade resistances, and hence no non-traded goods, the factor abundance comparison should refer to the quantities of factors employed in the traded-good sector (Bhagwati, 1964), but the existence of non-traded goods is unlikely to influence significantly trade patterns. The mainstream trade theory which attempted to include trade resistances and their effects on trade flows and ultimately, welfare, explains only this feature because it is primarily based on a two-country model. See Corden (1971, 1974). At the same time, Finger and Yeats (1976) regarded transportation costs as an equivalent to tariffs.

[10] Though the concept is quite different, Sanyal and Jones (1983) recently attempted a "two-tier" approach in international trade theory in a two-country world. Traded goods are segregated into two tiers, production process and process of transforming traded goods into the final stage required by the consumer.

Thus, the importance of trade resistances with respect to the geographical distribution of a country's trade is not the existence of resistances, but rather the differential degree of resistances across trade flows. This point was emphasised by Garnaut (1972) who noted (pp.23–25) that a bilateral trade flow is affected most importantly by the relative degree of resistances compared with those in the competing trade flows rather than the absolute degree of resistances in the trade flow.[11]

The degree of resistance to trade changes over time. The change has two sources. First, development in commercial infrastructures produces a decrease in psychic and economic distance. Second, institutional and policy resistances change over time. Any change in a given resistance leads to a magnifying influence on trade flows, through the effect on the other resistances (Garnaut, 1972, pp. 262-69). At the same time, in the light of the importance of the relative degree of resistances in affecting trade, the trade flow in a particular trading route is also affected by changes in resistances in other trading routes.

In summary, the commodity and geographical pattern of trade is influenced by both comparative costs in production and transaction costs in overcoming trade resistances. The importance of individual resistances varies considerably across bilateral trade relationships. Where the transaction cost is small relative to international differences in production costs, production costs will be the major determinant of the "actual" trade pattern, as predicted from trade theory. But high transaction costs relative to production costs may cause trade to divert away from the trading route bearing high resistances towards one bearing lower resistances. This induces the "actual" trade in a particular bilateral trade relationship to deviate from the one expected from the commodity composition of each country's total trade.

[11] Garnaut (p. 23) emphasised that trade flow between country i and j is a function of resistances to trade on all possible trading routes in the world economy, though they do not have an eqaully important influences on that trade flow and defined "first order" resistances, comprising resistances on the route; "second order" resistances, which exist between each trading partner and third countries; and "third order" resistances, existing between all pairs of third countries.

This completes the theoretical framework to explain the rapid growth of Australia–Korea trade over the past two decades. Before developing an empirical model to test this hypothesis, which is undertaken in Chapter 3, it is useful to review earlier studies of bilateral trade flows.

2.2. Empirical Approaches to Bilateral Trade Analysis[12]

Two independent approaches can be identified in studies of the determinants of bilateral trade — the "gravity" and "intensity" models. The gravity model assumes that a particular trade flow is independent of the other trade flows, and is concerned with the absolute rather than the relative level of bilateral trade. It seeks to explain the absolute level of each bilateral trade flow by reference to the "trade potential" of the two economies concerned and to resistances to that bilateral trade. Alternatively, the "intensity" approach recognizes interdependence among bilateral trade flows, and seeks to explain the relative level of a particular bilateral trade flow. It calculates an index of trade intensity by abstracting from the level of bilateral trade the effects of the different size of the trading partners, and concentrates on the explanation of variations in the index number of trade intensity across bilateral trade flows.

Empirical studies of trade flows have concentrated on the effect of resistances on trade flows with little reference to the implications of trade theory. However, their results provided increasing evidence that the difference in factor endowments between a pair of trading countries plays an important role. This review focusses on revealing the importance of difference in factor endowments in bilateral trade.

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12 This section owes much to a survey by Drysdale and Garnaut (1982).

2.2.1. The Gravity Approach

The gravity model simply follows the trade dependence model in a two-country world, and regards a bilateral trade flow from country i to country j, V_{ij}, as a function of the interaction of export supply potential of country i and import demand potential of country j, taking account of trade resistances.[13] Accordingly, the gravity model ignores the reality

[13] Trade dependence models concentrate on aggregate trade flows. They assume the existence of only one commodity and accordingly cannot reveal the influence of comparative advantage. This is the main reason why empirical studies of trade flows diverge from the theory. In general, trade dependency is defined as a share of trade in the gross national product (GNP), or per capita trade (imports) which is regressed against the size of economy (either GNP or population and per capita income). Hence they implicitly assume that all countries have the same pattern of factor endowment and consumption preference in the relative sense (Chenery, 1960; Kuznets, 1964, 1967). More recently, recognising the effect of trade resistances (undifferentiated between trading routes) on the trade dependency, some variables representing trade resistances were introduced (see Glejser, 1968; Leamer, 1974). Hence, the basic trade dependence model used is:

$$V_i = f(PC_i, N_i, R_i)$$

or

$$V_i = f(Y_i, R_i)$$

where

V = the size of trade,

PC = the level of per capita income,

N = the size of population,

R = the degree of trade resistances in i's trade,

Y = the aggregated gross national products, and

i = subscript indicating country i

To comply with the implication of traditional comparative advantage theory for a country's trade dependency, however, Leamer and Stern (1970) proposed the following trade dependence model,

$$V_i = f(E_i, D_i, R_i)$$

where

E = the pattern of relative factor endowments,

D = the pattern of demand structure.

This defines a country's trade dependency as a function of factors such as the pattern of factor endowments, demand structure, and transaction costs.

that a country trades more with a particular foreign country but less with another foreign country because of differences in relative factor endowments. This is the main reason why empirical studies of bilateral trade flow using gravity models have neglected to take account of the importance of differences in factor endowments, as suggested by trade theory. The basic empirical model used in the gravity approach (which should be compared with trade dependence model in footnote 13) is

$$\begin{aligned} V_{ij} &= h(f(V_i)f(V_j)) \\ &= h(f(Y_i, R_i), f(Y_j, R_j)) \\ &= g(Y_i, Y_j, R_{ij}), \end{aligned} \tag{2.1}$$

or

$$= g(PC_i, N_i, PC_j, N_j, R_{ij}), \tag{2.2}$$

where

i and j = subscripts indicating country i and j respectively,

V_{ij} = bilateral trade from i to j,

R_{ij} = trade resistances in i's export trade to j, and

others are as defined elsewhere.

This direct link between the empirical model of the gravity approach and that of the trade dependence model developed in the two-country world is the main reason why the gravity model seeks the absolute level of bilateral trade on the assumption that a particular trade flow is independent of the other trade flows, and fails to take account of the implications of the theory.[14]

Tinbergen (1962) pioneered the application of gravity model to the estimation of

[14] The gravity model, however, should be defined to take account of the difference in comparative advantge between a pair of trade countries (see Leamer and Stern, 1970, p. 158)

bilateral trade levels. He regarded bilateral trade levels as a function of two trade potential variables (gross national products of importing and exporting countries) and three resistance variables (distance, and two dummy variables for adjacent countries and for common membership of a preferential arrangement). These variables explained some 36 per cent of variation in the level of bilateral trade flows in a multi-country.[15]

Linnemann (1966) elaborated the Tinbergen model by introducing the population size of trading countries as an additional trade potential variable, and applied this to a larger

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as follows:

$$\begin{aligned} V_{ij} &= h(f(V_i)f(V_j)) \\ &= h(f(E_i, D_i, R_i)f(E_j, D_j, R_j)) \\ &= g(E_i, E_j, D_i, D_j, R_{ij}) \end{aligned}$$

where all indicators are as defined elsewhere.

15 His basic model is;

$$V_{ij} = a_0 Y_i^{a_1} Y_j^{a_2} D_{ij}^{a_3} n^{a_4} P_C^{a_5} P_B^{a_6},$$

where

$D_{ij} =$ distance between country i and j,
$n =$ dummy variable for neighboring countries,
$P_C =$ dummy variable for Commonwealth preference,
$P_B =$ dummy variable for Benelux preference, and
others are as defined previously.

number of observations (for trade flows of 80 countries).[16]

The addition of population size is a significant modification of the trade dependence model because the latter used either a set of two variables, per capita income and population size, or the aggregated GNP. In introducing this variable, Linnemann argued that the relative size of the foreign sector, defined as " the domestic-market/foreign-market production ratio" is related primarily to the population size of a country. This argument reemphasised the implicit assumption of the trade dependence model that all countries have the same relative factor endowments, and hence it leads to denying the theory of comparative advantage.[17]

Linnemann's results showed that all explanatory variables were statistically significant with the expected sign. The value of the coefficient of each variable was almost the same as in Tinbergen's results. The selected explanatory variables explained some 65 per cent of variations in the level of bilateral trade flows.

Most interestingly, he introduced an additional variable, measured by the scalar product of the two vectors of commodity composition of the exporting country's export

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[16] The basic model is;

$$V_{ij} = a_0 Y_i^{a_1} N_i^{a_2} Y_j^{a_3} N_j^{a_4} D_{ij}^{a_5} P_{ij}^{a_6},$$

where

$P_{ij} =$ dummy variable for preferntial trade factor comprising
three dummy variables for British Commonwealth Preference,
French Community Preference, and Belgian
and Portuguese colonial preference, and
the others are as defined previously.

[17] Linnemann (p. 13) explicitly denied the theory of comparative advantage, as stating that *comparative advantages are predominantly man-made, and their existence is a consequence as much as a cause of foreign trade*, and that *they hardly contribute to an understanding of the size of trade flows or the magnitude of potential trade supply.*

and importing country's import, despite his arguments neglecting the effect of comparative advantage. Though Drysdale and Garnaut (1982) discussed some difficulties with Linnemann's potential complementarity index with respect to his failure to take account of "relative" closeness, his results clearly showed the importance of comparative advantage in determining bilateral trade flows. The coefficient of this variable was highly significant with positive sign. This addition considerably reduced the value of coefficients of GNP (by some 30 per cent) and population (by more than 50 per cent) and slightly increased the coefficient of multiple correlation. This statistical results be interpreted that the influence of difference in the relative factor endowments on bilateral trade is significant.

In addition, Linnemann (pp. 180–96) conducted further analysis of the deviation of actual flows from expected flows. This detailed analysis revealed several important features, contradicting the assumption of the gravity model that each bilateral trade flow is independent of other trade flows (no-trade diversion) and suggesting interdependence among bilateral flows (trade diversion). First, despite Linnemann's presupposition (p.56) that preferential relations are trade-creating only and have no trade-diverting effects to comply with the independent assumption, his residual analysis indicated considerable trade diverting effects (pp. 100–101). Second, there was a tendency for countries at the geographical periphery of the world economy to trade more intensively with their closest neighbour (even if they were rather far away in absolute terms) than for the more favourably located countries to trade with their closest neighbours (pp. 180–88). This implies that what is important in the determination of trade levels is not absolute distance but relative distance. Third, there was a "kink" in the estimated parameters between large scale and small scale flows so that the parameter value that fitted larger trading flows resulted in greatly overestimating smaller flows, while an equation that fitted well the smaller flows produced an extraordinarily high estimate of large flows (Linnemann, 1966, 116–119). The kink in the relationship, together with the discontinuity in the bilateral trade data observed by Linnemann, is open to the possible explanation that economies of scale in overcoming trade resistances raise large trade flows partly by diverting trade from smaller flows. All of this evidence indicates that the assumption that a bilateral trade relationship is independent of the other relationships is unrealistic. This point will be emphasized in the next section by proving that the gravity model is a special case of trade relationships, where the intensity of trade is unity.

In later empirical studies, Tinbergen–Linnemann's gravity model has been further developed in three directions: further detailed identification of the effect of trade resistances; an application of gravity models to a particular country's bilateral trade flows; and accounting for different economic characteristics between trading partners. We will turn to those empirical studies in order.

Wolf and Weinschrott (1973) took account of various natural resistances to trade. They applied the gravity model to identify criteria used in deciding whether to form, or join, a multi-country or regional trade preferential arrangement, with reference to international transaction costs. Their model is distinguished by the incorporation of not only a variable representing transport costs, but also of other proxy variables designed to indicate other influences such as costs of transferring technology, communication costs, and cross-cultural frictions and their attendant costs.[18] It should be noted that the proxies for structural

[18] Their basic model is

$$V_{ij} = a_0 Y_i^{a_1} Y_j^{a_2} D_{ij}^{a_3} e^{\alpha C + \beta S_1 + \gamma S_2 + \delta S_3 + \mu},$$

where

$C =$ vector of sociocultural dummy variables relating to language affinity,
$S_1 =$ difference in economic structure(foreign trade ratio),
$S_2 =$ difference in technological structure(per capita income ratio),
$S_3 =$ difference in technological structure(agricultural labour force ratio),
$\mu =$ a random error term, and
the others are the same as defined previously.

differences are the very variables used to represent difference in relative factor endowments.

Their conclusion was that geographical distance is only one among several persistent and significant influences on international transactions. Some of the other influences — economic size, cultural proximity, and economic and technological structure — have relatively greater individual and collective effects than does distance, so that a multi-country association based on minimizing the "distance" costs of membership will, in general, not minimize the "non-distance" costs. Most importantly, variables for technological structure are highly significant, and this indicates the importance of differences in factor endowments on bilateral trade flows.

Geraci and Prewo (1977) estimated the effects of actual transport costs instead of geographical distance on bilateral trade, by introducing error-in-variables into a gravity model. According to their results, the estimation of the elasticity of bilateral trade flows with respect to transport costs raised serious doubts about the use of mere distance as a replacement for transport costs, implying that factors other than freight rates are important for transport costs. They found the tendency for the transport cost elasticity to be above the distance elasticity, except for intra-European trade, and interpreted this to mean that transport costs rise at a decreasing rate with distance.

The gravity model was applied to explain variation in trade flows from the standpoint of a particular country. Bryan (1974) used a gravity model to explain the variation in the values of Canadian exports in disaggregated manufactures to different markets.[19] The results showed that the relative importance of each independent variable varies significantly across different commodities. Again, this implies that difference in factor endowments plays an important role in bilateral trade.

Bryan's other important findings were as follows. First, the elasticity of transport costs is significantly higher in his results than that in the other studies. This indicates that the underlying trade-diverting effect between bilateral trade flows is large. This important feature is unlikely to be revealed when estimation is applied to the trade relationship of many countries as a set. Second, transport costs are more important for trade in "primary manufactures" than in "secondary manufactures". Third, transport costs tend to have a larger elasticity than tariffs. These findings are consistent with the results of the other studies (see Kravis and Lipsey, 1971).[20]

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[19] The model is,

$$V_{kj} = f(t_{kj}, F_{kj}, Y_j, Pr_{kj}, D_{1j}, D_{2j}),$$

where

V_{kj} = Canadian exports of commodity k to country j,
t_{kj} = nominal tariff on commodity k in country j,
F_{kj} = ocean freight rate on commodity k from Canada to j,
Pr_{kj} = domestic production of commodity k in country j,
D_i = dummy variables for country j's join to a preferential arrangement, and the others are as defined previously.

[20] In addition, Bryan attempted to test the implications of the trade theory for Canadian export trade relationships. For the secondary manufactures, where production location is relatively free from the location of natural resources, per capita income was used to test a hypothesis that similarity in per capita income is important in determining the import demand for those commodities (see Linder, 1961). However, the coefficient was in general not significant, and had a negative sign in cases where it had some significance. From the results, Bryan concluded that Linder's hypothesis was unlikely to be relevant to Canadian export trade relationships. This gives support to the discussion of theoretical framework in the previous section which relied on the traditional theory of comparative advantage.

Gruber and Vernon (1970) explicitly introduced two additional trade potential variables representing differences in factor endowments between the exporting and importing countries. Their object was not only to identify the variables that help to explain trade flows but also to detect systematic variations in the value and direction of the selected variables from one manufacture to another, so that their model was applied for individual commodity groups.[21]

Gruber and Vernon's estimation revealed two important relationships. First, the explanatory power of chosen variables differs with individual commodity groups, though there was no systematic difference between technology intensive manufactures and manufactures categorized into the other group. Second, the differences in factor endowments are of significance. The large differences in per capita income and in human capital endowment between importing and exporting countries are consistently associated with high trade levels in every type of product. These suggest a strong influence of comparative advantage despite the logic of the gravity approach that comparative advantage contributes little to understanding the size of bilateral trade flows.

The most recent contributions to the gravity model are attempts to provide theoretical foundation to it (Bergstrand, 1985; Anderson, 1979). This enhanced the predictive potential of the gravity model which had been significantly inhibited by an absence of strong theoretical foundation despite the model's success in explaining trade flows.

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[21] Their basic model is,

$$\log V_{ijk} = f(PC_i, PC_j, Y_i, Y_j, D_{ij}, P_{ij}, P\bar{C}_{ij}, \bar{H}_{ij}),$$

where

$P\bar{C}_{ij} =$ the absolute difference in per capita income between i and j,

$\bar{H}_{ij} =$ the absolute difference between human capital stock in countries i and j, and the others are the same as defined previously.

However, they derived the gravity equation from the properties of (aggregate) expenditure systems, and hence failed to take account of the implications of comparative advantage.

2.2.2. The Intensity Approach

By contrast with the gravity model, which assumes independence of a given bilateral trade flow from the others, the intensity approach acknowledges interdependence among bilateral trade flows. It assumes that a country's total exports and imports are given so as to take account of interdependence. It measures trade intensity in a trade relationship by precluding the effect of the different size of the countries. Accordingly, the intensity approach was developed independently from the trade dependence model in a two-country world.

The intensity approach was pioneered by Brown (1949) and developed and popularized by Kojima (1958, 1962, 1964). It calculates an intensity of trade index by netting out the effects of different size of each country's trade so that focus is given on explaining variations in the "relative" level of trade across different bilateral trade flows. To illustrate the logic of the intensity of trade, it is useful to keep in mind a two-dimensional matrix of international trade flows in a given year, where all the values are expressed in the same unit. It forms an n×n matrix of trade flows, where n is the number of trading countries. V_{ij}, a representative element in the matrix, indicates the value of the trade flow from country i to country j. Given the assumption that a country's total exports and imports are constant, a country's total exports ($V_{i.} = \sum_{j \neq i} V_{ij}$) or total imports ($V_{.j} = \sum_{i \neq j} V_{ij}$) and world trade ($V_{..} = \sum_i \sum_j V_{ij}$) are known.

The trade matrix assumes that there are no transaction costs, and that the transfer of commodities between countries is instantaneous, so that country i's exports to j is exactly equal to country j's imports from i. Though these assumptions are not realistic because international transactions are costly and take time, they are analytically convenient. Accordingly, the degree of intensity in country i's export trade with j is the same as that in country j's import trade with i. It should be noted that these assumptions are used throughout this study so that all of the indexes are measured from the standpoint of the exporting country, unless otherwise indicated.

Given a country's global trade volume, the intensity of trade measures the differential between the actual volume, V_{ij}, and the volume expected from random distribution of each country's exports and imports (see Goodman, 1963; Savage and Deutsch, 1966; Uribe, *et al.*, 1966). Let country i have a share in world exports, $p_{i.} (= \frac{V_{i.}}{V_{..}})$. Then, the probability that country i is involved in world exports is $p_{i.}$. Similarly, the probability that country j is in world imports is $p_{.j}$, being equal to the share of country j in world imports $(= \frac{V_{.j}}{V_{..}})$.

Thus, the probability, p_{ij}, that trade takes place from i to j is given as

$$p_{ij} = p_{i.} \times p_{.j} \tag{2.3}$$

and the expected value of trade from country i to j $(\bar{V}_{ij})$ is

$$\bar{V}_{ij} = p_{ij} \times V_{..} \tag{2.4}$$

$$= V_{i.} (\frac{V_{.j}}{V_{..}}) \tag*{(2.4)'}$$

or

$$= V_{.j} (\frac{V_{i.}}{V_{..}}) \tag*{(2.4)''}$$

These equations indicate the expected value of exports from country i to j when country i's total exports $(V_{i.})$ are distributed to country j in proportion to the latter's share in world imports. Similarly, country j's total imports $(V_{.j})$ are allotted to country i proportional to country i's share in world exports because of randomness in the assignment of exporters to importers (Kunimoto, 1977).

The index of intensity of trade in country i's export trade with j (or country j's import trade with i) is defined as the ratio of the actual value of trade to the expected value

$$\begin{aligned} I_{ij} &= \frac{V_{ij}}{\bar{V}_{ij}} \\ &= \frac{V_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} \end{aligned} \tag{2.5}$$

The deviation from the randomly established geographical distribution of a country's trade provides a starting point for analysis of the relative importance of the various types of resistances to trade. If the index value exceeds unity, the trade flow is more intensive due to the lower trade resistances in country i's exports to j relative to the average degree of country i's exports to the rest of the world. This is because the weighted average of index value of country i's export trade with all of its trading partners is equal to unity.[22]

Here, it is useful to look at the relation between the gravity model and trade intensity. Yamazawa (1970) made it clear that the gravity model supposes a special case of trade relationship where the intensity of trade is always unity. As seen previously, in the simplified gravity model, bilateral trade is solely determined by the two trade potential variables, since it argues away the possibility of trade diversion. Ignorance of any trade diversion implicitly assumes the same degree of trade resistances in every trading route, because any differential degree of trade resistances is likely to cause trade diversion from the route with higher degree to that with the lower (see Linnemann, 1966, p.51).

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22 This can be easily shown,

$$\bar{I}_{ij} = \sum_{j} \left(\frac{V_{.j}}{V_{..}} \right) \times I_{ij} = 1$$

The simplified form of gravity model from the equation 2.1 is

$$V_{ij} = \alpha_0 Y_i^{\beta_1} N_i^{\beta_2} Y_j^{\gamma_1} N_j^{\gamma_2},$$

thus,

$$V_{i.} = \alpha_0 Y_i^{\beta_1} N_i^{\beta_2} \sum_{j \neq i} Y_j^{\gamma_1} N_j^{\gamma_2},$$
$$V_{.j} = \alpha_0 Y_j^{\gamma_1} N_j^{\gamma_2} \sum_{i \neq j} Y_i^{\beta_1} N_i^{\beta_2},$$

and

$$V_{..} = \alpha_0 (\sum_{i \neq j} Y_i^{\beta_1} N_i^{\beta_2})(\sum_{j \neq i} Y_j^{\gamma_1} N_j^{\gamma_2}).$$

Hence, the intensity of trade is always equal to unity, that is

$$I_{ij} = \frac{V_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} = 1 \qquad (2.5)$$

Because of this speciality, Linnemann (p.56) stated that "..... *Consequently, trade diversion can only demonstrate itself in the deviations between actual and theoretically expected trade for individual countries.....*" It should be noted that the explanation of this "deviation" is the very thing which the intensity approach aims to do when it answers the question of why a country trades more intensively with one country than another.

Though intensity of trade is useful for giving precision to the relative importance of trade between particular countries or regions, its usefulness for analytical purposes is limited. This is because the "intensity of trade" index is a catch-all index which summarises the influence of the complex factors of trade between trading partners. For example, Kojima (1958) explained the differential degree of trade intensity of Japanese trade with its various trading partners by the growth of the Japanese economy and its structural changes, the growth of individual partner economies and their structural changes, geographical distance, political and historical ties, each country's trade policy, the world trade situation, and so on.

Drysdale (1967, 1969) separated trade intensity into a "complementarity" index and a "country bias" index. Complementarity index summarises the potential trade intensity resulting from the commodity composition of each country's global trade in the absence of trade resistances (more specifically, under the uniform resistances over all trading routes). Country bias index measures the deviation of actual trade from potential trade resulting from the differential degree of trade resistances. This refinement overcame the limited usefulness of the intensity approach as a method of analysis of bilateral trade flows. It will be discussed in detail in the following chapter.

Drysdale (1967) examined the bilateral trade relationship between Australia and Japan over the half century from 1913 to 1963. The high degree of potential trade originated from the high degree of complementarity between their factor endowments and economies. However, a high degree of trade resistance associated with the external political relationships of both countries led to a relatively low and unstable level of trade intensity despite their geographical proximity. As the structure of the world economy and politics was reorganized during the postwar period, trade intensity grew rapidly. Drysdale concentrated particularly on the role of institutional arrangements in exploiting trade potential through reducing trade resistances.

Yamazawa (1970, 1971) analysed factors affecting the changing structure of international trade flows between pairs of countries. He introduced an econometric model to explain the relationship between intensity of trade index and resistance variables and complementarity by the use of least square regression techniques.[23] Notably, Yamazawa (1971) employed more satisfactory concepts for estimating the effect of trade resistances by defining independent variables in relative terms (compared with the gravity model which defines variables in absolute terms). The selected variables explained around 50 per cent of variation in the intensity of trade between individual countries (or country groups). Interestingly, the proportion of variation explained declined over time, and this decline was associated with lower explanatory power of discriminatory trade arrangements.

Garnaut (1972) identified the pattern of trade resistances and ascertained how trade resistances affect trade flows in a particular trading route, taking account of the trade diversion effect due to differential degrees of trade resistance. He explained variation in intensities of Australian trade with five ASEAN countries and identified a close relationship between relative distance and both transport costs and the "prior" orientation of traders. The effects of relative distance on transport costs and traders' "prior" orientation were the main reasons for high country bias (and hence, high intensity) in Australian trade with ASEAN countries as a whole, despite the relatively low complementarity between Australia and those countries. However, there was a wide variation in country bias in Australia's trade with individual ASEAN countries. Garnaut explained this variation by difference in

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[23] The basic model is,

$$I_{ij} = f(C_{ij}, D_{ij}, y_{ij}, A_{ij}, P_{ij}),$$

where

i and j = subscripts indicating countries,

$C_{ij} =$ the value of complementarity index between i and j,

$D_{ij} =$ the relative distance between i and j,

$A_{ij} =$ index of "intensity of aid flows" between i and j,

$y_{ij} =$ difference of per capita income between i and j, and

$P_{ij} =$ dummy variable for discriminatory trade arrangements, comprising 5 different traditional trade blocs.

Australia's historical relationship with individual countries through policy discrimination and its effects on transport costs (especially associated with shipping services) and biases in traders' market orientation. Country bias in Australian trade with the Philippines and Thailand was very low, while country bias in trade with the other three countries was high, particularly with Malaysia and Singapore.

Roemer (1975, 1976, 1977) presented four types of trade intensity indexes. Roemer (1977) applied the intensity approach to explain the different pattern of exports from 5 OECD countries to 14 areas of the world, using new terminology such as "area intensity" and "sector intensity". He observed a strong tendency for exporting countries to market their weaker sectors disproportionately in the areas where they have strong economic influence, while exporting their stronger sector to the weaker areas. He argued that the pattern of commodity trade between areas cannot be accounted for entirely by transport costs, since transport costs are generally a small fraction of total value for manufactures, and suggested that it is largely due to "sphere-of-influence" factors: communication channels, preferential tariffs and other forms of discrimination, tied aid, multinational subsidiaries, and the demonstration effect in consumer tastes, which give certain exporters trading advantages in some areas. He noted that "sphere-of-influence" relationships tended to affect either direction of a bilateral trade flow. The biased pattern of trade implies that the different costs of overcoming various types of market imperfections across trading routes play an important role in determining the level and pattern of bilateral trade flows.

A number of studies have analysed the effect of economic and political blocs on the level of bilateral trade. Girgis (1973) was interested in trade between one developed country and a group of developing countries and suggested that political and economic alliances explained best the variation in intensity of the developed country with different developing countries, despite the high degree of potential intensity of the former's trade with all of the latter countries. In his three papers, Kleiman (1976, 1977, 1978) used a similar approach to analyse the impact of defunct colonial ties on bilateral trade. He observed that colonial ties raised trade intensity between the colonial power and its colony many fold, and that this remained with reduced effect after independence.

Others (for example, Wilford and Christou, 1973, 1976; Sautter, 1974) used the intensity approach simply to demonstrate realignment and redirection of trade flows between major trading blocs due to changes in the world political-economic system during the postwar period, the effect of customs union and free trade associations, or the tendencies of regionalization in world trade.

All of these studies except for Yamazawa and Garnaut were undertaken without reference to Drysdale's separation. Indeed, the studies are very similar to Kojima's (1962) earlier use of intensity indexes to analyse the underlying factors of regional trade flows in Asia and the Pacific. Hence, the explanation of deviations from unity in the aggregate intensity of trade did not distinguish trade resistances and underlying economic structure. Furthermore, whereas the intensity approach was used to identify various factors in bilateral trade relationships and explain their effect, it also was used to project bilateral trade flows on the assumption that the underlying factors are stable over time (see Cuddy, 1973).

2.3. The Approach Adopted in this Study

It is useful to evaluate the strength and weakness of the two approaches to bilateral trade analysis to identify the analytical framework of this study.

The theory of comparative advantage regards commodity trade as due to differences in relative factor endowments between countries. In the absence of trade resistances, this implies that the greater the differences in factor endowments between a pair of trading countries, the more intensively they trade with each other. However, resistances to trade, which are differentiated across commodities and across bilateral trading relationships, causes the "actual" commodity and geographical pattern of trade to deviate from the patterns expected from this theory.

As became clear from the earlier discussion in this chapter, "actual" commodity and geographical pattern of a country's trade in the real world depends on both comparative costs in production and comparative costs in transaction. If the difference in transaction costs is small, comparative costs in production will be the major determinants of actual trade patterns. Conversely, if the differences in transaction costs are high enough to offset differences in production costs, the actual patterns of trade will be different to the one predicted through trade diversion among commodities and among trading routes. This suggests that comprehensive explanation of a bilateral trade relationship can be achieved by simultaneous understanding of both differences in factor endowments and the degree of trade resistances.

On the other hand, empirical studies of trade flows have concentrated on the effect of trade resistances on (geographical) patterns of trade with little reference to the implications of theory. As evidence appear that differences in factor endowments play an important role in trade flows, however, attempts have been made to incorporate differences in factor endowments into an empirical model, though this has been dealt with in terms of trade resistances.

Two basic approaches — the gravity approach and the intensity approach — have been used for analysing bilateral trade flows. Each of the two approaches is useful for particular purposes. The gravity model estimates quantitatively the importance of resistances to trade flows as determinants of the "absolute" level of bilateral trade flow. The intensity approach identifies (relative) differentials in resistances across various bilateral trade flows, and examination of the differentials is useful for analysis of the nature of resistances and their effect on the "relative" level of trade.

Both approaches have limitations. The assumption of independence of individual trade flows in the gravity model is so extreme that it may not catch trade diversion between trade flows, which is crucial to understanding a country's bilateral trade relationships. On the other hand, the intensity approach fails to explain directly the reasons for bilateral trade. As we shall see in the following chapter, however, Drysdale's decomposition of intensity of trade index into two factors helped overcome this limitation.

When considering the importance of the relative degree of trade resistances in a particular bilateral trade, and the considerable evidence of interdependence of trade flows across bilateral trading relationships (or diversion of trade from high resistance to low resistance routes), the intensity approach is preferred for the analysis of rapid growth in Australia–Korea trade. This is because it enables a simultaneous understanding of both the changing factor endowments in both countries and the changing trade resistances relative to those in other trade relationships.

It is useful to look at trends in the relative importance of Australia–Korea trade over the period 1962 to 1981, by using intensity of trade indexes. Figure 2–1 presents trends in the intensity of trade indexes in two-way trade between Australia and Korea. The indexes were calculated according to formula 2–5.[24] The trends in the intensity of trade indexes in Australia's export trade with Korea represent nothing but the disproportionate growth of Australia's (Korea's) importance as a source of (market for) Korean imports

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[24] In actual calculation, formula 2–5 requires modification because every country does not export to itself nor import from itself by definition of international trade. Hence actual calculation is done by following modified formula,

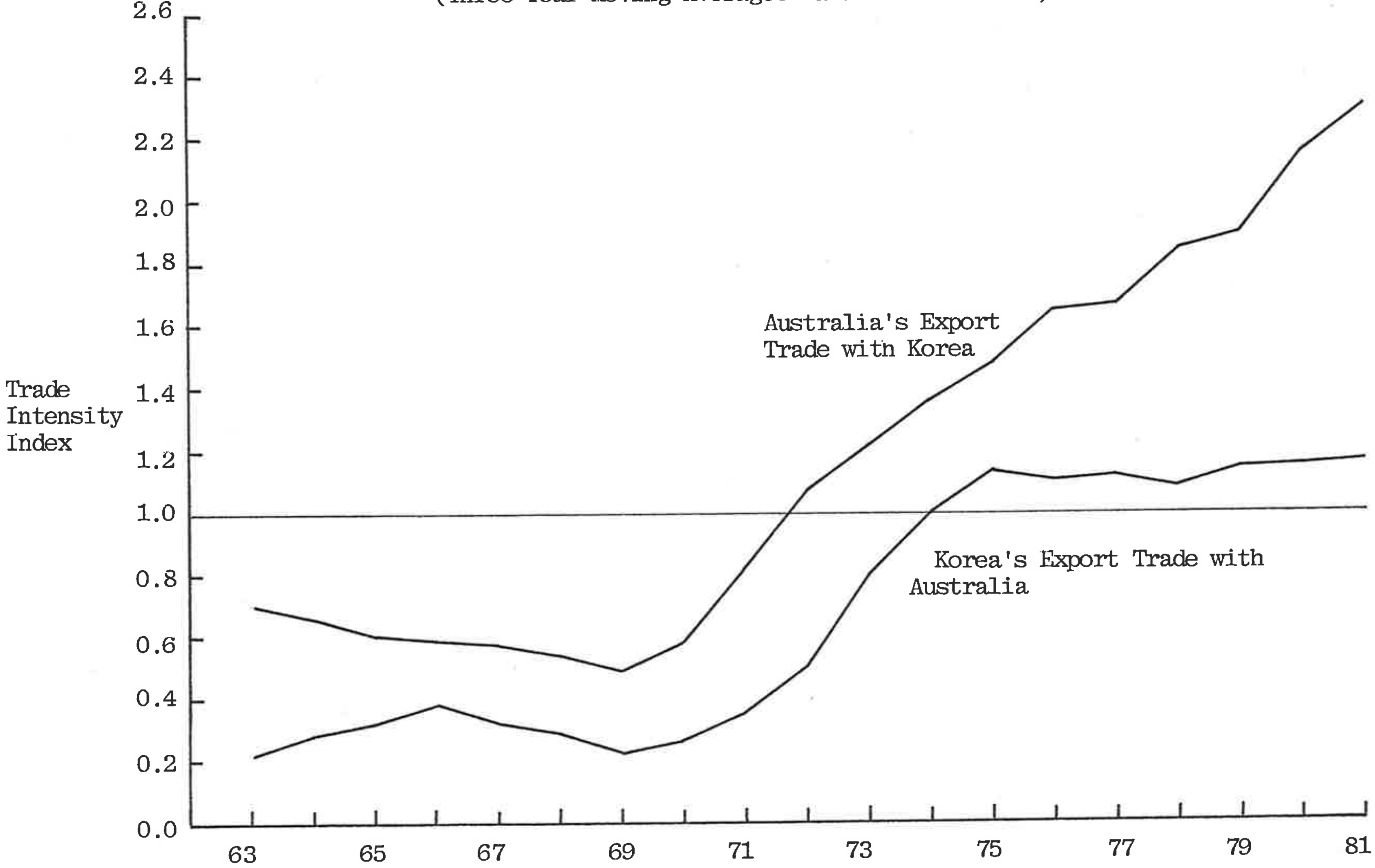
$$I_{ij} = \frac{V_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..} - V_{j.}} \quad \text{or} \quad I_{ij} = \frac{V_{ij}}{V_{.j}} \Big/ \frac{V_{i.}}{V_{..} - V_{.i}}$$

This modification will be applied to all other indexes on the same ground.

Figure 2-1

Intensity of Trade between Australia and Korea

(Three Year Moving Averages around Year Shown)



Note: Indexes are calculated according to formula 2.5.
Source: International Economic Data Bank, RSPacS, A.N.U.

(Australian exports) compared with changes in her relative size in world trade, which is presented in Figure 1–1. Similarly, the trends in Korea's export trade with Australia represent the disproportionate growth of Korea's (Australia's) importance in Australian imports (Korean exports) to her importance in world trade, which is presented in Figure 1–2.

Figure 2–1 readdresses three important issues regarding the development of Australia–Korea trade over the past two decades, which was raised in Chapter 1. First, the intensity of trade in both directions grew at an exceptionally high speed and more than quadrupled between 1962 to 1981. Second, there was a different rate of development in either direction between subperiods. The intensity of trade in Australia's exports to Korea considerably declined before steep growth in the 1970s, while that in Korea's exports to Australia sharply grew in the early 1970s, thereafter stagnating. Third, the intensity of trade in Australia's export trade with Korea was higher than that in the opposite direction. It is interesting that the intensity indexes in the two directions moved in parallel until the mid 1970s, before diverging in the late 1970s. These are the main topics which the following chapters aim to explain.

CHAPTER 3

ANALYTICAL FRAMEWORK OF THIS STUDY

The previous chapter emphasized the fact that the pattern and level of a particular bilateral trade flow are the results of the degree of complementarity in the structure of two economies, and the degree of trade resistances in the trading route relative to those in alternative routes. It then identified two approaches to bilateral trade analysis, and selected the intensity approach as preferable for this study because it acknowledges interdependence among alternative trade flows. It also presented trends in intensity of trade between Australia and Korea over the period 1962 to 1981. This chapter is concerned with providing an analytical framework to explain reasons for this.

Drysdale (1967) greatly enhanced the analytical usefulness of the intensity approach by decomposing intensity of trade into two components: "complementarity" index, which measures the influence of complementarity in economic structure; and "country bias" index, which measures the influence of trade resistances. Recently, Drysdale's indexes have been widely used to explain and predict the pattern of a country's trade relationship over time. However, there has not, as yet, been econometric analysis of these relationships. This chapter is concerned with building a set of models to examine those causal relationships to explain the rapid growth of intensity of trade between Australia and Korea.

The first section reformulates Drysdale's two indexes from a three-dimensional world trade matrix by using a probability model, and discusses the characteristics of and difficulties with decomposition. The second section proposes a set of econometric models to test the causal relationship between the indexes and a number of underlying factors. The final section discusses the statistical procedures adopted.

3.1. Decomposing the Intensity of Trade Index

The index of trade intensity measures the relative importance of bilateral trade flows in aggregate trade. Since aggregate trade flow implicitly assumes the existence of only one commodity, it cannot separate the effect of comparative advantage of each country on a bilateral trade flow from the influences of various trade resistances. This is the main reason why studies of bilateral trade flows solely using the intensity approach have concentrated on trade resistances with little reference to trade theory. Drysdale (1967) analysed intensity of trade in disaggregated commodity groups, so that the effect on bilateral trade of commodity pattern of each country's global trade can be measured separately from other influences. He termed the former effect as "complementarity" between one country's export pattern and the other country's import pattern, and the latter influence as "country bias" in bilateral trade.

Drysdale's decomposition requires two assumptions in order to introduce disaggregated commodity groups. First, in addition to the assumption that the level of a country's global exports and imports is independent of the level of its individual bilateral trade, the commodity composition of a country's global trade is taken to be independent of influences affecting its individual bilateral trade. Second, each commodity group identified in the analysis is assumed to be completely homogeneous. Though the second assumption is familiar in empirical studies on trade patterns, it is particularly important for the decomposition of intensity of trade.

3.1.1. A Three-Dimensional Trade Matrix

To illustrate the logic of Drysdale's two indexes, the two-dimensional trade matrix, used for illustrating intensity of trade, needs to be extended to a three-dimensional one to incorporate the number of commodities. It forms an $n \times n \times m$ matrix, where n is the number of countries and m is the number of commodity groups (Yamazawa, 1970; Kunimoto, 1977). Hence, a representative element in the matrix, V_{ijk}, indicates the value of exports from country i to j in commodity k.

In the margins of the matrix,

$V_{ij.} (= \sum_{k=1}^{m} V_{ijk})$, the value of total exports from country i to j;

$V_{i.k} (= \sum_{j \neq i}^{n} V_{ijk})$, the value of exports of country i in commodity k;

$V_{.jk} (= \sum_{i \neq j}^{n} V_{ijk})$, the value of imports of country j in commodity k;

$V_{i..} (= \sum_{j \neq i}^{n} \sum_{k=1}^{m} V_{ijk})$, the value of total exports of country i;

$V_{.j.} (= \sum_{i \neq j}^{n} \sum_{k=1}^{m} V_{ijk})$, the value of total imports of country j;

$V_{..k} (= \sum_{i}^{n} \sum_{j}^{n} V_{ijk})$, the value of world trade in commodity k; and

$V_{...} (= \sum_{i}^{n} \sum_{j}^{n} \sum_{k=1}^{m} V_{ijk})$, the value of total world trade.

All of the values in the margin except for $V_{ij.}$ are taken to be given in compliance with the first assumption that the level and commodity composition of a country's global trade is independent of influences affecting those of individual bilateral flows. It should be borne in mind that we assume that there are no transaction costs, and that the transfer of commodities is instantaneous, so that country i's exports to j in commodity k are exactly equal to country j's imports from i in the commodity.

The assumption of random distribution of trade is valid for each individual commodity k, that is, export and import are independent of each other for each commodity k. Hence, the probability that country i is involved in world trade as an exporter of commodity k is $p_{i.k}$, which is equal to country i's share in world trade of commodity k ($= V_{i.k}/V_{..k}$).

Similarly, the probability that country j is involved in world trade as an importer of k is $p_{.jk}$, being equal to country j's share in world trade of k $(= V_{.jk}/V_{..k})$.

Thus, the probability that Country i exports commodity k to j is

$$p_{ijk} = p_{i.k} \times p_{.jk} \tag{3.1}$$

and the "expected" trade flow of k from i to j, $\bar{V}_{ijk}$, is

$$\bar{V}_{ijk} = V_{i.k}\left(\frac{V_{.jk}}{V_{..k}}\right) \tag{3.2}$$

or

$$= V_{.jk}\left(\frac{V_{i.k}}{V_{..k}}\right) \tag{3.2$'$}$$

Equation 3.2 (comparable with equation 2.3) indicates the expected exports of commodity k from country i to country j when i's exports of k $(V_{i.k})$ are distributed to j in proportion to j's share in world imports of k $(= V_{.jk}/V_{..k})$ or, alternatively, j's imports of k $(V_{.jk})$ are allotted to i in proportion to i's share in world exports of k $(= V_{i.k}/V_{..k})$. Thus, the expected value of total exports from country i to j for all commodities k is defined as the sum of expected values of exports of all commodities,

$$\bar{V}_{ij.} = \sum_{k=1}^{m} \bar{V}_{ijk} \tag{3.3}$$

3.1.2. Complementarity Index

Drysdale's complementarity index, C_{ij}, is defined as the intensity of trade expected from the commodity composition of one country's exports and another country's imports, if there were no trade resistances or they were uniform across all trading routes. It is the value which the trade intensity index, I_{ij}, would take if country i's exports to j in every commodity k were distributed exactly in proportion to j's share in world imports of every commodity k. The expected intensity of trade is obtained by replacing the expected value of trade for the actual one in formula 2.5:

$$C_{ij} = \frac{\bar{V}_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} \tag{3.4}$$

In order to understand the economic meaning of the expected trade intensity, it is rearranged by substituting the earlier equations 3.2 and 3.3 step by step into formula 3-4:

$$\begin{aligned} C_{ij} &= \frac{\bar{V}_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} \\ &= \sum_{k=1}^{m} \left(\frac{V_{i.k}}{V_{i..}} \times \frac{V_{.jk}}{V_{.j.}} \times \frac{V_{...}}{V_{..k}}\right) \\ &= \sum_{k=1}^{m} \left(\left(\frac{V_{..k}}{V_{...}}\right)\left(\frac{V_{i.k}}{V_{i..}} \Big/ \frac{V_{..k}}{V_{...}}\right)\left(\frac{V_{.jk}}{V_{.j.}} \Big/ \frac{V_{..k}}{V_{...}}\right)\right) \\ &= \sum_{k=1}^{m} \left(\frac{V_{..k}}{V_{...}} \times S_{i.k} \times S_{.jk}\right), \end{aligned} \tag{3.5}$$

where

$S_{i.k}\left(= \frac{V_{i.k}}{V_{i..}} \Big/ \frac{V_{..k}}{V_{...}}\right) =$ the index of country i's export specialisation in commodity k, and

$S_{.jk}\left(= \frac{V_{.jk}}{V_{.j.}} \Big/ \frac{V_{..k}}{V_{...}}\right) =$ the index of country j's import specialisation in commodity k.

Hence, Drysdale defined the concept of complementarity which had been used in qualitative terms so as to be quantified in a precise way.[1] Complementarity in country i's export trade with j is the weighted sum of products of country i's export specialisation index and country j's import specialisation index in every commodity k, weighted by

[1] The concept of "complementarity" is often used in economic literature to describe the extent to which countries have dissimilar factor endowments and structures of production, and are, therefore, likely to trade intensively with each other. See, for example, Meyer (1956, p. 323). Drysdale defined it precisely as an analytical concept.

each commodity k's share in world trade. From the standpoint of a small country, complementarity in its export trade with a particular trading country is determined by the extent to which its export specialisation pattern matches the partner's import specialisation pattern, since it is reasonable to assume that a small country's trade volume is too small to affect the commodity pattern of world trade. Accordingly, it is useful to look at the economic meaning of these indexes so that the underlying factors affecting complementarity can emerge.

Trade specialisation index measures the relative competitiveness of country i in commodity k compared with its average competitiveness in all of the other commodities, or compared with the average competitiveness of the rest of world in commodity k.[2] Thus, though the terminology given to the indexes varies between authors, most authors appear to agree that the indexes reveal a country's comparative advantage (see Kanamori, 1960; Balassa, 1965, 1977; Parry, 1975), because comparative advantage is difficult to measure and compare between industries and countries.

This interpretation has limitations, however. Comparative advantage, in theory, is usually specified with respect to comparison in production costs in the absence of trade resistance (free trade relative prices), while the indexes are observed from the actual trade data undertaken under the resistances.[3] It should be noted that given the assumption

[2] The formula can be defined alternatively as follows:

$$S_{i.k} = \frac{V_{i.k}}{V_{i..}} \Big/ \frac{V_{..k}}{V_{...}} = \frac{V_{i.k}}{V_{..k}} \Big/ \frac{V_{i..}}{V_{...}}$$

[3] Kanamori (1960) and Balassa (1965) recognized that trade intervention could compromise the effectiveness of the specialisation indexes as an indicator of comparative advantage, and treated asymmetrically the export and import specialisation indexes in spite of the statistically formal symmetry. This is on the grounds that the pattern of the import specialisation is particularly influenced by government import restrictions. However, the influence is also true for the export specialisation pattern. Recently, there has been doubt as to the appropriateness of the trade specialisation indexes as an indicator of the pre-trade structure of a country's comparative

that the commodity composition of a country's global trade is independent of individual bilateral trade flows, a country's trade specialisation pattern is influenced by the inter-commodity disparity (but inter-country uniformity) of resistances. Transport costs and other resistances are specific to each bilateral trade flow, and accordingly different between various trading routes, whilst government trade policy is, in general, uniform across all trading routes, as we shall see in Chapter 7. Hence, trade complementarity between a pair of trading countries is most importantly determined by each country's comparative advantage, but it is also influenced by protection policy. It should be borne in mind that the importance of protection with respect to the trade specialisation pattern (and complementarity) rests not with the absolute degree of protection, but with the inter-industry disparity in protection rates.

3.1.3. Country Bias Index

Country bias index, B_{ij}, is defined as the ratio of the actual intensity of trade to the expected intensity due to the differential degree of trade resistances. In order to derive it from the three-dimensional matrix an index of country bias for each commodity, B_{ijk}, is first defined as the differential of the actual trade from the expected one for each individual commodity k (equation 3.2). The index is defined analogously to the intensity index in formula 2.5:

$$\begin{aligned} B_{ijk} &= \frac{V_{ijk}}{\bar{V}_{ijk}} \\ &= \frac{V_{ijk}}{V_{i.k}} \Big/ \frac{V_{.jk}}{V_{..k}} \end{aligned} \tag{3.6}$$

advantages, see Donges and Reidel, 1977; Hillman, 1980; Bowen, 1983a. These authors reviewed it by using a country's production and consumption structure, but they reconfirmed the usefulness of the trade specialisation pattern. For example, Bowen (1983a) concludes that *the [trade specialisation] indexes are useful as summary measures [of comparative advantages]*. Words in brackets are added by this author.

This index measures the extent to which country i's exports in commodity k have more or less favourable access to j's import markets than might be expected from the relative sizes of country i's exports and j's imports in world trade in commodity k.

Overall country bias, B_{ij}, is defined as a weighted average of the indexes B_{ijk}, weighted by the share of the expected trade of each commodity k in the total expected exports from i to j, that is,

$$\begin{aligned} B_{ij} &= \frac{V_{ij}}{\bar{V}_{ij}} = \frac{\sum_k V_{ijk}}{\bar{V}_{ij}} = \sum_k \left(\frac{\bar{V}_{ijk}}{\bar{V}_{ij}} \times \frac{V_{ijk}}{\bar{V}_{ijk}} \right) \\ &= \sum_k \left(B_{ijk} \times \frac{\bar{V}_{ijk}}{\bar{V}_{ij}} \right). \end{aligned} \tag{3.7}$$

Finally, the intensity of trade is separated into a complementarity and a country bias index, and the index value of intensity is expressed as a product,

$$\begin{aligned} I_{ij} &= \frac{V_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} \\ &= \left(\frac{\bar{V}_{ij}}{V_{i.}} \Big/ \frac{V_{.j}}{V_{..}} \right) \times \frac{V_{ij}}{\bar{V}_{ij}} \\ &= C_{ij} \times B_{ij} \end{aligned} \tag{3.8}$$

To summarize, the intensity of trade in country i's exports to j has been defined as a ratio of country i's share in j's total imports to i's share in world trade. The extent to which a country is of greater or lesser importance as a trading partner is separated into two effects: the degree of "match" of commodity composition between country i's global exports and country j's imports, relative to the match of commodity composition between each and world trade; and the degree of trade resistances in the trading route relative to those in the alternatives, which causes trade-diversion toward or away from the route. Complementarity index C_{ij} measures the former influence, and country bias index B_{ij}, the latter.

One important aspect of these indexes is worth stressing. This is associated with the interdependence assumption of the intensity approach, which is based on a share analysis. From the standpoint of country i, the weighted mean of each index value for its various trading routes (or in all of the commodities) is equal to unity, so that the value of each index in country i's exports to a given trading partner j (or in a given commodity k) is negatively related to the index value in its exports to the other trading partners (in other commodities). For example, increasing trade intensity in i's export trade with j automatically implies decreasing intensity in i's exports to other countries. Also, increasing export (import) specialisation in a commodity k means decreasing specialisation in the other commodities.[4] In turn, increasing complementarity between country i's exports and j's imports structures means, by implication, decreasing complementarity between i's exports and other trading partners' imports on the average.

This is also true in the case of the country bias index, but there are further implications. Increased trade within a preferential trade arrangement which results merely from the trade stimulating measures among the member countries, implies higher country biases in trade between member countries, lower country biases in trade between member and non-member countries, and also higher country biases in trade between non-member trading partners (see Garnaut, 1972). For example, membership of the United Kingdom in the EEC meant increased bias in trade between the UK and the EEC countries, lower trade between the UK and Australia, and increased trade between Australia and Pacific-Asian countries.

The indexes are essentially static in nature because they are derived from a trade

[4] Changes in trade specialisation of a country over time may reflect differential changes in its competitiveness for different commodity groups. For example, increased overall competitiveness may be associated with more rapid growth in competitiveness for some commodities and less rapid growth or even decline in competitiveness for other commodities. If change in a country's overall competitiveness is uniform for every commodity group, there are no changes in its trade specialisation pattern, but changes in its relative size in world trade.

matrix in a given period (year). However, the comparison of each index value measured in a consistent way over a period of time provides a starting point to explain the changing pattern of a country's trade relationships due to changes in economic characteristics and trade resistances.

3.1.4. Some Difficulties with Decomposition

Although this decomposition enables two elements determining bilateral trade flows to be separately measured, it has some limitations. These are closely associated with the assumptions under which it is done (see Drysdale, 1967, pp.29–32). The greatest difficulty arises from the assumption that the level and composition of each country's global trade is independent of influences affecting bilateral trade. This presupposes independence between the two categories of trade resistances described in Chapter 2: those which are uniform among trade flows and influence the commodity composition of a country's global trade; and those which differ between trade flows and influence geographical distribution of trade.

This is clearly not the case in the real world. As discussed in Chapter 2, a policy which is discriminatory between commodities will affect individual bilateral trade flows through its influence on the commodity composition of global trade. Conversely, discriminatory policy with respect to trading partners will also affect the level and commodity composition of its global trade through its influence on individual bilateral trade flows. Natural resistances, including geographical distance and cultural, historical, and political affinities, will affect not only the level and commodity composition of trade with a particular trading partner, but also those of its total trade through their effects on its relative competitiveness in a certain market over a whole range of commodities. So it is difficult to separate the determinants of the level and commodity composition of a country's global trade from those of its individual bilateral trade.[5]

[5] Drysdale (1967, pp. 33-34) gave special importance to this assumption with regard to

The effect of this difficulty, however, should not be exaggerated in this study. In the real world with more than 200 national economies there are usually alternative sources of imports (or markets) for most countries. Discriminatory trade policy or institutional arrangements are likely to lead to the substitution of one source (market) for another so that such measures largely influence country bias, rather than leading to significant alteration in the commodity composition of trade. In particular, both Australia's and Korea's trades are diversified in terms of geographical distribution and commodity composition, and they have the capacity to diversify their export markets and import sources. In addition, although they trade intensively with each other, there is no dominance of one over another.

The second difficulty follows from the assumption of homogeneous commodities. It can be best illustrated by looking at extreme cases. If all commodities were classified into one category, country bias alone would determine the intensity of trade, since there is no room for complementarity. This is the case of earlier (prior to Drysdale's decomposition) intensity approach where the differential of the actual from the expected trade flow is explained solely by the relative degree of trade resistances, as seen in the previous chapter. On the other hand, if commodities were so defined that each commodity could only come from one country, only complementarity would affect the intensity of trade because there is no alternative source (market).

This example shows that, given the value of trade intensity, the values of the complementarity index and the country bias index depend solely upon the degree of aggregation chosen for classifying commodities.[6] This requires that commodities should be

decomposition by saying *"It is quite conceivable that changes in a tariff or the structure of transport costs would have effects on import specialisation and complementarity as well as country bias in trade. If there are many such cases, the distinction between country bias and complementarity would be blurred"*. This tendency is strong in countries whose trade is highly concentrated geographically and on few commodity groups (Michaely, 1962).

[6] If an identified commodity k can be categorized into further subcommodity groups, *i.e.*

classified according to whether they are readily substitutable for each other: commodities should be included in the same category if they are substitutable for each other, but commodities in different categories should not be substitutable. In the chain of substitutability between commodities, it is nearly impossible to satisfy simultaneously both requirements (see Lancaster, 1966). It is true that both requirements present the most serious practical problem, but it should be possible to derive meaningful results by adopting widely used commodity classifications (see Grubel and Lloyd, 1975).

3.2. Towards a Testable Model

The discussion so far has been concerned with separating the two main elements determining the intensity of trade. The following discussion proposes a set of empirical models to test the causal relationship between each index and underlying factors.

3.2.1. A Basic Model for Explaining Complementarity

Formula 3.5 has defined trade complementarity between a pair of trading countries as the "goodness-of-fit" between an exporting country's export specialisation pattern and an importing country's import specialisation pattern. In turn, these patterns are most importantly influenced by each country's comparative advantage, but are modified by the inter-commodity structure of protection policy. A testable model to explain complementarity can be derived from empirical studies to test trade patterns (comparative advantage). Empirical studies have attempted to explain variation in the

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k_a and k_b, country bias index in commodity k (B_{ijk}) is a product of complementarity within the commodity group k (C_{ijk}) and weighted average value ($\bar{B}_{ijk}$) of country biases in each subcommodities k_a and k_b, just in the same way as decomposing the index of trade intensity.

$$B_{ijk} = C_{ijk} \times \bar{B}_{ijk}$$

trade specialisation pattern for a particular country over various commodities, or variation for a particular commodity between countries. In explaining variation of the indexes for a particular commodity k across various countries, observations are made of factor endowments of each country which are regressed on the trade specialisation pattern (for example, Leamer, 1974; Bowen, 1983b):[7]

$$S_{i.k} = f(E_i) \quad (i = 1, 2, \cdots, n), \tag{3.9}$$

where

i = country subscript, and

E_i = the factor endowments of individual countries.

These studies largely used the export specialisation indexes, recognizing that import data are more highly distorted by trade intervention. However, a similar model can be used for explaining cross-country variations in import specialisation for a particular commodity k, if protection rates are explicitly included:[8]

$$S_{.jk} = f(E_j, t_j) \quad (i = 1, 2, \cdots, n), \tag{3.10}$$

[7] By comparison, in explaining variation in trade specialisation indexes for a particular country across various commodities, the factor intensity of various commodities is observed (for example, Gruber and Vernon, 1970; Gruber, *at el*, 1967; Baldwin, 1971; Branson and Junz, 1971):

$$S_{i.k} = f(E_k), \quad (k = 1, 2, \cdots, m),$$

where

k = the commodity subscript, and

E_k = proxy indicating relative factor intensity of each commodity.

[8] Leamer (1974) introduced explicitly the tariff rate in explaining cross-commodity variation in import specialisation pattern for a particular country,

$$S_{.jk} = f(E_k, t_k) \quad (k = 1, 2, \cdots, m),$$

where

where

$j =$ country subscript, and

$t_j =$ the inter-country disparity in the degree of protection for a particular commodity k, and others are the same as defined previously.

Complementarity in commodity k between i's exports and j's imports is expressed as interaction between equations 3.9 and 3.10. Since overall complementarity between country i's exports and j's imports is a sum of complementarity in every commodity k, it is determined by the extent to which i's export specialisation pattern matches j's import specialisation pattern. Hence, an empirical model for explaining complementarity in i's export trade with j needs to be include the interaction of country i's export specialisation pattern and country j's import specialisation pattern as follows:

$$\begin{aligned} C_{ij} &= F(f(S_{i..}), f(S_{.j.})) \\ &= h(E_i, E_j, t_{j.}) \qquad (i \neq j = 1, 2, \cdots, n-1) \end{aligned} \tag{3.11}$$

where

$S_{i..} =$ the pattern of country i's export specialisation,

$S_{.j.} =$ the pattern of j's import specialisation, and

others are the same as defined previously.

$t_k =$ the inter-commodity disparity in the degree of protection of country j, and others are the same as defined previously.

Some recent studies have also examined the relationship between changes in factor endowments and trade by using a two-stage approach to use industry cross-section regressions to analyse the effect on trade of variation in factor endowments between countries (see Balassa,1979).

Equation 3.11 is the basic framework used to explain the degree of complementarity and its change in bilateral trade between Australia and Korea in Chapters 4 to 6.

3.2.2. A Basic Model for Explaining Country Bias

Country bias has been defined as the divergence of the actual trade flow from the one expected from the degree of complementarity. As suggested in the previous section, country bias is affected by trade resistances in the particular trading route. In country i's export trade with j, the lower (higher) country bias index is associated with the access costs bearing upon the higher (lower) degree of trade impediments such as geographical and psychic distance, cultural, historical, and institutional dissimilarity, and discriminatory trade policies against (in favor of) country i's exports in j's import market.

It should be reemphasized that country bias is defined not as a function of the "absolute" costs in overcoming trade resistances in a particular trading route but as a function of costs "relative" to those in alternative routes. In this sense, the effect of resistances upon trade flows can be identified only in relative terms in a multi-country world. Hence, country bias can be expressed as a function of the relative degree of trade resistances,

$$B_{ij} = f(R_{ij}) \quad (i \neq j = 1, 2, \cdots, n-1) \tag{3.12}$$

where R_{ij} is the relative degree of trade resistances in i's exports to j, and R should be enumerated in terms of observable variables to make the model operational because R is composed of a number of both tangible and intangible variables.

It is well known that the importance of different resistances varies from commodity to commodity and it is not uncommon for a certain resistance (say, geographical distance) to be relatively high for exports of one commodity from country i to j, but to be relatively low for other commodities in the same bilateral flow (Kravis and Lipsey, 1971). Thus, equation 3.12 needs to be supplemented by the disaggregated indexes B_{ijk} for a detailed explanation of the influence of trade resistances upon trade flows. Hence, the results of equation 3.12 should be supplemented by the disaggregated analysis as follows: for the variation in country bias across countries for a particular commodity k,

$$B_{ijk} = f(R_{ijk}) \quad (i \neq j = 1, 2, \cdots, n-1); \tag{3.13}$$

and for the variation in country bias across commodities for a particular trading route from i to j,

$$B_{ijk} = f(R_{ijk}) \quad (k = 1, 2, \cdots, m). \tag{3.14}$$

These equations formulate the basic framework to explain the degree of country bias in Australia–Korea trade in Chapters 7 and 8.

3.3. Statistical Procedures

3.3.1. Calculating the Indexes

The main concern of this study is to explain the rapidly intensifying trade relationship between Australia and Korea over the period 1962 to 1981. Since the various bilateral trade flows are interdependent, the intensity of trade between Australia and Korea is a consequence of the changing commodity composition of, and changing trade resistances in, each country's other trade relationships. Hence, reference must be made to each country's other bilateral trade relationships.

Therefore, the calculation of trade indexes requires detailed trade statistics in the form of annual three-dimensional world trade matrices for the period 1962 to 1981, disaggregated by a common commodity classification, covering the same time interval, and evaluated at the same currency unit. The previous section indicated that success in isolating both indexes of complementarity and country bias depends upon the degree of aggregation chosen for classifying commodities in the analysis.

This implies two requirements for the calculation of indexes. First, commodity groups need to be classified at a sufficient level of detail, so that each commodity group includes reasonably homogeneous sub-commodities. Second, in order to enable consistent comparisons over a period of time and across different trading routes, the same commodity classification should be used over the whole period and across all routes.

The calculation of indexes is based on the International Economic Data Bank, held in Research School of Pacific Studies of the Australian National University. The data are based on the United Nations Commodity Trade Statistics and supplemented by the World Bank international trade data set for countries whose external trade is not reported to the United Nations. The data are disaggregated up to a 3–digit Standard International Trade Classification (SITC) level, which is the most detailed commodity classification available for all trading countries since 1962, when the first revised SITC (United Nations, 1961) was adopted.

3.3.2. Aggregating the Commodities

In order to meet the requirement of reasonable homogeneity within each commodity group, the 3–digit SITC classification was used for calculating the indexes. However, in order to explain the structure of complementarity and its changing pattern in Australia–Korea trade, each commodity group is aggregated into six broad categories according to relative factor intensities: foodstuffs; agricultural raw materials; mineral materials; labour-intensive; human skill-intensive; and technology-intensive goods. The first three are primary products, and the second three are manufactured products. This aggregation follows, with some modification, Krause's classification (1982), which used four commodity groups: natural resource-intensive, labour-intensive, technology-intensive and human capital-intensive goods. Essentially the modification disaggregates primary products into three categories.

In general, processing activities require different stages of industrialisation and different factor intensities between agricultural and mineral raw materials. The processing activities of agricultural raw materials are unskilled labour-intensive in the "first stage" of industrialisation according to Hoffmann (1958), whereas those of mineral raw materials are capital (physical and human) intensive in the "second stage". On the other hand, trade in foodstuffs is mainly dependent on consumption patterns, determined by income and historical background, whereas trade in raw materials is undertaken on the bases of industrial structure.

Whereas Krause adopted the 4–digit SITC classification for some commodities, our data were based on the 3–digit level. Hence, in adopting the Krause classification some modifications were necessary. He first identified labour-intensive goods as those with low levels of value added per worker. These goods are essentially the same as those identified by Garnaut and Anderson (1980). Krause then identified technology-intensive goods as those with the highest ratios of research and development expenditures to value added. These goods are primarily the same as those identified as "product-cycle goods" by Hufbauer and Chilas (1974). Accordingly, in modifying the Krause classification, both earlier classifications are utilised. The commodities assigned to six broad categories are detailed in Appendix 1.

3.3.3. Selecting the Major Trading Countries

As discussed previously, the Australia–Korea trade relationship has evolved as a consequence of each country's global trade. At the same time, the relative importance of their bilateral trade relationship is judged by a comparison with their other relationships. Accordingly, the pattern of complementarity and country bias in their bilateral trade is identified with reference to the pattern of complementarity and country bias in those relationships.

Forty major non-socialist trading countries have been selected on two criteria: countries with the largest trade volume, and with the maximum geographical coverage of world trade flows. The procedure of selection is as follows. First, in 1980, 36 countries with export volume of more than US$10 billions were selected.[9] Their geographical distribution is 15 from Europe, 2 from North America, 4 from Latin America, 7 from the Pacific-Asian region, 5 from the Middle East, 2 from Africa, and 1 from South Asia. The criterion of largest trade volume is to comply with the underlying assumption of the intensity approach, which is that a country's global trade is independent of influences affecting individual bilateral trade relationships. This will not hold for a country whose total trade volume is relatively small, because its global trade will be strongly influenced by particular bilateral trade relationships.

The criterion of largest trade volume, however, gives unduly high weight to European and to oil-exporting Middle East countries. This requires some adjustment in order to meet another criterion of the maximum geographical coverage. Three European and two oil-exporting Middle East countries with the lowest volume of exports were excluded from the originally selected countries in the concerned region. In their place, two countries from Africa, one country from both South Asia and Latin America, and the largest non-oil exporting Middle Eastern country were included, together with the remaining four Western Pacific countries. As a result, the total trade volume of the selected countries accounts for

[9] The size of import value is not considered because a country, which has a large trade deficit with small export earnings, tends to have strong political and economic ties with a particular trading partner. Hence, for those countries global trade is strongly influenced by certain bilateral trade relationships.

some 90 per cent of world trade, with a geographically balanced distribution in proportion to regional shares in world trade. Appendix 2 provides the list of major trading countries, together with the statistics of each country, which are used in this study.

CHAPTER 4

THE CHANGING PATTERN OF COMPLEMENTARITY IN AUSTRALIA'S AND KOREA'S TRADE RELATIONSHIPS

A major concern of this chapter is to understand the pattern of complementarity in Australian and Korean trade relationships. Chapter 2 pointed out that the change in commodity composition of a country's trade is closely associated with the redirection of its trade relationship through changes in the pattern of complementarity. Chapter 3 then developed an econometric model to estimate the pattern of complementarity in Australia–Korea trade.

This chapter is divided into four sections. Using trade specialisation indexes, the first section examines changes in the commodity composition of Australian and Korean trade. Section 2 specifies the relevant explanatory variables needed to make operational the model defined in Chapter 3. Section 3 reports and discusses estimates of complementarity in Australian and Korean trading relationships. Section 4 summarises the discussion.

4.1. The Changing Pattern of Trade Specialisation

4.1.1. Specialisation of Australian Trade

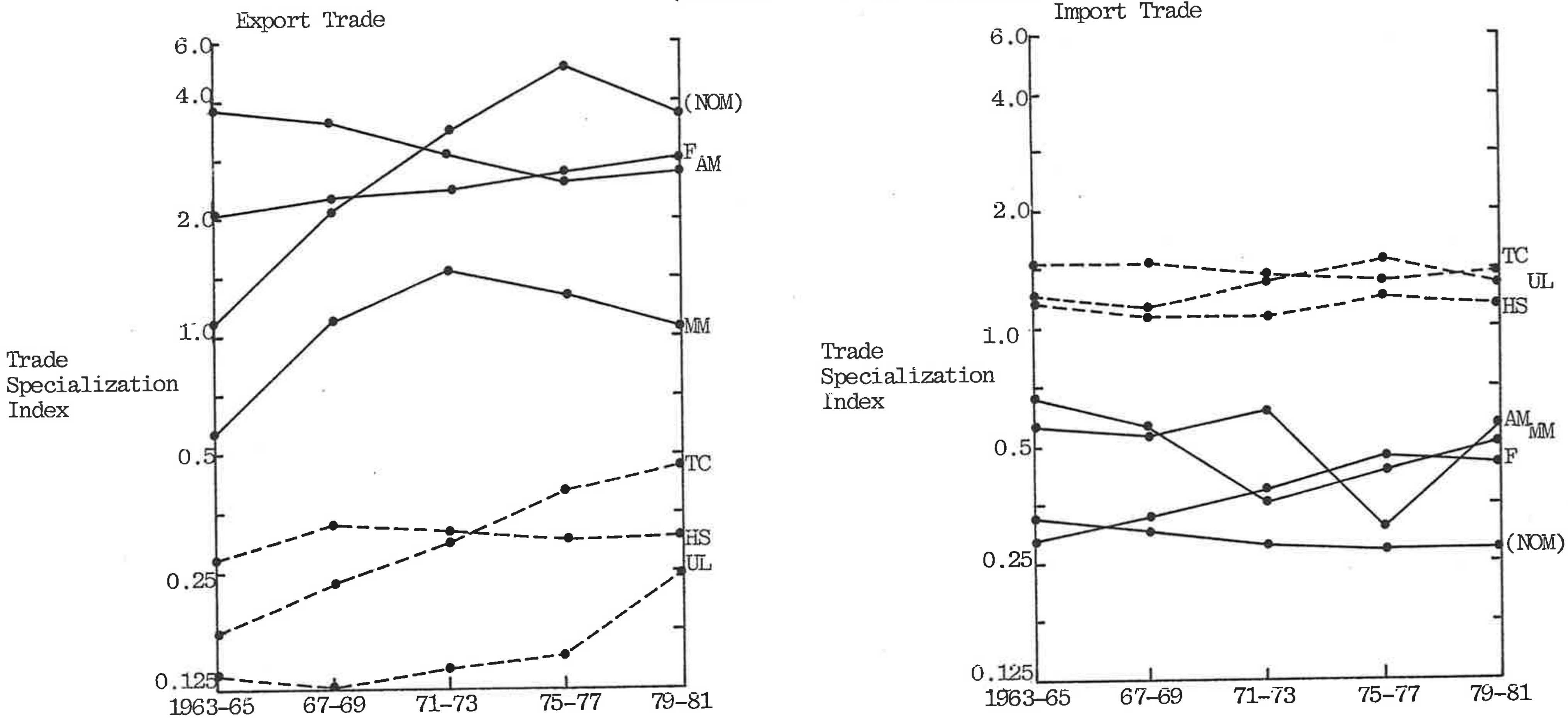
The Australian economy is characterised by abundant natural resources and scarce labour. This leads to a strong comparative advantage in natural resource intensive primary products, and a comparative disadvantage in labour intensive manufactures.

Figure 4–1 plots Australia's trade specialisation indexes in 6 broad commodities in the period 1962 to 1981. These are the weighted averages of index values in each 3-digit SITC commodity group, which is presented in Appendix 3. Reflecting Australia's

Figure 4-1

Australia's Trade Specialisation by Broad Commodity Group

(Selected Three Year Averages)



Note: Calculated based on formula 3.5.
Index values of each broad category are the weighted average of all commodities classified into the category in Appendix 1. Broad categories are: F for foodstuffs, AM for agricultural materials, MM for mineral materials (NOM for non-oil minerals), UL for unskilled labour intensive manufactures, HS for human skill intensive manufactures, and TC for technology intensive manufactures.

Source: Appendix 3.

relative factor endowments, Australia's exports are strongly specialised in three primary commodity groups, whereas import specialisation is strong in three manufactured groups. This pattern remained throughout the whole period.

There were, however, considerable changes within each sector. Within primary products, export specialisation sharply increased in non-oil minerals, whereas it steadily declined in agricultural raw materials. As a result, non-oil minerals replaced agricultural materials as Australia's most important export in the 1970s. Australia's export specialisation in foodstuffs also increased slightly. Australia's import specialisation in three primary product groups remained persistently low, and the changing pattern is negatively asymmetric with that of export specialisation during the period.

Within the manufacturing sector, there was a considerable increase in export specialisation in technology intensive manufactures to become the most important exports in the manufacturing sector. The lower relative importance of human skill intensive manufactures, mainly primary metal products, is also notable. By contrast, there was little change in the import specialisation pattern, although Australia's import specialisation in unskilled labour intensive manufactures rose significantly in the early 1970s, but declined in the subsequent period.

These changes in Australia's trade specialisation reflect differential change in Australia's competitiveness across individual commodities.[1] Australia's overall competitiveness, measured by her share in world trade, worsened during the period 1962 to 1981. Several reasons are frequently cited for this: unfavourable commodity composition, higher growth in the non-traded sector relative to the traded sector, inward orientation of indus-

[1] The changing pattern of comparative advantage reflects not the change in overall competitiveness of a country, but the differential change for individual commodities. Although change in overall competitiveness, in general, accompanies differential change across individual commodities, there will be no change in the pattern of trade specialisation if there are uniform changes in competitiveness for all commodities.

trial policy under high protection, the small size of manufacturing industries, protectionism in overseas markets (agricultural protectionism), geographical location requiring high tansport costs, and a low level of R & D expenditures (see Krause, 1984; Kasper, 1978; McColl and Nicol, 1980; Australian Bureau of Industry Economics, 1979).

However, there was considerable change in Australia's economic structure and trade policy during the past two decades, which led to a shift in the trade specialisation pattern. First, there was rapid growth of the export-oriented mining sector and this produced a sharply strengthened export specialisation in raw minerals, largely at the expense of Australia's traditional agricultural exports. Gregory (1976) and Snape (1977) outlined the mechanism of the effect of mineral booms on inter-sectoral competitiveness. The growth of mineral exports and inflow of foreign capital for mineral developments affected the traded good sectors either through an appreciation of the Australian dollar or by a monetary inflow and an increase in the relative rate of domestic inflation. Both effects caused the import-competing manufacturing sector and the traditional export (agricultural) sector to lose international competitiveness.

The second development took place Australian trade policy which was partly a consequence of the mineral boom.[2] There was a general tariff cut in 1973 and particular cuts subsequently. However, the later world-wide recession reversed this policy, inducing increased protection for selective manufactured goods to avoid the extra costs associated with industrial restructuring. Though the traditional structure was heavily weighted towards consumer goods, the reintroduction of non-tariff import restrictions further resulted in discrimination against imports of consumer goods such as footwear, clothing, textiles, and motor-vehicles.

[2] The Industries Assistance Commission (*Annual Report*, 1973–74, p. 127) noted that the general reduction in tariffs in 1973 was part of a package to respond to the rapid rise in the foreign exchange rate because of the growth in mineral exports. Furthermore, on the political and economic climate surrounding a series of changes in trade policy in the 1970s, see Anderson and Garnaut (1985) and Lloyd (1978).

These changes in Australian economic structure and trade policy were relatively unimportant for the changing pattern of Australian trade compared with the influence resulting from changes in the structure of world trade. The latter's influence was particularly strong on Australian exports owing to its commodity composition.[3] McColl and Nicol (1980) used constant market share analysis to analyse Australia's worsened export performance. Their finding was that all of Australia's lost market shares could be attributed to the commodity composition of her exports. Australia's market distribution was positive on balance as the slow-growing European market was more than counterbalanced by the fast-growing Asian-Pacific markets. The effect of competitiveness, measured as a residual, was marginally unfavourable in the 1970s, while it had been positive until the early 1970s.

Though the change in the structure of world trade was continuing a long term post-war trend, this accelerated over the past decade. First, technological advances led to large-scale substitution of synthetic for natural raw materials, especially in the textile industry, and to less use of raw materials, chiefly minerals and energy sources (United Nations, 1964; United Nations Industrial Developing Organization, 1979). Second, the structure of world production and trade shifted towards high technology-intensive industries, such as engineering, electro-metallurgy, and service industries which have a low raw material content. This trend was strong, in particular, in the advanced industrial countries, and this left high raw material content industries such as textiles and metal processing to the newly industrialising developing countries (Leechor, *et al*, 1983; Kojima, 1977). Thirdly, a series of oil shocks during the 1970 affected the Australian trade pattern enormously. The energy shocks not only accelerated these trends, but they also directly influenced

[3] The share of foodstuffs (SITC 0+1) and non-fuel raw materials (SITC 2+4) in world trade dropped drastically from 19.2 and 18.5 per cent in 1963–65 to 11.1 and 11.6 per cent in 1979–81 respectively. But for this reduced share of these products in world trade, Australia's export specialisation would have declined in foodstuffs and further declined in agricultural raw materials. Their share in Australian exports declined from 37 to 12 per cent for agricultural raw materials, and from 41 to 34 per cent for foodstuffs between 1962 to 1981.

the Australian trade pattern through intensive development of domestic energy sources such as foreign market-oriented coal and uranium, as well as import-substituting crude oil (Australian Department of Trade and Resources, 1982, 1983). Finally and most importantly, agricultural protectionism became more popular generally, and particularly in the advanced industrial countries. The operation of the Common Agricultural Policy (CAP) in the EEC and the enlargement of the membership of the EEC to include the United Kingdom had a direct impact on Australian exports not only through the total loss or severe erosion of her traditional markets, but also through intensified competition from heavily subsidized EEC exports (Balderstone *et al*, 1982).

4.1.2. Specialisation of Korean Trade

The Korean economy is one of the most rapidly growing economies in the world. Growth produced rapid accumulation of capital, human skill, and new technology, which resulted in a continuous change in Korea's relative factor endowments. According to Bowen (1983b), who examined changing resource structure in a multifactor context by ranking a country's world share of each resource (included unskilled, semiskilled, and highskilled labour, capital, and arable land), Korea's relative factor endowments have significantly changed from unskilled labour abundance in 1963 to abundance of capital and skilled labour in 1975.

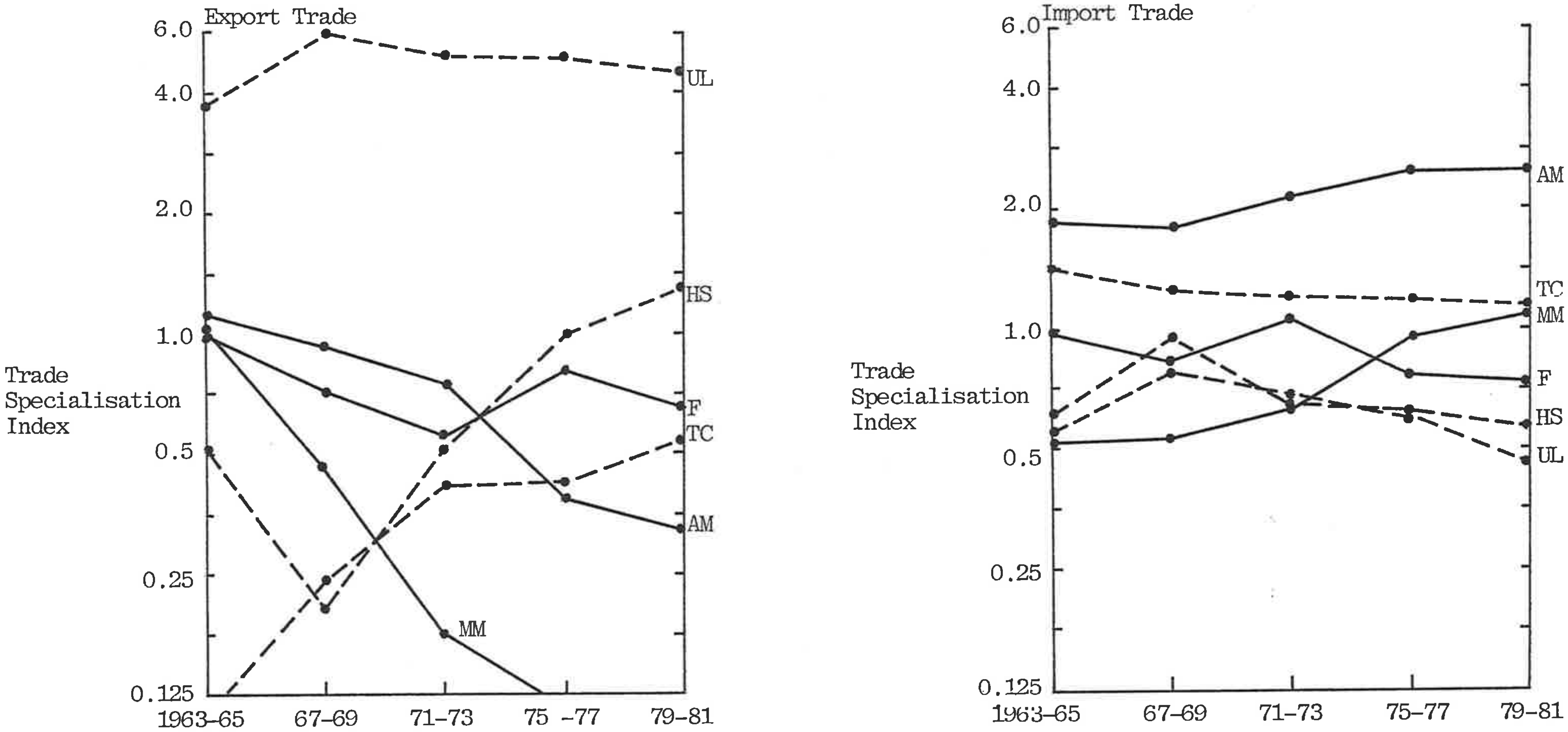
Figure 4–2 presents the changing pattern of Korea's trade specialisation, corresponding to Figure 4–1 in the case of Australian trade (Appendix 4 presents the index number in each 3-digit SITC commodity group). The complex crossing of the lines in Figure 4–2 highlights the huge changes in Korea's trade specialisation pattern during the period 1962 to 1981.

Briefly, Korea's export specialisation pattern experienced two rounds of changes.

Figure 4-2

Korea's Trade Specialisation by Broad Commodity Group

(Selected Three Year Averages)



Note: Calculated based on formula 3.5.
Index values of each broad category are the weighted average of all commodities classified into the category in Appendix 1. Broad categories are the same as noted in Figure 4-1.

Source: Appendix 4.

First, there was a shift between primary and manufacturing sectors. In the early 1960s, Korean exports were moderately specialised in primary products, but during the 1960s manufactures increased their importance. This shift was induced by strengthened specialisation in unskilled labour intensive manufactures. Second, there was strong growth of export specialisation in the more sophisticated human skill and, to a lesser degree, technology intensive manufactures in the 1970s. Meanwhile, exports of primary products became negligible (with the exception of fish, silk and tobacco leaf) by the end of 1960s.

There was also considerable change in Korea's import specialisation pattern. Korean imports were already specialised in primary products in the early 1960s. This reflected lack of natural resources. Korea's imports became even more specialised over time, initially in agricultural raw materials, and then in mineral materials. Another notable feature is that import specialisation in manufactures, mainly intermediate and capital goods, rose significantly in the 1960s, and in the 1970s declined steadily.

This changing pattern of imports reflects Korea's continuously upgrading industrial structure, linked up with the change in its export pattern. It is notable that in the 1960s when exports were concentrated on unskilled labour intensive manufactures, import specialisation rapidly rose in human skill intensive manufactures, mainly processed intermediates. Notably, the declining export specialisation in unskilled labour intensive manufactures and increasing specialisation in other manufactures in the 1970s coincided with declining import specialisation in manufactures (intermediate and capital goods) and increasing specialisation in industrial raw materials. It is also interesting that import specialisation in foodstuffs slightly declined, though with considerable fluctuation. This contrasts with the trend in imports of raw materials.

As we shall see in the next two chapters, these changes in Korea's trade specialisation pattern are primarily due to the continuous changes in Korea's economic structure and trade policy. However, changes in the world trade environment have also played their role. During the period following World War II until the first oil shock in 1973, advanced economies grew at an unprecedented rate and maintained such a high level of employment that shortages of labour were of widespread concern. This situation stimulated structural changes in the developed economies, from labour intensive industries toward more sophisticated technology and capital intensive industries, backed up by the exceptional rate of technological innovation during the period. This industrial restructuring left domestic and foreign markets for labour-intensive manufactures to be exploited by developing countries. This development was accompanied by the introduction of generalized preferences for the manufactured exports of developing countries to markets in advanced countries in the late 1960s (see Murray 1977). Korea had already adopted an export-oriented industrialization strategy to capitalize on this development. Consequently, Korean exports were specialised in labour-intensive final consumer goods. At the same time, Korean imports were concentrated on capital equipment, processed intermediates, and agricultural raw materials.

However, the trade environment drastically changed after the world recession in 1974. Import restrictions became more prevalent in industrialised countries through a variety of non-tariff measures (GATT, 1977). Increasing unemployment in advanced countries resulted in import restrictions upon labour intensive manufactures especially. Korea's response to increasing protectionism was commodity diversification toward more sophisticated goods (to overcome trade barriers in advanced markets, and to diversify export markets into other developing countries).

4.2. Specification of a Model of Complementarity in Trade

The previous section discussed the changing pattern of both Australia's and Korea's trade specialisation, referring to the underlying factors promoting this change. The following discussion examines to what extent the change in trade specialisation pattern affected the redirection of each country's trade. A basic model for explaining complementarity in trade was developed in Chapter 3,

$$C_{ij} = f(E_i, E_j, t_{j.}). \tag{3.11}$$

It specified that complementarity in trade is a function of the interaction of the underlying factors affecting the trade specialisation, factor endowments and trade policy.

4.2.1. Explanatory Variables

The hypothesis regarding the degree of complementarity in a trade flow emerged from the theoretical discussion in Chapter 2, which was based on traditional theory of comparative advantage. That is, complementarity in bilateral trade is positively correlated with differences in national factor endowments. Hence, the model is applied to test the significance of differences in individual factor endowments in explaining variations in complementarity of Australian and Korean trade with the major trading countries selected in Chapter 3.

Following the theoretical framework, three factors of production were selected — natural resources, labour, and capital. Population density is used as a proxy for relative endowments of natural resource. The use of this proxy assumes that natural resources are evenly distributed over the earth's surface, and that the ratio of the labour force to population (labour participation rate) is the same across all countries. Population density is assumed to be negatively correlated with the combined availability of natural resources, arable land, and other economically useful endowments from nature. In other words, densely populated countries could be expected to have a comparative disadvantage in producing natural resource-based goods, along the lines suggested by a land–labour version of the traditional comparative advantage theory. Hence, the greater the difference in population density, the higher the trade potential would be between a pair of countries.[4]

Per capita income is used as a proxy for the ratio of capital to labour. The relevant concept of capital, therefore, is a highly aggregated one which includes social capital, human capital, technology, and other intangible productive factors, as well as physical capital equipment, following Johnson's concept (1968). This concept became widely used in empirical studies after Leontief's paradoxical discovery that the relatively capital-rich United States imported relatively capital-intensive goods (see Leontief, 1968). Value added per worker has been used in industry cross-sectional analysis, and per capita income used in country cross-sectional studies (see Lary, 1968; Kojima, 1970; Balassa, 1979; Hirsch, 1974; Baldwin, 1979; Gruber and Vernon, 1970; Garnaut and Anderson, 1980).

However, there is some difficulty with using per capita income as a proxy for capital stock relative to labour. The greatest difficulty arises from the fact that higher per capita income is a consequence of not only abundant capital stock per head but also abundant natural resource endowment per head. Therefore, the trade pattern could be entirely different between countries with similar per capita incomes, depending on the contribution of natural resources to national income. For example, the high per capita income of most oil-exporting countries derives solely from their abundance of natural resources, and this is obviously different to the sources of high income in industrialised countries. To the extent that this is true, per capita income needs to be supplemented by variables representing

[4] Though the use of population density as a proxy for natural resource availability is deficient, it is used because it is simple and there are no easily measurable alternatives. Keesing and Sherk (1971) and Garnaut and Anderson (1980) use population density as a proxy for the relative endowment of natural resources. In addition, Garnaut and Anderson also proposed the ratio of population to "usable land area" in the same paper. However, usable land may be relevant for agricultural production, but not for mineral resources. Recently, Bowen (1983) differentiated the measurement of land (as a proxy for the endowments of natural resources) by three climate types: "tropical humid", " meso-thermal", and "micro-thermal", on the grounds that climate is a primary characteristic affecting land productivity. Again this differentiation is relevant only for agricultural production.

different sources of income.[5]

Accordingly, additional variables are introduced to represent relative endowments for human skills and technology factors. Several proxies have been used to measure endowments of human skill and technology: (inter-industry or inter-country) wage differential, difference in the composition of labour force, and difference in R&D expenditure (see, Kenen, 1965; Keesing, 1966, 1967; Hafbauer, 1970; Kravis, 1956; Stern and Maskus, 1981; Branson and Monoyios, 1977). For inter-country comparisons, this study prefers relative abundance of professional personnel and highly trained labour. The number of students enrolled in secondary school as a percentage of the schooling age group is used as a proxy for human skill, and the share of professional, technical, and related workers out of the total economically active population is used as a proxy for technology.

Two dummy variables are introduced to represent the influence of trade policy. Trade policy is generally biased in favour of import-competing industries. So it will blunt the effect of differences in factor endowments. However, it is difficult to measure the structure and extent of policy distortion in a country. Nonetheless, one can secure a general idea of the structure of protection in world trade. Most industrial countries impose heavy import restrictions on foodstuffs and unskilled and semiskilled labour-intensive manufactures, while trade in raw materials and capital equipment and machinery tends to be unrestricted (see Balassa, *et.al* 1971, Table 3.2; Preeg, 1970, Table 13-1 to 13-4). More importantly from the point of view of this study, this feature of trade policy is characteristic of Australia and Korea. Accordingly, dummy variables are introduced: for trade in capital equipment and machinery, and for trade in raw materials.[6]

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[5] Garnaut and Anderson (1980, p. 418) argued that high per capita income associated with a relatively rich natural resource endowment was commonly reflected in a high wage level. This would cause the manufacturing sector to be relatively less competitive and to be concentrated in relatively capital intensive activities within the manufacturing sector.

