

Trade and Investment between China and South Korea: Toward a Long-Term Partnership

Joon-Kyung Kim * · Yangseon Kim ** · Chung H. Lee ***

This paper examines the effect of China's rapid economic development on the Korean economy through trade and investment linkages. It shows that China's export structure has converged to that of Korea with its exports displacing Korean exports in third-country markets while the bilateral trade between the two countries has expanded rapidly. The paper points out that the displacement of Korean exports by exports from China is partly due to exports from Korean affiliates in China. It concludes with ideas on how Korea will have to respond to China's rapid industrialization to sustain its own economic growth.

JEL Classification: F10, F21

Keywords: China, Korea, trade, investment

1. INTRODUCTION

Economic relations between the Republic of Korea (henceforth Korea) and the People's Republic of China (henceforth China) have been expanding ever since China undertook the Four Modernization reforms in the late 1970s and the two countries established a formal diplomatic relationship in 1987. Bilateral trade between the two has been growing steadily in both the volume and the variety of goods traded. Capital flows between the two likewise

* Korea Development Institute, P.O. Box 113, Cheong-Nyang, Seoul, 130-012, Korea, Tel.: +82-2-958-4088, E-mail: joon@kdi.re.kr

** Northeast Asia Economic Forum, East-West Center, 1601 East-West Road, Honolulu, Hawaii, 96848-1601. Tel.: +1-808-944-7479, Fax.: +1-808-944-7446, E-mail: kimya@eastwestcenter.org

*** Department of Economics, University of Hawaii, Manoa 2424 Maile Way Honolulu, Hawaii, 96822 Tel.: +1-808-956-8427, Fax.: +1-808-956-4347, E-mail: lchung@hawaii.edu

have been increasing although the flows have been mostly from Korea to China in the form of direct investment. Between 1989 and 2001, for instance, Korea's merchandise exports to China grew from \$1.3 billion to \$18.2 billion while China's merchandise exports to Korea grew from \$472 million to \$12.5 billion (UNCOMTRADE). In fact, China has now emerged as Korea's third largest trading partner. Also, by the end of 2002 Korea had invested \$5.6 billion in China where it had no investment at all before the late 1970s, and during 2002 alone Korea invested \$777 million in China (Lee and Kim, 2004, Table 3). This increasing trend in both trade and investment is a sign that the economic growth of the post-reform China has had a beneficial effect on the Korean economy. Its effect, however, has not been entirely positive.

The rapid industrialization of the Chinese economy has had both positive and negative effects on the Korean economy, as it has created markets for Korean products in China while leading to their displacement in third-country markets. As a matter of fact, an influential report undertaken in Korea on the future of its economy has portrayed the present condition of the Korean economy a "nutcracker" situation as it is rapidly losing its comparative advantage in many of its manufacturing industries to China while it has yet to gain a comparative advantage in technologically more advanced industries (Booz-Allen & Hamilton, 1997). Obviously, this nutcracker situation will be only temporary and short-lived if Korea succeeds in gaining a comparative advantage in technologically more advanced industries that will sustain its economic growth. Otherwise it will persist long with adverse consequences on the Korean economy.¹⁾

In this paper we examine the changes that have taken place in the export structure of China and Korea and their implications for their bilateral trade

¹⁾ The situation in which Korea now finds itself with respect to China parallels that in which Japan was before the 1940s. According to Howe (1996), Akamatsu Kaname characterized the Japanese economy as being challenged by the "newly industrializing economy" of China but lagging behind the West. Akamatsu saw Japan's situation as a transitional phase that required both the domestic and international processes of adjustment but was made difficult by the West with its entrenched trading position in East Asia.

relationship. In section 2 we specifically examine the trends and characteristics of the two countries' overall export structure for 1986-2001 to find out the extent to which China's export structure has "caught up" with that of Korea. It will be shown that exports from China have in fact displaced many of the Korean exports in Japan and the United States, Korea's two major trading partners. In section 3 we investigate the trends and characteristics of the China-Korea bilateral trade. We show that the bilateral trade has increased more rapidly than their respective trade with the rest of the world and that there is an increasing trend in intra-industry trade between the two countries. Section 4 examines the linkage between Korean investment in China and the bilateral trade between the two. In the final section we offer some ideas on how Korea will have to respond to the challenges brought about by China's rapid economic growth.

2. CHANGING EXPORT STRUCTURE OF CHINA AND KOREA

To find an overall picture of changes in the export structure of China and Korea we first examine the sectoral distribution of their exports at the SITC 1-digit level, using the United Nations trade statistics (UNCOMTRADE). We find that in 1986-2001 China, and Korea to a lesser extent, went through a major change in their export structure (Table 1).

In 1986, manufactured goods (SITC-6), mineral fuels (SITC-3), food and live animals (SITC-0), and crude material (SITC-2) accounted for close to 90 percent of China's exports, indicating that China's comparative advantage was then mainly in simple manufactured goods and raw materials. By 2001, however, China made a significant change in its export structure with machinery and transport equipment (SITC-7), miscellaneous manufactured articles (SITC-8), and manufactured goods (SITC-6) together accounting for 85 percent of its total exports. The first two sectors increased their export share from 1.77 and 4.22 percent in 1986 to 35.65 and 32.54 percent in 2001, respectively—a clear sign that China was becoming rapidly industrialized, making a significant change in its export structure in only 15 years. What is

**Table 1 Sectoral Distribution of Total Exports
(share in total exports)**

(unit: %)

	China				Korea			
	1986	1991	1996	2001	1986	1991	1996	2001
SITC0 Food and Live Animals	19.16	10.28	6.76	4.80	4.52	2.98	2.09	1.47
SITC1 Beverages and Tobacco	0.26	0.74	0.89	0.33	0.28	0.16	0.16	0.20
SITC2 Crude Material	16.63	4.84	2.66	1.55	0.97	1.37	1.24	1.05
SITC3 Mineral Fuels, etc	24.45	6.62	3.93	3.16	1.87	2.10	3.00	5.34
SITC4 Animal Vegetable Oils etc.	0.70	0.21	0.25	0.04	0.01	0.00	0.02	0.01
SITC5 Chemicals and Related Products	4.36	5.36	5.85	4.97	3.08	4.39	6.98	8.22
SITC6 Manufactured goods	28.45	20.51	19.33	16.73	23.59	22.76	21.14	18.11
SITC7 Machinery and Transport Equipment	1.77	19.36	23.35	35.65	33.58	41.70	52.08	57.43
SITC8 Miscellaneous Manufactured Articles	4.22	31.06	36.84	32.54	31.97	24.17	9.17	7.44
SITC9 not classified	.	1.03	0.15	0.22	0.14	0.36	4.13	0.74

Source: UN COMTRADE data.

noteworthy is that the most dramatic change in the export structure took place during the five-year period of 1986-1991.

