Structural Adjustment and Outward Direct Foreign Investment in Korea

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This paper aims at analyzing the patterns of outward direct foreign investment by Korean firms in relation to the structural changes in the Korean economy since the late 1980s. Korean investment in China is single-factor dominated, seeking mainly cheap labor for export-oriented production, and there is relatively little, local-market oriented DFI. The rise of China as strong attraction for Korean labor-intensive DFI prompted the relative decline of Korean labor-intensive DFI in ASEAN during 1991 and 1992. Thus, more recent Korean DFI in ASEAN is becoming more capital-intensive DFI, whereas prior to 1990 Korean DFI in ASEAN was primarily cheap-labor oriented and only secondarily related to the local market for final goods. Korean investment in Western Europe and North America has been local-market oriented and dominated by the three sectors of electronics, industrial and other chemicals.(*JEL* Classification: F21)

I. Introduction

The motivations and patterns of direct foreign investment by developing country firms have been studied since the early 1980s (Lall 1983; Kumar and McLeod 1981). Since the late 1980s, a rapidly increasing volume of DFI by the newly industrializing economies has attracted further academic interest in this issue. This new phenomenon is main-

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[**Seoul Journal of Economics** 1994, Vol. 7, No. 2]

ly explained by structural adjustments in those economies (Lall 1991; Lee 1990; Lee and Lee 1992).

Economists have, however, conducted few empirical studies of the determinants of DFI by NICs. Lee and Plummer (1992) first employed regression analysis to verify the determinants of outward DFI by Korean firms. However, they did not separate Korean investment in developing countries from that in advanced countries in their analysis, although they recognized the different motivations and patterns of Korean outward DFI in different regions. Lee and Lee (1992) differentiated more explicitly the different motivations of Korean outward DFI, at least in conceptual terms, and supported their analysis with some statistical data. Building upon the previous study, this paper aims to analyze the patterns of direct foreign investment (hereafter DFI) by Korean firms in relation to the structural changes in the Korean economy since the late 1980s. Different patterns of Korean DFI across regions and times are identified, and regression analysis is employed to verify the arguments.

In section two, relying on the industrial census data of the years of 1987, 1988, 1989, and 1991, structural changes in manufacturing sectors of the Korean economy are examined to address the question of what motivated Korean firms tc invest abroad. Section three examines the patterns of Korean investment in ASEAN. Korean investment cases and hosting sectors are classified in terms of their motivations and main features. Section four, and five, examines the Korean DFI pattern in China, and in Western advanced countries, respectively. Section six examines general Korean outward DFI in the world to provide an overall assessment as well as to synthesize findings in the preceding sections. The last section concludes the paper with a brief summary.

II. Structural Changes in the Korean Economy, 1987-1991

A. Structural Changes

While there has been increasing concern about the recent and future performance of the Korean economy, the mid-1980s is regarded as a boom period for the Korean economy. First, from 1986 to 1988, the Korean economy exhibited an average annual growth rate higher than 12 percent, while it maintained an average annual growth rate of less than 9 percent between 1980 and 1985 (NSO of Korea, 1991). Second, the persistent current account deficit in the 1970s and early 1980's turned into

a surplus of 4.6 billion US dollars in 1986 for the first time in 20 years (except 1978), and the surplus peaked in 1988 at 14.2 billion US dollars. The current account has resumed deficit status since 1990.

These favorable economic conditions, combined with the partial political democratization since the beginning of the Roh regime in 1987, were soon followed by some deterioration in economic conditions. First, an increasing number of labor strikes demanding higher wage rates and better working conditions contributed to a substantial increase of real wage rates. Surpassing the growth of labor productivity, they partially eroded the international competitiveness of Korean products, in particular labor-intensive products. Second, with the emerging surplus in current account, the Korean Won underwent rapid appreciation from 1986 to 1989, which further eroded the price competitiveness of Korean products in the world markets. The Won appreciation, in combination with the rise of oil prices after 1988, meant that the good days of the Korean economy were doomed to end soon. Growth rates were cut in half in 1989, and the current acount returned to a deficit in 1990 and deteriorated further in 1991 as export performance markedly dropped off, although the economy made a slow recovery since 1991.