[6] The dummy variable for trade in high technology commodities is applied to such countries where technology endowment is higher than that of Australia in 1980: Japan, Canada, U.S.A.,

Finally, the statistical tool employed is cross-section logarithmic linear regression analysis. Separate estimates are made for export and import trade of each country. This is because the degree and structure of complementarity differs between the two, as illustrated in Chapter 2. By regressing the same independent variables against complementarity in each trade flow, an important feature of bilateral trade, mainly asymmetry in trade relationships (which is neglected in the pure theory founded on a two-country model), can be confirmed. Accordingly, the final model takes the following form in export trade (C_{ji} for import trade):

$$C_{ij} = \alpha_0 PD_{ij}{}^{\alpha_1} PC_{ij}{}^{\alpha_2} HS_{ij}{}^{\alpha_3} TC_{ij}{}^{\alpha_4} D_1^{\alpha_5} D_2^{\alpha_6} \tag{4.1}$$

where

subscript i = Australia or Korea,

subscript j = the other major trading countries (39),

C_{ij} = complementarity in country i's export trade with j,

C_{ji} = complementarity in country i's import trade with j,

PD_{ij} = the ratio of country i's population density to that of j,

PC_{ij} = the ratio of country i's per capita income to that of j,

HS_{ij} = the ratio of country i's human skill endowment to that of j,

TC_{ij} = the ratio of country i's technology endowment to that of j,

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Belgium, France, German, Netherlands, Sweden, Switzerland, and U.K. The dummy variable representing trade in raw materials is applied differently between estimates of Australian and Korean trade because of their contrasting position in trade of raw materials. For Australian trade, the variable is applied to countries in whose imports raw materials accounted for more than share of raw materials in world trade. However, the application requires avoiding overlapping with the dummy variable representing high technology. Consequently, this dummy variable was applied to the so-called newly industrialising developing countries, such as Korea, Hong Kong, Singapore, Brazil, Chile, Greece, and Egypt. For Korean trade, the variable is applied to 4 Asian agricultural raw materials-exporters with relatively high population density (Indonesis, the Philippines, Thailand, and Malaysia).

$D_1 =$ dummy variable indicating trade in high technology commodities, and

$D_2 =$ dummy variable indicating trade in raw materials.

This model is estimated at two points in time (1970 and 1980) in order to see how the pattern of complementarity has changed. The important changes in both countries' trade patterns occurred during the 1970s, and there was a huge change in world trade between 1971–1974. The year 1980 is the latest year for which all the necessary data were available when this study began. The statistical data are presented in Appendix 2, B.

4.2.2. Some Limitations

This model has some limitations. Perhaps the most serious is the failure to measure consistently the influence of trade policy, although dummy variables are introduced. These dummy variables, however, reflect not only the influence of protection, but also each country's underlying economic structure.

It should be pointed out, however, that the estimated influence of government policies in regression analysis will be different between the export and import trade of a country. Trade policies have less influence on export than on import trade patterns, and vary greatly with countries. Thus the pattern of complementarity in a country's export trade is largely subject to the different policies of its various partner countries, while the pattern of its import trade is largely subject to its own uniform policy structure. Therefore a cross-section model of the pattern of complementarity in a country's import trade is likely to be specified more correctly than its export trade.

In addition, there is a multicollinearity problem, as with all empirical tests of international trade theory. In the process of economic development, endowments of individual factors are a consequence as much as a cause of others. This is particularly true among variables representing the stage of industrialisation, such as technology, human skill, and (physical) capital.[7] Even in the case of natural resources, the productivity of an endowed natural resource is a consequence of technology and human and physical capital invested in exploration, while the natural resource itself is a source of accumulation of technology and capital.

Table 4–1 presents two matrices of correlation values for all pairs of the independent variables for Australia and Korea. In the Australian case, there is a high positive correlation among differences in per capita income, human skill, and technology. In the Korean case, the difference in the technology factor is positively and closely associated with the difference in per capita income, but notably, the difference in human skill has no systematic relation with differences in the other two factors, especially in 1980.[8] In addition, the dummy variable for high technology is closely and negatively associated with differences in per capita income, human skill, and technology in the Australian case, while in the Korean case, it shows a positive relation. All of these relationships between explanatory variables should be taken into account for interpreting the results, since they indicate that high multicollinearity is likely to be present in the regression equation.

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[7] Hufbauer (1970) identified 7 variables (physical capital, human skill, wage per worker, scale economy in production, technology gap, stage of production, and product differentiation) which he said are most frequently raised in the hypotheses of trade patterns in manufactured goods. He attempted rank and simple correlation in both commodity cross section and country cross section, and found a high degree of correlation between factors in both cross sections. The correlation coefficients were more than 0.6 in most of the pairs of factors. Recently, this collinearity problem is intensively discussed in Leamer (1984).

[8] This reflects Korea's abundant endowments of human skill far beyond the one expected for a country with similar per capita income and technology. This is often mentioned as an important source of rapid growth of the Korean economy. An empirical study concluded that the growth and structural change in Korean exports owed much to the abundant base of human skill, which enabled Korean industries to absorb, master, and diffuse imported technological know-how and marketing expertise. See Westphal, *et al*, 1981.

Table 4-1

Correlations between Explanatory Variables

A. Complementarity in Australia's Trade Relationships

	PD	PC	HS	TC	D_1	D_2
PD		.159 -.022	-.208 -.329	.004 -.075	.259 .167	.270 .159
PC			.765 .790	.884 .852	-.621 -.624	.153 .143
HS				.760 .724	-.541 -.621	-.158 -.136
TC					-.649 -.593	.052 .151
D_1						-.075 -.036
D_2						

B. Complementarity in Korea's Trade Relationships

	PD	PC	HS	TC	D_1	D_2
PD		-.073 -.129	.113 .088	-.043 -.048	-.304 -.374	.618 .612
PC			-.357 -.046	.738 .848	.627 .701	-.389 -.304
HS				-.586 .032	-.431 .115	.237 -.045
TC					.707 .719	-.305 -.127
D_1						-.317 -.279
D_2						

Note: Numbers in the above indicate correlation coefficients in 1970, and below numbers are coefficients in 1980.
PD: difference in population density, PC: difference in per capita income, HS: difference in human skill endowments: TC: difference in technology endowments: D_1: dummy variable for industrial countries with high technology; and D_2: dummy variable for the newly industrialising developing countries in Australian case and for 4 ASEAN countries in Korean case.

4.3. Discussion of Results

It should be emphasized that the model is intended to explain both the changing pattern of complementarity in Australia's and Korea's trade relationships and the asymmetric nature of bilateral trade. It is unlikely that the model will have the same explanatory power for complementarity in directions and over time. Indeed, this differential explanatory power represents the change in each country's trade relationships due to changes in complementarity in trade.

The regression results are presented in Tables 4-2 and 4-3. Despite the limitations discussed previously, the model performs reasonably well. Several general features can be seen. First, the explanatory power of each independent variable is distinctly different between export and import trade, as shown by the asterisks which represent statistical significance. This is a consequence of asymmetry in trade flow.[9] Second, the explanatory power of each variable changes over time, so that the regression perfomance, judged by the adjusted coefficient of determination and F-value, is substantially different in 1970 and 1980. Third, variation in complementarity is explained by the explanatory variables better in import than in export trade. This difference complies with a priori expectation.

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[9] An analysis of correlation between complementarity in each country's export and import trade was undertaken to examine the asymmetric nature of bilateral trade. In the Australian case, the coefficient of correlation was 0.41 in 1970 with significance at the one percent level, meaning that the degree of complementarity in export trade with a certain trading partner was moderately and positively related to the degree of complementarity in import trade that year. However, the coefficient was −0.18 for 1980, with significance only at the 14 percent level. Though its statistical significance is weakened, what is important is the negative relationship. This intensified asymmetry of Australian trade is a notable aspect of the development in Australian trade relationships in 1970s. By comparison, the degree of complementarity in Korea's export trade is unrelated to that in her import trade, as shown by the extremely low coefficient of correlation between them of 0.02 in 1970 and 0.13 in 1980, without statistical significance in both cases.

4.3.1. The Changing Pattern of Complementarity in Australian Trade

The results show that difference in population density is the most important determinant of complementarity in Australian trade. Except for export trade in 1980, the estimated coefficient of the variable has a positive sign, and it differs significantly from zero. This indicates that Australia tends to trade with densely populated countries because of high complementarity.

Another important feature is that Australia's export trade relationships have experienced considerable change over the 1970s, whereas import trade relationships have not changed as much. In Australian export trade, in 1970 population density difference was the only important factor explaining variance in complementarity among her various markets. This variable alone explained nearly a third of the variation in complementarity. The addition of other variables decreased the proportion of variations explained, but it disclosed an interesting feature of Australian export trade. The coefficients of two variables, difference in per capita income and the dummy variable for newly industrialising developing countries (NICs), have a positive sign and are moderately significant.[10] What is important is that the significance of those variables is at the cost of the explanatory power of difference in population density. This implies that complementarity in Australian export trade in 1970 was higher with densely populated countries, particularly developing countries with low income level (suggested by the positive sign of the coefficient of per capita income).[11]

However, the relative importance of each variable completely changed by 1980. The

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[10] The other variables do not seem to play any role in explaining complementarity in Australian exports in 1970, even without the predicted sign. However, attention should be given to the multicollinearity between difference in per capita income, human skill, technology, and the dummy variable for high technology countries.

[11] This point is important in order to understand the relative contribution of each commodity group to complementarity in Australian export trade. Higher complementarity with lower income developing countries implies that foodstuffs played a relatively important role in determining Australian export markets, since the newly industrialising developing countries were major importers of foodstuffs in the early stage of their industrialisation.

Table 4-2
Estimation of the Pattern of Complementarity in Australia's Trade Relationships

	Constant	PD	PC	HS	TC	D1	D2	$\bar{R}^2$	F-value	D-W Test
Export Trade										
1970	3.965	0.147 (3.857)***						.284	14.878***	
	3.955	0.108 (2.049)**	0.171 (1.155)	0.061 (0.310)	-0.149 (0.681)	0.129 (0.721)	0.197 (1.250)	.262	3.074**	1.846
1980	4.357						0.377 (3.512)***	.239	12.332***	
	4.535	-0.059 (1.846)*	0.190 (1.938)*	-0.148 (0.860)	-0.239 (1.233)	0.087 (0.628)	0.419 (3.351)***	.257	3.078**	2.042
#	4.352	0.046 (1.360)	-0.001 (0.017)	0.154 (1.053)	-0.239 (1.571)	-0.153 (1.292)	0.545 (5.482)***	.531	7.422***	2.612
Import Trade										
1970	4.206					0.501 (4.178)***		.302	17.452***	
	3.762	0.087 (2.780)***	-0.141 (1.176)	0.116 (0.748)	0.363 (1.986)*	0.585 (4.182)***	-0.303 (2.316)**	.487	6.844***	1.675
1980	4.109	0.104 (3.834)***						.276	14.699***	
	4.047	0.093 (4.009)***				0.336 (3.765)***		.474	17.204***	
	3.980	0.106 (3.923)***	-0.152 (1.831)*	-0.039 (0.269)	0.339 (2.068)**	0.331 (2.809)***	-0.040 (0.381)	.492	6.810***	1.754

Note: Numbers in parentheses are t-value.
*** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

PD: difference in population density; PC: difference in per capita income; HS: difference in haman skill endowments;
T: difference in technology endowments; D1 dummy variable for industial countries with high technology; and
D2: dummy variable for the newly industrialising developing countries.

dummy variable for the NICs became the most important, and it alone explains a quarter of the variation in complementarity in Australian export trade. Though the addition of other variables slightly improved the adjusted coefficient of determination, the difference in population density has a negative sign, and is significant at the 10 per cent level. At the same time, per capita income increased its explanatory power with a positive sign.

This perverse statistical result is associated with the greater importance of mineral raw materials in Australian exports in 1980.[12] Among the NICs, complementarity in Australian export trade with the most densely populated and prosperous city states (Singapore and Hong Kong), declined to an extremely low level.[13] An estimation was undertaken with the exclusion of the two states (see equation marked # in Table 4–2). The dummy variable for the NICs is the only variable with statistical significance and it alone explains more than half the variation in complementarity (the value of the coefficient of the dummy variable grew by more than one-third). In addition, difference in population density has a "positive" sign and difference in technology and the dummy variable for high technology countries have a "negative' sign, with moderate significance.

These statistical results indicate that Australian export trade relationships within the densely populated countries has been significantly redirected during the 1970s, away

[12] Mineral raw materials increased their relative importance in complementarity in Australian export trade at the expense of agricultural products, partly because of change in the Australian export pattern, but most importantly because of worldwide agricultural protectionism. The commodity boom in the early 1970s had an important impact on trade in foodstuffs. The export embargo of some grains by some exporters and the price rise in world grain markets provided support to arguments for agricultural protectionism in the food importing countries to achieve self-sufficiency. Together with the already well-entrenched agricultural protectionism in advanced countries, this induced a sharp decline in the share of foodstuffs in world trade.

[13] Both countries are distinguished from other developing countries with respect to the industrial restructuring after the first stage of industrialisation. In contrast to other countries, which promoted import substitution of intermediate inputs through the processing of raw materials, both countries became oriented to low raw material content industries such as service, precise machinery, and to the upgrading of quality in final consumer goods. See Leechor, *et al* (1983). Accordingly, complementarity in Australia's export trade declined from 0.75 in 1970 to 0.69 in 1980 with Hong Kong and from 0.48 to 0.45 with Singapore.

from advanced industrial countries toward the NICs. The explanatory power of population density declined because the import structure of densely populated industrial countries, especially European countries, moved away from Australia's export structure. This is a consequence of both increasing agricultural protectionism in the industrial countries, and the geographical redistribution of world industry in the 1970s. The industrial structure of the industrial countries shifted toward technology intensive industries to leave basic materials industries to the NICs. This finding provides an explanation to the phenomenon noted by Anderson and Garnaut (1985), namely that *"Australia's comparatively high and increasing propensity to trade with developing countries may seem at odds with what standard trade theory would predict"*.

The story is completely different for complementarity in Australian import trade. The model performs well. The variables explain half the variation in complementarity in Australia's import trade in both 1970 and 1980. Though population density is also an important factor in explaining complementarity in import trade, this is associated with high technology and high per capita income. Another notable feature is that the explanatory power of each variable remains little changed over time. This also contrasts with the case of export trade.

The dummy variable for technologically advanced countries is the most important variable explaining Australian import trade in 1970. The variable alone explains about one-third of the variation in complementarity. It is interesting that the coefficient of the technology variable has a statistically significant positive sign. Given the high correlation between the dummy and technology variables, the positive sign attaching to the coefficient on technology is a product of the "stepwise regression" method. That is, the positive sign for technology is a consequence of a priori determination of the coefficient of the most important regressor, the dummy variable for high technology countries. The negative sign of the dummy variable for the NICs is also notable. These statistical results indicate that Australia's imports in 1970 were highly complementary to exports of technologically advanced populated industrial countries.

This pattern showed little change by 1980. However, the change in the relative importance of each variable is notable. Population density became the most important variable, while the dummy variable for high technology countries weakens its relative importance. The negative coefficient of the per capita income variable became increasingly significant in 1980, while that of the dummy variable for the NICs is no longer significant. All of these indicate that the NICs became gradually important as a source of Australian imports, perhaps in labour intensive goods.

One can draw several important conclusions about Australia's trade relationships from these results. First, despite Australia's continuous export specialisation in land-intensive primary products, her export trade relationship has been significantly reoriented during the 1970s, away from the advanced industrial countries toward the NICs. Second, Australia's import trade relationships are strongly directed toward technologically advanced countries, but the NICs increased their importance as sources of Australian imports.

Third, this distinctive pattern of changes in complementarity between Australia's export and import trade is a major reason for increasing asymmetry in Australian trade relationships. In 1970, both Australian export and import trade were directed to the advanced industrial countries. But export trade was redirected toward the NICs by 1980, whereas changes in import trade lagged behind. Fourth, this increasing asymmetry suggests an important aspect of the bilateral balance of Australian trade relationships. Because of differing complementarity between export and import trade, Australia tends to have bilateral surpluses in trade with the NICs, but bilateral deficits in trade with the advanced industrial countries. Finally, Australian trade relationships were reasonably well explained by factor endowments, though her export trade is greatly influenced by trade policy overseas. This confirms the conclusion of earlier study that Australian trade is primarily undertaken according to the traditional theory of comparative advantage (Grubel and Lloyd, 1975).

4.3.2. The Changing Pattern of Complementarity in Korean Trade

Table 4–3 presents the results of estimating complementarity in Korean trade relationships. The explanatory power of each variable differs between export and import trade, and the relative importance of each variable has significantly changed over time, indicating rapid change in Korea's trade relationships. In general, population density has become more important, while country characteristics representing the stage of industrialisation (such as per capita income, human skill, and technology) have become less significant as explanatory variables.

In Korea's export trade, per capita income played a significant role in explaining Korea's trade relationships in 1970, together with the human skill factor. Both explain nearly a third of the variation in complementarity. The coefficients are significant at the one percent level and have a positive sign. As other variables are added, the adjusted coefficient of determination decreases. However, the added regression equation provides an important insight into Korean export trade relationships. The explanatory power of per capita income and human skill falls, while the dummy variable for high technology countries becomes significant with a positive sign. These statistical results indicate that Korean export trade was highly oriented toward high income countries, mainly advanced industrial countries.

This pattern completely changed by 1980. In 1980, the regression equation shows no statistical significance (see F–value). The only notable result is that population density is positively associated with complementarity in Korean export trade. This indicates that

Table 4-3
Estimation of the Pattern of Complementarity in Korea's Trade Relationships

	Constant	PD	PC	HS	TC	D1	D2	$\bar{R}^2$	F-Value	D-W Test
Export Trade										
1970	3.926		0.264					.232	12.205***	
			(3.494)***							
	3.700		0.269	0.388				.297	8.815***	
			(3.716)***	(2.075)**						
	3.686	0.072	0.285	0.312	-0.278	0.409	0.060	.288	3.494***	1.544
		(1.474)	(1.609)*	(1.549)	(0.982)	(1.643)*	(0.255)			
1980	4.382	0.062		-0.061	0.153	-0.084		.060	1.573	
		(1.737)*		(0.477)	(0.941)	(0.514)				
	4.343	0.062	0.035	-0.068	0.142	-0.098	0.050	.005	1.028	2.211
		(1.695)*	(0.292)	(0.499)	(0.681)	(0.565)	(0.336)			
Import Trade										
1970	4.254					0.320	0.549	.205	5.904***	
						(2.192)**	(3.111)***			
	4.194	0.032	0.296	-0.046	-0.546	0.427	0.689	.225	2.841**	2.088
		(0.675)	(1.878)*	(0.244)	(2.067)**	(1.764)*	(3.429)***			
1980	4.238	0.094					0.665	.498	18.870***	
		(3.025)***					(5.435)***			
	4.148	0.105	-0.037	0.093	0.035	0.157	0.692	.460	6.111***	1.756
		(2.979)***	(0.329)	(0.722)	(0.178)	(0.950)	(4.874)***			
	4.162	0.106	-0.027	0.083		0.169	0.684	.477	7.563***	1.756
		(3.128)***	(0.281)	(0.728)		(1.144)	(5.171)***			

Note: Numbers in parentheses are t-value.
*** indicates significance at the 1 percent level, ** at the 5 percent level, and * at the 10 percent level.

PD: difference in population density; PC: difference in per capita income; HS: difference in haman skill endowments; T: difference in technology endowments; D1: dummy variable for industrial countries with high technology; and D2; dummy variable for 4 ASEAN countries.

Korea's trade relationship has significantly reoriented over the 1970s, though the included variables do not explain Korean trade relationships in 1980.

On the other hand, in 1970 two dummy variables were important in explaining Korea's import trade relationship. Both explain one-fifth of variation. As other numerical variables were added into the regression equation, the adjusted coefficient of determination increased slightly. This indicates that Korea's import trade in 1970 was oriented toward two country groups: the technologically advanced countries, and the agricultural raw material exporters. This geographical pattern reflected the commodity pattern of Korea's then imports, which were concentrated on intermediate inputs and capital equipment from technologically advanced countries and agricultural raw materials from natural resource-rich countries.[14]

The relative importance of each variable in explaining Korea's import trade relationship significantly changed by 1980. Population density became the most important determinant. Consequently, population density and the dummy variable for agricultural materials-exporting countries explain half the variation in complementarity in Korean import trade in 1980. Most notably, all variables representing the stage of industrialisation (such as difference in per capita income and technology and the dummy variable for high technology) lost their importance. These statistical results mean that Korea's import trade relationship became completely reoriented toward the natural resources-exporting countries and away from the countries exporting manufactures.[15]

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[14] It should be noted that exports of four ASEAN countries are highly specialised in agricultural raw materials, especially timber. Korean imports were extremely highly specialised in timber for producing export-oriented plywood and veneers. This contrasts with Korea's moderately specialised imports in textile raw materials, despite her highly specialised export specialisation in textile products. This is due to Korea's concentration on synthetic textile products, while large-scale substitution of synthetic for natural raw materials was not available for wood products. Consequently, the coefficient of import dependence, as a ratio of imported input to total input, was 0.17 in 1970 and 0.14 in 1980 for Korean textile products, while 0.51 and 0.53 respectively for her wood products (Bank of Korea, Input-Output Tables of Korea, 1980).

[15] This does not mean that technologically-intensive manufactures are not important in Korean

From the statistical results several important conclusions can be drawn. First, Korea's trade relationship has been significantly reoriented away from advanced industrial countries, firstly in import trade, and, to a lesser degree, in export trade. Korean export trade was highly complementary to the import pattern of the high income countries in 1970, but this pattern disappeared by 1980. Complementarity in Korean import trade in 1970 was higher with the high technology countries and agricultural raw material exporters. This pattern has significantly changed toward natural resource-abundant countries.

Second, the pattern of Korean trade would become more symmetric, if and only if, developing countries are natural resource exporters. The changing pattern suggests that because of the commodity composition of Korean trade, Korea would have a deficit in trade with raw material exporting countries, and a surplus in trade with exporters of manufactures.

Third, the results suggest that Korean trade also was primarily undertaken on the basis of traditional comparative advantage theory. The increasing trade relationship in exports and imports with other developing countries is not a consequence of horizontal intra-industry trade (suggested by Linder's hypothesis), but a product of a burgeoning vertical inter-industry trade according to the traditional factor proportion theory.

4.4. Summary

A cross-section regression model was developed to explain the pattern of complementarity in bilateral trade relationships, and applied to both Australia's and Korea's export and import trade at two points of time. The results of the analysis give full support to hypothesis that as a result of changing comparative advantage, changes in the commodity composition of a country's trade accompany reorientation of its trade relationships.

imports. These commodities still have 30 per cent of Korean imports, but they also have a large share in world trade.

Australia's abundant natural resources always played a dominant role in determining complementarity in Australia's trade. However, as a consequence of structural change in her trading partners, Australian trade relationships also have reoriented themselves. Complementarity in her export trade has reoriented towards the newly industrialising countries and away from advanced industrial countries. In import trade, complementarity started to be directed away from advanced industrial countries, though it continued to be high with exports of those countries.

By comparison, changes in Korean factor endowments caused Korean trade relationships to be significantly reoriented themselves. In the early stage of industrialisation the labour-abundant Korean economy traded more intensively with capital-abundant industrial countries. In 1970, differences in per capita income were most important in determining the pattern of export trade, and differences in technology were most important in import trade, but variables representing natural resource endowments had become most important by 1980, especially in import trade.

The results also showed that bilateral trade flows can be asymmetric between the two directions. Both Australia's and Korea's trade relationships are typically asymmetric because their trade is undertaken according to the traditional comparative advantage theory. This is consistent with the view that bilateral imbalance of trade reflects efficiency and patterns of comparative advantage, as suggested by the theoretical discussion in Chapter 2, and has important implications for bilateral trade policy between the two countries.

CHAPTER 5

INCREASING COMPLEMENTARITY IN AUSTRALIA–KOREA TRADE

We now come to one of the central tasks of this study which is to explain the complementarity that developed in trade between Australia and Korea over the last two decades. How precisely did developments in the trade and economic structure of both countries complement each other? The general answer to this question emerges clearly from what has been said in the previous chapter regarding the changing pattern of complementarity in Australia's and Korea's overall trade relationships.

The commodity composition of Australian trade has experienced little change over the last two decades as between primary and manufactured products. However, her export trade has been considerably redirected, mainly because of structural change in her trading partners' import patterns, while there has been little change in her import trade. By comparison, the commodity composition of Korean trade has undergone major changes and this has induced a significant shift in the pattern of complementarity in Korean export and import trade. A radical redirection of her trade relationships, especially in her import trade, would have resulted had there not been important resistances to new bilateral trade flows (discussed in Chapter 7).

Section 1 describes the overall trend in the degree of complementarity in trade flows between Australia and Korea. Section 2 discusses changes in the commodity structure of complementarity. In examining the reasons for these changes, emphasis is given to the impact of Korean industrialisation. That section also estimates a causal relationship between structural changes in complementarity in Australia's export trade with Korea and Korea's export trade with Australia. In section 3 the influence of the Korean iron and steel industry is examined as a case study to show how Korea's industrial upgrading reoriented her trade relationship toward Australia.

5.1. The Changing Degree of Complementarity

Complementarity indexes for the period between 1962 and 1981 were calculated according to the formula defined in Chapter 3. The detailed indexes for each commodity are presented in Appendix 5. Figure 5–1 presents the trend in overall complementarity in both directions. It confirms prior expectations derived from the theory of the changing pattern of each country's global trade in the course of their economic growth: rapid increases in both trade flows, and asymmetry.

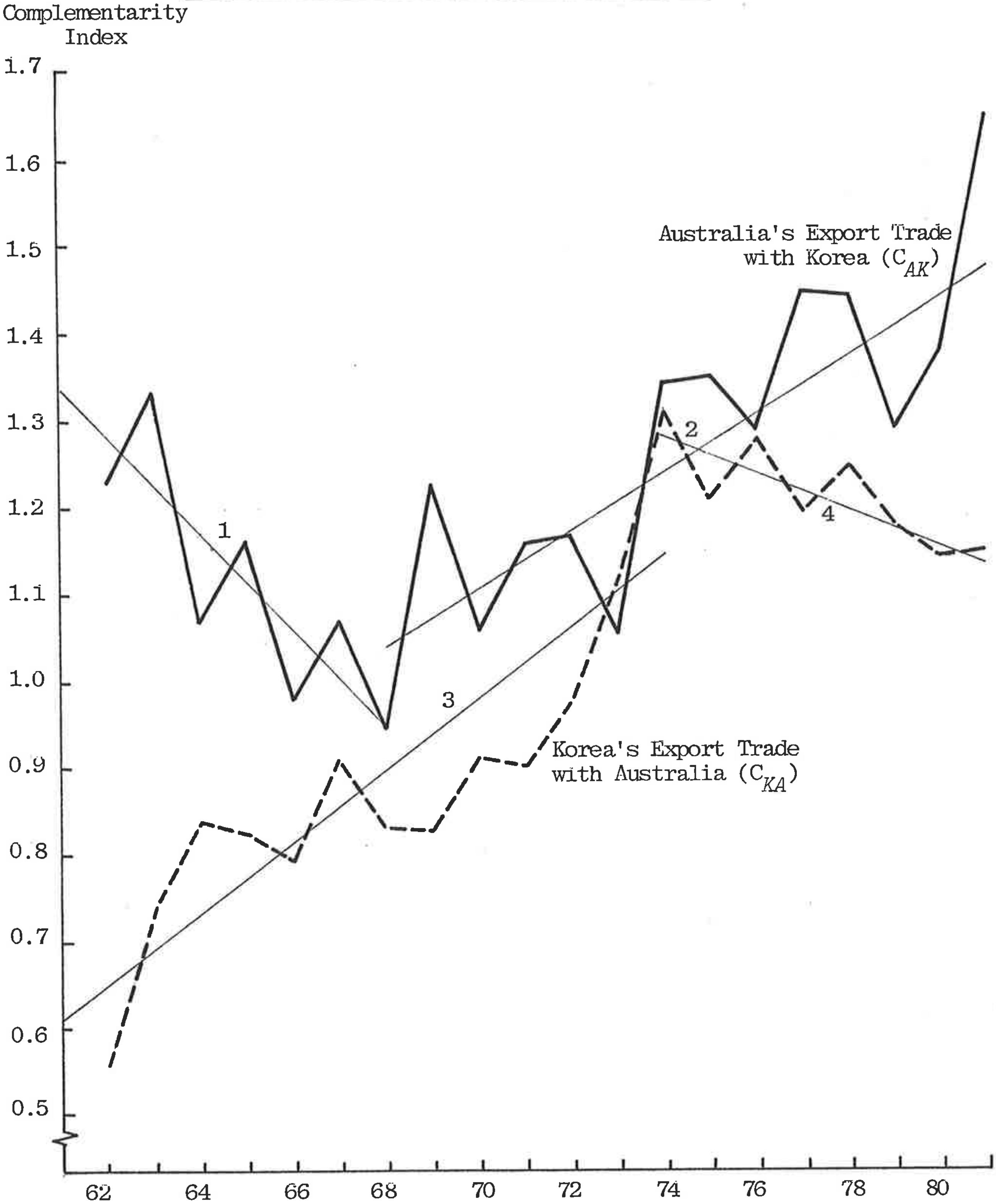
In the early 1960s, complementarity in Australia's export trade with Korea was much higher than unity, meaning that ceteris paribus, Australia would have held a much larger share in Korean imports than her share in world trade as a result of the commodity composition of both Australian exports and Korean imports. Overall complementarity declined considerably between 1962 to 1968, but has since rapidly increased to be far above the original level at the early 1960s. Accordingly, the year 1968 provides a critical turning point in creating two distinctive periods in the development of complementarity between Australian export and Korean import structures, as shown by the linear trend lines in Figure 5–1.

The distinguishing trends in complementarity in Australia's export trade with Korea (C_{AK}) before and after 1968, are highlighted in the following time-series estimates (t is time and t-values in parentheses).[1] During the period 1962 to 1968 (trend line 1 in Figure 5–1),

[1] For the time-series estimates, the value of complementarity index is multiplied by 100.

Figure 5-1

Complementarity in Australia - Korea Trade



Note: Calculated based on formula 3.5.

Source: Appendix 5.

$$C_{AK} = 133{-}5.3t \qquad \bar{R}^2 = .63; \tag{5.1}$$

$$(3.35)$$

and during the period 1968 to 1981 (line 2),

$$C_{AK} = 101{+}3.3t \qquad \bar{R}^2 = .60, \tag{5.2}$$

$$(4.48)$$

indicating that the structure of Korean imports moved away from the structure of Australian exports between 1962 and 1968, but moved towards the Australian export structure in the subsequent period.

By contrast, complementarity between Korean export and Australian import structures was extremely low in the early 1960s. This means that, even without high trade resistances, Korea would have held a much lower share in Australian imports than in world trade because of the commodity composition of trade. However, the structure of Korean exports steadily moved towards the structure of Australian imports until 1974. Thereafter, complementarity declined slightly.

The following time-series summarize the trend in complementarity in Korea's export trade with Australia (C_{KA}). During the period 1962 to 1974 (line 3),

$$C_{KA} = 61{+}4.0t \qquad \bar{R}^2 = .72, \tag{5.3}$$

$$(5.57)$$

and during the period 1974 to 1981 (line 4),

$$C_{KA} = 130{-}2.1t \qquad \bar{R}^2 = .68. \tag{5.2}$$

$$(3.94)$$

Thus, Australia–Korea bilateral trade has developed asymmetrically over the period. In the early 1960s, complementarity in Australian exports to Korea was more than twice as high as for trade in the opposite direction. The differential gradually contracted, and by the mid-1970s had disappeared before emerging again in the latter 1970s. This pattern is similar to the differential in the intensity of trade (Figure 2–1), implying that differential complementarity is largely responsible for difference in trade intensity.

5.2. The Changing Structure of Complementarity

Figure 5–2 shows the changing commodity structure in Australia's export trade with Korea and Korea's export trade with Australia. This figure aggregates the detailed contribution of each commodity presented in Appendix 5 into our familiar 6 commodity categories. Complementarity in Australian exports to Korea was derived predominantly from primary products, and in the reverse trade from manufactures. This reflects the fact that the trade is between natural resource rich and poor (labour scarce and abundant) countries.

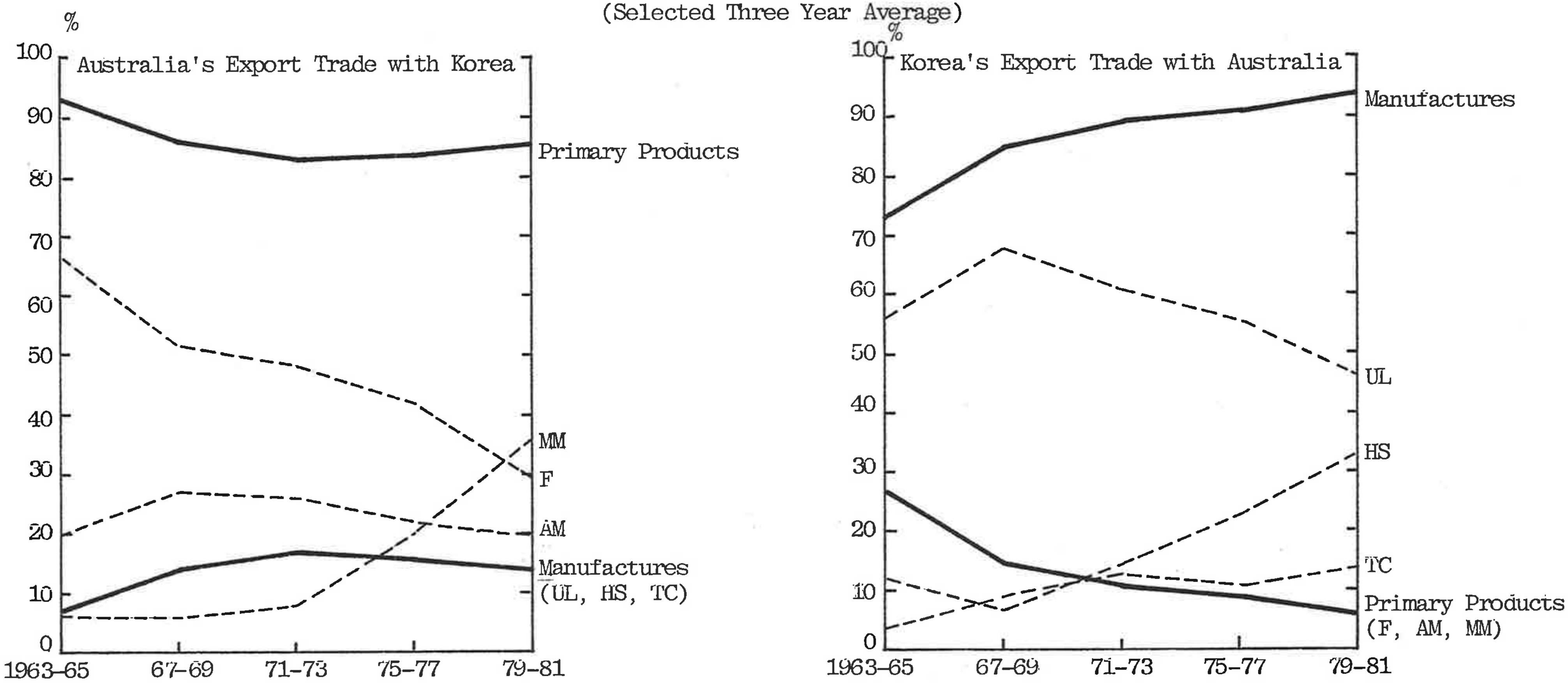
There were considerable changes in each trade flow. In Australian exports to Korea, mineral raw materials strongly emerged as Australia's major exportables to Korea in the 1970s, to replace the dominant position of foodstuffs by the end of the decade. On the other hand, in Korea's export trade with Australia, unskilled labour intensive manufactures played a leading but diminishing role, while human skill intensive manufactures became increasingly more important in Korean exports to Australia during the 1970s.

It is useful to turn to the changing pattern of Korean trade specialisation in order to understand the causes of the structural change in complementarity, since Australia's specialisation pattern was relatively unchanged over the period. Though any change in a country's domestic production and consumption pattern is revealed in changes in its

Figure 5-2

Structural Change in Trade Complementarity between Australia and Korea

(Selected Three Year Average)



Note: Broad categories are defined in Appendix 1, and the same as noted in Figure 4-1.
Source: Appendix 5.

trade pattern, this relationship is particularly strong in the Korean economy because Korean industrialisation initially depended on foreign trade.[2] In addition, there was a close interrelation between Korea's export and import patterns because industrial production processed imported materials for exports, while imports for domestic consumption were severely restricted.[3]

In considering causal relationships it seems likely that changes in complementarity in Australian export trade with Korea derived from foodstuffs are likely to be associated with changes in the Korean diet (and in agricultural protection policy), while changes in complementarity in Australian export trade with Korea derived from industrial raw materials, and complementarity in Korea's export trade with Australia (derived from manufactures) are closely related to the changing structure of Korean industrial production.

5.2.1. The Influence of Changes in Korean Diet

Foodstuffs played a dominant role in complementarity of Australian exports to Korea contributing two-thirds of overall complementarity in the early 1960s. Because of exports of foodstuffs alone, Australia could have held a share in Korean imports nearly as large as her share in world trade in the absence of resistances to trade. However, Korean imports

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[2] Though it is well known that the growth of the Korean economy was highly dependent on foreign trade, the important role played by foreign trade is re-emphasised when compared with the early growth of the Japanese economy. Between 1963 and 1975, the contribution of foreign trade to the growth of Korean industrial production was 59 per cent compared with contributions of trade to Japanese growth between 1914–54 of 22 per cent. See Song (1981) and Chenery, *et al* (1962).

[3] For example, import generation coefficients of domestic consumption are 11 in 1966, 13 in 1970, 19 in 1975, and 23 per cent in 1980. This compares with those of exports, 23, 26, 36, and 38 per cent respectively (Bank of Korea). At the same time, Kim (1980) estimated that the growth of exports accounted for 52 per cent of the growth of Korean imports between 1970 and 1975. This contribution rose further in later years because Korean exports shifted away from light industries where the import generation effect was relatively low (29 per cent in 1980), towards heavy and chemical industries with a much higher coefficient of 58 per cent.

of foodstuffs were tied to American aid, so resistances to imports from Australia were very high.

Since the early 1960s, however, complementarity induced by foodstuffs has sharply dropped in absolute as well as relative terms. This was the prime reason for the sharp decline in overall complementarity in Australian exports to Korea between 1962 and 1968. This decline was large enough to offset the considerable increase in complementarity derived from wool and metal products.

Australia's traditional export specialisation in foodstuffs became even stronger during the last two decades, while Korea's import specialisation increased slightly until the early 1970s. In this context, the sharp decline of complementarity attributable to foodstuffs is a puzzle. The puzzle remains even after accounting for the smaller share of foodstuffs in world trade.[4] The changed Korean diet due to increasing income provides the explanation. Korea's food consumption pattern has experienced huge changes away from barley towards rice within grain foods and, subsequently, away from grain foods (including rice) toward non-grain foods.

Table 5–1 presents the percentage change in per capita consumption of individual food categories and its ratio to the percentage change in per capita income in two periods. Growth in the consumption of non-grain foods has been much higher than that in grain foods. However, attention should also be given to the differential growth rate within grain foods in the earlier period because the consumption of non-grain food was extremely low in the base year and Korean imports were virtually non-existent except for sugar.

The consumption of rice rose twice as fast as that of other cereals in the earlier stage

[4] The lower share of foodstuffs in world trade was responsible for Australia's strengthened export specialisation in foodstuffs despite their lower relative importance in Australian exports. Despite the decline in importance of foodstuffs in Australian exports from 41 to 34 per cent between 1962 and 1981, Australian export specialisation in foodstuffs rose from 2.1 to 2.3 during the same period.

Table 5-1

The Changing Pattern of Korea's Food Consumption

	Percentage Change in Per Capita Consumption (%)		Ratio of Percentage Change in Consumption to that in Per Capita Income	
	1963 to 1973	1973 to 1979	1963 to 1973	1973 to 1979
Percentage change in per capita income	107.7	59.1	-	-
Grain food	22.8	-7.7	0.21	-0.13
Rice	27.7	5.4	0.26	0.09
Other cereals	14.8	-28.6	0.14	-0.48
Non-grain food	92.1	79.1	0.85	1.34
Fruits and vegetables	89.5	94.4	0.83	1.60
Meat and diary products	142.6	116.0	1.32	1.96
Fish	53.3	0.0	0.49	0.00
Sugar	500.0	116.7	4.64	1.97

Source: Anderson and Joo, (1984).

of income growth, despite a variety of administrative and price incentives encouraging other cereal consumption.[5] This resulted in a shift in imports of grain food towards rice. This income effect caused a shift of Korean imports away from Australian exports, since Australian exports were well established in wheat and barley but not yet developed in rice. For example, in the years 1963–65 complementarity was dominated by wheat, barley, and wheat flour, with their respective contributions of 52, 5, and 4 per cent to overall complementarity in Australian exports to Korea, but their respective contributions declined to 26, 4, and 1 per cent by the early 1970s. This further decreased by the end of the decade so that only wheat contributed to overall complementarity with its share of 12 per cent, while the contribution of rice rose from zero to 5 per cent during the same period.

As per capita income grew further, consumption patterns shifted away from grain food toward non-grain food in the 1970s. There was an absolute decrease in consumption of cereals, implying negative income elasticity of demand. This shift had a dual effect upon complementarity in Australian exports to Korea: a continuous decline in complementarity derived from cereal grain, and an increase drived from non-grain foods, especially meat.

The negative effect, however, overwhelmed the positive effect, because of increased agricultural protectionism in Korea to achieve agricultural diversification and greater self-sufficiency.[6] Agricultural diversification caused Korean imports to shift away from Australian exports because it was directed toward non-grain foods. As a result,

[5] Throughout the whole period, the Korean government encouraged the use of other cereals to lighten the burden of food imports on foreign exchange reserves, because the international price of other cereals was lower than that of rice, and because imports of other cereals were financed by aid-grants or preferential loans from the United States.

[6] The policy measures to achieve greater self-sufficiency in foods were adopted in two ways: price support schemes and productivity improvement. However, the limit of arable land constrains the productivity improvement so that the policy gradually came to depend on the price support schemes, resulting in increasing rate of protection. The rapid increase in protection for agricultural sector will be discussed in the following chapter. In addition, for the evaluation of Korea's price support schemes aiming at self-sufficiency in food grains, see Martin and McDonald (1986).

concentration on rice was replaced by increased production of fruit, vegetables, dairy products, and meat under increasing protection. However, the extension of livestock farming is handicapped by a shortage of grazing land, which resulted in rapid increases in imports of feeding-stuffs, mainly maize. This caused a shift of Korean food imports away from the Australian export structure, since Australian exports are specialised in beef and dairy products, but not in animal feeds.

5.2.2. The Influence of Korean Industrialisation

Korea's industrial structure was mirrored in her pattern of trade because of the high dependence of Korean industrial production upon foreign trade for input as well as output. Continuous changes in Korea's industrial structure were the main source of change in trade complementarity between Australia and Korea.

Apart from the dominance of cereal foods in Australian export trade with Korea, complementarity in both directions was extremely low in the early 1960s because of Korea's low industrial base. Westphal and Kim (1977) showed that the share of manufactures in Korean domestic production and exports in the early 1960s lagged far behind the expected norm for a country with the same size and characteristics. In the subsequent period, however, Korea's continuous industrial development gave a great impetus to bilateral trade with Australia.

Korea's industrialisation can be separated into two distinct stages. In the first stage when industrial strategy changed from "inward-looking" to "outward-looking" over the 1960s, industrial structure was concentrated on so-called "light industries". Now the main emphasis is given to so-called "heavy and chemical industries" which produce basic intermediate materials.[7]

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[7] For the purpose of studying industrial change in the process of economic development,

During the first stage of industrialisation Korean exports were concentrated on unskilled labour intensive final manufactures, mainly textile products, clothing, and wood products, while depending on imports for inputs — agricultural raw materials such as cotton, wool, and lumber, basic intermediate and capital goods.[8] Accordingly, Korea's continuous export specialisation in unskilled labour intensive final consumer goods caused continuous growth in complementarity between Korean export and Australian import structures. However, Korean imports began to move away from the Australian export structure during the first stage of industrialisation because Korea's import sources were increasingly concentrated on the advanced industrial countries for basic intermediate and capital goods. This resulted in a sharp increase in the relative importance of manufactures in complementarity even in Australia's exports to Korea until the early 1970s, as seen in Figure 5-2.

This development in the 1960s deserves detailed discussion. Although agricultural raw materials, mainly wool, became more important in Korean imports, this produced

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manufacturing industries are often categorised into broad groups based on criteria such as economic use of products, the degree of income elasticity of demand, factor intensity, and linkage effects. Studies of international trade, in general, use a classification based on factor intensity. But the terms "heavy and chemical industry" and "light industry" are preferred to comply with the statistics available for Korean industry. In many ways, light industries correspond to labour intensive industries, while heavy and chemical industries correspond to (physical and human) capital and technology intensive industries. The heavy and chemical industries have the following common characteristics: first, their products have a high income elasticity of demand; second, the industrial production has a greater degree of backward or (and) forward linkage effects; lastly, the production is undertaken in large scale plant offering economies of scale. For further detail, see Shinohara (1976) and Hoffmann (1958). Studies of Korean industrial restructuring use two approaches. One is the approach from the standpoint of changed factor endowments (from unskilled labour surplus to shortage). Articles concerned with this approach are Federation of Korean Industries (1979) and Fei and Ranis (1975). The other is the approach from the viewpoint of the demand-pull backward integration of industrial structure and Watanabe (1978) provides an example.

[8] In the first stage of Korean industrialisation, the foreign trade structure was often described as a typical "processing trade pattern" in the sense that export expansion (in final consumer goods) gave rise to a great increase in imports (of intermediate goods) with little contribution to the formation of domestic industrial development. See Japanese Institute of Developing Economies (1967) and Sumiya (1975).

little increase in complementarity with Australian exports. The post-war technological advances in the textile industry enabled a huge substitution of synthetic for natural fibres. As a late comer to textiles, Korean industry concentrated on synthetic fibres in advance of the world textile industry.[9] This caused imports to concentrate on synthetic fibres, such as polyester, nylon, and acrylic in the mid 1960s, and then intermediate materials for producing synthetic fibres domestically, such as ethylene glycol, caprolactum, acrylonitrile monomer, ethylene, and propylene. Accordingly, Korea's import specialisation in cotton steadily declined in the 1960s, though in wool it slightly rose.[10]

In the second stage of Korean industrialisation from the early 1970s, Korea put continuous emphases on import substitution and export of basic intermediates through the promotion of heavy and chemical industries. This caused Korean imports to concentrate on mineral raw materials. This led Korean imports to be reoriented towards Australia.

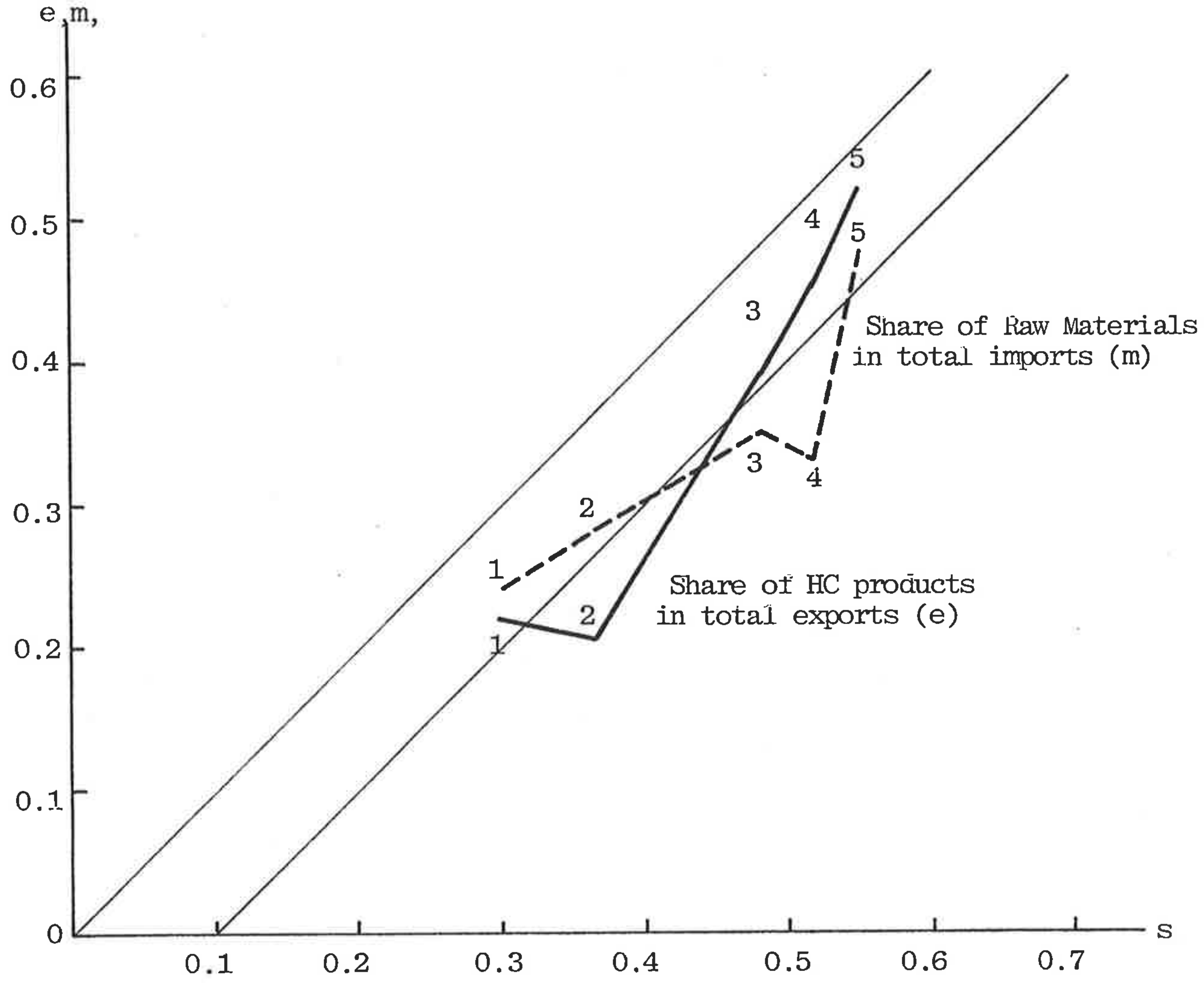
In the process of industrial restructuring towards heavy and chemical industries in the 1970s, there was an extremely rapid import substitution in basic intermediates and machinery and equipment. This import substitution was accompanied by export expansion with a very short time lag. Figure 5–3 illustrated the changing pattern of

[9] The proportion of synthetic fibre in world textile industries increased from 29 in 1965 to 44 per cent in 1975 (Textile Economic Bureau, *Textile Organon*), compared with a rise from 13 to 62 per cent in Korean textile industries during the same period, when the textile industry led Korean industrial growth and export expansion. By contrast, the production of wood products was solely dependent on imports of natural raw materials. On the difference in the coefficient of import generation effect of domestic production of per unit of final good between textiles and wood products, see footnote 14 of Chapter 4.

[10] In addition, the development of synthetic fibres also reduced the relative importance of natural fibres in world trade. For example, the share of wool in world trade, which was the only agricutural raw material and the second largest item next to wheat in Australian exportables to Korea until the earlier 1970s, dropped from 1.5 in 1963–65 to 0.6 per cent in 1971–73. Though the rapid growth of Korea's textile industries increased the importance of wool in relative and absolute terms in Australian exports to Korea, the increase was not significant when compared with the relative importance of wool in Australia's export to Japan in the mid–1950s, when textile industries led Japanese industrial growth (Drysdale, 1967). As we shall see in Chapter 10, as a result, wool alone accounted for around three-quarters of complementarity in Australia's export trade with Japan in the mid-1950s/early 1960s.

Figure 5-3

Development of Heavy and Chemical Industries and Transition in Trade of Korea, 1966-80



Note: s indicates the coefficient of heavy and chemical industrialization in production, defined as a share of heavy and chemical industries in the value added in manufacturing sector;

e, the share of heavy and chemical products in total exports; and

m, the share of raw materials and fuels in total imports.

1, 2, 3, 4, 5 indicate Year 1966, 1970, 1975, 1978 and 1980.

Source: Bank of Korea, Input-Output Tables of Korea, various issues.

Korean exports and imports in the process of industrial restructuring towards heavy and chemical industries. It presents the respective trends in the relative importance of heavy and chemical industries, defined as the share of these industries in domestic value added (s) and in manufactured exports (e) and the share of raw materials in total imports(m). The 45 degree line indicates the pattern of heavy and chemical industries when production and trade grew at the same rate. The figure demonstrates that the increasing proportion of heavy and chemical products in the Korean domestic production was accompanied by both an increasing proportion of heavy and chemical products in exports and an increasing proportion of raw (mineral) materials in imports during the period 1966–1980.[11]

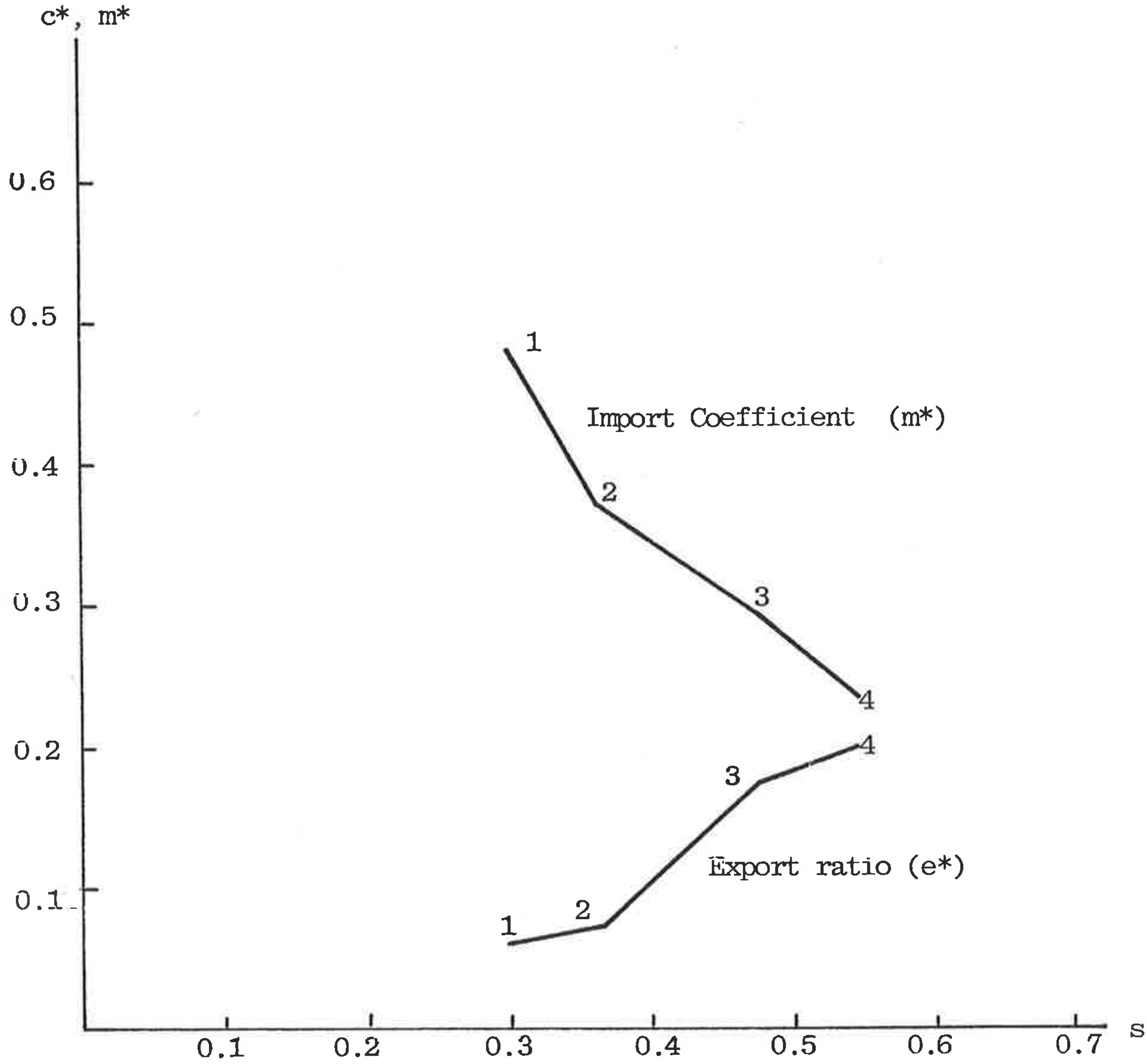
There is a notable feature of the trends in exports (e) and imports (m) between 1966 and 1970, which gives an insight into the differential turning point of trends in complementarity between Australia's export trade with Korea and Korea's export trade with Australia — year 1968 in the former and 1974 for the latter. The relative importance of raw materials in Korean imports started to rise at the end of 1960s, but that of heavy and chemical products in exports declined. This occurred because of the time lag between import substitution and export expansion in heavy and chemical industries.

Figure 5–4 shows that import substitution and export expansion in heavy and chemical products have simultaneously taken place after a short time lag between 1966 and 1970. The import coefficient (m^*) in Korean heavy and chemical industries, defined as the ratio of imports to total supply declined from 0.48 in 1966 to 0.24 in 1980, while the export ratio

[11] Watanabe (1978) noted that the shift from import substitution towards export expansion in Korea's heavy and chemical industries was distinguished from that of the earlier Japanese pattern, where heavy and chemical industrialisation in exports was nearly unchanged until the ratio of heavy and chemical industrialisation in production reached 50 per cent. Because of this distinction, Watanabe termed Korean heavy and chemical industrialisation as "time compression" between the stages of import substitution and export expansion, implying that the stage of import substitution was linked with the export expansion stage with very little time lag. On the relationship between the increasing importance of heavy and chemical products in Japanese production and trade, see Shinohara (1964).

Figure 5-4

Import Substitution and Export Expansion in Korea's Heavy and Chemical Products, 1966-1980



Note: Export ratio (e*) is a ratio of exports to total output.

Import coefficient (m*) is a ratio of imports to total supply.

1, 2, 3, 4 indicate year 1966, 1970, 1975 and 1980 respectively.

s is the same as defined in Figure 5-3.

Source: Bank of Korea, Input-Output Tables of Korea, various issues.

(e^*), defined as the ratio of exports to domestic output increased from 0.07 in 1966 to 0.19 in 1980. Consequently, the degree of self-sufficiency in the manufacturing sector increased from 76 in 1970 to 97 per cent in 1980, while that in raw materials drastically declined during the same period — from 50 to 14 per cent for mineral raw materials, from 79 to 64 per cent for industrial crops, and from 64 to 45 per cent in forestry products.[12] This caused the Korean import pattern to be redirected toward Australian exports which had already become strongly specialised in mineral raw materials. However, it did not bring about any increase in complementarity between Korean export and Australian import structures. Given that the Australian import structure was strongly specialised in manufactures, this asymmetric development can be explained only by looking at Korea's trade pattern by industry.

Table 5–2 presents the trade pattern by industry. Industries can be categorised into five groups according to the changing pattern of export ratio and import coefficient. In industries such as food processing, beverage and tobacco processing, pulp and paper, and coal processing, the export ratio and import coefficient are extremely low, and Korea had an obviously comparative disadvantage, but her high protection forced down actual imports, so that little trade took place (natural resource-based industries). Second, in industries such as clothing, textile, wood, rubber products, and miscellaneous manufactures, the export ratio was extremely high, but the import coefficient was low (unskilled labour intensive industries). Third, in industries such as chemicals and chemical products and general industrial machinery and equipment, the export ratio remained in the low range, but the import coefficient was in the highest range in spite of substantial decline (technology intensive products). Fourth, in primary metal manufacturing industries, the import coefficient significantly declined and simultaneously, the export ratio considerably increased. Finally, in industries such as electric and electronic equipment and apparatus,

[12] Source: Bank of Korea, *Input - Output Table*, 1980.

Table 5-2

Export Ratios and Import Coefficients by Industry
(Selected Years)

Code No.	Industries	Export Ratio 1970	Export Ratio 1975	Export Ratio 1980	Import Coefficient 1970	Import Coefficient 1975	Import Coefficient 1980
	Group 1						
10	Meat, dairy, food processing	.055	.105	.038	.063	.144	.097
11	Sea food processing	.514	.581	.226	.007	.020	.005
12	Polished grains	.000	.000	.000	(.018)	.000	.054
13	Flour and cereal preps.	.000	.000	.000	(.018)	.017	.011
14	Sugar	(.011)	(.111)	.269	(.185)	(.241)	.413
15	Bake, confect & noodles	(.011)	(.111)	.016	(.185)	(.241)	.001
16	Other food preparations	(.011)	(.111)	.036	(.185)	(.241)	.088
17	Beverages	.006	.027	.003	.007	.013	.025
18	Tobacco products	.001	.001	.003	.002	.000	.000
32*	Petroleum products	.092	.063	.014	.207	.104	.122
33*	Coal products	.000	.002	.004	.034	.060	.030
24	Pulp and paper	.024	.056	.085	.323	.302	.203
25	Printing & publishing	.013	.063	.016	.057	.030	.047
	Group 2						
19	Fiber yarn	.180	.162	.180	.092	.028	.051
20	Textile fabrics	.150	.308	.350	.216	.153	.077
21	Textile products(clothings)	.353	.524	.489	.011	.026	.018
22	Leather & leather products	.065	.441	.523	.049	.176	.161
23	Lumber & wood products	.423	.217	.279	.016	.006	.026
34*	Rubber products	.231	.534	.576	.039	.022	.029
35*	Non-metallic mineral prods.	.039	.133	.136	.067	.067	.053
45	Miscellaneous manufactures	.541	.582	.534	.047	.081	.078
	Group 3						
26*	Basic chemicals	.033	.067	.103	2.082	.846	.344
27*	Fertilizer & agri. chemicals	.053	.000	.292	.044	.552	.045
28*	Drugs & cosmetics	.011	.019	.025	.168	.097	.070
29*	Synthetic rubber & resins	(.032)	(.147)	.136	(.677)	(.195)	.163
30*	Chemical fibres	(.032)	(.147)	.030	(.677)	(.195)	.047
31*	Other chemical products	(.032)	.029	.054	(.677)	.534	.360
40*	Industrial machinery(non-elect.)	.033	.098	.107	3.497	2.352	.590
	Group 4						
36*	Iron & steel manufactures	.057	.123	.108	.885	.355	.220
37*	Primary iron & steel prods.	.041	.238	.304	.414	.348	.119
38*	Primary non-ferrous metals	.117	.062	.118	.603	.621	.334
39*	Fabricated metal products	.131	.291	.457	.656	.167	.125
	Group 5						
41*	Electric equips & appars.	(.227)	.118	.159	(.702)	.417	.271
42*	Electronics & commun. equip.	(.227)	.506	.438	(.702)	.468	.270
43*	Transport equipments.	.019	.197	.295	.646	.682	.343
44*	Measurements & precious mach.	.122	.520	.418	1.036	.882	.415

Note: Export ratio is a share of exports in domestic output, and import coefficient is a ratio of imports to domestic supply.
* indicates heavy and chemical industries.

Source: Bank of Korea, Input-Output Tables, various years.

transportation equipment, and other precious machinery, both export ratio and import coefficients were high.

Groups 4 and 5 are capital (human and physical) intensive industries, and produce commodities toward which Korea's export pattern has shifted. But there is an important distinction with respect to their factor intensity. The primary metal manufacturing industries (group 4) can be loosely identified as natural resource based industries, while group 5 industries use skilled labour intensively and their production processes can be easily decomposed into different sub-processes depending on different factor intensities.

The change in Korea's export structure was induced by absolute and relative increases in exports of these two industry groups. However, increased exports of metal products did not create any increase in complementarity to Australia's import structure,[13] because Australia has a strong comparative advantage in this group, based on abundantly endowed raw materials (see Bishay and Bishay, 1981), while the increase in Korean production and exports created a significant increase in import demand for raw minerals and hence in complementarity between Korean import and Australian export structures. On the other hand, in the instrument and equipment industries, Korean exports began from labour-intensive activities in the late 1960s, and have since upgraded to more sophisticated skill and technology-intensive activities to become a leading export sector by the 1970s.[14] These include electrical appliances (including television and radio, sewing machines, calculators and other office equipment), electrical machinery, power tools, machine tools and parts,

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[13] Note, however, that by year 1981-82 Korea became the third largest supplier of basic metal products to Australia, accounting for 6.6 per cent of Australian imports.

[14] Helleiner (1973) noted that intra-firm trade had been expanding at an extremely rapid rate in recent years and that the form of trade is highly concentrated on electric and electronic machinery. He raised divisibility of production processing with different factor intensities as the reason for this. Other studies (Suh, 1975; Westphal, *et al.*, 1981; Cohen, 1973; Helleiner, 1979) reveal that though intra-firm trade has constituted only a minor part of Korean exports, distinguished from the other developing countries, exports by foreign firms (wholly or partly foreign-owned subsidiaries or through "arm's length" contracts) made a dominant contribution to exports in electronic machinery.

motorcycles and bicycles and their parts, typewriters, cameras, optical equipment, watches, aircraft parts, telecommunications equipment, musical instruments, vehicles and parts, and ships. Australia's import specialisation was invariably strong and increasing in these commodities. Accordingly, export expansion in these commodities created a considerable increase in complementarity with the Australian import structure. However, this increase was not enough to make up the decline in complementarity derived from labour intensive manufactures. At the same time, expanded domestic production in these industries, pulled by export expansion, led to expansion in the production of metal products, and in turn, to the increase in import demand for mineral materials.

In addition, though Korean exports were diversifying from the unskilled labour intensive commodity group as a whole, there was considerable change within the group which added to the asymmetry of Australia–Korea trade in the late 1970s. In the case of textiles, whose relative importance in Korean exports declined in the late 1970s, increasing quantitative restrictions upon textile products in advanced countries led to Korean exporters raising quality through the production of high value items. For example, the EEC imposed specific number, weight, or area restrictive quotas on textile and clothing products, but did not specify the fibre content of those products (see Harrop, 1978; Carland, 1980). This strategy led to the recomposition of the natural-synthetic fibre mix. At the same time, there was substantial export expansion of leather products such as handbags, travel bags, sport goods, and footwear. These structural changes caused increases in the relative importance of imports of agricultural raw materials, such as cotton, wool, and hides and skins, without any corresponding increase in exports of those manufactures in relative terms. These structural changes also produced an increase in complementarity between Korean import and Australian export structures.

Finally, there was considerable influence on complementarity in Australia's export trade with Korea from oil shocks, although the spectacular growth of bilateral trade occurred without any direct contribution by petroleum, the share of which in world trade more than doubled in the 1970s. Coal became Australia's most important export item from the mid–1970s, helped by worldwide substitution of other energy sources for oil. Korea continued to concentrate on imports of steaming coal to substitute for oil. The importance of steaming coal as an alternative energy source and of coking coal as an input for metal processing induced a sharp growth of complementarity in Australian exports to Korea, so that coal became the most important Australian export to Korea in the late 1970s.

This discussion suggests that there is a strong causal relationship between structural change in Australia's export trade with Korea (A–K trade) and structural change in Korea's export trade with Australia (K–A trade). Complementarity derived from final consumer goods (unskilled labour intensive manufactures) in K–A trade induced complementarity derived from agricultural raw materials in A–K trade, and complementarity derived from heavy and chemical products (human skill and technology intensive manufactures) in K–A trade is responsible for complementarity derived from mineral raw materials in A–K trade.

The empirical relationships between changes in indexes of trade complementarity over the period 1962 to 1981 can be summarised as follows (t-values in parentheses):

$$\log {C_{AK}}^{AM} = 2.63 + \underset{(1.48)}{0.18} \log {C_{KA}}^{USM} \qquad \bar{R}^2 = .06, \tag{5.5}$$

$$\log {C_{AK}}^{MM} = 0.56 + \underset{(8.91)}{1.05} \log {C_{KA}}^{SM} \qquad \bar{R}^2 = .81, \tag{5.6}$$

where

$C_{AK}{}^{AM}$ = complementarity derived from agricultural raw materials in A–K trade,

$C_{KA}{}^{USM}$ = complementarity derived from unskilled labour intensive manufactures in K–A trade,

$C_{AK}{}^{MM}$ = complementarity derived from mineral raw materials in A–K trade,

$C_{KA}{}^{SM}$ = complementarity derived from human skill and technology intensive manufactures in K–A trade.

Equation 5.5 suggests that the growth of complementarity in K–A trade derived from unskilled labour intensive products (light industries) produced little corresponding increase in complementarity in A–K trade. The possible reasons for the poor performance have been discussed in the previous section. By contrast, the growth of complementarity in K–A trade derived from human skill and technology intensive manufactures (heavy and chemical industries) was associated with increase in complementarity in A–K trade derived from mineral raw materials. This is indicated by the highly significant regression estimate, as seen in equation 5.6.

More interest attaches to the value of the coefficients of the independent variable, which can be interpreted as elasticities. The value of the coefficient of 1.05, implying unitary elasticity, complies with the illustration of Figure 5–3, which showed that the increasing proportion of heavy and chemical industries in the Korean production was accompanied by an equiproportional increase in importance of heavy and chemical products in her export and by an equiproportional increase in importance of raw materials in her imports at the same speed. This confirms that Korea's industrial restructuring towards export-oriented heavy and chemical industries gave impetus to the reorientation of Korean import sources to Australia, and increased Australia's importance as a source of Korean imports of mineral raw materials.

5.3. An Illustration: the Effect of Korea's Iron and Steel Industry on Trade with Australia

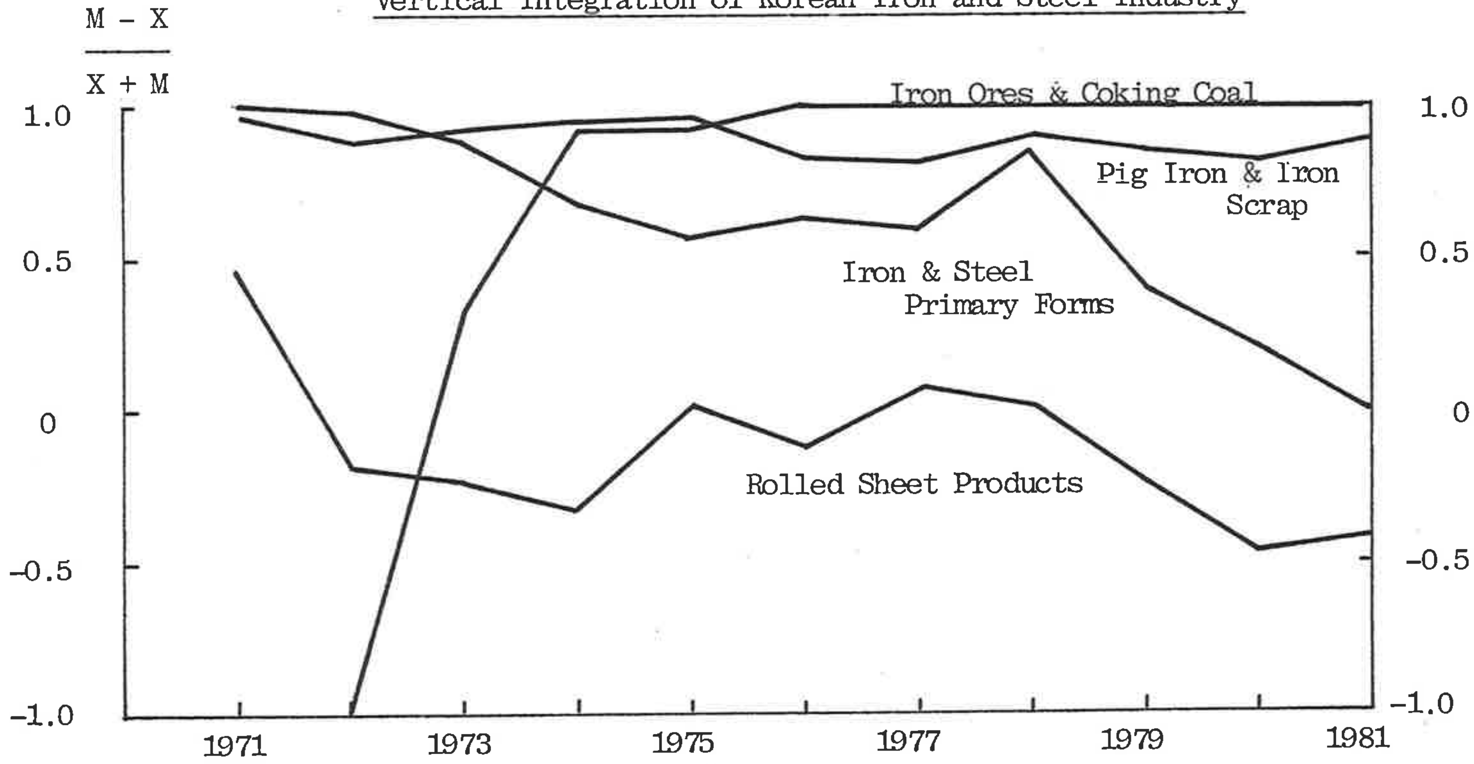
The previous section showed how changes in Korea's import and export patterns due to changes in her industrial structure, affected her bilateral trade relationships. Here, we turn to a case study, to show the way in which vertical integration of the iron and steel industry (see Kim, 1979; Song, 1978; Watanabe, 1978) induced a geographical reorientation of her trade towards Australia. The Korean iron and steel industry not only accounted for more than half the increase in complementarity in Australia's export trade with Korea, but Korean imports of raw materials are highly biased toward Australia.

The iron and steel industry may be divided into three basic processes (Yamazawa, 1972): (a), the iron-making processing whereby pig iron is produced, using iron ore and coking coal; (b), the steel-making process whereby iron and steel primary forms such as steel ingots, billets, slabs and hot coils are produced, using pig-iron and scrap iron (iron and steel primary forms); and (c), the rolling process, whereby a variety of steel products is produced, using iron and steel primary forms (rolled steel products). The development of Korean iron and steel industry typifies that of her industrialisation pattern which proceeded from the production of final goods to intermediate goods.

Figures 5–5 and 5–6 are presented to show that vertical integration of the Korean iron and steel industry was followed by geographical reorientation of Korean import sources toward Australia. Figure 5–5 illustrates an index of vertical integration, the ratio of net trade balance (M − X) to total trade volume (M + X) of raw materials (iron ore

Figure 5-5

Vertical Integration of Korean Iron and Steel Industry



Note: The index of vertical integration is defined as a net trade balance (M - X) to total trade volume (X + M) in each processing stage.

Source: Korean Iron and Steel Industries Association, Hankook Chulgang Tonggye Yonbo (Steel Statistics Yearbook) various years.

and coking coal) and three iron and steel products produced in each processing stage.[15] Korea's domestic production for import substitution directly led to export expansion so that Korea's industrial production is highly dependent on foreign trade, and this ratio is suitable for measuring vertical integration. The ratio takes a value of + 1 if Korea only imports a commodity without exports (because of zero domestic production), and − 1 if Korea only exports it without imports (because of zero domestic consumption or complete import substitution).

In the earlier stage of industrialisation in the 1960s, there was rapid growth of domestic demand for rolled steel products due to the remarkable growth in steel consuming industries such as construction, electrical and transport machinery (ship-building), and a variety of metal products. Most of the expanded demand for rolled steel products was initially met by imports, but this encouraged domestic production. The continuous expansion of domestic production in rolled steel products gradually replaced imports and increased exports, so that by 1972 Korea became a net exporter of rolled steel products.

In turn, growing domestic production of rolled steel products increased domestic demand for iron and steel primary forms which had been wholly supplied by imports. This growing demand stimulated domestic production of primary forms to replace imports, and exports began. Figure 5–5 shows that the ratio of net imports to total trade in iron and steel primary forms started to decline with a short time lag after the decline of the ratio in rolled steel products, and by 1981 Korean trade in the primary forms became balanced.

[15] This ratio is often used an indicator for changing international competitiveness (Watanabe, *et al*, 1982). Although it does not show the total value of exports and imports, its trends over time provide an useful indication of changes in a country's competitiveness in a particular commodity. In this study the ratio is used to show the vertical integration of Korea's iron and steel industry, by measuring the ratio for products in different processing stages. The ratio seems to be adequate for the purpose when considering that Korea's import substitution of products in a a processing stage and subsequent export expansion carried its import demand back to products of the next processing stage.

The increased import dependence on pig-iron and scrap iron because of further expansion of domestic production of iron and steel primary forms gave impetus to the construction of integrated steel mills for the production of pig iron. This in turn led to imports of raw materials such as iron ore and coking coal. The commencement of domestic production of pig iron in 1973 meant vertical integration of the iron and steel industry. This completely changed the Korean trade position from net exporter of iron ore (though small volume) to net importer, shown by the drastic transition from -1 to $+1$ in trade balance of iron ore (and coking coal). Thereafter, Korea gradually concentrated on exports of downstream steel products and on imports of raw materials, as her steel industry grew.[16]

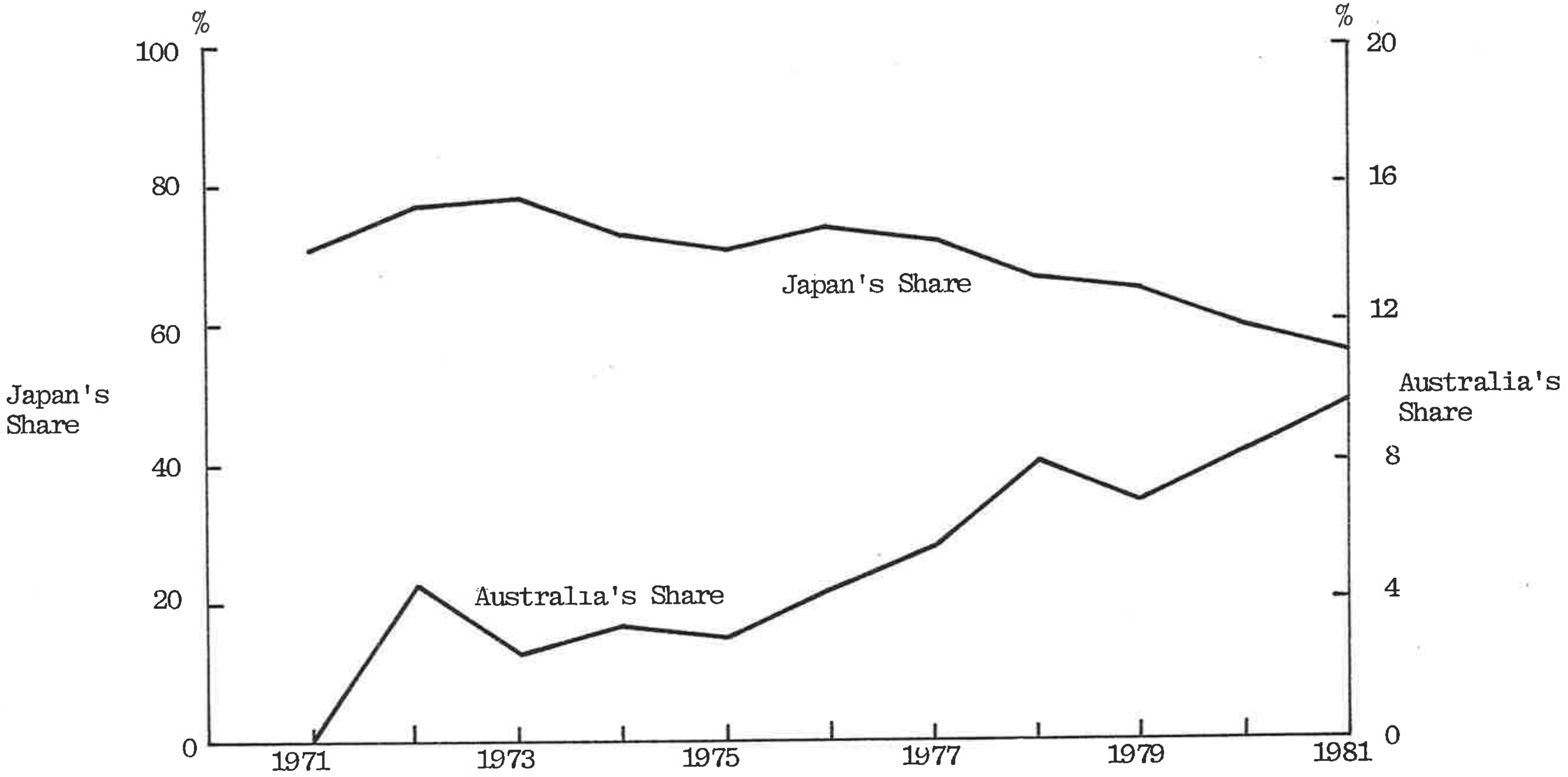
This discussion indicates several important features of the Korean iron and steel industry. First, the integration process occurred through a demand pull, backward mechanism between processing stages with a very short time lag in shifting from one stage to the next. Second, domestic production of each stage was immediately followed by exports, which meant an accelerated process of industry evolution: imports $\Longrightarrow$ domestic production $\Longrightarrow$ exports (Akamatsu, 1965). This backward process was accompanied by a transition in Korea's trade pattern: from iron ore to rolled steel products and primary forms in exports, and from rolled steel products and primary forms to pig iron and raw ore and coking coal in imports.

This vertical integration process in the Korean steel and iron industry caused its import pattern to shift from iron and steel products towards intermediate products (pig-iron) and raw materials. This shift induced a significant redirection of Korea's import sources, as seen in Figure 5–6. The Japanese share in imports of the Korean steel industry gradually declined in the process of Korea's backward integration, while the Australian

16 It is interesting to compare this development pattern in the Korean iron and steel industry with the long-range development pattern in Japan's iron and steel industry. One is struck by the much faster speed in Korea of the transfer from one processing stage to the next, and the transition from imports to import substitution to exports in each stage. For the case of Japan, see Yamazawa (1972).

Figure 5-6

Redirection of Import Sources in Korean Iron and Steel Industry



Source: Korean Iron and Steel Industries Association, Hankook Chulgang Tonggye Yonbo (Steel Statistics Yearbook) various years.

share increased. That is, the vertical integration of Korea's iron and steel industry resulted in increasing complementarity between her import structure and the export structure of raw material exporting country, Australia, and in decreasing complementarity between her import structure and the export structure of Japan.

It is useful to look also at the development pattern of the non-ferrous metal industry, because it traced a quite different pattern. As in the case of the iron and steel industry, Korea pursued a backward integration in non-ferrous metals, and constructed a complex of smelters and refineries on a large scale in response to the increase in domestic demand.[17] This backward integration had the same effect on the commodity composition and geographical distribution of Korean imports as in the steel and iron industry. A series of energy crises, however, led Korea to lose comparative advantage in non-ferrous metal processing. Because of rising energy costs, together with increasing costs associated with anti-pollution measures, Korea lost comparative advantage and adopted a more flexible policy with regard to off-shore processing at the site of raw material extraction, and imports of processed metals. This would have an important effect on the future development of Australia–Korea trade, different to the case of the steel industry.[18]

The difference between ferrous and non-ferrous processing can be seen in the changing pattern of complementarity in Australian exports to Korea, where complementarity derived

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[17] Consequently, the production of non-ferrous metals increased over the 1973–1978 period at annual rates of 25 for copper, 12 for lead, 34 for zinc, and 2 per cent for aluminium, resulting in sharp drop of import coefficients from 0.62 in 1975 to 0.33 in 1980 for non-ferrous metals, as seen in Table 5–2. Source: Korean Development Bank, (1980).

[18] This induced changes in Korea's industrial strategy, which excluded non-ferrous metal industries from the priority industry list (Korean Ministry of Commerce and Industry, 1979). This is reflected in decline in effective protection rates for non-ferrous metal processing between 1978 and 1982: from 145 to 33 per cent for aluminium, from 24 to 19 per cent for copper, from 257 to 69 per cent for zinc, and from 52 to 47 per cent for other non-ferrous metals (KDI, 1982). This policy change coincided with Australia's increasing concern with the potential of large export-oriented raw material processing projects (see Crawford Report, 1979). This coincidence led to the establishment of the Australia–Korea Joint Committee for Mineral Resources Development (AKSCMRD) and Australia–Korea Joint Study Group on Raw Materials Processing (AKSGRMP).

from iron ore has replaced that derived from steel products, while complementarity derived from non-ferrous metals is still more important than that from non-ferrous ores. As we shall see in Chapter 10, the concentration ratio on raw ores in Korean imports of non-ferrous metal industries from Australia sharply declined from 57 to 46 per cent in the latter 1970s after the continuous increase. This contrasts with the growth in the ratio of the ferrous industry from 70 to 75 per cent.

5.4. Summary

This chapter reveals distinctive developments in complementarity in Australia–Korea bilateral trade: rapid growth in both directions which was associated with a huge change in Korea's trade structure, but a typically asymmetric development. In order to explain the reasons for these changes, discussion has focussed on dynamic change in Korea's industrial structure . An attempt was made to identify statistically the causal relationship between the two trade flows. The Korean iron and steel industry was used as a case study to understand how Korean industrial integration led to a reorientation of her trade relationship through changes in the commodity composition of her trade.

In the early stages, Korean industrialisation was highly weighted toward light industries. Korea's concentration on exports of textile and wood products produced a rapid increase in complementarity with the structure of Australian imports, but it caused the structure of Korean imports to move away from that of Australia's exports, partly due to Korea's concentration on synthetic textile fibres and partly due to growing importance of processed intermediate imports. At the same time, the huge change in Korean diet induced a sharp decline of complementarity derived from cereal grains other than rice which had dominated Australian exportables to Korea in the early 1960s. Accordingly, overall complementarity in Australian export trade with Korea experienced considerable decline during the 1960s.

Then, during the 1970s, Korea's industrial restructuring toward heavy and chemical industries reoriented Korea's import structure toward that of Australia's exports, so that complementarity between them increased sharply. Korea's continuous industrial upgrading carried her import structure from intermediate materials back to raw materials, mainly minerals, and consequently, caused a redirection of her import sources toward mineral rich Australia. However, the change in her export pattern produced little increase in complementarity with Australia's import structure, because Australian exports were already well established in metal products which Korea was beginning to export. This asymmetric development is the primary reason for greater divergence in complementarity between the two way trade in the late 1970s.

CHAPTER 6

EFFECTS OF TRADE POLICY ON COMPLEMENTARITY

It was noted in the preceding chapter that complementarity in bilateral trade between Australia and Korea has significantly risen over the last two decades. The growth of complementarity and its structural change originated from changes in each country's comparative advantage structure, which shifted so as to intensify trade between the two countries. As seen in Chapter 3, however, the degree and structure of complementarity is also significantly influenced by trade policies through their influence on the trade specialisation pattern.

In general, a country's protection tends to be given where competitiveness is weak. This implies that a country's protection pattern affects most adversely trade with countries whose factor endowments are most complementary to its own. It is quite conceivable, then, that complementarity in bilateral trade between Australia and Korea, which has significantly increased along with high complementarity in factor endowments, would have been affected most adversely by the two countries' protectionist trade policy. This chapter is primarily concerned with the effect of protectionism on complementarity.

The first section discusses the structure of Korea's protection and its influence on her trade specialisation pattern. It reveals that Korea's agricultural protectionism forced down complementarity derived from agricultural foodstuffs in Australian export trade with Korea, not only because of reduced import specialisation in foodstuffs as a whole, but also because protection rates tended to be higher on foodstuffs in which Australian export specialisation is well established. Then Australian protection and its influence on her trade specialisation pattern is examined. This reveals that complementarity in Australian imports from Korea was reduced by protection of the Australian manufacturing sector as a whole, but especially by high protection for manufactures in which Korean export specialisation is strong.

6.1. Effects of Korean Protection on Complementarity in Imports from Australia

6.1.1. The Structure of Korean Protection

Korean exports have always been promoted by a variety of incentives and emphasis has been put on the development of new exports. Imports for domestic consumption were always severely restricted with the exception of food grains in the 1960s, while raw materials, capital equipment, and intermediate inputs for export production were encouraged. As domestic production replaced imports of intermediate inputs and capital equipment, these commodities too came under import restriction, while for those commodities in which Korea came to have international competitiveness, protection has been reduced. Accordingly, the Korean structure of protection was biased toward manufacturing sector until the latter 1960s, but shifted toward increasingly higher protection for the agricultural sector thereafter. In addition, the degree of escalation in the tariff system increased through time (see Frank, *et al*, 1975; Westphal and Kim, 1977; Krueger, 1979; Hong, 1979; Nam, 1981; Korea Development Institute, 1982).

The main instrument of protection was quantitative import restrictions. Generally, the items in each commodity group to be restricted were determined on the basis of import needs, the balance-of-payments situation, and the protection requirements of domestic industries.[1] Though the number of commodities automatically approved for

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[1] Government administers quantitative restrictions by designating "automatically approved", "prohibited", and "restricted" commodities in a trade program that continues to be revised every

import gradually increased along with import liberalisation attempts over the period, these commodities largely fell into imports of raw materials and non-competitive intermediate inputs, whereas most import-competing items and non-essential or luxury goods have been subject to quantitative restriction.

Table 6–1 presents the structure of protection in Korea, showing the tariff, nominal protection, and effective protection rates. The table confirms the well known fact that nominal tariffs are usually not a good index of protection. During the period 1968 to 1982, the weighted average of legal tariffs declined from 49 to 6 per cent, but the nominal rates of protection, measuring the percentage excess of the domestic price over the world price, rose from 14 to 32 per cent over the same period. Indeed, tariff protection is, to a large extent, inoperative in Korea.[2] At the same time, the estimated effective rates of protection (using the Corden method), measuring the proportion by which value added has been raised, increased from 9 to 38 per cent during the period. Thus, attention is focused on the nominal and effective protection rates.

The table shows two distinct characteristics of Korean protection. Import policy was primarily designed to allow the import of cheap raw materials and intermediate inputs

six months. In 1967, together with import liberalisation attempts, the system switched from the so-called "positive" list system, under which only those commodities listed could be imported, to the "negative" list system, under which all commodities not listed were automatically approved for import. The rate of import liberalisation (ratio of automatically approved items to total number of items) steadily declined from 60 in 1967 to 49 per cent by 1975, when Korea introduced new industries through import substitution while promoting exports in traditional final goods. Thereafter, the liberalisation rate gradually increased to 69 per cent in 1981 and further to 77 per cent in 1982 (Korean Development Institute, 1982). The rate of import liberalisation by industry as of the mid-1982 is as follows: 76 per cent in agricultural, forestry, and fishing (CCCN 8-digit item number 443), 94 in mining and energy (168), and 77 in manufacturing (6913). The manufacturing sector includes: 50 per cent in processed food (475), 24 beverage and tobacco (54), 99 construction materials (131), 85 intermediate products I (758), 92 intermediate products II (2506), 73 nondurable consumer goods (1479), 57 consumer durables (313), 62 machinery (985), and 41 transport equipment (212).