Korea has also experienced changes in its export structure, albeit not as drastic as in China. In 1986, three manufacturing sectors—SITC-7, SITC-8, and SITC-6—together accounted for 89.14 percent of Korea's exports, a sign that by 1986 Korea had become a highly industrialized economy. By 2001, the share of exports of the last two sectors dropped significantly to 7.44 and 18.11 percent from 31.97 and 23.59 percent in 1986, respectively, while the share of SITC-7 increased from 33.58 to 57.43 percent. These are signs that Korea's comparative advantage has been shifting from low-wage, labor-intensive to capital-intensive and technology-intensive manufacturing industries.

The above analysis of changes in the export structure, which is based on the one-digit SITC sector classification, provides us with a rough measure of change in comparative advantage that has taken place in China and Korea but

says little on what might have brought about the change. Is it a change in factor endowment or an improvement in technology that has brought about the change? The data based on the one-digit SITC classification are too aggregate to provide an answer to this question. The SITC-8 sector (miscellaneous manufactured articles), for instance, includes labor-intensive, low technology products such as apparel, footwear, and toys as well as high technology products such as photographic apparatus, medical instruments. The SITC-6 sector (manufactured goods) also covers a diverse set of products that range from labor-intensive textile fabric to resource-based rubber and aluminum and capital-intensive tube and pipes.

To help us find an answer to the question of what has brought about the change in the export structure we group products in terms of production technology. That is, following Lall (2000) we divide the products classified at the 3-digit SITC level into ten subgroups divided in terms of the level of production technology. This is done in two steps: the products are first divided into five groups—primary products (PP), resource-based products (RB), low-technology products (LT), medium-technology products (MT), and high technology products (HT); and the latter four are divided further into agriculture-based products (RB1), other resource-based products (RB2), textile/fashion cluster (LT1), other low technology products (LT2), automotive products (MT1), process industries—chemical and basic metals—(MT2), engineering products (MT3), electronics and electrical products (HT1), and other high-technology products (HT2).

It is clear from Table 2 that changes in China's export structure are highly correlated with its increasing ability to produce technologically more sophisticated products. In 1986 a little more than a half of China's exports was in primary products such as crude petroleum, gas, vegetables, and rice, with low technology products and technologically more sophisticated products accounting for 25 and approximately 10 percent, respectively. But by 2001, China made a dramatic change in its export structure, achieving a remarkable increase in the export of medium and high technology products, especially in the export of engineering product (MT3) and electronics (HT1).

**Table 2 Distribution of Total Exports by Technological Category
(share in total exports)**

(unit: %)

	PP	RB1	RB2	LT1	LT2	MT1	MT2	MT3	HT1	HT2
China										
1986	50.93	5.78	8.05	20.99	4.35	0.39	5.26	1.55	0.39	2.30
1991	18.11	4.44	5.82	31.35	11.42	6.74	5.08	10.13	4.09	1.64
1996	9.99	5.24	5.59	30.18	15.52	0.94	5.94	11.17	12.59	2.34
2001	6.92	3.86	5.03	24.71	14.96	1.55	5.06	13.22	21.84	2.15
Korea										
1986	4.38	3.90	3.88	28.45	14.76	4.47	9.90	14.60	13.72	1.56
1991	3.21	3.19	4.24	22.82	11.57	3.67	12.39	16.77	20.25	1.26
1996	2.38	3.45	5.41	10.76	8.22	8.98	12.58	16.09	26.70	1.08
2001	2.27	3.19	8.18	9.22	7.44	10.17	9.87	17.60	30.04	1.04

Source: UN COMTRADE data.

Their combined share of exports increased from less than two percent in 1986 to more than 35 percent in 2001.

China also increased exports from low-technology industries (LT1 and LT2) during the same period, albeit not as much as those from technologically more sophisticated industries, expanding their share of exports from 25 percent in 1986 to a little over 39 percent in 2001. These industries, which require relatively simple skills and compete mostly on price, have served as an engine of China's export growth during the 1986-2001 period, taking advantage of China's abundant supply of low-cost labor.

As noted above, China has rapidly increased its export of electronics and other electrical products. Although they are classified as high-technology products, the nature of technology associated with their production in China is quite varied. While some of them require advanced technology and extensive R&D, others involve only simple labor-intensive processes. Furthermore, many of these products are only assembled at the foreign-owned or joint venture enterprises that are in China mainly to take advantage

of its low-cost labor (Fung and Iizaka, 2002). At present China may be able to export these products only with the help of foreign investors, but that does not mean that it will remain so for long. Given that foreign direct investment has enabled rapid catching-up industrialization in other parts of Asia (Yamazawa, 1990), there is no reason why China will not be able to do the same and replicate the catch-up development achieved by Japan and the Asian NIEs.

In the case of Korea the most dramatic increase took place in the export share of electronics and electrical products (HT1), albeit not as much as in China. But unlike in the case of China this increase is from Korea's indigenous firms, an indication that they have acquired their own capability for producing high technology products. Also, as to be expected, the export share of textile (LT1) and other labor-intensive products (LT2) decreased from a combined share of 43 percent to a little over 16 percent.

To further buttress the findings reported above we calculate the revealed comparative advantage (RCA) for China and Korea. With the usual caveat we take an increasing value of a country's RCA in a product as an indication that it is gaining a comparative advantage in that product, and conversely when the RCA is decreasing.

It is clear, as shown in Table 3, that between 1986 and 2001 China rapidly shed its comparative advantage in primary products (PP) while maintaining its comparative advantage in textiles (LT1) and gaining one in other labor-intensive products, a sign of a diversifying export structure. The increase of RCA in engineering products and electronics is also impressive. Although China did not have a comparative advantage in engineering products (MT3), as indicated by the value of RCA less than one, and although it gained a comparative advantage in electronics and electrical products (HT1) only in 2001, the direction of change is clear: it is rapidly gaining a comparative advantage in these products.