Based on the data compiled from the industrial census on 28 manufacturing sectors, Table 1 points out several important changes in the Korean industrial economy. Table 1 utilizes the following decomposition of gross profit per an unit of capital:

Capital profitability (= gross profit/capital)
= (gross profit/value-added) × (value-added/capital)
= (value-added – wage sum)/(value-added) × (value-added/capital)
= (1 – unit wage cost) × (capital productivity)

In other words, we can decompose the changes in capital profitability into changes in unit wage cost and capital productivity (see Lee and Plummer 1992 for more on the decomposition). We can see from the Table 1, capital profitability of manufacturing business deteriorated at an annual average of 9.0 percent over the 1987-89 period. This decrease is decomposed into two components: first, an average 6.8 percent per annum decrease in capital productivity, and, second, an average 5.6 percent per annum increase of unit wage cost (or equally an average 2.4 percent per annum decrease in unit gross profit). The economy wide increase of wage rates contributed to the declining capital profitability as wage rates increased at an annual aveage of 20.8 per-

TABLE 1
CHANGES IN THE KOREAN INDUSTRY, 1987-1991(AVERAGE ANNUAL CHANGE)

	1987-89	1989-91
profit/capital	-9.0%	6.2%
output/capital	-6.8%	2.9%
wage/output	5.6%	-6.4%
profit/output	-2.4%	3.3%
average wage	20.8%	18.7%
capital stock	16.4%	16.1%
labor/capital	-18.7%	-18.5%
number of firms	8.4%	6.6%
net output	8.1%	18.5%

Source: Calculations using the Korean industry Data Base compiled from raw data in Korean Industrial Census Year books, 1987, 1988, 1989, 1991.

cent during 1987-89.

Table 1 also shows that between 1987 and 1989 and also between 1989 and 1991 the Korean economy continued to become more capital-intensive as shown by the decrease in the labor-capital ratio at an annual average of more than 18 percent.[1] This change has been, of course, a trend, but also reflects to Korean business effort to adjust to the rising wage rates by adopting more labor-saving production methods. As a matter of fact, Table 2 shows that every manufacturing subsectors, both labor-intensive and capital-intensive sectors, became more capital-intensive than before.

Table 1 also enables us to identify some difference in the economic conditions between the two periods of 1987-89 and 1989-91. Overall, the 1989-91 period was much better than the preceding period, as shown not only by a more rapid output growth but also by an average 6.2 percent per annum increase of capital profitability. This improvement of capital profitability was caused by a growth of capital productivity and, more importantly, a decrease of unit wage cost. The fact that unit wage cost decreased despite the continuing rise of average wage rates implies that Korean business effort to save wage cost by adopting

[1]Unfortunately, this labor-capital ratio is not free from price effects as capital values here are measured at its current values. However, over the 1987-91 period, labor-capital ratio has certainly decreased as average employment in manufacturing sectors has declined in absolute terms. Also, the ratio of current capital values to total wage cost (employment times wage rates) has also increased.

more capital-intensive production methods was successful.

B. Manufacturing Subsectors

Now, let us try to deliver a detailed sectoral picture of structural changes in the Korean economy since the late 1980s. Table 2 presents a detailed sectoral picture for the same variables covered in Table 1. These variables include capital profitability, unit wage cost, capital productivity, labor-capital ratio, capital accumulation rates, average wage rates, and number of firms in each sector, etc.

First, those sectors experiencing more than the average (9.0 percent, see Table 1) decline in capital profitability (gross profit/capital ratio) over the 1987-89 period include: textiles, apparel, leather & fur, paper, printing, petroleum refinery, petroleum products, rubber products, plastic products, pottery & china, glass products, medical & scientific products, and miscellaneous products. You should note that not all of the above listed industries are labor-intensive industries.