[2] Legislatively established tariff rates played only a secondary role in Korea's trade policy because of the wide range of administrative discretion to set up actual tariff rates. For the detailed discussion, see Westphal and Kim (1977).

Table 6-1

The Structure of Korea's Protection

(%)

	Legal Tariff Rates			Nominal Protection Rate			Effective Protection Rate		
	1968	1978	1982	1968	1978	1982	1968	1978	1982
Agriculture, fishing, forestry	36.0	7.4	6.8	17.0	43.4	66.3	17.9	57.1	70.6
Mining and energy	9.6	0.3	0.1	8.9	0.5	0.3	3.5	-1.3	-1.5
Primary sector	34.1	3.5	2.3	16.5	39.6	60.5	17.1	49.1	62.9
Processed food	56.7	16.9	7.2	2.9	16.8	19.8	-14.2	-30.0	-33.8
Beverages and tobacco	135.4	88.0	67.6	2.2	14.8	12.2	-15.5	23.1	10.8
Construction materials	30.5	22.2	25.9	3.9	7.0	26.3	-8.8	8.5	33.5
Intermediate products I	31.0	6.6	4.3	2.8	11.1	14.6	-18.8	25.5	39.7
Intermediate productsII	53.4	10.7	8.7	21.0	13.8	19.2	17.4	13.3	24.3
Non-durable consumer goods	67.9	19.9	17.9	11.7	28.7	21.3	-8.0	42.2	28.1
Durable consumer goods	78.4	6.1	4.2	38.5	54.7	26.1	39.8	119.4	36.0
Machinery	49.1	18.7	14.3	29.9	24.6	22.6	29.5	29.5	21.5
Transport equipment	61.8	19.1	7.0	54.9	48.6	33.0	83.2	108.8	60.4
Manufacturing sector	58.8	13.9	9.1	12.2	19.1	19.4	-1.1	20.6	18.5
All Industries	49.4	10.9	6.2	14.0	25.2	31.7	9.0	34.1	38.4

Note: 1. The legal tariff rate refers to the compound tariff rate made up of the regular plus special tariff rates(after 1973, the flexible tariff system), and hence it includes tariff exemption.
2. The nominal rate of protection is the price difference between the domestic and world markets, expressed as a percentage of the latter.
3. The effective rate of protection is estimated using the Corden method.

Sources: Westphal and Kim, (1977); Nam, (1981); and Korea Development Institute, (1982).

for industrial growth to foster the process of industrial deepening. It was also tempered to the changing pattern of industrial production. In 1968, when Korean industrialisation was concentrated on final consumer goods using foreign intermediate inputs and capital goods, nominal protection was lowest for the intermediate products and highest for the final goods. At the same time, nominal protection of agricultural products was starting to rise. Hence, nominal protection in manufacturing showed a moderately escalating trend from lower to higher processing activities. This pattern of nominal protection gave rise to a high inter-industry disparity in effective protection: effective protection for intermediate products was actually negative due to moderately high nominal protection for industries producing raw materials.

As Korea's industrial structure reoriented itself toward import substitution (and subsequently export promotion) of intermediate products from the early 1970s, the protection structure changed. By 1978 nominal protection on mineral and agricultural raw materials had been virtually reduced to zero as protection for intermediate products rose drastically and that on final goods further increased. These changes produced a typical structure of escalation in Korean protection by 1978. The escalating structure of nominal protection also created a typical escalation in effective protection with a much wider inter-industry disparity. The lessened nominal protection for raw materials and increased protection for intermediate products gave rise to a sharp increase in the effective rate for domestic production of intermediate inputs. The only exception was lowered nominal protection for machinery and capital equipment.[3]

Since 1978, the level of Korean effective protection, at least in the manufacturing

[3] Note that imports of domestically unavailable machinery and equipment are encouraged through the exemption from, or reduction of, tariffs, while imports of domestically produced machinery and equipment are quantitatively restricted. As seen in footnote 1, the import liberalisation rate is lowest for machinery, apart from processed food and beverage and tobacco. A number of machines were additionally designated as import restrictive items, as import substitution proceeded.

sector, has declined. As a consequence of deepened industrialisation, protection on consumer goods was lowered considerably, while on intermediate products it increased. As a result, inter-industry disparity in protection declined considerably. However, apart from the lower protection for non-durable consumer goods, the escalating feature of Korean protection became clearer by 1982. For example, in the case of iron and steel products, the 1982 nominal protection rates were zero for iron ore, 5 for pig iron, 15 for hot coil and steel ingots and frames, 25 for steel sheets, bars, and wires, and 50 per cent for metal products. The effective protection rates were −3, 0, 19, 43, and 46 per cent respectively (KDI, 1982).

The second important feature is that protection for the agricultural sector increased rapidly in the 1970s. Nominal and effective protection rates rose from 17 in 1968, to 43 in 1978, and to 66 per cent in 1982, and from 18, to 57, and to 71 per cent. The increase was due to increased protection for foodstuffs. According to Anderson (1981b, 1986), the nominal protection coefficient (ratio of domestic to border prices) for foodstuffs as a whole (the average for grains and livestock products weighted by domestic production value at border prices) has changed from − 14 (1955–59), to − 5 (1960–64), 10 (1965–69), 58 (1970–74), 133 (1975–79), and to 169 per cent (1980–84). During the decade to 1980–84, the protection rate nearly tripled. Notably this increase was associated with the greater variation in protection rates across individual foodstuffs. For example, in 1982 nominal rates range from 14 on barley to 160 per cent on rice, while effective protection ranges from 15 on barley to 270 per cent on beef cattle in 1982 (KDI, 1982).

As a consequence of accelerated agricultural protectionism, the extent of disparity between the primary and manufactured sectors has become greater in recent years. In 1982, the average rate of nominal and effective protection for agriculture was more than three times as high as that for manufacturing. This increased agricultural protection led to an increase in protection on tradable goods as a whole during the period 1978 to 1982.

It also led to negative effective protection for processed food whose imports have been quantitatively restricted.

6.1.2. The Influence of Protection on Trade Specialisation

The pure theory of international trade implies that a country does not simultaneously export and import the same goods. If international transaction costs are assumed away, tradables can be neatly divided into two groups, exportables whose pretrade domestic price is below the world price and importables whose pretrade domestic price is above the world price.

However, in practice trade statistics show simultaneous export and import of the same commodity group. Even apart from the effect of aggregating differentiated commodities into one commodity group, one reason for this phenomenon is that the geographical dimension can lead to the export of a particular commodity from some regions, but to the import of the same commodity into other regions of a country, while a country may export a particular commodity in one season, but import the same commodity in another season (Grubel and Lloyd, 1975).

It is quite conceivable, however, that in the absence of trade intervention, there is an inversely symmetric relationship between a country's export and import specialisation patterns. This is because the greater a country's comparative advantage in a particular commodity group, the higher is likely to be the ratio of the value of exports to the value of imports in that commodity group. Thus, a hypothesis for estimating influence of policy on trade pattern is that any deviation from this inverse symmetry indicates the extent to which trade intervention has influenced its specialisation pattern. The hypothesis will be tested to ascertain the influence of Korean and Australian (inter-industry disparity of) protection on each country's trade specialisation.[4] It should be kept in mind that policy distortion of trade specialisation pattern results from inter-industry disparities in the degree of protection, as discussed in Chapter 3.

There are two practical difficulties with this test: the existence of non-traded goods; and the influence of intra-industry trade which causes both export and import specialisation to be high. First, some goods are neither exported nor imported, and this varies with individual countries, depending on per capita income and international transaction costs. In order to take account of this, those commodities are excluded as non-traded goods. This exclusion presents a difficulty. When protection is prohibitively high, the exclusion of that commodity underestimates the influence of policy intervention. This is not a problem for Australian trade because Australian trade takes place in all commodities except maize, fuel woods, silk, and electric energy at the three-digit Standard International Trade Classification (SITC) level. By contrast, some problem is involved with testing Korea trade pattern. Korean non-tradables have sharply declined as Korea's per capita income has increased, and most commodities which began to be traded since the early 1960s are raw materials and technology intensive manufactures. However, goods still not traded include a number of commodities, mainly foodstuffs such as coffee, cocoa, chocolate, alcoholic beverages, butter, and cheese, imports of which have remained virtually prohibited.[5] This requires caution in interpreting results for Korean trade.

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[4] In a broad sense, trade policy is necessarily related, in important measure, to general economic policies including those directly bearing on the domestic structure and competitive efficiency of domestic production and on the income and consumption pattern. Thus, all government economic policy has directly or indirectly some effect on trade specialisation pattern (see Crawford, 1968). Hence, this inverse symmetry will be distorted by trade policy in the broad sense as well as in the narrow sense that trade policy is defined as government policy which attempts to encourage or restrict the trade flow directly.

[5] Number of commodity groups are 179, excluding mail (SITC 911), special transactions (931), and animal pets (941). This was divided into five commodity categories: foodstuffs with 41 commodity groups, raw materials with 42, labour intensive manufactures with 26, human skill intensive manufactures with 43, and technology intensive manufactures with 27 (see Appendix 1). In case of Australian trade, numbers of non-traded goods are 13 in 1963–65, 4 in 1971–73, and 6

The second difficulty is related to the magnitude of intra-industry trade which has increased substantially in recent years. Intra-industry trade is fundamentally a consequence of product differentiation, so that it is particularly prevalent in trade in technology intensive commodities (Grubel and Lloyd, 1975). It causes a country to export and import the same commodity. However, our test is not invalidated by this phenomenon,[6] and the influence will be reflected in the correlation coefficients. In addition, the previous chapter revealed that Australian and Korean trade is mainly inter-industry rather than intra-industry trade..

Both Spearman rank and Pearson products-moment correlation analyses were used for estimating the influence of protection on trade specialisation patterns. However, the latter is influenced by the degree of trade concentration. In our estimates there is a strong tendency for greater divergence between the results of the two methods, the higher the concentration of trade specialisation on a few commodities.[7] Hence, the following discussion focuses on the results of rank correlation analysis.

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in 1979–81. In 1979–81 they comprise 2 foodstuffs and 4 raw materials. By comparison, Korea's non-traded goods declined from 28 in 1963–65 to 14 in 1979–81. In 1979–81 they comprise 9 foodstuffs, 4 raw materials, and 1 labour intensive manufactures.

6 It should be noted that when using the specialisation indexes (formula 3.5) which is the "relative share" of a commodity k in a country's exports (imports) compared with k's share in world trade, it is unlikely that the influence of intra-industry trade is as much as when using a simple commodity composition of the country's trade. This is because intra-industry trade in commodity k increases not only both exports and imports of the country in k, but also world trade in the commodity.

7 In general, the coefficient of correlation is lower in the Pearson method than in rank correlation, but they differ little in statistical significance. However, for Korean trade specialisation in the period 1963 to 1965, the coefficient of Pearson correlation is not significant at all despite significance in rank correlation. In that period, Korean trade specialised in few commodities, so each had an extremely high trade specialisation index value. For example, the export specialisation indexes were: 102 for silk, 28 for veneer and plywood, 17 for raw fish, 10 for crude vegetable materials, while import specialisation indexes were: 36 for flour of non-wheat cereals, 17 for manufactured fertilisers, 10 for barley, 7 for waste textile fabrics, and 6 for raw wood and cotton respectively. As a result, the simple mean of Korea's export specialisation indexes was 1.83 but standard deviation was 10.61, and those of import specialisation indexes were 1.30 and 3.45 respectively. This high concentration distorted the results of Pearson correlation, but not those of rank correlation.

Table 6-2

Correlation between Export and Import Specialisation Patterns of Korean Trade

			1963-65	1971-73	1979-81
All comodities			-.357***	-.274***	-.248***
	Primary products		-.368***	-.406***	-.331***
		Foodstuffs	-.411**	-.403**	-.088
		Raw materials	-.327**	-.458***	-.507***
	Manufactures		-.350***	-.256***	-.233***
		Unskilled labour	-.065	-.031	-.351***
		Human skill	-.317***	-.266***	-.064
		Technology	.445**	.305*	.200

Note: *** indicates significance at the 1 percent level, and ** at the 5 percent level, and * at the 10 percent level.

Source: Appendix 4.

The results for Korean trade specialisation are presented in Table 6–2. Considering the different degree of protection between primary and manufacturing sectors, between foodstuffs and raw materials within primary products, and between commodity groups within the manufacturing sector, actual estimates are undertaken for five commodity categories.

For all commodities as a group, Korea's trade pattern shows an inverse symmetry, as indicated by the negative sign attached to each coefficient. Similar tendencies are seen for the two broad catagories, primary and manufactured products, except for higher significance in primary than in manufactured products. It is interesting that the value and significance of the coefficients appear to decrease over time, though they are significant at the one percent level. This declining inverse symmetry indicates that Korean trade pattern has been increasingly affected by policy distortions. This finding seems to give support to an argument (Edwards, 1980) that in the process of Korean industrialisation, market interventions were increasingly numerous, complex and significant, through a variety of export incentive and import restriction schemes.

The results for the five commodity subgroups also show several important features of Korea's trade specialisation pattern with regard to policy intervention. First, note that the coefficient for foodstuffs is high with significance at the five percent level until the early 1970s, but not at the end of 1970s. This confirms Andersons's estimate (1981) that Korea shifted from providing negative to positive protection for foodstuffs around the end of 1960s. This is further emphasised when one consider that 9 items out of 41 foodstuffs are excluded from the analysis as non-traded goods, and most of them are still subject to prohibitive import restrictions.

Second, the coefficients for raw materials are significant throughout the whole period, and the inverse symmetry increased over time. This indicates that trade in raw materials was subjected to increasingly fewer restrictions. From the two results, it appears that the declining inverse symmetry in Korea's trade specialisation in primary products is attributable to foodstuffs.

Other interesting features can be seen with respect to trade in manufactures. It should be kept in mind that Korea's industrialisation strategy and structure of protection changed in the early 1970s. Until the early 1970s, the coefficient for unskilled labour intensive manufactures are not significant but by the end of 1970s it became significant at the five percent level. Conversely, the coefficient for human skill intensive manufactures (which include a number of intermediate inputs) showed high statistical significance until the early 1970s, and became insignificant by the end of the decade. This confirms that in the first stage of Korea's industrialisation, unskilled labour intensive manufactures were assisted for exports under import restriction, while imports of intermediate inputs were subjected to freer import. However, as the industrial structure reoriented toward import substitution (and export promotion) in intermediate goods in the 1970s, and Korea became competitive in unskilled labour intensive products, trade policy was restructured in favour of production of intermediate inputs. Hence, Korean trade policy significantly distorted trade patterns in unskilled labour intensive products until the early 1970s, but thereafter distorted trade in human skill intensive manufactures.

Finally, it also is of interest that the coefficient for technology intensive manufactures has the opposite sign to our hypothesis, with high statistical significance, until the early 1970s. This means that the higher the Korean export specialisation in a commodity group, the higher is her import specialisation in that commodity group. This is a consequence of two contradictory aspects of Korean trade. On the one hand, in the earlier stage of Korean industrialisation, little trade was undertaken in a number of technology intensive commodities, especially consumer durables. On the other hand, Korea's exports in technological intensive products began from the labour intensive activities or the processing of electrical and electronic equipment, resulting in high intra-industry trade in those commodity groups. However, as Korean imports diversified, and Korean exports upgraded to more sophisticated activities or processing, trade in the technology intensive manufactures gradually came under selective policy intervention.

This analysis confirmed that the Korean trade pattern with the exception of raw materials was significantly distorted by policy intervention, depending on the stage of Korea's industrialisation. Currently, foodstuffs and human skill and technology intensive commodities are the major items subject to trade policy intervention.

6.1.3. Effects on Complementarity in Imports from Australia

The following discussion considers the effect of Korean protection on complementarity in her imports from Australia. Since more than 90 per cent of overall complementarity in Australian export trade with Korea was contributed by primary products, attention is given to the detailed structure of protection within the primary sector and its effects on complementarity. Korea's protection structure discriminated in favour of imports of raw materials and against imports of foodstuffs, this increased complementarity in raw materials, while it forced down complementarity in foodstuffs.[8]

A simple correlation analysis is attempted between the structure of Korean protection and Australian export specialisation in 30 primary products (16 foodstuffs and 14 raw materials), based on estimates available for Korea's effective protection rates for individual

[8] It is quite conceivable that complementarity in Korea's exports to Australia is also influenced by Korean policy, since the Korean government gave significant and complicated incentives for export promotion discriminately across industries so as to restructure exports. However, focus is put on the influence on import patterns. Standard deviations were calculated to compare intra-industry disparities between export subsidies and import protection in Korea at the level of classification into 11 industry groups. The standard deviation in export incentive rates for exports is only 3.6 per cent compared with that in import protection of 40.5 per cent in the year 1978 (in 1968, 9.5 and 30.7 per cent respectively).

commodities. Although one cannot claim any causal relationship between the two structures, our supposition is that negative correlation (a higher value of Australian export specialisation associated with a lower protection rate) would create higher complementarity than would be the case if protection is uniform or non-existent, whilst positive correlation would reduce complementarity because of protection. Data on Korean rates of protection and Australian export specialisation indexes are listed in Table 6–3. The protection rates used are the effective protection rate to take account of its effects on domestic production, since protection influences import patterns through its effect on domestic production and consumption patterns. Commodities are divided into two groups, foodstuffs and industrial raw materials, because Korean protection aimed to restrict imports of foodstuffs, while imports of raw materials were encouraged.

For foodstuffs, the results are not significant in 1968, but the degree of correspondence between the effective rates of Korean protection and the Australian export specialisation proved surprisingly high in 1978 and 1982. The coefficients of the Spearmen rank correlation are + .48 (significant at the five percent level) in 1978 and + .45 (significant at the 6 percent level) in 1982, while those of the Pearson moment product correlation are + .37 and + .32 respectively, which are significant at the 10 percent level. These results are consistent with increased Korean protection on foodstuffs resulting in diversion of Korean imports away from Australia. Both correlation analyses also indicate that in 1978 and 1982 the Korean protection rate tended to be higher on foodstuffs in which Australian export specialisation is strong. This suggests that Korea's high agricultural protectionism not only prevented the growth of complementarity in Australian export of foodstuffs as a whole, but the structure within foodstuffs also contributed to reducing complementarity lower than would have been the case if protection were uniform even within foodstuffs.[9]

[9] Typically, the rapid expansion of the livestock industry under high protection shifts the relative importance of imports from meat and dairy products in which Australian export specialisation is strong, to feed grains in which Australian export specialisation is weak. Tyers

Table 6-3

Relationship between Korea's Protection Rates and Australia's Export Specialisation in Primary Commodities

Item	SITC Code	Effective Rates of Korean Protection (%)			Index of Australian Export Specialisation (Three Year Averages)	
		1968	1978	1982	1967-69	1979-81
Foodstuffs						
Live animal	001	-0.8	99.7	96.1	0.384	3.780
Meat	011- 013	-3.6	28.7	-1.1	5.674	8.296
Dairy products	02	22.7	13.3	-12.3	3.234	1.999
Fish	031	-3.8	-0.5	0.1	1.777	2.032
Processed fish	032	-5.8	-4.2	-12.0	0.333	0.635
Barley and wheat	041, 043	66.5	38.3	30.3	8.071	10.477
Rice	042	14.5	103.5	208.6	0.892	2.646
Other cereals	044, 045	-0.7	113.6	193.0	0.589	0.878
Flour and other milled grain	046-048	-12.6	-25.8	-26.2	3.597	2.604
Fruit	051, 052	-11.9	30.1	28.6	1.332	1.113
Vegetables	054	138.4	52.7	43.1	0.228	0.263
Processed fruit and vegetables	053, 055	-19.6	-17.2	-44.8	2.534	0.980
Sugar, raw and refined[1]	061, 062	-15.0	33.4	66.1	3.683	6.617
Beverage and tobacco	1	-15.5	23.1	10.8	0.190	0.249
Animal and vegetable oils and fats	411, 42	(77.4)	41.1	43.6	0.651	0.066
Processed oils	431	(77.4)	3.4	6.2	0.325	0.597
Industrial materials						
Hides and skins	211, 212	-12.1	-11.1	-11.4	4.519	5.672
Crude rubber[1]	231	36.7	16.7	16.1	0.020	0.029
Wood	24	4.4	-0.8	-0.7	0.072	0.090
Pulp	251	-8.1	-1.1	20.5	0.011	0.188
Fiber crops	26(ex 262, 266)	22.1	21.8	-1.7	0.101	1.142
Wool (worked,worsted)	262	13.5	-0.0	-5.2	27.682	30.013
Coal	321	4.4	-2.0	-1.5	4.176	11.495
Iron ore	281,282	-0.9	-2.9	-2.8	4.664	11.274
Non ferrous ores	283-286	-4.8	-5.0	-2.9	3.399	4.990
Non-metal ores	271-6	-4.7	0.9	-0.1	0.168	0.909
Pig iron	671	28.4	49.9	0.3	0.985	1.369
Steel ingots	672, 673	-12.2	37.7	18.3	1.091	0.926
Copper	682	35.3	23.6	19.1	0.726	1.618
Other non-ferrous metal	68(ex 682)	61.2	128.4	43.4	1.765	2.533

Note: 1. Korea does not produce raw sugar and natural crude rubber. Hence, the protection is directed for refined sugar production and synthetic rubber.
2. Indexes of Australia's export specialisation in each item is the weighted average of indexes in individual SITC 3-digit commodities, presented in Appendix 3.

Sources: Westphal and Kim (1976) and Korea Development Institute (1982)

Conversely, within raw materials, the degree of correlation is moderate, but the sign is negative in 1978, while it is not significant in 1968. In 1978 the coefficient of rank correlation is $-.34$ and that of the Pearson correlation is $-.27$, both with significance at the 10 percent level. In 1982 coefficients further increased with negative sign. The coefficient of rank correlation is $-.52$ (significant at the two percent level) and that of the Pearson correlation is $-.38$ with significance at the 8 percent level. The results show that Korean protection to encourage raw materials as a whole not only contributed to increased complementarity between Australian export and Korean import patterns, but Korean protection within the broad group also tended to be lower on materials in which Australian export specialisation was well established. Although Korea's import promotion of raw materials may have lowered complementarity in metal products (Anderson and Smith, 1981), this share analysis does not provide precise estimates of this.[10]

The statistical results were further supported by examining the relative contribution of individual sources determining complementarity in Australian exports to Korea.[11] Though

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and Anderson (1986), using partial equilibrium methods, estimated that free agricultural trade would have caused livestock product consumption, especially beef and milk (dairy products), to be markedly greater (consequently, a rise in imports of meat) and consumption of feed grain to be substantially lower (consequently, less imports) in Korea.

[10] The relationship between changes in Korean protection and in Australian specialisation patterns was examined, but no statistically significant results were obtained. The reason is likely to lie in the fact that Korean agricultural protectionism rose in response to increasing import demand, so that her import specialisation always remained in the lower range, while in imports of raw materials, import policy played a secondary role next to the underlying change in Korean industrial structure.

[11] The sources of increase in complementarity are derived from the formula (3.5):

$$C_{ij} = \sum_k \left(\frac{V_{..k}}{V_{...}} \times S_{i.k} \times S_{.jk}\right)$$

When $\frac{V_{..k}}{V_{...}}$ is put as s^k,

$$\triangle C_{ij} = \triangle s^k + \triangle S_{i.k} + \triangle S_{.jk} + \text{interaction among them.}$$

Thus, the contribution of each component is the hypothetical change in complementarity due to the change in the pattern if the other two patterns had remained constant.

changes in Korean import specialisation are not solely affected by import restrictions, imports of foodstuffs are especially influenced by trade policy. Complementarity in Australian exports to Korea due to foodstuffs declined by 26 per cent during the period 1967-69 to 1979-81. Korea's lower import specialisation accounted for 118 per cent of the decline, while the reduced share of foodstuffs in world trade accounted for 115 per cent. Conversely, Australia's export specialisation would have produced growth of 159 per cent, but for the adverse influence of Korean imports and world trade. This compares with complementarity in raw materials, which rose by 94 per cent. The increases in Korean import and Australian export specialisation in raw materials accounted for 131 and 59 per cent respectively, whereas the trend in world trade accounted for – 58 per cent.

Any restriction of imports of raw materials would have little effect on trade flows in raw materials because substitution between raw materials is highly limited in production and consumption. Conversely, foodstuffs have a wide range for substitution in production and consumption, so protection could have far greater influence on the pattern of trade in foodstuffs.[12] The distinct nature of the two commodity groups is important for assessing the effect of Korean protection on overall complementarity in imports from Australia, and leads us to conclude that Korean protection reduced the extent of increase in complementarity in Australian exports to Korea. It also played an important role in changing the structure of complementarity, decreasing the relative importance of foodstuffs, and increasing the relative importance of raw materials, especially minerals.

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12 The effect of protection is in particular significant in agricultural products because agricultural production uses similar processes and competes for the same resources between alternative activities within the sector. This contrasts with mineral production which is entirely dependent upon the natural endowment of a particular material, though it competes for labour and capital with other sectors. This difference is reflected in a very different attitude of most countries to trade policy which tends to provide high protection for agricultural products and free trade for raw minerals.

6.2. Effects of Australian Protection on Complementarity in Imports from Korea

6.2.1 The Structure of Australian Protection

The structure of Australian protection basically reflects her abundant natural resources and scarce labour. Australian protection is heavily in favour of manufacturing industries, while protection on the whole range of agricultural products and minerals is generally low or negative. The only exception is high levels of assistance on a few agricultural commodity groups.[13] At the same time, almost all the complementarity in Korea's export trade with Australia was contributed by manufactures. Hence, attention is given solely to protection for the manufacturing sector.

Protection for manufacturing industries in Australia is largely provided by tariffs and quantitative import restrictions. Tariffs have been the major form of protection since 1960, when import licencing was abandoned, but there has been increasing reliance on import licences and tariff quotas since 1974, though on selective commodity groups. Furthermore, the Australian tariff system was complicated through the by-law system and various preferential tariffs.

Table 6–4 presents the structure of Australian nominal and effective assistance rates. Reflecting a 25 per cent across-the-board cut in all Australian tariffs and some subsequent

[13] Australian protection in the agricultural sector is given through a variety of measures including those which influence product prices, such as price support and underwriting schemes; those which reduce input costs, such as fertilizer assistance, tractor bounty, fuel price subsidies, and concessional credit; and those which directly affect income, such as the current income tax averaging arrangements. Hence, protection rates for particular industries tend to fluctuate greatly year by year. During the 1970s, the general level of assistance to the agricultural sector fell. The average affective rate of protection has fallen from 24 in 1970/71 to 2 per cent in 1979/80. Agricultural products under exceptionally high protection in the late 1970s include dairy products (only market milk), tobacco, and poultry for eggs with effective rate of more than 100 per cent, citrus with more than 60 per cent, wine grapes and rice with more than 20 per cent. Source: Australian Industries Assistance Commission, *Annual Report*, various years.

Table 6-4

The Structure of Australia's Protection

(%)

	Nominal Assistance Rate			Effective Assistance Rate		
	1968/69	1979/80	1982/83	1968/69	1979/80	1982/83
Food, beverages, and tobacco	14	7	6	16	10	8
Textiles	25	26	25	43	52	54
Clothing and footwear	53	64	81	97	142	204
Wood and wood products	22	13	10	26	18	13
Paper and paper products	29	16	16	52	26	30
Chemical products	21	7	8	31	19	13
Non-metallic mineral products	12	4	4	15	5	5
Basic metal products	14	6	6	31	12	14
Fabricated metal products	38	21	20	61	32	34
Transport equipment	34	30	45	50	57	79
Other machinery and equipment	34	17	17	43	20	22
Miscellanious manufactures	30	20	21	34	26	27
All manufactures	24	15	16	36	23	26

Source: Industries Assistance Commission, Annual Reports, various years.

additional tariff cuts, both rates of protection had been significantly reduced during the period 1968/69 to 1977/78 but thereafter, had a slight upward trend. The most important development in Australian protection was increased inter-industry disparities in protection.

The increased disparities lie in the fact that a relatively small group of industries received substantial increase in protection. These large increases in protection overshadowed the small changes in protection on many other industries, both positive and negative, and consequently, led to a slightly upward trend after the late 1970s. The largest increases in protection were in those industries which have been the principal recipients of quota-protection, namely textiles, clothing and footwear, and motor vehicles and parts.[14]

There were several important features of the Australian structure of protection with respect to the influence upon her import specialisation pattern. First, protection was generally high to extremely high on labour-intensive manufactures. High discrimination in favour of labour-intensive manufactures tends to lead Australian protection to discriminate against its imports from developing countries, despite provision of preferences for them.[15] Secondly, as a reflection of her abundant natural resources, protection on natural resource-based manufacturing such as processed foods and basic metal products is low. Thirdly, protection on finished consumer goods like motor vehicles, fabricated metal products and electrical appliances, is relatively high, while trade policy strongly favours the import of

[14] During 1973/74 and 1981/82, effective rates of protection rose sharply from 35 to 54 per cent for textiles, from 64 to 204 per cent for clothing and footwear, and from 38 to 124 per cent for motor vehicles and parts, contrasting with the gradual decline from 23 to 14 per cent in the average rate for other industries. The sharp increase was solely due to additional assistance provided by quantitative restrictions. See, Australian Industries Assistance Commission, *Annual Report*, 1981-82, Table A 1.6.2.

[15] Warr and Lloyd (1982) examined the discriminatory effect of Australian trade policy. Australian protection discriminated in two ways: "direct discrimination" because of Australian preference schemes; and "indirect discrimination" because of inter-commodity differences in the rate of protection. According to their estimation of the discrimination index, in 1968/69 the index number was 0.567 for developing countries compared with 1.065 for developed countries, but by 1977/78, the relative discrimination rose to 1.138 for developing countries, contrasting with the decline to 0.967 for developed countries.

industrial materials and capital equipment. Consequently, escalation is well established in the Australian protection system.

6.2.2. The Influence of Protection on Trade Specialisation

The influence of Australia's protection on her trade specialisation pattern is estimated in the same way as was done for Korea. Results are presented in Table 6–5. In comparing the Australian results with those for Korea, two points are noteworthy. For all commodities as a group, the significance of the coefficients is high and it increases over time. This indicates that Australian trade is less distorted during the 1970s. Another important feature is that the degree and significance of the coefficients in individual commodity categories and their changes contrast with those for Korean trade. The results confirm that Australia's trade in primary products has taken place under a nearly free trade regime, whilst manufactures have been subjected to high protection. Throughout the whole period, the coefficients of correlation in primary products as a whole, and in each category of foodstuffs and raw materials, are surprisingly high, with negative sign.

Within the manufacturing sector, in the case of the unskilled labour intensive products, the coefficient became moderately significant (in 1971-73, at the 14 per cent level) until the early 1970s, but then worsened to became insignificant again. These statistical results reflect the trends in Australian protection on the unskilled labour intensive manufactures over the 1970s. For the human skill intensive manufactures, the coefficient was not significant until 1971–73, but became significant at the one percent level with negative sign. This confirms that the series of tariff reductions in the 1970s are reflected in Australian trade specialisation patterns and that liberalisation was mainly concentrated on intermediate inputs.

A perverse result is associated with trade patterns in technology intensive products.

Table 6-5

Correlation between Export and Import Specialisation Patterns of Australian Trade

			1963-65	1971-73	1979-81
All comodity			-.376***	-.415***	-.474***
	Primary products		-.644***	-.591***	-.563***
		Foodstuffs	-.649***	-.623***	-.611***
		Raw materials	-.568***	-.588***	-.522***
	Manufactures		.041	-.020	-.098
		Unskilled labour	-.137	-.181	-.038
		Human skill	-.110	-.065	-.354***
		Technology	.544***	.455***	.559***

Note: *** indicates significance at the 1 percent level, and ** at the 5 percent level, and * at the 10 percent level.

Source: Appendix 3.

The coefficients are high throughout the whole period, with statistical significance at the one percent level, but with opposite sign to the one expected. Considering the relatively low protection for these commodities, these perverse results are unlikely to be a consequence of high policy intervention, but rather a symptom of intra-industry trade in this commodity category. Australia's exports are relatively strong in those commodities, such as inorganic elements and oxides, medical and pharmaceutical products, explosives and pyrotechnic products, agricultural machinery and implements, machinery and appliances and their parts, equipment for distributing electricity, photographic and cinematographic supplies, and developed cinematographic films. Though Australian import specialisation is strong in almost all technology intensive commodities, it is particularly strong in those products. This analysis seems to reveal that there is a strong tendency for Australia's comparative advantage to be relatively strong in technology intensive manufactures, where intra-trade is rather common, but the overwhelmingly stronger advantage in natural resources forced down export perfomance in this category.

6.2.3. Effects on Complementarity in Imports from Korea

Given Korea's strong export specialisation in a number of labour-intensive manufactures, Australia's highly weighted protection against imports of those goods, in general, forced down complementarity in her imports from Korea below the level that would exist if protection were uniform or non-existent. This adverse effect was magnified by high inter-industry disparities in protection.

To ascertain the effect of Australian protection upon Korea's export trade with Australia, a similar correlation analysis to that in the previous section was attempted between the structure of Australian protection and Korean export specialisation pattern in 33 manufactured commodity groups. Again, no causal relationship can be claimed between Australian protection rates and Korean export specialisation indexes for individual commodity groups as listed in Table 6–6.

The degree of correspondence between the effective rate of Australian protection and Korean export specialisation pattern proved surprisingly high in 1978/79. Though the coefficient of rank correlation is moderately high at + .31, which is significant at the five percent level, that of the Pearson moment product correlation is + .71 with significance at the one percent confidence level. The coefficients declined slightly by 1982/83. The coefficient of rank correlation is + .25 (significant at the 8 percent level), and the coefficient of Pearson correlation is + .70 with significance at the one percent level. The reason for the better performance of the latter seems to lie in the high concentration on the same commodity group in both observations. The results make it clear that the Australian protection rate tended to be higher on manufactures in which Korean export specialisation is strong.

A similar analysis was applied to correspondence between changes in protection for individual commodity groups relative to the average change in the manufacturing sector as a whole and the changes in Korean export specialisation pattern during the period 1967–69 and 1979–81. The coefficients of correlation are statistically significant: the coefficient of rank correlation is – .32 with significance at the five percent level; and that of the Pearson correlation is – .20 with significance at the 10 percent level. Of special importance is the negative sign, implying that Australian protection structure discriminated less against imports from Korea in the later years. This result is compatible with that of an analysis using a general equilibrium model which ascertained that Australia's discrimination against Korean exports fell over the 1970s.[16] Given decreasing protection for all but unskilled

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[16] This is consistent with the finding of an earlier study using the ORANI 77 short-run 109 commodity general equilibrium model of the Australian economy. The index number of discrimination of Australian protection was highest against Korea at 1.897 in 1968/69, but by 1977/78, had considerably declined to 1.337. This compared with 1.363 (in the later year, 1.562)

Table 6-6

Relationship between Australia's Protection Rates and Korea's Export Specialisation in Manufactures

ASIC Code	SITC Code	Effective Rates of Australian Protection (%)			Index of Korean Export Specialisation (Three Year Averages)	
		1968/69	1978/79	1982/83	1967-69	1979-81
231-2	651-4	45	75	74	2.959	4.863
233	655-57	30	24	30	2.824	2.231
241-2	84	93	148	225	13.480	8.540
243	851	53	121	250	3.804	7.455
251	631-33	19	13	10	22.655	4.736
252	821	52	31	21	0.405	0.377
261	641-2	54	23	20	0.096	0.504
262	892	46	35	29	0.117	0.205
271	266,512-4, 561	34	17	17	0.249	0.758
272	53, 55, 541, 571,599	42	21	11	0.053	0.155
273	332	-9	0	0	0.050	0.085
274	521	26	9	25	0.167	0.563
281	664-5	12	6	4	0.213	0.500
282	666	36	11	5	0.133	3.077
283	661-3	6	1	0	0.623	2.571
284	667	28	12	15	0.009	0.075
2911	671-2	0	14	15	0.063	2.682
291(ex 2911)	673-9	37	18	20	0.134	2.080
292-3	68	21	10	2	0.138	0.207
311	691	81	33	24	0.036	2.400
312	692	85	46	43	0.231	0.385
313	693-8	61	24	21	0.944	2.293
321	731	55	79	108	0.028	0.104
322	732-5	64	13	10	0.199	2.490
331	861-3	15	5	8	0.162	0.419
332(ex 3326)	724,725,729	57	31	32	0.978	2.254
3326	722,723,726	38	8	12	0.644	0.667
333	711-19	38	18	17	0.105	0.198
3411	611,613	46	19	33	0.028	0.179
3412	612	93	48	32	0.750	3.600
342	621,629	50	36	29	0.853	3.815
343	893,581	24	21	24	0.234	0.629
344	864,891, 894-9 812,831	47	29	24	3.752	2.580

Note: Indexes of Korea's export specialisation in each item are the weighted average of the indexes in individual SITC 3-digit commodity groups, presented in Appendix 4.

Source: Australian Industries Assistance Commission, Assistance to Manufacturing Intustries, 1977/78 to 1982-83, 1985 and Annual Report, various years.

labour intensive manufactures, the lower discrimination is a consequence of the gradual transformation of Korean export specialisation away from labour intensive manufactures.

From these results, it is clear that the structure of Australian protection resulted in discriminating against imports from Korea and consequently forced down complementarity between Korean export and Australian import structures. It also played a rôle in changing the structure of complementarity toward more sophisticated manufactures, so that the influence of Australian protection on Australian import complementarity with Korea lessened over time.

These results are also confirmed by the relative importance of each source in complementarity in Korean export trade. During the period 1967–69 to 1979–81, complementarity derived from manufactures increased by 60 per cent. The most important contribution to the increase was made by the changing Korean export pattern with a contribution of 89 per cent of the growth, while the pattern of world trade affected it slightly adversely.[17] The change in Australian import specialisation pattern also contributed to the growth with a contribution of 46 per cent. This implies that despite the rapidly increased protection in labour-intensive products, Australia's imports have been increasingly concentrated on those products.

6.3. Summary

This chapter reveals that the degree and structure of complementarity in bilateral trade between Australia and Korea has been influenced substantially by protectionist

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for Japan, 1.269 (1.002) for U.K., 1.753(1.699) for the newly industrialising countries as a whole, 1.852 (2.434) for Taiwan, and 0.050 (0.477) for ASEAN countries. I am grateful to Dr. P. J. Warr for these unpublished results from a study which is reported in more general terms in Warr and Lloyd (1982).

[17] The main reason was the decline in the share of textiles and clothing and footwear in world trade from 9.3 in 1965 to 5.8 per cent in 1980. The rapidly increased protection in advanced countries is likely to be partly responsible for the decline.

import barriers. Korea's high agricultural protectionism (which increased during the 1970s) not only deterred complementarity in foodstuffs from further increasing, but reduced the relative importance of foodstuffs in Australia's exports to Korea. On the other hand, Australia's protection discriminated against imports of labour-intensive products and discouraged an increase in complementarity in Korea's export trade to Australia. Our analyses show that Korean protection in foodstuffs tended to be higher on foods in which Australian export is strong, while protection in Australian manufactures is higher on those commodities where Korean export is well established. A general implication of this analysis is that protection tends to lead not only to a reduction in total trade but also to the diversion of trade away from those countries which have the most complementary trade pattern to the country applying protection.

CHAPTER 7

THE CHANGING PATTERN OF COUNTRY BIAS IN AUSTRALIA'S AND KOREA'S TRADE RELATIONSHIPS

Chapters 4–6 explained the pattern of complementarity in two-way trade flows between Australia and Korea. Their global trade was developed complementary to each other so that the trade potential between them intensified over the past two decades. However, increasing complementarity is only one condition for an intensifying trade relationship. Declining trade resistances in Australia–Korea trade relative to that in their alternative bilateral trade is the other main factor contributing to the intensifying trade relationship.

The present and following chapters are concerned with the growth in country bias in Australia–Korea trade. This chapter explains the changing pattern of country bias in Australian and Korean trade relationships. This corresponds to Chapter 4, which dealt with the changing pattern of complementarity in both countries' trade relationships. Changes in country bias in Australia–Korea bilateral trade, which will be discussed in the following chapter, are an offspring of interaction of the changing pattern of country bias in both countries' various trade relationships.

Section 1 discusses the numerous factors which impede (or induce) trade flows between countries. In section 2 trade resistances are measured in relative terms and introduced into a model explaining the pattern of country bias. Section 3 reports and discusses the empirical estimates of country bias in Australian and Korean trading relationships.

7.1. Trade Resistances as Determinants of Country Bias

Trade resistances (or trade inducements) reduce and may even nullify comparative advantage as reflected in production cost comparisons, so that they cause a divergence of bilateral trade from that expected from trade complementarity. As defined in Chapter 3, country bias measures this divergence. However, it should be reemphasised that country bias is not simply determined by the existence of trade resistances, but by the differential degree of trade resistances among alternative trading routes causing trade diversion.

In Chapter 2 trade resistances were divided into two categories: those which are uniform across all trade flows (or the average or normal level of trade resistances across trade flows); and those which differ between bilateral trade flows (or a deviate from the average level of trade flow). Uniform resistances influence the level and pattern of a country's global trade and the degree and structure of complementarity, while non-uniform resistances influence the level and pattern of bilateral trade through trade diversion among alternative foreign sources (markets). Non-uniform trade resistances determine country bias in trade, given the assumption that the level and commodity composition of a country's total trade is independent of those of individual bilateral trade flows.

A great variety of tangible and intangible forces might be mentioned as determinants of country bias. Earlier studies (Drysdale, 1967; Linnemann, 1966) categorise these into two groups: natural resistances, which are associated with geographical location; and artificial resistances, which are initiated by public or private decisions.[1] An attempt will be made to quantify these two broad types of resistances.

[1] Garnaut (1972) distinguished two types of resistance from the standpoint of individual traders: objective resistances such as transport costs and policy constraints, which an individual firm can overcome only at some cost; and subjective resistances, which derive from imperfect information available to individual traders, and affect decision-making on the value, commodity composition, and source (market) of trade. However, this study adopts the traditional classification because subjective resistances are more or less products of objective resistances, and they also require costs if they are to be overcome.

7.1.1. Natural Trade Resistances

The most obvious natural trade resistance is the cost of transportation. Other things being equal, the greater the cost of transportation between two countries, the smaller the trade flow. This causes favorable country bias in trade with partners on low transportation cost trade routes.[2]

Transport costs are complex and their magnitude is different for different types of commodities. Garnaut (1972) identified three components of transport cost: freight charges; organization costs; and delay costs in the form of inventory costs and lost opportunities arising from lack of shipping availability. While freight costs and, to a lesser degree, delay costs, are likely to depend on distance, organization and delay costs tend to depend upon shipping facilities, such as frequency of travel and accessibility to ocean freight markets (tankers and bulk carriers, liners, and tramps). In turn, these shipping facilities are related to the volume of inward and outward cargo, to opportunities for creating backhauls by combining shipments in a particular trading route with shipments in third trading routes, to the capacity of ports, to the commodity composition of trade, and to the institution through which decisions on shipping are made.

This suggests that transport costs in a given trading route are highly influenced by opportunities to combine trade with other trading routes. The presence of such opportunities is particularly important for trading routes where the volume of trade is too small on its own to support regular and frequent shipping services. The importance of this factor indicates that delay and organization costs are also influenced by distance.

As noted in Chapter 2, empirical studies have introduced two types of proxies for transport costs: geographical distance and the differential between c.i.f. and f.o.b. prices.

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[2] Greater trade flow in the low cost route is the product not only of trade diversion, but also of trade creation. In the latter case, complementarity between two countries will be increased because lower transport costs increase the number of goods between countries.

However, there is a clear difference between the two proxies. Geographical distance stands for the broader natural resistances to trade, including both transport costs and other psychological effects distance may have, while the differential between c.i.f. and f.o.b. prices stands solely for transport costs.[3]

This study prefers to use distance as a proxy for natural resistances on two grounds. First, the difference between c.i.f. and f.o.b. prices has problems associated with it. In principle, the difference between c.i.f. and f.o.b. trade values represents the costs of freight and insurance, and it would appear a relatively simple task to obtain transport costs from them. Nonetheless, there is a serious problem associated with using a c.i.f./f.o.b. trade value comparison. One problem is that price differences based on trade data can only be applied to commodities actually traded, but not to commodities which are not traded due to transportation costs. Thus, differences in prices may not accurately estimate the effect of transportation costs.[4]

Second, and more importantly, transport costs are only one of the natural resistances arising from geographical distance. Natural resistances other than transport costs have not been explicitly incorporated into earlier studies because of their intangible nature.[5]

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[3] Geraci and Prewo (1977, p. 72) noted this point. They raise doubt about the use of mere distance as a proxy for transport costs, but they conclude that *the use of distance may result in a serious underestimate of the sensitivity of bilateral trade flows to transport costs.* However, it should be noted that their estimation was restricted to trade flows among OECD countries, so that in trade among them, resistances other than transport costs associated with geographical distance can be regarded as having trade-stimulating effects. On the other hand, Beckerman (1956) and Balassa (1961) utilized c.i.f. and f.o.b. price data for an ordinal comparison of economic distance including psychological effects.

[4] Drysdale (1967, p. 230) raised two other serious problems associated with comparison between c.i.f. and f.o.b. trade values for transport costs. First, goods priced f.o.b. at the point of origin are different from goods priced c.i.f. at the point of destination in any given period, since it takes time to transport merchandise. Second, goods are not classified according to the same formula, especially in manufactures. In addition, acknowledging that the difference between f.o.b. and c.i.f. values is a highly inaccurate measure of transport costs, Geraci and Prewo (1977) use an errors-in-variable approach when including this difference in their empirical model.

[5] Wolf and Weinschrott (1973) introduced a dummy variable representing language affinity between a pair of trading countries. However, this also does not represent resistances other than

However, distance should be interpreted as an indicator not only of transport costs but also of general costs of overcoming "psychic distance" (economic horizon), which is important in creating trade between countries. Nearer location provides better business opportunities due to greater familiarity with institutions, laws, habits, and language of the partner country, greater similarity in the way of life and thinking and in preference patterns, and other trade-stimulating factors.[6] Thus, the use of distance as a proxy for transport costs alone gives undue weight to the effect of transport costs on trade flows.

Both transport costs and psychic distance are closely related to geographic distance between two trade partners. Therefore, this study measures the natural resistances to trade between any pair of countries by the geographical distance between the two. It is important to realise that the distance variable has a dual effect on resistances: it creates transport costs and various psychological impediments to trade.

7.1.2. Artificial Trade Resistances

While natural resistances are associated with geographical location and are therefore constant over time, artificial trade resistances are created, maintained, and removed by government and private action. However, it is difficult to derive "systematic" differences (across trading routes) in trade policy to explain variations in country bias and incorporate them into the present analysis as measurable explanatory variables.[7] This contrasts with

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transport costs associated with distance.

[6] The analogous effect may be found in the common cultural and historical background through a permanent settlement abroad of part of the population regardless of distance. This is the case for trade among certain member countries of the British Commonwealth such as the U.K., Canada, Australia, and New Zealand (and to a lesser degree South Africa) or for the overseas Chinese communities, etc. On the importance of Chinese overseas communities on economic activities, see Wells (1978, p. 47).

[7] It is assumed that there are no systematic differences (discrimination) in trade policy in favour of or against a trading partner in the postwar world trade system under the GATT, because, in principle, GATT does not allow the existence, except in very particular circumstances, of systematically discriminatory trade policies. Hence, in such a system, deviations (for the

natural resistances which are differentiated between trading routes and can be quantified.

Consider policy resistances, the most important of which are the tariff, direct administrative controls on imports and exports, and controls on the uses of foreign exchange. Governments may also impose restrictions on the range of countries with which their nationals can trade, and on the use of official grants and loans to foreign countries. In addition, political and economic alliances may lead to the establishment of a customs union, a free trade area, or to more limited preferential relationships between countries.[8]

Although tariffs and quantitative restrictions can be applied in a discriminatory way, inter-country discrimination is usually inherent in other government restrictions. Under the GATT system, two kinds of government-initiated resistances which systematically discriminate between trading countries can be identified. One is the (pre-World War II) preferential trade arrangements which were institutionalised under GATT. Apart from the direct influence through the (remaining) preferential margins, several studies (Myrdal, 1968; Arndt, 1968) suggest that prewar discriminatory trading blocs currently have significant influence on country bias in trade through a well-arranged commercial infrustructure, such as shipping and banking services, familiarity with legal and institutional settings, an environment conducive to lower transport and transaction costs, consumer preferences, and trader's market orientations. These views also received support in the econometric analysis of trade flows (Tinbergen, 1962; Linnemann, 1966; Yamazawa, 1971).

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individual trade flow) from the average or normal level of policy resistances will be incidental or random due to differences in commodity composition between trade flows (indirect discriminatory effect), and to the fact that there are general differences in natural trade resistances between countries, whose effects tend to be magnified by the impact of policy.

[8] Despite the principle of non-discrimination, GATT allows preferential systems which completely abolish or reduce trade barriers among participants, such as free trade areas and customs unions, on the presupposition that they are a step towards freer trade in general. It also allows the preservation of existing prewar preferences, on the condition that margins of preferences are bound to the levels that existed at an agreed date (in most cases April 1947).

The other is informal economic and political considerations, which vary with individual partner countries. Although it is often claimed that political considerations are basic sources of trade discrimination (Hirschman, 1945; Singer, 1972), these have not been explicitly introduced into empirical studies. Perhaps this is because they are intangible and unsystematic and cannot be quantified to allow incorporation into econometric models. However, political hostility or distrust may lead to a partial or complete embargo on trade, while political and military alliances lead to favorable market access. This is most dramatically demonstrated by difficulties surrounding so called East–West trade, or economic sanctions against hostile countries. Furthermore, in many nations of the Third World, changes in government often accompany changes in foreign economic relationships. Korean trade, in particular, has been greatly influenced by international politics.

Thus the value of bilateral "official" aid flows is used as a proxy variable to capture the effects of these broad political and economic considerations, since official aid relationships are closely and directly associated with political, military, and economic alliances (see Hayter, 1972; Krassowski, 1968). The usefulness of aid flows as a proxy for political and economic considerations is enhanced by the fact that they are often tied to exports of the donor country. However, there is a problem in using aid payments since these in general flow from the developed toward the developing countries. This means that they cannot stand for political and economic links between developed countries or between developing countries. On the other hand, there is merit in the use of aid flows because one can compare the effect of postwar alliances with that of pre-war colonial blocs.

Finally, we turn to privately initiated resistances (inducements). The most important source of country bias initiated by private enterprise is the association between trade and international capital movements, especially if the latter take the form of direct investment. Intra-firm trade is also important (Helleiner, 1973, 1979). In addition, the activities of affiliates in other countries enhance institutional familiarity and lower psychological distance between home and host countries.

It should be noted, however, that foreign investment flows add another dimension to international economic relations, just as do trade flows. Hence, the factors affecting the geographical distribution of country's foreign investments, and alternatively, the source of a host country's inflows, are similar to the factors which affect each country's trade flows. A study on Japanese direct investment toward the Southeast Asian region (Pangestu, 1982) concluded that Japanese direct investment tends to be concentrated on the region because of geographical proximity and cultural and ideological similarity. All of these factors are expected to affect country bias in trade, as discussed previously.

7.2. Specification of Explanatory Variables

The discussion in the previous section identified several proxies for trade resistances: geographical distance for natural resistances, official aid flows for informal political and economic links, preferential arrangements for institutionalised government-initiated resistances, and direct investments for privately initiated resistances (inducements). As emphasised in Chapter 2, however, the importance of trade resistances in influencing country bias is not absolute. Hence, all variables should be defined in relative terms.

7.2.1. The Index of Relative Distance

Yamazawa measured relative distance as a ratio of the absolute distance between a particular pair of trading regions to the value of the geometric mean of the distance between each of two trading regions and all of their partners.[9] Later, Garnaut redefined

[9] Yamazawa (1971 p. 15) used the following formula:

$$D_{ij} = \frac{d_{ij}}{\sqrt[n-1]{\sum_i d_{ij} \times \sum_j d_{ij}}},$$

where

Yamazawa's formula through the introduction of the sum of the distance between all pairs of trading partners.[10] However, Garnaut's index formula has the disadvantage that it is not compatible with the intensity approach, which nets out the effect of different size of trading partners, as seen in formula in footnote 10.

In this study, relative distance D_{ij}, is calculated in the following way which preserves the logic of the intensity approach:

$$D_{ij} = \frac{d_{ij}}{d_{i.}} \Big/ \frac{d_{.j}}{d_{..}}, \tag{7.1}$$

where

$$\begin{aligned} d_{ij} &= \text{the distance between country i and j,} \\ n &= \text{the number of trading countries, and} \\ D_{ij} &= \text{the relative distance between i and j.} \end{aligned}$$

[10] Garnaut (1972, p. 19) criticised Yamazawa's relative distance variable on the grounds that it is not weighted by total distance between all pairs of trading countries, and proposed the following formula:

$$D_{ij} = \frac{d_{ij}(\sum_i \sum_j d_{ij}(x_i m_j))}{\sum_i d_{ij}(x_i m_j) \sum_j (x_i m_j)},$$

where

$$\begin{aligned} d_{ij} &= \text{the distance between country i and j,} \\ x_i &= \text{the share of country i in world exports,} \\ m_j &= \text{the share of country j in world imports, and} \\ D_{ij} &= \text{the relative distance between i and j.} \end{aligned}$$

In addition, Roemer (1977) used the following formula to measure the distance from i to j relative to the distance from other competing exporters to j:

$$D_{ij} = \frac{d_{ij}}{\sum_i d_{ij}}$$

This formula is useful for measuring the distance from a source to a given market when it is compared with the distance from other competing sources, if potential competitors are determined *a priori*. Hence, this formula will be used in Chapter 8.

$d_{ij} =$ the geographical distance from country i to j,

$d_{i.} =$ the sum of the distance from source i to all of its potential markets,

$d_{.j} =$ the sum of the distance from market j to all of its potential sources, and

$d_{..} =$ total distance between all pairs of trading routes.

This relative distance definition ensures that the average value for a country is unity.

7.2.2. The Index of Aid Flow Intensity

Bilateral official aid flows are used as a proxy for broad political and economic relationships. Yamazawa (1971, p. 16) defined an index of intensity of aid flows as a proxy for international capital movements. However, in this study, official aid is assumed to be an indicator of broad political, military, and economic relationships rather than of capital movements, as discussed previously. Though the use of aid cannot represent political and economic relationships between developed countries, this is unlikely to impose significant difficulties in estimating Australian country bias. This is because Australia, as a strong member of the Western alliance, has strong political and economic relations with all of the developed countries listed as major traders.

The index of intensity of aid flows A_{ij}, is defined as

$$A_{ij} = \frac{a_{ij}}{a_{i.}} \Big/ \frac{a_{.j}}{a_{..}}, \tag{7.2}$$

where

$a_{ij} =$ the value of official aid flows from country i to j,

$a_{i.} =$ the value of total aid flows from country i to the rest of the world,

$a_{.j} =$ the value of total aid receipts of country j from the rest of the world, and

$a_{..} =$ total world aid flows.

While the same formula is used for Australia and Korea, the meaning is different for each, since Australia is a donor country, while Korea is a recipient. Hence, the index can be defined only for developing countries in the case of Australia, whilst it can be defined only for developed countries in the Korean case.[11] In addition, the index for 1970 is based on aid flows during 1969 and 1970 (consistent aid data are not available for all countries before 1969) and for 1980 on aid flows over 1977–80, since aid flows might be expected to have an influence beyond the year they are undertaken.

7.2.3. Discriminatory Preferential Agreements

A dummy variable is introduced as a proxy for discriminatory preferential agreements. As in the case of aid flows, this variable has a different meaning for the two countries because of differing historical trade relationships. While Australia's formal ties with British Preference came to an end at the beginning of the 1970s, Australia's relationship with the rest of the world has long been tempered by her strong economic, cultural, ideological, and political links with the U.K. Currently, Australia has other preferential arrangements with neighbouring small economies, but any variable for them is not explicitly included

[11] Though Korea has strengthened its economic cooperation with other developing countries through economic and technical assistance, which is expected to have a significant influence on country bias in her trade with other developing countries, the variable cannot be included because of lack of consistent data.

because most of them were also part of the British Preferential system (see IAC, Annual Report 1981/82, pp. 162–202, Appendix 3.1 and 3.2). Hence, a dummy variable is applied to current and former British Commonwealth countries.[12]

Korea, by contrast, has never belonged to any formal trade group. However, Korea's colonial ties, historical and cultural common background and political and strategic common concerns with Japan, and her political and military alliance with the U.S.A. throughout the post World War II period, have had a significant effect on Korea's trade and other economic relationships with the rest of the world. This special relationship has of course been closely associated with aid flows. Nevertheless, the special relationship is likely to have paramount influence over public and private decision-making in Korea. Consequently, a dummy variable is included to identify both America and Japan in Korean trade.

7.2.4. Foreign Activities of Multinational Corporations

The influence of direct investment on country bias in trade between a pair of trading partners is not only through one country's investment in the other but also by third countries' investment in both trading partners. However, direct investment undertaken by third countries in both trading partners will not be included because of data availability.

Consistent and reliable data are rarely available to define relative international direct investment. The only available data are the distribution of the foreign affiliates of transnational corporations published by the United Nations (1978, 1983). However, because even these publications include only statistics on the geographical distribution of

[12] Dummy variable for British Commonwealth preference is applied to Hong Kong, Malaysia, Singapore, New Zealand, Papua New Guinea and Fiji (Oceania), India, Pakistan, South Africa, Kenya, Canada, Ireland, and the United Kingdom.

transnational corporations (TNCs) from the developed countries, the variable can be only defined as outward flows for Australia and as inward flows for Korea.

This limitation seems to have some difficulties. First, both countries, especially Australia, have received a substantial amount of direct investment not only from other developed countries but also from neighbouring developing countries (see Australian Bureau of Statistics, ***Foreign Investment, Australia***, Cat. No. 5305.0). In addition, there is a considerable evidence that the origin of imported goods is closely associated with the origin of inward direct investment (Brash, 1966; Parry and Watson, 1979). Secondly, Korea's outward foreign direct investments have rapidly increased since the mid-1970s. Considering that Korea's outward investment has been motivated by the desire for secure sources of raw materials, or for export promotion (see Jo, 1981, p. 76), this exclusion would impose a considerable difficulty in estimating country bias in Korean trade.

The following is a familiar formula for the index of intensity of foreign activities of TNCs. The index of outflow from Australia T_{Aj}, is calculated separately for developing and developed countries, because comprehensive data for the geographical distribution of the foreign activities of TNCs are published separately. In the case where j is a developing country,

$$T_{Aj} = \frac{t_{Aj}{}^{u}}{t_{.j}{}^{u}}, \tag{7.3}$$

and if j is a developed country,

$$T_{Aj} = \frac{t_{Aj}{}^{d}}{t_{.j}{}^{d}}, \tag{7.4}$$

where

$t_{Aj}{}^{u}$ = the share of developing country j in affiliates of TNCs from Australia toward all developing countries,

$t_{.j}{}^{u} =$ the share of developing country j in affiliates of TNCs from all developed countries,

$t_{Aj}{}^{d} =$ the share of developed country j in affiliates of TNCs from Australia toward other developed countries, and

$t_{.j}{}^{d} =$ the share of developed country j in affiliates of TNCs from all other developed countries.

On the other hand, the index of inflows toward Korea is only defined for developed countries,

$$T_{iK} = \frac{t_{iK}}{t_{.K}}, \tag{7.5}$$

where

$t_{iK} =$ the share of Korea in affiliates of TNCs from developed country i, and

$t_{.K} =$ the share of Korea in affiliates of TNCs from all developed countries.

7.2.5. An Empirical Model

Earlier studies implicitly assumed that the degree of country bias is the same in either direction between any pair of trading countries. This assumption is false because of the different commodity composition of trade in the two directions. Drysdale (1967, p. 235) noted that differential commodity composition causes asymmetry in country bias. This is because each trading route has to compete with different alternative sources or markets, and because the sensitivity of trade to individual trade resistances varies with individual commodity groups. Hence, in this study a separate regression model is estimated for each country's export and import trade.

The analysis is applied to the major trading countries selected in Chapter 3, and is undertaken at two points of time (1970 and 1980) in order to understand the effect of changing trade resistances over time. Given the nature of some resistances such as geographical distance and preferential arrangements which remain constant over time, the changing value of coefficients provides a good indication of changing importance. The detailed data are presented in Appendix 2, C.

Note that the relationship between (relative) distance and country bias is likely to be non-linear, taking account of the magnifying effects towards the lower trading route away from the higher (trade-diverting effects). The magnifying effects are likely to be quadratic.[13]

Accordingly, the empirical model for explaining the pattern of country bias in export trade of both countries, B_{ij} (for import trade, B_{ji}), takes the form,

$$B_{ij} = \alpha + \beta D_{ij} + \gamma (D_{ij})^2 + \delta A_{ij} + \epsilon P_{ij} + \varsigma T_{ij}, \tag{7.6}$$

where

subscript i = Australia and Korea,

j = their trading partners (39),

D_{ij} = relative distance between i and j,

A_{ij} = intensity of official aid flows between i and j,

P_{ij} = dummy variable for common membership of

[13] Tinbergen (1962) introduced a dummy variable for neighbouring countries in addition to geographical distance. This addition is likely to catch the trade-magnifying effect of geographical proximity, beyond the trade-increasing effect resulting from short distance, which is linear.

preferential trade agreements, and

$T_{ij} =$ intensity of foreign activities of TNCs of i (or j) in j (i).

The expected signs of the coefficients are $\beta < 0, \gamma > 0, \delta > 0$, $\epsilon > 0$, and $\varsigma > 0$.

Correlation is measured to look at the multicollinearity between the explanatory variables (Table 7–1).[14] All the variables are reasonably independent of each other with the exception, not surprisingly, of direct investment and aid. In the Australian case, correlation between aid flows and membership of the British Commonwealth is low and declined during the 1970s, whilst that between aid flows and relative distance nearly trebled (with a negative sign). By comparison, in the Korean case, the correlation between aid flows and the dummy variable for special economic and political alliances is high and increased during the 1970s, reflecting the importance of Korea's aid relationships with America and Japan. It should be borne in mind that this increase is associated with Korea's gradual transition from aid-dependence. These should be taken into account in interpreting the results.

7.3. Discussion of Results

7.3.1. The Changing Pattern of Country Bias in Australian Trade

Table 7–2 presents the results of estimating Equation 7.6 for Australian trade. The coefficients of determination are high in all cases, and it is clear that the selected variables provide a statistically satisfactory explanation for almost all of the variation in country bias in Australian trade.[15]

[14] In the light of interaction among individual trade resistances, Drysdale and Garnaut (1982, p. 72) pointed to the possibility of multicollinearity among independent variables in attempting to estimate the extent to which each resistance affects country bias.

[15] The adjusted coefficients of determination in Tables 7–2 and 7–3 are compared with those of around .5 obtained in earlier studies to explain the geographical distribution of trade flows (as discussed in Chapter 2).

Table 7-1

Correlations between Explanatory Variables

A. Country Bias in Australia's Trade Relationships

	D	P	A	T
D	1.000	-.301	-.338 (-.135)	-.501
P		1.000	.275 (.109)	.439
A			1.000	.622
T				1.000

B. Country Bias in Korea's Trade Relationships

	D	P	A	T
D	1.000	-.270	-.066 (-.095)	-.284
P		1.000	.605 (.799)	.780
A			1.000	.761
T				1.000

Note: Geographical distance and preferential arrangements are constant over time. Hence, only the intensity of aid flows is defined differently between 1970 and 1980. Numbers in parentheses indicate the coefficients in 1970.

D: the relative distance, A: the index of aid flow intensity, P: dummy variable for preferential trade arrangements, and T: the intensity of foreign activities of MNCs.

Table 7-2

Estimation of the Pattern of Country Bias in Australia's Trade Relationships

	Constant	D	D^2	A	P	T	$\bar{R}^2$	F-Value	D-W Test
Export Trade 1970	1520.248	-27.611 (6.636)***	0.110 (5.768)***	0.145 (2.971)***	271.645 (2.797)***		.733	27.113***	2.049
1980	1228.085	-22.678 (5.150)***	0.092 (4.648)***	0.376 (11.112)***	196.286 (2.042)**		.895	81.732***	1.743
#	54.106	0.166 (0.077)	-0.003 (0.268)	0.298 (22.902)***	-26.024 (0.704)	1.095 (15.429)***	.987	568.891***	1.907
Import Trade 1970	978.571	-18.091 (6.092)***	0.074 (5.442)***	0.104 (2.977)***	173.111 (2.498)**		.684	21.543***	2.023
1980	1027.204	-19.637 (4.846)***	0.082 (4.458)***	0.465 (14.875)***	146.249 (1.650)*		.925	117.361***	1.814
#	-70.532	1.723 (0.973)	-7.004 (0.911)	0.392 (36.525)***	-61.624 (2.025)**	1.024 (17.525)***	.992	1000.675***	2.105
Foreign Activity of MNC 1980	1072.340	-20.866 (5.535)***	0.087 (5.094)***	0.071 (2.462)**	203.064 (5.074)***		.701	23.237***	1.754

Note: Numbers in parentheses are t-values.
*** indicates significance at the 1 percent level, ** significance at the 5 percent level, and * at the 10 percent level.
D: the relative distance; A: the index of aid flow intensity; P: dummy variable for preferential trade arrangements; and
T: the intensity of foreign MNC's activity.

Both variables, D_{ij} and $D_{ij}{}^2$, representing relative distance, are significant and have the expected signs. This suggests that relative distance is most important in determining country bias in Australian trade and that the relationship between relative distance and country bias is not linear but quadratic. One notable feature is that the estimated coefficients of distance are much higher in export than in import trade. This is due to differential commodity composition: Australian exports are dominated by bulk commodities which are highly sensitive to transport costs, while her imports are concentrated on manufactures which are less sensitive. This is the main reason for the greater concentration on the Asian-Pacific region of Australian exports (54 per cent) as compared with import trade (34 per cent).

The coefficients of distance in import trade rose over time, whilst surprisingly, those in export declined. This seems to be a consequences of two factors. First, the reorientation of Australian export trade preceded that in import trade, which did not occur until the 1970s. The second is the redirection of trade between two sub-regions within the Asian-Pacific region, in the process of changes in the commodity composition of Australian exports towards minerals away from agricultural products. ASEAN and Oceanian countries, which are nearer to Australia, became more important as Australia's suppliers rather than markets, whilst Northeast Asian countries are more important as Australian markets. As the former began to export (labour-intensive) manufactures, they became increasingly competitive with the latter. Accordingly, Australian imports became biased towards the nearer sources because of institutional and historical ties additional to geographical proximity. This effect was further magnified by the removal of the latter from the list of countries to be included in Australian System of Tariff Preferences (ASTP).[16]

Another important feature is that the variable for aid flows has become the most

[16] For their removal, see Australian Department of Trade and Resource, *Australian Tariff Preference for Developing Countries,* AGPS, Canberra, various years.

significant determinant of country bias in Australian trade in 1980, judging from the partial correlation coefficient. This is consistent with the argument that the reorientation of Australian trade is closely associated with changes in Australian attitudes to a whole range of international and commercial affairs in the post-World War II (see Drysdale, 1978, 1981).

Aid flows have usually been thought to stimulate the export trade of the donor country rather than its import trade, since aid often takes the form of tied loans or a grant in kind. However, Australian import trade tends to be more sensitive to aid flows than her export trade. This seems to reflect the nature of Australian aid, which is concentrated on technical rather than commodity assistance. In addition, this is a consequence of the coincidence of high concentration of Australia's aid on the ASEAN and Oceanian countries and higher country bias toward these countries in import than export trade.

Conversely, Australia's historical ties with British Commonwealth countries have declined in importance as a determinant of country bias in Australia's trade, though in 1980 the coefficient remains significant at the 5 per cent level. Consequently, the country bias-increasing effect of Australia's membership of the British Commonwealth (at the mean value of the dependent valuable) declined from 117 in 1970 to 74 per cent in 1980 in export trade and from 105 to 53 per cent in imports during the same period. This is consistent with the fact that there has been a continuous redirection of Australia's political and economic relationships throughout the postwar period.[17]

Though each variable has its own importance for determining country bias in Australian trade, the changing explanatory power of the two variables, aid flows (post-

[17] It is also noteworthy that Australia's membership of the British Commonwealth bloc created more country bias in her export trade than in imports. This provides a reason why arguments in Australia surrounding the U.K.'s joining to the E.E.C. had been so much concentrated on the expected negative influence on her export prospects (see Australian Industries Development Association, 1971).

war alliance) and historical preferential ties (pre-war blocs), explains the changing pattern of Australian trade relationships over the the postwar period. Notably, this redirection has been based on Australia's strong relationships with the members of the British Commonwealth in the Asian-Pacific region. This is the main reason why country bias in Australian trade is concentrated on Malaysia, Hong Kong, and Singapore, in addition to Australian trade with New Zealand and Pacific island countries which still have preferential arrangements with Australia.

An attempt was made to include a proxy for foreign direct investment in the regression equations. Incorporation of this independent variable considerably improves the explanatory power, but reveals high multicollinearity with other variables, as seen from the equation marked ♯ in Table 7–2. Conversely, its use as a dependent variable (see the final row of Table 7–2) produced satisfactory results: 70 per cent of variation in the geographical distribution of foreign activities of Australian TNC's affiliates is explained by the same variables as country bias in trade. In addition, the parameters of each independent variable are significant at the one per cent level with the same sign as in country bias in trade. This is consistent with our prior expectation that foreign investment flows add another dimension to international economic relations of a country.

Despite the complication of various trade resistances and the practical difficulty of quantifying those resistances, these estimates provide strong support for our hypotheses about the pattern of country bias in Australian trade. From these statistical results several important conclusions can be drawn with respect to the pattern of country bias in Australian trade. First, geographical distance is the most important factor in determining country bias in Australian trade. Second, this is associated with increasing importance of Australia's post-war political and economic alliance and with the declining importance of Australian historical ties with the British Commonwealth. Third, the country bias-increasing effect of the current Australian preferential arrangements with her neighbouring countries are further magnified by the combined effects of geographic proximity, historical ties, and aid flows from Australia, resulting in distinctively steep quadratic relationships between country bias in Australian trade and relative distance. Lastly the geographical distribution of foreign activities of Australian firms (direct investments) is determined by the same factors as country bias in trade.

7.3.2. The Changing Pattern of Country Bias in Korean Trade

Table 7–3 presents the results of a parallel regression analysis of country bias in Korean trade with major trading countries. The combined explanatory power of selected variables is considerably lower in Korean trade compared with the Australian case, especially in 1980. This poorer result probably originates from failure to introduce Korea-initiated country bias factors, as pointed out previously.

Despite this limitation, the results of the estimation seem to throw light on the sources of country bias in Korean trade. Geographical distance is the most important factor. Statistically, the coefficients of both variables, D_{ij}, and D_{ij}^2 have the expected sign with significance at the one percent level in both trade flows in 1970. However, in 1980 the explanatory power of the distance variables is considerably weaker, especially in export trade, though it still has the expected sign. In 1980 the significance of D_{ij} declined to the 5 per cent level and the coefficient of D_{ij}^2 has no significance in export trade, but in import trade the significance of D_{ij}, still remains at the one percent level, and that of D_{ij}^2 declined to the 10 per cent level.

One of the interesting features of country bias in Korean trade associated with the explanatory power of distance is that it is much higher in import than in export trade, and this differential increased in 1980. Again, difference in the commodity composition of Korean import and export trade explains this. Primary products dominated Korean

Table 7-3

Estimation of the Pattern of Country Bias in Korea's Trade Relationships

	Constant	D	D^2	A	P	T	$\bar{R}^2$	F-Value	D-W Test
Export Trade 1970	231.353	-2.952 (4.055)***	0.010 (2.717)***		181.612 (5.476)***		.764	42.059***	
	236.617	-3.098 (3.555)***	0.011 (2.381)**	-0.076 (0.313)	197.921 (3.195)***		.758	30.756***	1.962
1980	262.148	-2.617 (2.045)**	0.008 (1.278)	-0.101 (0.469)	157.980 (2.269)**		.460	9.090***	2.319
#	238.249	-1.997 (1.431)	0.005 (0.782)	-0.250 (0.980)	97.266 (1.095)	0.229 (1.097)	.463	7.555***	2.448
Import Trade 1970	307.211	-4.234 (3.504)***	0.015 (2.427)**	0.669 (3.444)***			.675	27.309***	
	325.029	-4.856 (3.789)***	0.018 (2.790)***	0.270 (0.764)	121.957 (1.340)		.682	21.396***	1.917
1980	305.778	-3.615 (2.689)***	0.012 (1.719)*	0.002 (0.009)	112.56 (1.539)		.531	11.736***	2.474
#	284.857	-3.072 (2.084)**	0.009 (1.254)	-0.129 (0.479)	59.41 (0.633)	0.201 (0.909)	.528	9.506***	2.500

Note: Numbers in parentheses are t-values.
*** indicates significance at the 1 percent level, ** significance at the 5 percent level, and * at the 10 percent level.
D: the relative distance; A: the index of aid flow intensity; P: dummy variable for preferential trade arrangements; and
T: the intensity of foreign MNC's activity.

imports and the share of bulk commodities in imports has increased significantly, while manufactures increasingly dominate her exports.

Also, the sensitivity of country bias to distance has moderated over the period, especially in export trade. This reflects Korea's rapidly diversified trade relationship, being closely associated with the transformation from an aid-dependent economy to a more self-reliant one. Accordingly, the quadratic effect on relative distance is more moderate in Korean trade.

Note the difference in the explanatory power of the variables representing the presence of special economic relationships, P_{ij} and aid flows, A_{ij}.[18] In export trade special political and economic relationships appear to be more significant, whereas in import trade aid flows played a more important role. However, the importance of both variables as determinants of country bias in Korean trade drastically weakened over the period. Aid flows no longer played any significant role in determining country bias in either export or import trade. On the other hand, the proxy for political and economic relationships retains the expected sign but is significant only at the 5 per cent level in export trade and at the 13 per cent level in import trade.

Since Korea's special relationship with the U.S.A. and Japan is closely associated with the inflow of aid from both countries, the differential influence is likely to come from the different effect of aid flows from other aid donors on Korea's export and import trade with them. Aid receipts were associated with country bias in Korean import trade with all of the aid donors, but not in her export trade. This warrants the following discussion.

At the beginning of Korea's export promotion policy, the outlook of Korean exporters

[18] In the year 1970, the addition of either of these explanatory variables significantly improved the regression results with their own coefficients highly significant at the one per cent level and with the expected sign, but simultaneous incorporation of both variables biased the regression equation because of high multicollinearity between them.

was limited to Japan, with which Korea shares a common cultural and historical background, and to the USA with which it has strong political and strategic interests. This was the most important factor in determining country bias in export trade. In addition, given the lack of skills required for international transactions and the fact that most Korean exports were initiated by foreign buyers in the earlier years, the Japanese and US buyers contributed to Korean exports most importantly through relatively well informed knowledge of Korean competitiveness and economic condition.[19]

However, as the Korean economy entered into international commerce, there was a huge change in the pattern of trade resistances in Korean trade. First, the growing volume of Korean trade was not only followed by accumulation of knowledge of foreign markets, but also by improvement in commercial infrastructure such as shipping, communications and banking facilities. Second, the growing reputation of Korea as a major seller as well as buyer contributed to a favourable bias among foreign traders towards trade with Korea.

The increasing scale of Korean trade has been more important in reducing resistances to trade with newly developed markets than in her traditional markets. This is because increasing size has little "marginal" effect on trade resistances in traditional routes (with Japan and America), but much greater "marginal" effect on newly developed routes. Consequently diversified international trade links have reduced country bias in trade with America and Japan.

An attempt was made to include a variable representing foreign inward direct investment to the host country but it did not improve the results (equation ♯ in Table 7.3).

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[19] An empirical study by Westphal, *et al*, (1981, pp. 58–64) showed that domestic initiatives in international transactions have rapidly replaced foreign initiated transactions, though foreign resources have continued to make considerable contribution to Korean exports. According to the survey, by the mid-1970s Korean initiatives in the sale of exports — either visits overseas by the exporting firm's staff or overseas representatives, participation in trade fairs, or enquiries from other Korean firms and the private and public marketing assistance institutions — accounted for more than half of the surveyed cases.

However, the coefficients of the variables for aid and political alliance changed significantly. This reflects high multicollinearity among the variables, because both Japan and America also accounted for more than 70 per cent of total inflows of direct investment at the end of 1980 (see Hill and Johns, 1985).

Finally, we consider the possible effects of some Korean-initiated country bias factors which we have not been able to quantify and include in the model. Official efforts to diversify Korean trade links had been directed toward so-called "priority regions". These have varied with the economic and political concerns of the time. Since the early 1970s, when world commodity markets began to fluctuate and Korean industrial structure was upgraded toward heavy and chemical industries requiring a high content of raw materials, Korea's concern was dominated by the need for stable sources of supply. This led her to give high priority to natural resource-rich countries in South East Asia and other Pacific basin countries and in the Middle East. As a result, Korea began to provide a wide range of economic and technological assistance, and became active in the construction of infrastructural facilities and in direct investment for the development and import of raw materials. Though many of these are still in the early stages and hence small, their effects on country bias have already been very important in Korean trade. Table 7–4 lists countries which have a large deviation of the actual value of trade from the estimated one. Countries with high positive deviation in Korea's import trade are those with abundant natural resources, such as Saudi Arabia, Chile, Kenya, Indonesia, Malaysia and Australia, with all of whom Korea has endeavoured to improve economic relations. On the other hand, countries with a high positive deviation in Korea's export trade include Egypt, Libya, and Saudi Arabia, where Korean construction activity has been most active. This indicates that the ability of the model to explain country bias in Korean trade in 1980 would be improved if those variables measuring Korea-initiative factors were incorporated.[18]

[18] A glance at Korean foreign investment would explain most of these variations. Korea's foreign investment was initiated in 1958, when the Korean Traders Association purchased a

Table 7-4

Comparison between Actual and Estimated Country Bias in Korea's Trade Relationships

1980

(Selected Countries with High Positive Deviation)

Country Bias in Export Trade	Actual	Estimated	Deviation(%)	Country Bias in Import Trade	Actual	Estimated	Deviation(%)
Egypt	239	59	405	Saudi-Arabia	169	42	402
Libya	204	56	364	Chile	180	52	346
Saudi-Arabia	233	65	358	Greece	115	34	338
India	230	123	187	Kenya	199	64	311
Chile	134	74	181	Indonesia	370	173	214
Thailand	263	179	147	Philippine	391	226	173
Philippine	281	204	138	Australia	195	160	122
Indonesia	214	165	130	Oceania	206	178	116

Note: Estimated values are calculated by the regression equation listed in Table 7-3.
Deviation is expressed as a percentage of the actual index value to the estimated value.

From the above findings, some important conclusions can be drawn with regard to the pattern of country bias in Korean trade. First, geographical distance is the most important factor in determining country bias, especially import trade, though its importance declined over time. Secondly, aid relationships were one of the most important determinants of country bias in her import trade in 1970, but the importance declined drastically by 1980. Thirdly, Korea's political and economic ties with her allies were the most important factor in her export trade in 1970, and still had considerable significance in 1980. Lastly, the pattern of country bias in Korean trade has become more complicated over time as Korean-initiated factors, especially in her trade with other developing countries, have become more important.

7.4. Summary

This chapter developed a cross-section regression model to estimate the pattern and degree of country bias in Australian and Korean trade and the change in the relative importance of various country bias factors. The explanatory variables were defined in relative terms to take account of the interdependence among individual trade flows. In addition, the regression model was estimated separately with the same set of explanatory variables for each country's export and import trade to ascertain asymmetry in country bias in two directions.

Almost all of the variation in country bias was explained by the defined explanatory

building in New York to establish a U.S. base for export promotion. Overseas direct investment by Korean firms started to rise from 1967, but the amount was as low as US$20million in 1973. This investment grew rapidly from the mid-1970s, amounting to a total value of US$111million by 1978. Its geographical distribution was as follows: Southeast Asia 43.0 per cent (27.2 per cent of cases), Middle East 6.6 (6.9), North America 23.2 (34.5), Latin America 1.6 (6.6), Europe 2.6 (17.3), Africa 21.0 (6.6), and Oceania 1.7 (1.2). The industrial distribution was: mining 0.4 per cent (0.8 per cent in cases), forestry 19.1 (2.8), fishing 7.0 (9.5), manufacturing 16.6 (7.9), construction 13.2 (6.6), and trading and other services 43.7 (72.4). Most investments towards North America and Europe were directed toward trading and other service sectors (Jo, 1981, p. 66).

variables. The results of the regression were consistent with our hypothesis that individual country bias factors had a different influence on export as compared with import trade flows. They also showed that there has been considerable change in the influence on the pattern of country bias in each country's trade over the period 1970 to 1980, and that geographical distribution of a country's direct investments is determined by the same factors as country bias in trade.

In Australian trade, geographical distance was the most important factor in determining country bias, especially in her export trade, and the importance further rose in import trade. Australian political and economic relationships, as reflected in aid flows, increased significantly their importance in determining country bias in trade. By contrast, Australian historical ties with the British Commonwealth have gradually weakened. All of these indicate that the redirection of trade relationships in the 1970s led to redirection in a whole range of Australia's political and economic relationships towards neighbouring countries in the Asian Pacific region.

In Korean trade, geographical distance is the most important country bias factor. Korea's aid relationships and political alliances were significant factors in 1970 —though the former was more important in import trade and the latter in export trade — but they lost a lot of their importance by 1980. The combined explanatory power of all measured variables declined after 1970. The countries with high positive residuals in country bias were those on which Korea's effort was concentrated to intensify her trade relationship. This suggests that Korean-initiated country bias factors such as direct investments and construction exports became more important in determining country bias in Korean trade during the 1970s.

CHAPTER 8

INCREASING COUNTRY BIAS IN AUSTRALIA–KOREA TRADE

The previous chapter made it clear that huge changes occurred in the pattern of country bias in both Australian and Korean trade relationships over the last decade. In both countries' trade, geographical distance was the most important determinant of country bias in trade, and historical ties weakened significantly over the 1970s. Australian trade was reoriented away from her traditional ties with the United Kingdom towards Asian-Pacific countries, while Korea's trade relationships rapidly diversified away from her two main trade partners, America and Japan. The interaction of these changing patterns suggests a rapid increase in country bias in Australia–Korea bilateral trade.

This chapter aims to explain both the growth and pattern of country bias in Australia–Korea trade. Section 1 presents the changing degree of country bias over time and describes the institutional and historical background against which trade between Australia and Korea took place. Focus is given to the important role played by institutional arrangements to break down initially high resistances to Australia–Korea trade. With changing institutional and political arrangements, the nature and effect of individual trade resistances have changed over time. These are dealt with in Sections 2 and 3. The model for country bias by commodity, defined in Chapter 3, is specified to estimate the influence of individual resistances. Section 2 tests the model with respect to country bias in Australia's export trade with Korea at the end of the period under study. This is followed by the corresponding analysis of country bias in Korea's export trade with Australia.

8.1. The Changing Degree of Country Bias

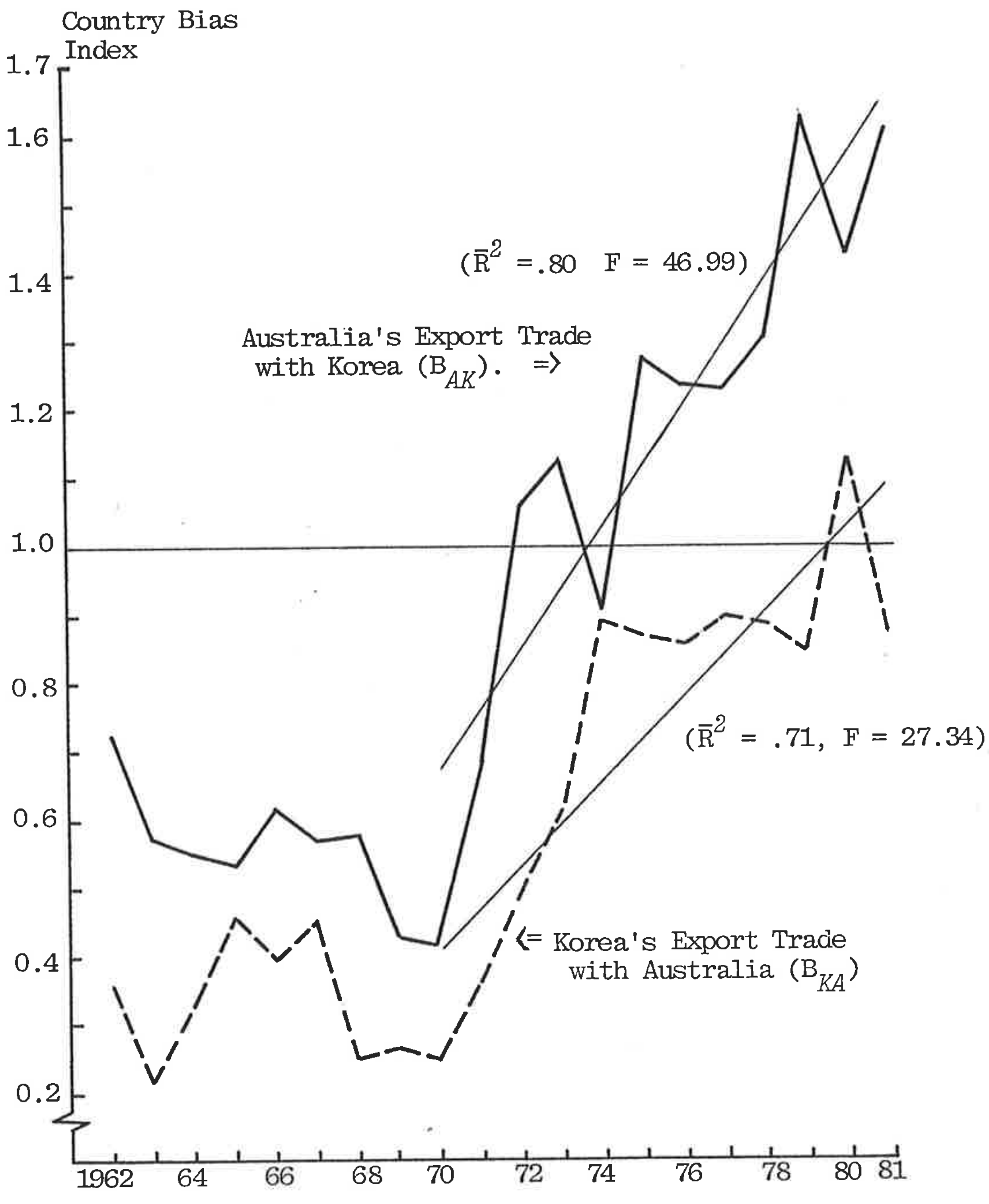
Figure 8–1 plots the degree of country bias in two way trade flows between Australia and Korea over the period 1962 to 1981. The figure shows two important features. First, despite the underlying high complementarity between the Australian and Korean economies from the early 1960s, bias in this trade relationship was very low prior to the 1970s when country bias grew rapidly. Secondly, country bias in Australia's export trade with Korea has always been higher than that in Korea's export trade with Australia, and the former grew more rapidly than the latter, as seen in the time-series estimates. This is another main reason for continual imbalance in bilateral trade in favor of Australia.

A comparison of the degree of country bias in Australian and Korean trade with other countries highlights the extremely low level of country bias in Australia–Korea trade in 1970, and the rapid growth thereafter. Table 8–1 presents the deviation of actual country bias from that estimated from the regression equations (presented in Chapter 7) derived from Australian and Korean trade with other Asian-Pacific countries. Country bias indexes in Australia's trade with all of the region's countries except Korea, exceeded 2.0 in 1970, reflecting the fact that her trade had already been reoriented away from Europe and towards neighbouring countries. However, country bias in Australia's trade with Korea was the lowest, and the actual index value was only one-tenth of the regression equation's estimated value. Similarly, from the standpoint of Korean trade, Australia was the country with both the lowest index number and the lowest ratio of actual country bias to estimated bias in 1970. The index value was only .26 in Korea's export trade with Australia and .43 in import trade. Australia–Korea trade was the least developed of all the trade flows in the region.

However, this changed substantially in the 1970s. Though the absolute value still remained low compared with other countries, the percentage deviation of actual from the

Figure 8-1

Country Bias in Australia - Korea Trade



Note: Calculated based on formula 3.7.

Source: International Economic Data Bank, RSPacS, ANU.

Table 8-1

Comparison between Actual and Estimated Country Bias in Australia's and Korea's Trade with Asian-Pacific Countries

1970 and 1980

	1970						1980					
	Australia's Export Trade			Australia's Import Trade			Australia's Export Trade			Australia's Import Trade		
	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)
Korea	43	449	10	36	281	13	195	354	55	113	276	41
Japan	210	501	42	166	314	53	229	394	58	192	310	62
New Zealand	2279	1501	152	1427	962	148	2207	1186	186	1904	967	197
Hong Kong	211	489	43	188	307	61	187	492	38	224	437	51
Indonesia	329	598	55	396	379	105	338	702	48	342	667	51
Malaysia	332	763	44	258	484	53	506	747	68	224	660	34
Philippines	363	520	70	101	327	31	200	500	40	256	373	69
Singapore	494	748	66	78	472	17	426	698	61	266	601	44
Thailand	363	427	85	73	268	27	226	408	55	167	354	47
Oceania	2304	1904	121	1605	1260	127	4487	4421	102	5087	5013	102

	Korea's Export Trade			Korea's Import Trade			Korea's Export Trade			Korea's Import Trade		
	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)	Actual	Estimated	Deviation (%)
Australia	26	113	23	43	135	32	113	155	73	195	160	122
Japan	369	378	98	531	494	108	401	358	112	421	384	110
New Zealand	247	117	211	58	140	41	55	156	35	122	165	74
Hong Kong	222	184	121	313	243	129	208	218	95	119	245	49
Indonesia	135	124	109	175	150	117	214	165	130	370	173	214
Malaysia	40	137	29	304	170	179	125	177	71	185	188	98
Philippines	103	169	61	234	219	107	281	204	138	391	226	173
Singapore	160	133	120	181	163	111	115	173	67	111	183	61
Thailand	214	139	154	114	174	66	263	179	147	71	191	37
Oceania	148	128	116	71	156	46	121	169	72	206	178	116

Note: Estimated value is calculated based on the regression equations presented in Tables 7-2 and 7-3.
Deviation is expressed as per centage of actual value to the estimated value.

estimated bias index fell sharply. What was the main reason for the extremely low level of country bias in the earlier period? What caused high trade resistances to give way to rapidly growing trade flows in only a decade?