A comparison of changes in RCA for China and Korea suggests two points. One is that in terms of comparative advantage Korea is ahead of China in MT2, MT3 and HT1—a sign that in terms of manufacturing technology

Table 3 Revealed Comparative Advantage by Technological Categories

	PP	RB1	RB2	LT1	LT2	MT1	MT2	MT3	HT1	HT2
China										
1986	3.28	0.72	0.84	3.04	0.51	0.04	0.59	0.10	0.04	0.46
1991	1.28	0.57	0.73	4.21	1.27	0.77	0.67	0.62	0.36	0.28
1996	0.77	0.67	0.75	4.13	1.75	0.11	0.77	0.72	0.85	0.50
2001	0.57	0.59	0.68	3.81	1.75	0.17	0.72	0.86	1.28	0.34
Korea										
1986	0.28	0.49	0.40	4.13	1.73	0.47	1.11	0.92	1.48	0.31
1991	0.23	0.41	0.54	3.06	1.29	0.42	1.62	1.03	1.77	0.22
1996	0.18	0.44	0.72	1.47	0.93	1.05	1.64	1.03	1.80	0.23
2001	0.19	0.49	1.10	1.42	0.87	1.13	1.40	1.15	1.77	0.16

Source: Computation based on UN COMTRADE data.

Korea is ahead of China. The other point is that China's gain in comparative advantage in LT2 appears exactly matched by Korea's loss in the same. This plus the fact that China had a strong comparative advantage in LT1 while Korea was losing its comparative advantage in the same clearly indicate that China is following Korea in the "catching-up product cycle" development (Akamatsu, 1962; Yamazawa, 1990).

With China catching up with Korea one would expect export competition to increase between the two with the exports from the former replacing those from the latter in many of the world markets. Our investigation of changes in the two countries' market shares in Japan and the United States confirm this expectation. In Table 4 we present Japan's ten major imports (as of 2001) from China for a select number of years between 1987 and 2001. In these product groups, with the exception of SITC 77, 89, and 75, China made a significant increase in the market share at the expense of Korea. This apparent displacement in Japan of Korean imports by Chinese imports took place mostly in labor-intensive low-technology and raw material industries—the industries in which Korea no longer holds a strong comparative advantage. This displacement, however, is not limited to those industries: even in the market for Telecommunication and Sound Recording Products

Table 4 China's and Korea's Market Share in Japanese Imports

Japan's 10 Major Imports from China in 2001 (SITC 2 digit level)	China's Share of Japan's Imports (%)				Korea's Share of Japan's Imports (%)			
	1987	1991	1996	2001	1987	1991	1996	2001
84. Articles of apparel and clothing accessories	17.8	34.5	59.3	77.0	37.7	24.9	6.9	3.6
77. Electric machinery, apparatus and appliances, nes, and parts, nes	0.4	3.1	9.1	16.5	10.9	10.0	12.7	10.5
89. Miscellaneous manufactured articles, nes	3.7	7.5	19.3	31.7	7.9	7.5	5.8	5.1
76. Telecommunications, sound recording and reproducing equipment	1.5	5.9	15.6	28.8	27.4	20.0	7.1	7.5
75. Office machines and automatic data processing equipment	0.23	1.0	7.0	15.8	3.7	3.0	2.7	7.6
65. Textile yarn, fabrics, made-up articles, nes, and related products	24.8	22.7	33.1	46.3	12.4	12.9	9.1	6.2
03. Fish, Crustacean and Molluscs	5.3	7.5	12.7	16.7	14.0	9.2	6.7	6.5
05. Vegetables and Fruits	14.0	17.6	28.3	34.5	8.3	5.0	3.4	4.3
85. Footwear	6.1	18.4	49.9	66.1	39.0	30.1	11.8	4.1
82. Furniture and Parts	7.4	6.0	19.6	34.5	10.4	7.8	2.5	1.5

Source: Computation based on UN COMTRADE data.

(SITC 76) China increased its market share by 27 percentage points between 1987 and 2001 while Korea lost its market share by about 20 percentage points.

In Table 5 we present the ten major imports of the United States from China (as of 2001), another major trading partner for both China and Korea, for the same period. These are product groups in which China made a significant gain in the market share in the United States and, again as in the case of Japan, China's gain appears to have been at the expense of Korea with the exception of SITC 75, 76, and 77. The displacement in the United States of Korean imports by Chinese imports took place, as to be expected, in labor-intensive low-technology industries. What is, however, interesting

Table 5 China's and Korea's Market Share in United States Imports

United States' 10 Major Import from China in 2001 (SITC 2 digit level)	China's Share of U.S.'s Imports (%)				Korea's Share of U.S.'s Imports (%)			
	1987	1991	1996	2001	1987	1991	1996	2001
89. Miscellaneous manufactured articles, nes	6.4	17.3	31.4	35.6	8.7	5.9	2.9	2.1
75. Office machines and automatic data processing equipment	0.04	1.0	5.4	14.4	4.3	4.3	5.9	6.1
76. Telecommunications, sound recording and reproducing equipment	1.2	6.5	13.5	16.4	10.0	7.5	3.4	9.6
77. Electric machinery, apparatus and appliances, nes, and parts, nes	0.6	2.9	5.8	11.7	6.9	6.8	9.6	5.9
85. Footwear	2.0	27.6	51.6	64.9	24.1	21.3	2.7	0.7
84. Articles of apparel and clothing accessories	9.9	14.7	15.3	14.0	14.8	10.7	3.7	3.7
82. Furniture and Parts	1.6	4.7	12.3	28.6	1.7	1.0	0.5	0.4
69. Manufactures of Metal, nes	1.9	5.6	9.9	20.1	7.9	5.8	3.8	3.5
81. Sanitary, Plumbing, Heating, Lighting Fixtures and Fittings, nes	0.8	13.3	42.1	53.3	4.4	3.1	1.3	0.6
66. Non-Metallic Mineral Manufactures, nes	1.2	2.5	6.6	10.1	1.8	1.1	0.3	0.6

Source: Computation based on UN COMTRADE data.

(and also puzzling) is that unlike in Japan Korea does not appear to have lost its market share to China in SITC 76 (Telecommunication and Sound Recording Products), keeping its market share steady at about 10 percent.