Table 2 shows that those sectors showing more than an average percentage (2.4%) reduction of unit profit (equivalently more than an average increase in unit wage cost) over the 1987-89 period include: textile, apparel, leather & fur, paper, printing, industrial chemicals, rubber products, pottery & china, glass products, basic metal, non-electrical machinery, electrical & electronics, transport equipment, medical & scientific products, and miscellaneous products.

If we take the average labor-capital ratio as the measure of an industry's labor intensity, then strongly labor-intensive industries include: apparel, leather & fur, footwear, furniture, rubber product, pottery & china, medical & scientific product, and miscellanous product. All of these, except footwear and furniture, experienced a substantial reduction in capital profitability and a substantial rise in unit wage costs. For the cases of marginally labor-intensive industries, such as textiles, wood products, prinitng, non-electrical machinery, and electronics, the degree of reduction in capital profitability and the rise is unit wage costs is much less severe, except in the case of textiles.

Those sectors whose capital profitability decreased rapidly due to the rising unit wage costs felt the need to pursue outward foreign investment and to produce using cheap labor in other Asian countries including China. Given the previous accumulation of capital with several years of trade surpluses and the deregulation of the former tight governmental control of outward investment. Korean labor-intensive

TABLE 2

CHANGES IN KOREAN MANUFACTURING SUB-SECTORS

(Average annual change, 1987-89 and 1989-91)

Sector names and codes		Profit/capital		Output/capital		Wage/output	
		87-89	89-91	87-89	89-91	87-89	89-91
Food	311	-3.0%	12.6%	-2.2%	9.3%	2.5%	-8.9%
Beverage	313	-0.0%	0.0%	0.1%	-1.9%	0.7%	-12.0%
Tobacco	314	1.9%	16.5%	1.3%	16.7%	-11.6%	4.0%
Textile	321	-16.7%	0.8%	-12.1%	-1.5%	10.5%	-3.8%
Apparel	322	-14.4%	10.8%	-10.8%	3.2%	4.9%	-8.5%
Leather & Fur	323	-19.0%	9.2%	-15.3%	5.5%	9.4%	-6.5%
Footwear	324	-4.2%	-8.5%	-2.9%	-4.6%	1.9%	5.2%
Wood product	331	-0.9%	25.3%	1.2%	15.9%	2.8%	-11.5%
Furniture	332	0.9%	19.6%	2.8%	9.0%	2.5%	-13.8%
Paper product	341	-12.4%	4.5%	-9.8%	1.9%	8.0%	-6.6%
Printing	342	-9.1%	15.7%	-6.1%	11.0%	5.8%	-7.3%
Indust. chemical	351	-8.9%	-11.6%	-5.5%	-13.2%	16.5%	-6.6%
Other chemical	352	-0.3%	8.0%	-0.5%	7.6%	-0.7%	-1.9%
Petro refinery	353	-25.7%	1.7%	-24.9%	1.0%	20.1%	-11.2%
Petro product	354	-14.8%	-7.6%	-13.3%	-3.0%	6.4%	14.2%
Rubber product	355	-19.8%	-8.2%	-16.9%	-23.1%	4.3%	-26.8%
Plastic product	356	-9.7%	-2.0%	-7.6%	-3.8%	5.1%	-3.8%
Pottery &China	361	-10.0%	0.4%	-6.8%	-0.5%	5.0%	-1.2%
Glass product	362	-12.6%	6.2%	-7.6%	-0.2%	12.6%	-12.6%
Oth. non-metal pr.	369	5.0%	16.9%	6.5%	12.8%	4.5%	-11.3%
Basic metal	371	-7.5%	10.1%	-4.8%	7.6%	12.9%	-8.8%
Non-ferrous metal	372	-2.4%	20.6%	-2.6%	18.3%	-0.5%	-4.9%
Fabricated metal	381	-9.0%	1.4%	-7.7%	0.4%	2.8%	-1.9%
Non-elec. machine	382	-8.0%	2.7%	-5.7%	0.9%	5.2%	-3.4%
Elec. & Electronic	383	-5.7%	5.0%	-3.0%	2.0%	7.2%	-6.7%
Transport equipm.	384	-8.9%	19.1%	-5.1%	12.7%	8.4%	-10.8%
Medical & Scient.	385	-18.1%	3.6%	-14.9%	-0.2%	6.7%	-6.3%
Miscellaneous	390	-19.7%	0.5%	-17.5%	-2.5%	4.1%	-4.4%

industries began to show a sudden upsurge of outward direct investment from 1988. Of course, given the rising protectionism in the world market, other motivations to go abroad included acquisiton of foreign raw materials and access to foreign markets.