8.1.1. The 1960s

Both Australia and Korea are located in the Western Pacific area, so that geographical distance is not a handicap. Since World War II both countries have shared a common political and strategic interest in the region as members of an alliance under the leadership of the U.S.A. However, these factors alone are not sufficient to produce a close trade relationship, and they create country bias only through interaction with other factors such as trade-supporting service facilities, and familiarity of traders with each other's economy. Despite the favourable geographical and political environment, the following factors were responsible for extremely low country bias in the 1960s.

First, both countries were relatively small traders. The foreign trade of small countries tends to agglomerate to major trading routes because of economies of scale in overcoming transaction costs (Garnaut, 1972). This was a key feature of Korean trade until the early 1970s, as discussed in the previous chapter. Korea's extremely high dependence on tied aid from America and Japan (after 1965) intensified the concentration of Korean trade on the two countries. Second, both economies were linked to different world powers via their historical trade relationships. While the Australian trade relationship was historically with the British, the Korean economy was connected to America. This resulted in the lack of trade-supporting service facilities and unfamiliarity between the business communities. For example, regular shipping schedules between Australia and Korea were not established until 1975, and Korea is the only regional country with which Australia has no direct air services.[1]

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[1] Cargo between Australia and Korea was trans-shipped at Hong Kong or Japanese ports at

8.1.2. Institutional Innovations for Expanding Bilateral Trade in the 1970s

The above obstacles to trade in the 1960s prompted various institutional initiatives which have played a major role in reducing resistances to Australia–Korea trade. The nature of the commodities traded encouraged governmental initiatives. Textile products, which were Korea's only important exportables until the early 1970s, have consistently been subjected to a variety of non-tariff barriers since the Multi-Fiber Arrangement (MFA). Furthermore, the practice of the Australian System of Tariff Preferences (ASTP) and the rather arbitrary criteria — "competitive need" criterion and "injury" criterion — on which preferential tariff rates may be withdrawn or modified, contributed to an increasing role for inter-governmental contacts in Korean export trade to Australia. On the other hand, Australian exports to Korea have been dominated by agricultural products and mineral raw materals, trade in which is subject to governmental intervention, though on different grounds. Whilst trade in the former fell increasingly under the control of government in the post-war period, trade in mineral raw materials requires long term perspectives and the exchange of information on government policies with respect to processing activities. Governmental initiatives in trade of raw materials were strengthened by the direct participation of the Korean government in ownership of processing activities and in decisions about investment priorities.[2] Also, fluctuations in commodity markets

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additional cost until 1975, when the Australian National Line inaugurated a direct, vehicle deck container cargo service between the two countries. The direct service travels via the Philippines, Hong Kong, and Taiwan. As trade volume increased, a conference service has gradually extended under the control of the Australian Northbound Shipping Conference. In 1979 when a Korean shipping company first commenced shipping services in the route, a conference, the Korea–Australia Searoad Service was formed as an extension of the Eastern Searoad Service between Australia and Japan. For further details of shipping facilities and their contribution to trade, see Trace (1984).

[2] The importance of government initiatives was exemplified by the Australian Prime Minister's press statement and the statement made to Parliament after his visit to Korea in April 1967. Long before Korea constructed an integrated iron mill, Mr. Holt emphasized the prospect for Australian exports of iron ore and coking coal, which are now important exportables from Australia to Korea: " One of the discoveries on this journey was the strength of South Korea, the extraordinary industrial growth there, the bright trade prospects they see with Australia. ⋯ Both (Korea and

from the early 1970s and Korea's need for stable supplies of raw materials contributed to an increasing role for government in bilateral trade.

Inter-government arrangements have taken three forms. Firstly, the initial Trade Agreement in 1965 (revised in 1975) paved the way for a closer trade relationship between the two countries.[3] Secondly, there were a number of inter-government contacts, represented by the present five standing committees including the annual Ministerial Trade Talks begun in 1968.[4] Interestingly, inter-government meetings have always been dominated by emphasis on Korea's role as a "reliable market" and Australia's role as a "stable supplier" of raw materials and agricultural commodities. Thirdly, both governments provided a number of trade services to support and encourage bilateral trade, such as government institutions for provision of commercial intelligence regarding the other, dispatching trade missions, and organizing or participating in trade fairs, trade exibitions, and other trade promotion activities.

Taiwan), for example, intend to set up an iron and steel industry, and will be looking to Australia for the iron ore required by these industries ···" Quoted from "Asian Journey", *Current notes on International Affairs* (currently, *Australian Foreign Affairs Record*), Vol. 38, 1967, p.137.

[3] The initial agreement, which guaranteed each country the right of most-favoured-nation (MFN) access to the other's market, was a breakthrough based on the expectation of high trade potential, though it did not immediately produce any significant increase in trade. While the initial agreement can be described as rather symbolic in providing for the exchange of non-discriminatory treatment with allowances for existing preferences, based on the underlying prospects for high trade flows in the future, the revised agreement of 1975 was more positively designed to create discrimination in favour of each other within the framework of the laws and regulations of the respective countries, based on a more intensified trade relationship. The 1975 Agreement states that the two governments are not only to take all appropriate measures to facilitate, strengthen, and diversify bilateral trade in accordance with the General Agreement on Tariffs and Trade (GATT), but also to recognize the need to improve conditions of world commodity trade, to declare support for international commodity agreements, and to express support in principle for the conclusion of long-term commercial contracts between enterprises in the two countries, reflecting the then fluctuation of world commodity markets. The Agreement also established a Joint Trade Committee to further the aims of the Agreement and review its implementation.

[4] Edwards (1983, p. v) invites one's attention to the annual Ministerial Trade Talks as follows: "What is unusual, indeed surprising, is that South Korea was the first country in the world with which Australia established such regular formalised talks!" This unusual happening seemed to be associated with the bright trade prospects, which Mr. Holt discovered during his visit to Korea in 1967.

Though it is impossible to over-emphasize the role that governmental arrangements played in reducing trade barriers, private institutional arrangements also played an invaluable role in promoting trade.[5] Familiarization at the private level was particularly important, considering differences in language, customs, and internal market systems, little experience in commercial transaction with each other, and lack of knowledge of other country's economic conditions. The Australian import quota system to which almost all Korean exports have been subject, should be noted. Unlike other countries, where there are continuing negotiations at government level for the allotment of additional quotas, Australia has a global quota system, in which quotas are largely owned by Australian importers.

Two additional factors important in increasing country bias deserve mention. The first is related to Australia's aid to Korea in earlier years. Besides relief aid during the post-Korean War period, Australia provided Korea with aid to the total value of approximately A$ 7.1 million, including economic development and technical assistance projects and supporting Korean students in Australia under the Colombo Plan, which ended in the late 1970s.[6] Though the size of aid is insignificant in absolute terms and as a proportion of Korea's total aid receipts or Australia's total aid, it had a significant influence on country bias in specific commodity groups. For example, Australian assistance to Korean sheep and other livestock industries accounted for the high degree of country bias in Australian exports to Korea in livestock animals, and technical assistance to the

[5] The Australia–Korea Business Cooperation Committee was formed in 1969, but its operation went into recess in 1971 (due probably to its prematurity, given the then small volume of bilateral trade). The Committee reformed in 1978, and has since had annual joint meetings. These meetings proved invaluable, not only to Korean businessmen in their understanding of the Australian trading system, but also to Australians in their understanding of the character and potential of the rapidly growing Korean economy. Especially, *Australia–Korea Business News*, published monthly by the Australia-Korea Chamber of Commerce and Industry, provides Australian firms with useful market informations.

[6] These data were available from the Korean desk of the Australian Department of Foreign Affairs.

Korean metal processing and mining industry contributed to the high bias in Australia's exports of metalworking machinery. The second factor, Korean immigration into Australia from 1968 played a role in promoting international familiarization, in addition to the direct contribution to trade.[7]

8.2. Country Bias in Australia's Export Trade with Korea

8.2.1. The Importance of Transport Costs and Aid

Australian exports to Korea are dominated by bulk commodities, trade in which is highly sensitive to transport costs. Consequently, the aim of this section is to quantify the role played by geography in determining the pattern of country bias.[8] Although there are limitations to using geographic distance as a proxy for transport costs, it is likely that geographic distance is one of the most important variables in Australian exports to Korea. This is despite the earlier discussion, which revealed that transportation facilities are still poor in Australia–Korea trade relative to those in each country's trade with other regional countries, and that, as a result, the negative impact on trade due to transport costs in this bilateral trading route would be greater than expected from mere geographic distance.

The reason geographic distance is expected to be important is that the trade is dominated by dry bulk cargoes, providing a wide variety of options to both Australian exporters and Korean importers in competitive tramps and bulk carriers commonly owned

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[7] The establishment of a Korean community in Australia contributed to promoting familiarity and business connections between the two countries. In addition, this directly contributed to the trade relationship. A daily newspaper *The Australian* (June 22, 1984) reported that a Korean-Australian trading company imported traditional Korean goods worth about US$30 billion in 1983. This accounted for about 20 per cent of total Australia's imports from Korea of the year.

[8] Commodities with more than the average contribution (0.6 per cent) to overall complementarity in years 1879–81 includes only 14 commodities: iron ore, iron scrap, non-ferrous ores, coal, raw sugar, wool, meat, wheat, rice, animal oils, hides and skins, cotton, aluminium, and lead (Table 8–2). Since these commodities accounted for about 85 per cent of overall complementarity in Australian exports to Korea, focus is given to country bias in these commodities. Country bias in each commodity over the period 1962 to 1981 is presented in Appendix 6, A.

or chartered by traders. Also, the pre-existence of Australia–Japan trade in the same commodities and direction as Australia–Korea trade provided opportunities to combine trade.

8.2.2. Estimating Country Bias by Commodity

In Chapter 3, the model for explaining country bias by commodity (B_{ijk}) was defined in two ways. For explaining the variation in country bias across country i's different trade relationships for a particular commodity,

$$B_{ijk} = f(R_{ijk}) \quad (i \neq j = 1, 2, \cdots, n-1), \tag{3.13}$$

where

R_{ijk} indicates various trade resistances.

For explaining the variation in country bias across commodities in a particular trading route i from j,

$$B_{ijk} = f(R_{ijk}) \quad (k = 1, 2, \cdots, m). \tag{3.14}$$

These are used to estimate the effect of transport costs and aid upon the pattern of country bias in Australia's export trade with Korea. The first (3.13) compares the pattern of country bias and the pattern of relative distance in Korea's imports source by source for each of Australia's major exportables to Korea, and the second (3.14) estimates the structure of country bias in Australia's export trade with Korea commodity by commodity.

In the first approach the hypothesis is that the lower the relative distance from Korea to a given source i, the higher the country bias in Korea's imports from that source i. This is tested using correlation analysis. This assumes that transport costs constitute the only important resistance in Korean import trade. Hence, different effects of aid flows between commodity groups will be reflected in the correlation coefficients for individual commodities.

Although geographic distance is the same for every commodity, economic distance is different across commodities. Drysdale (1967, p. 232) first noted that a given geographic distance has different effects for different commodities traded in a given route. Thus, Australia may be Korea's nearest source for imports of iron ore, but not necessarily of rice. Accordingly, relative distance is measured for each of 14 commodities, which are most important as Australia's exports to Korea.[9]

The coefficients of rank correlation, presented in Table 8–2, show the relationship between country bias in Korean import trade and the relative geographic distance for each commodity group. The analysis of rank correlation has been undertaken in two ways. First, import sources are those from which Korea actually imports each commodity. Second, import sources additionally include countries with high export capacity (the 10 largest exporters in the world) in the commodity concerned, regardless of whether Korea actually imported from them or not. This is to take account of the fact that Korea's non-import from certain sources may be the result of very high trade resistances.

All mineral raw materials, dairy products, meat, wool, and raw sugar have a high coefficient with high statistical significance and negative sign. This is consistent with the hypothesis that transport costs are the major trade resistance in Korea's imports of these commodities, and the lower the relative distance, the higher the country bias in Korea's imports.[10] In addition, in these commodities, there are no significant differences between

[9] Both asymmetry and non-uniformity in economic distance dictates calculation of relative distance for each commodity. This was calculated by Roemer's formula, which was introduced in Chapter 7, footnote 10. Although Roemer's formula does not take account of other alternative markets for a specific exporters, it is useful for measuring relative distance from competing sources to a specific Korean market, in addition to simplication of calculation. Detailed statistical data for this are presented in Appendix 7.

[10] Note the relatively low coefficients for iron ore and non-ferrous ores. This reflects the

Table 8-2

Rank Correlation Coefficients of Country Bias against Relative Distance in Korea's Imports of Australia's Major Exports

1980

SITC code		Country Bias in A's Exports to K: A's Export Data	Country Bias in A's Exports to K: K's Import Data	R. Distance from A to K	Share in World Trade: A's Share (%)	Share in World Trade: K,s Share (%)	Rank Correlation (K's Actual Sources): Number of Sources	Rank Correlation (K's Actual Sources): Coefficient	Rank Correlation (K's Actual Sources): Significance (%)	Rank Correlation (Incuding K's Potential Sources): Number of Sources	Rank Correlation (Incuding K's Potential Sources): Coefficient	Rank Correlation (Incuding K's Potential Sources): Significance (%)	Share of Aid-financed Im. in K's Imports: 1964-78 Average (%)
281	Iron ore	2.83	2.83	57	19.7	2.3	6	-.657	7.8	12	-.403	9.7	-
282	Iron scraps	1.32	4.32	58	1.9	8.0	6	-.829	2.1	12	-.855	0.0	-
283	Non-fer. ores	1.15	1.47	89	15.7	1.7	11	-.693	0.9	15	-.671	0.3	-
321	Coals	2.25	1.63	68	19.1	4.1	9	-.867	0.1	13	-.861	0.0	-
684	Aluminium	.51	1.99	73	1.0	1.5	14	-.833	0.0	15	-.779	0.0	-
685	Lead	.17	.16	81	30.4	1.7	9	-.583	0.5	13	-.805	0.0	-
061	Raw sugar	2.76	5.06	58	7.4	4.1	9	-.883	0.1	15	-.675	0.3	-
262	Wool	1.95	1.88	68	39.3	3.4	9	-.870	0.1	14	-.866	0.0	-
011	Meat	2.30	4.03	55	11.5	1.0	5	-.800	5.2	12	-.882	0.0	-
041	Wheat	.00	.00	65	14.2	3.3	2	1.000	50.0	10	-.510	6.6	34.4
042	Rice	.00	.00	91	2.8	14.8	3	-.500	33.3	10	-.723	0.9	46.7
411	Animal oils	.40	.48	75	6.3	5.6	6	.085	43.6	11	-.715	0.7	16.0
211	Hides & skins	.23	.28	70	10.1	5.9	5	.700	9.4	11	-.749	0.4	48.3
263	Cotton	.15	.15	73	1.6	10.9	14	-.322	13.1	15	-.344	10.5	56.3

Note:
1. Relative distance was calculated for each commodity group by using Roemer's formula introduced in footnote 10 of Chapter 7.
2. Share in world trade has different meaning with each country: Australia's share indicates her share in world exports, while Korea's share indicates in her share in world imports.
3. Potential sources include the world's biggest 10 exporting countries of each commodities, regardless of whether Korea actually imported from them or not.
4. Share of Aid-financed imports in Korea's total imports was extracted from Anderson and Joo, (1984), U S Department of Agriculture, (1980), and Bank of Korea, Economic Statistics Yearbook, various years.
5. Major sources are listed in Appendix 7, with relevant statistics.

the results for the two types of import sources, implying that Korea's non-import from certain sources is due to geographical distance.

However, in a number of grainfoods and some agricultural raw materials, Korea's imports were not only confined to a few sources, but the correlation coefficients are very low and different between actual and potential sources. In the case of actual sources, the correlation results are not significant. These commodities include wheat, rice, cotton, hides and skins, and animal oils, which have long been subject to aid-financed imports from America under the so-called Public Law 480 (PL.480). In the case of the ten largest potential sources, the coefficients are statistically significant with the expected sign. However, the apparent significance may be a consequence of the relatively proximate distance between Korea and America in global comparison. The strong influence of aid can be seen in the few sources from which Korea actually imported. This is a consequence of the high concentration of Korean imports on the USA because of its aid. The last column of Table 8–2 shows the average proportion of aid-financed imports in total imports of each commodity from the mid 1960s to the mid 1970s.

These correlations suggest that geographic proximity accounts for the higher country bias in Korean imports from Australia of mineral raw materials and non-grain foods. By contrast, Korean imports of grain foods and some agricultural raw materials continue to be dominated by earlier aid flows from America, and as a result, country bias in imports from Australia remained in the extremely low range. It also should be noted that foodstuffs are, in general, imported by a government-influenced association or government agency.

The second approach involves estimating the structure of country bias in Australia's export trade with Korea commodity by commodity. Considering Korea's imports

influence of Korea's direct investment or long-term import contracts for development imports. For example, Korea invested in Philippine copper mining and in Canadian, U.S.A., and Australian iron ore mining. At the same time, Korea had long-term contracts with Chile for non-ferrous ores and with India for iron ore.

are highly influenced by aid-receipts from America in some commodities, the variable representing aid influence, defined as the share of US aid-financed imports in Korea's total imports in each commodity, is also included. Thus, our second empirical model is defined as:

$$B_{AKk} = f(D_{AKk}, A_k) \quad (k = 1, 2, \cdots, m), \tag{8.1}$$

where

B_{AKk} = country bias index in Australian exports to Korea in commodity k,

D_{AKk} = the relative distance between Australia and Korea for each commodity k, and

A_k = the amount of US aid in Korea's imports of each commodity k.

The two independent variables are expected to be inversely related to country bias.

8.2.3. The Regression Results

Two alternative variables are used to measure country bias, one based on Australia's export data, and the other based on Korea's import data. The results, based on Australian export data, are

$$B_{AKk} = 466 - \underset{(2.75)}{2.54} D_{AKk} - \underset{(2.53)}{4.50} A_k \qquad \bar{R}^2 = .59; \tag{8.2}$$

and based on Korean import data,

$$B_{AKk} = 815 - \underset{(3.12)}{8.40} D_{AKk} - \underset{(2.68)}{3.74} A_k \qquad \bar{R}^2 = .64, \tag{8.3}$$

with t-values in parentheses.

The coefficients of determination are reasonably high, suggesting that nearly two-thirds of the structure of country bias in Australian exports to Korea is explained by the independent variables, and the coefficients of each independent variable are significant at the one per cent level with the expected sign. The different explanatory power of the two estimations underlines the importance of transport costs in country bias, since import data include freight and insurance costs.[11]

These two exercises suggest that relative proximity between Australia and Korea is the primary source of high country bias in Australia's exports to Korea. This suggests that the shift in the commodity composition of Korean imports toward mineral raw materials and non-grain foods (where country bias is dominated by geographic distance) away from grain foodstuffs and agricultural raw materials (where country bias is overwhelmingly aid-influenced) was the major source of increased country bias in Australian exports to Korea. Country bias in Australian exports to Korea is likely to further increase as Korean imports continue to shift toward raw minerals and non-grain foods.

Before concluding this section, mention should be made of the reasons for the extremely low country bias in a number of manufactured goods in Australian exports to Korea. Apart from remoter economic distance in manufactures than in primary

[11] Another test was attempted using a dummy variable for commodities which Korean imports were influenced by aid receipts, instead of using the share. Based on Australian export data,

$$B_{AKk} = 464 - \underset{(2.63)}{4.36 D_{AKk}} - \underset{(3.20)}{121.64 A_k} \qquad \bar{R}^2 = .64;$$

and based on Korean import data,

$$B_{AKk} = 810 - \underset{(3.27)}{8.16 D_{AKk}} - \underset{(3.18)}{181.45 A_k} \qquad \bar{R}^2 = .69.$$

Note that the regression performs better when using a dummy variable. This indicates that aid flows influenced not only aid-financed imports directly, but also general imports, regardless of the proportion of aid-financed imports.

products, there are several factors causing low access of Australian manufactures to Korean markets.[12] First, the view of Australia as a mere producer of primary products is strong among Korean businessmen. Second, Australian commercial diplomacy concentrated on export promotion of primary products. Third, Australia is uncompetitive in terms of suppliers' credit, and credit terms are usually critical in determining Korean importers' decision-making.[13] Fourth, Australian investment in Korea is minimal. Given the importance of joint ventures in exports of producer goods, this leads to poor export performance in machinery and equipment, and processed foods. As an example of the importance of this factor, the persistently high country bias in motor vehicles since 1973 is worthy of note. Though this originated from intra-firm trade within an American based multinational corporation, it proves the importance of joint ventures in trade.[14]

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[12] The Australian trade commissioner in Korea reported that despite Australians being favourably regarded by the Korean people and well considered as reliable traders with a reputation for honesty, quality, and perfomance, Australia is not successful in gaining access to Korean manufactures. The commissioner raised several reasons for this unsuccessful access. First, Australian manufacturers make an approach without sufficient prior research of Korean market needs. Second, they tend not to visit Korean markets. Third, even those who do visit come for insufficient time with inadequate prior knowledge. Fourth, they have insufficient knowledge of international sources of finance through which the terms offered by competitors may be met. All of these indicate Australian exporters' unfamiliarity with Korean markets. For further details, see "New Trade Doors Open as Korea Eases Import Policies", *Overseas Trading*, 1979, pp. 556–561; "Trade Signposts in Korea are built on Economic Stability", *Overseas Trading*, 1977, pp. 732–735.

[13] This is because of the low level of equity capital in many Korean firms, the resultant high debt equity ratio, the high interest rates on routine commercial bank loans, and the existence of advance import deposit schemes. For example, in 1965 Australian exporters' reluctance to ship on a documents-against-acceptance (D/A) basis caused the diversion of Korean imports of wool tops, and coal toward Japanese suppliers with more favourable credit terms. This is the main reason for the sharp fall in country bias in the mid-1960s shown in Figure 8–1.

[14] Since 1972, when a Korean auto maker established a joint venture with General Motors, intra-firm trade between its Korean and Australian subsidiaries rapidly increased from zero, creating high country bias. It is notable that country bias in motor vehicles has been high, not only in Australian exports to Korea, but also in the opposite route since 1975. See Appendix 6.A and 6.B.

8.3. Country Bias in Korea's Export Trade with Australia

8.3.1. The Importance of Competition

A similar procedure to that taken in the previous section is used to explain the pattern and nature of country bias in Korea's exports to Australia. Table 8–3 contains the indexes of country bias for important Korean exportables, while Appendix 6, B presents the indexes for all commodities.

Table 8–3 shows two features. First, the index value in almost all of Korea's important exportables has persistantly remained under unity, implying that Korea has less favourable access to the Australian market than her competitors on average. Second, there is a different time pattern in the development of country bias between two broad commodity groups, Korea's traditional exportables (which are unskilled labour intensive and technologically simple manufactures), and her newly developed exportables (which are more capital intensive and technologically more sophisticated manufactures). Country bias in the former group increased rapidly until the mid-1970s and thereafter stagnated or declined, whereas in the latter group country bias increased sharply from the mid-1970s.

The following factors inhibited growth of country bias in Korea's exports to Australia. First, because of the late development of this relationship compared with trade with other Asian–Pacific countries, there are still gaps in their commercial relationship, such as commercial servicing, shipping and banking facilities, communication channels, joint ventures, and familiarity with each other's markets.[15] Second, because of ignorance

[15] As noted earlier, Korea is the only country with which Australia is not directly connected by air. Though this disadvantages trade in manufactures, Korea's access to Australia is relatively more disadvantaged, considering that the share of air cargo is higher in Australia's inward than in outward trade. The proportion of air cargo in Australian outward cargo increased from 4.2 % in 1976/77 to 7.4 % in 1981/82 (in value terms), while that in inward cargo was 15.7 % in 1981/82. Source: *Shipping and Air Cargo Commodity Statistics,* (previously Outward Overseas Cargo), Australian Bureau of Statistics, Catalogue No. 9206.0., Canberra.

Table 8-3

Country Bias in Korea's Export Trade with Australia for Important Exports

(Selected Three Year Averages)

SITC code		1963-65	1967-69	1971-73	1975-77	1979-81
Unskilled labour intensive manufactures						
841	Clothing, non-fur	0.011	0.504	0.515	0.939	0.780
653	Textile fabrics, non-cotton	0.741	0.720	0.702	0.675	0.619
651	Textile yarn	0.864	0.397	0.247	0.785	2.429
851	Footwear	-	0.069	1.447	1.039	0.910
894	Toys, sports goods	-	0.598	0.314	1.256	1.627
831	Travel goods and hand bags	-	6.859	0.445	0.947	0.758
652	Cotton fabric	0.750	0.251	0.252	0.514	0.561
631	Plywood & veneers	-	0.023	0.346	0.934	0.227
899	Manufactures, n.e.s.	0.231	0.885	0.096	0.327	0.618
656	Other textile materials	-	0.008	1.080	2.387	3.217
655	Special textile products	0.107	0.274	0.374	0.676	0.852
666	Pottery	0.172	-	0.114	1.326	1.378
654	Lace, ribbons, tulles	0.187	0.190	0.026	0.011	0.134
893	Plastic articles	-	0.409	0.352	0.569	1.412
657	Floor coverings	-	0.012	0.518	0.063	0.142
Human skill intensive manufactures						
724	Telecommunication equip.	0.082	0.013	0.070	0.526	0.526
629	Rubber articles	0.049	-	0.296	0.835	1.875
735	Ships and boats	-	-	4.311	0.003	0.461
891	Sound recorders	-	0.337	0.448	0.474	0.541
678	Tubesand pipes, iron & steel	-	-	-	6.182	1.465
696	Cuttery	-	-	0.026	0.795	1.030
674	Plates & sheets, iron & stl.	-	-	1.624	3.554	6.808
697	Metal household equip.	-	-	1.284	1.294	0.879
864	Watches and clocks	-	-	0.407	0.534	0.552
698	Metal manufactures	0.053	0.012	0.750	0.955	0.644
694	Nuts, bolts, etc.	-	-	-	0.350	0.124
725	Domestic electrical equip.	-	-	-	0.149	0.505
673	Iron and steel shapes	-	-	-	0.037	0.218
Technology intensive manufactures						
729	Other electric machinery	-	-	0.012	0.072	0.150
722	Electric power machines	-	-	0.089	0.079	0.275
861	Scientific and precious inst.	1.164	0.041	1.048	0.518	0.404
714	Office machines	-	-	-	0.255	0.161
Primary products						
031	Fresh fish	0.028	0.118	0.397	0.062	0.259
032	Fish preparations	1.647	0.022	1.027	0.986	1.545
121	Tabacco leaf	-	2.396	2.563	2.251	1.432
276	Other crude minerals	0.033	0.161	0.231	0.161	0.338
283	Non-ferrous ores	4.538	0.136	-	-	-
	Total	0.38	0.31	0.54	0.87	0.96

Note: Indexes are calculated according to formula 3.7 presented in Chapter 3.
Source: Appendix 6.B.

and conservatism, familiarity at the private level has lagged, compared with institutional arrangements on the government level. Third, Korea's major exportables are so highly competitive with other regional countries that the effect of underdeveloped commercial relationships disadvantages Korean competitiveness in Australian markets. Fourth, Korean commercial diplomacy towards Australia was geared to stable imports of industrial raw materials. Lastly and most importantly, there was a widespread feeling among Korean exporters that Australia would be a difficult market with which to do business directly. This is because of Australia's separated small markets, complicated trade protection and discriminatory trade practices, and unfamiliar business and commercial practice. This is particularly relevant for explaining stagnating country bias in the mid-1970s, considering that the structure of complementarity in Korea's export trade with Australia had shifted towards metal products and machinery (producer goods), where the character of international trade requires marketing organisation and service facilities, and therefore more direct entry into the Australian market-place.[16]

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[16] Australian imports are diversified among a number of manufactures with small volume in each item, while Korean exports are concentrated on a few manufactures. This discouraged the Korean exporters from pursuing direct participation in the Australian market-place. In addition, Australian import orders, serving high per capita income consumers, highly differentiated in brand names, style, design, and quality, and serving separated national markets, involve small volumes but high degree of specification. Conversely, Korean exporters, who are generally large scale conglomerates, are heavily dependent upon mass production in large scale plants for large orders of one item specified in design or style. This probably led Korean exporters to be reluctant to participate in the Australian market-place. This is probably responsible for the difference in shares in Australian imports between Korea of 1.5 per cent and Taiwan of 3.1 per cent. In addition, Korea's share in Australian imports of clothing and footwear declined from 8.1 in the mid-1970s to 7.9 per cent by the end of 1970s, but Taiwan increased its share from 11.6 to 23.4 per cent during the same period. The importance of this was suggested in three independent sources. One study by Nishimura (1982) compares the export performance of Korea and Taiwan in the years 1978–81, when export orders declined due to upsurging protection and a world-wide recession, focusing on the different size of exporters from Korea and Taiwan. Taiwan's exporters are characterised by small scale trading companies, which are specialised in specific types and design, and hence, they are able to meet small scale orders which are popular in recession. Conversely, Korean exporters are large scale conglomerates, each of which is indifferent to, and competitive with, others. Further evidence comes from the author's interview with the Korean Commercial Attache to Australia. The Attache raised as reasons for Korea's unsuccessful access to Australian markets, Australia's rapidly increasing dumping claims against Korean exports and Korean exporters' unresponsiveness to Australia importers' enquiries and orders. These two factors are interrelated. More evidence

These factors disadvantaged Korea's access to Australia (compared with other countries' access) in two ways. First, increasing competition from the ASEAN countries and China in the late 1970s has had significant influence on country bias in traditional Korean exports to Australia. The lower resistances to trade between Australia and the ASEAN countries, forged by geographical proximity, well arranged commercial infrastructure, close communications and business linkages, investment ties, bilateral aid flows, and historical factors, all disadvantaged Korea's competitiveness in the Australian market.

The second is the influence of Australian trade policy. The New Zealand–Australia Free Trade Agreement(NAFTA) had a considerable influence on Korea's access to Australia because of the similarity between exports to Australia from the two countries.[17] In addition, the practice of the Australian System of Tariff Preferences (ASTP) has more complicated influences on country bias in Australian imports from Korea. On the one hand, most of Korea's traditional exports, where competition from new exporters became strong, have gradually been withdrawn from eligibility for preferences since the general review in 1976, while new exporters remain eligible. On the other hand, Korea's newly developed exportables, where competition comes from other developed countries, were the major beneficiary of the ASTP. This policy practice also explains the different time pattern between the two commodity categories, together with the different degree of competition

comes from Australian importers. All of the interviewed people in charge of imports from Korea raised Korean exporters' unresponsiveness to their enquiries or import orders as one of the great difficulties in the initial period or in diversification of items beyond currently imported ones.

[17] While the concept and usefulness of the index of similarity of exports to indicate the possible trade diversion because of discriminatory preferential tariff are discussed in the following chapter, the similarity index of exports between Korea and New Zealand in 1980 was only 0.17 in world markets, but rose to 0.31 in Australian markets. At the same time, the average index between Korea and the five ASEAN countries was 0.18 in world markets but rose to 0.22 in Australian markets. Though the difference in the index number between world and Australian markets is attributable to differential costs of overcoming all kinds of trade resistances, this indicates considerable adverse effects of the NAFTA and the selective practice of the ASTP on Korea's accessibility to the Australian market.

from other regional countries.

8.3.2. Estimating Country Bias by Commodity

Country bias in Korea's exports to Australia is analysed for two commodity groups, clothing and footwear. These two commodities are selected because the less developed Asian-Pacific countries are very competitive with Korea in these and because they still account for nearly a quarter of the overall complementarity in Korea's export trade with Australia. Furthermore, these two commodities are rarely imported under the by-law system, so that the import pattern is simply influenced by Australia's preferential tariffs.

Country bias in Australian import trade across various sources is related to difference in costs of overcoming natural and tariff trade barriers. Following the basic model (3.13), a model is defined for the analysis of country bias in Australia's import trade of a particular commodity from her various sources,

$$B_{iAk} = f(D_{iA}, t_i) \quad (i = 1, 2, \cdots, n-1), \tag{8.4}$$

where

B_{iAk} = the index of country bias in Australian imports from country i of commodity k,

D_{iA} = the relative distance between Australia and i, and

t_i = the actual tariff rate on Australian imports from country i in commodity k.

The model assumes homogeneity within a commodity group regardless of source. However, commodities classified into "clothing" range from undergarments, gloves, stockings, and handkerchieves to outer garments, with a wide range of type, quality, and price. Moreover, Australian tariff rates vary with each item. Hence, the tariff rates at which actual imports are cleared, vary with the import sources, and with the items within a commodity group.[18] On the other hand, the volume of Australian imports in each tariff item in general is so small that imports are confined to a few sources and as a result a cross-section comparison is impossible for each item. Thus, we take the risk of heterogeneity.

In Table 8–4 Australian imports from countries listed in the lower part of the table enjoy lower tariffs than imports from countries listed in the upper part. However, the index number of country bias is also lower. This suggests that influence of higher transport costs is so great as to overwhelm the effect of lower tariff rates.

The table highlights an important feature of the Australian tariff system. Even though the Asian–Pacific region is a major beneficiary of the ASTP, the weighted averaged tariff rates applied to imports from the region are much higher than that from other sources, due solely to the far higher tariff imposed on imports from the Northeast Asian countries, Hong Kong, Taiwan, Korea, and China. New Zealand especially enjoys Australian preferential treatment, and tariff rates in imports from New Zealand are as low as one-sixth in clothing, and less than one-third in footwear, of rates on imports from the Northeast Asian region. This huge preferential margin is the major reason for the extremely high value of country bias in Australian imports from New Zealand, together with geographical proximity. At the same time, whilst the Philippines does not enjoy preferential treatment as much as other ASEAN countries, its relative proximity leads to a high value of country bias in Australian imports from that country.

[18] Australian tariff rates applied to each source country of the two commodities were calculated, from *Imports Cleared for Home Consumption,* (Australian Bureau of Statistics, Cat. no. 5412.0, issued on micro fiche), since the preferential margins in tariff schedules is unlikely to be reliable.

Table 8-4

Relative Distance, Tariff Rates, and Country Bias in Australia's Imports of Clothing and Footwear

1980/81

		Clothing		Footwear	
	Relative Distance	Country Bias	Tariff Rate	Country Bias	Tariff Rates
Japan	45	1.29	33.2	1.17	36.6
Korea	48	0.53	44.9	0.57	38.8
New Zealand	11	56.67	7.2	58.44	13.7
Hong Kong	48	1.48	46.4	2.11	41.9
Indonesia	41	18.14	9.9	50.46	1.6
Malaysia	47	2.64	28.3	6.25	44.4
Philippines	44	4.11	40.1	5.35	37.8
Singapore	47	1.11	37.1	2.23	40.0
Thailand	50	1.02	23.5	1.55	44.8
China	45	2.98	38.1	4.51	39.9
Taiwan	45	2.05	46.8	2.45	41.4
Sub total	-	1.88	38.3	2.36	38.9
		(84.6)		(64.0)	
India	78	1.78		9.57	
U S A	113	0.61		1.06	
Mexico	97	0.02			
Brazil	104	0.29		1.44	
Italy	174	0.22		0.36	
France	181	0.19		0.42	
U K	175	0.37		0.76	
Spain	180			0.37	
Belgium	174	0.01			
Austria	169			0.04	
Netherland	172	0.01		0.08	
W. germany	173	0.09		0.20	
Others		0.82		0.85	
Sub total		0.27	35.5	0.49	31.7
		(15.4)		(36.0)	
Total		(100.0)	37.8	(100.0)	36.6

Note: Numbers in parentheses indicate share of two country groups in Australian imports.
Relative distance is the value calculated in Chapter 7.
Tariff rates are calculated from Australian Bureau of Statistics,
Imports Cleared for Home Consumption, Australia, 1980/81(micro fiche).

8.3.3. The Regression Results

It should be re-emphasized that the test includes only eleven Asian-Pacific countries, so that the effect of differential tariff rates among import sources should not be overwhelmed by the difference in transport costs. Considering that country bias factors are different across commodities, even within manufactures, the model is applied to two commodity groups, clothing and footwear, where international competitiveness is assumed to be highly sensitive to price levels and delivery timing, and also highly subject to a variety of protectionist policies.

The regressions for the two commodities are presented as follows (t-values in parentheses). For clothing

$$B_{iA} = 6244 - \underset{(5.29)}{28.0} t_i - \underset{(19.12)}{131.0} D_{iA} \qquad \bar{R}^2 = .99, \tag{8.5}$$

and for footwear

$$B_{iA} = 4145 - \underset{(8.01)}{106.9} t_i - \underset{(4.22)}{72.9} D_{iA} \qquad \bar{R}^2 = .95. \tag{8.6}$$

The results of the regression indicate that nearly all of the variation in country bias in Australian imports from her major sources is explained by relative distance and tariff preference. The coefficients of determination of the regression are very high in both cases, and the coefficients of each variable are significant at the one percent level with the expected sign. However, the explanatory power of each variable is different between commodity groups. Australian tariff rates are more important for footwear than for clothing, while country bias in clothing is more sensitive to transport costs than to tariff rates. This results from greater variation in tariff rates in clothing than in footwear. The range is from 2 to

36 per cent in footwear, and from duty-free to more than 300 per cent in clothing. On the other hand, transport costs are the same for the two groups.

Though it is not possible to compare directly the effect of distance on Australian exports to Korea and Korean exports to Australia, one important feature of the estimations is that distance is a major source of high country bias in Australian exports to Korea, whereas it is a major source of low country bias in Korean exports to Australia. This is so despite distance being an important factor in country bias in Australian and Korean import trade. This confirms asymmetry in economic distance between the two directions. Australia is the nearest source of Korea's major imports, while Korea has to compete with other countries which are nearer to Australia.

Given the regression results, Figure 8–2 compares the trend in Korea's share and country bias in Australian imports with those of her major regional competitors in Australian imports of the two commodities. Korea has never had a share in Australian markets equal to her share in world exports, nor to the share of her competitors in the Australian markets. Apart from Japan, whose comparative advantage has already moved away from these commodities, all the regional countries increased their share of Australian markets until the general review of the ASTP in 1976, so that country bias in Australian imports increased for all of the regional countries. The sharp increase in Korea's share is especially notable. However, after the review, the increase for all countries, except for New Zealand,[18] and Taiwan, diminished. Again, the sharp fall in Korea's share is notable. Apart from Hong Kong, whose share was already gigantic in Australian and world markets, Korea was the only developing country whose share in Australian markets declined.

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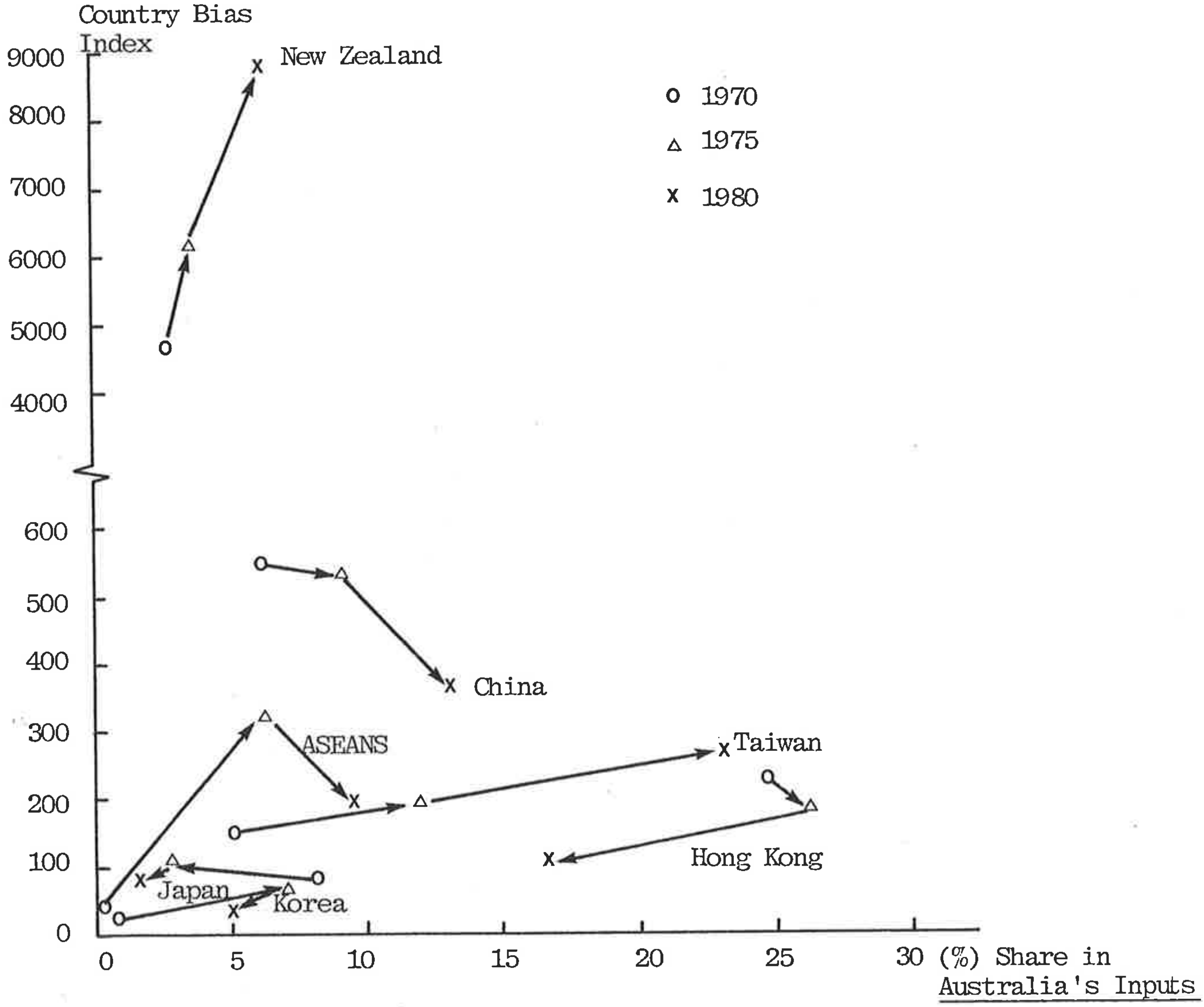
[18] It should be noted that New Zealand's share in Australian markets increased without any corresponding increase in her share in world markets, so that country bias skyrocketed. This is solely attributable to the growing preference margin conferred on imports from New Zealand as a consequence of both a series of reviews of the ASPT and Australia's increasing dependence upon import quota restrictions. Hence, given the fact that New Zealand has weak comparative advantage in producing these commodities, Australian trade policy eventually contributed to diverting Australia's imports from more efficient to less efficient sources.

Figure 8-2

Shares of the Asian - Pacific Countries in Australia's Imports of Clothing and Footwear and Country Bias Indexes



Sources: U.N., Commodity Trade Statistics, various years.
For share of Taiwan in Australian imports, Australian Industries Assistance Commission (1985); and for shares of China and Taiwan in world exports, Findlay, C., et al. (forthcoming).

This illustration is consistent with the results of statistical estimation, showing several features of Korea's access to Australian markets. Firstly, Korea is a "marginal" supplier in Australian markets because of the distance between Korea and Australia relative to that between Korea's competitors and Australia. Secondly, and as a result, Korea's access is very sensitive to Australian trade practices.

8.4. Summary

This chapter explained the origins of major changes in the degree and pattern of country bias between Australia and Korea. Country bias in two way trade between Australia and Korea was extremely low until the early 1970s. This was because the size of Korean trade was small and her trade relationship was highly dependent on two aid donors, America and Japan, and because the economic, commercial, cultural, historical, and institutional links for supporting trade between Australia and Korea were weak.

As Korean trade grew and her trade became independent of aid, a number of institutional arrangements reduced the initially high trade resistances associated with psychological and historical distance. Along with improved institutional arrangements, relative geographical proximity produced growth in country bias. In Australia's export trade with Korea, country bias in mineral materials and non-grain foods is high, because country bias in Korean imports of these commodities is influenced solely by transport costs. However, Korean imports in some agricutural products, such as grain foods, cotton, and animal hides, are still highly influenced by earlier aid receipts from America, and this forms high resistances to Australian exports of these commodities to Korea.

Familiarity at the private level still lags behind institutional arrangements, causing low country bias in trade in manufactures between Australia and Korea. Given the domination of manufactures in Korean exports to Australia, this is the main reason for the slower growth of country bias in Korean exports to Australia. However, there was a notable difference in the growth of country bias between Korea's traditional exports, where country bias grew until the mid-1970s, and her newly developed exports, where country bias showed considerable growth from the mid-1970s. Country bias in Korea's two traditional exports, clothing and footwear, stagnated due not only to increasing competition from other countries which are nearer to Australian markets than Korea, and but also to Australian discriminatory tariffs.

Our econometric estimation also demonstrated asymmetry in economic distance. A given distance between Australia and Korea played an important role in establishing country bias in Australian exports to Korea, but played a negative role in Korea's exports to Australia. This occurred because Australia is the nearest source of most of Korea's major imports, but Korea has to compete with more favorably located countries in Australian markets.

CHAPTER 9

BILATERAL IMBALANCE IN AUSTRALIA–KOREA TRADE

As stressed in earlier chapters, both complementarity and country bias indexes were always higher in Australia's export trade with Korea than in Korean exports to Australia. This has contributed to considerable bilateral imbalance, and needs to be understood to design bilateral trade policy. Bilateral imbalance is often interpreted as a consequence of one country's discriminatory trade policy against another, and is used to justify further policy intervention in a particular trade flow. As seen in Chapter 2, however, imbalance is natural. For the sake of more informed bilateral relations, there is value in improving our understanding of the reasons behind bilateral imbalance.

This chapter focuses on the differential degree of country bias, because this measures more or less favorable access of one trading partner to another compared with access by third countries. Section 1 identifies sources of bilateral imbalance in Australia–Korea trade over the period 1962 to 1981. Section 2 is concerned with understanding the causes of the differential degree of country bias between a pair of trading countries. Though our primary concern is to explain the causes of differential country bias in Australia–Korea trade, the experience of ten Asian-Pacific countries will be considered in an attempt to generalize the analysis. A model for explaining differential country bias will be developed and tested. Section 3 discusses the policy implications for bilateral imbalance in Australia–Korea trade which emerge from the regression results.

9.1. Sources of Imbalance in Australia–Korea Trade

Within the framework followed in this study, bilateral imbalance between any pair of trading partners originates from two sources: imbalance in each country's global trade;

and the difference in the intensity of trade between two directions. Thus if the intensity of trade were the same in both directions, bilateral balance would reflect an interaction of both trading partners' balance of global trade. Alternatively, if both trading partners' global trade were balanced, bilateral imbalance would result from different degrees of trade intensity between the two directions.

Both of these factors contributed to imbalance of Australia–Korea trade over the period 1962 to 1981. Korea's global trade has been chronically in deficit, while apart from cyclical fluctuation, Australian global trade has been generally in balance. This implies that the bilateral trade balance would favour of Australia. However, as seen in the previously chapters, the intensity of trade has always been higher in Australia's exports to Korea than in Korea's exports to Australia. This magnifies the effect of global trade balance.

Figure 9–1 illustrates the trend in the balance of Australia–Korea trade over the period 1962 to 1981, and compares it with the balance that would have existed, due to difference in trade intensity, if global trade had been balanced in both countries. Bilateral imbalance is here defined as the ratio of the value of Australia's exports to Korea to the value of Korea's exports to Australia. It is clear from the figure that the difference in trade intensity explains only a small part of the total imbalance before the mid-1970s. Even so, an imbalance of two to one would still exist with global balance.

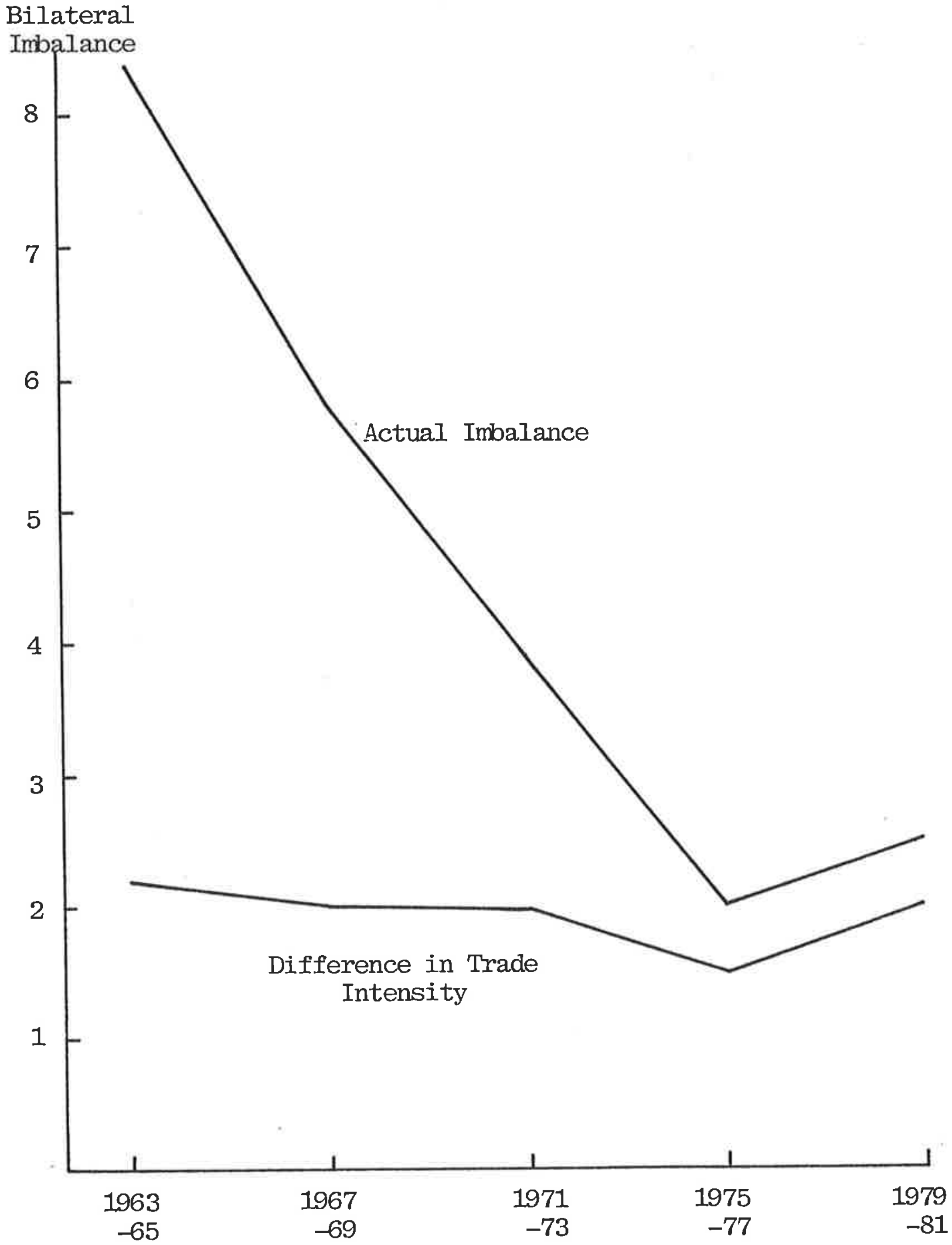
Until the mid-1970s bilateral imbalance in favour of Australia dramatically declined from 8.4 to 2.0. This resulted from the decline in Korea's global trade deficits, as seen in the reduced gap between actual and hypothetical imbalance.[1] However, in the late 1970s the trend in bilateral imbalance reversed to increase from 2.0 in 1975–77 to 2.5 in

[1] Korean exports were only 13 per cent of imports in 1963, and most imports were financed by aid receipts. However, exports rose to 93 per cent of imports in 1977, nearly achieving balance in global trade. Due to the second oil shock the ratio declined considerably in 1979, but again rose to 90 per cent of imports in 1981.

Figure 9-1

Trend in Bilateral Imbalance of Australia - Korea Trade

(Three Year Averages)



Note: Bilateral imbalance is defined as a ratio of value in Australia's exports to Korea to that in Korea's exports to Australia.

Source: International Economic Data Bank, RSPacS, ANU.

1979–81. This was solely associated with greater difference in trade intensity from 1.5 to 2.0, as seen in a parallel trend between the two lines. As discussed in Chapters 5 and 8, this expansion was partly due to changes in complementarity in the process of Korea's industrial restructuring toward heavy and chemical industries, and partly due to changes in country bias as a result of the shift in Korea's imports toward raw minerals. This is the main reason why bilateral imbalance began to emerge as an important policy issue in Australia–Korea trade from the late 1970s.[2]

Figure 9–2 illustrates the relative importance of differences in complementarity and country bias as contributors to the difference in trade intensity between Australia's export trade with Korea and Korea's export trade with Australia. The difference in complementarity accounted for all the difference in trade intensity in the 1960s, but country bias became increasingly important as a source of Australia–Korea bilateral imbalance in the late 1970s.[3] As Korean exports of manufactures grew, differences in complementarity gradually declined. By contrast, difference in country bias accounted for more than half of differential intensity. The difference in country bias expanded significantly, as Korean imports became increasingly concentrated on mineral raw materials. Consequently, aid-ties became less important determinants of country bias in Korean imports, while Korean

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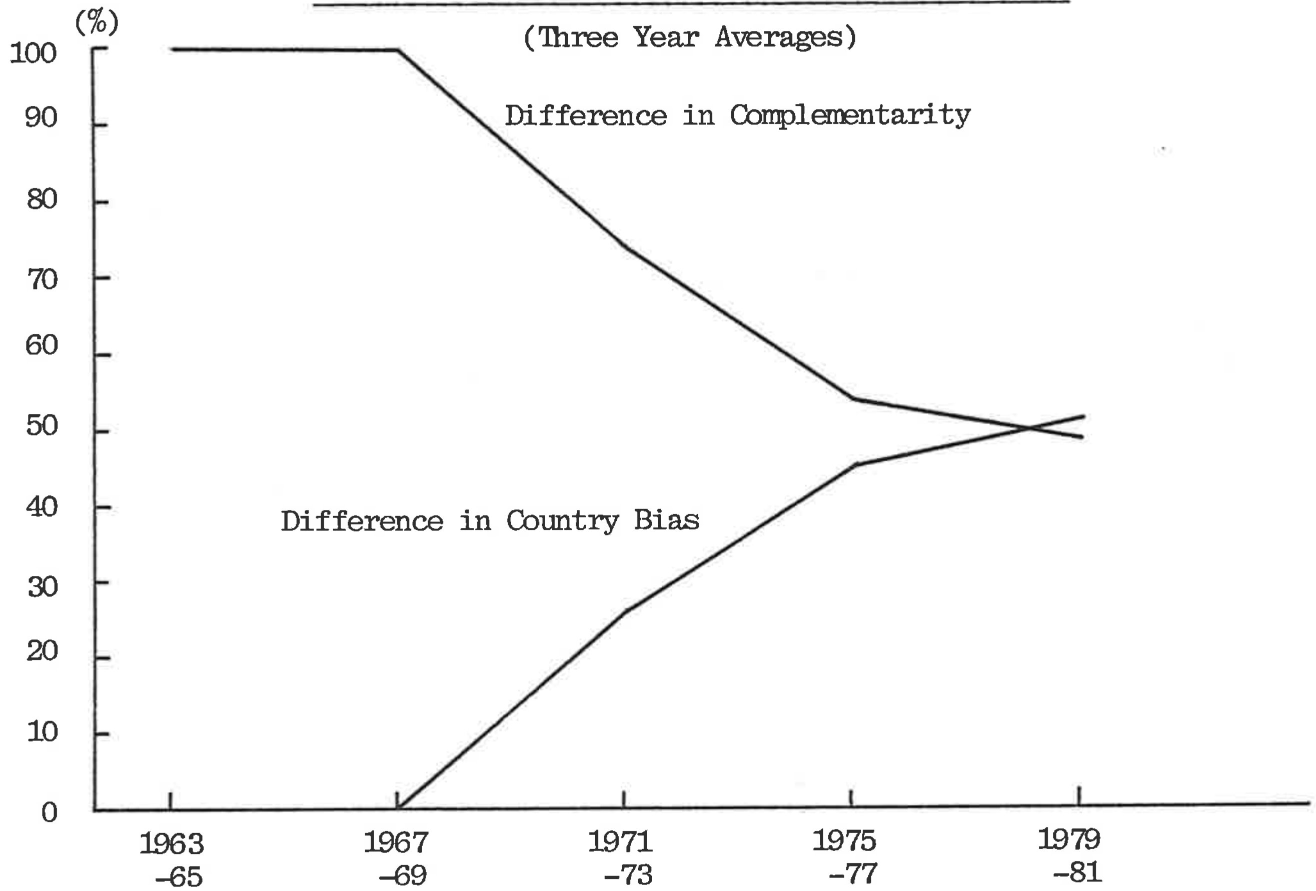
[2] The issues in Australia–Korea bilateral trade were reflected in joint communiques issued after the annual Ministerial Trade Talks. From 1978 the Korean side started to express its serious concern over continuing imbalance of trade. Other relevant factors may have been Australia's increasing anti-dumping claims against Korean exports, Australia's intention to withdraw Korea as a beneficiary of the ASTP, the fact that Korea's bargaining power had strengthened in bilateral negotiations as Korea had increased her importance as a market for Australian exports, and American pressure to seek bilateral balance in Korea–US trade.

[3] It is interesting to note the similar trend between the relative importance of complementarity as a source of difference in trade intensity and the relative importance of Korea's global trade imbalance as a source of Australia–Korea imbalance in Figure 9–1. This is largely explained by the fact that the growth of Korean exports was led by export expansion in manufactures. Hence, the more rapid growth in exports than in imports not only caused gradual improvement in global trade balance, but also created higher growth in complementarity between Korea's export and Australia's import patterns. In addition, Korea's imports of wheat and barley, which accounted for most of complementarity between Australian exports and Korean imports in the 1960s, was highly influenced by American aid.

Figure 9-2

Relative Importance of Complementarity and Country Bias as Sources of Difference in Australia - Korea Trade Intensity

(Three Year Averages)



Source: Appendix 9.

exports to Australia had to compete with closer countries in the Asian-Pacific region.

The following analysis focusses on difference in country bias for two reasons. First, difference in country bias is more subject to bilateral trade friction than difference in complementarity (and global imbalance) because the former reflects more or less favourable access of one country to another compared with other third countries, whilst the latter are due to each country's general economic structure. Another is that difference in country bias became more important as a source of bilateral imbalance between Australia and Korea.

9.2. Differential Country Bias in Bilateral Trade Flows: a Generalisation

9.2.1. A Model for Explaining Differential Country Bias

Analyses of the pattern of country bias in Chapters 7 and 8 suggested that country bias is usually different between the two directions of bilateral trade between any pair of trading countries. Our concern here is to explain differential country bias of Australia–Korea trade due to the different commodity structure between two directions. This is done by cross-sectional analysis of bilateral trade relationships between Asian-Pacific countries, of which Australia–Korea trade will be an example.

It is assumed that bilateral trade relationships are reciprocal, so that policy resistances exist to the same degree in both directions. This assumption seems reasonable since bilateral trade relationships are unlikely to persist with inequality in access to partners' markets. Commodity composition of trade then creates differential country bias in three ways. First, as discussed in the previous chapter, the presence of third countries means that economic distance is asymmetric and each trading country has a different intensity of competition in another's market. Second, potential trade volume is different and traders' market orientation and outlook vary with the potential volume. Third, the impact of individual trade resistances upon trade flows varies with each commodity group. For example, some commodities, especially manufactures, can be delivered to distant markets at relatively small cost, while low value to weight bulk commodities are generally expensive to transport. This suggests that the differential degree of country bias between the two sides in a specific bilateral trade relationship can be expressed as a function of the factors cited above: different competing opportunities, different size of potential trade, and different proportion of bulk commodities.[4]

9.2.2. Specification of Explanatory Variables

Competing opportunities faced by each trading route can be measured by an index of similarity between the export pattern of a particular country and those of other regional countries in world markets.[5] The index of export similarity between countries i and j is calculated by the following formula:

$$S_{ij} = [\sum_{k} \text{ Minimum } ({x_i}^k, {x_j}^k)] \cdot 100, \tag{9.1}$$

[4] There is some difficulty in including the different proportion of bulk commodities in a many country model as an explanatory variable. Given the fact that trade in bulk commodities is more sensitive to transport costs than trade in manufactures, it is likely that the nearer the distance between a pair of trading countries, the higher the country bias in the trading route carrying the greater proportion of bulk commodities, while the remoter the distance, the lower the country bias in the trading route carrying the greater proportion of bulk commodities. This varying aspect depending on distance of individual trading routes invites caution in using the variable in a many country, cross-section model. On the other hand, aid creates differential country bias because it is often tied to commodity exports from donor countries.

[5] The index of "export similarity" was originally used to estimate trade diversion occasioned by the General System of Preferences (GSP) of major industrial countries towards developing countries. The index was initially used by Finger and Kreinin (1979) to measure the similarity of exports of any two countries (or country groups) to a third country. If the index value is high, that is, exports are overlapped, then there is scope for trade diversion. Finger and Kreinin computed the similarity of exports between developing and industrialised countries (both of which are classified into several groups) and examined the potential for trade diversion of the General System of Preferences granted to the manufactured exports of developing countries.

where

S_{ij} = the index of similarity of country i's exports

and country j's exports in world markets,

x_i = the share of commodity k in country i's exports, and

x_j = the share of commodity k in country j's exports.

A high index of similarity between two countries means that the countries are potentially competitive with each other in world markets. The indexes are shown in Table 9–1.[6] Countries are listed in order of the proportion of manufacturing products in their exports, so that the index values are higher along the diagonal and become lower toward the upper-right corner.[7]

It should be noted that the similarity index indicates only the potential for competition between countries, and a country's accessibility to a given market in the region depends on the degree of trade resistance to the country's exports, compared with the degree

[6] In calculating the indexes we are again subject to the familiar constraint that commodity category k be homogeneous across the different exporting countries. The calculation of this index was based on the revised SITC(rev.2) 3–digit classification (see United Nations, 1975), so that all goods were divided into 235 categories. The calculation of intensity of trade indexes is based on the SITC (first revised) classification to use the same commodity classification over time. However, this analysis is applied to one point of time (1980), so commodity classification is based on the second revised SITC, adopted in 1975. Accordingly, the number of commodity groups on the 3-digit level increased from 182 to 235.

[7] There are two interesting features. First, the value of the indexes tends to be lower among primary product-exporting countries than among manufacturing exporters. This occurs because the former countries' exports are more strictly subject to the availability of a specific natural resources, so that detailed categorisation of commodity groups makes the structures differ from each other, while the latters' exports are diversified into various manufactured goods as their industrial structure has been upgraded. Second, on average, Korea and Singapore have the greatest export similarity compared with those of other regional countries, while Indonesia, New Zealand, and Australia have the least. This indicates that the former countries' accessibility to other regional markets is liable to be influenced more by the impact of differential trade barriers, while the latter's accessibility is influenced less.

Table 9-1

Similarity of Export Structure between Asian-Pacific Countries
1980

	Japan	HK	Korea	Sing.	Phil.	Thai.	Aust.	Mal.	NZ	Indon.
Japan		22.46	44.13	30.72	23.72	17.08	13.98	11.53	12.21	3.04
Hong Kong			42.00	22.98	14.76	15.58	7.52	11.21	10.27	3.16
Korea				27.47	19.55	19.17	14.37	16.79	17.02	5.92
Singapore					19.15	24.96	15.14	34.01	17.36	12.96
Philippines						16.46	24.20	25.99	15.22	11.90
Thailand							13.87	19.97	12.93	12.34
Australia								8.78	31.20	7.36
Malaysia									12.05	46.47
New Zealand										6.71
Indonesia										
Average (simple)	19.87	16.66	22.94	22.75	18.99	16.93	15.16	20.76	15.00	12.20
(weighted)	14.87	19.55	32.90	26.22	21.32	17.11	13.38	17.17	14.05	7.41

Note: Indexes are calculated by using formula (9-1) in text.
The weighted average is one weighted by each partner country's share in total exports of the region excluding the concerning country's exports.

Source: United Nations, Commodity Trade Statistics, 1980.

of resistance to its potential competitors' exports. Thus Korea's less favourable access to the Australian market is due to the fact that the similarity of Korea's exports is higher with countries which have lower trade barriers to their exports to Australia than is Australia's similarity with those countries which have lower resistances to their exports to Korea. Hence, given the earlier estimation in Chapter 7 that geographical distance is the most important resistance, a variable for the differential degree of competing opportunity between country i's exports to j and j's exports to i can be defined as follows:

$$\frac{S_{iA.j}}{S_{jB.i}} = \frac{\frac{1}{n}\sum_{A=1}^{n} S_{iA}}{\frac{1}{n}\sum_{B=1}^{n} S_{jB}}, \tag{9.2}$$

where

$S_{iA.j}$ = country i's competing opportunity when exporting to country j's market,

$S_{jB.i}$ = country j's competing opportunity when exporting to country i's market,

S_{iA} = the similarity of exports between country i and the third country group A,

S_{jB} = the similarity of exports between country j and the third country group B,

subscript A = country group which is geographically nearer to country j than i, and

subscript B = country group which is geographically nearer to country i than j.

This ratio will be used as an independent variable for representing differential competing opportunities in one partner's exports to another.

The volume of potential trade over a trading route depends not only on the match in commodity composition between the exporting country's exports and the importing country's imports, but also upon the size of the exporting country's export capacity and the importing country's import demand.[8] The potential volume of country i's exports to country j is defined in relative terms with a formula consistent with the intensity approach:[9]

$$\hat{V_{ij}} = \frac{\sum_k (\alpha^k \cdot x_i{}^k \cdot m_j{}^k) \sum_i \sum_j \sum_k (\alpha^k \cdot x_i{}^k \cdot m_j{}^k)}{\sum_j \sum_k (\alpha^k \cdot x_i{}^k \cdot m_j{}^k) \sum_i \sum_k (\alpha^k \cdot x_i{}^k \cdot m_j{}^k)}, \tag{9.3}$$

where

$\hat{V_{ij}}$ = the relative size of potential trade volume in exports from country i to j,

α^k = share of commodity k in world trade,

$x_i{}^k$ = country i's share in world exports of commodity k, and

$m_j{}^k$ = country j's share in world imports of commodity k.

The indexes of relative potential trade volume among the Asian-Pacific countries are set out in Table 9–2. For all the regional countries, the absolute size of potential trade

[8] Note the difference between the complementarity index and the potential trade volume index. Though the former also indicates potential trade volume, it does not take account of the size of each trading country because the intensity approach nets out the size effect. But the potential trade index takes account of size. Each country's share in world trade of each commodity (which was reaggregated into 6 commodity group according to the SITC 1-digit level) is taken into account, together with the degree of match of commodity composition. Though the broad categorisation is likely to affect the results, it is used to simplify calculations.

[9] Each component of this formula is compared with a standardising factor in Garnaut's index of relative distance, which was presented in footnote 10 in Chapter 7.

Table 9-2

Relative Size of Trade Potential between Asian-Pacific Countries
1980

	Japan	HK	Korea	Sing.	Phil.	Thai.	Aust.	Mal.	NZ	Indon.
Japan		.318	.214	.277	.248	.176	.349	.335	.296	.284
Hong Kong	.135		.189	.244	.210	.149	.321	.264	.278	.263
Korea	.129	.417		.235	.210	.150	.312	.264	.271	.265
Singapore	.321	.232	.311		.266	.272	.258	.258	.258	.256
Philippines	.401	.297	.373	.248		.163	.207	.225	.191	.243
Thailand	.273	.339	.253	.209	.202		.211	.256	.312	.276
Australia	.364	.252	.323	.236	.231	.223		.241	.208	.263
Malaysia	.472	.216	.415	.297	.231	.252	.218		.215	.214
New Zealand	.352	.291	.319	.222	.211	.182	.193	.247		.268
Indonesia	.532	.122	.362	.295	.296	.426	.166	.172	.221	

Note: Indexes are calculated by using formula 9-3 in text.

Source: United Nations, Yearbook of International Trade, 1981.

volume is highest in export and import trade with Japan, reflecting Japan's large size. However, relative size is quite different. Relative size tends to be smaller between exporters of manufactures and between exporters of primary products, while it is higher between manufacturing and primary exporting countries. Countries are again listed according to the proportion of manufactures in their exports, so that the index values are lower along the diagonal and higher in the upper-right and bottom-left corners.

Finally the intensity of aid index, defined in Chapter 7, is used as a variable for aid flows. Statistical data are presented in Appendix 8.

Hence, a basic model can be defined as follows:

$$\left(\frac{B_{ij}}{B_{ji}}\right) = f\left(\frac{S_{iA.j}}{S_{jB.i}}, \frac{\hat{V}_{ij}}{\hat{V}_{ji}}, A_{ij}\right), \tag{9.4}$$

where,

$\frac{B_{ij}}{B_{ji}}$ = the ratio of country bias in country i's exports to j to that in j's exports to i,

$\frac{S_{iA.j}}{S_{jB.i}}$ = the ratio of competing opportunities from third routes faced by trading route from i to j to that faced by trading route from j to i,

$\frac{\hat{V}_{ij}}{\hat{V}_{ji}}$ = the ratio of potential trade volume in trade from i to j to that in trade from j to i, and

A_{ij} = aid flows from country i to j.

9.2.3. The Final Model and Some Limitations

Since all variables except for the index of intensity of aid flows take the form of ratios, the estimated equations are in log linear form. In addition, the effect of aid flows upon trade flows seems to vary with the conditions attached to the aid, and this condition varies among individual aid donors. Indeed, the estimation of country bias in Australian trade in Chapter 7 showed that aid flows from Australia contributed to increased country bias in her import more than in her export trade, contrary to the usual belief. Hence, a dummy variable was introduced to ascertain the possible differential effect of aid flows across individual aid donors.

$$\frac{B_{ij}}{B_{ji}} = \alpha_0\left(\frac{S_{iA.j}}{S_{jB.i}}\right)^{\alpha_1}\left(\frac{\hat{V}_{ij}}{\hat{V}_{ji}}\right)^{\alpha_2} A_{ij}^{(\alpha_3+D_1\cdot\alpha_4+D_2\cdot\alpha_5)}, \tag{9.5}$$

where

D_i indicates dummy variables for individual

aid donors: D_1 for Japanese aid flows

D_2 for Australian aid flows, and

the others are the same as defined previously.

The predicted relationships between dependent variable and each independent variable are $\alpha_1 < 0$, $\alpha_2 > 0$, and $\alpha_3 > 0$.

It should be emphasized that this model is not intended as a complete theory of differential country bias between the two directions in a bilateral trade relationship. However, the model should provide a valuable foundation for understanding the causes of differential country bias, and hence, in guiding bilateral trade policy.

This model has several limitations. The first limitation comes from the assumption that the strength of policy resistances is the same in both directions of a bilateral trade relationship. This is not so. For example, the advanced countries grant preferential treatment to the developing countries' manufactures. In addition, even if bilateral policy is reciprocal, the effects would be different, partly because the importance of a given policy resistance would differ with each other's trade relationships, and partly because of the differential effects of the policy resistance across commodities, just as in the case of differential effects of transport costs.

The second limitation is a practical one. Statistics on trade flows are widely divergent between importing and exporting countries, even if consideration is given to the differences between c.i.f. and f.o.b. values. This divergence is particularly wide for bilateral trade between the intermediate trade centre and its neighbouring countries, such as trade between Singapore and Indonesia and Malaysia, and between Hong Kong and Korea, Indonesia, and the Philippines (see Appendix Table A 8–1).[10] So, the differential country bias between the two directions of those trade flows are unreasonably wide between country bias indexes calculated on export and import data. Here, country bias calculated on export data is used on the ground that export data would be more reliable. Thirdly, as discussed previously, an important factor for differential country bias, the different proportion of bulk commodities, is deliberately excluded.

9.2.4. The Regression Results

The results of the regression are presented in Table 9–3. Despite the above-mentioned limitations, the table shows several statistically impressive results. First, the coefficients of determination for the regression equations are reasonably high: the defined variables explain about half the variation in country bias. Secondly, the coefficients of variables measuring trade potential volume and competing opportunity are extremely stable with the predicted sign, meaning that both variables have a systematic relationship with differential country bias.

The trade potential variable is the most important explanatory variable with

[10] This divergence seems to be attributable to deliberate statistical manipulation. All of these countries imposed trade imbargoes on their trade with China. This is illustrated in a paper by Sung (1985), explaining the role of Hong Kong in China's entry into world markets.

Table 9-3

Estimation of Differential Country Bias

	Const.	$\hat{V}_{ij}/\hat{V}_{ji}$	$S_{iA.j}/S_{jB.i}$	A_{ij}	D_1	D_2	$\bar{R}^2$	F-value	D-W Test
9-1	-0.309	1.325 (5.366)***	-0.273 (1.248)	0.060 (1.958)*			.488	15.001***	1.981
9-2	-0.050	1.321 (5.460)***	-0.326 (1.392)	0.089 (2.548)**		-0.078 (1.637)*	.509	12.380***	2.102
9-3	-0.086	1.329 (5.063)***	-0.326 (1.484)	0.085 (1.420)	0.005 (0.079)	-0.075 (1.131)	.496	9.659***	2.101
9-4	-0.576	1.403 (5.501)***	-0.291 (1.335)	0.033 (0.859)	0.057 (1.154)		.492	11.673***	2.031

Note: *** indicates significance at the 1 percent level, ** significance at the 5 percent level, and
* significance at the 10 percent level.

$\hat{V}_{ij}/\hat{V}_{ji}$: differential size of relative trade potential; $S_{iA.j}/S_{jB.i}$: differential competing opportunity; A_{ij}: index of intensity of aid flows; D_1: dummy variable for aid flows from Japan; and D_2: dummy variable for aid flow from Australia.

significance at the one percent level, while the competing opportunity variable is significant at around the ten per cent level. The lower significance of competing opportunity may come partly from ignorance of the size of the import market and export capacity of each country, and partly from difficulty in defining the countries which have lower resistance to a given market than a particular exporter has.[11] For example, Korea's imports of capital equipment tend to be dominated by Japanese exports, while Japanese imports of a number of labour-intensive manufactured goods may be large enough to absorb exports from Korea and Hong Kong and leave room for other exporters.

The greater explanatory power of the trade potential variable has important implications for bilateral balance. Though trade potential was defined differently from complementarity, by incorporating each country's relative size in world trade, both indexes are basically the same in that both measure the degree of match between the commodity composition of the exporting country's exports and the importing country's imports. Given the size of each country's trade, this suggests that in any bilateral trade relationship, trade flows in the route with better fit tend to be larger than trade flows with less fit due to

[11] There are several interesting features with respect to the pattern of difference in country bias in every pair of trading countries. Firstly, the only major exporter of high technology manufactured goods in the region, Japan, tends to have a higher value of country bias in her export than in import trade with the other regional countries, with the exception of her trade with Australia, New Zealand, and Korea, where country bias is slightly higher in her import than in export trade. Secondly, Hong Kong, whose exports are highly competitive with Northeast Asian countries and which is nearer to the manufacturing importing South Pacific countries, tends to have higher country bias in her export than in import trade with the latter countries, while the opposite in her trade with the former countries. Thirdly, the only major exporter of manufactures among ASEAN countries, Singapore, has much higher country bias in her export than in import trade with countries surrounding her, whose exports of primary products are competitive with one another. Lastly, two Oceanian countries, Australia and New Zealand, which export primary products without any significant competition from the region, and import manufactured goods, in general have the higher country bias in their export than in import trade with the regional countries except for the nearest manufacturing exporters to them, Hong Kong and the Philippines in the case of Australian trade, and Hong Kong and Singapore in the case of New Zealand. All of these illustrations indicate that differential country bias in each pair of trading countries is associated with the commodity composition of each country's exports and imports and their geographical location in the region.

higher complementarity. This is further magnified by higher country bias through larger volume of potential trade, *ceteris paribus.*

Another interesting feature is associated with aid flows. The coefficient of aid is significant at the 10 percent level with a positive sign, supporting the widespread conception that aid flows tend to increase country bias more in the aid-donor's export than in her import trade. However, the effect of aid on country bias is different between individual aid donors. The addition of a dummy variable for Australia improved the performance of the regression estimate, as seen in the higher adjusted coefficient of determination (see Equation 9–2 in Table 9–3). In addition, the introduction of the dummy variable not only increased the significance of the aid variable with positive sign, but its own coefficient is statistically significant with negative sign. This shows that Australia's aid tends to increase country bias in import rather than export trade, while the other two countries' aid raises country bias in their export rather than import trade.[12] This result is consistent with the statistical results of the pattern of country bias in Australian trade discussed in Chapter 7.

The central conclusion is that the degree of country bias in any bilateral trade tends to differ persistently and significantly in both directions because of structural factors inherent in each trade flow, even without policy discrimination. This has important implications for actual trade relationships in the current trend towards discriminatory agreements aiming at bilateral balance.

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12 An attempt was made to reveal the importance of aid flows in differential country bias in Japan's trade with other regional countries (nine observations). The result is:

$$log(\frac{B_{Ji}}{B_{iJ}}) = 1.368 + 0.590 log(\frac{\hat{V}_{Ji}}{\hat{V}_{ij}}) - 0.092 log(\frac{S_{Ji}}{S_{iJ}}) + 0.076 A_{ji} \qquad \bar{R}^2 = .637$$

$$(3.247) \qquad\qquad (0.583) \qquad\qquad (2.853)$$

Note that the coefficient of aid varible is significant at the 5 percent level with a positive sign.

9.3. Implications for Australia–Korea Bilateral Imbalance

The reasons for differential country bias in Australia–Korea trade emerge from what has been said in the previous chapter. Here, our concern is a comparison of the observed differential with the differential predicted from our estimation. The following is a comparison between the actual difference in country bias and that expected from the second regression equation 9–2 listed in Table 9–3.

Observed difference (based on export data)	1.34
Observed difference (based on import data)	2.14
Expected difference from regression equation	1.52

This comparison suggests that differential country bias can be explained by structural factors. The actual difference, when based on export data, is slightly lower than the difference expected from our estimation, but when based on import data, the actual difference is much higher than expected. This is because import data include freight and insurance costs which are important in trade in bulk commodities. In addition, it should be noted that the variable representing proportion of bulk commodities, which appeared very important in differential country bias in Australia–Korea trade (discussed in Chapter 8), was not included.

It is useful to draw conclusions on bilateral imbalance in Australia–Korea trade and policy design. As seen in Chapter 5, both Australia's exports and Korea's imports are highly concentrated on the same few bulk commodities, whereas both Korea's exports and Australia's imports are diversified over a number of manufactures. Accordingly, the degree of complementarity between the latter two structures was not as strong as the degree of complementarity between the former two.[13] This difference alone accounted for

[13] Note that this difference is a result of each country's existing trade specialisation pattern on the assumption that both countries' overall level of openness is accepted as given. However,

all difference in intensity of Australia–Korea trade in the 1960s, but its relative importance gradually declined in the 1970s to make up slightly less than half by 1979–81.

This difference in the degree and structure of complementarity underlies asymmetry in economic distance, causing higher country bias in Australia's export trade with Korea than in the opposite direction. This is another factor in bilateral imbalance in Australia–Korea trade, and its importance as a source of imbalance sharply rose in the 1970s. Differential country bias is mostly accounted for by three factors: the different competition from third countries in each trading route; the different volume of potential trade between two directions; and different transport costs among commodities.

First, in almost all of Australia's major exports, Australia is the nearest source of Korean imports, while Korea is only one of many sources of Australian imports in Korea's major exports. In addition, Korean competitors have relatively lower trade resistances in trade with Australia than Korea does in terms of geographical and historical ties. This is the main factor favouring Australian access to Korean imports, while discourging Korean access to Australian imports. Second, the potential volume of trade is much higher in Australian exports to Korea than in Korean exports to Australia. This creates "asymmetry" in market orientation and outlook between the two countries' traders: Korean traders see Australia as a source of imports rather than as a market for exports, while Australian traders see Korea as a market for exports rather than as a source of imports. Third, the influence of transport costs varies with commodities. Australian exports to Korea are dominated by low value to weight bulk commodities in which trade is highly sensitive to transport costs, and nearby sources of supply offer distinct cost advantages to international buyers, while Korean exports to Australia are concentrated on manufactures which are in general delivered to distant markets at relatively small cost, so

it is not likely that greater open of both economies change the difference, since both countries' protection discriminated against imports from the other, as seen in Chapter 6.

that the location of foreign markets does not much affect geographical distribution of their exports.

These factors also explain reasons for increasing importance of differential country bias in bilateral imbalance over time: because of increasing competition of Korea's exports with newly emerging manufacturing exporters; because of the rising share of raw minerals in Korean imports; and because of the decline in aid-financed imports in Korean imports. All of these suggest that bilateral imbalance in Australia–Korea trade resulted from structural factors inherent in both countries' trade rather than from policy discrimination.

The continuous upgrading of Korea's export pattern towards more sophisticated consumer durables and producer goods has two implications for country bias in Korea's exports to Australia. First, this upgrading will differentiate Korean exports from those of other regional developing countries, contributing to reducing competition of Korean exports in Australian markets with other regional developing countries. Second, exports of those new commodities is closely connected with joint venture and direct commercial activities such as marketing organizations and servicing facilities. This will contribute to increasing familiarity between the two countries and to improving service facilities to support trade. This development will increase the relative access of Korean exports to Australian markets.

These structural reasons suggest that the current bilateral imbalance will continue — even increase — as Korea's industrial structure is continuously concentrated on heavy and chemical products, and that bilateral trade policy should be designed in a broader perspective. Most importantly, the structural nature of bilateral trade between Australia and Korea, including its extreme imbalance, appears to be a direct and an indirect consequence of domestic availability of industrial raw materials. Korea imports from Australia most kinds of natural materials which Korea requires for manufactures. By contrast, Korea's exports, based on imported materials and abundant domestic labor, compete with products made in many other countries. Thus, Korea's export growth in processed manufactures leads directly to an increase in Korean demand for Australian exports; and an asymmetric interdependence between Australia and Korea.

The first feature suggests that Australia and Korea should cooperate in multilateral trade negotiations, while the second feature implies unequal bargaining power in trade negotiation. The latter point deserves further discussions. In view of the asymmetric dependence on each other, Australia has more bargaining power. However, Korea's increasing importance as a market for Australian products might give Korea a stronger position, though this will depend on future markets for primary products. This suggests that Korea's interest is not in adhering to bilateral balance, but in expanding trade flows in two ways. Korea has to buy raw materials on competitive terms, in order that her exports remain successful in international markets.

However, there is universal preoccupation with bilateralism. This might eventually affect Korea's overall balance of trade position and trade relationships. Taking account of Australia's size in Korean exports and world trade, there is limited room to resist bilateralism. The current increasing imbalance in Australia–Korea trade will have to be considered in this context. All of these indicate that both countries have common interests in a broader, long-term, and cooperative approach toward bilateral imbalance.

9.4. Summary

This chapter is concerned with an explanation of persistent imbalance of Australia–Korea trade. Until the begining of the 1970s much of the imbalance was due to Korea's global imbalance. Hence, as Korean exports grew more rapidly than her imports, the actual imbalance fell sharply. The imbalance due to differential intensity of trade also gradually improved until the mid-1970s, but deteriorated in the late 1970s, when Korea began to concentrate on basic material industries, because differences in both complementarity and country bias further expanded. Differential country bias became increasingly important for bilateral imbalance.

The econometric analysis makes clear that country bias differs in both directions because of the different commodity composition, even without policy discrimination. This explains the difference in country bias between Australia's exports to Korea and Korea's exports to Australia. Accordingly, bilateral imbalance in Australia–Korea trade primarily results from the commodity structure of each country's trade rather than policy discrimination. These reasons for bilateral imbalance suggest that current tendencies will continue as Korea's industrial structure continuously concentrates on heavy and chemical industries, and that bilateral trade policy should be designed with a multilateral perspective in mind.

CHAPTER 10

A COMPARISON WITH AUSTRALIA–JAPAN TRADE

In many respects the development of the Korean economy in the 1970s resembles that of the Japanese economy over the decade 1955–65 (see Edwards, 1980). Both countries are very densely populated and resource-poor. In addition, Korea's industrial policies currently emphasize industrial restructuring toward heavy and chemical industries and its trade policies encourage exports from those industries while encouraging imports of raw materials and high technology, just as Japan's industrial and trade policies did from the mid-1950s. Thus it is useful to compare the development of trade between Australia and Korea (A–K trade) with that between of Australia and Japan (A–J trade) to examine the degree of similarity between them and thereby comment on the likely prospects for future A–K trade.

Section 1 compares the size and commodity structure of Korean trade in the 1970s with Japanese trade in the decade preceding the mid-1960s. Section 2 compares the importance in Australian trade of the present A–K trade and A–J trade two decades ago, using our three indexes — trade intensity, complementarity, and country bias. The discussion is extended to the development of complementarity and country bias in A–J trade after the mid-1960s to see what this might imply for future A–K trade. Section 3 focuses on Australian exports to Korea of raw mineral materials, in the light of the importance of mineral trade in this trade relationship.

10.1. Comparison of Trade Performance

The years 1964-66 in Japanese trade history are comparable with years 1979–81 in Korean history. Factor endowments shifted from a surplus to a shortage of unskilled labour (Minami, 1970 and Federation of Korean Industries, 1979) and heavy and chemical products accounted for more than half manufactured exports.[1]

In the decade preceding the mid-1960s, Japanese trade grew at an annual rate of 15 per cent in exports and 12 per cent in imports (in nominal terms), compared with annual growth for world trade of 8 per cent. As a result of this relatively rapid growth, Japan's share in world exports rose from 2.5 to 4.3 per cent between 1954–56 and 1964–66. This compares with the growth of Korea's share from 0.4 to 1.0 per cent in world exports and from 0.7 to 1.2 per cent in world imports in the 1970s, as a result of an annual growth rate of around 30 compared with 19 per cent for world trade.

This rapid growth in both countries' trade was accompanied by huge structural changes. Table 10–1 illustrates that the structural change in Korea's exports in the 1970s duplicated that in Japan's exports during the decade following the mid-1950s. For both countries, manufactures played a dominant and increasing role over time. Within the manufacturing sector labour intensive manufactures, mainly textile products, initially dominated, but their importance was rapidly replaced by metal products and machinery and equipment.

Similarity is also seen in structural changes in imports, although the structure was initially quite different (Table 10–2). For both countries, raw minerals and fuels increased their importance but they replaced agricultural raw materials in Japan's imports and

[1] This comparison does not means that the structure of the Korean economy in 1979–81 is comparable with the Japanese economy in 1964–66. In many respects the Japanese economy in the mid-1960s is more based on domestic markets than the Korean economy at the end of the 1970s. First, the Korean domestic market is much smaller than the Japanese even after netting out the difference in GNP (the size of population and per capita income). For example, the degree of dependence on exports, as a ratio to GNP, was 38 per cent in Korea in 1979–81, while that in Japan was 10 per cent in 1964–66. Second, Japan had a more broadly based manufacturing sector in the mid-1960s than Korea had at the end of the 1970s, and Japan's exports were more diversified in terms of commodity structure and geographical distribution in the mid-1960s than Korean exports in the latter 1970s.

Table 10-1

Commodity Composition of Japan's Exports 1954-1981 and Korea's Exports 1971-1981
(Three Year Averages)
(%)

	Japan's Exports						Korea's Exports		
	1954 -56	1959 -61	1964 -66	1969 -71	1974 -76	1979 -81	1971 -73	1975 -77	1979 -81
Primary products (SITC 0, 1, 2, 3, 4)	13.1	10.0	6.3	4.5	2.4	2.2	16.3	14.5	9.6
Textile products (266, 56, 84, 851)	35.0	31.1	19.5	12.8	7.2	4.7	41.6	38.9	37.0
Metal products (67, 68, 69)	17.0	14.3	18.8	19.1	22.1	16.2	5.5	8.6	13.5
(Iron and steel)	(1.1)	(1.3)	(14.0)	(14.4)	(17.6)	(12.1)	(5.2)	(4.4)	(11.3)
Machinery & equipment (7, 86)	16.8	23.3	34.8	44.9	50.5	64.4	11.4	17.8	24.5
Chemicals (5)	4.6	4.5	6.4	6.3	6.6	5.0	1.8	1.8	3.7
Other manufactures	13.5	16.8	14.2	12.4	11.2	7.5	23.4	18.4	11.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: United Nations, Yearbook of International Trade, various years.

Table 10-2

Commodity Composition of Japan's Imports 1954-1981 and Korea's Imports 1971--1981

(Three Year Averages)

(%)

	Japan's Imports						Korea's Imports		
	1954 -56	1959 -61	1964 -66	1969 -71	1974 -76	1979 -81	1971 -73	1975 -77	1979 -81
Primary products	78.1	75.7	76.4	70.4	78.3	76.4	38.6	46.3	51.3
Food (SITC 0. 1. 4)	15.9	13.1	18.3	14.6	14.6	11.7	15.6	9.6	9.6
Agricultural materials (2 ex. 226, 27, 28)	37.4	33.1	24.9	19.0	12.1	10.6	13.6	13.1	11.3
Mineral raw materials (27, 28)	12.8	15.6	14.3	15.0	8.8	6.5	1.5	3.8	3.9
Fuels (3)	12.0	13.9	18.9	21.8	42.8	47.6	7.9	19.8	26.5
Manufactured materials	5.8	6.4	7.2	10.1	7.4	9.1	21.6	13.4	11.9
Textile materials (65)	0.6	0.4	0.6	1.2	1.5	1.4	8.0	3.8	2.1
Metal products (67, 68, 69)	3.5	4.5	5.1	6.0	3.1	3.7	9.2	7.7	7.3
Others materials	1.7	1.5	1.5	2.9	2.8	4.0	4.4	1.9	2.5
Chemicals (5)	3.8	5.9	5.3	5.2	4.0	4.3	8.4	9.9	8.7
Machinery & equipment (7, 86)	11.1	10.6	9.1	11.0	6.6	6.0	29.5	28.4	26.6
Other manufactures (8-86)	1.2	1.4	2.0	3.3	3.7	4.2	1.9	2.0	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Commodity classification is different from Table 10-1 to account of distinguishing pattern of both countries' import from their export pattern.
Source: United Nations, Yearbook of International Trade, various years.

manufactures in Korea's imports. Another common pattern is the declining weight of foodstuffs over time.