3. CHINA-KOREA BILATERAL TRADE: TRENDS AND CHARACTERISTICS

While Korea has been losing its market share to China in third-country markets the bilateral trade between the two has been increasing. Although this increase is to be expected as concomitant to China's expanding

international trade, we ask here whether economic development in China has had more than the “average” effect on the China-Korea bilateral trade. To answer the question, that is, whether the increase in the China-Korea bilateral trade was greater than the average—the growth of their respective trade with the rest of the world—we calculate the export- and import- intensity indices for China and Korea, respectively.²⁾ These indices are calculated for 1987 and 2001 and are reported in the parenthesis on Tables 6 and 7. In 1987 China’s export-intensity index with respect to Korea was less than one, indicating that China exported a smaller share of its exports to Korea than its average for the rest of the world. But in 2001 China’s export-intensity index with respect to Korea increased significantly. China’s import-intensity index with respect to Korea moved in a manner similar to its export-intensity index. Korea’s export-intensity with respect to China increased from zero to 2.77 over the period while its import-intensity index moved in a similar direction. These increases in export- and import-intensity indices indicate that bilateral trade between the two countries has expanded faster than their respective trade with the rest of the world.

When two economies become similar to each other in terms of factor endowment and technology there is a tendency for intra-industry trade between them to expand relative to their inter-industry trade. With China converging to Korea in the export structure we would thus expect intra-industry trade between the two to expand over time.

To find out whether there was in fact such an expansion of intra-industry trade between China and Korea we calculate the intra-industry trade index—one minus the ratio of the absolute value of exports minus imports over

²⁾ The export-intensity index is calculated as the share of country j in the total exports of country i normalized by country j 's share in the total world imports (excluding country i). If the index is greater than one, country j 's share of country i 's total exports is greater than its share of total world imports (excluding country i), indicating that country i is more dependent on country j for its exports than the average for the rest of the world, and conversely if it is less than one. The import-intensity index is calculated as country j 's share of the total imports of country i normalized by its share of total world exports (excluding country i). Thus if this index is greater than one, country j 's share of country i 's total imports is greater than its share of total world exports (excluding country i), indicating that country i is more dependent on country j for its imports than the average for the rest of the world is, and conversely if it is less than one.

**Table 6 Destination of Exports as Percentage of Total Exports
(export intensity)**

(unit: %)

Chinese Export	Destination									
	Japan	Korea	HK	ASEAN	Other Asia	USA	Other America	Europe	Africa	Oceania
1987	16.21 (2.87)	0.01 (0.00)	34.93 (19.07)	6.06 (2.06)	5.43 (1.61)	7.66 (0.48)	2.26 (0.38)	15.17 (0.25)	1.46 (1.11)	0.91 (0.67)
2001	16.89 (2.65)	4.70 (1.83)	17.49 (4.74)	6.91 (1.21)	7.16 (1.60)	20.43 (0.95)	4.33 (0.60)	18.33 (0.40)	1.82 (2.81)	1.53 (1.12)
Korean Export	China	Japan	HK	ASEAN	Other Asia	USA	Other America	Europe	Africa	Oceania
	1987	0.00 (0.00)	17.84 (3.16)	4.66 (2.55)	4.20 (1.43)	7.13 (2.12)	38.90 (2.43)	5.52 (0.92)	16.39 (0.27)	1.77 (1.34)
2001	12.09 (2.77)	10.97 (1.75)	6.28 (1.74)	10.94 (1.95)	11.00 (2.50)	20.84 (0.99)	7.71 (1.08)	15.21 (0.34)	2.35 (3.70)	2.19 (1.64)

**Table 7 Origin of Imports as Percentage of Total Imports
(import intensity)**

(unit: %)

Import of China	Origin									
	Japan	Korea	HK	ASEAN	Other Asia	USA	Other America	Europe	Africa	Oceania
1987	23.31 (2.52)	0.02 (0.01)	19.43 (9.92)	5.00 (1.49)	3.20 (1.71)	11.13 (1.12)	6.10 (0.81)	24.19 (0.39)	0.39 (0.34)	3.65 (2.57)
2001	17.57 (2.31)	9.60 (3.38)	3.87 (1.07)	9.53 (1.39)	16.67 (2.94)	10.76 (0.78)	4.40 (0.54)	19.45 (0.40)	1.02 (2.51)	2.58 (1.82)
Import of Korea	China	Japan	HK	ASEAN	Other Asia	USA	Other America	Europe	Africa	Oceania
	1987	0.00 (0.00)	33.29 (3.59)	0.97 (0.49)	6.99 (2.08)	8.46 (4.51)	21.36 (2.15)	5.19 (0.68)	13.34 (0.22)	0.87 (0.76)
2001	9.43 (1.92)	18.88 (2.53)	0.87 (0.25)	11.28 (1.68)	20.65 (3.72)	15.90 (1.18)	3.69 (0.46)	13.27 (0.28)	0.62 (1.55)	4.54 (3.26)

Source: Computation based on UN COMTRADE data.

exports plus imports of a given industry. The index takes a value between zero and one, with zero indicating that the country either exports or imports the good in question and one indicating that it simultaneously

exports and imports an equal amount of the same good, thus being engaged fully in intra- industry trade. To calculate the index we use the trade data based on the SITC 4-digit classification (more than 1,000 industries), a classification disaggregate enough to give a meaningful measure of intra- industry trade. We then take a weighted average of the indices thus calculated, the weight being the trade share of each industry, to calculate the intra- industry trade index for the entire country and for a few select manufacturing sectors.

The figures in the row with the heading of Total Trade on Table 8 report the intra- industry trade index of total global trade of China and Korea, respectively, for four different years. We find that there was a definite upward trend in the index for the two countries' global trade. That is, between 1987 and 2001 the index increased from 0.25 to 0.38 for China and from 0.29 to 0.44 for Korea. The figures for the sectoral index show, however, that this upward trend was by and large due to an increase in intra- industry trade in SITC-6 in the case of China and SITC-5, -7 and -8 in the case of Korea. This is not surprising, given that intra- industry trade is of greater importance in manufacturing industries, in which product differentiation and scale economies are more prevalent than in other sectors of the economy and given the convergence in the export structure of China to Korea reported above.