Table 2 also shows changes in manufacturing sub-sectors during the later period of 1989 to 1991, compared to the earlier period of 1987 to 1989. It is shown that all the manufacturing sub-sectors experienced some improvement in their capital profitability and capital productivity, except the two cases of footwear and industrial chemical. Footwear case is special among the labor-intensive sectors. During the 1987-89

TABLE 2
(Continued)

	Profit/output		Capital stock		Labor/capital		No. of firms	
	87-89	89-91	87-89	89-91	87-89	89-91	87-89	89-91
Food	-0.8%	2.9%	17.0%	15.5%	-16.1%	-14.8%	2.0%	1.5%
Beverage	-0.1%	2.0%	27.0%	23.6%	-15.7%	-27.1%	-11.5%	-2.4%
Tobacco	0.6%	-0.2%	15.6%	-5.2%	-23.9%	3.1%	-2.3%	-2.4%
Textile	-5.2%	2.3%	14.5%	15.5%	-19.5%	-20.1%	4.5%	0.8%
Apparel	-4.0%	7.3%	11.4%	9.5%	-21.4%	-20.4%	12.7%	0.1%
Leather & Fur	-4.4%	3.5%	20.1%	15.3%	-24.1%	-19.0%	8.0%	0.7%
Footwear	-1.3%	-4.1%	10.9%	56.7%	-18.8%	-15.1%	5.0%	57.6%
Wood product	-2.0%	8.2%	14.4%	16.6%	-15.4%	-17.7%	6.6%	4.9%
Furniture	-1.9%	9.7%	14.1%	23.0%	-12.7%	-23.3%	17.5%	16.9%
Paper product	-2.8%	2.6%	13.4%	15.0%	-17.5%	-19.9%	10.6%	9.2%
Printing	-3.2%	4.3%	18.4%	2.9%	-17.5%	-7.8%	9.5%	5.5%
Indust. chemical	-3.6%	1.8%	14.2%	39.6%	-11.0%	-29.3%	6.2%	2.7%
Other chemical	0.2%	0.4%	13.3%	4.6%	-15.9%	-8.5%	6.7%	5.3%
Petro refinery	-1.0%	0.7%	55.9%	-36.6%	-23.3%	-10.7%	-3.9%	117.9%
Petro product	-1.7%	-4.7%	17.9%	46.3%	-22.0%	-14.1%	3.3%	-85.9%
Rubber product	-3.5%	19.5%	18.4%	57.2%	-28.0%	-58.6%	15.4%	-35.9%
Plastic product	-2.3%	1.9%	16.9%	28.3%	-19.0%	-23.5%	12.8%	-0.9%
Pottery & China	-3.5%	0.9%	4.7%	-0.6%	-18.7%	-16.0%	12.6%	14.8%
Glass product	-5.5%	6.5%	14.8%	28.7%	-17.6%	-27.7%	9.2%	7.8%
Oth. non-metal pr.	-1.4%	3.7%	11.9%	16.1%	-9.9%	-15.0%	3.1%	10.0%
Basic metal	-2.9%	2.3%	12.6%	4.6%	-16.5%	-15.8%	9.3%	15.1%
Non-ferrous metal	0.2%	1.9%	11.9%	-1.2%	-13.7%	-2.9%	14.1%	5.2%
Fabricated metal	-1.4%	1.0%	20.6%	11.1%	-22.2%	-17.6%	12.8%	1.6%
Non-elec. machine	-2.4%	1.7%	14.1%	12.9%	-17.8%	-17.5%	16.8%	16.6%
Elec.& Electronic	-2.8%	2.9%	4.7%	12.1%	-16.3%	-20.0%	16.4%	7.0%
Transport equipm.	-4.0%	5.6%	4.2%	15.8%	-13.2%	-16.4%	17.1%	8.3%
Medical & Scient.	-3.7%	3.8%	23.5%	8.7%	-27.8%	-19.4%	16.8%	6.5%
Miscellaneous	-2.7%	3.1%	23.3%	13.6%	-28.3%	-22.5%	3.6%	-2.9%