The difference in the structure of imports in the initial period deserves more discussion to show that it is merely a consequence of changes in world industrial and trade patterns.[2] As pointed out in Chapter 4, technological advances led to large-scale substitution of synthetic for natural raw materials, especially for textile fibres. In the mid-1950s, Japan's strong export specialisation in textile products corresponded with strong import specialisation in natural fibres (agricultural raw materials). The declining importance of textile products in exports coincided with the declining importance of agricultural raw materials in imports. This contrasts with Korean textile industries, which concentrated more on synthetic fibre from the start. This is illustrated by the higher share of intermediate textile materials in Korean imports, which was 8.0 per cent in the early 1970s, compared with only 0.6 per cent of Japanese imports in the mid-1950s. This difference is mirrored in the different share of agricultural raw materials, which was 37.4 per cent in Japan's imports and 14.6 per cent in Korea's imports, though raw timber was another major component of agricultural raw materials in both countries' imports.

Another influence is the oil-shock of 1973. After 1973, the share of fuels more than doubled in Korean imports and nearly doubled in Japan's imports. There was nothing like

[2] In addition, note that the differential structure of imports also reflects Japan's more broadly based manufacturing sector in the mid-1950s compared with the Korea's in the early 1970s. Consequently, Korea's concentration of exports on labour intensive final consumer goods corresponded with her concentration of imports on capital equipment and manufactured input materials, such as textile yarn and fabric, metal products, and other manufactured input materials. Accordingly, the shift in Korea's export pattern from textile to metal products corresponded with a shift in her import pattern from manufactured input materials toward raw materials. By comparison, manufactures always played a minor role in Japanese imports, and the shift in the Japan's export pattern corresponded with a shift in the import pattern from agricultural toward mineral raw materials. Kojima (1970) noted this difference in the pattern of industrialisation between the Japanese and Korean economies, and termed Japan's industrial structure as "full range industrialisation" or "one-set self-reliant structure" (Wan-seto jikyu-gata kozo) and Korea's industrial structure as "truncated industrialisation" or "processing trade industrial structure" (Kako boeki-gata kozo).

this at a comparable stage of Japanese development.

Given the similar pattern between Japanese trade in the mid-1960s and Korean trade in the late 1970s, the subsequent structural change in Japan's trade might shed light on future structural change in Korean trade. Japanese exports became increasingly concentrated on machinery and equipment and metal products. These two commodity groups rose to account for 72 per cent of Japan's total exports by the mid-1970s. However, in the late 1970s the share of metal products dropped sharply from 22 to 16 per cent, and machinery alone accounted for nearly two thirds of total exports by the 1970s.

In the import pattern, there are also important changes after the mid-1970s. Except for the continuously increasing share of fuels, primary products, chiefly raw minerals, experienced a considerable drop of their share by 1980, while labour intensive manufactures, such as textile products, other final consumer goods, and manufactured input materials, started to grow. In particular, note that the share of raw minerals fell by more than half during the 1970s, after substantial growth in the preceding decade.

As would be expected from the theoretical discussion in Chapter 2, these changes in the commodity composition were associated with a geographical redirection of Japanese trade due to change in complementarity (and country bias). As Japan's trade pattern became one typical of technology-abundant advanced industrial countries, other developed countries became less important as both Japan's import sources and export markets. For example, North American and European developed countries accounted for 45 per cent of Japanese imports and 51 per cent of exports in the years 1964–66, but their share steadily declined and by 1979–81 accounted for only 29 and 42 per cent respectively. This decline was associated with the lower importance of technology intensive manufactures, such as chemicals and machinery and equipment, in Japan's imports, and labour-intensive manufactures in exports.[3]

The share lost by these developed countries was made up by developing and Oceanian developed countries. The share of these countries in Japan's exports steadily and uniformly grew, except for developing countries exporting labour intensive manufactures (the four Asian Newly Industrialising Countries comprising Korea, Taiwan, Hong Kong, and Singapore) whose share slightly declined in the latter 1970s after rapid growth. A most notable feature is changes in country groups' share in Japanese import trade before and after the mid-1970s.[4] During the decade preceding the mid-1970s, the share of exporters of industrial raw materials grew — for example, from 8 to 10 per cent for Oceanian developed countries, from 7 to 8 per cent for three ASEAN countries (Malaysia, Philippines, and Thailand), and from 14 to 18 per cent for other developing countries, whereas the share of the four Asian NICs was unchanged at the 3 per cent. This pattern completely reversed in the latter 1970s. The four Asian NICs' share grew nearly by three times from 3 to 9 per cent, while shares of industrial raw material exporters dropped sharply: from 10 to 6 per cent for Oceanian developed countries, from 8 to 5 per cent for the three ASEAN countries, and from 18 to 13 per cent for other developing countries.

This complies with the theoretical implication discussed in Chapter 2. As Japan became a capital- and technology-abundant country, exporters of labour intensive manufactures started to replace raw material exporters as Japan's import source, and the latter became more important in Japan's export markets. These changes in the commodity and geographical pattern of Japan's trade, especially imports, had important implications for Australian trade through impacts on trade complementarity between Australia and Japan.

[3] Shares of each country (and country group) are obtained from United Nations, *Yearbook of International Trade*, various years.

[4] There was a drastic change in shares of oil-exporting countries because of a series of oil shock since 1973. The share of oil-exporting countries (Middle East countries and Indonesia) declined from 19 per cent in the mid-1960s to 16 per cent by the early 1970s, but thereafter more than doubled to 38 per cent by 1979–81. However, focus is given on two country groups — exporters of labour intensive manufactures (4 Asian NICs) and exporters of industrial raw materials.

10.2. Relative Importance in Australian Trade

The previous section revealed that Korean trade in the 1970s and Japanese trade in the decade preceding the mid-1960s enjoyed the same rapid growth and structural changes. Now, we turn to the importance in Australian trade of A–J trade two decades ago and A–K trade in the 1970s.

In 1955 Japan absorbed 9 per cent of Australian exports. This proportion grew to 17 in 1965, and to 35 in 1976, and then declined to 25 per cent by the end of the 1970s. The proportion of Australian imports supplied by Japan was 3, 9, 21, and 20 per cent during the same period. Likewise Korea's share in Australian exports grew by more than five times from 0.6 in 1971 to 3.4 per cent by 1981, and in Australian imports from 0.2 to 1.2 per cent during the same period. This comparison indicates that the growth of Japanese and Korean global trade created disproportionately high growth in their bilateral trade with Australia. However, A–J trade in the mid-1950s was much more important in Australian trade than A–K trade in the 1970s. This difference was due to the relative size of Japan and Korea in world trade. As seen previously, the relative size of Japan in world trade over the period 1954 to 1966 was about five times as large as that of Korea in the 1970s.

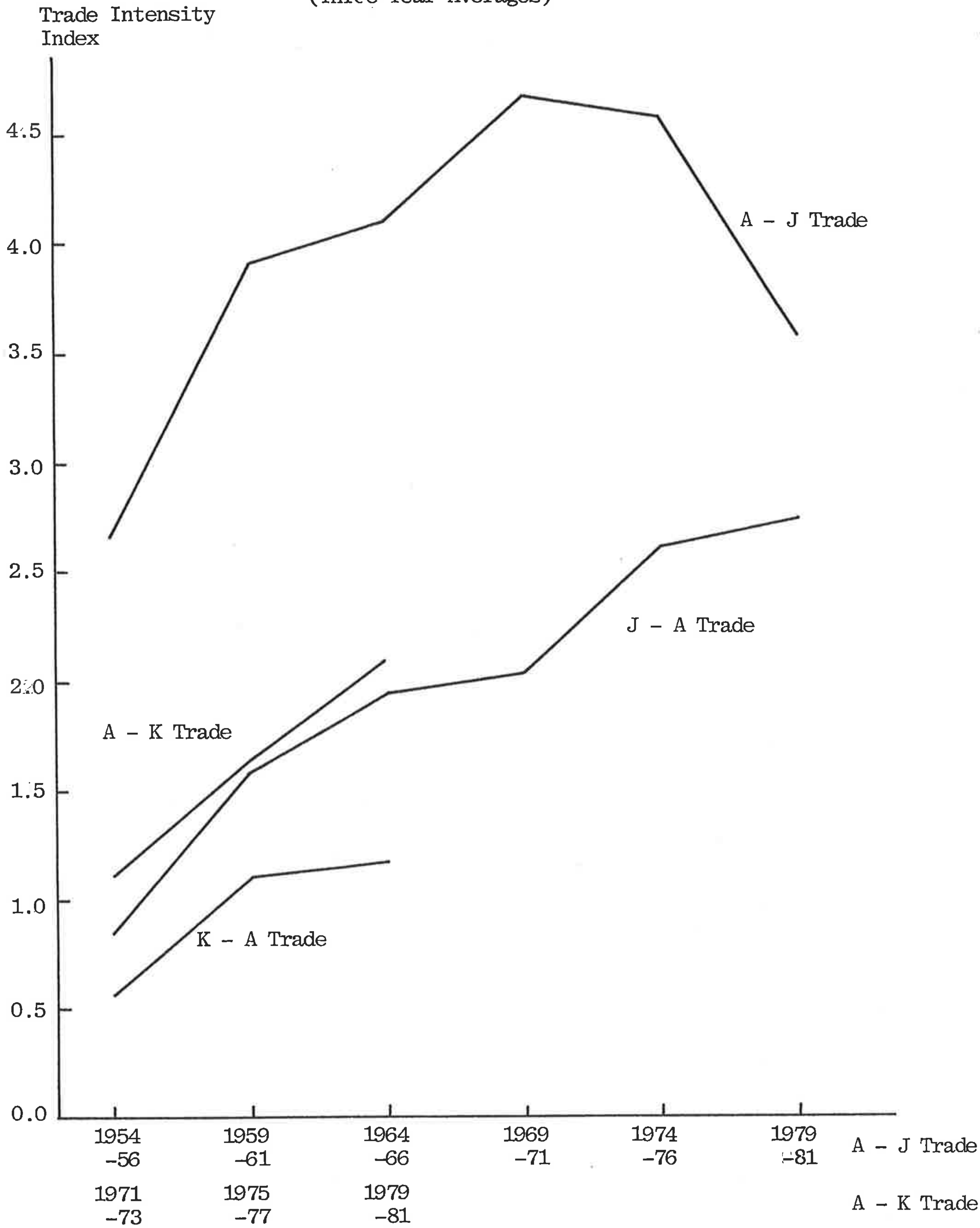
In order to net out this size effect, trade intensities are calculated. Figure 10–1 presents the trade intensity in A–J trade over the period 1954 to 1981 and that in A–K trade during the 1970s.[5] Figure 10–1 reveals several common features between Australia's trade with Japan and Korea in the comparable period. First, the trade intensity in both trade relationships more than doubled in one decade. Second, trade intensity in Australia's export trade is commonly more than twice as high as that in import trade. The only difference is that intensities in A–J trade are roughly twice as high as those in A–K trade.

[5] The degree and structure of three indexes (trade intensity, complementarity, and country bias) in A–J trade over the period 1913 to 1963, presented in this chapter, are extracted from Drysdale (1967).

Figure 10-1

Intensity of Trade in Australia's Trade with Japan and Korea

(Three Year Averages)



Sources: International Economic Data Bank, RSPacS, ANU, and Drysdale, (1967).

After the mid-1960s, trade intensity in Australian export trade with Japan continued to grow from 4.1 to 4.7 by the early 1970, but thereafter it stagnated and then dropped to 3.6 in the late 1970s. By contrast, the intensity of Australia's import trade continued to rise, but by 1980 was still far below the intensity of export trade. These features can be analysed using our two factors, trade complementarity and country bias.

10.2.1. Changing Commodity Composition

Before comparing the degree and structure of complementarity and country bias, it is useful to look at changes in the commodity composition of A–J trade over the period 1954 to 1981 (comparable with those in A–K trade over the 1970s).

More than 90 per cent of Australian exports to Japan was accounted for by primary products throughout the whole period (see Table 10–3). There was a huge change within the primary products group, however. In the mid-1950s agricultural raw materials, mainly wool, accounted for more than three-quarters of Australia's exports to Japan, but dropped their share to 16 per cent by the end of the 1970s. Raw mineral materials and fuels (coal) made up the proportion lost by wool. The combined share of these two commodity groups grew from 3 to 53 per cent over the period. Note that the two commodity groups have different trends in the 1970s: the share of minerals declined from 34 to 25 per cent after rapid growth in the preceeding period, whereas that of fuels grew from 15 to 28 per cent. Another notable feature is the increased importance of foodstuffs from 14 in the mid-1950s to 27 per cent by the end of the 1970s. This increase was attributed solely to non-grain foods. During the period grain foods lowered in their share from 12 to 6 per cent, while non-grain foods grew from 2 to 21 per cent. Also note that (natural resource based) metal products accounted for most Australian manufactured exports to Japan.

These are compared with changes in the composition of Australia's exports to Korea in the 1970s (Table 10–3), where primary and metal products made up almost all of Australian exports. Furthermore, there were similar changes: mineral materials, fuel, and non-grain foods replaced agricultural raw materials and grain foods, though foods as a whole lost slightly their importance. This illustrates that change in Australia's exports to Korea in the 1970s duplicated earlier change in Australia's exports to Japan.

By contrast, more than 90 per cent of Australia's imports from Japan was made up of manufactured goods (Table 10–4). At the end of the 1970s primary products accounted for only 1 per cent of Australia's imports from Japan. Again, there were large changes within manufactures over the period. Most important was the increased importance of machinery and equipment and the reduced importance of textile products. In the mid-1950s machinery and equipment accounted for only 7 per cent of Australian imports from Japan, but made up more than two-thirds at the end of the 1970s. This increase was at the expence of all other commodity groups except chemicals. In particular, textile products, which accounted for nearly half in the mid-1950s, dropped to only 5 per cent of Australia's imports from Japan by the end of 1970s. Note that shares of metal products also started to decline in the 1970s.

Again, these can be compared with changes in Australian imports from Korea in the 1970s, where manufactures also played an increasingly dominant role and textile products were gradually replaced by metal products and machinery and equipment. This indicates that changes in Australia's imports from Korea in the 1970s also resembled that in Australia's imports from Japan in earlier years.

Although the similar commodity composition and its change between earlier A–J trade and present A–K trade reflects the similar pattern of their global trade, a comparison between the commodity composition of both countries' trade with Australia (Tables 10–3 and 10–4) and their global trade (Table 10–2 and 10–1) shows distinctive features shared

Table 10-3

Commodity Composition of Australian Exports to Japan 1954-1981 and to Korea 1971--1981

(Three Year Averages)

(%)

	to Japan						to Korea		
	1954 -56	1959 -61	1964 -66	1969 -71	1974 -76	1979 -81	1971 -73	1975 -77	1979 -81
Primary products	93.1	90.1	94.4	93.0	92.0	95.2	83.5	94.9	90.5
Grain food	12.4	8.3	7.9	8.8	9.8	6.4	22.7	9.1	4.4
Non-grain food	1.8	2.5	9.3	11.5	16.8	20.6	12.6	30.4	26.7
Agricultural materials	76.2	67.3	58.0	23.3	13.8	15.6	40.3	25.8	18.8
Raw mineral materials	0.6	3.9	7.9	34.2	24.9	24.5	3.2	10.1	16.3
Fuels	2.1	8.1	11.3	15.2	26.7	28.1	4.7	19.5	24.3
Manufactures	6.9	9.9	5.6	7.0	8.0	4.8	16.5	5.1	9.5
Metal products	5.3	8.2	2.6	5.7	3.7	1.5	9.5	2.3	5.6
Other manufactures	1.6	1.7	3.0	1.3	4.3	3.3	7.0	2.8	3.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: United Nations, Commodity Trade Statistics, various years.

Table 10-4

Commodity Composition of Australian Imports from Japan 1954-1981 and from Korea 1971-1981

(Three Year Averages)
(%)

	from Japan						from Korea		
	1954 -56	1959 -61	1964 -66	1969 -71	1974 -76	1979 -81	1971 -73	1975 -77	1979 -81
Primary products	8.0	5.5	5.4	3.8	2.7	1.0	19.3	11.1	3.9
Textile products	47.3	47.0	28.1	20.3	9.6	5.2	45.0	42.4	37.8
Primary metal products	19.3	16.3	14.5	12.9	9.6	8.3	11.2	10.9	17.7
Machinery & equipment	7.1	9.4	28.6	44.2	56.8	68.2	6.0	8.7	12.0
Chemicals	3.9	2.9	6.7	5.4	6.8	5.0	1.4	1.5	5.1
Other manufactures	14.4	18.9	16.7	13.4	14.5	12.3	17.1	25.4	23.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Commodity classification is different from Table 10-3 to account of distinguishing pattern between Australia's export and import trade with Japan and Korea.

Source: United Nations, Commodity Trade Statistics, various years.

by Australia's trade with Japan and Korea. Australia's exports to Japan and Korea are commonly concentrated on primary products, mainly industrial raw materials, far beyond what the pattern of their global imports suggest. Similarly, Australia's imports from them are commonly concentrated on manufactured goods beyond what their global export patterns indicate. Note that labour intensive manufactures are higher in Australia's imports from both countries than they are in their global exports. This indicates that both A–K and A–J trades are between natural resource-rich and -poor (and labour-scarce and -abundant) countries.

10.2.2. Changing Complementarity

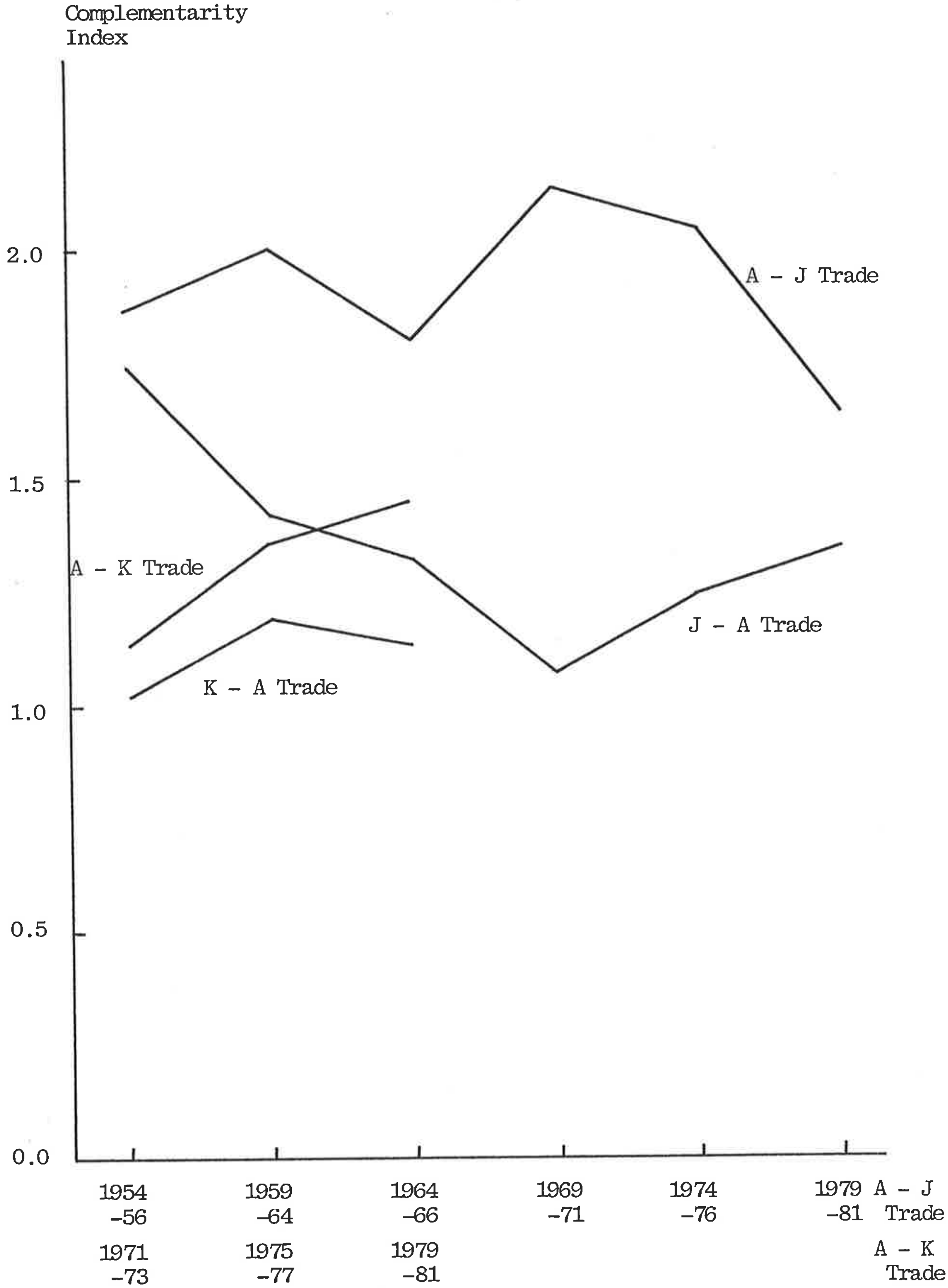
Figure 10–2 plots the trends in complementarity in A–J trade over the period 1954 to 1981 and in A–K trade in the 1970s. It is useful to start with a comparison of complementarity in A–J trade during the period preceding the mid-1960s and A–K trade in the 1970s, and then to consider what the changing complementarity in A–J trade after the mid-1960s implies for the future development of complementarity in A–K trade. Apart from the higher degree of complementarity in A–J trade than in A–K trade, spectacularly so for Australia's export trade, there are similar trends between the two. This reflects the similar change in the commodity composition of Japanese and Korean global trade in Tables 10–1 and 10–2.

Difference in the degree of complementarity is a consequence of the changed pattern of world trade. First, the share of petroleum, which made little contribution to A–J and A–K trade, more than doubled its share in world trade from 9 per cent in the years 1963–65 to 20 per cent in 1979–81. This induced lower complementarity in A–K trade (and A–J trade) in the 1970s than in A–J trade in earlier period. Second and most importantly, the

Figure 10-2

Complementarity in Australia's Trade with Japan and Korea

(Three Year Averages)



Sources: International Economic Data Bank, RSPacS, ANU, and Drysdale, (1967).

difference is a product of lowered share of wool, which was discussed in Chapter 4.[6] [7]

On the other hand, the influence of changed pattern of Australian exports offset some of the effect of changed pattern of world trade. Although Japan's metal industries were already matured and her imports were concentrated on raw minerals than Korean imports in the 1970s, as we shall see in the next section, this did not produce complementarity with Australian exports because of Australia's yet undeveloped exports in raw ores.[8] However, this does not mean that raw minerals are of less importance in A–J trade in the earlier period. Indeed, Australia's establishment as a major exporter of raw minerals was closely associated with the rapidly growing Japanese market.[9]

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[6] In years 1955-56 complementarity derived from wool in Australia's exports to Japan was 1.5, accounting for more than 70 per cent of total complementarity in Australia's exports to Japan. This declined to 1.2, leading the slight decline in total complementarity by years 1962-63. This decline continued to lead a sharp decline in overall complementarity in the mid-1960s, when increase in complementarity derived from raw minerals was not large enough to compensate for the decline. By comparison, the contribution of wool to complementarity in Australian exports to Korea in the early 1970s was only 0.2.

[7] Difference in complementarity in Australia's import trade is in part due to difference in the export specialisation pattern between Japan and Korea within textile products. In the mid-1950s Japan's exports were specialised in intermediate textile materials, while Korean exports in the 1970s specialised in clothing. Since Australian trade policy was highly weighted in favor of intermediate materials, Japan's exports were more complementarity with Australian imports than Korean exports were. Thus, despite the fact that Korea was more strongly specialised in textile products in the early 1970s than Japan in the mid-1950s, complementarity derived from textile products was 0.92 in Australia's imports from Japan, while it was 0.63 in imports from Korea in the corresponding period.

[8] In years 1954–56 the index values of Japan's import specialisation was 2.9 for iron ore and 0.9 for non-ferrous ores, and rose to 4.4 and 2.4 by 1961–63, respectively (Drysdale, 1967). These are compared with the index values of Korea's import specialisation of 0.1 for iron ore and 0.2 for non-ferrous ores in the early 1970s. These rose to 1.5 and 1.2 by the end of the 1970s, respectively. However, complementarity derived from raw ores in Australian exports to Japan was only 0.1 in the earlier years, whereas that in Australian exports to Korea was 0.2. This difference is due to the growth in Australian export specialisation in raw minerals.

[9] Changes in both the relative size of A–J trade in each country's trade and the relative size of each country in world trade (Australia's share in world exports was 5 in 1964–66, 21 in 1974–76, and 19 per cent in 1979–81 for iron ore and 6, 15, and 25 per cent for non-ferrous ores and others are shown in Table 10–6) suggest that the growth of Australian mining industries has been heavily dependent on the growth of Japan's import demand for raw minerals. Until the mid-1970s, the growth of Japan's metal and Australia's mining industries were closely integrated through the growing complementarity and though the growing country bias relating to geographical proximity

Changes in the degree of complementarity (and in the direction of changes in its structure) are similar between A–J and A–K trade: in Australian export trade, complementarity derived from minerals and non-grain foods grew rapidly, leading to growth in overall complementarity, while in import trade the importance of labour intensive products was replaced by more sophisticated capital and technology intensive manufactures, leading to a decline in overall complementarity. The reasons for this were already discussed in Chapter 5 with reference to Korea's industrial restructuring.

Given the similar pattern in the degree and structure of complementarity in A–J between the decade preceding the mid-1960s and A–K trade in the 1970s, changes in the degree and structure of complementarity in A–J trade after the mid-1960s have implications for complementarity in future A–K trade.

Complementarity in Australia's export trade with Japan continued to rise from 1.9 in 1954–56 to 2.1 in 1969–71, and thereafter declined to 1.6 by 1979–81. This change was solely associated with complementarity derived from raw minerals. At the same time, non-grain foods steadily increased in importance, accounting for nearly one-third of total complementarity in 1980. By contrast, complementarity between Japan's export and Australia's import structure continued to decline from 1.7 in 1954–56 to 1.1 in 1969–70, but thereafter reversed to grow to 1.3 by 1979–81. Strikingly, complementarity in A–J trade developed asymmetrically over the period. This development of complementarity in A–J trade was closely associated with the shift in the commodity composition of Japan's trade.

The main period of expansion of Japanese trade since the mid-1950s was associated with fundamental changes in the world trading environment and in the Japanese economy.

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and commercial arrangements, such as direct investments and long-term contracts (Drysdale, 1970; Smith, 1977). However, the shift of Japan's industrial structure away from metal processing in the 1970s resulted in the decline in complementarity between Japan's import and Australia's export pattern. This caused the declining share of Japan in Australian exports of raw minerals.

The Japanese postwar industrial transformation can be divided into two periods, each of which is associated with specific changes in Japan's trade pattern (Minami, 1981; Nakamura, 1981). In the first period up to the mid–1970s Japanese industrialisation continuously concentrated on basic material industries, such as iron and steel, non-ferrous metal processing, and petrochemical industries, and this was reflected in Japan's trade pattern. As seen in Tables 10–1 and 10–2, the industrial transition corresponds to the switch in her exports from textile products to steel and non-ferrous metal products, electrical and transportation equipment, and petrochemicals, and the switch in her imports from agricultural raw materials to mineral raw materials. This produced the rapid increase in complementarity between Australia's export structure and Japan's import structure, mainly derived from raw minerals, but it did not bring about any increase in complementarity between the Australia's import structure and Japan's export structure.[10]

The second transformation from the mid–1970s reflects adjustment to changes in Japan's economic development, such as accumulation of human skill and technology and increasing concern with the living environment, and changes in the world trading environment, such as the higher price of oil and raw materials and intensifying competition from newly industrialising countries.[11] This transformation was the shift from the basic material-producing heavy and chemical industries to the so-called knowledge-based soft

[10] Drysdale (1967, p. 164) interpreted this decline to mean that the composition of Japan's exports and Australia's imports came to resemble the composition of world trade more closely than before. Hence there was less reason to expect Japan to export relatively more to Australia than to other countries because of their uniquely similar trade structure. However, one can expect that the decline was a consequence of shift in Japan's export structure away from textile products, where Australian import specialisation is strong, towards metal products where Australian import specialisation is weak, as in the case of decline between Korean exports and Australian imports discussed in Chapter 5.

[11] Among many others, a particularly important factor was increasing competitiveness of newly industrialising countries based on the advantage of low wages in human skill-intensive products. This was reflected in a number of Japanese government and academic publications focusing on the response to the developing countries' exports to Japanese and third foreign markets during the 1970s. See, for example, Kojima (1977, 1979) and Japanese Ministry of Internatinoal Trade and Industry (1977).

industries.[12] The shift in industrial structure can be seen from the relative (in some cases, absolute) decline in output and employment in natural resource and energy intensive basic material processing industries such as ferrous and non-ferrous metals, petrochemical, non-metallic mineral processing, and pulp industries, and the rapid growth of the technology intensive (and resource and energy saving) processing and assembling industries such as general machinery, electric and electronic equipment, and scientific machinery, and transportation equipment. This second transition is reflected in the continuous upheaval of exports in technology intensive machinery at the expense of metal and petrochemical products and in the (relatively) declining importance of raw minerals in Japanese imports. Consequently, Japan's import structure began to shift away from the Australian export structure, while her exports moved towards the Australian import structure.[13] This development was the fundamental reason for the distinctive development of the A–J trade relationship before and after the mid–1970s.

This development of A–J trade after the mid-1960s has important implication for A–K trade. Given Korea's currently advancing heavy and chemical industries, it is likely that complementarity between Australia's exports and Korea's imports will continue to grow. As a result, Australia will increase further her importance as a supplier of major raw materials (mainly minerals) critical to Korea's industries and non-grain foodstuffs, and

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[12] Though a precise definition of knowledge-based industries is not easy, the term is used in almost the same way as the familiar technology intensive industries. In addition to the existing technology intensive industries, the industries include electronics, bio-technology, and a variety of new material processing industries. See Japanese Government Ministry of International Trade and Industry, *Tsusan Haksho*, (White Paper on the International Trade), various years.

[13] The decline in the late 1970s in complementarity between Australia's export and Japan's import structure in the late 1970s is striking, because this was the first time it has occurred in the history of A–J trade, at least, since 1913. By comparison, complementarity between Japan's export and Australia's import structures continuously increased during the period when Japan's exports concentrated on labour intensive textile products and other final consumer goods (from primary products) since 1913, then declined when Japan's exports shifted toward primary metal products after the mid 1950s, and again reversed to increase when Japan's exports further upgraded toward technology intensive machinery and equipment from the mid-1970s. For details of the trends in complementarity in A–J trade since 1913, see Drysdale (1967).

Korea will become more important as a market for Australia's major exports. However, increases in complementarity in the opposite direction will have to await further shifts in Korean industry and exports.

10.2.3. Changing Country Bias

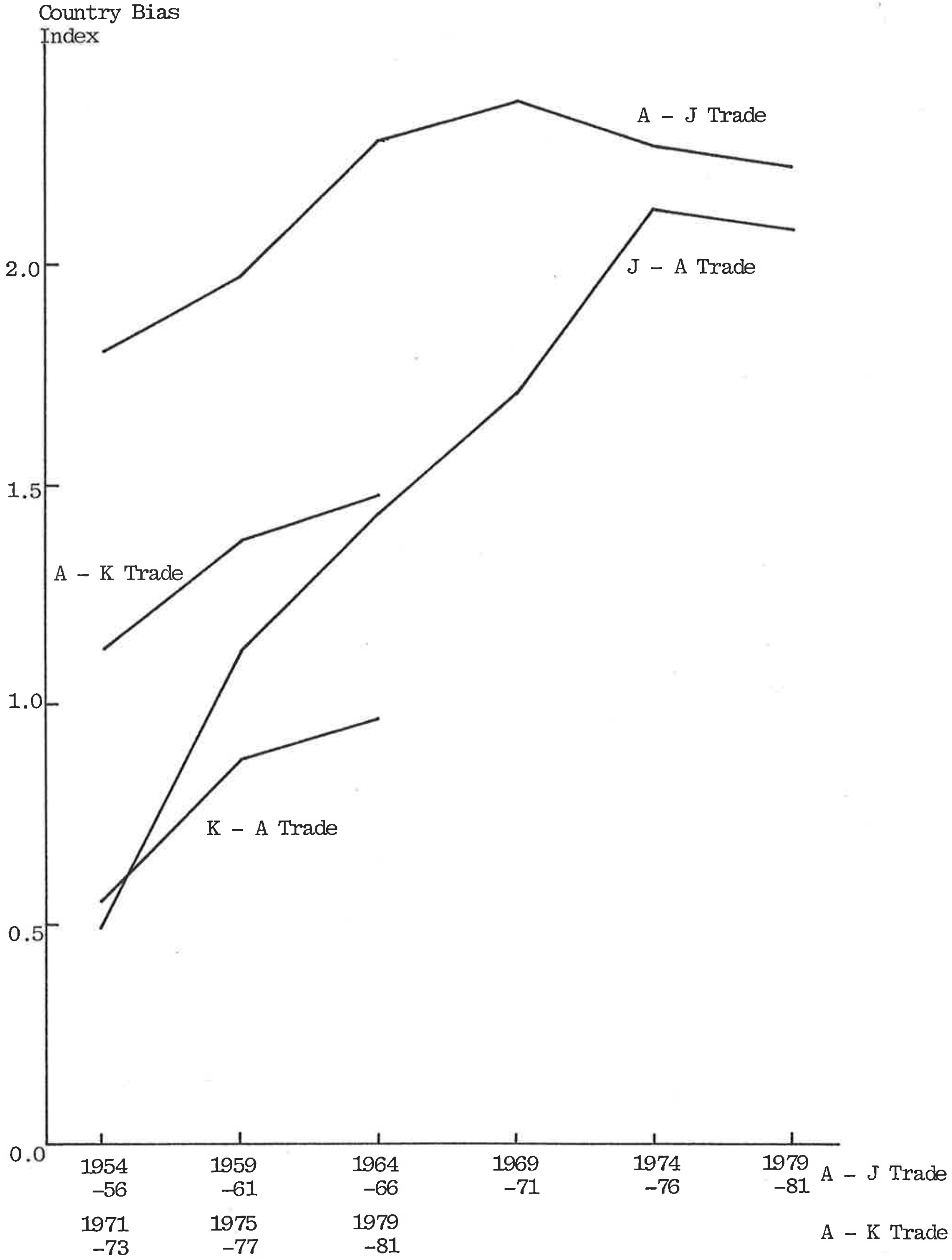
Figure 10–3 plots the degree of country bias in A–J trade over the period 1954–81 and in A–K trade in the 1970s. First, compare A–J trade in the decade preceding the mid-1960s with A–K trade in the 1970s. Again, there are two common features. First, there was rapid growth in country bias. Second, country bias in Australia's export trade was nearly twice as high as that in her import trade in both A–J and A–K trade. This is a consequence of both dominance of bulk commodities in Australia's exports and the asymmetry in economic distance, discussed in Chapters 7–9.

There are several notable features in Figure 10–3. First, country bias in Australian exports to Japan was nearly twice that for Australian exports to Korea. This reflects the fact that Japan's imports were much more concentrated on primary products (raw minerals) than Korea's imports in the corresponding period. The second important feature is associated with the differential growth of country bias in Australia's import trade from Japan and Korea. Country bias in Australian import trade with either Japan in the mid-1950s (index number 0.49) or Korea in the early 1970s (0.54) was extremely low, meaning that both countries had much less favourable access to Australian markets in the respective period compared with their competitors. However, after one decade, Japan's position in Australian markets reversed to much more favorable access relative to Japan's competitors, as indicated by a threefold increase in the index of country bias to 1.46 by 1964–66. Compare this with Korea's continuously less favorable position throughout the whole decade of the 1970s, though Korea's position improved as shown by increase in the country bias index to 0.96.

Figure 10-3

Country Bias in Australia's Trade with Japan and Korea

(Three Year Averages)



Sources: International Economic Data Bank, RSPacS, ANU, and Drysdale, (1976).

This distinctive development resulted from two factors, the reorientation of Australia's trade relationships, and the different positions of Japan and Korea as a source of Australian imports.

Australian institutions and trade policy were completely different in the years between the 1950s and 1970s. Australia's discriminatory trade policy significantly inhibited Japanese access to Australian markets in the 1950s.[14] However, the conclusion of the Japanese–Australian Trade Agreement and the renegotiation of the United Kingdom–Australia Trade Agreement were major watersheds in Japan–Australia trading relations after World War II. Under the Japanese–Australian agreement, Australia accorded Japan most-favoured-nation treatment, which involved substantial reductions in tariffs on textiles and other consumer goods (resulting in reductions in margins of British preference) and nondiscriminatory treatment under import licencing arrangements.

Once institutional discrimination was relaxed, country bias in all major Japanese exports to Australia increased sharply. In the 1950s, Japan was the only supplier to Australia of unskilled labour intensive consumer goods from the Asian-Pacific region. Country bias in traditional Japanese exportables grew sharply from far below unity to far above unity in less than a decade (Drysdale, 1967, Table 6–1). This compares with the consistently low country bias (below unity) in Korea's traditional exports throughout the 1970s (Table 8–4). In addition, in Japan's newly emerged exportables, geographical proximity gave such an important competitive edge to Japan that she increased her market share in Australia, despite being a newcomer in these commodities.

On the other hand, Korea's entry to Australian markets began after the reorientation

[14] Drysdale (1967) concluded that Australia's continuous discrimination against Japanese exports stemmed from her strong ties with British Commonwealth countries under the Ottawa Agreement, fears of "cheap labour" competition, and the hangover of war. Postwar trade arrangements allowed Australia–Japan trade to resume. But the considerable expansion of Japanese exports had to wait until 1954, when Australia eased restrictions on the entry of Japanese goods, mainly due to the rapid growth of Australian exports to Japan.

of Australia's economic and political relationships, initiated on the base of her increasing economic relationship with Japan.[15] At the same time, Korea's initial access to Australia was significantly assisted by the Australian System of Tariff Preferences, though Korea was removed from the beneficiary list in some commodities after the first general review in 1976. Accordingly, Korea's entry to Australia in the 1970s took place in a much freer environment than Japan's entry two decades ago.

Korea, however, was only one of many regional suppliers in her major exportables to Australia in the 1970s. In all her traditional exportables Korea had to compete with other countries, with whom Australian trade has lower trade resistances because of geographical, institutional, and historical ties. In her newly developed exportables Korean exporters had to compete with industrial countries which had well-established marketing organizations, servicing facilities, and capital investments. The existence of Japan as a major supplier of these commodities deprived Korea of the opportunity to capitalise on geographical proximity, which Japan had successfully capitalised on two decades ago.

Subsequently, the index of country bias in Australian exports to Japan remained at a plateau of 2.3, while that in Japan's export trade continuously grew to 2.1 by the late 1970s (Figure 10–3). Considering that Japan's major exportables have switched to technology intensive capital equipment and durable consumer goods, Japan's highly successful access to Australian markets in the period following the mid-1960s was not only

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[15] On Australia's reorientation and her interests in Pacific economic coorperation, see Crawford, (1980) and Drysdale, (1978, 1981). Drysdale (1978) pointed out that Australia's growing relationship with Asia and the Pacific was one of the inevitable consequences of her growing economic relationship with Japan. The trade relationship has had continuously significant impact upon the Australian economy and politics, upon Australian perceptions of world affairs, and upon Australia's position in the world economy as a major resource supplier. This affected Australia's reorientation toward the other Asian-Pacific economies on two grounds. First, Japan's emergence as a global economic power, whose interests in management of the world economy did not necessarily coincide with those of Australia's traditional allies, presented Australia with the prospect of hard choices in economic diplomacy. Second, the scale of Japan's economic interaction with the Asian-Pacific region and the growth of regional economic integration and industrial power broadened the Australian conception of the relationship with Japan to the Asian Pacific region.

due to geographical proximity. It was also attributable to Japan's direct participation in Australian markets through Japan's direct investment in Australia, strong commercial link between the two countries' businessmen, and well arranged marketing organizations and servicing facilities. In addition, the size of Japan in Australian exports must also have played an important role in creating a favorable environment for Japanese access to Australian markets, since the greater size contributed to Australia–Japan trade links by bringing Australia into closer alignment with Japan in Australia's commercial, political, social, and even cultural interests (Drysdale, 1981).

This development in country bias had an important implication for bilateral imbalance in A–J trade. Though bilateral balance was always in favor of Australia throughout the whole post-war period, it continuously moved toward balance in relative terms.[16] As seen in Figure 10–1, intensity of trade in Australia's exports to Japan was more than three times as high as that in Japan's exports to Australia in the mid-1950s, but the difference gradually declined. In years 1979–81, the ratio of trade intensity in A–J exports to J–A exports was only 1.3.

As discussed earlier, complementarity continuously grew in Australia's exports to Japan until the mid-1970s, while complementarity in Japan's exports to Australia declined. Accordingly, if the trend in country bias had been neutral, bilateral imbalance would have been further enlarged in favor of Australia in the process of the growth of A–J trade until the mid-1970s.[17] However, the continuously rapid growth in country bias in Japan's

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[16] Since Australia's and Japan's global trade was generally balanced over the period, there was no significant divergence between the actual imbalance in A–J trade and the one expected from the differential degree of trade intensity between two directions. During the period 1954 to 1981 the ratio of exports to imports in both countries global trade fluctuated in the range of 0.8 and 1.2. Notable is that the actual imbalance as a ratio became less than the one expected from the differential degree of trade intensity from the end of the 1960s. This is a consequence of the shift in balance of Japanese global trade from deficit to surplus.

[17] In the mid-1960s when bilateral imbalance was not improved because of growing difference in complementarity, there were arguments about the trade balance between Australia and Japan.

exports to Australia (relative to the growth in the opposite direction) not only prevented bilateral imbalance from further expanding, but contributed to gradually reducing it.

This development of country bias in A–J trade after the mid-1960s is not likely to be repeated in A–K trade in the future. On the one hand, Korea's market access to Australia in traditional exports is disadvantaged by the newly emerged exporters in the ASEAN countries and China. On the other hand, it is unlikely that in her newly developed exportables Korea can capitalise on geographical proximity as Japan did, though the extent will depend on the continuity of Korea's exports of these commodities under the Australian preferences. In addition, the smaller size of the Korean economy will not force more favourable access to the Australian market as the size of the Japanese economy did in the 1960s.

This leads to the conclusion that bias in favour of Korean exports to Australia will not grow as fast as did bias in Japanese exports to Australia during the past two decades. Nonetheless, as Korea increases its importance as a market for Australian products, this will create more favorable conditions for access to Australia, but to a lesser degree than for Japan. Consequently, given the enlarged difference in complementarity between two directions in A–K trade, bilateral imbalance is unlikely to be reduced as smoothly as in A–J trade in the past three decades. This was seen in Chapter 9. This implies that bilateral imbalance will remain an irritation in future development of A–K trade.

For example, Japan argued that A–J trade should be more or less balanced, and insisted on more favourable access for Japan's exports to Australia, while Australia argued that the balance was a result of commodity composition, and insisted that Australia was buying much more from Japan on a per capita basis than Japan was buying from Australia (Goldfinch, 1969). However, this argument disappeared as bilateral imbalance gradually improved and Japan's global trade reversed to surplus after 1970.

10.3. Importance of Minerals in Australian Exports

The previous discussion suggests that Australia is more important as a source of Korean and Japanese imports of industrial materials than as a market for those countries' manufactures. Likewise, Korea and Japan are more important as markets for Australian products rather than as sources of Australia's imports. Australian exports in mineral materials, and to a lesser degree, non-grain foods played an increasingly dominant role in Australia's export trade, because of rapid growth in both complementarity and country bias.[18]

As seen previously, the trend in trade complementarity between Australia and Japan depended on the maturity of Japanese metal industries. Japan's concentration on basic material industries, mainly metal industries, produced the continuous increase in complementarity between Australia's export structure and Japan's import structure, but the decline in complementarity in the opposite side, and the subsequent diversion from the metal industries reversed the trends. This implies that future A–K trade is likely to depend on the prospects of Australian exports to Korea of minerals.

In both Japan and Korea, the development of metal industries is reflected in their trade pattern, partly because of domestically unavailability of raw materials and partly because metal industries in both countries were vertically integrated through a demand

[18] Two non-grain foods are particularly important for Australian exports to Korea: meat and sugar. During the 1970s Korea's share in Australian exports grew from 0.1 to 2.4 per cent for meat and from 0.2 to 9.8 per cent for sugar, and the growth in Australia's share in Korean imports from 0.7 to 71.0 per cent for meat and from 10.1 to 34.0 per cent for sugar. These are comparable with the increase in Japan's share in Australian exports of meat, which rose from 5.3 per cent in the mid-1960s to 29.4 per cent by the end of the 1970s, and from 24.5 to 32.3 per cent in sugar. Alternatively, Australia's share in Japan's imports declined from 32 to 24 per cent in meat, but in sugar rose from 17 to 29 per cent during the same period. Despite the higher Australian share of Korea's imports than of Japan's imports, the lower share of Korea in Australian exports than that of Japan indicates that the size of Korean imports is much smaller than the Japanese. But Australia had a more favorable access to Korean imports than to Japanese imports. Given the high country bias in Korean imports toward Australia, the further increase in Korean market size would increase Korea's share in Australian exports.

pull, backward linkage mechanism between processing stages, with an accelerated process of industry evolution — imports ⟶ domestic production ⟶ exports — in each stage (see Chapter 5 and Yamazawa, 1972). Accordingly, vertical integration gradually shifted imports back to raw materials. Consequently, the share of raw minerals in imports of raw ores and basic metal products by metal industries would reflect the stage of vertical integration. A comparison of the index of vertical integration between Korea's and Japan's metal industries can be need to indicate future trends in complementarity between Australia's export structure and Korea's import structure.

Table 10–5 compares the stage of vertical integration in Korea's and Japan's metal industries. Given the well established exports of Australia in raw minerals, the higher index of vertical integration the greater the likely complementarity with Australian exports. In the 1970s this index for Korea grew rapidly from zero to 14 per cent in ferrous metal industries and from 18 to 32 per cent in non-ferrous metal industries. This growth produced a sharp increase in complementarity between Australia's export structure and Korea's import structure, as seen in Chapter 5. However, this ratio was still far below that for Japan. This suggests that there is plenty of room for imports of raw minerals to replace basic metal products and consequently, for further increase in complementarity with Australian exports.[19]

[19] It is unlikely that the index for Korea will be as high as the measured index for Japan, which seems excessive. Nonetheless, one can have an idea for continuous rise in Korean index from projected estimations of long term demand for, and supply of, iron and steel products. According to separate estimations by Kim (1979) and Song (1978), Korean total domestic demand would be between 25 and 28 million m/t in 1991, up from 5 million m/t in 1977, and domestic production rise from 4 million m/t to a level between 32 and 35 million m/t (depending on the rates of assumed operation of the projected capacity).

Table 10–5

Index of Vertical Integration in the Metal Industries of Korea and Japan

(%)

	Korean Metal Industry			Japanese Metal Industry			
	1969-71	1974-76	1979-81	1964-66	1969-71	1974-76	1979-81
Ferrous Metal	0	6	14	78	85	87	90
Non-ferrous Metal	18	19	32	51	52	57	46

Note: The index is defined as the percentage of raw ores in the total imports by metal industries of raw ore and basic metal products.

Source: UN, *Commodity Trade Statistics*, various years.

Table 10–6 presents Korea's share in Australian exports and world imports and country bias in A–K trade for each mineral commodity comparable with those of A–J trade. In 1979–81, Korea made up 5 per cent of Australia's exports in all mineral products. This compares with Japan's share of 27 in 1964–66, 52 in 1969–71, and 39 per cent in 1979–81. Although the lower share of Korea is partly due to the smaller size of the Korean economy compared with the Japanese, the lower stage of development of Korean metal industries also helps explain this difference. The difference is greater for raw minerals and less for mineral products, despite both countries' imports from Australia being highly concentrated on raw minerals.[20]

What is important is the growth rate in Korea's share. In 1974–76, Korea accounted for only 1 per cent of Australian exports in all minerals. Most of the increase to 5 per

[20] In 1979–81, the concentration ratio on raw ores in Korea's imports from Australia was 75 per cent in ferrous metal and 63 per cent in non-ferrous metal industries, compared with the ratio for Japan of 98 and 78 per cent respectively. This compares with the ratio in imports from the rest of the world (including Australia), presented in Table 10–5.

Table 10-6

Shares of Korea and Japan in Australian Mineral Exports and Country Bias

(Three Year Averages)

Australia's Exports to Korea

	K's Share in A's Exports (%)			K's Share in World Imports (%)			Country Bias in A-K Trade		
	1969 -71	1974 -76	1979 -81	1969 -71	1974 -76	1979 -81	1969 -71	1974 -76	1979 -81
Coal(32)	0.0	2.4	6.4	0.1	0.6	3.1	0.0	4.0	2.1
Iron ore (281)	0.0	1.1	5.4	0.0	0.4	1.9	0.0	2.8	2.8
Non-ferrous ores (283)	0.0	0.5	2.0	0.2	0.3	1.5	0.0	1.7	1.4
Iron & steel (67)	0.1	0.9	3.0	0.7	0.9	1.4	0.1	1.0	2.1
Non-ferrous (68)	0.0	0.1	1.1	0.2	0.5	0.9	0.0	0.2	1.2
Total (mineral)	0.0	1.1	4.2	0.4	0.7	1.5	0.0	1.6	2.8

Australia's Exports to Japan

	J's Share in A's Exports (%)				J's Share in World Imports (%)				Country Bias in A-J Trade			
	1964 -66	1969 -71	1974 -76	1979 -81	1964 -66	1969 -71	1974 -76	1979 -81	1964 -66	1969 -71	1974 -76	1979 -81
Coal(32)	92.5	87.5	81.6	69.7	13.5	31.0	34.1	26.1	6.9	2.8	2.4	2.7
Iron ore (281)	89.7	87.8	78.9	75.1	23.9	36.7	33.2	36.3	3.8	2.4	2.4	2.1
Non-ferrous ores (283)	29.0	31.4	17.3	8.6	25.5	29.2	29.6	27.2	1.1	1.1	0.6	0.3
Iron & steel (67)	1.7	14.9	10.0	3.0	1.8	1.4	0.6	1.3	0.9	10.6	16.7	2.3
Non-ferrous metal (67)	8.5	14.1	12.4	5.7	4.2	7.7	7.3	9.0	2.0	1.8	1.7	0.6
Total (mineral)	27.4	51.6	48.9	39.4	7.4	11.5	10.6	10.4	3.7	4.5	4.6	3.8

Sources: United Nations, Commodity Trade Statistics and Yearbook of International Trade, various years cent by 1979–81 was contributed by raw minerals: from 2 to 6 per cent for coal; from 1 to 6 per cent for iron ore; and from 0.5 to 2 per cent for non-ferrous ores. Although this rise corresponded with the growth in Korea's share in world imports from 0.7 to 1.5 per cent, Korean imports became increasingly biased toward Australia. This sharp increase contrasts with that in A–J trade where Japan's share in Australian exports steadily declined. This decline was also associated with the Japan's smaller share in world imports, especially during the 1970s. However, the decline was greater in Australian exports, suggested by the lower country bias in A–J trade. In 1979–81, country bias in A–K trade became higher for most minerals than the average for all A–J trade.

Given the lower stage of vertical integration of Korean metal industries, Korea's continuous concentration on heavy and chemical industries will create further increases in complementarity between Australian exports and Korean imports. The effect of increasing complementarity will be magnified by higher country bias in Korean imports from Australia. This prospect suggests that there will be continuous growth in Australian exports to Korea. This will produce closer interdependence between Korea's growing metal industries and Australia's mining industries, which are facing decline in their most important market, Japan.

10.4. Summary

This chapter compared A–K trade in the 1970s and A–J trade in the decade preceding the mid-1960s. Given the similar factor endowments and industrial and trade structures of the Korean economy at the end of the 1970s to those of the Japanese economy in the mid-1960s, this discussion extended the development of A–J trade after the mid-1960s as a basis for speculating about the future development of A–K trade. In general, in so far as A–K trade in the future duplicates the pattern of A–J trade since the 1960s, then the prospects are for continued growth in the intensity of A–K trade. However, its impact on the Australian economy will be more moderate due to the smaller size of the Korean economy.

Given Korea's current advance in heavy and chemical industries, complementarity between Australia's export structure and Korea's import structure will grow, mainly in minerals and non-grain foods, while complementarity between Korea's export and Australia's import structures will not. At the same time, as Korean imports continue to shift toward raw minerals and non-grain foods, country bias in Australia's exports to Korea also will continue to grow because of relative proximity and institutional arrangements. However, whether country bias in Korean exports to Australia will duplicate that in Japanese exports to Australia is not clear. On the one hand, unlike Japan, who enjoyed a near monopoly situation in the Australian market, Korea will encounter more intensive competition from other regional countries, most of which have better commercial ties with Australia than Korea. On the other hand, Korea may be able to capitalise on her importance as a market for Australian products to create more favorable access for her exports.

CHAPTER 11

SUMMARY AND CONCLUSIONS

The major aim of this work has been to explain the sources of the rapid growth of Australia– Korea trade and the structural changes therein by using the intensity approach to the analysis of bilateral trade. Though some of the empirical conclusions of the thesis are specific to Australia–Korea bilateral trade, the thesis also has more general relevance to international trade. This chapter summarises the findings of the empirical analysis, points to some of its implications for trade theory and policy, and discusses avenues for further developments in the analysis of bilateral trade.

11.1. Summary of Empirical Results

Table 11–1 provides a synopsis of the main sources of growth in two-way trade between Australia and Korea over the period 1962 to 1981. The first column represents the growth in the trading route. Australia's exports to Korea rose 90 fold, while Korea's exports to Australia rose 700 fold. The second column shows the growth of each country's total exports. Australian exports rose more than 6 fold, while Korean exports rose 200 fold. The change in each country's share in the other country's exports is shown in the third column. Korea's share in Australian exports rose 11 fold, while Australia's share in Korean exports more than doubled. The fourth column indicates Korea's (Australia's) share in world imports: while Korea's share in world imports trebled, Australia's share declined by one-third. The difference between columns 3 and 4 indicates a major change in the intensity of the bilateral trade. The percentage change in the trade intensity index is shown in the fifth column. The intensity of Australia's export trade with Korea doubled, while the intensity of Korea's export trade with Australia quadrupled. In the last two columns the

Table 11-1

Summary Analysis of Growth of Bilateral Trade between Australia and Korea, 1962 to 1981

(%)

A. Australia's Export Trade with Korea

	$G(X_{AK})$	$G(X_{A.})$	$G(S_{AK})$	$G(S_K)$	$G(I_{AK})$	$G(C_{AK})$	$G(B_{AK})$
1962-64 to 1971-73	764	154	243	133	47	-9	61
1971-73 to 1979-81	942	200	246	77	98	30	58
1962-64 to 1979-81	8994	662	1088	313	191	18	155

A. Korea's Export Trade with Australia

	$G(X_{KA})$	$G(X_{K.})$	$G(S_{KA})$	$G(S_A)$	$G(I_{KA})$	$G(C_{KA})$	$G(B_{KA})$
1962-64 to 1971-73	4100	2186	82	-23	155	42	116
1971-73 to 1979-81	1567	810	84	-12	107	13	44
1962-64 to 1979-81	69922	20697	234	-32	427	60	226

Note: The intensity of trade formula $I_{ij} = (X_{ij}/X_{i.}) / (M_{.j}/M_{..}) = C_{ij} * B_{ij}$, where C_{ij} is complementarity in country i's exports to j, and B_{ij} is country bias in country i's exports to j. From the formula, the value of country i's exports to j can be written as follows.
$X_{ij} = I_{ij} * X_{i.} * (M_{.j}/M_{..})$. Now if S_j is defined as country j's share in world trade $(=M_{.j}/M_{..})$, $X_{ij} = I_{ij} * X_{i.} * S_j$ Thus, $G(X_{ij}) = G(I_{ij}) + G(X_{i.}) + G(S_j)$ + interaction among them, and $G(I_{ij}) = G(C_{ij}) + G(B_{ij})$ + interaction between both. The letters G refer to the percentage changes over each period, and S_{ij} is country j's share in country i's exports $(=X_{ij}/X_i)$.
Subscripts A and K stand for Australia and Korea.

Source: International Economic Data Bank, RSPacS, ANU.

growth of bilateral trade intensity is divided into two components, the percentage change in complementarity and in country bias. The reasons for changes in the size and structure of these two indexes have been the main focus of this thesis.

The table illustrates some of the important general features of developments in Australia–Korea trade. Korea's export trade with Australia grew significantly throughout the whole period between 1962 to 1981 because of the size of Korea's export growth relative to the rest of the world. At the same time, the substantial growth in Australia's export trade with Korea derived largely from the size of Korea's import growth relative to the rest of the world, despite Australia's lower share in world trade. More importantly, the effect of Korea's total trade growth on Australia–Korea trade was reinforced by structural changes in both countries' trade patterns and by the improved trade environment; this is reflected in the substantial rise in intensity of trade in both directions.

Four features of Australia–Korea trade are worth stressing. Firstly, complementarity has increased considerably in both directions, although at different rates. The structure of Australia's export specialisation and Korea's import specialisation was always highly complementary, but it declined noticeably from the early 1960s to the early 1970s, and it then increased sharply, rising far above the level of the early 1960s. Conversely, complementarity of structure between Korean exports and Australian imports was low in the early 1960s, rose until the mid 1970s and has since stagnated. The explanations for these distinctive developments are provided in Chapters 4, 5, and 6, the main conclusion of which are as follows.

Whilst Australia's import and export specialisation pattern experienced relatively little change over the last two decades, her trade relationships experienced a considerable change, both because of the changing pattern of comparative advantage overseas and because of growth in agricultural protectionism in Western Europe. As a result, Australia's export trade relationships gradually shifted away from the advanced industrial countries toward the advanced developing countries, while her import trade changed little, remaining largely with the advanced industrial countries. In contrast, Korea's export and import specialisation underwent a huge shift, resulting in continuous redirection of her trade. Korea's exports were highly complementary to the imports of the high income advanced countries until the early 1970s, but became gradually complementary to the imports of developing countries in subsequent years. Her import structure was highly complementary to the exports of the advanced industrial countries until the early 1970s, but in the subsequent period it changed so as to be complementary to the exports of resource-rich countries.

A conjunction of these developments in Australia's and Korea's trade relationships brought about the considerable growth of, and structural changes in, complementarity in both directions. This is discussed in Chapter 5. The growth of complementarity and its structural change is mostly attributed to Korea's dynamic industrial growth: there was a strong causal relationship between the trend in the size of complementarity derived from her newly developed exports in her export trade with Australia and that derived from raw minerals in Australia's export trade with Korea. This relationship reveals an increasing structural interdependence between the two economies as Korea's export growth in newly developed manufactures led to the growth in import demand for Australian raw minerals.

The analysis in Chapter 6 reveals that the considerable increase in complementarity in both directions has been lower than it might have been because of import barriers in both countries. Correlation analysis showed that Korea's agricultural protection not only reduced complementarity derived from foodstuffs as a whole in Australia's export trade with Korea, but its protection rates were higher in commodities for which Australia's export specialisation was stronger. A similar tendency was seen in Australian protection of its manufacturing sector.

The second important feature of Australia–Korea trade is that, despite the underlying high complementarity between the Australian and Korean economies even in the 1960s, the Australia–Korea trade relationship has developed only recently. The low country bias of the 1960s and its change are discussed in Chapters 7 and 8. Until the early 1970s, country bias in both directions was extremely low, both absolutely and compared with each country's other trade relationships. This was attributed to the small size of Korean trade and the high dependence of Korean trade on aid. Though the continuous growth of the size of Korea's exports gave an impetus to break down high trade resistances resulting from historical and cultural unfamiliarity, the changing pattern of country bias in both countries' overall trade relationships played an important part in the rapid growth of country bias in Australia–Korea trade.

In Australia's trade relationships, geographical distance became more important, while the importance of her historical ties with the British Commonwealth countries weakened. At the same time, Korea's aid dependence lost its importance in her trade relationships, and geographical distance increased its relative importance. As discussed in Chapter 7, the concurrence of changes in country bias in both countries' trade relationships was conducive to higher country bias in Australia–Korea trade, given their relative geographical proximity.

Chapter 8 seeks to explain country bias in trade specifically between Australia and Korea. A number of institutional arrangements at both government and private levels broke down the initially high trade resistances to allow rapid growth in bilateral trade in the 1970s. The importance of individual trade resistances in determining country bias in both directions is examined. One of the most important findings is that the geographical distance between Australia and Korea "positively" affected country bias in Australian exports to Korea, but "negatively" affected country bias in Korean exports to Australia. This is because of the asymmetry in economic distance, that is, Australia was the nearest source for Korean imports in almost all of Australia's exportables, while

Korea had to compete with other Asian-Pacific countries in Australian markets in almost all of Korea's exportables. Accordingly, geographical distance played a dominant role in high country bias in Australia's export trade with Korea, except for foodstuffs and agricultural raw materials, where country bias in Korean imports was overwhelmingly aid-influenced. Conversely, geographical distance had a different effect on Korea's export trade to Australia, depending on Korea's competitive position. Until the early 1970s, distance played a dominant role in increasing country bias in Korean export trade with Australia in Korea's traditional exportables, but as the ASEAN countries and China began to be competitive in Australian markets after the mid 1970s, the distance effect reversed. In Korea's newly developed exportables, distance played an important role in increasing country bias in the 1970s. This different effect was reinforced by Korea's eligibility for Australian tariff preferences as a consequence of Australia's flexible practice in applying preferential tariffs.

The third key feature of Australia–Korea trade is the persistent difference in the intensity of trade between the two directions. This is of interest in the context of Australia–Korea trade policy. As emphasised in Chapters 5 and 8, and examined more closely in Chapter 9, the bilateral imbalance up to the early 1970s was due largely to the large deficit in Korea's global trade. However, while this explained up to three-quarters of the actual bilateral imbalance prior to the mid-1970s, it accounted for only one-fifth thereafter. Accordingly, the difference in trade intensity came to play a dominant role in the bilateral imbalance by the end of the 1970s. Complementarity difference favoured much larger Australian exports to Korea than Korean exports to Australia, *ceteris paribus.* The concentration of Australian exports and Korean imports on the same few raw materials was responsible for the high complementarity in north-bound trade, while lower complementarity in south-bound trade was due to it being diversified among a number of manufactures. The effect of differential complementarity was reinforced by differential country bias in the same direction, resulting from asymmetry in economic distance. The differential in the product of these two, namely intensity of trade, gradually narrowed until the early 1970s, largely due to the reduced differential in complementarity, but then it increased from the mid 1970s when Korea's industrial structure began to concentrate on heavy and chemical industries.

The fourth and final feature of Australia–Korea trade worth stressing concerns its future prospects. A comparison of the present development of Australia–Korea trade with the past development of Australia–Japan trade suggests an optimistic future for Australia–Korea trade growth (Chapter 10). Given the similar factor endowments and industrialisation patterns of the current Korean economy and the Japanese economy two decade previously, the development of Australia–Japan trade in the past two decades can be expected to be duplicated in Australia–Korea trade in the future, though with less impact upon the Australian economy due to the smaller size of the Korean economy. There are, however, two notable differences between Australia–Korea and Australia–Japan trade. In the first place, Japan in the 1960s was the only regional market for Australian raw materials, and the only regional source of Japan's major exportables to Australia. However, Korea is only one among many markets for Australia's raw materials and only one among many regional suppliers to Australia in her major exportables. And secondly, the smaller size of the Korean economy is not likely to allow the Koreans to play as much of a role in creating a favourable environment for access to the Australian market through joint ventures and direct commercial activities as did the Japanese in the 1960s. This is reflected in the different development of country bias in earlier Australia–Japan trade and present Australia–Korea trade.

11.2. Implications for Trade Theory

These remarks lead the author to a final appraisal of the method of analysis adopted in this thesis: the intensity approach to the analysis of bilateral trade, which was popularized by Kojima and redefined and expanded by Drysdale. One important contribution made by this thesis is to expand the usefulness of the intensity approach for the analysis of bilateral trade by suggesting ways in which econometric analysis can be used to explain the size and structure of Drysdale's two indexes and their changes over time: complementarity can be explained in terms of relative factor endowments, while country bias can be explained by trade resistance factors.

In the process of explaining complementarity and country bias index levels, several new indexes have been introduced to define rather intangible trade resistance factors in relative terms. The results of this exercise make it clear that in the process of changes in comparative advantage and patterns of trade resistance, the commodity composition of international trade is closely associated with its geographical distribution. This combined analysis provides a clearer understanding of those causes underlying the size, commodity composition, and geographical distribution of trade among trading partners.

Another important contribution made by this thesis has been to confirm the nature of, and reasons for, bilateral imbalance as reflected in the differential intensity of trade in two directions between a pair of trading countries. Differences in trade intensity are induced by difference in complementarity and country bias. The estimation in Chapter 4 of the pattern of complementarity showed that a country's pattern of complementarity is usually different between its export and import trade. In the real world with a number of alternative sources and markets, the theory of comparative advantage suggests that a commodity flows from countries producing it most efficiently to those producing it least efficiently. Country A exports commodity X to country B which it produces most efficiently. But country B does not necessarily produce most efficiently commodity Y, in which Country A's competitiveness is the least, and may instead produce most efficiently commodity Z. A third country C may produce most efficiently commodity Y. This illustrates the richness of the traditional theory of comparative advantage for explaining bilateral trade in a multicountry, multicommodity world. This also implies that bilateral imbalance would be common between countries where relative factor endowments are extreme.

Even without policy discrimination, the different degree and structure of complementarity favours one country's exports to another, thus inducing differential country bias. Drysdale (1967, pp. 234–35) took note of asymmetry in economic distance in Australia–Japan trade arising from the differential commodity composition of exports. Econometric evidence presented in Chapter 9 supports Drysdale's argument. Asymmetry in economic distance induces differential country bias through differential competing opportunity, differential size of trade potential, and the differential effect of individual trade resistances across commodities.

These results have important general implications for trade theory which is based on the two-country model. Hence, the detailed implications of this study for trade theory come from the lack of generality of the prediction from an overly simplified two country model. This is mainly associated with the identification of the different influence of trade resistances across individual trade routes. This identification has important implications for the theory of protection and customs union as well as for the determination of comparative advantage.

The first implication relates to the theory of protection. Chapter 6 revealed that non-discriminatory trade restrictions tend to force down complementarity in trade with a partner whose structure of comparative advantage is most complementary to one's own. This implies that protection costs result from losing the benefits not only from specialisation (trade creation), but also from the most efficient trade flow due to trade diversion. Hence, freer trade is likely not only to diminish the loss from distorted domestic production and consumption patterns, but also to diminish the loss from distorted trade relationships. The traditional theory of protection stresses only the former benefits from freer trade.

This loss from trade diversion is reinforced by the effects of trade policy on other trade resistances. Non-discriminatory protection reduces trade levels below that which would exist under free trade. Given that this effect is higher on trade flows with high complementarity than on those with low complementarity, and that trade policy has a multiplying effect on other resistances through its effect on the historical levels of trade, this results in increasing trade resistances in highly complementary trade routes through limiting traders' orientation towards these trading routes, and limiting development of commercial infrastructure. This indirect effect is particularly important for bilateral trade relationships where the historical trade level is low. This is because the greater trade flow resulting from freer trade policy has little effect on trade routes with already low resistances, where the marginal change resulting from reduced restriction is negligible, but it has a significant effect on trade routes with currently high resistances, where the marginal change is great. For example, if Australia lowered its protection for textile, clothing and footwear products, there would be a considerably larger volume of Korean exports to the Australian market, but little increase in exports from New Zealand and some ASEAN countries to Australia. Alternatively, Korea's lower protection for agricultural foodstuffs would enhance significantly Australian exports to the Korean market, but increase little America's exports. Indeed, the relatively stable trade relationship of a country, in spite of change in comparative advantage domestically and overseas, is mainly attributed to this indirect effect.[1]

[1] Recently a number of researchers have continued to extend protection theory to an analysis of the discriminatory effect of a country's non-discriminatory protection system, or to an analysis of the indirect effect of trade policy on other trade resistances. For example, Warr and Lloyd (1982) examined the discriminatory effect of Australian trade policies against less developed countries, and Garnaut (1972) scrutinized the effect of trade policy on other trade resistances. Although there is long way to go in incorporating these effects on trade flow and welfare into a consistent trade theory, their identification is useful for the future development of theory.

The second implication requires some modifications to the theory of customs union (preferential trading arrangement) through recognition of the effect of discriminatory trade policy on other resistances to bilateral trade. Given the magnifying effect of preferential treatments associated with customs unions through their effect on other trade resistances, customs unions can distort or liberalize trade flows (trade diversion or trade creation), or improve or worsen the allocation of resources, depending on the degree of resistance to intra-union trade compared with that in trade between members and third countries. If, prior to the formulation of a customs union, intra-union trade relationships are based on the lower level of resistances such as geographical distance, cultural and historical familiarity, and legal and institutional similarity, and hence, marginal changes in the relative degree of resistances associated with the union are not great, there would be little trade creation relative to trade diversion. Conversely, if intra-union trade was not fully developed due to the high degree of trade resistance before the union, there would be great trade creation relative to trade diversion. In terms of our two indexes, trade-creating effects would dominate trade-diverting effects if, before the union, complementarity was high between member countries, but country bias was low, and vice versa.

This point casts doubt on the post-war trend for preferential arrangements to be made among countries in the same region, because geographical distance is the most significant and persistent influence on international trade. This is consistent with the conclusion of an earlier study, which pointed out that "*if actual exports and imports are less than predicted by the regression parameters, gains may be realised by policies that bring about closer association between the countries concerned. ⋯ Opportunities for increasing transactions through association, or other preferential arrangements, lie principally outside a country's contiguous geographical area.*"[2]

[2] Wolf and Weinschrott (1973, p. 59). This study compared the actual trade flows with the norm predicted from the estimated regression parameters of their international transaction model, and confirmed that the negative residuals fell outside specific geographical areas.

Recognition of the different influence of trade resistances across individual trading routes also has significant implications for the doctrine of comparative advantage, reflected in producer price comparisons. This is important because it gives insight into the long-standing question as to whether the commodity composition of bilateral trade is determined by bilateral comparison of one country's comparative advantage with another, or by global comparison of one country's comparative advantage with the rest of the world. Some earlier empirical studies have revealed that a country's trade pattern is quite different across its bilateral trade flows, and this evidence has been adduced in support of the bilateral comparison (see Tatemoto and Ichimura, 1959; Wahl, 1961; Leontief, 1970; Amsden, 1980).

It should be noted that comparative advantage reflects producer price comparisons because of the assumption of the absence of international transaction costs (for overcoming all kinds of trade resistances). Yet prices paid for traded commodities include both production and transaction costs, so that producer and consumer prices will diverge as much as transaction costs. Prices will be different across individual sources, since transaction costs are different across individual trade routes. If transaction costs are great relative to production costs and hence, the differential across different sources is large, they may reduce or even nullify the differential in production costs. In this case, comparative advantage is no longer the major determinant of the pattern of bilateral trade. For example, the share of New Zealand in Australian imports of clothing and footwear was nearly 70 times as high as her corresponding share in world exports, while Korea's share in Australian imports was half her corresponding share in world exports. Furthermore, the share of New Zealand in Australian imports was much higher than that of Korea, despite the fact that New Zealand's share in world exports was only one-twentieth of the size of the Korean. This is not because New Zealand has a comparative advantage and Korea has a comparative disadvantage on bilateral comparisons with Australia, nor because New Zealand's comparative advantage compared with Australia is far greater than Korea's comparative advantage compared with Australia. It is a consequence of lower transaction costs (including preferential access) in New Zealand exports to Australia than in Korea's exports to Australia.

Earlier studies have taken note of the likelihood that a country's trade pattern differs from one trade flow to another, because of different trade resistances. For example, Drysdale (1967, pp.36–7) suggests that Japanese exports of capital intensive commodities to relatively capital scarce countries in Asia and of labour intensive products to relatively labour scarce North America, was not a product of bilateral determination of comparative advantage, but a product of Japanese advantage in Asian markets over the other competitors, the advantage coming from geographical proximity, war-reparation payments, and market familiarity. Roemer (1977) also confirms that a country tends to export intensively the products of its "strong" industries to "weak" areas with high trade resistances, and export intensively products of its "weak" industries to "strong" areas with low resistances.[3] According to Roemer's argument, New Zealand has a high share in Australian imports of clothing and footwear because New Zealand enjoys lower transaction costs sufficient to offset her disadvantage in production costs compared with other exporters to Australia. This advantage in transaction costs is the reason for the fact that New Zealand is highly specialised in her exports to Australia (her strong area) in clothing and footwear (her weak sector) despite her comparative disadvantage globally in these commodities. This example makes it clear that differential transaction costs across markets or sources are the primary reason for the differential pattern of a country's exports (imports) across different trade routes.

The influence of trade resistances on comparative advantage is important, since it

[3] This argument can be expanded to importing competing and exporting sectors. Since the domestic market is the strongest market for individual sectors, the importing competing (weak) sector concentrates on domestic markets, while the exporting (strong) sector concentrates on foreign markets.

may cause production activities to be located at other than the optimum site from the point of view of world welfare. It also means that the pattern of a country's global trade and production is more influenced by the structure of the particular economies to which the country is connected closely, and with low resistances. This feature tends to cause a division of global trade into natural trade regions, even without any formal regional arrangements, if there are no supra-market, historical factors other than distance affecting transaction costs. This is particularly relevant to the trade pattern of small economies, because they are often closely tied to one or two large economic powers. This supports Leontief's suggestion (1968): ***"a comprehensive, two-sided explanation of our economic relationships with the rest-of-the-world will not, of course, be possible before the internal economic structure of at least one of the most important of our trading partners has been studied as fully as that of our own"***. This is because one of the most important trading partners for a particular country is the partner with which it is connected with the lowest trade resistances, such as strong economic and political relationships, cultural and historical ties, and geographical proximity.

11.3. Implications for Trade Policy

This study also has several implications for trade policy in general and for Australia–Korea trade policy in particular. First of all, the asymmetric nature of bilateral trade associated with both asymmetry of complementarity and country bias raises doubt about the currently accelerating trend toward bilateral deals in trade negotiations. This thesis makes it clear that bilateral imbalance is inherent in the trade flow between any pair of trading countries in a multi-country, multi-commodity, multi-factor real world, because of different commodity composition of trade. Thus, any policy designed to intervene in a trade flow for the purpose of pursuing bilateral balance would cause a significant reduction of trade and, therefore, of welfare, resulting from less efficient resource allocation and trade specialisation. This is consistent with the conclusion of a study of Japanese–American trade that bilateral trade imbalance is primarily a function of the overall commodity composition of U.S. and Japanese trade. Petri (1984, p.164) concludes as follows. " *The large bilateral imbalance [in US-Japan Trade] is also consistent with existing trade specialisation. In other words, if Japan's overall level of openness is accepted as given, the observed bilateral trade and its imbalance follow as a natural consequence [of the commodity composition of both countries]. Furthermore, if the Japanese economy did become more open, the imbalance would become still larger*".[4] Recognition of structural factors as a major source of bilateral imbalance confirms the long-established view that the goal of a freer global trading system based on free and generally unbalanced bilateral trade is most desirable in order to increase the welfare of all nations through the efficient allocation of world resources.

Some implications for trade policy are directly related to the implications for trade theory discussed in the previous section. The effect of closer New Zealand–Australia economic cooperation deserves mention with regard to the implications for a customs union. Such a union would have great trade-diverting effects but would stimulate little trade creation, given the low complementarity and extremely high country bias in trade between the two countries. As the current study suggests, a customs union makes the structure of member economies more complementary with each other due to dynamic effects. When considering the long history of Australia–New Zealand preferential agreements, however, the still extremely low complementarity provides evidence in support of the above argument. If practicable, a preferential arrangement between Australia and Korea would have great trade-creating but little trade-diverting effects, because of currently high complementarity and low country bias.

Further, the tendency for a country's trade pattern to be significantly affected by

[4] The words in square brackets are inserted by this author.

the structure of comparative advantage in trading partners with which it has a close trade relationship has important implications for planning efficient trade specialisation. Even without any formal regional arrangement, successful industrial and trade policy requires close cooperation and exchange of information with other regional countries. In this context, the growing Pacific community concept and the regional trade liberalisation initiatives — not aiming at creating discriminatory trade liberalisation but aiming at reducing trade barriers within the region — not only would provide net benefits to regional countries by being able to promote efficient trade specialisation and structural readjustment, but also would be consistent with their longer-term interests in more effective movement toward global trade liberalisation. If trade barriers within the region are removed sufficiently, those benefits can be achieved without discriminatory "free trade areas" because of the geographical proximity among regional countries and separation of the region from other trading centres. However, a country's protection and bilateral or selective trade liberalisation within the region will be most harmful to the other (non-member) regional countries through trade diversion.

Immediate policy suggestions to further develop Australia–Korea bilateral trade can be drawn from this study. First, bilateral imbalance deserves mention, since there have been arguments about the trade imbalance and it is continually an issue of friction in Australia–Korea trade discussions. Chapter 9 reveals that the chronic and large scale imbalance of Korean global trade was the most important source of bilateral imbalance in Australia–Korea trade, and its relative imbalance has been gradually improved as Korean global imbalance has improved. From the late 1970s the differential intensity of trade became more important for bilateral imbalance, but this was closely associated with Korea's industrial upgrading toward heavy and chemical industries, implying that the imbalance was primarily structural, coming from both countries' relative factor endowments.

This suggests that on two grounds there seems to be no point in adhering to bilateral balance. Firstly, the commodity composition of bilateral trade has more significant implications than the differential intensity of trade. Australia has almost all of the natural resources which Korea needs for her exports to world markets, while Korea supplies none of Australia's essential imports. Adherence to bilateral balance would result in great cost to the Korean economy. This suggests that a long-term, multinational view is needed for the designing of policy. As Korea's exports, based on raw materials imported from Australia, continuously grow, and their structure upgrades toward capital equipment and machinery which are predominant in Australian imports, bilateral imbalance will be reduced through improvement in Korea's global trade balance, and through increasing complementarity between Korean exports and Australian imports. Secondly, as Korea increases her importance as a market for Australian exports, Korea can capitalise on her importance, so that her exports may have more favourable access to Australian markets. Korea's increasing importance also will lead her to more direct involvement in the Australian economy. As a consequence, Korean businessmen will become more familiar with Australian industrial requirements, trading and investment opportunities, and economic policy, and thereby reduce the high trade resistances resulting from unfamiliarity. This increased direct participation in the Australian market will become more important, because Korean exportables will shift towards capital goods such as machinery and equipment and producer materials. The past development of Australia–Japan trade sheds light on the design of trade policy with regard to the current dispute concerning bilateral imbalance in Australia–Korea trade.

Another important feature deserves mention with regard to bilateral imbalance. Neither country can be said to be fully engaged in the international division of labour, particularly in view of their stages of development. There is plenty of scope for both countries to move toward freer trade. Both Korea's protection against imports of foodstuffs and Australia's protection against imports of textiles, clothing and footwear, and motor vehicles, have increased dramatically over the 1970s. When considering that each country's protected commodities are those in which the other's exports are highly competitive in world markets, the reduction of each country's protection would be a substantial trade stimulant in both directions through increases in complementarity and country bias. The increase in country bias would be particularly important, since each country is a marginal supplier of those commodities in the other's market. Moreover, the reduction would contribute to global liberalisation in cases where both countries have a common interest in world trade.

The reasons for bilateral imbalance and the long-run consideration of bilateral imbalance lead to the conclusion that both countries share interests in maintaining and increasing global trade liberalisation. In addition, both countries' major exportables are highly subject to currently increasing protectionist policies, particularly in the advanced industrial countries. Furthermore, both countries' trade relationships are typically asymmetric between export and import trade because of their highly skewed factor endowments. These points imply that both economies are most vulnerable to increasing bilateral trade negotiation. Korea's factor endowments especially suggest that it would be difficult for the Korean economy to maintain its growth rate amidst such a tendency to bilateral negotiation. This argument suggests strongly that both countries should cooperate to maintain and promote global trade liberalisation instead of becoming involved in bilateral trade negotiations.

Nevertheless, it should be stressed that the degree of resistances to Australia–Korea trade is still high, relative to that in both countries' trade with other regional countries. The high complementarity between the two economies suggests the need for further development of trade-supporting services and familiarity. This includes further public provision of information and assistance in market research, the expansion of transportation (for example, establishment of a direct air route) and other communication channels, and the interchange of banking and insurance institutions. Such developments will generate, directly and indirectly, further expansion and diversification of bilateral trade in both directions, particularly in manufactures, through reducing market imperfections. In this context, several currently operating joint committees at government and private levels, and the mutual exchange of commercial banks in 1986, are contributing to increasing familiarity and reducing market imperfections.

11.4. Areas for Further Research

This study used the two concepts of complementarity and country bias to explain the rapid growth of bilateral trade between Australia and Korea. Some of the strengths and weaknesses of this thesis are associated with the strength and weakness of the decomposition of the intensity of trade into these two components, as discussed in Chapter 3. The main weaknesses lies in the assumption that the commodity composition of each country's global trade is independent of influences affecting bilateral trade bias. This assumption is not a major limitation to this study because both Australia and Korea have relatively large shares in world trade with neither dominating the other. However, the size and commodity composition of a country's trade tends to be associated with the level and commodity composition of a particular bilateral trade when the bilateral trade is a substantial share of one or both countries' total trade. This implies that the approach should be applied with care when used to analyse bilateral trade between a major economic power and a small country under its influence, for example, Korea–America or Korea–Japan trade.

The structure of protection of a country has a significant influence over the size, commodity composition, and geographical distribution of its trade. While both the Australian and Korean structures of protection were qualitatively taken into account in this analysis on the assumption that the degree and structure are given, quantitative estimates of the effects of protection structures on both complementarity and country bias in a bilateral trade would require the use of a multi-country, multi-commodity general equiliblium model.

Another important avenue for development is the need for further detailed empirical study of the influence of natural resistances on trade flows. The study has used geographical distance as a proxy for natural resistances including transport costs, and shown that distance has significant impacts on bilateral trade. This result needs to be supplemented by further analysis in two ways. In the first place, the weight of freight costs (largely depending on distance) in transport costs has been declining as increases in the size of cargo carriers and more efficient carriers specific to each commodity group are introduced. Shipping markets tend to be monopolistic and specialised, and the relative cost of air freight is decreasing rapidly. Hence, the effect of non-distance components of transport costs such as delay and organizing costs seems to be becoming more important. In the second place, the influence of common culture and historical backgrounds on user and trader preference in decision making needs closer examination.

This study also suggests an avenue for further study relating to Australia–Korea trade in particular. First of all, the structure of complementarity in both directions can be regarded as a vertical one. Most of the complementarity in Australian exports to Korea is contributed by raw materials and the importance of raw materials will further increase, while in the reverse direction the trade is dominated by processed manufactures. This implies that there is significant structural interdependence between the two economies, and that this will intensify in the future. The identification of structural interdependence will help in projecting the efficient specialisation patterns for each country and in designing trade policy for their bilateral and global trade.

Finally, it should be emphasized that this thesis documents an important aspect of the general relationship between Australia and Korea. Due to remoteness in terms of psychic and cultural distance, the economic relationship as a whole has been slow to develop, despite the increasing benefits to be gained by intensifying it. Deepening trade relationships will bring about broad social, political, and academic contact, and these contacts will further intensify trade and other economic relationships between the two countries.

REFERENCES

Adams, M. (ed.) (1984), *Economic Development in East and South-East Asia: Implications for Australian Agriculture in the 1980s,* Bureau of Agricultural Economics, Canberra: AGPS.

Akamatsu, K. (1965), *Sekaikeizairon* (World economy), Tokyo: Kunimotoshobo.

Amsden, A. H. (1980), The Industry Characteristics of Intra-Third World Trade in Manufactures, *Economic Development and Cultural Change,* Vol. 28, pp. 1–19.

Anderson, K. (1981a), Growth of Agricultural Protectionism in South Korea and Its Trade and Welfare Effects, paper prepared for USDA/Universities Agricultural Trade Research Consortium Meeting, Washington, D.C., June.

____________ (1981b), Northeast Asian Agricultural Protection in Historical and Competitive Perspectives: The Case of South Korea, Australia–Japan Research Centre, Research Paper no. 82, Canberra.

____________ (forthcoming), Tariffs and the Manufacturing Sector, in Maddock, R. R. and McLean, I. W. (ed.), *The Australian Economy in the Long Term,* Cambridge University Press.

____________ (1986), Food Policy in Korea, 1955 to 1985, paper presented for a workshop on Food Price Policies in Asia, Stanford University, California, March.

____________, *et al.* (1985), Pacific Economic Growth and the Prospects for Australian Trade, Australia–Japan Research Centre, Pacific Economic Paper no. 122, Canberra.

____________ and **Garnaut, R.** (1985), Australia's Trade Growth with Developing Countries, Australia–Japan Research Centre, *The Developing Economies,* Vol. 23, pp. 121–37.

____________ and **George, A.** (ed.) (1980), *Australian Agriculture and Newly Industrialising Asia: Issues for Research,* Canberra: Australia-Japan Research Centre.

____________ and **Joo, Y. J.** (1984), South Korea's Rapid Industrialisation and Its Implications for Agricultural Trade, in Adams, M. (ed.), *Economic Development in East and South-East Asia,* Bureau of Agricultural Economics, Canberra: AGPS.

——— and **Smith, B.** (1981), Changing Economic Relations between Asian ADCs and Resource-Exporting Developed Countries, in Hong, W. T. and Krause, L. B. (ed.), *Trade and Growth of the Advanced Developing Countries in the Pacific Basin,* Seoul: KDI (Korean Development Institution).

Anderson, J. E. (1979), A Theoretical Foundation for the Gravity Equation, *American Economic Review,* Vol. 69, pp. 106–16.

Armington, P. S. (1969a), A Theory of Demand for Products Distinguished by Place of Production, *International Monetary Fund Staff Papers,* Vol. 16, No, 1, pp. 159–176.

——— (1969b), The Geographic Pattern of Trade and the Effects of Price Changes, *International Monetary Fund Staff Papers,* Vol. 16, No. 2, pp. 177–199.

Arndt, H. W. (1968), Trade Relations between Australia and Indonesia, *Economic Record,* Vol. 44, pp. 168–93.

Balassa, B. (1962), *The Theory of Economic Integration,* London: Allen and Unwin.

——— (1965), Trade Liberalisation and " Revealed" Comparative Advantage, *The Manchester School,* Vol. 33, 1965, pp. 99–123.

——— (1967), *Trade Liberalization among Industrial Countries: Objectives and Alternatives,* New York: McGraw-Hill.

——— (1968), Tariff Protection in Industrial Nations and its Effects on the Exports of Processed Goods from Developing Countries, *Canadian Journal of Economics,* Vol. 1, pp. 583–94.

——— (1977), "Revealed" Comparative Advantage Revisited: an Analysis of Relative Export Shares of the Industrial Countries: 1953–1971, *The Manchester School,* Vol. 45, pp. 327–44.

——— (1979), The Changing Pattern of Comparative Advantage in Manufactured Goods, *Review of Economics and Statistics,* Vol. 61, pp. 259–66.

———, *et al.* (1971), *The Structure of Protection in Developing Countries,* Baltimore: Johns Hopkins Press.

Balderstone, J. S., *et al.* (1982), *Agricultural Policy: Issues and Options for the 1980s,* Working Group Report to the Minister for Primary Industry, Canberra: AGPS.

Baldwin, R. E. (1971), Determinants of the Commodity Structure of U.S. Trade, *American Economic Review,* Vol. 61, pp. 116–46.

____________ (1979), Determinants of Trade and Foreign Investment: Further Evidence, *Reviews of Economics and Statistics,* Vol. 61, pp. 40–48.

Bergstrand, J. H. (1985), The Gravity Model in International Trade: Some Microeconomic Foundations and Empirical Evidence, *Review of Economics and Statistics,* Vol. 67, pp. 474–81.

Beckerman, W. (1956), Distance and the Pattern of Intra-European Trade, *Review of Economics and Statistics,* Vol. 38, pp. 31–40.

Bhagwati, J. (1964), The Pure Theory of International Trade: a Survey, *Economic Journal,* Vol.74, pp.1–64.

Bishay, F. K. and **Bishay, M.** (1981), Non-Traded Goods and Comparative Advantage: A Multisectoral Analysis of Trade Policy in Australia, *Economic Analysis and Policy,* Vol. 11, pp. 103–119.

Bowen, H. P. (1983a), On the Theoretical Interpretation of Indices of Trade Intensity and Revealed Comparative Advantage, *Weltwirtschaftliches Archiv,* Vol. 119, pp. 464–472.

____________ (1983b), Changes in the International Distribution of Resources and Their Impact on U.S. Comparative Advantage, *Review of Economics and Statistics,* Vol. 65, pp. 402–14.

Branson, W. H. and **Junz, H. B.** (1971), Trends in U.S. Trade and Comparative Advantage, *Brookings Papers on Economic Activity* No. 2, pp. 285–346.

Branson, W. H. and **Monoyios, N.** (1977), Factor Inputs in U.S. Trade, *Journal of International Economics,* Vol. 7, pp. 111–31.

Brash, D. T. (1966), *American Investment in Australian Industry,* Canberra: ANU Press.

Brown, A. J. (1949), *Applied Economics, Aspects of the World Economy in War and Peace,* London: George Allen and Unwin.

Bryan, I. J. (1974), The Effect of Ocean Transport Costs on the Demand for Some Canadian Exports, *Weltwirtschaftliches Archiv,* Vol. 110, pp. 642–662.

Carland, D. (1980), Development in the Textile and Clothing Industries of Northeast Asia, in Anderson, K. and George, K. (ed.), *Australian Agriculture and Newly Industrialising Asia: Issues for Research*, Canberra: Australia-Japan Research Centre.

Caves, R. E. and **Jones, R. W.** (1973), *World Trade and Payments*, 2nd edition, Boston: Little, Brown and Company.

Chenery, H. B. (1960), Patterns of Industrial Growth, *American Economic Review*, Vol. 50, pp. 624–54.

____________ and **Taylor, L.** (1968), Development Patterns: among Countries and Over Time, *Review of Economics and Statistics*, Vol. 50, pp. 391–416.

____________ and **Syrquin, M.** (1975), *Patterns of Development: 1950–70*, London: Oxford University Press.

____________, **Shishido, S., and Watanabe, T.** (1962), The Pattern of Japanese Growth, *Econometrica*, Vol. 30, pp. 98–139.