The figures in the column under the heading of Bilateral Trade report the index for bilateral intra- industry trade between China and Korea. It is clear that for China intra- industry trade with Korea is much less important, albeit on an upward trend, than its intra- industry trade with the rest of the world. The same is true for Korea.

Product differentiation and scale economies are the standard explanations given for intra- industry trade. There is, however, another reason why it may have expanded between China and Korea—that is, an increasing international fragmentation of production processes. As noted earlier, studies have shown that many of China's exports of high-technology products are from foreign-owned or joint venture firms that are in China to take advantage of its low-cost labor. These firms are basically assembly operations that put

Table 8 Intra-Industry Trade Index

		China's trade with world	Korea's trade with world	Bilateral trade between China and Korea	
Total	1987	0.25	0.29	0.00	
	1991	0.35	0.34	0.10	
	1996	0.34	0.44	0.28	
	2001	0.38	0.44	0.34	
Non- Manufacturing	1987	0.14	0.15	0.00	
	1991	0.24	0.12	0.00	
	1996	0.30	0.30	0.08	
	2001	0.20	0.15	0.08	
Manufacturing	1987	0.32	0.30	0.00	
	1991	0.31	0.39	0.21	
	SITC5	1996	0.30	0.47	0.16
	2001	0.33	0.50	0.17	
SITC6	1987	0.26	0.46	0.00	
	1991	0.34	0.43	0.13	
	1996	0.43	0.42	0.27	
	2001	0.46	0.41	0.29	
SITC7	1987	0.33	0.36	0.00	
	1991	0.55	0.44	0.20	
	1996	0.43	0.49	0.51	
	2001	0.53	0.53	0.56	
SITC8	1987	0.24	0.12	0.00	
	1991	0.22	0.21	0.26	
	1996	0.19	0.49	0.37	
	2001	0.19	0.57	0.33	

Note: Based on data provided by Korea.

Source: Computation based on UN COMTRADE data.

Table 9 Share of Parts Trade between China and Korea

	Export of Korea to China		Export of China to Korea	
	Share of Parts in the trade of SITC7&8	Share of Parts in the total trade	Share of Parts in the trade of SITC7&8	Share of Parts in the total trade
1991	12.9	2.9	10.0	0.6
1996	24.5	7.3	24.3	7.0
2001	41.4	14.9	26.5	12.8

Source: UN COMTRADE data.

**Table 10 Parts Trade in Major Manufactured Trade
(2001, share of parts, %)**

SITC code	Export of Korea to China	Export of China to Korea
71. Power generating machinery and equipment	37.7	14.7
72. Machinery specialized for particular industries	20.7	15.7
73. Metalworking machinery	7.2	13.8
74. General industrial machinery and equipment, nes, and parts of, nes	7.9	7.1
75. Office machines and automatic data processing equipment	68.7	53.0
76. Telecommunications, sound recording and reproducing equipment	96.0	79.1
77. Electric machinery, apparatus and appliances, nes, and parts, nes	30.5	20.0
78. Road vehicles	27.8	53.6
79. Other transport equipment	5.4	12.9
80. Miscellaneous manufactured articles	12.2	1.5

Source: UN COMTRADE data.

together imported parts for sale outside of China, and since many of these imports and exports are in the same SITC groups they would be reported as intra-industry trade. The figures on Table 9 show that between 1987 and 2001 there indeed was an increase in parts trade between China and Korea, indicating an increasing fragmentation of production processes and an expansion of production networks. Table 10 also shows significant parts-trade between the two countries, parts moving in both directions. In SITC-75 and -76 groups, especially, the parts-trade was significantly more than a half of the trade in those sectors. Our research on the effect of Korean investment in China on bilateral trade, reported in section 4, also supports the hypothesis.

As noted earlier, many Korean firms have invested in China to manufacture products for export markets. Some of the exports are to Korea and others are to third-country markets, and what appears to be a competitive relationship between China and Korea is in fact a relationship in partnership

between the two countries to the extent that the exports from China are produced by Korean affiliates. For instance, the loss of a market share in Japan and the United States by Korean exporters to Chinese exporters may be in part a displacement of exports from Korea by exports from Korean affiliates in China. The following section attempts to shed some light on such relationship between Korean investment in China and the trade patterns of the two countries.

4. KOREAN INVESTMENT IN CHINA: ITS MOTIVES AND EFFECT ON BILATERAL TRADE

Given that Korea is one of the major investors in China and given the investment-trade nexus that is widely recognized in the literature, we need to ask how the Korean investment in China has affected the two countries' trade patterns. To answer this question we examine the results of two recent surveys on Korea's overseas direct investment (ODI), one carried out by the Korea Institute for Industrial Economics and Trade (KIET) and the other by the Korean Export-Import Bank (KEXIM). The KIET survey, conducted by two KIET researchers, Ha and Hong (1998), was based on a sample of 615 Korean companies (216 large firms and 399 small and medium-sized enterprises) and their 952 offshore affiliates. It contains information on the motives for overseas investment, the patterns of sales and procurement, and other activities of offshore affiliates, as reported by their parent companies registered officially as overseas investors in 1996.

The KEXIM survey was based on a smaller sample of 290 large offshore affiliates with an outstanding investment of at least US\$10 million at the end of 1998. Of these affiliates, 191 (66 percent) were the affiliates of the top 5 *chaebols* and 29 (10 percent) the affiliates of the second-tier 25 largest *chaebols*. Since small and medium-sized enterprises (SMEs) are not included in the KEXIM survey, we expect to draw some inference about the investment in China by Korea's SMEs and its effect on the trade patterns of the two countries by comparing the results of the two surveys.

4.1. Motives for Investing in China

In the KIET survey the sample firms were asked to pick the two most important from a number of motives for investing overseas— natural resource or raw materials, low-cost labor, market access, high technology, and “others.” Out of 305 firms with investment in China, 179 (58.7 percent) reported low-cost labor and 66 firms (21.6 percent) market access as the most important motive for investing in China. These motives are quite different from those for investing in North America and Europe, which, according to the survey, are market access, “others” and high technology in a descending order of importance (Kim and Lee, 2003).³⁾

The KEXIM survey on the motives for Korea’s ODI shows that export expansion from Korea was chosen by 34.3 percent of the respondents as the most important reason for investing in China while low-cost labor was chosen by only 16.4 percent (Kim and Lee 2003). This is significantly less than the 58.7 percent of the respondents in the KIET survey that reported low-cost labor as the most important motive for investing in China. Given that the KEXIM survey covers only the affiliates of large firms whereas the KIET survey includes SMEs as well, we take the difference in the reported percentage as an indication that for the large firms the access to markets in China is the most important reason for investing in China whereas for the SMEs China’s low-cost labor is the most important one.⁴⁾

According to the two surveys, the most important motive for ODI by labor-intensive textiles and apparel and the footwear and leather industries⁵⁾

³⁾ This difference in motives between ODI in China and that in North America and Europe may to a certain extent be due to the fact that China has SEZs and others do not. Some of the Korean ODI in China is likely to be in SEZs but with no access to China’s internal markets. Due to lack of data we are unable to verify this possibility.

⁴⁾ According to Tseng and Zebregs (2002), the market size is more important as a determinant of European and U.S. FDI in China than for FDI from Hong Kong and Taiwan. That is, the motive for investing in China by European and U.S. investors is similar to that of large Korean investors whereas the motive of Hong Kong and Taiwanese investors is similar to that of Korea’s SME investors. See also Graham and Wada, (2001).

⁵⁾ This survey results are consistent with the result of an econometric study that shows that investments from Hong Kong and Taiwan tend to use China to manufacture goods for

was, as to be expected, low-cost labor in host countries. The textiles and apparel and the leather and footwear industries had been two of Korea's major export industries until it began losing comparative advantage in labor-intensive industries in the mid-1980s, owing in part to rapid wage increases in Korea. The Korean firms in those industries had already established international marketing networks and thus could continue to utilize them in selling the products of their affiliates in China. In the case of those industries it is reasonable to conclude that the exports from the Korean affiliates in China were displacing the exports of the same goods from Korea. Whether it has led to an increase in China-Korea bilateral trade in intermediate goods and "reverse imports" will be addressed later in the paper. Low-cost labor in China was an important factor in Korean firms' decision to invest in capital-intensive heavy industries such as machinery and equipment, electronics and telecommunications equipment, and motors and freight (Table 11). This apparent contradiction with the theory of comparative advantage (i.e., investment in capital-intensive industries in labor-abundant China) can be easily explained, however, once we recognize the increasingly widespread practice of intra-firm, inter-process production arrangements or "international fragmentation" in production processes (Jones, 2001).⁶⁾

Production processes in heavy industries involve, relative to light manufacturing industries, a large number of separable sub-processes with different requirements for technology and factor intensity — some sub-processes requiring high-tech materials and component parts and others requiring an intensive use of low-cost labor. A firm in such an industry can minimize the unit cost of output by producing high-tech components in the home country where there is a high technological capability and assembling components in China where there is an ample supply of low-cost labor.

export to industrialized countries and also tend to be concentrated in labor-intensive industries that only require low-skill labor (Fung, Iizaka, and Parker 2002).

⁶⁾ Jones (2001) defines international fragmentation in the production process as a phenomenon that allows previously integrated production processes at one location to be separated into various component parts, some of them being "outsourced" to other countries. He adds that international fragmentation does not necessarily occur within a multinational corporation and can take place as arm's-length transactions whereby the market is utilized between firms.

**Table 11 KEXIM Survey on Motives for Korean investment in China
(As of 1998; %)**

	Natural resource or Raw materials	Low-cost labor	Export Expansion	High technology	Others	Total (number of sample)	
	Manufacturing	0.0	26.2	50.0	0.0	9.5	100 (42)
	Food and Beverage	0.0	0.0	0.0	0.0	100	100 (3)
	Textiles and Apparel	0.0	100	0.0	0.0	0.0	100 (2)
	Footwear and Leather	0.0	100	0.0	0.0	0.0	100 (2)
China	Petroleum and Chemicals	0.0	25.0	50.0	0.0	25.0	100 (4)
	Basic Metals	0.0	0.0	80.0	0.0	20.0	100 (5)
	Machine and Equipment	0.0	33.3	66.7	0.0	0.0	100 (6)
	Electronics and Telecomm equipment	0.0	18.8	62.5	0.0	18.8	100 (16)
	Motors and Freight	0.0	33.3	66.7	0.0	0.0	100 (3)

Note: The figures are the shares of the firms indicating the most important motive for investing abroad in total number of surveyed firms.

Source: KEXIM.

Indeed, many Korean firms in heavy industries have made such production arrangements since the late 1980s by establishing assembly plants in China. International fragmentation thus makes it possible for a developing country to become a site for producing some parts of a previously wholly integrated process in a capital-intensive industry and acquire new skills and knowledge by producing them.

The Korean affiliates in heavy industries in China may be serving as an export platform for their parent companies. Even though, in that case, the affiliates' exports from China are displacing exports from Korea, the international fragmentation of production processes has a positive effect on bilateral trade if parts and components are shipped from parent to affiliate firms or vice versa.

4.2. Trade Patterns of Korean Affiliates in China

As discussed above, we are able to make some informed guesses about the effect on the trade patterns of Korean investment in China from the knowledge of its motives. Here we try to find additional information on the investment-trade nexus by looking into the procurement and sales patterns of affiliates as reported in the KIET and KEXIM surveys. This examination provides us, however, only with a first approximation of the investment-trade nexus since it does not take into account the indirect linkage effect of investment that may take place in other sectors in the economy.

According to the KIET survey, 60.5 percent of the total procurement of intermediate goods and materials by Korean affiliates in China came from Korea, 31.3 percent from local suppliers in China, and 8.2 percent from third countries. According to the KEIXM survey, the procurement pattern of large-firm affiliates differs from that of all affiliates: the former imported 44.7 percent of intermediate goods and materials from Korea (78 percent of this share came directly from their parent companies or related affiliates). Local suppliers in China accounted for 39.2 percent of total procurement while third countries accounted for 16.1 percent. In other words, Korea's large-firm affiliates in China imported less from Korea, procured more locally and from third countries, implying that Korea's SME-affiliates in China relied more heavily than their large-firm counterparts on imports from Korea and less from local and third-country sources. This difference may be due to the network of SMEs being more localized inside Korea than that of large firms, which, we expect, is global in reach. Another reason might be that, relative to SMEs, large firms are concentrated in capital-intensive industries, which are internationally more fragmented in production processes than labor-intensive industries in which ODI from SMEs is concentrated.