Chipman, J. S. (1969), Factor Price Equalization and Stolper-Samuelson Theorem, *International Economic Review*, Vol. 10, pp. 399–406.

Cohen, B. I. (1973), Comparative Behaviour of Foreign and Domestic Export Firms in a Developing Economy, *Review of Economics and Statistics*, Vol. 55, pp. 190–7.

Cohen, S. I. (1978), Industrial Performance in South Korea: a Descriptive Analysis of a Remarkable Success, *Developing Economies*, Vol. 16, pp. 408–33.

Corden, W. M. (1971), *The Theory of Protection*, Oxford: Clarendon Press.

____________ (1974), *Trade Policy and Economic Welfare*, Oxford: Clarendon Press.

Crawford, J. G. (1968), *Australian Trade Policy 1942–66: A Documentary History*, Canberra: ANU Press.

____________ (1980), The Pacific Basin Cooperative Concept, paper presented to The Export-Import Bank of Japan Symposium on Business Cooperation between Asia-Pacific and Japan in the 1960s, May, in Tokyo.

____________, *et al.* (1979), *Study Group on Structural Adjustment* (Crawford Report), Canberra: AGPS.

Cuddy, J. D. A. (1973), A Note on Projections of International Trade Based on Coefficients of Trade Intensity, *Economic Journal,* Vol. 83, pp. 1222–35.

Dixon, P. B. (1978), Economies of Scale, Commodity Disaggregation and the Costs of Protection, *Australian Economic Papers,* Vol. 17, pp. 63–80.

Donges, J. B. and **Reidel, J.** (1977), The Explanation of Manufactured Exports in Developing Countries: an Empirical Assessment of Supply and Demand Issues, *Weltwirtschaftliches Archiv,* Vol. 113, pp. 58–87.

Drysdale, P. D. (1967), *Japanese Australian Trade,* Unpublished Ph.D. dissertation, ANU, Canberra.

__________ (1969a), Japan and Australia: the Prospect for Closer Economic Integration, *Economic Papers,* Vol. 30, pp. 12–28.

__________ (1969b), Japan, Australia and New Zealand: the Prospects for Western Pacific Integration, *Economic Record,* Vol. 45, pp. 321–342.

__________ (1970), Minerals and Metals in the Japanese–Australian Trade, *The Developing Economies,* Vol. 8, pp. 198–218.

__________ (1972), Japan in the World Economy: the Decade Ahead, in Stockwin, J. A. A. (ed.), *Japan and Australia in the Seventies,* Sydney: Angus and Robertson.

__________ (1978), Australia's Economic Relations with Asia and The Pacific: Past Perspectives and Future Prospects, Lecture in University of Washington ITT series, *Perspectives on the Pacific,* November.

__________ (1981), Australia's Economic Relations with the Pacific Basin, paper delivered to *Trade and Development in the Pacific Basin: Toward the Year 2000,* Institute of Asian Research, University of British Columbia, September.

__________ and **Garnaut, R.** (1982), Trade Intensities and the Analysis of Bilateral Trade Flows in A Multi-Country World: a Survey, *Hitotsubashi Journal of Economics,* Vol. 22, pp. 62–84.

Edwards, C. T. (1980), South Korea's Industrial Development Strategy: Implications for Australia, *Australian Economic Review,* No. 49, pp. 29–40.

Edwards, S. (1983), Australia's Relations with the Koreas: a Chronology and Bibliography 1953–1983, Centre for the Study of Australian-Asian Relations, Research Paper no. 25, Griffith University, Brisbane.

Fei, J. C. H. and **Ranis, G.** (1975), A Model of Growth and Employment in the Open Dualistic Economy: the Case of Korea and Taiwan, *Journal of Development Studies,* Vol. 11, pp. 32–67.

Findlay, C., Phillips, P., and **Tyers, R.** (forthcoming), ASEAN and China Exports of Labour-Intensive Manufactures: Performance and Prospect, Asean-Australia Working Paper, Canberra.

Finger, J. M. and **Kreinin, M. E.** (1979), A Measure of 'Export Similarity' and its Possible Uses, *Economic Journal,* Vol. 89, pp. 905–12.

Finger, J. M. and **Yeats, A. J.** (1976), Effective Protection by Transportation Costs and Tariffs: a Comparison of Magnitudes, *Quarterly Journal Economics,* Vol. 40, pp. 169–176.

Frank, C. R., Kim, K. S., and **Westphal, L. E.** (1975), *Foreign Trade Regimes for Economic Development: South Korea,* New York: NBER (National Bureau of Economic Research).

Garnaut, R. (1972), *Australian Trade with Southeast Asia: a Study of Resistances to Bilateral Trade Flows,* Unpublished Ph.D. dissertation, ANU, Canberra.

____________ (ed.) (1980), *ASEAN in a Changing Pacific and World Economy,* Canberra: ANU Press.

____________ and **Anderson, K.** (1980), ASEAN Export Specialisation and the Evolution of Comparative Advantage in the Western Pacific Region, in Garnaut, R. (ed.), *ASEAN in a Changing Pacific and World Economy,* Canberra: ANU Press.

Geraci, V. J. and **Prewo, W.** (1977), Bilateral Trade Flows and Transport Costs, *Review of Economics and Statistics,* Vol. 59, pp. 67–74.

Giersch, H. (ed.), (1974), *The International Division of Labour: Problems and Perspectives,* Germany: Kiel Institute of World Economics.

Girgis, M. (1973), Development and Trade Patterns in the Arab World, *Weltwirtschaftliches Archive,* Vol. 109, pp. 121–168.

Glejser, H. (1968), An Explanation of Differences in Trade-Product Ratio among Countries, *Cashiers Economiques de Bruxelles,* Vol. 37, pp. 47–58.

Goldfinch, M. B. (1969), Japanese Trade: an Australian Viewpoint, *Economic Papers,* Vol. 30, pp. 29–38.

Goodman, L. A. (1963), Statistical Methods for the Preliminary Analysis of Transactions Flows, *Econometrica*, Vol. 31, pp. 197–208.

Gregory, R. G. (1976), Some Imlications of the Growth of the Mineral Sector, *Australian Journal of Agricultural Economics*, Vol. 20, pp. 71–91.

Gregory, R. G. and **Martin, L. D.** (1976), An Analysis of Relationships between Import Flows to Australia and Recent Exchange Rate and Tariff Changes, *Economic Record*, Vol. 52, pp. 1–25.

Grubel, H. G. and **Lloyd, P. F.** (1975), *Intra-Industry Trade: the Theory and Measurement of International Trade in Differentiated Products*, London: Macmillan.

Gruber, W. H., Metha, D., and **Vernon, R.** (1967), The R & D Factor in International Trade and International Investment of the United States Industries, *Journal of Political Economy*, Vol. 75, pp. 20–37.

Gruber, W.H. and **Vernon, R.** (1970), The Thechnology Factor in a World Trade Matrix, in Vernon, R. (ed.), *The Technology Factor in International Trade*. New York: NBER.

Gruen, F. H. and **Corden, M. W.** (1970), A Tariff That Worsens the Terms of Trade, in McDougall, I. A. and Snape, R. H. (ed.), *Studies in International Economics*, Amsterdam: North-Holland.

Hansson, K. E. (1952), A General Theory of the System of Multilateral Trade, *American Economic Review*, Vol. 42, pp. 58–68.

Harrop, B. (1978), Trade and the MFT, *Textile Asia*, November, pp. 105–12.

Hayter, T. (1972), *Aid as Imperialism*, (reprinted) England: Penguin Books.

Heckscher, E. (1949), The Effect of Foreign Trade on the Distribution of Income, reprinted in American Economic Association, *Readings in the Theory of International Trade*, Philadelphia: Blakiston.

Helleiner, G. K. (1973), Manufactured Exports from Less-Developed Countries and Multinational Firms, *Economic Journal*, Vol. 83, pp. 21–47.

__________ (1979), Intra-Firm Trade and the Developing Countries: an Assessment of the Data, *Journal of Development Economics*, Vol. 6, 1979, pp. 391–406.

Hill, H. and **Johns, B.** (1985), The Role of Direct Foreign Investment in Developing East Asian Countries, *Weltwirtschaftliches Archiv*, Vol. 121, pp. 355–81.

Hillman, A. L. (1980), Observations on the Relation between "Revealed Comparative Advantage" and Comparative Advantage as Indicated by Pre-Trade Relative Prices, *Weltwirtschaftliches Archiv*, Vol. 116, pp. 315–321.

Hirsch, S. (1974), Capital or Technology? Confronting the Neo-Factor Proportions and the Neo-Technology Accounts of International Trade, *Weltwirtschaftliches Archiv*, Vol. 110, pp. 535–63.

__________ (1978), The Product Cycle Model of International Trade: a Multi-Country Cross-Section Analysis, *Oxford Bulletin of Economics and Statistics*, Vol. 40, pp. 305–17.

Hirschman, A. O. (1945), *National Power and the Structure of Foreign Trade*, Berkeley and Los Angeles: University of California Press.

Hoffmann, W. G. (1958), *The Growth of Industrial Economies*, England: Manchester University Press.

Hong, W. T. (1976), *Factor Supply and Factor Intensity of Trade in Korea*, Seoul: KDI.

__________ (1979), *Trade, Distortions and Employment Growth in Korea*, Seoul: KDI.

__________ and **Park, Y. C.** (1986), Financing of Export-Oriented Growth in Korea, in Tan, A. H. H. and Kapur, B. (ed.), *Pacific Growth and Financial Interdependence*, Sydney: Allen and Unwin.

__________ and **Krause, L. B.** (ed.), (1981), *Trade and Growth of the Advanced Developing Countries in the Pacific Basin*, Seoul: KDI.

__________ and **Krueger, A. O.** (ed.), (1975), *Trade and Development in Korea*, Seoul: KDI.

Houthkker, H. S. (1957), An International Comparison of Household Expenditure Patterns: commemorating the Centenery of Engle's Law, *Econometrica*, Vol. 25, pp. 532–51.

Hufbauer, G. C. (1970), The Impact of National Characteristics and Technology on the Commodity Composition of Trade in Manufactured Goods, in

Vernon, R. (ed.), *The Technology Factor in International Trade,* New York: NBER.

__________ and **Chilas, J. G.** (1974), Specialisation by Industrial Countries: Extent and Consequences, in Giersch, H. (ed.), *The International Division of Labour: Problems and Perspectives,* Germany: Kiel Institute of World Economics.

Ikema, M. and **Yamazawa, I.** (ed.), (1981), *Shigen Boeki no Keizaigaku* (Economics of resource trade), Tokyo: Boonshinto.

Isard, W. (1956), *Location and the Space Economy,* New York: John Wiley and Sons, pp. 208–219.

Jo, S. H. (1981), Overseas Direct Investment by South Korean Firms: Direction and Pattern, in Kumar, K. (ed.), *Multinationals from Developing Countries,* Lexington: McLeod, M.

Johnson, H. G. (1958), *International Trade and Economic Growth,* Cambridge: Harvard University Press.

__________ (1968), Comparative Cost and Commercial policy Theory for a Developing World Economy, Wicksell Lectures, Stockholm.

Jones, R. W. (1977), "Two-ness" in Trade Theory: Costs and Benefits, special papers in International Economics no. 12, Princeton University.

__________ (1971), A Three-Factor Model in Theory, Trade, and History, in Bhagwati, J. *et al.* (ed.), *Trade, Balance of Payments and Growth: Papers in International Economics in honor of Charles P. Kindleberger,* Amsterdam: North-Holland.

Kanamori, H. (1960), Boeki Jiuka to Hikaku Seisansei no Kozo (Trade liberalisation and structure of comparative productivity), *Keizaihyoron,* Vol. 9, pp. 14–24.

Kasper, W. (1978), Australia's Economic and Industrial Structures: Past Patterns and Prospective Trends, in Kasper, W. and Parry, T. G. (ed.), *Growth, Trade, and Structural Change in an Open Australian Economy,* Sydney: University of New South Wales.

Keesing, D. B. (1966), Labour Skills and Comparative Advantage, *American Economic Review,* Vol. 56, pp. 249–58.

———— (1967), The Impact of Research and Development on United States Trade, *Journal of Political Economy,* Vol. 75, pp. 38–48.

———— and **Sherk, D. R.** (1971), Population Density in Patterns of Trade and Development, *American Economic Review,* Vol. 61, pp. 956–61.

Kenen, P. B. (1965), Nature, Capital and Trade, *Journal of Political Economy,* Vol. 73, pp. 437–60.

Kim, K. S. (1980), *Hankook Konguphwa Pattern gwa gue Yoin,* (Pattern of Korean industrialisation and its source), Seoul: KDI.

Kim, Y. (1979), *Hankook Chulgang Kongup ui Sungjang* (Growth of Korean iron and steel industry), Seoul: KDI.

Kleiman, E. (1976), Trade and the Decline of Colonialism, *Economic Journal,* Vol. 86, pp. 459–480.

———— (1977), Heirs to Colonial Trade, *Journal of Development Economics,* Vol. 4, pp. 93–103.

———— (1978), Cultural Ties and Trade: Spain's Role in Latin America, *Kyklos,* Vol. 31, pp. 275–290.

Kojima, K. (1958), *Nihon Boeki to Keizai Hatten* (Japan's foreign trade and economic development), Tokyo: Kunimotoshobo.

———— (1962), The Pattern of Triangular Trade among the U.S.A., Japan, and Southeast Asia, *The Developing Economies,* preliminery issue, Vol. 1, pp. 48–74.

———— (1964), The Pattern of International Trade among Advanced Countries, *Hitotshubashi Journal of Economics,* Vol. 5, pp. 16–36.

———— (1970), Structure of Comparative Advantage in Industrial Countries: a Verification of the Factor-Proportions Theorem, *Hitotsubashi Journal of Economics,* Vol. 11, pp. 1–29.

———— (1971), *Japan and a Pacific Free Trade Area,* London: Macmillan.

———— (1977), *Japan and a New World Economic Order,* London: Croom Helm.

———— (1979), Shinko Kyogyokoku eno Taio (Responce to the newly industrialising countries), the Export and Import Bank of Japan, Research Report, no. 11, Tokyo.

Krassowski, A. (1968), *The Aid Relationship,* Washington, D. C.: Overseas Development Institute.

Krause, L. B. (1982), *U.S. Economic Policy toward the Association of Southeast Asian Nations,* Washington, D.C.: Brookings Institution.

____________ (1984), Australia's Comparative Advantage in International Trade , in Caves, R. E. and Krause, L. B., (ed.), *The Australian Economy: a View from the North,* Washington, D.C.: Brookings Institution.

____________ and **Patrick, H.** (ed.), (1978), *Mineral Resources in the Pacific Area,* San Francisco: Federal Reserve Bank of San Francisco.

Kravis, I. B. (1956a), "Availability" and Other Influences on the Commodity Composition of Trade, *Journal of Political Economy,* Vol. 64, pp. 143–55.

____________ (1956b), Wages and Foreign Trade, *Review of Economics and Statistics,* Vol. 38, pp. 14–30.

____________ and **Lipsey, R. E.** (1971), *Price Competitiveness in World Trade,* New York: NBER.

Krueger, A. O. (1977), Growth, Distortions and Patterns of Trade among Many Countries, special papers in International Finance no. 40, Princeton University.

____________ (1979), *The Developmental Role of the Foreign Sector and Aid: Studies in the Modernisation of the Republic of Korea, 1945–1975,* Cambridge: Harvard University Press.

Kunimoto, T. (1977), Typology of Trade Intensity Indices, *Hitotsubashi Journal of Economics,* Vol. 17, pp. 15–32.

Kuznets, S. (1964) Quantitative Aspects of the Economic Growth of Nations: IX, Level and Structure of Foreign Trade: Comparison for Recent Years, *Economic Development and Cultural Change,* Vol. 13, pp. 1–106.

____________ (1967), Quantitative Aspects of the Economic Growth of Nations: X, Level and Structure of Foreign Trade: Long Term Trends, *Economic Development and Cultural Change,* Vol. 15, pp. 1–140.

Lancaster, K. (1966), A New Approach to Consumer Theory, *Journal of Political Economy,* Vol. 74, pp. 132–57.

Lary, H. B. (1968), *Imports of Manufactures from Less-Developed Countries,* New York: NBER.

Leamer, E. E. (1974), The Commodity Composition of International Trade in Manufactures: an Empirical Analysis, *Oxford Economic Papers,* Vol. 26, pp.350–374.

__________ (1980), The Leontief Paradox Reconsidered. *Journal of Political Economy,* Vol. 88, pp. 495–503.

__________ (1984), *Sources of International Comparative Advantage: Theory and Evidence,* London: the MIT Press.

__________ and **Stern, R. M.** (1970), *Quantitative International Economics,* Boston: Allyn and Bacon.

Lee, Y. S. (1984), Protectionism and Intra-Industry Trade in the Pacific Basin, paper presented at Workshop on Trade and Protectionism on June, in Singapore.

Leechor, C., Kohli, H. S., and **Hur, S.** (1983), Structural Changes in World Industry: a Quantitative Analysis of Recent Developments, World Bank Technical Paper, Washington, D.C.: World Bank.

Leontief, W.W. (1968), Domestic Production and Foreign Trade: the American Capital Position Re-examined, reprinted in American Economic Association, *Readings in International Economics,* Homewood Ill.: Richard D. Irwin.

Linder, S. B. (1961), *An Essay on Trade and Transformation,* New York: Wiley.

__________ (1985), Pacific Protagonist—Implications of the Rising Role of the Pacific, *American Economic Review,* Vol. 75, pp. 279–84.

Linnemann, H. (1966), *An Econometric Study of International Trade Flows,* Amsterdam: North-Holland.

Lipsey, R. G. (1960), The Theory of Customs Unions: a General Survey, *Economic Journal,* Vol. 70, pp. 496–513.

Lloyd, P. J. (1978), Protection Policy, in Gruen, F. H. (ed.), *Surveys of Australian Economics,* ed., Sydney: George Allen and Unwin.

Martin, M. V. and **McDonald, J. A.** (1986) Food Grain Policy in the Republic of Korea: the Economic Costs of Self-Sufficiency, *Economic Development and Cultural Change,* Vol. 34, pp. 315–31.

Mason, E. S. (1964), *Foreign Aid and Foreign Policy,* New York:

McColl, G. D. and **Nicol, R. J.** (1980) An Analysis of Australian exports to its Major Trading Partners: Mid-1960s to Late-1970s, *Economic Record,* Vol. 56, pp. 145–57.

Meyer, F. V. (1956), Complementarity and the Lowering of Tariffs, *American Economic Review,* Vol. 46, pp. 323–35.

Michaely, M. (1962), *Concentration in International Trade,* Amsterdam: North-Holland.

__________ (1977), Exports and Growth, *Journal of Development Economics,* Vol. 4, pp. 49–53.

Miganagi, K. (1980), Structural Change in Japan, in Proklamasi, Y. (ed.), *Asia-Pacific in the 1980s: toward Greater Symmetry in Economic Interdependence,* Jarkarta: Centre of Strategic and International Studies.

Minami, R. (1981), *Nihon Keizai Hatten* (Development of Japanese economy), Tokyo: Toyokeizai.

__________ (1971), *Nihon Keizai no Denkanten* (Turning point in the Japanese economy), Tokyo: Shoboonsha.

Moriguchi, C. (1969), Japanese Trade Policies, *Economic Papers,* no. 30, pp. 1–11.

Murray, T. (1977), *Trade Preferences for Developing Countries,* London: Macmillan.

Myrdal, G. (1968), *Asian Drama,* London: The Penguin Press.

Nakamula, T. (1981), *The Postwar Japanese Economy: its Development and Structure,* Tokyo: University of Tokyo Press.

Nayyar, D. (1978), Transnational Corporations and Manufactured Exports from Poor Countries, *Economic Journal,* Vol. 88, pp. 59–84.

Nishimura, T. (1982), *Kankoku ni Chosen shita Taiwan: Ryokoku no Keizai Higaku Genkyu* (Comparison between Korean and Taiwan economies), Tokyo: Kokusai Books.

Nam, C. H. (1981), Trade and Industrial Policies and the Structure of Protection in Korea, in Hong, W. T. and Krause, L. B. (ed.), *Trade and Growth of the Advanced developing Countries in the Pacific Basin,* Seoul: KDI.

Ohlin, B. (1933), *Interregional and International Trade,* Cambridge: Harvard University Press.

Pangestu, M. (1982), Japanese and Other Foreign Investment in the ASEAN Countries, Australia–Japan Research Centre, Research Paper no. 73, Canberra.

Parry, T. G. (1975), Trade and Non-Trade Performance of U.S. Manufacturing Industry: "Revealed" Comparative Advantage, *The Manchester School,* Vol. 43, pp. 158–172.

__________ and **Watson, J. E.** (1979), Technology Flows and Foreign Investment in the Australian Manufacturing Sector, *Australian Economic Paper,* Vol. 18, pp. 103–118.

Petri, P. A. (1984), *Modelling Japanese–American Trade: a Study of Asymmetric Interdependence,* Cambridge: Harvard University Press.

Preeg, E. H. (1970), *Traders and Diplomats,* Washington, D.C.: Brookings Institution.

Ricardo, D. (1971), *The Principles of Political Economy and Taxation,* (reprinted), London: Penguin book.

Richardson, B. (1980), Trends in the Location of Early Stage Wool Processing in Asia, in Anderson, K and George, A. (ed.), *Australia Agriculture and Newly Industrialising Asia: Issues for Research,* Canberra: Australia-Japan Research Centre.

Roemer, J. E. (1975), *U.S.–Japanese Competition in International Markets,* Berkeley: University of California Press.

__________ (1976), Extensions of the Concept of Trade Intensity, *Hitotsubashi Journal of Economics,* Vol. 17, pp. 29–35.

__________ (1977), The Effect of Sphere of Influence and Economic Distance on the Commodity Composition of Trade in Manufactures, *Review of Economics and Statistics,* Vol. 59, pp. 318–327.

Rybczynski, T. M. (1955), Factor Endowment and Relative Commodity Prices, *Economica,* Vol. 22, pp. 336–341.

Sakai, N. (1983), Kankoku Senisangyo no Kokusai Kyoshoryoku to Kagaku Yoin (International competitiveness and price factor in Korean textile industry), *Sekai keizai hyoron,* Vol. 27, No. 4, pp. 46–55.

Sanyal, K. K. and **Jons, R. W.** (1983), The Theory of Trade in Middle Products, *American Economic Review*, Vol. 72, pp. 16–31.

Sautter, H. (1974), Tendencies of Regionalzation in World Trade between 1938 and 1970, in Giersch, H. (ed.), *The International Division of Labour: Problems and Perspective*, Germany: Kiel Institute of World economics.

Savage, I. R. and **Deutsch, K. W.** (1966), A Statistical Model of the Gross Analysis of Transactions Flows, *Econometrica*, Vol. 28, pp. 551–572.

Sharpston, M. (1976), International Subcontracting, *World Development*, Vol. 4, pp. 333–7.

Shinohara, M. (1964), *Keizai Seicho no Kozo: Denki Nihon Keizai no Bunseki* (Structure of economic growth: analysis of Japanese economy on the turning point), Tokyo: Kunimotoshobo.

____________ (1976), *Sangyokozoron* (Theory of industrial structure), Tokyo: Chikubashobo.

Singer, M. R. (1972), *Weak States in a World of Powers: The Dynamics of International Relationships*, New York: The Free Press.

Smith, B. (1978), Australia's Mineral Production and Trade : Case Study of a Resource-Rich Developed Country, in Krause, L. B. and Patrick, H. (ed.), *Mineral Resources in the Pacific Area*, San Francisco: Federal Reserve Bank of San Francisco.

Snape, R. H. (1977), Effects of Mineral Development on the Economy, *Australian Journal of Agricultural Economies*, Vol. 21, pp. 147–56.

____________(1984), Australia's Relations with GATT, *Economic Record*, Vol. 60, pp. 16–27.

Song, B. (1981), *Hankook Kyungje-ron* (Korean economy), Seoul: Bakyoungsa.

Song, H. (1978), *Hankook ui Chulgang Sooyo Bunsuk* (Analysis of demand for iron and steel products in Korea), Seoul: KDI.

Stern, R. M. and **Maskus, K. E.** (1981), Determinants of the Structure of U.S. Foreign Trade 1958–76, *Journal of International Economics*, Vol. 11, pp. 207–224.

Suh, S. C. (1975), Development of a New Industry through Exports: the Electric Industry in Korea, in Hong, W. T. and Krueger, A. O. (ed.), *Trade and Development in Korea*, Seoul: KDI.

Suh, S. T. (1975), Import Substitution and Economic Development in Korea, KDI, Woking Paper no. 7519, Seoul.

Sumiya, M. (1975), *Kankoku Keizai* (Korean economy), Tokyo: Iwanamishoten.

Sung, Y. W. (1985), The Role of Hong Kong and Macau in China's Export Drive, paper presented to the Conference on China's Entry into World Markets, University of Adelaide, August, in Adelaide.

Takayama, A. (1964), Economic Growth and International Trade, *Review of Economic Studies*, Vol. 31, pp. 207–220.

Tatemoto, M. and **Ichimura, S.** (1959), Factor Proportions and Foreign Trade: the Case of Japan, *Review of Economics and Statistics*, Vol. 41, pp. 442–46.

Tinbergen, J. (1962), *Shaping the World Economy: Suggestions for an International Economic Policy*, New York: Twentieth Century Fund.

Trace, K. (1984), Australia's Competitiveness in the Commodity Markets of East and South-East Asia: the Contribution of Transport, in Adams, M. (ed.), *Economic Development in East and South-East Asia*, Bureau of Agricultural Economics, Canberra: AGPS.

Tyers, R. and **Anderson, K.** (1986), The Price, Trade and Welfare Effects of Agricultural Protection, in Anderson, K., Hayami, Y., and others (ed.), *The Political Economy of Agricultural Protection*, Sydney: Allen and Unwin.

Tyers, R., Phillips, P., and **Findlay, C.** (1985), China's Merchandise Trade: Composition and Export Growth in the 1980s, ASEAN-Australia Economic Paper no. 19, Kuala Lumpur and Canberra.

Uekawa, Y. (1971), Generalisation of the Stolper-Samuelson Theolem, *Econometrica*, Vol. 39, pp. 192–217.

Uribe, P., Theil, H., and **Leeuw, C. G.**(1966), The Information Approach to the Prediction of International Trade Flows, *Review of Economic Studies*, Vol. 33, pp. 209–220.

Vanek, J. (1965) *General Equelibrium of International Discrimination: the Case of Customs Union*, Cambridge: Harvard University Press.

Vernon, R. (1981), Alternative to the GATT Framework, in Center for International Affairs, *Annual Report Program on U.S.–Japan Relations; 1980–81*, Cambridge: Harvard University Press.

———— (ed.) (1970), *The Technology Factor in International Trade,* New York: NBER..

Warr, P. G. and **Lloyd, P. J.** (1982), Do Australian Trade Policies Discriminate against Less Developed Countries?, Centre for Economic Policy Research, Discussion paper, no. 50, Canberra.

Watanabe, T. (1978), Heavy and Chemical Industrialisation and Economic Development in the Republic of Korea, *The Developing Economies,* Vol. 16, pp. 385–407.

————, *et al.* (1981, 1982), Nickan Keizai Kankeiron Shosech (Introduction of Japanese-Korean economic relationship), *Sekai keizai hyoron,* Vol. 25, No. 11, and Vol. 26, No. 2, and No. 3.

Wells, L. T. Jr. (1978), Foreign Investment from the Third World: the Experience of Chinese Firms from Hong Kong, *Columbia Journal of World business,* Spring, pp. 42–53.

Westphal, L. E. (1978), The Republic of Korea's Experience with Export-led Industrial Development, *World Development,* Vol. 6, pp. 347–82.

———— and **Kim, K. S.,** (1977), *Industrial Policy and Development in Korea,* World Bank Staff Working Paper no. 263, Washington, D. C.: World Bank.

————, **Rhee, Y. W.,** and **Pursell, G.** (1981), *Korean Industrial Competence: Where It Came from,* World Bank Staff Working Paper no. 469, Washington, D. C.: World Bank.

Wilford, W. T. and **Christou, G. C.** (1973), A Sectoral Analysis of Disaggregated Trade Flows in the Central American Common market: 1962–1970, *Journal of Common Market Studies,* Vol. 12, pp. 159–175.

———— (1976), Directional Intensities of World Trade Flows: 1957–68, *Journal of Developing Areas,* Vol. 10, pp. 181–192.

Wolf, C. Jr. and **Weinschrott, D.** (1973), International Transactions and Regionalism: Distinguishing "Insiders" from "Outsiders", *American Economic Review,* Vol. 63, pp. 52–60.

Yamazawa, I. (1970), Intensity Analysis of World Trade Flows, *Hitotsubashi Journal of Economics,* Vol. 10, pp. 61–90.

——— (1971), Structural Change in World Trade Flows, *Hitotsubashi Journal of Economics,* Vol. 11, pp. 11–21.

——— (1972), Industrial Growth and Foreign Trade: a Study of Japan's Steel Industry, *Hitotsubashi Journal of Economics,* Vol. 12, pp. 41–59.

Statistics and Official and Other Documents

Australian Bureau of Industry Economics (1978), Industrialisation in Asia: Some Implications for Australian Industry, Research Report no. 1, Canberra: AGPS.

——— (1979), Australian Industrial Development: Some Aspects of Structural Changes, Research Report no. 2, Canberra: AGPS.

——— (1983), Australian Direct Investment in the ASEAN Countries, Information Bulletin no. 4, Canberra: AGPS.

——— (1984a), Australian Direct Investment Abroad: Effects on the Australian Economy, Research Report no. 14, Canberra: AGPS.

——— (1984b), Australia and New Zealand in Asia: an Analysis of Changes in the Relative Importance of Australia and New Zealand as Suppliers of Goods to East Asia, 1970–80, Information Bulletin no. 7, Canberra: AGPS.

Australian Bureau of Statistics, Shipping and Air Cargo Commodity Statistics, (previously Outward Overseas Cargo), Cat. no. 9206.0, Canberra.

——— Imports Cleared for Home Consumption, Cat. no. 5412.0 (issued on micro fiche), Canberra.

——— Exports, Australia: Annual Summary Tables, Cat. no. 5424.0, Canberra.

——— Imports, Australia: Annual Summary Tables, Cat. no. 5426.0, Canberra.

——— Foreign Investment, Australia, Cat. no. 5305.0, Canberra.

——— Foreign Investment Statistics, Unpublished data, Canberra.

——— Overseas Trade Australia: Comparative and Summary Tables, Cat. no. 5410.0, Canberra.

——— Australian National Accounts, Cat. no. 5204.0, Canberra.

Australian Department of Foreign Affairs *Australian Foreign Affairs Record,* various years, Canberra.

____________ *Current Notes on International Affairs,* various years, Canberra.

Australian Department of Trade and Resources (1982), *Australian Export Performance in the 1970s: Some Further Analysis,* Internal Research Memorandum no. 4, Canberra.

____________ (1983), *Pattern of Australian Exports, 1970/71 to 1980/81,* Internal Information Paper, Canberra.

____________ *Australian Tariff Preference for Developing Countries,* various years, Canberra: AGPS.

Australian Industries Development Association (1971), Britain, the EEC, and the Australian Preferential Tariff, *Bulletin,* no. 220, pp. 1–9

Australian Industries Assistance Commission, *Annual Report,* various years, Canberra: AGPS.

____________ (1985a), *Australian Trade Classified by Industry: 1968-69 to 1981-82,* Canberra: AGPS.

____________ (1985b), *Assistance to Manufacturing Industries, 1977-78 to 1982-83,* Canberra: AGPS.

General Agreement on Trade and Tariffs (1977), *Trade Liberalization Protectionism and Interdependence,* Geneva: GATT.

____________ *International Trade,* various issues, Geneva: GATT.

International Monetary Fund *International Financial Statistics, Supplement Series,* various issues, Washington, D. C.: IMF.

Japanese Institute of Developing Economies (1967), *Development of Manufacturing in Korea in the 1960s: a Statistical Analysis,* Statistical Data Series no. 17, Tokyo.

Japanese Ministry of International Trade and Industry *White Paper on the International Trade,* various years, Tokyo.

____________ (1977), *Sangyokozo no Choki Vision* (Long-term vision for the industrial restructuring), Tokyo.

The Bank of Korea Input-Output Table of Korea, various years, Seoul.

__________ Economic Statistics Yearbook, various years, Seoul.

Korean Development Bank *Industry in Korea*, various years, Seoul.

Korea Development Institute (KDI) (1982), *Sanup Jungchek ui Kibongwaje wa Jiwonsichek ui Gepyunbangan* (Basic objective of industrial policy and reform proposals of industrial incentives), Seoul.

Korean Federation of Industries (1979), *Hankook Kyungje ui Junwhanjum gwa Jungcheck Jean* (Turning point of Korean economy and policy proposal), Center for Economic and Technical Research, Research Series no. 32, Seoul.

Korean Iron and Steel Industries Association Hankook Chulgang Tonggye Yonbo (Steel statistics yearbook), various years, Seoul.

Korean Ministry of Commerce and Industry (1979), *SanupKoojo kodohwa lul wuihan Kibonbangan* (Basic direction of industry adjustment), Seoul.

Korean Textile Enterprises Association Seomyu Tonggye Yonbo (Textile statistics yearbook), various years, Seoul.

Textile Economic Bureau *Textile Organon*, various years, New York.

United Nations (1964), *Towards a New Trade Policy for Development* (Prebish Report), Report by the Secretary General of the UNCTAD, New York.

__________ (1978), *Transnational Corporations in World Development: a Re-examination*, New York: United Nations Centre on Transnational Corporations.

__________ (1983), *Transnational Corporations in World Development: Third Survey*, New York: United Nations Centre on Transnational Corporations.

__________ Yearbook of International Trade, various years, New York.

__________ Commodity Trade Statistics, various years, New York.

__________ (1961), *Standard International Trade Classification, Revised*, Statistical Papers, Series M no. 34, UN Statistical Office, New York.

__________ (1975), *Standard International Trade Classification: Revision 2*, Statistical Papers, Series M no. 34, UN Statistical Office, New York.

United Nations Industrial Development Organization (1979), *World Industry since 1960: Progress and Prospect*, New York.

United States Department of Agriculture (1980) The Market for US Cotton in the Republic of Korea, Washington, D. C.

World Bank *World Development Report*, various years, Washington, D. C.

The Australian, Sydney.

Australia–Korea Chamber of Commerce & Industry, *Korea Business News,* Sydney.

Overseas Trading, Canberra. Journal of the Australian Trade Commission, Canberra.

Australian Financial Review, Melbourne.

Far Eastern Economic Review, Hong Kong.

APPENDICES

APPENDIX 1

Commodity Aggregation

1: Natural Resource Intensive Products

1.1. Foodstuffs(41)

SITC code	Commodities
001	Live animals
011	Meat, fresh, chilled and frogen
012	Meat, dried, salted, or smoked
013	Meat, tinned, n.e.s. or meat preparations
022	Milk and cream
023	Butter
024	Cheese and curd
025	Eggs
031	Fish, fresh, simply presvd.
032	Fish, etc, tinned, n.e.s. and prepared.
041	Wheat and meslin, unmilled
042	Rice
043	Barley, unmilled
044	Maize, unmilled
045	Other cereals, unmilled
046	Meal and flour of wheat or meslin
047	Meal and flour of other cereals
048	Cereals, e.t.c preparations
051	Fruit, fresh, and nuts, fresh or dried
052	Dried fruit
053	Fruit, preserved and prepared
054	Vegetables, fresh or simply preserved
055	Vegetables, e.t.c., preserved or prepared
061	Sugar and honey
062	Sugar, confectionary and prepared
071	Coffee
072	Cocoa
073	Chocolate and other prepared products
074	Tea and mate
075	Spices
081	Feeding-stuff for animals
091	Margarine and shortening
099	Food, preparations, n.e.s.
111	Non-alcoholic beverages, n.e.s
112	Alcoholic beverages
121	Tobacco, unmanufactured
122	Tobacco, manufactured
411	Animal oils and fats
421	Fixed vegetable oils, soft
422	Other fixed vegetable oils, non-soft
431	Animal, vegetyable oils and fats, processe

1.2. Agricultural Raw Materials(17)

SITC code	Commodities
211	Hides and skins, undressed
212	Fur skins,undressed
221	Oil-seeds, oil-nuts, oil-kernels
231	Crude rubber
241	Fuel wood and charcoal
242	Wood, rough or roughly squared
243	Wood, shaped or simply worked
244	Cork, raw and waste
251	Pulp and waste paper
261	Silk
262	Wool and other animal hair
263	Cotton
264	Jute
265	Other vegetable fibres
267	Waste of textile fabrics
291	Crude animal materials, n.e.c.
292	Crude vegetable materials, n.e.s.

1.3. Mineral Materials(25)

271	Fertilizer, crude
273	Stone, sand, and gravel
274	Sulphur and unroasted iron pyrites
275	Natural abrasives
276	Other crude minerals
281	Iron ore and concentrates
282	Iron and steel scrap
283	Non-ferrous metal ores and concentrates
284	Non-ferrous metal scrap
285	Silver and platinum ores
286	Uranium and thorium ores and concentrates
321	Coal, coke and briquittes
331	Petroleum, crude or partly refined
332	Petroleum products
341	Gas, natural and manufactured
351	Erectric energy
681	Silver, platinum metals
682	Copper
683	Nickel
684	Aluminium
685	Lead
686	Zinc
687	Tin
688	Uranium and thorium and their alloys
689	Miscellaneous non-ferrous base metals

2. Manufactures

2.1. Unskilled Labour Intensive Manufactures(26)

SITC code	Commodities	SITC code	Commodities
611	Leather	664	Glass
612	Manufactures of leather	665	Glassware
613	Fur skins, tanned or dressed	666	Pottery
631	Vaneers, plywood board	812	Sanitary,plumbing, heating, and lighting fixtures
632	Wood manufactures, n.e.s.	821	Furniture
633	Cork manufactures	831	Travel goods, hand bags, and similar articles
651	Textile yarn and thread	841	Clothing, non-fur
652	Cotton fabrics, woven	842	Fur clothing
653	Other textile fabrics, woven	851	Footwear
654	Tulle, lace, ribbons, other small wares	893	Articles of artificial plastic materials, n.e.s.
655	Special textile fabrics	894	Perambulators, toys, games, sporting goods
656	Made-up articles of textile materials	895	Office and stationery supplies, n.e.s.
657	Floor coverings, tapesteries, etc.	899	Manufactured articles, n.e.s.

2.2. Human Skill Intensive Manufactures(43)

531	Synthetic organic dyestuffs	691	Finished structure arts and structures, n.e.s
532	Dyeing and tanning extracts	692	Metal containers for storage and transport
533	Pigments, paints and related metarials	693	Wire products and fencing grills
551	Essential oils, perfume, and flavour materials	694	Nails, screws, nuts, bolts, similar articles
553	Perfume, cosmetics, etc.	695	Tools for use in the hand or in machines
554	Soaps, cleansing and polishing preparations	696	Cultery
621	Materials of rubber	697	Household equipment of base metals
629	Articles of rubber, n.e.s.	698	Manufactures of metal, n.e.s.
641	Paper and paperboard	724	Telecommunication apparatus
642	Articles of paper pulp, paper board	725	Domestic electrical equipments
661	Lime, cement, and other building materials	731	Railway vehicles
662	Clay and refractory construction materials	732	Road motor vehicles
663	Other non-mineral mmineral manufactures	733	Other road vehicles
667	Pearls and precious stones, worked.	735	Ships and boats
671	Pig iron and steel powders	864	Watches and clocks
672	Iron and steel ingots and other primary forms	891	Musical instruments and sound records
673	Iron and steel bars, angles, and shapes	892	Printed matter
674	Iron and steel universals, plates, and sheets	896	Works of art, collector's pieces and artiques
675	Iron and steel hoop and strip	897	Jewellery and gold- and silver - wares
676	Iron and steel rails and railway track materials	961	Coin , non-gold, non-current
677	Iron and steel wires		
678	Iron and steel tubes, pipes and fittings		
679	Iron and steel castings and forgings		

2.3. Technology Intensive Manufactures(27)

SITC code	Commodities	SITC code	Commodities
266	Synthetic and artificial fibres	715	Metalworking machinery
512	Organic chemicals	717	Textile and leather machnery
513	Inorganic elements, oxides, halogen, salt	718	Machines for special industries
514	Other inorganic chemicals	719	Machinery and appliances and parts, n.e.s.
515	Radioactive and associated materials	722	Electric power machinery and switchgear
521	Coal and petroleum chemicals	723	Equipment for distributing electricity
541	Medicinal and pharmaceutical products	726	Medical electric apparatus
561	Fertilisers, manufactured	729	Other electrical machinery and apparatus
571	Explosives and pyrotechnic products	734	Aircraft
581	Plastic materials and artificial resins	861	Scientific and medical instruments
599	Chemical materials and products, n.e.s.	862	Photographic and cinematographic supplies
711	Non-electric power generating machinery	863	Developed cinematographic films
712	Agricultural machinery and implements	951	War firearms, ammunition
714	Office machines		

Note: 1. Unclassified items are SITC code : 911(Mail), 931(Special transactions), and 941(Zoo animals, pets).

2. SITC 3-digit classification is based on United Stations(1961), Standard International Trade Classification, revised; Series M, no.34, United Nations Statistical Office, New York.

3. Commodities are reaggregated according to relative factor intensities in producing them. The reaggregation is referred to Krause(1982), Garnaut and Anderson(1980), and Hufbauer and Chilas (1974).

APPENDIX 2

Selected Major Trading Countries and Statistical Data

A. Trade Indexes in Australia's and Korea's Trade with Major Trading Countries

Table A 2-1
Trade Indexes in Australia's Export Trade

	1970 Compl.	1970 Bias	1970 Intensity	1980 Compl.	1980 Bias	1980 Intensity
Korea	1.03	0.43	0.44	1.31	1.51	1.97
Japan	2.11	2.10	4.43	1.56	2.29	3.58
Hong Kong	0.75	2.11	1.59	0.69	1.87	1.28
Indonesia	0.67	2.29	1.53	0.89	3.38	3.02
Malaysia	0.88	3.32	2.91	0.80	5.06	4.06
Philippines	0.74	3.63	2.67	1.11	1.75	1.94
Singapore	0.48	4.94	2.40	0.45	4.26	1.93
Thailand	0.49	3.63	1.78	0.66	2.26	1.49
New Zealand	0.55	22.79	12.49	0.73	22.07	16.05
Oceania	0.78	23.04	18.03	0.93	44.87	41.72
India	2.04	0.63	1.29	0.68	1.95	1.33
Pakistan	1.42	0.76	1.08	0.79	0.84	0.66
S. Africa	0.46	3.54	1.61	1.01	0.56	0.57
Kenya	0.40	2.43	0.97	0.43	1.36	0.58
Tunisia	1.63	0.01	0.01	1.22	0.06	0.01
Libya	0.70	0.30	0.21	0.85	0.59	0.50
USA	0.85	1.14	0.97	0.60	1.32	0.79
Canada	0.58	1.14	0.67	0.83	0.82	0.68
Maxico	0.59	0.60	0.36	-	-	-
Brazil	0.91	0.07	0.07	1.22	0.09	0.11
Argentina	0.53	0.19	0.10	0.65	0.96	0.62
Chile	0.81	0.58	0.47	1.26	0.28	0.35
Venezuela	0.70	0.09	0.07	0.93	0.12	0.11
Austria	0.90	0.03	0.02	0.77	0.02	0.02
Belgium	1.16	0.25	0.29	1.00	0.28	0.28
France	0.97	0.42	0.41	0.88	0.30	0.26
W. Germany	1.03	0.27	0.28	0.86	0.28	0.24
Greece	1.12	0.47	0.52	0.72	0.42	0.30
Ireland	0.74	0.33	0.24	0.85	0.09	0.07
Italy	1.29	0.32	0.41	1.35	0.31	0.41
Netherlands	0.66	0.45	0.30	0.72	0.42	0.30
Spain	0.85	0.25	0.21	0.77	0.26	0.20
Sweden	0.58	0.18	0.10	0.54	0.31	0.17
Switzerland	0.67	0.05	0.03	0.60	0.07	0.05
UK	1.38	1.18	1.63	0.96	0.74	0.71
S.Arabia	0.79	1.97	1.56	0.76	1.12	0.85
Iran	0.69	1.91	1.32	-	-	-
Egypt	1.52	1.26	1.90	2.23	3.75	8.37
Israel	0.93	0.20	0.18	0.81	0.41	0.33

Note: Indexes are calculated according to formulas defined in Chapter 3.

Source: International Economic Data Bank, RSPacS, ANU, Canberra.

Table A 2-2
Trade Indexes in Australia's Import Trade

	1970 Compl.	1970 Bias	1970 Intensity	1980 Compl.	1980 Bias	1980 Intensity
Korea	0.92	0.36	0.34	1.15	0.91	1.05
Japan	1.17	1.66	1.94	1.31	1.91	2.50
Hong Kong	1.11	1.88	2.10	1.38	2.24	3.08
Indonesia	0.60	3.96	2.39	0.49	3.42	1.69
Malaysia	0.58	2.58	1.50	0.72	2.24	1.61
Philippines	0.29	1.01	0.29	0.65	2.40	1.55
Singapore	0.88	0.78	0.69	1.11	2.66	2.94
Thailand	0.45	0.73	0.33	0.62	1.67	1.04
New Zealand	0.40	14.27	5.70	0.64	19.04	12.26
Oceania	0.59	16.05	9.48	0.55	50.87	27.83
India	1.09	1.02	1.12	1.12	1.47	1.65
Pakistan	1.23	1.63	2.01	1.11	0.69	0.76
S. Africa	0.72	1.03	0.74	0.62	0.74	0.45
Kenya	0.79	0.72	0.57	1.10	0.36	0.39
Tunisia	1.07	0.01	0.01	0.82	0.01	0.01
Libya	0.75	0.00	0.00	0.49	0.00	0.00
USA	1.21	1.44	1.74	1.08	1.80	1.95
Canada	0.95	0.75	0.71	0.95	0.87	0.83
Maxico	0.71	0.37	0.26	-	-	-
Brazil	0.50	0.43	0.21	0.90	0.56	0.50
Argentina	0.33	0.20	0.07	0.53	0.17	0.09
Chile	0.31	0.47	0.15	0.50	0.24	0.12
Venezuela	0.63	0.02	0.01	0.72	0.01	0.01
Austria	1.14	0.24	0.27	1.30	0.21	0.27
Belgium	0.94	0.20	0.19	1.03	0.22	0.23
France	1.07	0.28	0.30	1.13	0.27	0.30
W. Germany	1.24	0.48	0.59	1.24	0.48	0.60
Greece	0.74	1.64	1.21	0.96	0.36	0.34
Ireland	0.70	0.58	0.40	1.05	0.59	0.61
Italy	1.10	0.42	0.46	1.26	0.49	0.62
Netherlands	0.91	0.48	0.44	1.00	0.29	0.29
Spain	0.90	0.54	0.48	1.13	0.26	0.30
Sweden	1.17	0.60	0.70	1.32	0.83	1.10
Switzerland	1.29	0.72	0.92	1.30	0.48	0.62
UK	1.20	2.68	3.23	1.14	1.37	1.56
S.Arabia	0.71	1.54	1.09	0.50	1.67	0.84
Iran	0.73	1.13	0.83	-	-	-
Egypt	0.56	0.63	0.35	0.60	0.01	0.01
Israel	0.64	0.72	0.46	0.91	0.88	0.80

Note: Indexes are calculated according to formulas defined in Chapter 3.

Source: International Economic Data Bank, RSPacS, ANU, Canberra.

Table A 2-3
Trade Indexes in Korea's Export Trade

	1970			1980		
	Compl.	Bias	Intensity	Compl.	Bias	Intensity
Australia	0.93	0.26	0.24	1.16	1.13	1.32
Japan	1.21	3.69	4.47	0.57	4.28	2.45
Hong Kong	1.57	2.22	3.48	2.04	2.08	4.24
Indonesia	0.74	1.24	0.89	0.84	4.52	3.81
Malaysia	0.82	0.40	0.33	1.05	1.83	1.93
Philippines	0.32	1.03	0.33	0.73	2.81	2.05
Singapore	1.02	1.60	1.64	1.09	1.15	1.26
Thailand	0.67	2.14	1.44	0.75	2.63	1.97
New Zealand	0.65	2.47	1.61	1.05	0.55	0.58
Oceania	1.07	1.47	1.58	1.27	1.21	1.54
India	0.26	0.37	0.09	0.62	2.29	1.42
Pakistan	0.38	0.21	0.08	1.01	1.60	1.61
S. Africa	0.85	0.48	0.41	0.67	0.02	0.01
Kenya	0.84	1.37	1.16	0.72	0.83	0.60
Tunisia	0.56	0.01	0.01	1.23	0.10	0.13
Libya	1.58	0.09	0.14	1.43	2.04	2.92
USA	1.44	2.49	3.59	1.02	2.06	2.09
Canada	0.77	0.70	0.54	0.83	0.81	0.67
Maxico	0.55	0.11	0.06	-	-	-
Brazil	0.43	0.03	0.01	0.51	0.03	0.02
Argentina	0.45	0.11	0.05	1.24	0.67	0.83
Chile	0.41	0.01	0.01	1.01	1.34	1.36
Venezuela	0.58	0.08	0.05	1.18	0.26	0.31
Austria	0.99	0.01	0.01	1.29	0.21	0.27
Belgium	0.82	0.08	0.06	0.95	0.23	0.22
France	0.83	0.04	0.03	0.95	0.26	0.25
W. Germany	1.21	0.28	0.34	1.22	0.44	0.53
Greece	0.49	0.19	0.09	1.18	0.73	0.86
Ireland	0.98	0.01	0.01	1.27	0.18	0.22
Italy	0.75	0.23	0.18	0.76	0.35	0.27
Netherlands	1.15	0.32	0.37	1.10	0.47	0.52
Spain	0.51	0.15	0.08	0.61	0.49	0.29
Sweden	1.31	0.32	0.41	1.21	0.36	0.43
Switzerland	1.30	0.02	0.02	1.24	0.17	0.21
UK	1.08	0.20	0.22	1.01	0.55	0.55
S.Arabia	0.71	0.11	0.07	1.54	2.33	3.58
Iran	0.97	0.22	0.21	-	-	-
Egypt	0.47	0.01	0.01	1.03	2.39	2.47
Israel	0.44	0.12	0.05	0.61	0.00	0.00

Note: Indexes are calculated according to formulas defined in Chapter 3.

Source: International Economic Data Bank, RSPacS, ANU, Canberra.

Table A 2-4
Trade Indexes in Korea's Import Trade

	1970 Compl.	1970 Bias	1970 Intensity	1980 Compl.	1980 Bias	1980 Intensity
Australia	1.07	0.43	0.46	1.41	1.95	2.75
Japan	1.17	5.31	6.24	0.87	4.44	3.87
Hong Kong	0.46	3.13	1.44	0.52	1.19	0.61
Indonesia	1.60	1.75	2.80	1.78	1.07	1.90
Malaysia	1.68	3.03	5.10	2.03	1.54	3.13
Philippines	2.50	2.34	5.86	1.03	3.91	4.06
Singapore	0.72	1.81	1.30	0.87	0.81	0.71
Thailand	1.17	0.73	0.85	1.73	0.71	1.23
New Zealand	0.68	0.58	0.40	1.02	1.22	1.24
Oceania	0.60	0.71	0.42	1.42	2.06	2.94
India	0.85	0.53	0.45	1.04	0.59	0.61
Pakistan	0.86	0.16	0.14	0.98	0.77	0.63
S. Africa	0.56	0.62	0.35	0.45	0.04	0.02
Kenya	0.72	0.01	0.01	0.57	1.99	1.14
Tunisia	0.93	0.01	0.01	1.08	0.00	0.00
Libya	1.19	0.00	0.00	1.60	0.00	0.00
USA	1.26	1.62	2.04	1.24	1.58	1.97
Canada	0.81	0.26	0.21	0.84	0.61	0.52
Maxico	0.90	0.12	0.11	-	-	-
Brazil	0.67	0.04	0.02	0.87	0.22	0.19
Argentina	1.04	0.02	0.02	1.39	0.10	0.14
Chile	0.32	0.21	0.07	0.91	1.80	1.64
Venezuela	0.85	0.00	0.00	1.24	0.09	0.11
Austria	0.88	0.01	0.01	0.78	0.11	0.09
Belgium	0.80	0.20	0.16	0.69	0.34	0.23
France	0.98	0.45	0.44	0.83	0.18	0.15
W. Germany	1.02	0.29	0.29	0.82	0.35	0.28
Greece	0.77	0.00	0.00	0.67	1.15	0.77
Ireland	0.43	0.00	0.00	0.62	0.06	0.04
Italy	0.86	0.26	0.22	0.65	0.20	0.13
Netherlands	0.83	0.36	0.29	0.73	0.14	0.10
Spain	0.67	0.01	0.01	0.63	0.19	0.12
Sweden	0.91	0.07	0.06	0.79	0.17	0.14
Switzerland	1.21	0.11	0.14	1.00	0.40	0.41
UK	0.84	0.30	0.25	0.82	0.28	0.23
S.Arabia	1.02	2.31	2.36	1.53	1.69	2.58
Iran	1.16	0.00	0.00	-	-	-
Egypt	1.41	0.01	0.01	0.97	0.44	0.42
Israel	0.75	1.03	0.77	0.60	0.00	0.00

Note: Indexes are calculated according to formulas defined in Chapter 3.

Source: International Economic Data Bank, RSPacS, ANU, Canberra.

B. Statistical Data for Complementarity

Table A 2-5
Relative Factor Endowments

Countries	Population Density[1]		Per Capita Income(current price)		Human Skill Endowments [2]		Technology Endowments[3]	
	1970	1980	1970	1980	1970	1980	1970	1980
Australia	1.6	1.9	2820	10856	82.0	86.0	16.6[c]	19.3
Korea	327.4	387.9	250	1533	42.0	80.0	4.0	5.3
Japan	280.3	313.7	1920	8978	86.0	91.0	10.5	13.7
Hong Kong	3806.7	4873.1	970	4579	36.0	62.0	9.5[c]	8.3
Indonesia	60.5	76.2	80	512	15.0	28.0	5.6[c]	4.0
Malaysia	32.9	42.1	380	1619	34.0	51.0	4.9	5.1
Philippines	122.8	161.0	210	761	46.0	63.0	6.5	6.4[j]
Singapore	3577.6	4163.8	920	4831	46.0	55.0	9.3	13.1
Thailand	70.9	91.3	200	713	17.0	29.0	2.8	4.1
New Zealand	10.5	12.2	2700	7157	77.0	81.0	15.0[c]	17.1
Oceania [4]	9.9	6.9	360	1010	13.0	22.0[g]	7.8	8.1
India	166.6	205.3	110	234	26.0	30.0	3.4[c]	3.8[h]
Pakistan	75.2	102.1	100	341	13.0	15.0[g]	2.3[c]	3.7
S. Africa	17.9	23.5	760	2558	18.0	40.0	5.1	6.1
Kenya	19.3	28.6	150	379	9.0	19.0	2.3	2.5
Tunisia	31.3	38.9	250	1272	23.0	27.0	4.7[a]	4.7
Libya	1.1	1.7	1770	10443	21.0	67.0[g]	6.5[b]	10.7
U.S.A.	21.9	24.3	4760	12670	100.0	97.0	23.0	25.5
Canada	2.1	2.4	3700	11158	65.0	89.0	22.5	22.4[h]
Maxico	25.9	35.2	670	2133	22.0	49.0	8.2	9.6
Brazil	11.3	13.9	420	2312	26.0	32.0[f]	6.5	7.6
Argentina	8.6	10.0	1160	2823	45.0	56.0	9.0	10.5
Chile	12.4	14.7	720	2512	39.0	55.0	7.5	8.2[i]
Venezuela	11.7	16.4	980	3306	33.0	39.0[f]	11.8	13.5[h]
Austria	88.6	90.0	2010	9248	72.0	74.0	9.3	11.2
Belgium	316.6	323.1	2720	10329	81.0	89.0	15.7	21.4
France	92.8	98.2	3100	11007	74.0	85.0	17.1	20.8
W. Germany	244.2	247.7	2930	11887	75.0	94.0	18.0	21.3
Greece	66.6	72.8	1090	4185	63.0	81.0[g]	6.4[c]	11.9[i]
Ireland	41.9	47.1	1360	5130	74.0	93.0	10.9[c]	14.1[g]
Italy	178.1	186.4	1760	6555	61.0	73.0	7.9[c]	14.7
Netherlands	316.6	343.3	2430	10739	75.0	94.0	15.5[c]	19.6[g]
Spain	66.9	74.2	1020	5093	56.0	87.0[g]	6.2	7.2[g]
Sweden	17.9	18.5	4040	13472	86.0	86.0	21.5	28.0
Switzerland	151.8	153.8	3320	15972	88.0	95.0[g]	17.2	19.5
U.K.	226.4	228.5	2270	9084	73.0	82.0[g]	14.8[c]	20.1
S. Arabia	2.7	4.2	440	15540	12.0	30.0	11.4	12.3
Iran	17.4	23.6	380	n.e	27.0	44.0[e]	3.2[a]	7.0[d]
Egypt	33.0	43.2	210	586	34.0	52.0	6.0[a]	8.6
Israel	143.2	186.4	1960	5147	57.0	72.0	18.5[c]	24.9

Table A 2-5: (continued)

Note: 1. Population density was defined as average number of population in per square kilometer of total area.

2. Human skill endowments were defined as number enrolled in secondary school as percentage of age group.

3. Technology endowments were defined as percentage of professional, technical, and related workers out of the total economically active population.

4. Oceania includes Papua-New Guinea and Fiji. Each variable is average number of two countries weighted by the ralative size of population.

5. Some data are not available for each year and other year data were used. Superscripts indicate following years:
a = 1966, b = 1968, c = 1971, d = 1976, e = 1977,
f = 1978, g = 1979, h = 1981, i = 1982, j = 1983.

Sources: I M F, International Financial Statistics: Supplement on Output Statistics, Supplement Series, no. 8, 1984;
World Bank, World Development Report, various years;
International Labour Organization, Yearbook of Labour Statistics, various years.

C. Statistical Data for Country Bias

Table A 2-6
Geographical Distance

	Kor.	Jap.	H. K.	Indon.	Mal.	Phil.	Sing.	Thai.	N. Z.	Oce.
Australia	4480	4030	3710	3180	3550	3180	3380	3990	1240	1770
Korea		930	1510	3480	2900	1870	2950	2980	5500	4320
Japan			1580	2940	2860	1790	2890	3050	5250	3880
Hong Kong				1710	1410	550	1440	1470	5190	3470
Indonesia					810	870	630	1300	4050	3880
Malaysia						700	170	740	4970	3290
Philippines							670	710	3690	2910
Singapore								810	4680	3120
Thailand									5310	3930
New Zealand										1860
Oceania Ire.										
India										
Parkistan										
S. Africa										
Kenya										
Tunisia										
Libya										
U. S. A.										
Canada										
Maxico										
Brazil										
Argentina										
Chile										
Venezuela										
Austria										
Belgium										
France										
W. Germany										
Netherlands										
Spain										
Sweden										
Switzerland										
U.K.										
Ireland										
Italy										
Greece										
S. Arabia										
Iran										
Egypt										
Israel										

Table A 2-6: (continued)

	India	Pakis.	S. Afr.	Ken.	Tun.	Lib.	USA	Can	Max.	Braz.
Aust	5010	6310	6840	6780	9150	9120	6880	7200	7640	8120
Kor	4580	5880	8460	7130	8970	8940	5450	5210	7300	12820
Jap	4520	5820	8400	7070	8910	8470	4520	4280	6370	11890
H.K.	3070	4370	6950	5620	7470	7030	6800	7150	7560	10190
Indon.	2260	3560	6140	4010	6650	6620	7670	7920	8340	10230
Mal.	1800	3100	5680	4350	6190	6150	7400	7750	8170	10350
Phil.	2300	3600	6180	4850	6690	6660	6700	7050	7460	9640
Sing.	1630	2930	5510	4180	6020	5990	7370	7720	8140	10320
Thai.	2440	3740	6310	4980	6820	6790	8000	8460	8870	10360
N.Z.	6240	7540	10120	8790	10620	10600	5640	5960	6400	6880
Oce. Ire.	4750	6050	8630	7300	9140	9110	5110	5430	5870	6350
India		490	4340	3480	3970	3920	8000	9350	9770	9790
Pakis.			5220	4350	3660	2970	7650	7880	9740	9600
S. Afr.				1490	5460	4780	6130	6940	7930	3510
Ken.					4070	3390	7500	7960	9820	5330
Tun.						680	3530	3990	5850	5890
Libya							4110	4570	6430	5790
USA								800	1800	3620
Can.									2600	4430
Max.										5420
Braz.										
Argen.										
Chile										
Venez.										
Austria										
Belg.										
France										
Germ.										
Neth.										
Spain										
Swe.										
Switz.										
UK										
Irel.										
Ita.										
Gree.										
S. Ara.										
Iran										
Egypt										
Israel										

Table A 2-6: (continued)

	Argen.	Chile	Venez.	Austria	Belg.	France	Germ	Neth.	Spain	Swe
Aust.	7290	6250	8670	9680	11540	9680	11750	11580	9770	11810
Kor.	11980	10370	9910	9500	11370	9500	11570	11410	9590	11830
Jap.	11060	9440	8990	9440	11300	9430	11510	11340	9520	12190
H K	9360	8320	10630	7990	9860	7980	10060	9890	8070	10740
Indon.	9400	8350	10780	7280	9050	7180	9250	9070	7270	9930
Mal.	9510	8470	10780	7720	8580	8710	8790	8620	8800	9470
Phil.	8810	7770	10080	7320	9080	7220	9290	9110	7310	9970
Sing.	9480	8440	10750	6550	8410	6540	8620	8450	6630	9300
Thai.	9520	8480	10790	7350	9220	7350	9430	9260	7440	10100
N. Z.	6050	5010	7430	13540	15390	13520	15600	15430	13710	16270
Oce.	5520	4480	6900	12050	13900	12030	14110	13940	12220	14780
India	10810	10070	7410	4480	6340	4470	6550	6380	4560	7230
Pakis.	10620	13330	7210	4290	6150	4280	6360	6190	4370	7030
S. Afr.	3600	4330	5660	6920	6400	5870	6810	6820	4970	7070
Ken.	5420	6150	7480	4710	6530	4700	6740	6540	4700	7000
Tuni.	5980	6810	8140	1110	2540	480	2740	2570	470	3000
Libya	5880	6710	8040	1010	2570	940	2970	2800	1050	3230
USA	5620	6690	1670	4050	3490	2960	3560	3500	2850	3820
Can.	6420	5890	2470	4180	2880	2590	3090	3030	2590	3450
Max.	7420	4060	2210	5940	5320	4940	5530	5480	4690	5790
Braz.	1020	2320	2060	6050	5290	4980	5500	5320	4660	5760
Argen.		200	4090	7070	6410	6070	6520	6440	5680	6880
Chile			3480	8020	7710	7300	7820	7740	6510	8170
Venez				4390	4150	3530	4360	4180	2940	4620
Austria					650	200	100	650	1990	1080
Belg.						100	100	100	660	1010
France							200	400	200	1180
Germ.								100	730	330
Neth.									720	1020
Spain										1760
Swe.										
Switz.										
UK										
Irel.										
Ita.										
Gree.										
S. Arab.										
Iran										
Egypt										
Israel										

Table A 2-6: (continued)

	Switz.	UK	Irel.	Ita.	Gree.	S. Ara	Iran	Egypt	Israel
Aust.	9870	11330	11470	9280	8660	7700	7290	8170	8380
Kor.	9690	11150	11290	9100	8480	7520	6870	7990	8200
Jap.	9630	11080	11220	9030	8420	7460	6800	7920	8140
HK	8180	9630	9770	7590	6970	6010	5350	6480	6690
Indon.	7370	8830	8970	6780	6160	5200	5550	5670	5880
Mal.	6910	8360	8500	6310	5700	4740	4990	5200	5420
Phil.	7410	8870	9010	6820	6200	5240	5490	5710	5920
Sing.	6740	8190	8330	6150	5530	4570	4820	5040	5250
Thai	7550	9000	9140	6950	6340	5370	5620	5840	6060
NZ	13720	15170	15210	13120	12610	11540	11800	12010	12230
Oce. Ire.	12220	13680	13720	11630	11020	10050	10300	10520	10740
India	4670	6130	6260	4080	3460	2160	1380	2970	3190
Pakis.	4480	5930	6070	3880	3270	1960	1180	2770	2990
S. Afr.	6520	6180	6280	6320	7270	3770	5130	4580	4800
Ken.	4950	6320	6440	4300	3680	2480	3970	3190	3400
Tun.	960	2320	2420	460	840	1580	4140	880	1090
Libya	1200	2550	2650	700	790	1550	4110	200	1060
USA	3850	3130	3270	3650	4150	5120	7470	4310	4530
Can	3980	2660	2630	3780	4280	5580	7930	4770	4990
Max.	5740	5110	5210	5540	6040	7440	9790	6630	6850
Braz.	6250	5070	5170	5950	6100	7420	9770	6610	6830
Argen	7270	6190	6290	6970	7120	8640	10790	7630	7850
Chile	7820	7490	7590	7620	8140	9250	11610	8440	8660
Venez.	4190	3930	4030	3990	5190	5680	8040	4880	5100
Austria	100	740	1150	100	770	2320	4680	1510	1730
Belg.	500	220	630	700	3210	4190	6540	3380	3500
France	150	120	530	200	910	2320	4670	1510	1730
Germ.	150	430	840	250	3420	4390	6750	3590	3800
Neth	500	220	630	850	3240	4230	6580	3420	3640
Spain	520	860	690	300	1170	2410	4760	1600	1810
Swe.	1030	1100	1910	1480	3670	5070	5420	4260	4480
Switz.		690	1100	100	1170	2510	4870	1710	1920
UK			230	920	2700	3970	6320	3160	3380
Ire				1330	3110	4110	6460	3300	3520
Ita					460	1920	4270	1110	1320
Greece						1300	3760	500	710
S. Arab							2360	810	1020
Iran								3160	3380
Egypt									220
Israel									

Table A 2-6: (continued)

Note : Distances are measured in nuatucal miles from ports of a country to another. Ports and hinterland distances for individual countries are as follows:

Australia	For nothern bound: average distance from Darwin, Brisbane, and Sydney
	For western bound: average distasnce from Perth and Melborne
	For estern bound: Sydney
New Zealand	
	Average distance from Wellington
Japan	For western bound: average distance from Osaka and Yokohama
	For estern bound: Yokohama
Indonesia	For western bound: Jakarta
	For estern bound: average distance from Jakarta and Surabaya
Oceania	Average distance from Port Moresby and Suba

Korea	Pusan
Philippines	Manila
Hong Kong	Hong kong
Singapore	Singapore
Malaysia	For western bound: Pinang
	For estern bound: Kuantan
Thailand	Bangkok
USA	For estern bound: New York
	For western bound: San Francisco
Canada	For estern bound: Quebec
	For western bound: Vancouver
Mexico	For estern bound: Veracruz
	For western bound: Mazatlan
Brazil	Rio de Janeiro
Argentina	Buenos Aires
Chile	Valparaiso
Venezuela	La Guaira
India	For estern bound: Calcutta
	For western bound: Bombay
Pakistan	Karachi
Egypt	For western bound: Alexandria
	For eastern bound: Port Said
UK	London
S. Arabia	Jidda
Iran	Abadan
S. Africa	For western bound: Cape Town
	For eastern bound: Durban
Libya	Tripoli(Tarabuluo)
Tunisia	Tunis
Kenya	Mombasa
Israel	Tel Aviv-Jeffa
Austria	Venezia + 200
Belgium	Antwerp
Italy	For estern bound: Naples
	For western bound: Genoa
Greece	Athens
France	For western bound: Dieppe or St. Nazaire
	For eastern bound: Marseille
Germany	Hamburg
Netherland	Rotterdam
Spain	For western bound: Bilbao or Vigo
	For eastern bound: Barcelona
Sweden	Goteborg
Switzerland	Genoa + 200
Ireland	Dublin

Sources: Distance was taken from World Map compiled from by Kummary & Firey.
This is supplemented by the Robinson's Map of the World' Mercator's Projection.
The latter is based on the shortest distance from the major trading routes.

Table A 2-7
Bilateral Aid Flows into Developing Countries From Australia and Other OECD Countries
(US $ million)

	1969-70 From Australia	From All OECD	1977-80 From Australia	From All OECD
Argentina	-	401.0	2.7	6008.3
Brazil	-	1135.5	0.2	15295.4
Chile	-	280.8	3.9	552.0
Egypt	39.9	41.7	121.0	5679.5
Oceania	437.8	502.4	1250.7	1379.4
Greece	-	360.3	1.8	1380.4
H K	3.0	321.4	71.5	2351.0
India	8.5	1555.4	19.1	2326.5
Indonesia	32.7	833.7	215.5	3207.4
Iran	-	692.0	-	5195.4
Israel	-	386.0	1.3	5452.2
Kenya	0.2	120.8	9.8	1700.5
Korea	2.5	2330.0	2.5	4021.9
Malaysia	5.5	132.2	67.2	1345.8
Maxico	-	429.2	5.5	10551.3
Pakistan	4.1	806.6	30.5	1674.8
Philippines	1.2	506.9	31.9	2838.9
Singapore	2.8	131.2	63.2	1712.9
Thailand	6.9	347.7	46.4	2041.4
Tunisia	-	274.2	0.1	1198.9
S. Arabia	-	29.9	-	-
Lybia	-	498.3	-	-
Spain	-	660.3	-	-
Total Aid	579.2	25181.8	2330.0	229473.5

Note: 1. Aid flows are confined to bilateral aid flows from OECD/DAC member countries to developing countries.

2. The aid flows are net total receipts(flows), and when net total receipts is negative, it is regarded as zero.

Source: OECD, Geographical Distribution of FInancial Flows to Developing Countries , various years.

Table A 2-8
Aid of OECD Countries to Korea and Other developing Countries
(US $ Million)

	1969-70 To Korea	To All Developing Countries	1977-80 To Korea	To All Developing Countries
Australia	1.1	579.2	2.5	2330.0
Austria	6.0	145.6	35.6	1250.6
Belgium	10.3	487.3	164.0	8479.6
Canada	3.0	735.6	306.3	8235.0
France	61.0	2339.8	102.1	30881.4
German	50.1	2768.2	432.8	22283.3
Italy	16.4	1379.0	100.7	11477.7
Japan	384.5	2665.1	1606.4	25084.2
Netherland	31.0	729.2	131.4	7406.6
New Zealand	-	15.2	1.5	268.3
Sweden	2.6	289.6	31.3	4547.6
Switzerland	8.1	114.0	71.9	11919.3
UK	34.1	2223.0	284.4	40283.0
USA	455.0	9284.7	746.0	50731.0
Total Korean Receipt	1045.7		4021.9	
World Total Aid Flows		25181.8		229.473.5

Note: 1. Aid flows are confined to bilateral aid flows from OECD/DAC member countries to developing countries.

2. The aid flows are net total receipts(flows), and when net total receipts is negative, it is regarded as zero.

Source: OECD, Geographical Distribution of Financial Flows to Developing Countries, various years.

Table A 2-9
Geographical Distribution of Multi-National Cooperations' Activities: 1980
(%)

A. M N C's Activities in Developing Countries
(Each Developing Country's Share)

	Australian M N C	All of OECD Countries' M N C
Argentina	0.1	3.2
Brazil	1.0	10.8
Maxico	0.3	8.8
Chile	-	0.9
Venezuela	0.1	3.6
Lybia	-	-
Tunisia	-	0.3
Kenya	0.5	1.7
Egypt	-	0.2
Israel	0.6	0.7
S. Arabia	0.1	0.5
India	0.6	2.9
Pakistan	0.5	0.7
Korea	-	1.7
Oceania	29.4	1.8
Hong Kong	20.4	7.7
Indonesia	4.4	2.4
Malaysia	10.6	3.8
Philippines	1.7	2.3
Singapore	13.4	5.4
Thailand	1.2	1.9

B. Australian M N C's Activities in Industrial Countries
(Australian Share in Each Industrial Country)

Belgium	0.2
Canada	0.8
France	0.1
Germany	0.1
Greece	0.2
Ireland	0.5
Italy	0.3
Japan	1.6
Netherland	0.3
New Zealand	27.1
S. Africa	1.3
Spain	0.3
Sweden	0.2
Switzerland	0.3
U K	3.1
U S A	1.9
All Industrial Countries	1.4

C. Activities of Industrial Countries' M N C in Korea

	Korea's Share in Each Industrial Country
Germany	0.6
Japan	13.0
Sweden	0.4
UK	0.1
Korea's Share In Total Industrial Countries' M N C	1.7

	Korea's Share in Each Industrial Country
France	0.4
Netherland	0.6
Switzerland	0.1
USA	1.7

Source: United Nations (1983), Transnational Corporations in World Development, third survey, New York.
A and C extracted from Annex Table 11.17: Global Distribution of Foreign Affiliates of Transnational Corporations from Selected Home Countries among Developing Countries.
B extracted from Annex Table 11.19: Distribution of Foreign Affiliates of Transnational Corporations from Selected Home Countries: F, Developed Market Economies.

APPENDIX 3

Australian Trade Specialisation Indexes, 1962--1981

A. Export Specialisation Indexes

Table A 3-1
Foodstuffs

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	0.35	0.29	0.30	0.28	0.36	0.47	0.36	0.34	0.48	0.46
011	8.74	6.91	7.11	7.56	8.60	7.20	7.84	7.98	8.34	8.71
012	0.07	0.07	0.16	0.20	0.24	0.07	0.09	0.08	0.11	0.16
013	2.74	1.45	1.77	2.16	1.68	1.59	1.52	1.29	1.91	2.48
022	2.19	1.86	2.30	2.13	2.43	2.63	2.24	2.05	2.21	1.98
023	6.93	6.51	6.26	6.70	7.86	7.10	6.00	5.80	6.06	4.02
024	1.92	2.06	1.97	1.92	1.70	1.86	2.28	1.87	1.83	1.74
025	1.47	0.76	1.15	1.55	1.48	1.57	2.00	2.01	2.39	2.59
031	1.06	0.88	0.97	1.33	1.34	1.51	1.87	1.93	1.70	2.10
032	0.06	0.04	0.03	0.09	0.14	0.32	0.35	0.33	0.36	0.78
041	6.35	6.03	5.65	7.13	4.81	10.02	7.01	9.13	9.36	10.95
042	0.58	0.50	0.49	0.50	0.74	0.79	0.90	0.98	1.02	1.45
043	3.45	2.40	2.32	2.83	1.99	3.22	1.09	4.03	3.48	7.00
044	0.03					0.01			0.05	0.09
045	3.23	2.56	3.32	2.32	1.94	2.70	2.40	3.29	3.62	10.67
046	5.25	4.75	5.90	5.32	4.11	4.91	4.76	4.09	4.36	3.87
047	0.01	0.00				0.12	0.05	0.13	0.25	0.25
048	3.66	1.99	2.24	2.38	4.10	3.50	3.33	2.63	2.97	3.36
051	1.09	1.07	1.09	1.05	1.15	0.81	0.91	0.83	0.87	0.86
052	7.30	4.53	7.47	7.65	7.14	6.29	7.37	5.10	6.47	5.54
053	4.06	3.34	3.08	3.54	4.33	4.56	5.13	3.08	3.53	3.57
054	0.15	0.17	0.16	0.13	0.16	0.27	0.26	0.16	0.27	0.26
055	0.49	0.12	0.10	0.10	0.15	0.13	0.12	0.12	0.13	0.10
061	3.17	3.18	3.10	2.81	3.39	3.39	4.51	3.90	4.86	4.97
062	0.29	0.25	0.35	0.51	0.55	0.36	0.32	0.32	0.34	0.28
071	0.01	0.01	0.01	0.01	0.03	0.01	0.01	0.03	0.05	0.04
072			0.01	0.02	0.26	0.01	0.01			0.02
073	0.04	0.05	0.06	0.05	0.23	0.63	0.41	0.37	0.44	0.84
074	0.09	0.08	0.09	0.12	0.12	0.01	0.01		0.01	
075	0.04	0.01	0.01	0.01	0.10					
081	0.56	0.51	0.40	0.25	0.23	0.29	0.31	0.46	0.39	0.43
091	0.16	0.05	0.05	0.07	0.07	0.07	0.08	0.13	0.21	0.37
099	2.05	3.44	2.87	3.88	0.55	0.78	0.90	0.61	0.56	0.47
111	0.26	0.35	0.85	0.76	1.05	1.36	1.98	1.80	2.22	3.00
112	0.28	0.27	0.30	0.31	0.32	0.28	0.28	0.23	0.22	0.26
121	0.02	0.01	0.01	0.02	0.04	0.01	0.01	0.01	0.01	0.01
122	0.27	0.26	0.28	0.30	0.27	0.25	0.23	0.21	0.36	0.37
411	3.57	2.49	2.30	2.36	2.70	2.38	2.61	4.00	4.00	4.49
421						0.01	0.01	0.01	0.01	0.03
422		0.01	0.02	0.01	0.02	0.01	0.01	0.01		
431	0.33	0.29	0.29	0.54	0.40	0.38	0.35	0.27	0.44	0.30

Table A 3-1: (continued)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001	0.41	0.79	1.33	0.78	1.09	2.65	0.81	3.12	3.87	4.26
011	9.30	9.98	7.12	6.28	7.46	9.03	6.53	11.71	9.82	7.87
012	0.13	0.17	0.20	0.20	0.21	0.30	0.21	0.88	0.55	0.57
013	1.96	1.74	1.93	1.51	1.92	2.25	1.56	2.55	2.52	2.22
022	2.36	2.99	3.81	4.25	3.34	2.98	4.42	2.73	2.38	2.65
023	5.43	3.42	3.22	2.99	2.34	2.32	3.10	1.53	1.18	0.49
024	1.52	1.42	2.12	1.57	1.87	1.89	1.64	2.15	2.66	2.43
025	1.85	2.10	1.40	1.74	1.40	1.44	1.81	1.06	0.76	0.83
031	2.00	1.40	1.71	1.38	1.62	1.77	1.44	2.02	1.93	2.13
032	0.62	0.47	0.55	0.49	0.52	0.74	0.51	0.44	0.66	0.78
041	7.30	2.22	9.04	9.00	8.75	10.71	9.35	11.93	12.36	8.50
042	1.19	1.30	1.24	1.58	2.52	1.81	1.59	2.84	2.38	2.70
043	6.28	2.44	7.61	9.93	10.70	12.23	10.32	8.82	12.87	6.08
044	0.02	0.01	0.00	0.01	0.03	0.02	0.01	0.01	0.03	0.01
045	6.40	3.23	5.76	7.34	6.90	5.13	7.63	5.27	5.18	5.54
046	2.99	2.29	4.95	4.28	3.27	2.69	4.45	1.14	0.87	1.09
047	0.35	0.28	0.42	0.41	0.57	0.26	0.43	0.59	0.73	0.45
048	2.77	2.31	3.56	2.74	2.39	2.87	2.85	2.88	3.79	4.07
051	0.61	0.73	0.66	0.54	0.42	0.37	0.56	0.57	0.59	0.65
052	6.90	4.80	4.36	4.99	4.47	4.70	4.47	4.76	8.59	4.55
053	2.74	3.13	2.68	2.10	1.69	1.49	2.18	1.83	1.60	1.60
054	0.24	0.20	0.20	0.15	0.12	0.21	0.16	0.20	0.29	0.29
055	0.08	0.08	0.11	0.10	0.06	0.06	0.10	0.09	0.10	0.08
061	5.68	4.97	5.61	5.02	8.61	8.50	5.32	6.73	6.26	8.42
062	0.21	0.21	0.31	0.28	0.34	0.37	0.29	0.51	0.49	0.56
071	0.04	0.04	0.07	0.07	0.05	0.08	0.07	0.08	0.12	0.17
072	0.03	0.03	0.02	0.02	0.00	0.04	0.02	0.01	0.01	0.01
073	1.20	1.07	1.01	0.98	0.97	0.54	1.02	0.56	0.58	0.76
074		0.15	0.13	0.13	0.08	0.13	0.13	0.05	0.06	0.05
075	0.01	0.04	0.08	0.04	0.06	0.06	0.04	0.06	0.07	0.07
081	0.50	0.52	0.38	0.51	0.54	0.69	0.51	0.42	0.29	0.29
091	0.36	0.79	0.47	0.26	0.39	0.27	0.27	0.38	0.42	0.52
099	0.40	0.39	0.43	0.36	0.32	0.35	0.37	0.36	0.36	0.34
111	2.69	1.97	1.96	1.85	1.17	0.95	1.93	0.82	0.75	1.08
112	0.20	0.19	0.28	0.24	0.23	0.20	0.25	0.21	0.27	0.34
121	0.01	0.03	0.03	0.02	0.02	0.03	0.02	0.10	0.08	0.06
122	0.24	0.26	0.27	0.27	0.25	0.28	0.28	0.25	0.21	0.21
411	5.26	4.33	3.84	6.41	6.03	6.58	6.33	6.85	5.65	4.45
421	0.01	0.02	0.02	0.07	0.04	0.02	0.07	0.04	0.01	0.04
422	0.01	0.03	0.07	0.01	0.01	0.01	0.01	0.03	0.06	0.07
431	0.23	0.35	0.51	0.53	0.75	0.69	0.55	0.65	0.58	0.53

Table A 3-2
Agricultural Raw Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211	6.56	6.77	7.27	6.75	7.24	5.64	6.61	6.95	7.00	6.41
212	0.51	0.57	0.69	0.45	0.42	0.37	0.40	0.38	0.37	0.24
221	0.01	0.01	0.02	0.01	0.01	0.04	0.04	0.06	0.04	0.13
231	0.01	0.01	0.02	0.03	0.05	0.02	0.02	0.03	0.03	0.04
241	0.18	0.10	0.09	0.06	0.15	0.00	0.08	0.10	0.02	0.00
242	0.05	0.04	0.03	0.02	0.04	0.03	0.02	0.01	0.02	0.02
243	0.19	0.14	0.14	0.10	0.17	0.11	0.11	0.11	0.09	0.12
244	0.05					0.01		0.01		
251	0.01	0.01				0.01	0.01	0.01	0.01	0.01
261										
262	22.38	19.42	20.63	22.94	23.94	26.27	28.75	27.97	27.16	25.90
263							0.01	0.17	0.17	0.01
264										
265					0.03					
267	0.69	0.68	0.66	0.82	1.05	1.20	1.30	1.13	1.01	0.89
291	0.51	1.45	1.51	1.75	2.06	1.64	1.72	1.71	1.96	2.13
292	0.37	0.30	0.23	0.22	0.24	0.30	0.21	0.22	0.21	0.31

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211	7.56	8.75	8.28	7.62	8.54	10.04	7.54	9.98	8.68	7.19
212	0.34	0.30	0.24	0.32	0.60	0.87	0.32	1.15	0.91	0.86
221	0.35	0.15	0.07	0.44	0.06	0.04	0.45	0.39	0.07	0.15
231	0.04	0.02	0.03	0.03	0.03	0.04	0.03	0.05	0.02	0.02
241	0.01			0.04	0.01	0.04	0.04	0.02		
242	0.01	0.01	0.04	0.05	0.01		0.05	0.01	0.02	0.02
243	0.12	0.11	0.13	0.14	0.13	0.11	0.15	0.15	0.15	0.15
244		0.01	0.01	0.01	0.01		0.01			0.01
251	0.01	0.01	0.01	0.01		0.01	0.01	0.01	0.02	0.02
261									0.11	
262	26.03	25.31	31.14	27.95	29.04	29.24	28.86	29.42	29.40	30.75
263	0.20	0.14	0.05	0.30	0.11	0.22	0.29	0.77	1.33	1.71
264	0.01		0.02	0.03	0.01		0.05		0.02	0.05
265									0.01	
267	0.85	0.71	0.92	0.83	0.95	1.18	0.86	1.17	1.35	1.20
291	2.07	1.48	1.32	1.75	1.69	1.43	1.76	1.58	2.23	2.01
292	0.31	0.28	0.39	0.46	0.30	0.31	0.48	0.39	0.45	0.42

Table A 3-3
Mineral Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271	0.04	0.04	0.01	0.02	0.02			0.02	0.01	
273		0.27	0.34	0.25	0.38	0.33	0.45	0.45	0.48	0.45
274									0.13	0.01
275		0.12	0.16	0.10	0.15	0.03	0.01	0.04	0.08	0.12
276		0.19	0.27	0.24	0.21	0.14	0.25	0.35	0.68	0.64
281		0.03	0.02	0.07	0.71	3.08	5.53	8.10	9.37	11.81
282	0.88	1.53	1.46	1.71	1.32	1.59	1.46	1.50	1.50	1.64
283	2.59	2.16	3.15	3.52	3.85	4.35	4.63	4.62	5.54	5.74
284	1.40	1.57	1.56	1.23	1.04	0.37	0.54	0.55	0.40	0.37
285	0.01	0.01	0.49	0.07	0.12	0.13	0.12	0.02	0.10	0.02
286		0.05	0.06	0.13	0.18	0.49	0.75	0.79	1.31	1.45
321	1.00	0.84	1.35	2.28	2.72	3.08	4.22	5.11	4.73	5.44
331	0.01									0.04
332	0.60	0.54	0.38	0.23	0.32	0.32	0.34	0.23	0.31	0.35
341	0.01	0.04	0.07	0.09	0.14	0.03	0.02	0.02	0.23	0.53
351										
681	0.09	0.33	0.98	0.11	0.14	0.90	2.84	0.94	1.42	0.99
682	0.47	0.48	0.36	0.82	0.69	0.50	0.63	0.99	0.97	1.24
683	0.01	0.02	0.03	0.03	0.03	0.01	0.01	0.05	0.74	2.46
684	0.03	0.15	0.36	0.61	0.55	0.42	0.25	0.37	1.29	1.35
685	15.70	13.45	13.46	13.30	14.19	14.03	16.58	16.59	17.52	16.64
686	5.60	4.84	4.03	4.89	6.69	5.08	4.91	6.52	7.02	7.41
687	0.01	0.01	0.06	0.01		0.01	0.06	0.19	0.38	0.62
688										
689	0.34	0.53	0.66	0.71	0.72	0.50	0.46	0.46	0.45	0.37

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271		0.03	0.01	0.24	0.34	0.29	0.24	0.02	0.03	0.02
273	0.48	0.69	0.73	0.63	0.65	0.57	0.65	0.72	0.78	0.98
274					0.01	0.01		0.01	0.01	0.01
275	0.04	0.17	0.39	0.32	0.33	0.40	0.33	0.49	0.63	1.06
276	0.62	0.78	0.99	1.08	1.41	1.49	1.11	1.90	1.53	1.41
281	11.71	11.62	14.70	13.61	13.39	15.85	13.75	14.23	16.04	15.17
282	1.04	1.51	2.37	2.33	2.04	1.89	2.43	1.59	1.56	2.26
283	5.63	5.25	6.42	10.90	9.40	9.62	10.00	3.12	6.60	8.25
284	0.43	0.40	0.81	0.74	0.49	0.83	0.77	0.94	1.18	1.05
285	0.15	0.33	0.19	0.26	0.32	0.61	0.25	0.71	0.17	0.15
286	0.71	0.50	0.61	0.32	0.19	21.48	0.22	12.16	25.41	37.94
321	6.00	6.38	6.62	7.61	10.19	12.50	7.93	11.30	10.45	12.52
331	0.03	0.01	0.01	0.02	0.01	0.01	0.01			
332	0.27	0.35	0.34	0.45	0.43	0.41	0.42	0.56	0.47	0.68
341	0.65	0.70	1.74	0.74			0.75			
351										
681	0.75	0.42	0.49	0.59	0.57	0.83	0.59	0.72	0.72	1.03
682	1.32	1.15	1.43	1.73	1.51	1.55	1.76	1.63	1.45	1.82
683	3.42	2.87	3.49	4.78	4.01	3.31	4.96		2.04	5.20
684	1.16	0.72	0.77	1.08	0.77	1.00	1.12	1.07	0.75	1.24
685	15.82	14.61	18.02	16.69	20.42	19.94	16.76	21.42	25.28	23.75
686	7.23	5.45	5.73	5.06	5.67	6.33	5.06	7.57	8.38	8.11
687	0.98	0.73	0.64	0.95	0.85	0.99	0.96	0.88	0.72	0.77
688						0.47				
689	0.45	0.38	0.45	0.33	0.29	0.28	0.34	0.27	0.26	0.34

Table A 3-4
Unskilled Labour Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611	1.28	0.99	1.01	0.99	0.86	0.71	0.62	0.53	0.40	0.38
612	0.23	0.13	0.12	0.24	0.12	0.17	0.16	0.21	0.19	0.19
613						0.05	0.10	0.13	0.35	0.29
631	0.05	0.08	0.06	0.07	0.10	0.08	0.08	0.09	0.09	0.34
632	0.30	0.13	0.14	0.17	0.26	0.16	0.13	0.20	0.15	0.14
633		0.06	0.05	0.03	0.05	0.07	0.08	0.14	0.12	0.25
651	0.09	0.13	0.14	0.13	0.09	0.07	0.07	0.08	0.11	0.10
652	0.03	0.04	0.05	0.06	0.01	0.05	0.05	0.07	0.09	0.07
653	0.03	0.05	0.06	0.07	0.14	0.08	0.09	0.09	0.09	0.10
654	0.06	0.08	0.07	0.09	0.19	0.06	0.06	0.07	0.05	0.07
655	0.18	0.22	0.20	0.22	0.20	0.17	0.19	0.17	0.21	0.18
656	0.11	0.10	0.12	0.15	0.13	0.09	0.10	0.14	0.19	0.16
657	0.04	0.06	0.07	0.05	0.08	0.07	0.07	0.06	0.12	0.12
664	0.09	0.05	0.13	0.07	0.07	0.13	0.19	0.20	0.23	0.26
665	0.05	0.07	0.08	0.16	0.20	0.21	0.17	0.21	0.18	0.14
666	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
812	0.17	0.11	0.16	0.21	0.12	0.21	0.19	0.17	0.20	0.21
821	0.15	0.10	0.14	0.14	0.12	0.10	0.12	0.09	0.10	0.09
831	0.04	0.06	0.05	0.06		0.04	0.05	0.07	0.05	0.05
841	0.04	0.05	0.06	0.06	0.07	0.10	0.12	0.11	0.10	0.10
842	0.17	0.27	0.20	0.24	0.42	0.14	0.26	0.23	0.23	0.25
851	0.03	0.03	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03
893		0.18	0.36	0.28	0.26	0.15	0.13	0.14	0.16	0.12
894		0.38	0.38	0.41	0.40	0.36	0.27	0.20	0.23	0.23
895		0.19	0.21	0.26	0.23	0.21	0.28	0.28	0.27	0.31
899	0.90	0.07	0.09	0.20	0.26	0.23	0.24	0.21	0.22	0.25