The results of the KEXIM survey are consistent with the information obtained from the KIET survey. That is, Korean affiliates in China imported a large share of their intermediate goods and materials from Korea, albeit not as much as that by those outside of Asia (including China). They

generally procured more from local suppliers, creating substantial backward linkages within China. These results lead to the conclusion that as far as procurement by affiliates is concerned Korean investment in China has had a positive effect on the China-Korea bilateral trade and has created extensive backward linkages, thus contributing to the economic integration of the two countries.

Table 12 reports the procurement pattern of Korea's large-firm affiliates in China. In footwear and leather, basic metals, and machinery and equipment at least one half of intermediate goods and materials was imported from Korea. In food and beverage, apparel, non-metallic minerals, and motors and freight a significant portion of inputs was supplied locally, a sign of strong backward linkages of investment in China by the affiliates of large Korean firms. In textiles and basic metals at least a third of inputs was imported from third countries.

For manufacturing as a whole the share of inputs imported from Korea was 45.2 percent while the share of local procurement was 38.5 percent. These high figures suggest that investment in China by Korea's large-firm affiliates has had a positive effect on the bilateral trade.

Table 13 reports the sales and exports of Korean affiliates as reported in the two surveys. Korean affiliates in China exported 69.9 percent of their output to the rest of the world—27.9 percent to Korea and 42.0 percent to third countries (the top panel of the table). In comparison, its large-firm affiliates exported 53.3 percent of their output to the rest of the world—24.5 percent to Korea and 28.8 percent to third countries (the bottom panel of the table), indicating that Korea's SME affiliates in China exported a much larger share of their output. The share of local sales by the affiliates outside of China was much larger than that by the affiliates operating in China, suggesting that the latter performed largely as an export platform for Korean companies, especially for its SMEs.

Table 14 reports the sales and exports of large-firm affiliates in China, as reported in the KEXIM survey. For the entire manufacturing sector, local

Table 12 KEXIM Survey on Sources of Procurement by Korea's

**Large-Firm Affiliates in China in Manufacturing
by Industry (As of 2000; % of total procurement)**

	China		
	Local Procurement	Import	
		Korea	Third Countries
Manufacturing	38.5	45.2	16.2
Food and Beverage	80.0	20.0	0.0
Textiles	29.5	32.2	38.3
Apparel	72.1	24.8	3.1
Footwear and Leather	29.9	68.5	1.5
Petroleum and Chemicals	44.2	27.9	27.8
Non-metallic Minerals	100.0	0.0	0.0
Basic Metals	17.0	49.8	33.1
Machinery and Equipment	10.0	67.4	22.6
Electronics and Telecommunication Equipment	41.8	45.1	13.1
Motors and Freight	55.6	44.4	0.0

Data Source: KEXIM

Table 13 Sales Destination of Offshore Affiliates of Korean Firms by Region

KIET Survey (As of 1996)				
	Local Sales	Export		Total
		Korea	Third Countries	
Asia	64.5	14.2	21.3	100
China	30.2	27.9	42.0	100
North America	93.9	3.6	2.5	100
Europe	69.9	1.4	28.7	100
Latin America	58.0	10.9	31.1	100
KEXIM Survey (As of 2000)				
	Local Sales	Export		Total
		Korea	Third Countries	
Asia	49.1	30.0	20.9	100
China	46.7	24.5	28.8	100
North America	83.5	5.5	11.0	100
Europe	50.1	7.2	42.7	100
Latin America	68.5	20.1	11.4	100

Source: Ha and Hong (1998), KEXIM.

Table 14 KEXIM Survey on Sales Destination of Korea's Large-Firm

Affiliates in China in Manufacturing by Industry
(As of 2000; % of total procurement)

	China		
	Local Sales	Export	
		Korea	Third Countries
Manufacturing	45.8	24.9	29.3
Food and Beverage	76.2	0.0	23.8
Textiles	36.0	38.3	25.7
Apparel	17.0	41.1	41.8
Footwear and Leather	0.2	20.3	79.5
Petroleum and Chemicals	75.1	11.4	13.6
Non-metallic Minerals	10.9	89.1	0.0
Basic Metals	97.8	0.0	2.2
Machinery and Equipment	100.0	0.0	0.0
Electronics and Telecommunication Equipment	33.0	32.4	34.7
Motors and Freight	79.6	20.4	0.0

Source: KEXIM

sales in China accounted for 45.8 percent of total sales, reverse imports to Korea 24.9 percent, and exports to third countries 29.3 percent. Reverse imports were especially large in non-metallic minerals (89.1 percent), followed by apparel (41.1 percent), textiles (38.3 percent), and electronics and telecommunication equipment (32.4 percent). As noted earlier, offshore affiliates in most of those industries procured much of their intermediate products from their parent companies. This pattern of procurement, combined with heavy reliance on reverse imports, suggests the importance of intra-firm trade for large-firm affiliates in those industries.

For large-firm affiliates in China in the footwear and leather industry, third-country markets accounted for 79.5 percent of their total sales; for those in apparel 41.8 percent; and for those in electronics and telecommunication equipment 34.7 percent.

Reverse imports resulting from overseas investment clearly add to the bilateral trade between home and host countries and reflect a changing comparative advantage between them. One of the factors that motivated Korean firms to invest in China was the rapidly increasing gap in labor cost

between the two countries. An increasing gap in labor cost between the two would have caused a contraction in labor-intensive industries in Korea and an expansion in the same in China even without the transfer of those industries to China through investment and would have led to Korea's importing labor-intensive products from China. What overseas investment has done is to bring about a more rapid response of the international division of labor to changing comparative advantage and a greater expansion of bilateral trade between Korea and China than would have been otherwise (Ogawa and Lee, 1996).

5. CONCLUDING REMARKS

Since it began the Four Modernization reforms in the late 1970s China has made rapid progress in economic development, shifting its comparative advantage from primary to manufactured goods. We have shown that China has been converging to Korea in the export structure, its exports displacing many of Korean exports in third-country markets such as those in Japan and the United States. This is likely to have had the effect of bringing about structural changes in the Korean economy more rapid than if China had not made such a rapid convergence.

Rapid economic development in China has also led to a rapid increase in the China-Korea bilateral trade that began only in the late 1980s. It has expanded more rapidly than the rate at which the both countries have increased their respective trade with the rest of the world—a sign of an increasing integration of the two economies.

Korea has made direct investments in China, motivated by its cheap labor, expanding markets, and natural resources. We have shown that the investments have had a positive effect on the two countries' bilateral trade although some of them have led to the displacement of Korean exports in third country markets with exports from China.

How China's economic development will affect the Korean economy in the long run is obviously difficult to tell. In the short or intermediate run

Korea will be confronted with the problems of structural adjustment as China's economy develops, forcing Korea out of many of the sectors in which it currently has a comparative advantage. Clearly, the challenge for Korea is to develop new areas of comparative advantage that will help it achieve sustained economic growth.

The Korean government has selected a number of industries such as digital TV and next-generation mobile phones as the new core industries that will hopefully turn into leading sectors of economic growth (Chun, 2003). It is not clear, however, what specific measures the government can provide to promote those industries. Industrial policies such as those used to promote the heavy and chemical industries in the 1970s will be, we suspect, no longer appropriate for the Korean economy, which has become too big and too complex for such policies to be effective. Barring such policies, the government's role will probably be limited to providing public goods and social infrastructure, especially to promote high-value service industries, and keeping the capital and labor markets flexible and efficient.

The history of world economic primacy shows that the economies that once held the position of economic primacy subsequently declined for reasons that were generally unique to each case. In the case of Venice, for example, which held a world commercial leadership in 1550 but declined to insignificance some years before 1700, the factors that led to its decline included the competition from Portugal in spices, the British in woolens, and the Dutch and British in shipping; the rigid attitude of guilds and workers; and a leveling off of productivity (Kindleberger, 1996, p.65). Spain and the Low Countries, whose economic primacy followed that of Venice, also had a similar fate but for reasons of their own. Although what brought about the fall from the position of world economic primacy differed from case to case there appears to have been one factor common to all. And that is, in all those economies rigidity eventually took over the vitality and flexibility that they once had had (*ibid.*, p.36). It may have been some uncontrollable external factors that triggered the downfall, but it was the inability to adapt to and successfully deal with the external challenges that ultimately brought that

about. And that is a lesson that Korea must learn from the history of world economic primacy: if its economic growth ever falters it will be not because of rapid economic development in China, which is anyway beyond Korea's control, but because of the loss of vitality and flexibility in its economic system.

REFERENCES

- Akamatsu, Kaname, "A Historical Pattern of Economic Growth in Developing Countries," *The Developing Economies*, 1, March-August 1962.
- Booz-Allen & Hamilton, *Revitalizing the Korean Economy toward the 21st Century*, Seoul, 1997.
- Chun, Soo Bong, "Developing New Industries to Improve the Nation's Economic Competitiveness," (in Korean), *ITBI Review*, 19(2), December 2003, pp. 33-50.
- Fung, K. C. and Hitomi Iizaka, "Japanese Trade and Direct Investment Links with Korea and China," a paper presented at the 2002 KIEP/NEAEF Conference on Enhancing Investment Cooperation in Northeast Asia, Honolulu, Hawaii, August 8-9, 2002.
- Fung, K. C., Hitomi Iizaka, and Stephen Parker, "Determinants of U.S. and Japanese Direct Investment in China," mimeo, University of California, Santa Cruz, March 2002.
- Graham, Edward M. and Erika Wada, "Foreign Direct Investment in China: Effects on Growth and Economic Performance," in P. Drysdale, ed., *Achieving High Growth: Experience of Transitional Economies in East Asia*, Oxford University Press, 2001.
- Ha, Byung-Ki and Seock-Il Hong, "An Analysis of the Actual Management Conditions of Korean Investors Overseas (in Korean)," Seoul: Korea Institute for Industrial Economics and Trade, 1998.
- Howe, Christopher, "Introduction: The Changing Political Economy of Sino-

- Japanese Relations: A Long Term View,” in C. Howe, ed., *China and Japan: History, Trends, and Prospects*, Oxford: Clarendon Press, 1996.
- ICSEAD, *East Asian Economic Perspectives: Recent Trends and Prospects for Major Asian Economies*, 13, Kitakyushu, Japan, February 2002.
- Jones, Ronald W., “Globalization and the Fragmentation of Production,” *Seoul Journal of Economics*, 14(1), Spring 2001, pp. 1-13.
- Kim, Joon-Kyung and Chung H. Lee, “Korea’s Direct Investment in China and Its Implications for Economic Integration in Northeast Asia,” *Journal of Economic Policy*, 25(2), 2003.
- Kindleberger, Charles P., *World Economic Primacy: 1500 to 1990*, New York: Oxford University Press, 1996.
- Kojima, Kiyoshi, “A Macroeconomic Approach to Foreign Direct Investment,” in K. Kojima, ed., *Trade, Investment and Pacific Economic Integration*, Bunshindo, Tokyo, 1996.
- Korea Export-Import Bank (KEXIM), *Analysis of Business Activities of Korea’s Overseas Affiliates* (in Korean), Seoul: KEXIM, March 2000.
- Lall, Sanjaya, “The Technological Structure and Performance of Developing Country Manufactured Exports, 1985-98,” *Oxford Development Studies*, 28(3), 2000, pp. 338-69.
- Lee, Keun and Mihnsu Kim, “The Rise of China and the Korean Firms Looking for a New Division of Labor,” a paper presented at an international KIEP conference on “Rising China and the East Asian Economy,” Seoul, Korea, March 19-20, 2004.
- Naya, Seiji, *The Asian Development Experience*, Asian Development Bank, 2002.
- Ogawa, Kazuo and Chung H. Lee, “Changing Comparative Advantage and Direct Foreign Investment: The Case of Six Japanese Industries,” in Richard Hooley, Anwar Nasution, Mari Pangestu, and Jan Dutta eds., *Asia-Pacific Economic Cooperation: Theory and Practice*, 7, part B, Greenwich: JAI Press, 1996, pp. 279-296.

Tseng, Wanda and Harm Zebregs, "Foreign Direct Investment in China: Some Lessons for Other Countries," IMF Policy Discussion Paper (PDP/02/3), International Monetary Fund, February 2002.

Yamazawa, Ippai, *Economic Development and International Trade: The Japanese Model*, Honolulu: East-West Center, 1990.