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611	0.27	0.20	0.15	0.18	0.36	0.73	0.19	0.91	0.95	0.74
612	0.24	0.19	0.24	0.19	0.18	0.15	0.20	0.15	0.20	0.16
613	0.27	0.24	0.20	0.27	0.44	0.42	0.28	0.25	0.28	0.27
631	0.63	1.18	2.09	1.76	1.94	2.31	1.81	2.09	3.43	3.16
632	0.11	0.08	0.11	0.07	0.06	0.07	0.08	0.05	0.05	0.06
633	0.16	0.11	0.30	0.23	0.19	0.19	0.24	0.20	0.23	0.28
651	0.08	0.08	0.11	0.07	0.07	0.05	0.07	0.49	0.58	0.64
652	0.06	0.13	0.17	0.10	0.11	0.09	0.10	0.08	0.07	0.08
653	0.07	0.08	0.11	0.06	0.06	0.06	0.07	0.06	0.05	0.06
654	0.07	0.08	0.09	0.09	0.06	0.06	0.09	0.05	0.06	0.05
655	0.19	0.18	0.27	0.23	0.22	0.23	0.24	0.27	0.31	0.36
656	0.15	0.19	0.21	0.11	0.13	0.12	0.12	0.07	0.15	0.10
657	0.09	0.13	0.09	0.06	0.09	0.12	0.05	0.16	0.13	0.12
664	0.32	0.26	0.19	0.15	0.24	0.15	0.16	0.21	0.25	0.27
665	0.10	0.11	0.15	0.11	0.10	0.11	0.11	0.13	0.22	0.24
666	0.01	0.03	0.06	0.07	0.04	0.04	0.07	0.04	0.04	0.06
812	0.18	0.18	0.21	0.14	0.11	0.12	0.14	0.17	0.17	0.19
821	0.07	0.05	0.07	0.05	0.04	0.04	0.06	0.06	0.08	0.10
831	0.05	0.03	0.05	0.03	0.03	0.03	0.03	0.04	0.03	0.03
841	0.09	0.09	0.09	0.06	0.05	0.04	0.06	0.05	0.05	0.03
842	0.26	0.17	0.19	0.16	0.28	0.28	0.17	0.10	0.10	0.12
851	0.03	0.03	0.04	0.02	0.02	0.02	0.02	0.03	0.04	0.04
893	0.11	0.12	0.16	0.16	0.14	0.13	0.16	0.09	0.09	0.10
894	0.26	0.28	0.35	0.22	0.15	0.15	0.23	0.14	0.15	0.20
895	0.29	0.30	0.46	0.47	0.45	0.54	0.48	0.57	0.67	0.75
899	0.27	0.32	0.45	0.37	0.29	0.27	0.39	0.20	0.19	0.23

Table A 3-5
Human Skill Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531					0.02	0.02	0.04	0.04	0.04	0.04
532	0.25	0.21	0.24	0.52	0.31	0.49	1.35	0.47	0.52	0.45
533	0.37	0.39	0.37	0.37	0.71	0.48	0.76	0.77	0.73	0.57
551	0.20	0.13	0.12	0.10	0.13	0.32	0.26	0.26	0.42	0.48
553		0.17	0.21	0.19	0.19	0.18	0.24	0.32	0.36	0.56
554		0.42	0.49	0.50	0.49	0.38	0.38	0.35	0.39	0.40
621		0.08	0.09	0.08	0.38	0.11	0.11	0.11	0.16	0.19
629	0.19	0.16	0.19	0.23	0.13	0.15	0.42	0.52	0.55	0.30
641	0.10	0.12	0.14	0.15	0.18	0.17	0.17	0.15	0.18	0.19
642	0.25	0.28	0.26	0.24	0.23	0.22	0.23	0.23	0.26	0.29
661	0.10	0.10	0.09	0.11	0.14	0.16	0.13	0.14	0.17	0.23
662	0.09	0.03	0.07	0.04	0.06	0.11	0.10	0.08	0.09	0.14
663	0.18	0.21	0.19	0.31	0.20	0.22	0.30	0.25	0.31	0.30
667	0.52	0.54	0.42	0.31	0.39	0.39	0.48	0.46	0.43	0.34
671		0.66	0.27	0.25	0.50	0.53	0.95	1.49	1.15	1.82
672		0.54	0.28	0.06	2.02	1.80	2.10	2.11	0.86	0.45
673		0.26	0.28	0.30	0.73	0.54	0.76	0.53	0.34	0.25
674		0.60	0.52	0.61	0.90	0.71	0.56	0.60	0.55	0.41
675		0.13	0.11	0.09	0.18	0.28	0.42	0.20	0.18	0.11
676		0.89	0.42	0.48	0.67	0.58	0.65	0.62	0.51	0.83
677		0.70	0.43	0.51	0.46	0.49	0.53	0.61	0.65	0.44
678		0.38	0.35	0.38	0.48	0.38	0.30	0.38	0.35	0.29
679		0.05				0.22	0.33	0.46	0.45	0.40
691	0.07	0.90	1.03	0.87	1.23	0.92	0.62	0.69	0.90	0.77
692		0.75	0.85	1.11	0.99	0.60	0.51	0.48	0.51	0.58
693		0.61	0.44	0.48	0.54	0.33	0.32	0.30	0.51	0.43
694		0.20	0.21	0.24	0.27	0.25	0.25	0.26	0.31	0.31
695		0.35	0.42	0.42	0.48	0.45	0.42	0.39	0.42	0.45
696		0.07	0.09	0.16	0.12	0.26	0.27	0.26	0.42	0.57
697		0.14	0.12	0.22	0.23	0.17	0.23	0.31	0.37	0.27
698		0.40	0.44	0.52	0.21	0.49	0.57	0.54	0.65	0.72
724		0.11	0.10	0.17	0.15	0.12	0.06	0.07	0.09	0.08
725		0.34	0.37	0.39	0.38	0.29	0.29	0.32	0.33	0.37
731	0.23	0.10	0.14	0.08	0.32	0.22	0.23	0.33	0.19	0.10
732	0.18	0.22	0.25	0.31	0.29	0.24	0.25	0.26	0.35	0.34
733	0.03	0.06	0.03	0.03	0.05	0.05	0.05	0.06	0.06	0.10
735	0.09	0.03	0.04	0.06	0.13	0.05	0.11	0.33	0.21	0.07
864	0.03	0.03	0.04	0.04	0.02	0.01	0.03	0.02	0.03	0.03
891	0.10	0.09	0.10	0.09	0.11	0.05	0.04	0.03	0.04	0.04
892	0.39	0.42	0.38	0.38	0.41	0.30	0.26	0.23	0.30	0.38
896		0.06	0.14	0.18	0.40	0.16	0.13	0.11	0.12	0.24
897	0.03	0.04	0.06	0.08	0.10	0.06	0.10	0.08	0.12	1.74
961	2.25	1.93	3.35	1.21		14.09	32.62	26.03	0.05	0.08

Table A 3-5: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531	0.05	0.05	0.06	0.05	0.05	0.05	0.06	0.07	0.08	0.07
532	0.37	0.12	0.09	0.05	0.12	0.21	0.05	0.19	0.21	0.22
533	0.58	0.48	0.54	0.56	0.46	0.49	0.59	0.47	0.35	0.28
551	0.45	0.46	0.64	0.49	0.27	0.36	0.51	0.39	0.35	0.38
553	0.58	0.52	0.69	0.51	0.38	0.37	0.53	0.34	0.38	0.41
554	0.47	0.44	0.52	0.42	0.36	0.34	0.43	0.43	0.43	0.42
621	0.11	0.12	0.15	0.13	0.12	0.13	0.14	0.17	0.15	0.13
629	0.27	0.33	0.14	0.11	0.07	0.07	0.12	0.08	0.10	0.09
641	0.17	0.16	0.17	0.11	0.10	0.13	0.11	0.16	0.24	0.18
642	0.25	0.25	0.30	0.23	0.16	0.16	0.24	0.21	0.21	0.20
661	0.19	0.24	0.47	0.45	0.29	0.21	0.47	0.37	0.45	0.23
662	0.08	0.08	0.12	0.12	0.07	0.11	0.12	0.14	0.12	0.13
663	0.27	0.30	0.33	0.29	0.20	0.24	0.31	0.29	0.34	0.31
667	0.30	0.29	0.34	0.31	0.38	0.32	0.32	0.42	0.36	0.57
671	1.41	1.88	2.42	1.46	1.41	1.76	1.56	1.82	1.58	0.69
672	1.83	1.66	1.95	4.26	4.05	4.29	4.43	1.49	1.54	2.55
673	0.40	0.25	0.31	0.29	0.44	0.52	0.31	0.50	0.46	0.38
674	0.52	0.39	0.42	0.46	0.38	0.58	0.48	0.94	1.06	1.18
675	0.17	0.15	0.18	0.19	0.15	0.34	0.20	0.42	0.78	0.39
676	0.64	0.85	0.11	0.22	0.44	0.24	0.22	1.34	0.93	0.07
677	0.52	0.46	0.47	0.36	0.45	0.66	0.38	0.51	0.44	0.39
678	0.33	0.33	0.34	0.28	0.13	0.19	0.29	0.29	0.29	0.13
679	0.26	0.21	0.70	0.41	0.41	0.32	0.43	0.61	0.60	0.88
691	0.48	0.52	0.40	0.49	0.20	0.18	0.51	0.38	0.14	0.29
692	0.49	0.60	0.63	0.56	0.43	0.39	0.58	0.41	0.30	0.39
693	0.41	0.34	0.47	0.48	0.31	0.46	0.50	0.46	0.36	0.30
694	0.37	0.32	0.43	0.47	0.28	0.30	0.49	0.31	0.39	0.44
695	0.48	0.46	0.57	0.42	0.37	0.34	0.44	0.40	0.45	0.45
696	0.46	0.49	0.68	0.66	0.60	0.48	0.69	0.58	0.69	0.70
697	0.24	0.36	0.34	0.28	0.24	0.23	0.29	0.22	0.23	0.17
698	0.69	0.66	0.79	0.73	0.57	0.51	0.76	0.52	0.61	0.70
724	0.10	0.08	0.12	0.13	0.07	0.06	0.13	0.07	0.10	0.11
725	0.31	0.37	0.43	0.30	0.26	0.25	0.31	0.21	0.27	0.27
731	0.10	0.13	0.10	0.18	0.19	0.08	0.19	0.56	0.68	0.34
732	0.37	0.40	0.37	0.17	0.12	0.11	0.18	0.13	0.13	0.14
733	0.06	0.06	0.08	0.05	0.04	0.05	0.06	0.08	0.15	0.08
735	0.12	0.50	0.31	0.22	0.14	0.09	0.23	0.47	1.01	0.50
864	0.02	0.08	0.09	0.08	0.12	0.11	0.09	0.15	0.15	0.17
891	0.03	0.04	0.07	0.10	0.07	0.08	0.10	0.12	0.10	0.09
892	0.37	0.50	0.50	0.44	0.38	0.36	0.45	0.41	0.48	0.56
896	0.14	0.45	0.89	0.20	0.38	0.22	0.20	0.23	0.25	0.38
897	1.21	0.46	0.25	0.18	0.17	0.09	0.19	0.17	0.18	0.12
961	0.18		0.09	0.24	0.08	0.02	0.25	0.22	0.12	0.25

Table A 3-6
Technology Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266	0.07	0.09	0.10	0.15	0.06	0.04	0.02	0.02	0.01	0.01
512	0.08	0.11	0.25	0.28	0.10	0.08	0.09	0.08	0.11	0.17
513		0.15	0.12	0.20	0.19	2.39	4.52	4.26	4.40	5.03
514		0.12	0.12	0.17	0.02	0.05	0.06	0.09	0.13	0.11
515			0.06	0.02	0.05	0.29	0.03	0.03	0.01	
521	0.03	0.01		0.01	0.03	0.14	0.09	0.17	0.06	0.15
541	0.37	0.36	0.41	0.55	0.59	0.48	0.52	0.49	0.52	0.60
561	0.01	0.01	0.01	0.01		0.01	0.01	0.04	0.02	0.02
571	1.05	2.32	1.60	2.10	1.97	1.03	0.83	1.23	1.08	1.83
581	0.00	0.17	0.19	0.19	0.19	0.14	0.15	0.13	0.13	0.13
599	0.50	0.37	0.33	0.52	0.61	0.57	0.63	0.68	0.71	0.72
711	0.13	0.12	0.16	0.17	0.17	0.12	0.10	0.15	0.16	0.13
712	0.26	0.23	0.22	0.38	0.38	0.27	0.27	0.24	0.35	0.47
714	0.08	0.12	0.09	0.09	0.08	0.03	0.04	0.05	0.03	0.04
715	0.06	0.09	0.11	0.13	0.15	0.09	0.08	0.09	0.10	0.11
717		0.08	0.06	0.05	0.06	0.03	0.02	0.02	0.04	0.05
718		0.24	0.27	0.32	0.33	0.28	0.23	0.24	0.32	0.42
719		0.10	0.12	0.13	0.11	0.13	0.16	0.14	0.17	0.22
722		0.10	0.12	0.15	0.16	0.12	0.12	0.12	0.14	0.21
723		0.15	0.23	0.19	0.30	0.27	0.20	0.23	0.26	0.42
726						0.08	0.05	0.05	0.04	0.09
729		0.15	0.21	0.16	0.10	0.14	0.17	0.14	0.19	0.21
734	0.10	0.09	0.12	0.14	0.20	0.05	0.04	0.19	0.06	0.05
861	0.18	0.17	0.19	0.26	0.24	0.19	0.22	0.21	0.23	0.27
862	0.32	0.30	0.31	0.32	0.28	0.40	0.50	0.48	0.48	0.49
863	0.74	0.57	0.40	0.46	0.33	0.22	0.71	0.24	0.26	0.31
951	0.21	0.00				0.15	0.08	0.19	0.01	0.01

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	0.01	0.01	0.03	0.02	0.01	0.01	0.03	0.01	0.02	0.01
512	0.18	0.14	0.11	0.17	0.13	0.12	0.17	0.12	0.18	0.13
513	5.06	5.57	6.48	3.64	9.73	10.30	3.76	9.71	10.39	10.81
514	0.14	0.17	0.28	0.22	0.14	0.17	0.23	0.27	0.47	0.22
515	0.02	0.01	0.03		0.03				0.01	0.01
521	0.03	0.37	0.29	0.95	0.89	0.43	0.98	0.42	0.06	0.08
541	0.45	0.54	0.54	0.46	0.46	0.48	0.47	0.54	0.50	0.56
561	0.07	0.05	0.08	0.04	0.03	0.01	0.05	0.05	0.06	0.06
571	1.21	0.98	0.99	0.65	0.50	0.51	0.68	0.92	1.04	1.26
581	0.14	0.15	0.21	0.22	0.18	0.19	0.23	0.25	0.26	0.34
599	0.65	0.58	0.54	0.44	0.51	0.50	0.46	0.41	0.42	0.45
711	0.15	0.22	0.24	0.13	0.11	0.11	0.13	0.12	0.12	0.17
712	0.44	0.51	0.71	0.61	0.55	0.46	0.63	0.35	0.46	0.62
714	0.04	0.12	0.14	0.16	0.15	0.14	0.16	0.18	0.19	0.21
715	0.10	0.12	0.15	0.11	0.07	0.07	0.11	0.08	0.08	0.06
717	0.05	0.07	0.08	0.10	0.08	0.07	0.11	0.08	0.06	0.07
718	0.27	0.30	0.37	0.31	0.24	0.27	0.33	0.32	0.32	0.28
719	0.16	0.18	0.23	0.22	0.18	0.19	0.23	0.20	0.23	0.25
722	0.15	0.16	0.23	0.19	0.14	0.17	0.20	0.12	0.14	0.16
723	0.28	0.31	0.40	0.45	0.33	0.27	0.47	0.27	0.23	0.25
726	0.10	0.16	0.16	0.26	0.48	0.61	0.28	0.08	0.10	0.11
729	0.16	0.17	0.23	0.24	0.16	0.16	0.25	0.13	0.14	0.15
734	0.13	0.71	0.29	0.29	0.31	0.39	0.30	0.37	0.33	0.30
861	0.29	0.35	0.39	0.31	0.30	0.35	0.32	0.46	0.48	0.49
862	0.44	0.51	0.61	0.69	0.56	0.68	0.72	0.85	0.90	1.09
863	0.30	0.64	0.34	0.33	0.29	0.36	0.34	0.32	0.45	0.38
951	0.01	0.12	0.02	0.02	0.07	0.25	0.02	0.21	0.21	0.25

Note: Indexes are calculated as defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

B. Import Specialisation Indexes

Table A 3-7
Foodstuffs

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	0.13	0.12	0.12	0.14	0.11	0.17	0.17	0.14	0.26	0.25
011	0.03	0.10	0.03				0.02	0.01	0.01	0.01
012			0.01							
013	0.49	0.06	0.04	0.04	0.04	0.04	0.07	0.12	0.13	0.10
022					0.01	0.01	0.01	0.02	0.01	0.02
023			0.01	0.01						
024	0.45	0.37	0.38	0.39	0.45	0.42	0.45	0.55	0.62	0.61
025		0.01	0.01							
031	0.96	0.82	0.83	0.76	0.76	0.73	0.75	0.78	0.86	0.83
032	1.55	1.32	1.37	1.72	1.84	1.73	1.60	2.21	1.69	2.15
041										
042	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.01	0.01
043							0.31			
044					0.01		0.01	0.01	0.01	0.01
045										
046		0.01						0.01		
047	0.01				0.02	0.04	0.01	0.01	0.01	0.02
048	0.31	0.26	0.22	0.26	0.35	0.43	0.58	0.62	0.70	0.60
051	0.19	0.16	0.17	0.15	0.15	0.15	0.18	0.18	0.18	0.20
052	0.30	0.22	0.23	0.15	0.23	0.21	0.25	0.29	0.40	0.34
053	0.28	0.13	0.14	0.14	0.20	0.22	0.25	0.30	0.50	0.39
054	0.15	0.13	0.20	0.24	0.24	0.22	0.29	0.22	0.19	0.25
055	0.27	0.46	0.34	0.36	0.46	0.47	0.42	0.53	0.57	0.67
061	0.04	0.03	0.02	0.03	0.04	0.04	0.05	0.05	0.05	0.05
062	0.55	0.50	0.41	0.54	0.48	0.49	0.55	0.59	0.68	0.64
071	0.33	0.27	0.25	0.25	0.31	0.34	0.28	0.36	0.37	0.44
072	0.85	0.88	0.96	0.74	0.90	1.15	0.77	0.96	1.08	0.94
073	0.18	0.31	0.29	0.19	0.15	0.21	0.21	0.28	0.29	0.32
074	3.06	2.41	2.26	2.16	2.20	2.23	2.29	2.28	2.07	2.45
075	0.61	0.56	0.52	0.49	0.48	0.50	0.38	0.50	0.57	0.46
081	0.11	0.11	0.13	0.13	0.26	0.33	0.26	0.24	0.27	0.27
091	0.00	0.01	0.02	0.01	0.02	0.04	0.02	0.02	0.01	0.01
099	0.43	0.42	0.43	0.41	0.35	0.48	0.48	0.69	0.96	1.10
111	0.04	0.04	0.06	0.18	0.15	0.11	0.12	0.07	0.09	0.13
112	0.63	0.47	0.46	0.52	0.38	0.53	0.56	0.57	0.65	0.73
121	1.68	1.18	1.03	1.09	1.01	0.95	1.15	1.44	1.21	1.08
122	1.66	1.47	1.41	1.22	0.91	1.39	1.24	1.24	1.34	1.52
411	0.28	0.19	0.25	0.23	0.26	0.17	0.19	0.18	0.17	0.11
421		0.93	1.08	0.92	0.98	0.73	0.90	0.93	0.73	0.55
422		0.68	0.44	0.37	0.63	0.48	0.37	0.41	0.63	0.60
431	1.29	1.16	1.05	1.02	0.55	0.64	0.75	0.89	0.75	0.70

Table A 3-7: (continued)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001	0.27	0.41	0.68	0.54	0.50	0.57	0.55	0.44	0.49	0.44
011			0.01		0.01	0.02	0.00	0.02	0.04	0.03
012								0.01		
013	0.10	0.15	0.28	0.15	0.08	0.08	0.15	0.16	0.20	0.15
022	0.03	0.04	0.04	0.02	0.03	0.02	0.02	0.04	0.10	0.09
023					0.02	0.01			0.12	0.04
024	0.74	0.75	0.67	0.78	0.84	0.77	0.79	0.77	0.84	0.79
025									0.01	
031	0.77	0.72	0.64	0.56	0.74	0.59	0.58	0.59	0.86	0.77
032	2.97	2.93	3.99	2.76	3.36	3.95	2.82	3.25	3.31	3.31
041										
042	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.02	0.02	0.01
043										
044	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.03
045		0.01	0.02	0.02	0.03		0.02			0.02
046					0.02					
047	0.02	0.03	0.02	0.01	0.02	0.02	0.01	0.02	0.02	0.03
048	0.68	0.56	0.49	0.50	0.55	0.57	0.50	0.46	0.47	0.46
051	0.25	0.23	0.29	0.25	0.27	0.36	0.26	0.30	0.33	0.33
052	0.45	0.27	0.38	0.52	0.69	0.28	0.53	0.47	0.66	0.45
053	0.31	0.37	0.65	0.66	0.66	0.59	0.68	0.66	0.80	0.47
054	0.25	0.27	0.51	0.36	0.23	0.19	0.37	0.19	0.18	0.21
055	0.67	0.88	1.80	0.98	0.88	1.08	1.00	1.09	1.10	1.01
061	0.05	0.05	0.03	0.02	0.04	0.06	0.02	0.06	0.03	0.04
062	0.67	0.62	0.74	1.61	1.66	1.13	1.64	1.01	0.70	0.86
071	0.48	0.50	0.52	0.51	0.64	0.77	0.52	0.81	0.83	0.77
072	1.30	1.11	1.53	1.23	1.04	1.33	1.26	1.31	1.52	1.27
073	0.32	0.29	0.22	0.25	0.57	0.49	0.25	0.94	0.31	0.23
074	2.79	2.73	2.24	2.61	2.43	2.85	2.48	2.51	2.12	1.97
075	0.56	0.60	0.75	0.55	0.60	0.62	0.56	0.59	0.59	0.45
081	0.24	0.17	0.37	0.14	0.17	0.14	0.15	0.22	0.28	0.19
091	0.01	0.01	0.02	0.02	0.01	0.00	0.01	0.01	0.00	0.00
099	1.04	0.74	0.83	0.90	0.84	0.95	0.90	1.00	0.91	0.78
111	0.13	0.10	0.06	0.07	0.06	0.12	0.07	0.10	0.15	0.20
112	0.81	0.75	0.90	0.87	0.89	1.08	0.89	0.79	0.96	0.92
121	1.28	0.99	1.21	1.31	0.86	1.21	1.35	1.08	1.25	1.08
122	1.55	1.49	1.39	1.70	1.52	1.38	1.65	0.95	1.01	0.73
411	0.07	0.07	0.06	0.08	0.06	0.05	0.08	0.05	0.04	0.04
421	0.48	0.52	0.55	0.75	1.24	1.15	0.74	0.82	0.63	0.65
422	0.78	0.89	1.02	0.73	0.94	1.04	0.73	1.01	0.74	0.57
431	0.78	0.71	0.79	0.78	0.67	0.96	0.78	0.90	1.22	1.48

Table A 3-8
Agricultural Raw Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211	0.25	0.20	0.20	0.11	0.12	0.10	0.14	0.10	0.03	0.04
212	0.34	0.23	0.22	0.23	0.17	0.22	0.19	0.16	0.19	0.12
221	0.31	0.30	0.25	0.32	0.27	0.18	0.36	0.39	0.23	0.16
231	1.19	1.03	1.19	1.05	1.00	1.11	0.98	0.96	0.97	0.98
241	0.05	0.03	0.07	0.07	0.02	0.01	0.02	0.03	0.02	0.03
242	1.76	1.28	1.29	1.08	0.11	0.13	0.13	0.11	0.10	0.10
243	0.62	0.40	0.44	0.44	0.95	1.01	1.18	1.21	1.32	1.28
244	0.45	0.37	0.31	0.40	0.45	0.44	0.66	0.49	0.59	1.20
251	1.27	0.96	0.96	0.90	0.86	0.98	0.82	0.99	1.04	1.13
261										
262	0.32	0.31	0.36	0.32	0.29	0.29	0.37	0.40	0.54	0.75
263	0.60	0.42	0.47	0.28	0.23	0.20	0.16	0.14	0.09	0.23
264	0.54	0.36	0.42	0.20	0.41	0.46	0.44	0.63	0.58	0.81
265	1.52	1.42	1.34	1.26	1.01	1.38	1.01	1.20	1.18	1.35
267	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.09	0.09
291	0.56	0.92	0.71	0.75	0.65	0.66	0.67	0.78	0.90	1.04
292	1.18	0.87	0.83	0.71	0.51	0.59	0.57	0.54	0.53	0.54

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211	0.05	0.06	0.08	0.07	0.03	0.03	0.07	0.00	0.01	0.01
212	0.14	0.16	0.20	0.19	0.10	0.13	0.19	0.11	0.14	0.13
221	0.20	0.32	0.27	0.06	0.14	0.13	0.06	0.03	0.13	0.15
231	1.16	1.18	1.01	0.91	1.07	0.85	0.93	0.97	0.86	0.80
241	0.02	0.01	0.02	0.02	0.01	0.06	0.02	0.01	0.02	0.02
242	0.10	0.10	0.07	0.03	0.04	0.03	0.03			
243	1.38	1.75	1.72	1.61	1.91	1.59	1.64	1.50	1.51	1.63
244	0.75	0.82	0.67	1.12	0.49	0.46	1.14	0.48	0.26	0.25
251	1.23	1.26	1.11	1.04	1.06	0.98	1.07	0.96	1.10	0.88
261								0.01	0.01	0.02
262	0.91	1.13	0.80	1.07	0.92	1.01	1.07	1.04	0.88	0.77
263	0.13	0.13	0.22	0.11	0.16	0.09	0.11	0.08	0.07	0.05
264	1.28	1.04	1.05	0.76	0.81	0.70	0.77	0.55	1.05	0.81
265	1.50	1.29	1.19	0.72	0.65	0.54	0.74	0.49	0.51	0.37
267	0.09	0.11	0.11	0.11	0.12	0.08	0.10	0.17	0.08	0.13
291	1.16	1.05	1.21	1.10	0.75	0.64	1.13	0.71	0.79	0.67
292	0.60	0.69	0.63	0.48	0.54	0.43	0.49	0.51	0.54	0.52

Table A 3-9
Mineral Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271	2.37	2.10	2.60	2.58	3.97	4.23	4.19	4.08	3.60	3.18
273		0.28	0.17	0.21	0.32	0.26	0.30	0.30	0.30	0.37
274		1.81	2.14	1.89	2.67	3.22	3.68	2.68	1.79	1.65
275		0.73	0.61	0.50	0.56	0.53	0.84	0.95	1.25	1.13
276		1.03	0.97	0.93	0.88	0.91	0.97	0.88	1.01	1.06
281	0.03	0.02	0.02	0.02	0.02	0.01	0.02			
282		0.02	0.01					0.01	0.04	0.01
283	0.10	0.14	0.09	0.10	0.11	0.08	0.10	0.07	0.09	0.12
284	0.22	0.46	0.14	0.15	0.09	0.18	0.27	0.19	0.26	0.30
285					0.05	0.05	0.04	0.02	0.04	0.04
286					0.01					
321	0.02	0.05	0.05	0.06	0.01	0.01	0.01	0.02	0.02	0.02
331	1.73	1.38	1.18	1.14	1.26	1.13	1.01	1.00	0.68	0.41
332	1.07	0.77	0.76	0.61	0.52	0.33	0.33	0.53	0.55	0.70
341		0.01	0.02	0.01		0.01	0.01	0.01	0.01	
351										
681	0.10	0.08	0.07	0.07	0.12	0.10	0.08	0.16	0.22	0.15
682	0.27	0.12	0.29	0.72	0.04	0.13	0.14	0.07	0.08	0.13
683	0.68	0.76	0.64	0.58	0.56	0.87	0.79	0.71	0.69	0.73
684	2.24	0.86	0.39	0.35	0.24	0.19	0.37	0.22	0.17	0.17
685	0.49	0.10	0.03	0.02	0.01	0.01	0.04	0.03	0.02	0.01
686	0.25	0.03	0.02	0.01	0.03	0.02	0.02	0.01	0.02	0.03
687	1.09	0.76	0.59	0.60	0.10	0.29	0.07	0.06	0.06	0.12
688					0.17		1.38	0.50	0.30	0.05
689	0.93	0.73	0.76	0.62	0.45	0.45	0.49	0.52	0.41	0.58

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271	2.81	4.27	2.39	3.06	2.47	2.72	3.11	4.29	4.26	3.45
273	0.50	0.50	0.49	0.76	0.80	0.70	0.78	0.87	0.85	0.94
274	2.45	2.81	2.54	1.39	1.30	2.03	1.42	2.41	3.32	2.22
275	1.37	1.23	1.43	1.07	0.96	0.80	1.10	0.89	1.35	1.10
276	1.14	0.92	0.75	0.86	1.02	1.21	0.87	0.69	0.69	0.58
281	0.01	0.01	0.01		0.01	0.01		0.01	0.02	0.01
282								0.01	0.01	0.01
283	0.10	0.16	0.15	0.11	0.11	0.21	0.11	0.18	0.21	0.26
284	0.33	0.48	0.46	0.14	0.23	0.16	0.14	0.15	0.15	0.19
285	0.08	0.09	0.07	0.23	0.18	0.07	0.23	0.02	0.17	0.06
286										
321	0.01	0.02	0.02	0.01	0.01	0.02	0.01	0.04	0.02	0.03
331	0.38	0.31	0.33	0.41	0.38	0.42	0.41	0.39	0.48	0.47
332	0.82	0.62	0.70	0.88	0.88	0.94	0.89	1.12	1.26	1.22
341	0.01									
351										
681	0.34	0.23	0.10	0.10	0.12	0.16	0.10	0.10	0.11	0.09
682	0.12	0.10	0.14	0.11	0.16	0.16	0.11	0.18	0.16	0.27
683	0.60	0.76	0.68	0.74	0.80	0.53	0.76	0.55	0.82	0.61
684	0.19	0.25	0.45	0.23	0.17	0.16	0.24	0.29	0.38	0.41
685	0.01	0.02	0.02	0.02	0.01	0.04	0.02	0.54	0.05	0.02
686	0.01	0.00	0.01	0.00	0.01	0.01	0.00	0.02	0.03	0.06
687	0.11	0.05	0.06	0.04	0.02	0.13	0.04	0.05	0.09	0.13
688		0.92	1.20	0.67	0.22	1.40	0.69	0.41	1.59	
689	0.59	0.54	0.66	0.84	0.51	0.62	0.86	0.56	0.78	0.64

Table A 3-10
Unskilled Labour Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611	0.43	0.50	0.50	0.49	0.56	0.62	0.52	0.49	0.51	0.50
612	1.08	0.86	0.71	0.78	0.80	0.90	0.68	0.75	0.79	0.74
613					0.14	0.13	0.24	0.18	0.20	0.21
631	0.72	0.47	0.49	0.50	0.57	0.61	0.61	0.55	0.62	0.65
632	0.91	0.62	0.60	0.61	0.55	0.68	0.81	0.87	0.91	0.88
633	1.40	1.16	0.96	1.11	1.21	1.48	1.48	1.55	1.68	2.05
651	2.00	1.36	1.19	1.09	1.01	1.11	0.97	0.95	0.99	1.08
652	4.82	3.21	2.81	2.67	2.80	3.14	3.21	3.41	3.58	3.86
653	1.82	1.38	1.25	1.21	1.17	1.29	1.22	1.19	1.27	1.43
654	7.81	4.99	4.86	4.26	3.31	3.28	2.65	2.32	2.23	1.82
655	1.81	1.37	1.47	1.33	1.43	1.46	1.53	1.56	1.68	1.66
656	4.23	3.36	2.99	3.26	3.14	3.15	2.79	2.90	3.02	2.95
657	4.35	2.44	2.40	1.94	2.33	2.66	2.67	3.00	2.61	2.48
664	2.84	1.96	1.69	1.50	1.87	1.67	1.78	1.89	1.84	2.01
665	1.93	1.69	1.42	1.45	1.61	1.63	1.75	1.69	1.74	1.95
666	3.13	2.22	1.82	1.91	1.89	1.93	1.83	1.92	2.08	2.12
812	3.00	0.88	0.70	0.73	0.52	0.50	0.58	0.57	0.61	0.66
821	0.88	0.59	0.40	0.43	0.32	0.32	0.36	0.33	0.35	0.35
831	2.22	1.95	1.77	1.63	1.20	1.37	1.20	1.31	1.36	1.54
841	0.69	0.50	0.44	0.45	0.42	0.51	0.49	0.46	0.49	0.53
842	1.68	1.04	0.59	0.67	0.11	0.11	0.11	0.10	0.11	0.08
851	0.43	0.45	0.40	0.36	0.45	0.50	0.47	0.64	0.67	0.85
893		1.94	1.53	1.17	0.90	0.74	0.74	0.78	0.78	0.89
894		1.65	1.39	1.49	1.46	1.48	1.24	1.23	1.25	1.42
895		2.16	1.88	1.80	1.56	1.94	1.63	1.89	1.96	2.03
899	4.44	0.95	1.07	1.74	1.45	1.53	1.37	1.24	1.63	1.24

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611	0.51	0.49	0.63	0.65	0.51	0.45	0.66	0.84	0.71	0.69
612	0.73	1.08	1.33	2.15	1.34	1.45	2.19	1.18	1.14	1.04
613	0.16	0.13	0.20	0.35	0.35	0.39	0.36	0.42	0.40	0.35
631	0.62	0.72	0.92	1.05	1.04	0.82	1.06	0.82	0.87	0.87
632	0.96	0.90	1.15	1.07	1.14	0.98	1.06	0.78	0.93	0.85
633	2.01	2.05	2.63	2.94	2.38	2.90	2.99	2.57	2.95	3.48
651	1.27	1.45	1.41	1.31	1.50	1.48	1.31	1.65	1.71	1.71
652	4.40	4.78	4.44	3.71	3.85	3.41	3.71	3.23	3.15	2.89
653	1.60	1.62	1.65	1.33	1.62	1.55	1.33	1.65	1.62	1.51
654	1.86	1.89	1.67	1.35	1.63	1.90	1.36	1.47	1.38	1.42
655	1.47	1.51	1.57	1.40	1.75	1.66	1.40	1.64	1.68	1.54
656	3.04	3.02	4.10	2.70	2.90	2.91	2.70	2.82	3.11	2.39
657	2.26	2.74	3.51	2.44	2.85	2.49	2.49	2.10	2.17	1.80
664	2.16	2.07	2.34	1.42	1.76	1.52	1.43	1.35	1.18	1.18
665	1.76	1.76	1.87	1.98	2.03	2.15	1.98	2.24	1.94	2.03
666	2.18	2.21	2.77	2.39	2.67	2.74	2.41	2.15	2.23	2.70
812	0.69	0.75	1.01	1.07	1.12	0.99	1.06	1.06	1.04	0.93
821	0.38	0.49	0.75	0.75	0.92	0.95	0.76	0.84	0.81	0.93
831	1.53	1.62	2.18	2.24	2.22	1.95	2.29	1.94	2.04	2.07
841	0.66	0.78	1.35	1.15	1.22	1.17	1.17	0.91	0.83	0.87
842	0.10	0.06	0.15	0.24	0.22	0.16	0.25	0.13	0.18	0.20
851	0.90	1.05	1.38	1.08	1.17	1.21	1.10	1.02	0.94	1.01
893	1.00	1.17	1.30	1.29	1.32	1.42	1.30	1.43	1.49	1.44
894	1.62	1.80	2.43	2.79	2.86	2.57	2.85	2.39	2.35	2.14
895	2.01	2.10	2.39	2.26	2.33	2.42	2.26	2.58	2.66	2.55
899	1.24	1.26	1.53	1.50	1.65	1.51	1.52	1.57	1.36	1.50

Table A 3-11
Human Skill Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531	1.86	1.20	1.14	1.13	1.35	1.40	1.17	1.29	1.35	1.37
532	1.00	0.87	0.79	0.67	0.80	0.74	0.93	1.26	1.18	0.96
533	1.01	1.02	0.70	0.64	0.82	0.71	0.78	0.77	0.80	0.85
551	1.27	0.50	0.44	0.46	1.06	0.99	1.06	1.17	1.33	1.27
553		1.86	1.83	1.64	1.16	1.05	0.92	1.02	0.94	1.08
554		0.82	1.34	1.03	0.95	0.77	0.75	0.67	0.87	0.88
621	0.82	1.05	1.09	1.24	1.68	1.64	2.07	1.90	1.81	1.89
629	1.44	1.15	1.39	1.72	1.47	1.75	1.89	1.58	1.85	2.35
641	2.22	1.89	1.72	1.64	1.54	1.61	1.58	1.55	1.67	1.70
642	1.04	1.10	1.04	0.72	1.04	0.98	1.02	0.90	0.91	0.91
661	0.70	0.18	0.14	0.24	0.23	0.24	0.28	0.31	0.35	0.38
662	1.98	1.63	1.37	1.33	1.09	1.01	1.17	1.37	1.31	1.48
663	2.59	0.98	0.88	0.83	1.34	1.26	1.40	1.41	1.29	1.32
667	0.49	0.40	0.39	0.22	0.19	0.20	0.18	0.19	0.26	0.26
671		0.78	0.52	0.65	0.55	0.59	0.62	0.52	1.16	0.96
672		0.03	0.03	0.35	0.04	0.11	0.09	0.08	0.13	0.36
673		0.65	0.85	0.98	0.46	0.35	0.38	0.31	0.42	0.59
674		0.44	0.63	0.50	0.39	0.50	0.46	0.44	0.48	0.75
675		1.41	1.37	1.50	1.47	1.62	1.34	1.01	0.98	1.05
676		0.00	0.05	2.77	0.32	0.86	0.23	0.08	0.06	3.24
677		0.66	0.57	0.78	0.67	0.72	0.72	0.63	0.77	0.62
678		0.54	0.64	0.73	0.77	0.89	1.20	1.20	0.94	0.89
679		0.16			0.11	0.11	0.11	0.11	0.07	0.08
691		0.16	0.13	0.45	0.53	0.25	0.28	0.22	0.17	0.22
692		1.26	1.16	0.84	0.79	0.41	0.35	0.44	0.37	0.40
693		0.80	0.85	0.90	0.67	0.68	0.70	0.76	0.59	0.60
694		0.86	0.80	0.78	0.86	0.92	0.96	0.92	0.98	1.08
695		1.85	1.73	1.75	1.87	1.82	1.89	1.98	2.01	2.33
696		2.71	2.52	2.17	1.87	2.42	2.33	2.41	2.23	2.79
697		0.95	1.14	1.38	0.87	0.96	0.92	1.05	1.11	1.15
698		1.28	1.25	1.50	1.29	1.23	1.28	1.24	1.26	1.24
724		0.79	0.89	1.14	1.09	1.14	1.17	0.97	0.95	0.80
725		1.14	0.95	0.87	0.83	0.77	0.83	1.07	1.14	1.55
731	0.55	0.53	0.72	0.79	0.50	0.81	0.70	0.84	0.79	2.25
732	2.52	2.24	2.17	1.93	1.35	1.30	1.29	1.21	1.32	1.17
733	1.08	0.66	0.56	0.34	0.61	0.74	0.68	0.77	0.88	0.67
735	0.16	0.19	0.07	0.15	3.61	1.23	2.91	2.83	1.59	0.58
864	1.86	1.36	1.34	1.39	1.11	1.21	1.26	1.23	1.16	1.40
891	1.63	1.34	1.40	1.28	1.27	1.46	1.33	1.52	1.37	1.49
892	4.36	3.61	2.76	2.43	2.71	2.56	2.70	2.58	2.69	3.11
896		0.38	0.52	0.65	0.49	0.84	0.47	0.55	0.78	1.24
897	0.87	0.92	0.87	0.81	1.07	1.08	1.12	1.09	1.21	1.06
961	0.20	0.14	0.18	1.35	0.21	0.04	0.43	0.80	0.02	0.05

Table A 3-10: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531	1.46	1.35	1.26	0.91	1.04	1.06	0.91	1.21	1.27	1.12
532	1.09	1.48	1.44	1.32	1.71	1.84	1.32	1.53	2.08	1.36
533	0.87	0.87	0.95	0.88	0.95	0.94	0.88	0.94	0.78	0.77
551	1.33	1.27	1.24	1.27	1.25	1.19	1.28	1.23	1.20	1.09
553	1.12	1.03	1.23	1.17	1.11	1.20	1.18	1.51	1.39	1.33
554	0.76	0.82	0.74	0.71	0.72	0.84	0.71	1.05	0.99	0.98
621	1.74	1.74	1.87	1.94	1.87	1.93	1.94	1.98	2.10	2.15
629	2.01	1.92	2.74	2.08	2.11	1.97	2.03	1.67	1.95	1.87
641	1.82	1.84	1.88	1.64	2.04	1.91	1.66	1.96	1.95	1.91
642	0.94	0.87	0.95	0.80	0.82	0.92	0.80	0.87	0.89	0.84
661	0.39	0.31	0.27	0.24	0.32	0.24	0.25	0.23	0.23	0.22
662	1.79	1.82	1.68	1.83	1.91	1.80	1.83	1.64	2.17	2.00
663	1.35	1.08	1.25	1.12	1.08	1.10	1.13	1.13	1.25	1.19
667	0.27	0.31	0.39	0.48	0.42	0.30	0.49	0.27	0.34	0.39
671	0.69	0.73	0.78	0.64	0.55	0.58	0.66	0.76	0.83	0.58
672	0.17	0.48	0.89	0.20	0.01	0.01	0.20	0.05	0.13	0.03
673	0.31	0.24	0.33	0.34	0.29	0.35	0.33	0.35	0.44	0.37
674	0.46	0.58	0.70	0.38	0.54	0.60	0.38	0.47	0.52	0.64
675	0.80	1.12	1.35	0.78	0.87	0.78	0.78	0.71	0.66	0.75
676	0.59	0.68	0.41	1.28	0.49	0.59	1.23	0.06	0.49	0.67
677	0.64	0.73	0.97	0.62	0.56	0.60	0.63	0.67	0.81	0.72
678	0.77	1.35	0.74	0.54	0.48	0.71	0.49	0.78	0.85	1.15
679	0.11	0.03	0.06	0.04	0.10	0.10	0.04	0.04	0.04	0.08
691	0.14	0.14	0.19	0.15	0.13	0.12	0.14	0.17	0.15	0.10
692	0.59	0.40	0.56	0.57	0.58	0.49	0.55	0.52	0.55	0.41
693	0.77	0.68	0.72	0.64	0.80	0.73	0.62	0.79	0.95	0.81
694	1.05	1.00	0.96	1.07	1.16	1.07	1.08	1.29	1.55	1.54
695	2.08	2.00	2.17	2.41	2.20	2.15	2.38	2.19	2.16	2.16
696	2.97	2.99	3.45	3.16	3.19	2.99	3.16	3.04	2.91	2.84
697	1.37	1.30	1.71	1.72	1.89	1.65	1.71	1.54	1.37	1.33
698	1.26	1.25	1.30	1.31	1.33	1.32	1.30	1.31	1.39	1.35
724	0.79	0.78	1.42	2.74	2.13	1.85	2.73	1.37	1.36	1.46
725	1.68	1.97	2.93	2.55	2.45	2.41	2.54	1.81	1.74	1.88
731	0.45	0.32	0.28	0.50	0.28	0.41	0.49	0.39	0.30	0.36
732	1.05	1.16	1.68	1.52	1.56	1.37	1.48	1.34	1.28	1.26
733	0.64	0.71	0.98	0.98	0.96	0.96	0.90	1.15	1.53	1.36
735	1.93	1.34	0.95	1.19	0.11	0.39	1.19	2.16	0.93	3.33
864	1.42	1.45	1.57	1.40	1.52	1.20	1.41	1.26	1.33	1.15
891	1.61	1.85	2.47	2.39	2.55	2.06	2.43	1.91	1.97	2.03
892	3.46	3.45	3.38	3.67	3.25	3.62	3.72	3.47	3.31	3.16
896	0.80	1.08	1.69	1.49	2.11	1.67	1.53	1.27	1.71	1.55
897	1.23	1.56	1.91	1.97	1.84	1.41	1.99	1.17	1.08	0.91
961	0.53	0.01	0.01	0.22	0.45	0.90	0.20	0.18	0.07	0.41

Table A 3-12
Technology Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266	2.71	1.67	1.71	1.45	1.19	1.22	1.32	1.28	1.35	1.38
512	1.95	1.20	2.04	1.83	1.53	1.50	1.50	1.38	1.40	1.52
513		1.10	1.01	0.78	0.87	1.14	0.81	0.77	0.79	0.96
514		1.33	1.15	1.13	1.25	1.23	1.09	1.31	1.36	1.49
515		0.14	0.18	0.27	0.27	0.26	0.43	0.43	0.31	0.32
521			0.23	0.70	1.88	1.47	1.10	1.48	0.90	2.15
541	2.93	1.88	1.81	1.54	1.42	1.31	1.25	1.29	1.54	1.55
561	0.67	0.43	0.52	0.36	0.40	0.51	0.46	0.47	0.33	0.32
571	3.05	3.45	4.59	5.44	1.91	2.30	2.14	2.31	1.46	2.54
581		2.14	2.01	1.89	2.06	1.99	1.96	1.77	1.70	1.66
599	3.19	0.80	0.79	0.75	1.38	1.40	1.53	1.41	1.42	1.46
711	1.99	1.60	1.88	1.95	2.51	2.49	2.21	1.95	1.96	1.66
712	3.20	2.70	3.72	3.32	2.00	2.54	1.95	1.72	1.25	0.95
714	2.38	1.67	2.35	3.06	2.69	1.33	1.40	1.76	2.05	1.79
715	1.82	1.53	1.72	2.00	1.85	1.45	1.59	1.24	1.26	1.76
717		1.20	1.05	1.22	1.07	1.03	0.89	1.13	1.11	1.06
718		1.73	1.57	1.83	1.89	1.91	1.87	1.92	2.32	2.38
719		1.11	1.00	1.04	1.27	1.18	1.36	1.40	1.36	1.37
722		2.16	1.64	1.59	1.90	1.82	1.68	1.60	1.66	1.91
723		0.97	1.10	1.13	1.27	0.88	0.95	0.96	0.97	1.07
726		0.56	0.92	0.65	0.88	0.78	0.69	0.86	0.89	1.21
729		1.42	1.34	1.30	1.39	1.41	1.32	1.18	1.10	1.18
734	0.93	1.22	2.33	2.99	3.55	4.05	3.09	2.64	3.13	1.87
861	2.09	1.60	1.46	1.42	1.84	1.67	1.74	1.83	1.94	2.00
862	1.66	1.37	1.31	1.24	1.37	1.46	1.54	1.70	1.72	1.82
863	4.08	3.04	3.42	3.17	2.82	2.62	2.09	2.41	2.67	2.62
951	0.52		0.16	0.12	0.62	1.43	1.03	1.39	1.30	0.75

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	1.40	1.61	1.36	1.12	1.33	1.21	1.09	1.29	1.13	1.05
512	1.50	1.51	1.38	1.15	1.37	1.41	1.18	1.41	1.47	1.23
513	1.28	1.27	1.40	1.56	1.74	1.43	1.60	1.14	0.97	1.37
514	1.38	1.37	1.25	0.90	1.24	1.22	0.91	1.29	1.21	1.23
515	0.24	0.21	0.30	0.25	0.18	0.14	0.26	0.11	0.13	0.17
521	1.52	1.36	0.79	0.65	0.86	0.70	0.67	0.50	0.61	1.39
541	1.67	1.56	1.65	1.52	1.35	1.16	1.50	1.20	1.07	0.85
561	0.34	0.23	0.16	0.24	0.29	0.41	0.24	0.35	0.40	0.52
571	1.63	1.86	1.91	1.69	2.03	1.68	1.57	1.90	2.08	1.65
581	1.74	1.61	1.73	1.38	1.53	1.50	1.38	1.39	1.39	1.43
599	1.44	1.40	1.34	1.46	1.32	1.36	1.46	1.42	1.43	1.28
711	1.58	1.43	1.50	1.54	1.48	1.59	1.53	1.72	1.67	1.44
712	1.22	1.47	1.64	1.96	2.46	2.74	1.93	2.14	2.93	2.45
714	2.13	2.11	2.49	2.53	2.23	2.50	2.57	2.25	2.20	2.15
715	1.20	0.94	1.03	1.25	1.00	1.06	1.25	1.00	1.36	1.28
717	1.06	1.06	1.11	1.10	1.13	0.98	1.08	1.05	0.97	1.03
718	1.80	1.75	1.99	1.83	1.57	1.70	1.74	1.97	2.13	2.32
719	1.27	1.11	1.33	1.23	1.20	1.25	1.21	1.38	1.50	1.54
722	1.67	1.20	1.37	1.86	1.35	1.31	1.84	1.42	1.46	1.43
723	1.18	1.09	0.99	0.89	0.78	0.81	0.86	0.71	0.83	0.89
726	1.01	0.81	0.97	0.99	1.44	1.84	1.01	1.74	1.30	1.22
729	1.22	1.02	1.20	1.39	1.29	1.28	1.40	1.16	1.17	1.18
734	1.22	4.73	1.79	1.43	1.62	1.73	1.37	1.57	0.91	1.80
861	1.85	1.90	1.98	1.99	2.09	2.05	2.00	1.81	1.84	1.84
862	1.91	1.90	2.25	2.36	2.36	2.21	2.39	2.34	2.16	2.09
863	2.56	2.77	3.40	3.42	3.30	2.97	3.45	2.67	2.84	2.45
951	1.43	0.71	0.20	0.15	0.08	0.14	0.14	0.11	0.10	0.18

Note: Indexes are calculated as defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

APPENDIX 4

Korean Trade Specialisation Indexes, 1962-1981

A. Export Specialisation Indexes

Table A 4-1
Foodstuffs

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	5.30	8.25	1.61	0.01	0.01	0.04	0.05	0.02		0.01
011	0.04	0.18	0.10	0.04	0.01	0.01	0.01	0.10	0.02	0.05
012	0.05	0.03		0.11	0.09	0.07	1.02	0.88	1.02	1.47
013	0.15	0.08	0.01	0.09	0.02	0.01	0.02	0.03	0.03	0.01
022										
023										
024										
025	0.97	0.34	0.10				0.01			
031	24.99	16.79	20.57	14.69	10.66	12.96	9.28	7.86	7.72	5.24
032	1.57	1.57	2.71	5.58	7.78	3.23	0.90	0.81	1.88	3.30
041										
042	28.52	1.49	3.37	3.18	5.10			0.05		
043		0.02				0.01				
044										0.01
045	0.28	0.16		0.87	0.31	0.58	0.63	0.89	0.43	0.10
046		2.09								
047						0.04				
048			0.00		0.41	0.50	0.36	0.57	0.45	0.94
051	1.33	0.27	0.23	0.14	0.14	0.14	0.11	0.14	0.10	0.06
052	0.18	0.07	0.06	0.03		0.03		0.01		
053		0.02	0.01	0.01	0.06	0.02	0.04	0.08	0.09	0.03
054	2.09	0.12	7.63	4.00	5.43	3.52	5.27	3.70	3.08	2.40
055	3.19	1.29	2.44	0.85	1.40	1.54	0.79	1.31	2.13	2.90
061	0.95	0.77	0.36	0.36	0.27	0.23	0.19	0.10	0.18	0.09
062			0.02	0.11				1.33	0.60	0.25
071								0.05		
072										
073					0.03			0.03		
074	0.02	0.04	0.04	0.09	0.05	0.05	0.05	0.10	0.19	0.26
075			0.01	0.01		0.07	0.10	0.01	0.04	0.02
081	0.05	0.25	0.12	0.12	0.08	0.06	0.08	0.03	0.02	0.02
091										
099	0.07	0.02	0.03	0.20	0.29	0.08	0.20	0.22	0.49	0.10
111					0.08					
112	0.15	0.07	0.03	0.02	0.21	0.15	0.25	0.29	0.13	0.15
121	0.17	0.29	0.17	0.80	4.54	3.68	3.35	4.76	4.19	3.76
122			0.05	0.04	0.05	0.04	0.12	0.13	0.02	0.02
411	0.37	0.24	0.10	0.04	0.07	0.11	0.15	0.08	0.05	0.04
421										
422			0.01							
431	0.12	0.53	0.41	0.37	0.53	0.24	0.07	0.01		

Table A 4-1: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001	0.02	0.02	0.01	0.09	0.02		0.09		0.01	
011	0.38	0.29	0.67	0.76	0.46	0.50	0.79	0.33	0.21	0.14
012	1.21	1.45	0.86	1.10	0.02	0.02	1.14	0.03	0.05	
013	0.03	0.09	0.10	0.02	0.02	0.07	0.02	0.01	0.01	0.01
022										
023										
024										
025	0.07	0.01		0.10	1.63	1.48	0.11	0.89	0.44	0.37
031	5.18	5.31	6.18	11.80	6.27	9.89	12.35	7.19	6.36	5.76
032	3.92	4.61	4.83	5.04	4.22	4.56	5.24	2.34	2.03	2.05
041										
042		0.88	0.01		0.02	0.51				
043										
044										
045	0.04	0.13	0.06					0.01	0.01	
046										
047			0.01		0.01	0.01		0.03	0.01	0.03
048	0.40	0.55	0.68	0.40	0.37	0.45	0.42	0.28	0.23	0.15
051	0.13	0.08	0.11	0.08	0.08	0.10	0.08	0.12	0.27	0.18
052	0.01	0.01	0.03	0.03	0.02	0.01	0.03		0.02	
053	0.04	0.25	0.27	0.14	0.23	0.21	0.15	0.23	0.44	0.35
054	0.78	1.03	0.71	0.88	0.71	0.81	0.91	0.93	0.99	0.93
055	2.49	3.47	2.36	2.76	2.46	3.08	2.88	2.33	1.92	1.22
061	0.12	0.41	0.80	1.82	0.52	0.40	1.94	0.49	1.48	1.71
062	0.42	0.23	0.19	0.70	1.67	1.56	0.73	1.64	1.43	1.06
071				0.01			0.01			
072					0.01	0.01				
073				0.02	0.03		0.02			
074	0.31	0.02	0.12	0.01	0.01	0.01	0.01	0.02	0.01	0.01
075	0.06	0.08	0.13	0.10	0.12	0.26	0.10	0.66	0.39	0.31
081	0.02	0.03	0.02	0.06	0.09	0.05	0.06	0.02	0.09	0.02
091									0.02	0.01
099	0.72	1.80	2.46	3.27	2.14	1.22	3.39	1.11	0.91	0.69
111	0.09					0.08		0.01	0.03	0.29
112	0.11	0.03	0.03	0.04	0.03	0.05	0.04	0.28	0.42	0.09
121	2.01	2.20	3.72	4.45	3.54	4.09	4.70	2.78	2.70	2.24
122	0.01	0.01	0.02	0.02	0.01	0.00	0.03	0.09	0.10	0.12
411	0.02	0.02	0.02	0.04		0.01	0.04			0.02
421	0.05		0.02			0.04		0.21	0.16	0.14
422			0.01	0.01	0.01	0.04	0.01	0.35	0.08	0.14
431	0.01	0.24	0.33	0.18	0.21	0.33	0.19	0.45	0.33	0.17

Table A 4-2
Agricultural Raw Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211		0.05	0.02	0.01	0.03	0.03		0.01	0.01	0.01
212	1.40	0.52	0.74	0.55	0.30	0.09	0.10	0.11	0.06	0.02
221	0.28	0.03	0.01		0.01	0.02	0.01		0.01	0.03
231									0.01	
241										0.29
242		0.01	0.06	0.12		0.01		0.02	0.02	
243				0.02	0.11	0.85	0.01	0.04	0.04	0.08
244		3.53	1.36	0.30						
251		0.01								
261	123.16	98.89	122.14	95.30	87.47	85.00	85.89	79.26	87.82	81.51
262	0.04	0.04	0.02	0.03	0.03	0.04	0.08	0.10	0.09	0.06
263	0.10		0.12	0.05	0.05			0.02	0.03	0.02
264	0.13		0.28	0.16	0.08			0.03	0.02	
265	0.04	0.02	0.02	0.03	0.07	0.00	0.24	0.38	0.11	0.06
267	0.94	1.16	3.25	0.34	0.40	1.19	1.23	0.89	1.08	0.91
291	10.20	17.57	3.69	4.00	2.04	2.41	1.19	0.94	0.75	0.56
292	7.84	14.32	10.83	7.82	6.61	7.53	5.03	5.02	5.00	3.98

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211									0.02	0.01
212	0.14	0.01	0.05							
221				0.01	0.01	0.01	0.01	0.01	0.01	0.01
231		0.00				0.01			0.01	0.06
241	0.57	1.25	1.14					0.01		
242	0.01	0.01		0.01		0.01	0.01	0.02		0.01
243	0.33	0.85	0.78	0.55	0.64	0.80	0.57	0.99	0.72	0.42
244	0.21	0.01	0.01			0.05		0.51	0.04	0.01
251						0.01				
261	52.51	30.15	44.75	20.10	8.42	26.59	20.91	9.75	7.46	1.23
262	0.42	0.56	0.45	0.65	0.27	0.16	0.67	0.18	0.10	0.06
263	0.01		0.01			0.01			0.01	0.01
264		0.01		0.06	0.13	0.15	0.09	0.01	0.08	0.01
265	0.06	0.13	0.08	0.24	0.10	0.08	0.25			0.01
267	0.70	0.78	0.85	1.00	1.05	0.61	1.03	0.18	0.13	0.26
291	0.64	0.39	0.43	0.30	0.32	0.47	0.30	0.48	0.40	0.28
292	2.94	2.69	2.19	2.10	2.36	2.08	2.15	1.79	1.66	1.33

Table A 4-3
Mineral Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271									0.02	
273		0.39	3.36	3.81	1.47	0.73	0.24	0.44	1.04	0.95
274	0.42		0.01		0.02				0.00	
275	0.11	0.05	0.01	0.01	0.09	0.03	0.02	0.23	0.07	0.05
276	7.30	8.52	8.34	5.00	4.28	4.40	3.50	2.89	2.55	2.13
281	8.99	7.84	5.50	4.40	2.93	2.32	1.89	1.23	0.64	0.55
282	0.24	0.04	0.05	0.04	0.03	0.05	0.11	0.28	0.22	0.10
283	8.81	6.23	7.29	6.88	6.60	5.51	4.13	3.22	2.75	1.83
284	0.22	0.08		1.05	0.16	0.05	0.09	0.13	0.17	0.13
285		1.65	0.36	0.53	0.72		1.01	1.03	2.15	1.96
286										
321	4.24	2.30	1.79	1.08	0.67	0.64	0.60	0.53	0.48	0.45
331										
332								0.12	0.21	0.22
341					0.01				0.01	0.07
351										
681	0.44	0.80	1.52	0.84	0.68	0.42	0.51	0.13	0.19	0.15
682	0.03		0.88	0.70	0.20	0.07		0.01	0.01	
683		0.03								0.01
684	0.40	0.20	0.89	0.10	0.03	0.01	0.01	0.67	0.64	0.24
685					0.22				0.00	0.03
686	0.17	0.04								0.09
687					0.02					
688										
689	0.40	0.11	1.20	1.34	2.24	1.94	0.80	0.98	0.69	0.76

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271										
273	0.78	2.23	3.42	1.74	1.24	1.18	1.80	1.57	1.46	1.50
274	0.01								0.03	0.01
275	0.03	0.08	0.03	0.02	0.05	0.02	0.02	0.01	0.02	
276	1.39	1.22	1.72	1.16	1.03	1.14	1.20	0.86	0.75	0.58
281	0.44	0.14	0.05	0.03			0.03			
282	0.05	0.02	0.00		0.13	0.02		0.11	0.11	0.19
283	1.37	0.75	0.81	0.87	0.65	0.60	0.79	0.37	0.22	0.20
284	0.05	0.10	0.03	0.04	0.03	0.03	0.04	0.17	0.11	0.10
285	2.22	0.97	0.67	0.88	0.85	0.81	0.86	0.39	0.45	0.35
286										
321	0.14	0.11	0.01		0.01					
331										
332	0.37	0.33	0.51	0.47	0.44	0.25	0.44	0.02	0.04	0.17
341	0.11	0.12	0.27	0.24	0.17	0.16	0.25	0.02	0.01	0.01
351										
681	0.13	0.05	0.07	0.19	0.20	0.08	0.19	0.14	0.17	0.26
682	0.04	0.02	0.06	0.03	0.02	0.03	0.03	0.04	0.18	0.28
683						0.01			0.01	
684	0.34	0.23	0.14	0.04	0.12	0.23	0.04	0.12	0.27	0.28
685	0.10	0.04	0.01	0.04	0.01	0.02	0.04	0.17	0.22	0.02
686	0.01	0.01	0.06	0.04	0.02	0.02	0.04	0.50	0.64	0.38
687										0.01
688		8.86	9.35		15.78					
689	0.43	0.32	0.41	0.47	0.96	1.46	0.49	0.69	0.70	0.73

Table A 4-4
Unskilled Labour Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611				0.01			0.01	0.01	0.02	0.03
612	0.10		0.11	0.27	0.64	1.01	0.17	0.64	0.71	1.56
613		0.01	0.01					0.02	0.16	0.20
631	13.39	22.42	27.72	29.57	34.27	31.56	35.76	31.85	29.43	31.36
632	0.14	0.20	0.35	0.30	0.42	0.27	0.34	0.91	0.94	0.86
633			0.09			0.03				
651	0.11	1.33	1.05	1.18	1.05	0.93	0.78	0.77	1.43	3.33
652	3.01	4.64	9.17	6.27	4.57	4.96	3.96	4.43	5.44	4.92
653	0.37	1.28	2.76	3.60	3.64	4.23	4.24	2.83	2.37	2.13
654		1.05	5.34	4.52	5.68	7.08	5.71	4.97	4.28	4.61
655		0.31	1.14	3.20	3.74	4.19	2.81	2.80	2.72	5.13
656	0.06	0.86	1.47	1.78	2.99	6.17	4.73	1.61	0.73	0.87
657	0.01	0.01	0.16	0.24	0.41	0.29	1.72	1.68	2.06	1.71
664	0.42	2.12	2.69	0.97	0.91	0.19	0.03	0.04	0.13	0.48
665	0.15	0.74	0.50	3.06	0.55	0.44	0.42	0.32	0.27	0.19
666		0.73	1.13	0.68	0.26	0.11	0.04	0.26	0.13	0.08
812	0.02	0.11	0.04	0.48	0.65	0.45	0.06	0.02	0.01	0.02
821	0.36	0.07	0.17	0.06	0.09	0.13	0.46	0.35	0.49	0.39
831	0.02	0.03	0.06	0.31	1.70	3.65	1.65	1.83	2.91	4.57
841	1.71	4.04	4.00	8.07	8.51	11.56	14.25	13.61	13.53	13.78
842				0.09	0.15	0.04	0.21	0.31	0.55	2.49
851	1.17	2.24	1.80	5.64	4.79	4.88	4.16	2.85	3.48	5.41
893	1.03	0.10	0.21	0.34	0.72	0.98	0.86	0.70	0.78	0.83
894	0.08	0.05	0.46	0.31	0.55	0.53	0.37	0.34	0.59	0.93
895		0.12	0.55	0.88	0.56	0.74	0.45	0.26	0.25	0.26
899	0.87	1.10	6.29	12.71	18.34	19.99	20.74	24.16	29.64	18.28

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611	0.15	0.12	0.06	0.08	0.04	0.09	0.08	0.10	0.26	0.23
612	2.48	3.38	5.16	3.85	4.59	3.30	4.01	3.62	3.89	2.71
613	0.95	0.02	0.15	0.20	0.18	0.20	0.20	0.10	0.12	0.12
631	24.11	18.22	11.93	14.01	13.34	12.15	14.37	9.11	6.56	6.23
632	1.56	3.67	4.36	2.35	1.84	1.47	2.44	1.45	1.45	1.08
633	0.00	0.06	0.02	0.22	0.02	0.01	0.23	0.51	0.48	0.04
651	2.41	2.31	2.76	5.03	4.50	3.14	5.23	3.93	5.07	3.88
652	3.44	2.81	2.41	2.14	0.96	1.90	2.22	1.76	2.11	1.69
653	2.94	4.85	4.31	5.18	5.67	4.98	5.44	6.07	6.68	6.72
654	5.60	8.31	9.21	11.93	12.15	11.66	12.38	10.99	8.18	6.48
655	2.25	2.31	3.10	2.83	2.09	2.45	2.94	2.41	3.02	2.82
656	0.89	2.71	2.93	2.20	3.04	4.02	2.32	3.13	3.69	3.23
657	1.13	0.97	1.30	1.04	1.04	1.22	0.95	0.91	0.84	0.80
664	1.20	0.66	0.71	0.50	0.49	0.43	0.52	0.37	0.41	0.54
665	0.32	0.48	0.53	0.37	0.53	0.44	0.39	0.35	0.53	0.74
666	0.41	0.63	0.51	0.95	1.44	1.82	0.99	2.75	3.02	3.14
812	0.06	0.16	0.16	0.10	0.15	0.19	0.10	0.20	0.21	0.32
821	0.59	0.91	0.66	0.44	0.52	0.54	0.46	0.36	0.33	0.43
831	4.99	8.09	11.30	13.50	13.40	12.95	14.07	10.38	9.80	9.90
841	12.29	11.14	12.57	12.02	11.72	10.09	12.47	9.09	8.32	8.36
842	3.66	4.05	5.98	7.63	0.01	6.75	7.90	6.32	7.51	8.98
851	4.73	5.38	7.89	6.46	8.37	7.81	6.71	7.22	7.83	7.39
893	1.19	1.63	2.40	4.67	1.17	1.29	4.86	1.31	1.38	1.43
894	1.92	2.80	3.95	3.67	3.82	4.78	3.82	4.40	4.16	3.62
895	0.33	0.44	0.68	0.50	0.70	0.55	0.52	0.34	0.38	0.42
899	13.64	9.24	8.26	7.12	5.20	4.33	7.41	3.18	2.92	2.38

Table A 4-5
Human Skill Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531		0.02	0.02	0.01	0.01	0.02	0.02	0.02	0.01	0.06
532										
533	0.01	0.04			0.03	0.12	0.02	0.01		
551	1.14	0.67	0.98	0.06		0.00	0.01	0.01	0.03	0.03
553	0.05	0.01	0.01	0.09	0.01	0.04			0.11	0.01
554		0.01				0.02		0.02	0.01	0.12
621			0.40	0.41	0.45	0.79	0.80	0.55	0.64	0.27
629	0.29	1.18	1.44	1.12	1.10	1.12	0.91	0.73	0.72	0.75
641	0.01	0.05	0.03	0.05	0.15	0.34	0.03	0.01	0.01	0.02
642	0.17	0.01	0.04	0.05	0.66	0.07	0.27	0.04	0.12	0.11
661	0.05	0.09	1.28	2.12	1.05	0.57	0.23	2.64	2.76	4.65
662	0.06	0.16	0.34	0.03	0.05	0.10	0.17	0.78	0.46	0.26
663	0.02	0.02	0.04	0.15	0.06	0.04	0.01	0.01	0.03	0.09
667	0.09	0.33	0.48	0.08	0.01				0.02	0.02
671					0.08	0.07	0.09	0.05	0.38	0.16
672	0.03	0.03	0.25	0.60		0.12		0.08	0.43	0.01
673		1.48	1.37	0.85	0.16	0.08		0.04	0.17	0.19
674	0.58	6.07	1.08	3.58	1.88	0.19	0.11	0.34	0.50	1.10
675		0.09	0.01	0.03	0.01		0.07	0.19	0.08	0.03
676										0.03
677	0.36	7.06	1.32	1.01	0.47	0.17	0.01	0.05	0.05	0.04
678	0.02	0.53	0.34	0.05	0.15	0.10	0.04	0.03	0.10	0.14
679	2.17	15.06	0.14	0.04	0.07	0.61	0.20	0.30	0.14	0.11
691					0.03	0.12	0.03	0.01	0.19	0.02
692	0.12	0.17	0.05	0.11	0.07	0.32	0.26	0.20	0.04	0.04
693	1.21	0.38	0.37	0.01	0.17	0.37	0.43	0.55	1.09	1.32
694		0.02	0.09	0.06	0.03	0.07	0.01	0.01	0.03	0.11
695	0.02	0.04	0.06	0.23	0.17	0.39	0.38	0.06	0.11	0.09
696		0.11	0.40	1.14	1.66	1.72	2.40	3.70	4.28	3.56
697	0.65	0.52	0.60	0.55	0.27	0.31	0.66	0.51	0.40	0.44
698	1.42	0.68	0.83	1.56	2.24	2.73	2.48	0.24	0.18	0.27
724	0.01	0.12	0.37	0.66	1.06	0.54	0.72	0.62	0.42	0.58
725		0.01			0.01	0.04	0.02		0.01	0.01
731					0.02			0.02		0.08
732	0.12	0.49	0.11	0.10	0.03	0.05	0.03	0.02	0.01	0.02
733		0.15	0.07	0.14	0.34	0.06	0.09	0.01	0.05	0.21
735		0.01	0.06		0.05	0.32		0.73	0.23	0.10
864		0.01	0.07	0.14	0.03	0.05	0.06	0.07	0.04	0.20
891	0.01	0.07	0.08	0.44	0.27	0.09	0.10	0.11	0.38	1.14
892	0.08	0.34	0.15	0.11	0.25	0.26	0.09	0.07	0.12	0.25
896	0.38	0.05	0.19	0.07	0.24	0.06	0.42	0.21	1.86	0.56
897	0.04	0.17	0.41	0.59	0.46	0.11	0.11	0.18	0.32	0.31
961			0.33	0.04						0.14

Table A 4-5: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531	0.27	0.26	0.21	0.19	0.21	0.27	0.19	0.46	0.54	0.44
532	0.06		0.05	0.03		0.01	0.03	0.02	0.01	0.00
533	0.03	0.07	0.10	0.06	0.09	0.13	0.06	0.19	0.13	0.15
551	0.02	0.01				0.01			0.01	0.04
553	0.00	0.00	0.02	0.04	0.02	0.03	0.04	0.03	0.01	0.04
554	0.17	0.19	0.20	0.24	0.30	0.22	0.25	0.23	0.31	0.75
621	0.11	0.18	0.28	0.11	0.09	0.12	0.11	0.12	0.15	0.24
629	1.22	1.18	2.88	3.05	3.25	2.88	3.16	4.10	5.26	3.95
641	0.09	0.42	0.32	0.23	0.29	0.27	0.24	0.22	0.50	0.42
642	0.95	1.23	1.56	1.50	1.70	1.48	1.56	1.11	0.88	0.89
661	3.68	3.09	5.59	6.21	6.46	6.03	6.40	3.81	6.36	6.77
662	0.75	1.20	1.35	0.95	1.20	1.24	0.99	0.86	0.76	0.76
663	0.14	0.49	0.66	0.69	0.98	1.50	0.72	0.49	0.54	0.59
667	0.04	0.02	0.04	0.03	0.03	0.02	0.04	0.05	0.06	0.14
671	0.28	0.28	0.30	0.19	0.32	0.54	0.20	0.33	0.57	0.23
672	0.11	0.66	1.81	1.34	1.43	1.61	1.39	2.83	4.38	5.11
673	0.81	0.25	0.90	0.96	0.80	0.36	0.99	1.10	2.43	1.92
674	2.48	2.38	2.96	1.08	1.57	1.29	1.12	2.36	2.83	2.55
675	0.03	0.04	0.33	0.01	0.01	0.08	0.01	0.27	0.30	0.65
676	0.07	0.13	0.05	0.05	0.04	0.11	0.06	0.15	0.23	0.51
677	0.28	1.08	1.03	0.56	0.55	0.68	0.58	1.55	2.03	1.69
678	0.63	0.90	1.82	0.76	1.04	1.14	0.79	1.71	2.53	2.21
679	0.30	2.56	4.64	1.60	1.10	0.93	1.66	1.12	1.00	1.18
691	0.08	0.51	0.40	0.16	0.48	4.88	0.17	1.57	2.00	3.20
692	0.08	0.24	0.29	0.21	0.31	0.25	0.22	0.59	0.21	0.31
693	1.13	1.56	3.43	2.91	2.97	3.06	3.03	4.44	5.13	5.43
694	0.27	0.35	1.89	1.67	2.26	2.67	1.74	2.89	2.80	3.08
695	0.16	0.20	0.41	0.35	0.48	0.46	0.37	0.47	0.53	0.55
696	5.06	6.48	7.13	7.65	8.25	9.22	7.95	7.07	7.90	7.06
697	0.66	1.23	2.20	2.04	2.64	3.63	2.11	4.43	4.89	5.03
698	0.33	0.51	0.73	0.57	0.67	0.68	0.60	0.98	1.15	1.09
724	0.86	1.40	2.09	1.67	2.03	2.14	1.73	3.33	3.32	3.02
725	0.03	0.06	0.15	0.13	0.20	0.26	0.14	0.44	0.83	1.04
731	0.05	0.42	1.18	1.41	0.34	1.83	1.46	4.84	5.97	6.12
732	0.01	0.01	0.01	0.01	0.02	0.04	0.01	0.10	0.10	0.10
733	0.62	0.94	1.11	0.59	0.59	0.63	0.62	0.36	0.41	0.37
735	0.02	0.09	1.07	1.46	2.03	2.83	1.52	3.98	4.47	6.42
864	0.44	0.80	1.78	2.47	3.14	1.94	2.56	2.34	2.75	2.53
891	1.30	2.76	3.42	3.68	4.17	3.49	3.82	2.97	2.12	1.68
892	0.08	1.25	0.12	0.70	0.10	0.15	0.72	0.25	0.17	0.19
896	0.18	0.27	0.41	0.40	1.75	0.58	0.40	0.81	0.19	0.21
897	0.35	0.74	1.57	1.85	1.50	1.32	1.92	1.19	1.16	0.79
961	2.48	6.36	71.25	12.02	36.31	4.97	12.49	2.26	2.73	22.42

Table A 4-6
Technology Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266		0.01	0.08	0.04	0.03	0.01	0.02	0.04	1.12	0.22
512	0.24	0.46	0.18	0.06	0.07	0.06	0.06	0.06	0.08	0.09
513	3.46	0.65	0.03	0.01	0.13	0.03	0.01	0.02	0.07	0.02
514	0.05	0.27	0.16	0.18	0.15	0.09	0.06	0.07	0.10	0.08
515										
521									0.01	0.13
541	0.11	0.07	0.09	0.04	0.03	0.05	0.04	0.18	0.18	0.21
561						0.77	0.65	2.00	1.78	1.67
571									0.05	0.02
581		0.01	0.02	0.01	0.03		0.04	0.16	0.15	0.13
599		0.01		0.02			0.06	0.05	0.01	0.10
711	0.13	0.40	0.11	0.42	0.39	0.18	0.06	0.12	0.14	0.13
712	0.03	0.02		0.10	0.01	0.03	0.06	0.01		0.05
714		0.01				0.01	0.50	0.67	0.27	0.35
715			0.05	0.05	0.04	0.07	0.01	0.02	0.03	0.03
717	0.16	0.11	0.06	0.40	0.56	0.47	0.09	0.22	0.12	0.12
718		0.01	0.01	0.07	0.03	0.03	0.03	0.02	0.03	0.04
719	0.05	0.15	0.03	0.05	0.05	0.08	0.02	0.02	0.03	0.02
722	0.18	0.59	0.03	0.09	0.11	0.48	0.83	1.03	0.49	0.24
723		0.01	0.17	0.08	0.04	0.11	0.08	0.03	0.07	0.07
726		0.02	0.03	0.09	0.01		0.01	0.01	0.02	0.02
729		0.06	0.20	0.11	0.36	0.60	1.31	2.06	2.05	2.76
734	0.99	0.11	0.00	0.07	0.01	0.13	0.03	0.05	0.44	0.08
861		0.01	0.05	0.07	0.13	0.08	0.15	0.21	0.21	0.18
862	0.04	0.06	0.61	0.01	0.04	0.04	0.02	0.04	0.28	0.09
863	3.03	0.58	5.64	2.58	1.25	1.07	1.10	1.24	2.14	3.17
951			0.05					0.01		

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	0.22	0.22	0.30	0.61	0.59	0.38	0.63	0.30	1.12	0.94
512	0.55	0.36	0.62	0.39	0.37	0.48	0.40	0.50	0.54	0.47
513	0.01	0.03	0.05	0.02	0.03	0.02	0.02	0.03	0.12	0.10
514	0.07	0.30	0.59	0.66	1.02	1.06	0.68	0.77	0.86	0.63
515										
521	0.25	0.67	0.07	1.75	0.33	0.31	1.80	0.59	0.45	0.65
541	0.17	0.16	0.19	0.23	0.15	0.14	0.24	0.15	0.14	0.15
561	1.52	0.32			0.38	1.67		3.16	3.78	1.83
571	0.04	0.03	0.14	0.19	0.26	0.38	0.20	0.34	0.44	0.34
581	0.24	0.25	0.18	0.13	0.13	0.12	0.14	0.22	0.54	0.49
599	0.05	0.06	0.11	0.08	0.05	0.05	0.08	0.06	0.08	0.07
711	0.17	0.05	0.05	0.03	0.13	0.13	0.03	0.19	0.29	0.22
712	0.00	0.00	0.03	0.02	0.03	0.02	0.02	0.03	0.04	0.02
714	0.59	0.75	0.82	0.77	0.67	0.51	0.80	0.46	0.37	0.30
715	0.23	0.10	0.10	0.02	0.01	0.03	0.02	0.14	0.26	0.24
717	0.22	0.26	0.32	0.26	0.38	0.37	0.27	0.33	0.33	0.35
718	0.08	0.13	0.06	0.05	0.07	0.05	0.05	0.10	0.07	0.08
719	0.04	0.05	0.08	0.06	0.06	0.06	0.06	0.16	0.17	0.20
722	0.32	0.62	0.80	0.65	0.73	0.48	0.68	0.57	0.68	0.55
723	0.16	0.41	0.69	1.04	0.88	0.73	1.08	1.18	1.20	1.42
726	0.00	0.01	0.01	0.03	0.03	0.05	0.03	0.06	0.04	0.03
729	2.94	3.24	3.68	2.66	2.76	2.18	2.76	2.03	1.97	1.52
734	0.37	0.11	0.49	0.26	0.43	0.60	0.27	1.14	0.50	0.47
861	0.23	0.30	0.51	0.42	0.54	0.57	0.43	0.48	0.59	0.47
862	0.06	0.06	0.11	0.07	0.04	0.06	0.07	0.07	0.06	0.07
863	0.62	0.59	0.67	0.83	0.62	0.42	0.86	0.36	0.51	0.75
951	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.04	0.96	0.89

Note: Indexes are calculated as defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

B. Import Specialisation Indexes

Table A 4-7
Foodstuffs

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	0.32	0.06	0.18	0.11	0.19	0.11	0.14	0.20	0.23	0.20
011	0.01		0.01		0.01	0.01	0.02	0.04	0.03	0.05
012			0.02			0.01	0.01	0.01	0.01	0.02
013	0.09	0.08	0.03	0.13	0.04	0.04	0.02	0.03	0.05	0.03
022	2.01	1.73	1.18	1.86	0.84	0.16	1.47	0.65	1.34	1.32
023			0.04	0.03		0.01	0.05	0.06	0.01	
024	0.02		0.01	0.01		0.01	0.01	0.01	0.01	0.01
025										
031	0.01		0.01	0.01		0.13	0.01	0.01	0.03	0.02
032	0.04			0.01	0.06	0.01	0.01	0.01	0.01	0.01
041	3.86	6.46	4.76	4.45	4.39	3.06	3.36	4.79	4.00	5.19
042		6.64			0.85	5.41	6.07	16.90	26.22	23.95
043	5.88	11.33	13.65	5.26	0.38	0.13	4.52	2.59	0.24	0.79
044	0.55	0.25	0.17	0.01	0.04	0.11	0.07	0.66	1.20	1.47
045	0.03	0.29	0.10	0.02			0.81			
046	2.44	3.54	2.71	5.47	8.30	1.33	2.23	9.30	1.20	4.03
047	35.15	15.83	38.24	59.58	18.64	4.33	4.39	4.09	1.77	1.68
048	0.21	0.16	0.50	0.91	1.16	0.25	0.46	0.09	0.18	0.25
051		0.01			0.01	0.02	0.01	0.02	0.02	0.02
052	0.04	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.07	0.13
053	0.03	0.02	0.09	0.15	0.05	0.09	0.06	0.08	0.13	0.11
054	0.03	0.04	0.05	0.07	0.04	0.05	0.02	0.03	0.03	0.04
055	0.09	0.07	0.14	0.03	0.02	0.01	0.02	0.03	0.02	0.02
061	0.86	0.44	0.56	0.70	0.77	0.89	0.88	1.30	1.89	2.01
062			0.09	0.03	0.12	0.06	0.07	0.22	0.12	0.18
071			0.01	0.03	0.01	0.02	0.01	0.03	0.05	0.08
072		0.01					0.09	0.07	0.10	0.09
073	0.07	0.05	0.10	0.10	0.12	0.07	0.08	0.08	0.06	0.08
074				0.01				0.04	0.01	
075	0.13	0.10	0.13	0.07	0.12	0.17	0.16	0.24	1.27	0.54
081	0.03	0.91	0.11	0.10	0.09	0.44	1.10	1.18	1.50	1.85
091	0.03	0.43	0.27	0.01	0.03	0.39	2.46	2.69	3.49	0.68
099	0.37	0.47	0.55	0.53	0.25	0.25	0.32	0.47	0.61	0.71
111	0.16	1.17	0.08	0.24	0.24	0.19	0.38	0.73	0.24	0.05
112	0.02	0.02	0.03	0.05	0.04	0.07	0.03	0.03	0.05	0.02
121		0.03				0.02	0.10	0.08	0.05	0.32
122	0.01	0.01	0.01	0.01	0.02	0.07	0.08	0.11	0.14	0.11
411	3.57	2.78	3.67	2.73	3.22	3.28	2.99	3.18	3.62	4.34
421	0.16	0.26	0.04	0.02	0.05	0.01	0.16	0.36	0.04	0.07
422	0.15	0.30	0.14	0.09	0.04	0.06	0.09	0.14	0.07	0.18
431	1.92	1.07	0.57	0.60	0.48	0.65	1.09	1.48	1.69	1.22

Table A 4-7: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001	0.19	0.31	0.30	0.05	0.08	0.37	0.05	0.46	0.15	0.20
011	0.08	0.15	0.26	0.18	0.20	0.33	0.18	0.80	0.11	0.39
012	0.01				0.01					
013	0.05	0.13	0.02	0.01	0.01	0.05	0.02	0.03	0.01	0.01
022	0.47	0.05	0.07	0.08	0.06	0.06	0.08	0.09	0.11	0.08
023		0.01								
024	0.01	0.01		0.01			0.01			
025								0.10	0.12	0.10
031	0.11	0.40	0.26	0.23	0.28	0.21	0.23	0.39	0.27	0.36
032	0.01	0.01		0.01	0.01	0.01	0.01	0.03	0.02	0.01
041	5.46	4.63	3.28	2.91	2.98	3.38	2.95	1.97	1.91	1.69
042	17.94	7.38	5.70	8.51	2.15	0.49	8.47	1.43	6.45	14.81
043	4.26	5.69	5.98	7.08	0.05	2.47	7.11	0.02		
044	1.52	1.21	1.19	1.41	1.77	2.32	1.44	2.69	2.61	2.31
045	0.00	0.41	0.43	0.14	0.28	0.17	0.15	0.64	0.08	0.38
046	2.87	0.95	0.52	0.47	0.59	0.47	0.46	0.21	0.11	0.02
047	0.45	0.29	0.13	0.04			0.04			0.09
048	0.14	0.09	0.11	0.07	0.04	0.01	0.07	0.45	0.30	0.12
051	0.14	0.04	0.05	0.03	0.03	0.02	0.04	0.06	0.05	0.01
052	0.13	0.07	0.08	0.08	0.06	0.05	0.08	0.07	0.12	0.41
053	0.11	0.09	0.06	0.08	0.05	0.07	0.08	0.10	0.18	0.17
054	0.06	0.02	0.27	0.28	0.03	0.03	0.03	0.26	0.06	0.24
055	0.02	0.02	0.08	0.15	0.07	0.06	0.15	0.14	0.14	0.21
061	1.86	2.18	2.04	2.13	1.77	2.05	2.08	2.36	2.76	2.60
062	0.21	0.11	0.06	0.01	0.01	0.01	0.01	0.01	0.02	0.01
071	0.14	0.10	0.07	0.09	0.07	0.08	0.10	0.11	0.15	0.15
072	0.06	0.06	0.05	0.10	0.07	0.07	0.10	0.13	0.17	0.13
073	0.14	0.09	0.04	0.01	0.01	0.01	0.01	0.01	0.01	0.01
074										
075	0.20	0.17	0.32	0.26	0.21	0.19	0.27	3.84	1.01	0.55
081	0.38	0.08	0.06	0.04	0.02	0.13	0.04	0.46	0.05	0.14
091	0.18	0.41	0.26	0.38	0.35	0.26	0.35	0.27	0.49	0.20
099	0.81	0.93	0.48	0.17	0.14	0.15	0.17	0.21	0.22	0.16
111	0.02	0.01								
112	0.03	0.03	0.02	0.10	0.07	0.06	0.10	0.05	0.06	0.03
121	0.70	0.37	0.56	0.40	1.07	1.11	0.41	1.32	1.79	1.24
122	0.06	0.02	0.01	0.02		0.01	0.02	0.01		0.01
411	5.34	5.36	4.76	5.09	5.16	5.69	5.23	4.99	4.16	3.95
421	0.13	0.06	0.03	0.03	0.05	0.06	0.03	0.03	0.04	0.05
422	0.11	0.30	0.14	0.15	0.14	0.15	0.15	0.63	0.63	0.88
431	1.10	1.52	1.10	1.47	1.83	1.02	1.48	0.58	0.44	0.52

Table A 4-8
Agricultural Raw Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211	0.21	0.12	0.14	0.01	0.19	0.34	0.44	0.46	0.59	0.61
212				0.01	0.01			0.02	0.01	0.08
221	0.17	0.10	0.30	0.08	0.19	0.48	0.14	0.36	0.35	0.63
231	1.28	1.14	1.44	1.96	1.41	1.34	1.08	1.16	1.29	1.50
241	0.26	0.42	0.06	0.01	0.01	0.13	0.01	0.26	0.19	0.01
242	6.51	5.50	6.35	6.51	7.98	7.32	7.28	6.99	7.48	8.58
243	0.23	0.18	0.06	0.07	0.11	0.18	0.16	0.17	0.08	0.06
244	0.03	0.27	0.05	0.07	0.05	0.04	0.01	0.02	0.10	0.11
251	2.15	1.65	2.20	2.08	1.85	1.86	2.03	1.58	1.85	2.08
261	0.25	0.07			0.19	0.63	0.21	0.25	0.97	3.66
262	1.23	0.68	0.63	0.75	0.73	1.13	1.11	1.16	1.16	0.95
263	5.61	4.46	6.53	7.06	5.02	4.57	3.24	3.34	4.15	4.50
264									0.01	0.02
265	1.37	0.68	1.36	2.23	2.00	1.43	1.01	1.13	1.08	1.07
267	5.95	5.92	9.61	5.69	2.72	1.85	5.10	2.33	2.14	1.52
291	0.30	0.10	0.06	0.18	0.27	0.50	0.37	0.49	0.46	0.51
292	0.17	0.42	0.42	0.65	0.34	0.73	0.45	0.59	0.57	0.39

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211	1.03	1.46	2.47	4.36	5.73	5.73	4.47	3.53	3.95	4.41
212	0.42	0.08	0.51	0.99	1.37	1.16	1.02	0.84	1.16	1.70
221	0.38	0.62	0.35	0.33	0.78	0.66	0.34	1.21	1.57	1.31
231	1.87	1.88	2.01	1.96	2.17	2.29	1.99	2.28	2.67	2.27
241	0.01	0.15	0.05	0.03	0.03	0.06	0.03	0.08	0.07	0.16
242	7.87	7.77	7.14	7.09	7.88	8.32	7.26	7.04	6.95	6.28
243	0.03	0.05	0.02	0.03	0.03	0.03	0.03	0.07	0.09	0.18
244	0.11	0.20	0.28	0.62	0.65	0.55	0.64	0.43	0.32	0.38
251	2.14	2.67	2.55	1.96	2.17	2.46	2.01	2.38	2.58	2.42
261	0.51	1.41	0.77	0.87	0.93	0.30	0.89	0.10	0.19	2.71
262	1.53	1.67	1.32	1.77	1.71	1.89	1.79	1.71	2.10	2.18
263	4.52	3.77	4.28	6.36	6.73	6.50	6.55	5.59	6.65	6.52
264	0.01	0.01	0.01	0.04	0.08	0.15	0.05	0.13	0.23	0.21
265	1.04	1.05	0.64	0.43	0.95	0.87	0.44	0.89	0.58	0.88
267	1.51	1.36	1.21	0.84	1.37	1.56	0.80	0.97	1.17	0.98
291	0.52	0.50	0.46	0.53	0.80	1.77	0.54	1.96	2.27	2.11
292	0.35	0.33	0.33	0.36	0.32	0.34	0.37	0.35	0.36	0.36

Table A 4-9
Mineral Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271	0.01	0.72	2.68	2.16	0.51	2.20	1.88	2.28	2.41	2.12
273	0.94	0.68	1.38	1.08	1.04	0.92	0.79	0.71	0.25	0.41
274	0.76	0.70	0.66	0.50	0.72	1.22	1.42	2.83	2.56	2.42
275	0.09	0.11	0.10	0.32	0.42	0.17	0.37	0.17	0.13	0.12
276	0.09	0.74	0.40	0.69	0.62	0.97	0.62	0.74	1.11	1.27
281	0.01							0.02	0.05	0.01
282	0.75	2.00	1.76	3.03	6.59	5.51	5.95	7.32	8.04	9.31
283		0.05	0.06	0.01	0.01	0.05	0.22	0.31	0.26	0.19
284	0.55	1.13	1.21	0.47	0.36	0.44	0.31	0.28	0.23	1.28
285										
286										
321	0.46	0.29	0.52	0.49	0.26	0.23	0.21	0.21	0.15	0.10
331	0.03	0.03	0.58	0.91	0.75	0.64	0.66	0.93	1.08	1.05
332	1.94	1.58	0.97	0.43	0.49	0.74	0.34	0.16	0.15	0.21
341	0.02	0.01	0.01			0.04		0.01		0.01
351										
681	0.05	0.04	0.03	0.05	0.02	0.02	0.01	0.01	0.01	0.19
682	0.11	0.19	0.04	0.02	0.04	0.14	0.09	0.10	0.21	0.25
683	0.09	0.09	0.17	0.18	0.09	0.11	0.16	0.12	0.11	0.11
684	1.83	1.01	0.63	1.30	1.14	0.99	0.81	0.69	0.34	0.27
685	0.81	0.41	0.20	0.63	0.71	0.15	0.16	0.13	0.27	0.47
686	2.31	3.03	1.50	4.00	1.96	0.94	0.89	0.89	1.11	0.50
687	0.72	0.41	0.60	0.35	0.40	0.23	0.29	0.25	0.38	0.60
688										
689	0.13	0.14	0.16	0.24	0.20	0.18	0.12	0.12	0.12	0.22

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271	1.96	1.63	1.27	2.46	2.84	3.54	2.50	3.44	3.43	2.49
273	0.03	0.19	0.29	0.04	0.07	0.07	0.04	0.29	0.28	0.24
274	1.99	1.83	2.40	3.13	3.11	2.59	3.20	2.83	2.85	2.17
275	0.15	0.30	0.33	0.41	0.56	0.55	0.42	0.71	0.67	0.67
276	1.54	1.45	1.16	1.19	1.35	1.15	1.21	0.77	0.90	0.88
281	0.01	0.17	0.45	0.44	0.51	0.80	0.45	1.08	1.60	1.82
282	5.30	5.72	6.96	5.37	6.02	9.20	5.51	4.82	6.25	5.80
283	0.22	0.23	0.29	0.23	0.62	0.65	0.24	0.70	1.24	1.50
284	2.85	4.01	2.91	2.85	2.90	2.69	2.92	2.39	0.98	1.18
285			0.02			0.03		0.02	0.03	
286										
321	0.05	0.49	0.50	0.53	0.96	1.11	0.55	2.03	2.27	2.92
331	1.16	0.85	0.86	1.12	1.12	1.13	1.12	1.12	1.58	1.50
332	0.19	0.16	0.19	0.26	0.15	0.35	0.26	0.33	0.49	0.43
341								0.03	0.07	0.06
351										
681	0.02	0.08	0.04	0.14	0.27	0.22	0.14	0.18	0.07	0.07
682	0.21	0.27	0.41	0.39	0.50	0.51	0.39	0.75	0.53	0.67
683	0.10	0.29	0.26	0.33	0.71	0.32	0.33	0.55	0.71	0.82
684	0.27	0.39	0.74	0.71	1.01	1.38	0.72	1.32	1.08	1.19
685	0.55	0.64	0.79	0.52	0.72	0.91	0.52	0.99	1.20	1.54
686	0.69	0.79	1.46	0.31	0.50	0.87	0.31	0.16	0.13	0.12
687	0.61	0.78	0.53	0.74	0.83	0.68	0.76	0.68	0.67	0.92
688	0.61		0.13			0.67				0.08
689	0.42	0.21	0.18	0.27	0.30	0.41	0.28	0.43	0.47	0.68

Table A 4-10
Unskilled Labour Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611			0.03	0.02	0.05	0.05	0.06	0.10	0.30	0.39
612	0.07	0.03	0.25	0.73	0.65	0.93	0.58	0.39	0.38	0.48
613	0.02					0.01	0.02	0.04	0.14	0.34
631	0.07	0.03	0.06	0.01	0.05	0.11	0.03	0.03	0.04	0.02
632	0.02	0.06	0.10	0.08	0.05	0.05	0.16	0.16	0.18	0.06
633	0.04	0.01		0.06	0.08	0.14	0.16	0.16	0.29	0.25
651	6.43	3.82	3.20	3.91	4.20	4.91	4.36	3.02	2.72	1.71
652		0.31	0.39	0.57	0.37	0.37	0.37	0.33	0.31	0.34
653	0.05	0.43	0.44	0.72	0.84	1.18	1.31	1.42	2.13	2.30
654	0.01	0.01	0.05	0.13	0.18	0.27	0.39	0.54	1.24	0.74
655	1.10	0.43	0.65	0.47	0.47	0.43	0.54	0.56	0.69	0.72
656	0.08	0.06	0.07	0.08	0.03	0.04	0.02	0.04	0.07	0.03
657	0.04	0.03	0.01		0.02	0.01	0.02	0.08	0.05	0.03
664	0.41	0.21	0.19	0.17	0.23	0.23	0.46	0.72	0.48	0.38
665	0.12	0.05	0.14	0.11	0.31	0.20	0.25	0.21	0.20	0.17
666	0.02	0.11	0.05	0.02	0.02	0.01	0.01	0.03	0.04	0.02
812	1.14	0.29	0.32	0.43	0.46	0.63	0.38	0.60	0.43	0.32
821	0.16	0.11	0.19	0.06	0.08	0.04	0.13	0.18	0.16	0.13
831	0.09	0.01	0.03	0.02	0.01	0.01	0.02	0.02	0.02	0.02
841	0.05	0.05	0.04	0.07	0.04	0.01	0.02	0.01	0.01	0.18
842		0.01					0.05	0.01	0.02	0.02
851	0.01	0.05	0.01	0.02	0.02			0.01		0.02
893	0.30	0.12	0.28	0.31	0.50	0.59	0.58	0.51	0.50	0.55
894	0.06	0.17	0.06	0.03	0.04	0.04	0.06	0.04	0.06	0.07
895	0.62	0.21	0.25	0.09	0.07	0.11	0.07	0.06	0.09	0.09
899	0.06	0.06	0.11	0.21	0.36	0.43	2.28	2.03	1.00	1.07

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611	0.46	1.05	2.33	4.61	4.54	4.90	4.72	3.61	5.05	5.96
612	0.51	0.74	0.36	0.40	0.43	0.26	0.40	0.20	0.26	0.20
613	0.62	0.98	1.07	0.80	1.13	1.31	0.82	1.29	1.92	2.25
631	0.01	0.04	0.04	0.04	0.02	0.05	0.04	0.13	0.27	0.34
632	0.11	0.10	0.08	0.03	0.04	0.07	0.03	0.05	0.08	0.07
633	0.18	0.11	0.08	0.02	0.01	0.05	0.02	0.07	0.02	0.05
651	1.59	2.27	1.26	0.93	1.20	1.19	0.93	0.84	0.76	1.01
652	0.53	0.63	0.62	0.56	0.71	0.76	0.56	0.55	0.54	0.45
653	1.88	2.77	2.04	2.16	2.06	1.75	2.16	1.13	1.11	1.06
654	1.01	1.91	1.61	2.02	2.47	2.24	2.04	1.73	1.00	0.81
655	1.09	1.18	0.97	1.40	1.87	1.43	1.40	0.80	0.71	0.78
656	0.07	0.05	0.07	0.09	0.04	0.07	0.09	0.04	0.08	0.08
657	0.01	0.01	0.01	0.01	0.02	0.04	0.01	0.03	0.05	0.06
664	0.47	0.66	0.66	0.83	0.84	0.92	0.83	0.92	0.90	1.23
665	0.17	0.16	0.14	0.11	0.10	0.14	0.11	0.47	0.24	0.23
666	0.02	0.01	0.02	0.01	0.02	0.02	0.01	0.05	0.02	0.02
812	0.27	0.26	0.12	0.13	0.16	0.41	0.13	0.27	0.24	0.26
821	0.11	0.10	0.08	0.06	0.07	0.05	0.06	0.05	0.03	0.04
831	0.02	0.08	0.07	0.01	0.02	0.01	0.01	0.01	0.01	0.01
841	0.35	0.13	0.05	0.03	0.06	0.04	0.03	0.04	0.03	0.02
842	0.01	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.10	0.03
851			0.01					0.01	0.01	
893	0.34	0.40	0.41	0.36	0.33	0.32	0.37	0.28	0.25	0.29
894	0.11	0.19	0.19	0.17	0.18	0.34	0.17	0.15	0.18	0.09
895	0.10	0.16	0.06	0.05	0.08	0.09	0.05	0.16	0.14	0.13
899	1.12	1.23	1.18	1.17	1.52	1.71	1.18	1.11	1.12	1.34

Table A 4-11
Human Skill Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531	1.94	1.79	2.45	2.98	1.69	1.99	1.37	1.31	1.37	1.27
532	1.13	1.26	1.45	2.38	0.86	1.04	0.77	0.77	0.61	0.69
533	0.27	0.60	0.79	0.74	0.65	0.64	0.55	0.74	0.80	0.75
551	1.20	0.73	0.88	0.27	0.27	0.40	0.46	0.45	0.48	0.54
553	0.01	0.01	0.04	0.06	0.12	0.05	0.11	0.14	0.34	0.17
554	0.40	0.56	0.75	1.50	0.85	0.93	0.90	0.77	0.89	0.76
621	0.21	0.49	0.23	0.29	0.28	0.32	0.37	0.50	0.75	0.39
629	0.13	0.20	0.07	0.04	0.05	0.10	0.08	0.06	0.07	0.05
641	0.49	0.20	0.25	0.17	0.25	0.23	0.26	0.19	0.23	0.28
642	0.44	0.25	0.22	0.22	0.23	0.33	0.49	0.37	0.54	0.48
661	3.99	4.18	0.85	0.33	2.03	3.93	0.88	0.20	0.13	0.10
662	0.24	0.64	0.73	0.48	0.75	0.74	0.80	0.64	0.59	0.47
663	0.37	0.37	0.33	0.39	0.43	0.70	0.60	0.55	0.53	0.66
667			0.01							0.01
671	0.67	0.73	1.04	0.40	0.95	0.61	0.85	0.56	0.14	0.48
672	0.13	1.60	1.40	0.63	1.81	0.98	3.16	3.36	2.93	5.19
673	0.64	0.55	0.33	0.37	0.68	0.96	0.66	0.60	0.42	0.39
674	1.59	1.43	0.70	1.76	1.38	1.66	0.79	0.54	0.60	0.52
675	3.61	2.21	2.68	3.64	2.16	1.49	1.15	1.15	1.04	0.85
676	3.05	5.03	1.88	5.00	8.37	4.56	3.60	5.51	2.94	6.95
677	2.25	0.75	0.70	0.61	0.34	0.49	0.34	0.39	0.32	0.21
678	0.79	1.62	0.49	0.46	0.67	0.80	1.10	0.93	0.81	0.99
679	0.74	0.14	1.34	0.29	0.89	2.47	0.42	0.25	0.34	0.20
691	2.23	2.53	0.22	0.76	3.98	3.23	3.39	4.16	3.46	2.68
692	0.87	1.32	1.14	5.45	3.21	3.28	2.64	2.45	1.52	2.48
693	0.97	0.49	0.67	0.55	0.38	0.56	0.51	1.15	0.92	0.30
694	0.21	0.67	0.11	0.12	0.34	0.23	0.29	0.17	0.29	0.28
695	1.05	0.75	0.80	0.61	0.85	0.92	0.70	0.61	0.48	0.49
696	0.14	0.10	0.01	0.01	0.01	0.01	0.03	0.04	0.03	0.08
697	0.42	0.09	0.06	0.05	0.61	1.82	0.64	0.32	0.18	0.24
698	0.26	0.35	0.25	0.61	1.23	1.26	1.21	1.08	1.05	0.85
724	1.67	0.46	1.07	0.42	0.75	0.60	0.97	0.71	0.66	0.85
725	0.27	0.16	0.11	0.11	0.13	0.20	0.29	0.28	0.31	0.24
731	1.88	10.25	1.65	0.74	0.80	13.46	9.03	8.99	4.07	3.94
732	0.17	0.31	0.25	0.14	0.20	0.38	0.66	0.50	0.50	0.30
733	0.18	0.13	0.64	0.12	0.43	0.32	0.16	0.25	0.51	0.45
735	0.09	0.85	0.65	1.98	6.41	6.41	5.61	4.70	2.73	2.09
864	1.16	0.22	0.06	0.26	0.28	0.37	0.58	0.83	0.96	0.74
891	0.76	0.26	0.18	0.14	0.12	0.16	0.23	0.17	0.22	0.40
892	0.57	0.38	0.50	0.36	0.24	0.27	0.51	0.96	0.50	0.44
896	0.03		0.01		0.11	0.02	0.01	0.07	0.56	0.17
897	0.05			0.04	0.03	0.02	0.02	0.02	0.03	0.02
961		0.16						0.08		2.05

Table A 4-11: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531	1.55	1.81	1.67	2.75	2.67	2.35	2.75	1.70	1.99	2.26
532	0.68	0.81	0.89	1.33	2.56	1.93	1.33	1.03	1.63	1.62
533	0.97	1.31	1.55	2.19	1.66	1.22	2.18	1.14	1.09	1.19
551	0.67	0.70	0.75	1.20	1.09	1.25	1.21	1.37	1.27	1.16
553	0.08	0.09	0.06	0.05	0.08	0.08	0.05	0.15	0.09	0.07
554	0.91	0.95	0.90	1.07	1.01	0.89	1.07	0.80	0.73	0.72
621	0.38	0.38	0.37	0.26	0.30	0.33	0.26	0.47	0.45	0.51
629	0.06	0.11	0.07	0.09	0.07	0.10	0.08	0.22	0.17	0.17
641	0.26	0.24	0.18	0.20	0.22	0.21	0.20	0.16	0.16	0.18
642	0.39	0.30	0.33	0.27	0.34	0.27	0.27	0.30	0.33	0.35
661	0.08	0.05	0.13	0.03	0.03	0.03	0.03	0.43	0.11	0.16
662	1.40	0.44	0.67	0.50	0.49	0.52	0.50	0.77	0.56	0.54
663	0.90	0.38	0.55	0.55	0.70	0.62	0.55	0.82	0.63	0.69
667	0.01	0.01	0.02	0.03	0.05	0.03	0.03	0.04	0.04	0.07
671	0.65	0.65	0.75	0.49	0.15	0.28	0.50	0.46	0.29	0.35
672	8.65	9.64	6.53	3.39	4.65	5.83	3.33	5.37	5.48	4.57
673	0.55	0.62	0.70	0.79	0.78	1.08	0.77	1.12	0.87	1.18
674	0.54	0.60	0.64	0.80	0.71	0.83	0.79	0.73	0.71	0.85
675	1.41	1.57	1.81	1.50	2.00	2.01	1.50	1.42	1.10	0.91
676	1.91	4.15	3.40	0.60	2.23	2.20	0.58	1.44	0.61	0.71
677	0.27	0.38	0.31	0.55	1.26	1.42	0.56	1.05	0.65	0.53
678	0.71	0.31	0.40	0.31	0.37	0.75	0.28	0.61	0.46	0.40
679	0.18	0.37	0.32	0.20	0.47	0.31	0.20	0.26	0.13	0.09
691	2.36	0.83	0.40	0.30	0.40	0.43	0.28	0.30	0.20	0.27
692	1.28	0.95	1.00	0.62	0.68	0.97	0.60	1.38	0.77	0.64
693	0.66	1.19	0.26	0.24	0.26	0.31	0.23	0.40	0.50	0.35
694	0.26	0.24	0.31	0.33	0.34	0.35	0.34	0.58	0.32	0.48
695	0.50	0.54	0.61	0.56	0.82	0.87	0.56	0.99	0.77	0.49
696	0.03	0.03	0.03	0.05	0.04	0.04	0.05	0.15	0.18	0.14
697	0.08	0.15	0.07	0.10	0.04	0.10	0.10	0.23	0.16	0.11
698	0.67	0.81	0.78	0.85	0.79	0.75	0.84	1.01	0.61	0.72
724	1.12	1.09	1.11	0.98	1.08	0.98	0.97	0.88	1.03	1.19
725	0.11	0.08	0.12	0.09	0.16	0.30	0.09	0.39	0.43	0.36
731	2.91	1.87	4.88	2.04	1.02	3.30	2.01	1.08	1.17	1.16
732	0.21	0.21	0.22	0.19	0.13	0.18	0.19	0.21	0.12	0.11
733	0.33	0.71	0.45	0.40	0.35	0.38	0.37	0.30	0.21	0.19
735	3.83	1.37	7.22	3.74	5.48	1.63	3.73	2.30	3.57	6.28
864	0.83	1.03	1.36	1.49	2.08	1.40	1.50	1.31	1.50	1.31
891	0.64	1.49	1.35	1.47	2.07	1.86	1.49	1.46	1.16	0.87
892	0.30	0.22	0.22	0.26	0.29	0.29	0.27	0.25	0.30	0.43
896	0.04	0.01	0.06		1.59	0.13		0.39	0.04	0.28
897	0.04	0.15	0.03	0.04	0.05	0.03	0.04	0.06	0.08	0.07
961										

Table A 4-12
Technology Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266	4.70	4.40	5.29	7.15	4.53	4.66	4.34	3.46	5.73	4.61
512	0.41	0.99	1.44	1.60	1.33	1.42	1.48	1.59	1.90	2.13
513	1.37	1.55	1.89	1.41	1.15	1.24	0.76	0.91	0.84	0.89
514	0.79	1.74	1.77	2.01	1.13	1.69	1.36	0.89	0.84	0.99
515	1.79	0.07	0.03	0.03	0.12	0.04	0.06	0.06	0.03	0.03
521	0.75	0.16	0.39	0.57	1.04	2.85	2.94	0.70	0.26	0.81
541	1.84	0.99	1.17	1.30	0.96	0.85	0.88	0.76	0.79	0.58
561	23.50	12.48	19.92	19.34	16.71	6.04	2.83	1.15	0.44	0.64
571	0.14	0.12	0.08	0.17	0.09	0.11	0.08	0.08	0.07	0.14
581	1.56	1.06	0.84	1.39	0.98	0.96	1.01	1.06	1.38	1.37
599	0.62	0.82	0.84	1.07	0.66	0.69	0.62	0.63	0.67	0.64
711	1.67	2.07	1.54	0.42	0.53	1.55	1.66	1.61	1.48	1.15
712	0.19	0.07	0.18	0.02	0.13	0.07	0.24	0.14	0.14	0.12
714	0.36	0.14	0.03	0.09	0.07	0.18	0.31	0.34	0.29	0.36
715	0.37	0.49	0.55	0.78	0.89	1.22	1.19	0.87	1.01	1.43
717	2.37	1.90	2.58	2.66	4.65	3.06	4.94	4.05	4.23	3.65
718	0.33	0.89	0.52	0.65	0.79	0.78	2.31	1.64	1.07	0.86
719	0.12	1.34	0.92	0.83	1.43	1.52	1.64	1.52	1.31	1.28
722	2.31	1.77	2.13	1.06	1.13	1.87	2.75	2.17	2.23	1.70
723	1.53	2.23	1.31	0.47	0.49	1.19	1.31	0.75	0.78	1.32
726	0.77	0.52	0.93	0.56	0.72	0.70	0.60	0.61	0.64	0.88
729	0.28	0.64	0.52	0.66	0.73	0.85	0.99	1.24	1.25	1.53
734	0.03	0.08	0.51	0.04	0.11	0.87	0.07	0.46	0.82	0.88
861	0.69	0.46	0.36	0.46	0.36	0.45	0.48	0.46	0.41	0.57
862	1.86	0.94	0.78	0.94	0.58	0.72	0.67	0.53	0.58	0.46
863	4.09	2.42	2.18	1.88	2.27	2.15	1.73	3.07	3.12	3.60
951										0.03

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	5.36	5.37	3.22	2.17	0.90	1.16	2.11	0.93	0.81	0.84
512	2.32	2.03	2.08	2.76	2.76	2.62	2.82	2.36	2.36	2.13
513	0.69	0.91	0.78	0.66	0.79	0.66	0.68	0.66	0.57	0.47
514	1.19	1.35	1.15	1.08	1.25	1.26	1.09	1.15	0.98	0.92
515	0.03	0.02	0.02	0.01	0.69	0.31	0.01	0.03	0.05	1.79
521	1.00	0.98	0.58	1.11	1.27	1.13	1.15	0.52	1.01	1.17
541	0.53	0.46	0.48	0.46	0.43	0.40	0.46	0.48	0.41	0.36
561	0.87	0.76	1.17	2.53	0.61	0.34	2.59	0.35	0.31	0.32
571	0.12	0.02	0.02	0.02	0.20	0.11	0.02	0.51	0.29	0.81
581	1.27	0.96	0.85	0.99	0.99	1.21	1.00	1.28	0.76	0.81
599	0.71	0.64	0.62	0.60	0.78	0.80	0.60	0.87	0.79	0.72
711	0.80	0.52	0.94	1.03	0.99	1.51	1.02	2.21	1.48	1.45
712	0.08	0.06	0.13	0.09	0.07	0.08	0.09	0.19	0.24	0.22
714	0.54	0.61	0.44	0.48	0.52	0.56	0.48	0.53	0.53	0.48
715	2.14	1.46	1.38	1.64	2.55	3.38	1.64	3.11	2.37	1.49
717	1.62	4.06	3.70	3.27	2.65	3.24	3.20	3.16	1.53	1.67
718	0.97	0.49	0.55	0.60	0.55	0.57	0.57	0.92	0.48	0.37
719	1.48	1.21	1.06	1.01	1.23	1.30	1.00	1.72	1.08	1.06
722	1.89	0.97	1.24	1.20	1.35	1.45	1.19	1.77	1.19	1.20
723	1.41	0.98	1.15	1.11	1.05	0.78	1.06	1.16	0.66	0.54
726	0.83	0.43	0.38	0.40	0.28	0.52	0.40	0.78	0.96	0.83
729	1.99	2.48	2.40	2.03	2.66	2.06	2.04	1.77	1.64	1.59
734	1.32	2.37	1.25	2.61	0.45	1.13	2.51	1.74	1.19	1.20
861	0.50	0.34	0.44	0.52	0.66	0.88	0.52	0.87	0.66	0.60
862	0.51	0.49	0.53	0.47	0.60	0.70	0.48	0.86	0.85	0.84
863	2.82	2.10	1.59	1.50	1.20	1.61	1.52	1.81	2.37	2.16
951	0.01	0.02	0.50	0.01	0.05	0.27	0.01	0.61	0.63	0.73

Note: Indexes are calculated as defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

APPENDIX 5

Trade Complementarity between Australia and Korea, 1962-1981

A. Complementarity Indexes in Australia's Export Trade with Korea

Table A 5-1
Foodstuffs.

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	0.1								0.1	
011		0.1				0.1	0.1	0.1	0.4	0.3
	0.5	012								
013	0.1			0.1						
022	1.4	1.0	1.0	1.5	0.7	0.1	1.1	0.4	0.8	0.8
023			0.1	0.1			0.1	0.1		
024										
025										
031						0.1				
032										
041	44.0	72.7	52.3	57.9	40.2	47.3	30.4	45.9	38.0	53.2
042		1.6			0.3	2.0	2.7	6.6	7.6	9.2
043	6.0	6.0	8.5	3.7	0.2	0.1	0.9	1.7	0.2	1.2
044										0.1
045		0.2	0.1				0.4			
046	3.9	4.8	4.5	6.2	6.7	1.3	1.8	5.0	0.6	1.7
047										
048	0.2	0.1	0.2	0.5	1.0	0.2	0.3		0.1	0.2
051										
052										0.1
053			0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
054										
055										
061	3.8	2.7	2.9	2.5	2.9	3.3	3.8	4.6	7.1	8.0
062										
071										
072										
073										
074										
075										
081		0.4				0.1	0.3	0.4	0.5	0.6
091										
099	0.1	0.2	0.2	0.2						
111										
112										
121										
122										
411	2.6	1.5	2.0	1.8	1.9	1.5	1.1	1.8	2.5	3.3
421										
422										
431	0.1								0.1	

Table A 5-1: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001		0.1	0.1			0.3		0.4	0.2	0.3
011	1.0	2.3	1.5	1.0	1.4	2.7	1.1	9.3	1.0	2.7
012										
013		0.1								
022	0.4		0.1	0.1	0.1		0.1	0.1	0.1	0.1
023										
024										
025										
031	0.2	0.4	0.2	0.2	0.3	0.2	0.2	0.6	0.3	0.5
032										
041	37.4	13.5	39.6	36.5	27.7	27.1	38.0	17.6	20.4	13.2
042	4.9	2.6	2.8	4.3	1.4	0.2	4.3	1.0	3.5	11.3
043	5.6	3.1	9.5	14.6	0.1	4.5	15.2			
044									0.1	
045	0.0	0.3	0.6	0.2	0.4	0.1	0.2	0.4		0.3
046	0.7	0.2	0.2	0.2	0.2	0.1	0.2			
047										
048	0.1		0.1					0.2	0.2	0.1
051	0.1									
052	0.1								0.1	0.1
053	0.1	0.1							0.1	0.1
054										
055										
061	9.7	9.0	12.2	14.5	11.5	10.4	15.4	7.2	15.2	15.6
062										
071										
072										
073										
074										
075										
081	0.1					0.1		0.1		
091										
099										
111										
112										
121										
122										
411	3.6	3.1	2.7	3.7	3.4	4.4	3.6	3.6	2.0	1.4
421										
422										
431				0.1	0.1	0.1	0.1			

Table A 5-2
Agricultural Raw Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211	0.7	0.4	0.4	0.0	0.7	0.7	1.0	1.2	1.2	1.0
212										
221										0.1
231				0.1	0.1					
241										
242	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.1	0.1
243	0.1									
244										
251										
261										
262	48.1	24.0	21.4	22.8	22.2	30.0	28.4	27.6	20.4	11.8
263								0.5	0.5	
264										
265										
267	0.4	0.4	0.6	0.4	0.2	0.1	0.4	0.1	0.1	0.1
291				0.1	0.1	0.2	0.1	0.2	0.2	0.2
292		0.1		0.1		0.1				

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211	2.6	4.3	3.9	5.4	10.7	12.1	5.3	9.1	5.1	4.5
212					0.1	0.1	0.0	0.1	0.1	0.1
221	0.1	0.1		0.1			0.1	0.3	0.1	0.1
231							0.1			
241										
242	0.1	0.1	0.2	0.2			0.2		0.1	0.1
243										
244										
251										
261										
262	23.5	32.5	16.8	16.5	20.8	20.7	17.0	16.9	18.0	21.1
263	0.7	0.4	0.1	1.0	0.4	0.8	1.0	1.7	3.6	4.1
264										
265										
267	0.1					0.1				
291	0.2	0.1	0.1	0.1	0.1	0.3	0.1	0.3	0.5	0.4
292				0.1			0.1			

Table A 5-3
Mineral Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271										
273			0.1							
274										
275										
276		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4
281								0.2	0.5	0.1
282	0.2	1.0	0.9	1.7	2.3	3.1	2.3	3.4	4.7	3.7
283		0.1	0.2			0.2	1.1	1.5	1.7	1.0
284	0.1	0.3	0.4	0.2	0.1		0.1			0.1
285										
286										
321	0.6	0.3	0.9	1.2	0.7	0.7	0.8	0.9	0.7	0.5
331										0.3
332	4.3	3.0	1.2	0.3	0.5	0.7	0.3	0.1	0.1	0.2
341										
351										
681										
682	0.1	0.1			0.1	0.1	0.1	0.2	0.4	0.4
683										0.1
684	0.0	0.1	0.2	0.5	0.5	0.3	0.2	0.2	0.3	0.2
685	1.7	0.7	0.4	1.5	1.5	0.3	0.3	0.3	0.7	0.8
686	1.9	2.1	1.2	3.8	2.3	0.8	0.7	0.9	1.1	0.5
687										0.1
688										
689										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271				0.2	0.2	0.2	0.2			
273										
274										
275										
276	0.4	0.4	0.4	0.4	0.6	0.5	0.4	0.4	0.4	0.3
281	0.1	1.7	5.0	4.6	5.0	8.1	4.6	8.5	12.3	13.3
282	1.2	2.7	6.0	3.3	2.6	2.6	3.4	1.7	2.0	2.0
283	1.1	1.1	1.6	2.0	4.3	4.2	1.9	1.4	5.7	8.3
284	0.2	0.3	0.5	0.3	0.2	0.4	0.3	0.5	0.3	0.2
285										
286										
321	0.3	2.5	3.3	5.0	10.5	13.3	5.2	19.9	21.1	39.4
331	0.2	0.1	0.1	0.3	0.2	0.2	0.2	0.1		
332	0.1	0.2	0.3	0.4	0.2	0.5	0.4	0.9	1.1	1.4
341										
351										
681										
682	0.3	0.4	0.8	0.5	0.6	0.6	0.5	0.9	0.6	0.7
683	0.1	0.2	0.2	0.3	0.5	0.2	0.3		0.2	0.6
684	0.2	0.2	0.3	0.4	0.4	0.9	0.4	0.9	0.6	0.9
685	0.8	0.9	1.4	0.6	1.0	1.5	0.6	2.5	2.8	2.3
686	0.9	0.8	1.8	0.2	0.4	0.7	0.2	0.1	0.1	0.1
687	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
688										
689										

Table A 5-4
Unskilled Labour Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611										
612										
613										
631										
632										
633										
651	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.2
652										
653				0.1	0.2	0.1	0.2	0.2	0.3	0.3
654										
655									0.1	
656										
657										
664										
665										
666										
812										
821										
831										
841										
842										
851										
893										
894										
895										
899							0.2	0.2	0.1	0.1

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611		0.1	0.1	0.2	0.4	0.8	0.2	0.9	0.9	0.7
612										
613										
631								0.1	0.3	0.3
632										
633										
651	0.1	0.2	0.1		0.1			0.3	0.3	0.4
652										
653	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.1		0.1
654										
655	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
656										
657										
664										0.1
665										
666										
812										
821										
831										
841										
842										
851										
893										
894										
895										
899	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

Table A 5-5
Human Skill Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531										
532				0.1						
533		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
551										
553										
554			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
621										
629										
641	0.1		0.1		0.1	0.1	0.1		0.1	0.1
642										
661	0.1	0.1			0.1	0.1				
662										
663										
667										
671		0.2	0.1		0.2	0.1	0.3	0.3	0.1	0.3
672		0.4	0.2		1.4	0.7	2.5	3.5	1.6	1.1
673		0.1	0.1	0.1	0.5	0.5	0.5	0.3	0.2	0.1
674		1.3	0.6	1.8	1.9	1.9	0.7	0.5	0.6	0.4
675		0.1	0.1	0.1	0.1	0.1	0.1			
676		0.4	0.1	0.2	0.4	0.2	0.1	0.2	0.1	0.3
677		0.1	0.1	0.1						
678		0.4	0.1	0.1	0.2	0.2	0.2	0.3	0.2	0.2
679										
691		0.5		0.1	1.1	0.7	0.5	0.7	0.8	0.6
692		0.1	0.1	0.8	0.4	0.3	0.2	0.1	0.1	0.2
693								0.1	0.1	
694										
695		0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
696										
697										
698		0.1	0.1	0.2	0.1	0.4	0.4	0.4	0.4	0.4
724		0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
725										
731	0.2	0.3	0.1		0.1	0.7	0.4	0.6	0.1	0.1
732	0.1	0.3	0.3	0.2	0.3	0.5	1.0	0.9	1.2	0.8
733										
735				0.1	0.7	0.3	0.4	1.2	0.5	0.2
864										
891										
892	0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1
896										
897										
961										

Table A 5-5: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531										
532										
533	0.1	0.2	0.2	0.3	0.2	0.1	0.3	0.1	0.1	0.1
551			0.1	0.1			0.1	0.1		
553										
554	0.1	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1
621										
629										
641	0.1	0.1								
642										
661										
662										
663	0.1									
667										
671	0.3	0.4	0.6	0.3	0.1	0.1	0.3	0.2	0.1	0.1
672	7.4	7.8	6.8	7.6	8.9	10.5	7.9	3.8	3.5	4.0
673	0.2	0.2	0.3	0.2	0.3	0.5	0.2	0.5	0.3	0.3
674	0.5	0.4	0.5	0.5	0.4	0.7	0.6	0.9	0.9	1.1
675		0.1	0.1		0.1	0.1	0.1	0.1	0.1	
676	0.1	0.2			0.1			0.1		
677					0.1	0.1		0.1		
678	0.2	0.1	0.1	0.1		0.1	0.1	0.2	0.1	0.1
679										
691	0.3	0.1					0.1			
692	0.1	0.1	0.1			0.1		0.1		
693		0.1								
694										
695	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
696										
697										
698	0.3	0.3	0.3	0.4	0.2	0.2	0.4	0.3	0.2	0.3
724	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.2	0.2
725									0.1	
731	0.1	0.1	0.1	0.1			0.1	0.1	0.2	0.1
732	0.6	0.6	0.4	0.2	0.1	0.1	0.2	0.2	0.1	0.1
733										
735	0.4	0.6	1.8	0.8	0.7	0.2	0.8	0.8	2.2	1.8
864					0.1	0.1		0.1	0.1	0.1
891				0.1	0.1	0.1	0.1	0.1	0.1	0.1
892	0.1	0.1		0.1			0.1		0.1	0.1
896					0.1					
897										
961										

Table A 5-6
Technology Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266	0.1	0.1	0.2	0.3	0.1	0.1				
512		0.1	0.5	0.6	0.2	0.2	0.2	0.2	0.3	0.6
513		0.1	0.1	0.1	0.1	1.5	1.9	2.2	2.3	2.7
514		0.1	0.1	0.1						
515										
521										
541	0.5	0.3	0.4	0.6	0.5	0.4	0.4	0.3	0.4	0.3
561	0.1	0.1	0.1	0.1						
571										
581		0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2
599	0.3	0.3	0.2	0.5	0.4	0.4	0.4	0.4	0.4	0.4
711	0.3	0.3	0.3	0.1	0.1	0.3	0.3	0.4	0.4	0.3
712							0.1			
714										
715			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
717		0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2
718		0.3	0.2	0.3	0.4	0.3	0.8	0.6	0.5	0.5
719		0.5	0.4	0.4	0.6	0.8	1.1	0.9	1.0	1.3
722		0.2	0.3	0.2	0.2	0.3	0.4	0.3	0.4	0.4
723		0.1	0.1			0.1	0.1	0.1	0.1	0.2
726										
729		0.1	0.1	0.2	0.1	0.2	0.3	0.3	0.5	0.6
734			0.1					0.1	0.1	0.1
861	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
862	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1
863	0.2	0.1					0.1			
951										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266										
512	0.6	0.5	0.5	0.8	0.6	0.5	0.8	0.6	0.7	0.5
513	2.0	2.5	2.8	1.4	4.2	3.8	1.4	3.7	3.6	3.2
514	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1
515										
521				0.1	0.1		0.1			
541	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
561			0.1	0.1			0.1			
571										
581	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.5	0.3	0.4
599	0.4	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3
711	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.4	0.2	0.4
712			0.1						0.1	0.1
714		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
715	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1
717	0.1	0.3	0.2	0.3	0.2	0.1	0.3	0.1		0.1
718	0.4	0.2	0.2	0.3	0.2	0.2	0.3	0.4	0.2	0.1
719	1.2	1.0	1.0	1.0	1.0	1.1	1.1	1.5	1.0	1.1
722	0.4	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.2	0.3
723	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.1		
726										
729	0.6	0.9	1.0	0.9	0.8	0.7	0.9	0.5	0.5	0.5
734	0.2	1.7	0.3	0.7	0.1	0.3	0.7	0.7	0.5	0.5
861	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.5	0.4	0.3
862	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3
863										
951										

Note: Indexes are calculated as formula 3-5 defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

B. Complementarity Indexes in Korea's Export Trade with Australia

Table A 5-7
Foodstuffs.

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001	0.4	0.6	0.1							
011										
012										
013										
022										
023										
024										
025										
031	15.2	8.6	10.5	7.1	5.3	5.9	4.3	3.7	4.2	3.0
032	0.8	0.6	1.0	2.6	3.7	1.4	0.4	0.4	0.7	1.5
041										
042	0.4				0.1					
043										
044										
045										
046										
047										
048								0.1	0.1	0.1
051	0.4	0.1	0.1							
052										
053										
054	0.3		1.1	0.8	1.0	0.6	1.0	0.6	0.4	0.4
055	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.2	0.3	0.5
061	0.1									
062										
071										
072										
073										
074		0.1		0.1				0.1	0.1	0.1
075										
081										
091										
099									0.1	
111										
112	0.1				0.1	0.1	0.1	0.1	0.1	0.1
121	0.2	0.3	0.1	0.5	2.7	2.1	2.0	3.3	2.1	1.6
122										
411										
421										
422										
431										

Table A 5-7: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001										
011										
012										
013										
022										
023										
024										
025										
031	3.0	2.8	2.1	3.6	2.9	3.8	3.8	3.1	3.3	2.8
032	2.5	2.8	3.2	2.2	2.4	3.0	2.2	1.2	1.0	1.1
041										
042										
043										
044										
045										
046										
047										
048	0.1	0.1	0.1			0.1				
051									0.1	
052										
053									0.1	
054	0.1	0.2	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.1
055	0.4	0.7	0.9	0.5	0.5	0.7	0.5	0.5	0.4	0.2
061				0.1			0.1			
062				0.1	0.2	0.1	0.1	0.1	0.1	
071										
072										
073										
074	0.2									
075										
081										
091										
099	0.1	0.2	0.2	0.4	0.2	0.2	0.4	0.2	0.1	0.1
111										
112	0.1							0.1	0.2	
121	1.0	0.7	1.2	1.8	0.9	1.3	1.9	0.7	0.7	0.5
122										
411										
421										
422								0.1		
431										

Table A 5-8
Agricultural Raw Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211										
212	0.1									
221	0.1									
231										
241										
242			0.1	0.1						
243					0.1	0.9		0.1	0.1	0.1
244										
251										
261										
262										
263	0.1		0.1							
264										
265										
267										
291	1.3	3.7	0.6	0.7	0.3	0.3	0.1	0.1	0.1	0.1
292	4.4	5.7	4.1	2.4	1.5	1.9	1.1	1.0	1.0	0.8

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211										
212										
221										
231										
241										
242										
243	0.4	1.7	1.1	0.5	0.9	1.0	0.5	1.2	0.8	0.4
244										
251										
261										
262	0.2	0.5	0.1	0.2	0.1	0.1	0.2	0.1		
263										
264										
265										
267										
291	0.1	0.1	0.1							
292	0.7	0.7	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2

Table A 5-9
Mineral Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271										
273			0.1	0.1	0.1					
274										
275										
276		3.9	3.7	2.1	1.7	1.7	1.5	1.1	1.1	1.0
281	0.3	0.2	0.2	0.1						
282										
283	0.8	0.7	0.6	0.7	0.8	0.5	0.4	0.2	0.3	0.2
284										
285										
286										
321	0.1	0.1	0.1	0.1						
331										
332								0.2	0.3	0.4
341										
351										
681										
682	0.0		0.4	0.9						
683										
684	0.6	0.1						0.1	0.1	
685										
686										
687										
688										
689			0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271										
273		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
274										
275										
276	0.6	0.4	0.4	0.3	0.3	0.4	0.3	0.2	0.1	0.1
281										
282										
283	0.1	0.1	0.1	0.1	0.1	0.1	0.1			
284										
285										
286										
321										
331										
332	0.7	0.6	1.5	1.5	1.5	0.9	1.4	0.1	0.2	1.0
341										
351										
681										
682										
683										
684									0.1	0.1
685										
686										
687										
688										
689					0.1	0.1		0.1	0.1	0.1

Table A 5-10
Unskilled Labour Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611										
612										0.1
613										
631	3.1	3.4	4.7	5.3	7.0	7.0	9.0	7.3	7.2	8.0
632								0.1	0.1	0.1
633										
651	0.2	2.0	1.4	1.4	1.1	1.0	0.8	0.8	1.6	4.2
652	15.6	15.2	26.1	15.8	11.0	12.4	9.2	10.3	11.3	10.9
653	0.9	2.6	4.9	6.3	6.0	7.6	7.0	4.8	4.1	4.2
654		0.7	3.4	2.6	2.4	2.7	1.7	1.3	0.9	0.8
655		0.1	0.6	1.4	1.8	2.0	1.5	1.5	1.6	3.1
656	0.1	1.0	1.5	2.0	3.2	6.1	3.7	1.2	0.5	0.6
657			0.1	0.1	0.3	0.2	1.4	1.5	1.6	1.3
664	0.3	1.0	1.2	0.4	0.4	0.1			0.1	0.3
665	0.1	0.2	0.1	0.9	0.2	0.1	0.1	0.1	0.1	0.1
666		0.2	0.3	0.2	0.1			0.1		
812				0.1	0.1	0.1				
821	0.1					0.1		0.1	0.1	
831				0.1	0.2	0.6	0.2	0.3	0.4	0.8
841	1.4	2.6	2.4	5.1	5.4	9.2	11.5	11.5	12.3	14.9
842										
851	0.2	0.4	0.3	0.9	1.0	1.2	1.1	1.1	1.4	2.9
893			0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3
894			0.2	0.2	0.3	0.3	0.2	0.2	0.3	0.6
895			0.1	0.2	0.1	0.2	0.1	0.1		0.1
899	2.4	0.7	3.6	7.2	8.8	11.5	10.9	12.0	19.2	8.0

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611										
612	0.1	0.2	0.3	0.3	0.3	0.2	0.4	0.2	0.2	0.1
613										
631	6.6	6.6	3.8	4.5	4.8	3.5	4.6	2.7	1.9	1.7
632	0.3	0.6	0.7	0.4	0.4	0.3	0.4	0.2	0.2	0.2
633										
651	3.3	3.8	3.6	5.1	5.5	3.6	5.3	4.8	5.9	4.4
652	9.3	8.1	5.3	3.5	1.8	3.1	3.6	2.6	2.6	1.8
653	6.5	10.3	7.3	6.6	8.6	6.7	6.9	9.2	8.9	8.4
654	0.9	1.3	1.0	0.9	1.2	1.4	1.0	1.1	0.7	0.7
655	1.2	1.2	1.5	1.1	1.0	1.1	1.2	1.1	1.3	1.1
656	0.7	2.0	2.6	1.3	1.9	2.6	1.3	1.9	2.5	1.7
657	0.8	0.9	1.2	0.6	0.8	0.8	0.6	0.5	0.5	0.3
664	0.7	0.4	0.3	0.1	0.2	0.1	0.1	0.1	0.1	0.1
665	0.1	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.3
666	0.1	0.2	0.2	0.3	0.5	0.6	0.3	0.8	0.9	1.1
812										0.1
821	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2
831	1.0	1.7	2.5	3.5	4.1	3.8	3.6	3.4	3.2	3.3
841	18.1	18.3	29.1	25.6	28.6	23.9	26.5	17.5	14.1	14.9
842				0.1		0.1	0.1	0.1	0.1	0.1
851	3.0	3.5	5.5	3.9	5.9	5.8	4.1	5.1	4.8	4.7
893	0.5	0.8	1.2	2.2	0.6	0.7	2.3	0.9	0.9	0.9
894	1.6	2.3	3.5	3.6	4.3	5.3	3.8	4.8	4.4	3.6
895	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
899	6.0	3.8	3.2	2.9	2.4	1.9	3.0	1.5	1.1	0.9

Table A 5-11
Human Skill Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531										
532										
533										
551	0.2	0.1	0.1							
553										
554										
621			0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1
629	0.2	0.6	0.9	0.9	0.8	1.0	0.9	0.6	0.7	1.0
641		0.1	0.1	0.1	0.4	0.9	0.1			
642					0.2		0.1			
661				0.1	0.1			0.2	0.2	0.4
662		0.1	0.1					0.2	0.1	0.1
663										
667		0.1	0.1							
671									0.2	
672				0.1						
673		0.9	1.2	1.0	0.1				0.1	0.1
674		4.1	1.1	3.0	1.1	0.2	0.1	0.3	0.4	1.4
675										
676										
677		0.8	0.1	0.2	0.1					
678		0.2	0.2		0.1	0.1			0.1	0.1
679		0.1								
691										
692										
693								0.1	0.1	0.1
694										
695				0.1	0.1	0.3	0.3		0.1	0.1
696		0.0	0.1	0.3	0.4	0.5	0.7	1.1	1.2	1.1
697		0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1
698		0.5	0.5	1.3	1.7	2.0	1.9	0.2	0.1	0.2
724		0.1	0.5	0.9	1.4	0.8	1.1	0.9	0.6	0.7
725										
731										
732	1.3	5.0	1.1	0.9	0.2	0.3	0.3	0.1	0.1	0.1
733										
735					0.2	0.3		1.5	0.3	0.1
864				0.1						0.1
891				0.2	0.1	0.1	0.1	0.1	0.3	1.0
892	0.2	0.6	0.2	0.1	0.4	0.4	0.1	0.1	0.2	0.5
896									0.2	0.1
897				0.1	0.1				0.1	0.1
961										

Table A 5-11: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531	0.1	0.1	0.1		0.1	0.1		0.1	0.1	0.1
532										
533										
551										
553										
554									0.1	0.1
621			0.1							
629	1.4	1.3	4.1	3.7	3.8	3.2	3.8	3.9	5.8	4.2
641	0.2	1.1	0.9	0.5	0.7	0.6	0.5	0.5	1.1	0.9
642	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.2	0.2
661	0.3	0.2	0.3	0.4	0.5	0.4	0.4	0.3	0.4	0.4
662	0.3	0.5	0.5	0.4	0.5	0.6	0.4	0.3	0.4	0.3
663		0.1	0.2	0.2	0.2	0.3	0.2	0.1	0.1	0.1
667										
671	0.1	0.1	0.1		0.1	0.1		0.1	0.1	
672		0.1	0.8	0.1			0.1	0.1	0.2	0.1
673	0.3	0.1	0.4	0.3	0.2	0.1	0.3	0.3	0.9	0.5
674	1.9	2.4	3.9	0.6	1.1	1.1	0.6	1.5	1.8	1.8
675										0.1
676										
677		0.1	0.2	0.1		0.1	0.1	0.1	0.2	0.1
678	0.4	1.0	1.1	0.6	0.5	0.7	0.6	1.2	1.7	2.7
679										
691						0.3		0.1	0.1	0.1
692										
693	0.1	0.2	0.4	0.3	0.3	0.3	0.3	0.5	0.6	0.5
694	0.1	0.1	0.4	0.4	0.5	0.6	0.4	0.8	0.8	0.8
695	0.1	0.1	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4
696	1.7	2.1	2.1	2.1	2.2	2.4	2.1	1.7	1.8	1.6
697	0.2	0.3	0.5	0.5	0.8	1.0	0.5	1.2	1.2	1.2
698	0.3	0.4	0.5	0.4	0.5	0.5	0.5	0.8	0.9	0.8
724	1.2	1.8	4.0	6.8	7.4	6.7	7.1	7.1	6.8	6.9
725		0.1	0.2	0.2	0.2	0.3	0.2	0.4	0.7	0.9
731			0.1	0.2		0.1	0.2	0.4	0.3	0.4
732	0.1	0.1	0.1	0.1	0.2	0.3	0.1	1.0	0.8	0.9
733	0.1	0.2	0.2	0.1	0.1	0.2	0.1	0.1	0.2	0.1
735		0.1	0.8	1.6	0.2	1.2	1.6	6.0	2.5	12.0
864	0.2	0.4	0.9	1.1	1.7	0.8	1.2	1.1	1.4	1.1
891	1.4	3.2	4.1	4.1	5.0	3.8	4.3	3.1	2.4	2.4
892	0.2	2.3	0.2	1.2	0.1	0.2	1.2	0.4	0.2	0.3
896		0.1	0.2	0.1	0.6	0.2	0.1	0.2	0.1	0.1
897	0.1	0.2	0.4	0.5	0.5	0.4	0.6	0.4	0.3	0.2
961					0.1					0.5

Table A 5-12
Technology Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266									0.5	0.1
512	0.5	0.6	0.5	0.2	0.2	0.1	0.1	0.1	0.2	0.2
513		0.3			0.1					
514		0.1	0.1	0.1	0.1					
515										
521										
541	0.3	0.1	0.1	0.1	0.0	0.1	0.0	0.2	0.3	0.3
561						0.3	0.2	0.5	0.3	0.2
571										
581					0.1		0.1	0.4	0.3	0.3
599							0.1	0.1		0.1
711	0.3	0.9	0.3	1.1	1.5	0.7	0.2	0.4	0.4	0.4
712	0.1	0.1		0.3		0.1	0.1			
714							0.8	1.4	0.8	0.9
715			0.1	0.1	0.1	0.1				0.1
717		0.1	0.1	0.4	0.5	0.4	0.1	0.2	0.1	0.1
718				0.2	0.1	0.1	0.1	0.1	0.1	0.1
719		0.6	0.1	0.2	0.3	0.4	0.1	0.1	0.2	0.1
722		1.3		0.1	0.2	1.0	1.5	2.0	1.0	0.6
723			0.1							
726										
729		0.1	0.4	0.2	0.7	1.3	2.8	4.3	4.4	6.1
734	1.5	0.2	0.0	0.2	0.0	0.6	0.1	0.2	1.7	0.2
861			0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.4
862			0.2						0.2	0.1
863	0.7	0.1	0.9	0.4	0.2	0.2	0.1	0.1	0.2	0.3
951										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.3	0.2
512	1.3	0.8	1.8	0.7	0.9	1.1	0.8	1.4	1.4	1.0
513									0.1	0.1
514		0.1	0.2	0.2	0.3	0.4	0.2	0.3	0.3	0.2
515										
521				0.1			0.1			0.1
541	0.3	0.2	0.2	0.3	0.2	0.1	0.3	0.1	0.1	0.1
561	0.3					0.3		0.6	0.8	0.5
571										
581	0.6	0.6	0.5	0.2	0.3	0.3	0.2	0.5	1.1	1.0
599	0.1	0.1	0.1	0.1		0.1	0.1	0.1	0.1	0.1
711	0.5	0.1	0.1	0.1	0.3	0.3	0.1	0.5	0.7	0.5
712					0.1				0.1	
714	1.8	2.1	2.3	2.2	1.7	1.5	2.3	1.3	1.1	0.9
715	0.2	0.1	0.1					0.1	0.2	0.2
717	0.2	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
718	0.2	0.3	0.1	0.1	0.2	0.1	0.1	0.3	0.2	0.3
719	0.2	0.2	0.4	0.3	0.3	0.3	0.3	1.0	1.1	1.3
722	0.7	0.9	1.2	1.5	1.3	0.9	1.6	1.1	1.3	1.1
723	0.1	0.1	0.2	0.3	0.2	0.2	0.3	0.3	0.3	0.4
726										
729	7.0	6.7	7.8	6.7	6.7	5.5	6.9	5.1	5.0	3.8
734	0.5	0.6	0.7	0.3	0.5	0.8	0.3	2.0	0.6	1.1
861	0.5	0.6	1.0	0.9	1.2	1.3	0.9	1.0	1.3	1.0
862			0.1					0.1		
863	0.1			0.1			0.1			
951										

Note: Indexes are calculated as formula 3-5 defined in Chapter 3.
Source: International Economic Data Bank, RSpacS, ANU.

APPENDIX 6

Country Bias in Trade between Australia and Korea, 1962-1981

A. Country Bias Indexes in Australia's Export Trade with Korea

Table A 6-1
Foodstuffs

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001				9.31	18.29	35.44	0.78	10.36	2.24	6.07
011	1.74	0.98				1.74	2.82	0.96	0.15	2.32
012										
013	0.16				0.37		0.52	8.51	18.98	29.90
022	0.39	0.58	1.22	1.64	2.02	7.65	0.22	0.74	0.18	0.24
023		1.95				1.76		0.16	1.36	1.45
024								1.32		1.11
025										
031										
032										
041		0.31						0.05		1.00
042										
043		0.10		0.22				0.29		0.27
044										
045										
046										
047										
048	4.11				0.21		0.02	0.08	1.96	4.28
051										
052										
053					0.45	0.05	0.09	0.05	0.02	
054										
055						19.71	10.93			
061	3.40	4.84	4.05			0.22				0.04
062										14.61
071									1.19	
072										
073										
074										
075										
081							0.13	1.24	1.72	0.91
091										
099				0.06		0.25		0.10	0.07	
111								0.12		
112	3.13			1.29		1.82	1.43		1.28	0.79
121										
122										
411	0.04	0.01	0.03	0.02	0.01	0.01				
421										
422										
431										

Table A 6-1: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001	70.34	12.51	6.45		0.98	1.60		2.37	0.66	3.41
011	0.95	0.37	0.39	1.07	2.10	3.66	1.09	3.54	2.30	6.67
012										
013									5.93	16.58
022	0.27	2.75	1.41	1.37	2.68	7.22	1.42	6.75	10.56	16.88
023	3.98	7.91	3.31	14.72	1.99		14.81			
024	7.92	14.40	8.60	5.02		0.78	5.09	1.52	2.90	0.32
025										1.14
031			0.52	0.01			0.01	0.10	0.36	0.16
032		2.00								
041	0.32				0.07	0.06		0.17		
042										1.51
043	4.06	2.22	0.89	3.26	1.20	0.16	3.32	7.11		
044										
045	7.57							3.34		
046		1.65								
047										
048			5.38	14.68	20.55		15.03	8.20	15.05	6.48
051										
052					0.66	1.22		1.42	0.15	
053	0.03	0.03	0.03	0.33		7.25	0.34			0.01
054					1.08			0.35		
055										
061		2.40	3.03	3.53	3.31	3.45	3.72	3.54	2.76	3.08
062	16.18	38.93								
071										
072										33.65
073									22.58	149.70
074										
075										
081	2.23	8.43	57.59	9.30	4.11	1.91	9.33	0.04		
091				0.18			0.20			
099	0.06	0.08	0.04					0.11	1.19	
111										
112	2.64	0.34	2.88	0.56	1.53	1.50	0.57	1.10	1.29	3.99
121										
122										
411	0.01	0.04		0.58	1.48	1.52	0.58	1.72	0.40	0.47
421										
422			2.52							
431		0.39			1.33	0.02		1.43	0.71	1.03

Table A 6-2
Agricultural Raw Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211					0.04	0.84			0.02	0.02
212										
221										
231								0.92	0.32	
241										
242										
243									11.27	
244										
251										
261										
262	1.29	1.23	1.85	2.32	1.99	1.74	1.70	1.61	1.99	1.38
263										
264										
265										
267	1.77	0.70	0.84	1.83	3.11	6.46	1.71	3.59	7.08	7.80
291			8.91	1.59						
292										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211	0.43	0.14	0.21	0.39	0.46	0.38	0.39	0.45	0.23	0.58
212				2.35	2.35	0.60	2.35	0.19	0.11	0.03
221				0.16		12.06	0.16	1.10	5.07	
231					1.36				0.74	0.03
241										
242	0.60									
243										
244										
251		0.07								
261										
262	2.12	1.62	1.51	1.66	1.90	2.11	1.69	2.14	1.95	1.97
263								0.02	0.15	0.57
264										
265										
267	10.21	22.93	10.96	23.83	21.34	12.48	25.66	9.28	12.73	6.77
291		0.36	2.96	4.37	3.15	1.57	4.37	2.23	1.16	0.74
292		1.84	0.03	0.25			0.25	0.23	0.13	0.05

Table A 6-3
Mineral Materials

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271										
273										6.80
274										
275			11.08							
276									2.00	
281								7.05		
282										
283			1.12	3.83	4.35	2.17	0.17	0.37	0.60	1.60
284	0.95							1.75	0.28	5.87
285										
286										
321	12.23	16.01	8.28	3.11	2.62	2.70	1.73	0.30	0.10	
331										
332								0.19		
341										
351										
681										
682	37.85									
683										
684					17.57	1.35	2.98			
685	1.40	0.28	1.39		0.16	2.75	1.87	0.31	0.05	0.73
686	0.48	0.99			0.48	0.18	0.02	0.01	0.19	0.14
687										
688										
689						0.93				

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271			0.93	6.12	11.55		6.19			
273						2.23		26.88	14.91	22.61
274										
275										
276	0.33	0.56	1.86	3.40	5.08	4.27	3.45	4.81	7.80	8.53
281		3.61	2.16	2.27	3.30	2.61	2.27	3.19	2.83	2.70
282										0.10
283	0.01			0.82			0.82	2.59	1.47	0.94
284	1.02	0.05	0.35	0.17		0.03	0.17	0.24	2.82	1.54
285										
286										
321		4.36	5.24	4.11	3.41	2.85	4.12	2.21	2.25	1.84
331										
332		0.15		0.01			0.01	0.00	0.02	
341										
351										
681										
682								10.68	1.48	0.13
683										
684			0.11			0.01		2.31	0.51	0.00
685	0.52	0.64	0.32	0.81	0.03	0.03	0.82		0.17	0.51
686	0.07	0.24	0.38	0.94	0.47	0.69	0.94	2.08	2.61	1.39
687								0.05	0.01	
688										
689								0.10	0.05	0.56

Table A 6-4
Unskilled Labour Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611										
612						1.81				
613										
631										
632										
633										
651	0.07			0.17	0.08				0.14	
652										
653										0.46
654										
655					1.18			0.11		
656								34.14		
657								119.95		
664										
665										
666										
812										
821								2.74		1.10
831										
841	14.51				1.73	3.41	1.54			0.24
842										
851										
893										
894							2.33		1.04	
895										
899										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611	0.13	0.10			0.00	0.05		0.08	0.04	0.38
612									0.16	
613					0.09	0.66		0.92	0.75	0.04
631				0.06			0.06		2.40	3.15
632				16.76		0.80	17.50	4.17		
633										
651								2.81	6.13	4.95
652								0.07		0.03
653			0.24		0.06	0.35		0.02	0.05	0.17
654						0.18				
655		0.04		0.18	1.06	2.17	0.18	3.65	4.16	4.39
656									0.48	
657					3.76					6.80
664								3.04	3.04	0.36
665										0.04
666									3.21	
812									0.10	
821									2.53	2.99
831								22.81		29.93
841	0.04	0.91	1.36	0.97		0.93	0.98			
842										17.73
851										
893									13.21	8.81
894			0.37		0.23				0.53	0.29
895									0.35	0.12
899		0.08	0.04			0.03		0.14	0.05	0.03

Table A 6-5
Human Skill Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531										
532										
533					0.08					
551									0.25	6.00
553								1.98		
554										0.10
621							1.06			
629							2.87		0.32	
641										
642	0.58							3.10	0.26	
661										
662									5.85	6.16
663						5.82		0.64		
667							13.18	16.25	2.76	
671		21.47				4.53		0.13		
672										
673										
674										0.02
675										
676										
677										
678										
679										
691										
692									0.32	
693										
694								5.64		
695				2.69	0.44		0.38	0.04		
696									2.42	1.71
697								2.36		
698		2.80	7.08				0.01	0.02	0.10	0.13
724						0.64	0.17	0.05		
725										
731										
732							0.11	0.10	0.01	0.02
733										
735										
864										
891										
892				0.18						
896			763.10		2.95					1.59
897										
961										

Table A 6-5: (continued)

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531					0.05			0.04		0.03
532										
533	6.36	0.61	0.07	4.39	3.83	10.66	4.54	4.67	0.49	0.10
551	22.42	33.07	19.23	0.29	2.79	0.44	0.29	3.54	3.17	2.60
553	0.41	3.20	3.12	1.61		0.37	1.65	0.46	2.20	3.28
554			0.26	0.01			0.01	0.02	0.08	0.33
621		3.54						1.11		
629		0.07			2.28				0.85	
641					0.20	1.16				
642		0.14		0.06	0.05		0.06	0.02	0.72	0.02
661										
662	6.90	14.28	2.99							
663						0.05		0.25	0.41	0.22
667	2.48	9.36	5.32	3.07	0.59	1.07	3.07	0.37	0.06	0.26
671		3.83	7.02		12.18			3.57	0.20	
672	3.44	0.72	0.61		0.31	0.54		0.64	1.97	2.33
673										0.73
674	0.01							0.02	0.73	0.56
675										
676										
677								0.02		
678	0.33							1.47	0.50	1.98
679	20.39									
691										
692			0.02	0.02			0.02			1.53
693	2.71		0.17	0.36		0.81	0.38			
694						0.08			0.08	
695	3.63		0.01	0.05	0.01		0.05	0.01	0.01	0.06
696								0.06	0.89	
697	17.68		0.34						2.37	0.33
698	0.25	0.12	0.30	0.11	0.30	0.07	0.12	0.04	0.23	0.65
724		0.01							0.02	
725									0.04	
731									1.90	0.98
732	10.13	7.46	4.42	2.92	1.11	0.23	3.07	10.76	8.89	13.44
733										
735	0.00			3.02			3.11		0.64	
864									0.01	
891			0.33	0.48	1.14	1.12	0.49	0.01	0.11	0.01
892	0.25	0.05	0.18	0.08		0.05	0.08	0.01	0.26	0.02
896			0.73			0.21			0.37	
897								1.01	1.02	
961										

Table A 6-6
Technology Intensive Manufactures

Code No.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266				0.07	1.49	0.68	0.85	0.71		2.98
512						0.04		0.07	1.50	1.31
513										
514									0.10	
515										
521										
541	0.37	0.03	0.25	0.09	0.04		0.01	0.04	0.02	0.11
561										
571										
581										
599		0.10			0.22	0.33	0.45	0.23	0.19	0.24
711								0.06		
712						1.35	0.08		0.18	0.49
714										
715				9.63	4.86			4.47	0.19	0.02
717										
718						0.02	0.09	0.43	0.15	0.01
719					0.05		1.01	0.17	0.16	0.96
722						0.18	0.24			
723										
726										
729					0.08	0.06	1.29	1.27	0.23	0.25
734				9.54						0.04
861	0.28	0.12	0.38	0.33	0.09	0.06			0.06	0.03
862										
863			0.67							
951										

Code No.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266		0.29	0.38							0.14
512	0.28	0.28	0.22	0.01	0.27	0.06	0.01	1.00	1.09	1.04
513		0.66	1.24	0.03			0.03	0.22	0.32	0.26
514			0.05			0.57		0.63	0.02	0.42
515									4.54	
521										
541	0.10	0.30	0.62	0.61	2.29	1.75	0.63	1.46	1.96	0.73
561										
571										
581			0.15	0.03	0.00	0.01	0.03	0.27	0.14	0.05
599	0.37	2.09	0.51	1.07	1.09	0.37	1.10	1.08	0.29	0.74
711	0.04	0.62	0.02	0.18	0.09		0.18	0.14	0.08	
712	1.26	7.06	0.15	0.82	0.58	0.96	0.86	0.34	0.37	0.51
714				0.82	1.72	2.00	0.83	0.61	0.87	0.05
715			0.42			0.02		0.85		0.11
717										0.08
718				0.01	1.35	0.03	0.01	0.04	0.71	0.86
719	0.38	0.81	0.56	0.31	0.03	0.03	0.32	0.12	0.21	0.15
722	0.02	0.15	0.34	0.16	0.02	0.76	0.17	0.45	0.24	0.01
723		0.02	0.06	0.02	0.01		0.02	0.06	0.01	0.02
726		0.51		0.07		0.03	0.07			
729	0.02	0.03	0.05	0.01	0.02	0.12	0.01	0.13	0.04	0.07
734		0.13	0.01	0.03	0.30	0.00	0.03	0.01	0.28	0.00
861	0.13	0.38	0.74	0.60	0.31	0.36	0.62	0.64	1.01	0.39
862		0.31	0.85	0.42			0.42			0.01
863					0.67					0.06
951										

B. Country Bias Indexes in Korea's Export Trade with Australia

Table A 6-7
Foodstuffs

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
001										
011										
012										
013										
022										
023										
024										
025										
031	0.26		0.07	0.01	0.02	0.30	0.05	0.02		0.20
032	0.54		5.91	0.48	0.19	0.01	0.15		0.16	1.36
041										
042										
043										
044										
045										
046										
047										
048										
051										
052										
053										
054	1.76									
055										
061						1.92				
062										
071										
072										
073										
074										0.05
075										
081				38.61						
091										
099										
111										
112	1.68								0.27	
121						3.16	3.23	1.55	3.12	2.63
122										
411										
421										
422										
431										

Table A 6-7: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
001										
011								14.70		
012										
013										
022										
023										
024										
025										
031		0.69	0.07	0.07	0.03	0.08	0.07	0.13	0.52	0.14
032	1.86	0.57	1.02	0.58	1.02	1.09	0.58	1.07	1.51	1.86
041										
042										
043										
044										
045									5481.45	
046										
047										
048	0.38	0.13			0.35	0.40		0.92	0.29	
051									0.04	
052										
053		1.36	2.53	0.59	2.33	0.94	0.59			2.02
054			0.02			0.04		0.01	0.02	
055		0.32	0.95	0.67	1.05	1.44	0.67	0.73	0.64	0.72
061								1.47	2.25	0.63
062				0.81	3.02	0.21	0.09			0.56
071				171.62			171.74			
072										
073										
074	0.14								0.24	
075			0.53		0.68	0.08		0.05		
081			1.73							
091										
099		0.30	0.04	0.83	0.99	1.15	0.86	0.86	0.39	0.66
111										
112		0.29	0.13	0.84	0.52	0.79	0.85			
121	3.47	1.96	1.69	4.51	1.01	1.33	4.50	1.02	1.36	1.80
122										
411										
421						79.04		18.32		0.23
422								0.18		
431						4.30		4.01	5.56	6.38

Table A 6-8
Agricultural Raw Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
211					81.91					337.99
212	6.67	5.06	12.56		41.24		29.57	57.28	117.31	46.33
321										
231										
241										
242										
243										
244										
251										
261										
262	61.42									
263										13.28
264										
265										
267		9.18	26.25	16.33	12.22		7.90	14.58	18.72	1.91
291	7.21	1.51	1.73	0.78		0.06	0.94			0.57
292	0.03		0.01			0.02		0.02		0.02

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
211										
212	1.69		30.42							
221									1.24	
231									2.88	0.31
241										
242										
243		0.01								
244										129.07
251										
261										
262	0.04									
263										
264										
265										207.34
267	7.39	2.45	3.65	1.33	9.39	13.41	1.43	2.38	12.44	5.48
291										
292	0.08		0.03		1.72	3.01		1.71	1.30	1.09

Table A 6-9
Mineral Materials

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
271										
273				1.35	0.48	0.93				
274										
275										
276		0.10	0.01	0.05	0.36	0.20	0.13	0.20	0.17	0.16
281										
282										
283	7.96	9.57	5.14	1.81				0.53		
284										
285										
286										
321										
331										
332									15.77	11.70
341										
351										
681										
682										
683										
684										
685										
686										
687										
688										
689						2.43	5.88	4.55		1.49

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
271										
273									0.03	
274										
275										
276	0.28	0.28	0.19	0.21	0.17	0.14	0.21	0.30	0.25	0.49
281										
282										
283										
284										
285										
286										
321										
331										
332	10.78	4.50	2.43	2.74	4.35	2.95	2.79	0.39		
341										
351										
681										
682					1.61	3.35				
683										
684		0.15	0.59			0.08		0.40	0.15	0.33
685										
686										76.14
687										
688										
689		0.12				0.07		0.08	2.74	

Table A 6-10
Unskilled Labour Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
611									3.35	
612						9.04				3.62
613										
631				0.01	0.01	0.00	0.00	0.06	0.01	0.06
632	12.85							0.08		0.16
633										
651	0.56	0.30	2.13	0.48	0.55	0.51	0.46	0.30	0.02	0.37
652		0.16	0.38	1.42	1.34	0.59	0.20	0.06	0.01	0.07
653			0.03	1.26	1.77	1.00	0.56	0.68	0.46	0.43
654				0.39	0.19	0.17	0.34	0.08	0.02	0.06
655		2.23	0.37	0.05		0.03	0.42	0.36	0.25	0.21
656						0.01		0.03	0.07	0.06
657						0.18	0.03	0.01	0.02	0.86
664				0.16	1.25			0.54	1.16	2.89
665						0.24			0.16	0.60
666				0.60	0.32					1.36
812										
821					2.86		0.85	6.12	0.46	1.13
831						16.76	0.30	0.04	0.16	0.27
841				0.03	0.09	0.62	0.37	0.59	0.32	0.39
842										5.41
851	0.74			0.04		0.09		0.13	0.32	0.79
893						0.79	0.13	0.59	0.04	0.70
894						0.52	0.55	0.76	0.51	0.16
895										
899			0.51	0.09	0.05	0.05	0.06	0.08	0.05	0.09

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
611		3.11	1.73		3.88	3.21		18.13	2.11	
612		0.23		0.17	0.50	0.93	0.18	0.91	1.10	1.41
613				0.76	4.01	5.20	0.76			
631	0.39	0.46	0.55	0.92	1.05	0.83	0.93	0.41	0.15	0.12
632	0.04	0.13	0.16	0.63	0.67	0.59	0.65	0.11	0.18	0.34
633										
651	0.19	0.22	0.39	0.79	0.61	0.99	0.81	2.09	2.28	2.77
652	0.33	0.30	0.04	0.47	0.75	0.45	0.48	0.90	0.41	0.43
653	0.66	0.74	0.89	0.69	0.79	0.53	0.70	0.48	0.64	0.68
654		0.03	0.03		0.01	0.01		0.04	0.09	0.27
655	0.45	0.48	0.58	0.58	0.58	0.81	0.59	1.13	0.71	0.80
656	0.79	1.26	2.51	2.92	1.79	2.58	3.01	2.91	4.06	2.62
657	0.21	0.47	0.21	0.17	0.03	0.05	0.17	0.09	0.15	0.18
664	3.50	4.89	4.12	4.45	2.66	1.82	4.55	0.27	1.21	1.12
665	0.26	0.28	0.13	0.60	1.99	1.96	0.61	0.56	1.06	0.46
666	0.28	0.05	0.57	0.71	1.59	1.28	0.73	2.06	1.11	1.17
812			1.35	0.97	0.42	0.95	1.01	1.91	1.11	0.86
821	0.05	1.95	2.56	5.42	4.45	3.32	5.47	3.73	4.01	1.66
831	0.34	0.51	0.96	0.85	0.99	0.98	0.85	0.79	0.75	0.73
841	0.32	0.63	1.02	1.15	0.88	0.87	1.16	0.73	0.66	0.86
842	23.03	7.43	0.05	0.34		0.33	0.34	0.15	0.70	0.94
851	1.57	1.56	1.32	2.07	1.04	0.65	2.08	0.77	0.80	1.05
893	0.68	0.21	0.40	0.30	1.02	0.72	0.31	0.82	1.17	1.92
894	0.36	0.30	0.84	1.37	1.31	1.22	1.38	1.33	1.71	1.78
895		0.40	0.33	1.81	2.08	1.74	1.86	2.40	1.66	1.55
899	0.05	0.13	0.13	0.25	0.30	0.42	0.26	0.46	0.70	0.70

Table A 6-11
Human Skill Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
531										
532										
533										
551										
553										
554										
621										
629		0.31			0.13		0.02		0.29	0.35
641					0.13	0.08				
642								15.34		3.82
661					0.47	3.15	3.06		4.95	2.20
662						4.59	13.40	7.40	4.38	0.66
663										
667										
671									1.58	
672										
673										
674										
675										
676										
677										
678										
679										
691										
692										
693										
694										
695										
696										0.07
697				0.21	0.58		0.12	0.22	0.21	0.70
698			0.26	0.02	0.04	0.03	0.01	0.06	0.06	1.85
724		2.82					0.04			
725										
731										
732										
733										
735										
864						0.75				
891						1.19		0.54	1.09	0.68
892							0.09	0.20		0.02
896										
897					0.25	2.22		0.85	0.11	0.35
961										

Table A 6-11: (continued)

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
531			0.17					1.41	1.53	3.35
532										
533				0.15		0.78	0.16	0.22	0.67	0.53
551			11.92							
553						0.79		3.83		1.06
554	3.09	0.10			0.16	0.09		0.55	1.25	1.33
621	0.72	0.29	0.56	2.89	4.02	3.08	2.96	1.33	3.58	4.54
629	0.15	0.40	1.06	0.52	0.77	1.10	0.55	1.58	1.66	2.19
641	0.02	0.08	0.03	0.32	0.36	0.32	0.33	0.19	0.11	0.20
642	0.90	1.71	2.20	5.75	4.88	3.53	5.89	4.80	5.05	4.20
661	5.29	5.05	4.10	3.75	0.83	0.02	3.85	0.03	0.75	0.02
662	0.02	0.10	0.57	2.15	2.94	3.34	2.21	3.83	1.99	2.27
663		0.06			0.05	0.12		0.40	0.51	0.74
667			0.67	1.18	0.42	0.49	1.18	0.33	0.62	0.40
671					0.94	1.55				
672		31.41	0.01		20.96	14.44		24.69	0.08	7.55
673					0.10			0.23	0.11	0.32
674		2.83	5.71	0.87	2.26	5.20	0.89	6.50	7.25	6.37
675			17.67							
676										
677		0.08	0.22			0.04		0.18	0.13	0.99
678			0.06	2.99	5.26	7.93	3.33	1.31	0.90	1.67
679			0.13	5.66	10.99	1.04	5.84		13.96	7.91
691					0.69	0.03		0.49	0.71	18.21
692	4.40	53.81	35.39	88.72	16.97	5.41	95.05	0.08		
693			0.29	0.07	0.24	1.19	0.07	0.60	0.94	1.49
694			0.34		0.15	0.61		0.10	0.11	0.14
695	0.22	0.60	0.97	2.46	1.39	0.99	2.56	0.90	0.78	0.69
696	0.02	0.02	0.49	0.73	1.01	0.68	0.75	1.35	0.76	1.03
697	0.78	1.51	1.06	2.17	1.67	0.86	2.24	1.00	0.87	0.81
698	0.52	0.63	0.80	0.80	1.04	0.96	0.83	0.80	0.58	0.59
724		0.11	0.72	0.57	0.61	0.48	0.59	0.45	0.52	0.57
725					0.44	0.02		1.23	0.36	0.37
731			0.03	0.70	14.62	3.68	0.74	0.53	0.98	
732	0.16	0.51	1.00	0.09	0.72	0.12	0.09	0.29	0.16	0.41
733		0.01	0.02	1.18	6.20	2.86	1.32	4.71	2.20	1.50
735		5.57	0.01	0.01			0.01	0.01	4.80	0.00
864		0.56	0.26	0.33	0.44	0.80	0.34	0.53	0.63	0.50
891	0.55	0.38	0.35	0.28	0.39	0.69	0.29	0.59	0.63	0.46
892		0.07	0.03	0.01	0.28	0.33	0.01	0.14	0.19	0.20
896		0.30	0.49	0.04	0.01	0.07	0.04	0.01	0.22	0.18
897	0.14	0.78	0.19	1.21	1.19	1.18	1.23	0.97	0.96	1.14
961									140.70	

Table A 6-12
Technology Intensive Manufactures

Code no.	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
266										0.88
512		0.11	0.43	0.98	2.85	3.39	1.38	0.41	1.08	0.46
513		0.97								
514					0.39					
515										
521										
541									0.19	0.24
561										
571										
581										1.54
599										
711										
712										
714										
715						0.44				
717										
718										
719				0.14	0.28	0.09	0.12			0.10
722							0.01			
723										
726										
729									0.03	0.01
734								0.33		
861			4.18	0.31				0.07	0.29	0.58
862										
863					0.29					
951										

Code no.	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
266	1.41		1.39	1.00	0.13	0.29	1.05	0.59	0.09	0.28
512	0.19	1.08	1.70	1.11	1.21	1.50	1.12	2.47	2.34	1.90
513						0.25		1.47	13.40	0.60
514						0.01		0.69	0.91	1.11
515										
521									4.61	9.88
541	0.27	0.41		0.02	0.37	2.46	0.02	1.69	0.79	2.87
561									1.16	0.01
571										
581	0.43	0.04	2.41	0.61	0.21	0.53	0.63	1.78	1.06	0.94
599				1.52	0.28	0.04	1.57	0.41	0.21	0.22
711			0.53	0.72	0.92	14.30	0.75	0.43	1.02	0.11
712			0.06							
714			0.01	0.27	0.30	0.21	0.27	0.27	0.19	0.05
715					3.18	0.14		0.16	1.24	2.34
717		2.21	0.53	1.80	0.60	0.96	1.90	0.31	0.09	0.06
718					0.11				0.02	0.09
719	0.12	0.51	0.60	0.47	0.22	0.31	0.49	0.33	0.56	0.71
722	0.03	0.16	0.15	0.06	0.06	0.12	0.06	0.19	0.18	0.40
723	0.71	0.82	0.95	0.82	0.17	0.04	0.88	0.01	0.08	0.24
726								0.72	0.76	1.51
729		0.02	0.05	0.03	0.06	0.11	0.03	0.18	0.16	0.12
734		0.02		0.42		0.06	0.45	0.00	0.01	
861	1.39	1.08	1.00	0.61	0.61	0.42	0.62	0.55	0.31	0.39
862										0.06
863					0.12	1.34			0.93	0.65
951										

Note: Indexes are calculated as formula 3-6 defined in Chapter 3.
Source: International Economic Data Bank, RSPacS, ANU.

APPENDIX 7

Sources of Korean Imports of Bulk Commodities 1980: Shares and Country Biases

	Share in Korean Imports(%)	Country Bias Indexes
Iron ore		
Australia	43.0	2.83
India	22.8	2.77
New Zealand	0.5	1.20
Peru	18.1	14.90
Brazil	13.4	0.57
Sweden	2.2	0.39

(Potential Sources)
Canada
USA
S. Africa
Venezuela
Chile
Liberia

	Share in Korean Imports(%)	Country Bias Indexes
Non-ferrous ores		
Japan	5.4	7.30
Philippines	37.6	7.06
Malaysia	4.1	5.19
Thailand	2.0	4.77
Indonesia	7.3	2.27
Australia	22.8	1.07
India	1.1	1.78
Canada	13.3	1.12
USA	4.3	0.14
Peru	4.4	1.07
Chile	8.8	4.85

(Potential Sources)
Papua New Guinea
S.Africa
Jamaica
Netherland

	Share in Korean Imports(%)	Country Bias Indexes
Iron Scrap		
Japan	6.2	5.47
Australia	8.2	4.32
Canada	2.5	0.85
USA	81.6	2.11
S. Arabia	0.2	3.81
Chile	0.2	0.74

(Potential Sources)
Switzerland
France
UK
Belgium
Netherland
Germeny

	Share in Korean Imports(%)	Country Bias Indexes
Coal		
Japan	4.4	62.73
Thailand	0.2	50.50
Australia	31.0	1.63
Canada	16.4	2.23
USA	22.4	0.48
S. Arabia	0.2	9.35
S. Africa	1.3	0.14
UK	1.1	0.39
Germany	0.6	0.05

(Potential Sources)
France
Belgium
Netherland

Raw Sugar	Share in Korean Imports(%)	Country Bias Indexes
Philippines	27.8	6.49
Thailand	8.0	7.49
Indonesia	1.9	5.32
Fiji	1.6	1.06
Australia	37.4	5.06
USA	0.3	0.09
Belgium	0.1	0.01
Netherland	0.8	0.48
Germany	0.2	0.06

(Potential Sources)
Mauritius
S. Africa
Dominica
Cuba
France
Brazil

Wool	Share in Korean Imports(%)	Country Bias Indexes
Japan	1.7	26.94
Hong Kong	0.7	1.04
Australia	73.8	1.89
New Zealand	14.8	0.74
S. Africa	0.1	0.21
Switzerland	0.2	1.04
Austria	0.1	0.59
Argentina	0.8	0.14
UK	0.6	0.11

(Potential sources)
France
Spain
Urugay
Belgium
Germany

Aluminium		
Japan	16.1	8.46
Australia	1.7	1.99
Canada	13.4	1.40
USA	40.5	2.65
Bahrain	2.2	2.16
Italy	0.8	0.35
France	6.9	0.89
Spain	2.0	1.16
Venezuela	2.0	0.49
Argentina	0.3	0.36
UK	0.1	0.02
Netherland	0.6	0.08
Germany	0.1	0.01
Norway	3.8	0.47

(Potential Source)
Switzerland

Lead		
Japan	16.4	29.43
Singapore	2.1	13.78
Burma	2.2	8.10
Australia	5.0	0.16
Canada	4.2	0.63
USA	7.9	0.84
Maxico	15.1	4.78
Peru	34.1	10.26
Germany	0.6	0.06

(Potential Sources)
Belgium
France
Sweden
UK

	Share in Korean Imports(%)	Country Bias Indexes
Cotton		
Sudan	0.3	0.09
Egypt	1.4	0.23
USA	94.2	2.24
Argentina	0.2	0.09
Mexico	1.2	0.25
Paraguay	0.7	0.44
Peru	0.2	0.20
Guatemala	0.3	0.11
Japan	0.1	0.47
Indonesia	0.0	0.10
Pakistan	0.8	0.12
Germany	0.0	0.04
Australia	0.2	0.15
India	0.2	0.15
(Potential Source)		
Syria		
Wheat		
Canada	0.8	0.04
USA	99.0	2.39
Japan	0.2	-
(Potential Sources)		
France		
Australia		
Argentina		
Netherland		
Germany		
Belgium		
Turkey		
UK		
Animal Oils		
Canada	15.7	3.04
USA	77.1	1.63
Japan	0.5	0.13
Netherland	0.1	0.07
Australia	3.0	0.48
New Zealand	3.3	1.02
(Potential Sources)		
Germany		
Norway		
France		
Denmark		
Argentina		

	Share in Korean Imports(%)	Country Bias Indexes
Hides and Skins		
Canada	11.6	3.14
USA	83.1	3.24
Japan	0.3	0.63
Australia	2.8	0.28
New Zealand	2.1	0.43
(Potential Sources)		
France		
Netherland		
Germany		
UK		
S. Africa		
Belgium		
Rice		
USA	71.6	2.34
Japan	26.2	4.53
Thailand	2.2	0.10
(Potential Sources)		
Pakistan		
Italy		
Australia		
Burma		
India		
Belgium		
Uruguay		
Meat		
USA	11.8	1.52
Costa rica	0.9	2.03
Japan	1.4	60.87
Australia	46.4	4.03
New Zealand	33.8	4.09
(Potential Sources)		
Netherland		
Denmark		
France		
Germany		
Ireland		
Argentina		
Belgium		

Sources: United Nations, Yearbook of International Trade, Volume II, 1980 and Commodity Trade Statistics, 1980

APPENDIX 8

Statistical Data for Explaining Difference in Country Bias

Table A 8-1
Country Bias Indexes in Bilateral Trade between Asian-Pacific Countries, 1980

	Jap.	Aust.	NZ	Kor.	HK	Indon.	Mal.	Phi.	Sing.	Thai.
Japan		1.91	1.42	3.99	2.34	3.45	2.18	3.12	2.08	3.31
		1.92	1.71	4.21	2.47	3.40	2.59	3.13	2.34	3.36
Australia	2.29		22.07	1.51	1.87	3.38	5.06	2.00	4.26	2.26
	2.50		21.03	1.95	1.96	3.45	5.75	2.25	4.41	2.48
New Zealand	1.56	22.46		1.03	1.25	5.60	3.34	5.49	2.69	2.72
	1.68	19.04		1.22	1.33	5.18	4.69	5.97	2.74	2.87
Korea	4.01	1.13	0.55		2.08	2.14	1.25	2.81	1.15	2.63
	3.74	0.91	0.49		1.83	2.87	1.87	2.77	2.74	3.10
Hong Kong	1.00	1.97	1.84	0.56		2.39	1.72	6.29	1.96	1.97
	1.10	2.24	2.40	1.19		5.30	2.67	9.08	2.76	3.25
Indonesia	2.74	3.18	2.76	3.70	2.41		0.91	2.11	6.22	0.36
	3.03	3.42	2.52	1.07	1.97		1.11	2.09	-	0.44
Malaysia	1.65	1.98	2.11	1.85	2.50	1.11		5.13	5.72	3.39
	1.68	2.24	1.75	1.57	2.03	1.07		4.08	6.76	2.86
Philippines	2.96	2.73	0.56	3.39	3.82	4.45	3.57		2.15	2.13
	3.08	2.40	0.76	3.91	3.35	3.56	3.47		1.34	2.58
Singapore	1.52	3.48	4.64	1.41	5.80	-	20.01	3.00		7.29
	1.40	2.66	4.61	0.81	4.18	9.32	8.42	1.45		5.11
Thailand	2.21	1.70	0.40	0.37	2.75	1.46	7.41	1.38	3.61	
	2.34	1.67	0.97	0.71	2.61	1.79	7.62	1.44	3.28	

Note: Lower numbers are calculated based on import data.

Source: International Economic Data Bank, RSPacS, ANU.

Table A 8-2
Shares of Asian-Pacific Countries In Each Commodity Group In World Trade, 1980
(%)

SITC code		0+1	2+4	3	5	7	6+8	Total
Australia	Import	0.5	0.7	0.6	1.2	1.4	1.2	1.0
	Export	3.6	3.6	0.5	1.1	0.2	0.6	1.1
Korea	Import	0.9	2.7	1.4	1.2	1.0	0.6	1.1
	Export	0.6	0.2	0.0	0.5	0.7	2.4	0.9
Japan	Import	7.3	18.1	14.6	4.0	1.6	3.1	7.1
	Export	0.7	1.1	0.1	4.5	14.8	8.7	6.6
Hong Kong	Import	1.3	0.8	0.3	1.1	1.0	2.1	1.1
	Export	0.3	0.5	0.0	0.5	0.8	2.8	1.0
Indonesia	Import	0.7	0.4	0.4	0.8	0.7	0.5	0.6
	Export	0.7	2.8	3.3	0.1	0.0	0.2	1.1
Malaysia	Import	0.6	0.4	0.3	0.6	0.8	0.5	0.5
	Export	0.2	4.1	0.7	0.1	0.3	0.4	0.7
Philippines	Import	0.3	0.3	0.5	0.5	0.4	0.3	0.4
	Export	0.7	1.5	0.0	0.1	0.0	0.2	0.3
Singapore	Import	0.7	1.5	1.4	0.9	1.4	1.0	1.2
	Export	0.5	2.0	1.0	0.9	1.0	0.6	1.0
Thailand	Import	0.2	0.4	0.6	0.7	0.5	0.3	0.5
	Export	1.5	0.7	0.0	0.0	0.1	0.4	0.3
New Zealand	Import	0.1	0.2	0.3	0.5	0.3	0.3	0.3
	Export	1.2	1.1	0.0	0.1	0.1	0.2	0.3

Source: United Nations (1981), Yearbook of International Trade.

Table A 8-3
Aid Flows to the Asian-Pacific Countries, 1977-80
(US $ million)

Countries	From Japan	From Australia	From New Zealand	Total Receipt
Korea	1606.4	2.5	-	4021.9
Hong Kong	507.3	71.5	4.6	2351.0
Indonesia	1679.5	215.5	12.2	3207.4
Malaysia	634.1	67.2	7.4	1345.8
Philippines	1177.2	31.9	6.4	2838.9
Singapore	603.7	63.2	3.3	1712.9
Thailand	914.2	46.4	9.1	2041.4
Oceania.Ire.	15.0	1250.7	48.2	1379.4
All developing countries	25084.2	2330.0	91.2	
World Total Aid Flows				229473.5

Sources: OECD, Geographical Distribution of Financial Flows to Developing Countries, 1980 and 1982.

APPENDIX 9

Summary Analysis of Australia-Korea Trade, 1962-1981

Three Year Averages

(US $ million)

A. Australia's Export Trade with Korea

	1962-65	67-69	71-73	75-77	79-81
1. Attributable to growth of global trade[a]	8.5	21.7	52.9	115.0	335.0
1-a, Amount increased over previous period		13.2	31.2	62.1	220.0
1-b, Increase attributable to the growth in Australia's exports		2.3	12.0	57.2	84.9
1-c, Increases attributable to the growth in Korea's imports		13.1	18.0	82.6	141.3
1-d, Increase attributable to growth of world trade		-3.6	-11.4	-66.5	-100.8
1-e, Increase attributable to interaction		1.4	12.6	-11.2	94.6
2. Attributable to complementarity in trade	10.3	23.9	58.3	156.2	482.5
3. Attributable to country bias in trade	-4.5	-12.3	0.1	31.6	247.1
4. Total Australian exports to Korea	5.8	11.6	58.4	187.8	729.6

B. Korea's Export Trade with Australia

	1962-65	67-69	71-73	75-77	79-81
1. Attributable to growth of global trade[a]	2.3	7.5	24.3	85.5	195.5
1-a, Amount increase over the preceding period		5.2	16.8	61.2	110.0
1-b, Increase attributable to growth of Korea's exports		4.6	13.3	48.2	96.1
1-c, Increase attributable to growth of Australia's imports		0.8	2.2	28.3	72.1
1-d, Increase attributable to growth of world trade		-1.0	-3.9	-30.5	-74.9
1-e, Increase attributable to interaction		0.8	5.2	15.2	16.7
2. Attributable to complementarity in trade	1.9	6.4	24.9	105.1	235.3
3. Attributable to country bias in trade	-1.2	-4.4	-11.3	-11.0	-8.4
4. Total Korean exports to Australia	0.7	2.0	13.6	94.1	226.9

C. Balance of Bilateral Trade (in favour of Australia)

	1962-65	67-69	71-73	75-77	79-81
1. Balateral imbalance attributable to both countries' imbalance in global trade[a]	6.2	14.2	28.6	29.5	139.5
2. Attributable to difference in complementarity	8.4	17.5	33.4	51.1	247.2
3. Attributable to difference in country bias	-3.3	-7.9	11.4	42.6	255.5
4. Actual bilateral imbalance	5.1	9.6	44.8	93.7	502.7

Note: Superscript a indicates the value of trade when index value of intensity of trade is equal to 1.00.
Source: Calculations from data presented in Chapters 5 and 8.