Source: Calculations using author's Data base compiled from raw data in Korean Industrial Census Yearbook, 1987, 1988, 1989, 1991

period, its capital profitability decreased much less than other labor-industries, whereas during the 1989-91 period its capital profitability decreased faster than the preceding period and also than other labor-intensive sectors whose capital profitability rather increased this time. Footwear is the only two sectors, together with tobacco, where unit wage cost still increased during the 1989-91 period. Industrial chemical is one of the few sectors, together with footwear, whose capital productivity decreased faster than the preceding period, while in most of other sectors, capital productivity improved (increased or decreased

less).

The general improvement of economic conditions in 1990 and 1991 in Korean manufacturing must be partly responsible for the modest slowdown of Korean outward DFI, except those going into China, in 1991 and 1992. Also, motivations of Korean firms for outward DFI seems to be changing and became more diverse, ranging from simple cost considerations to responses to protectionistic measures, market expansion, and to active globalization strategy.

III. Korean Investment in ASEAN Countries

A. The 1986-1990 Period

Table 3 shows the trend of Korean investment cases in the ASEAN-four countries of the Philippines, Indonesia, Malaysia, and Thailand from 1987 to 1992. I divided the period into two sub-periods since the early and later periods show different patterns in terms of the sectoral distribution of investment. The last row in the table clearly shows that Korean investment in ASEAN reached a peak in 1990 and then started to decline, at least in terms of the absolute number of DFI cases.

Table 3 also presents the sectoral DFI intensity as measured by the number of cases of Korean DFI divided by the total number of firms in each Korean manufacturing subsector. During the first period, the DFI-prone sectors included the following 10 sectors: apparel, leather & fur, footwear, wood products, industrial chemical, other chemical, rubber products, pottery & china, electric & electronical products, and miscellaneous products (see the intensity column in Table 3).

It is interesting to note that the textile sector is not a strongly DFI-prone sector. Although it has generated as many DFI cases in absolute numbers (30) as leather & fur or footwear, its DFI intensity measured relative to the total number of firms in the sector is low. The low DFI intensity is explained by its only marginal labor intensity as well as government restrictions on outward DFI; the Korean government was concerned with the possibility of undesirable transfer of some valuable technological know-how in Korean textile industry.[2]

Several surveys have been conducted on Korean DFI, and they have identified diverse motivations for outward DFI by Korean firms (KBF

[2]The Ministry of Commerce and Trade designated some sub-sectors of textile as restricted outward DFI sectors. For details, see Ministry of Commerce and Trade (1992).

TABLE 3

TRENDS IN KOREA INVESTMENT IN ASEAN-4 COUNTRY
(number of cases approved)

	A. First Period (87-90)						B. Second Period (91-92)					
Sector	1987	1988	1989	1990	Sub-total	Inten-sity	1991	1992h	1992 Sub-Total		Inten-sity	Firm No's
311	0	0	1	4	5	0.13%	1	1	3	2	0.05%	3981
313	0	0	1	1	2	0.29%	0	0	0	0	0.00%	683
314	0	0	0	0	0	0.00%	0	0	0	0	0.00%	21
321	0	1	8	8	17	0.22%	6	7	8	13	0.17%	7858
322	3	5	14	29	51	0.78%	10	5	8	15	0.23%	6497
323	0	1	7	15	23	1.78%	2	4	5	6	0.47%	1290
324	1	5	7	1	14	1.99%	3	1	1	4	0.57%	704
331	0	2	3	8	13	0.65%	6	0	2	6	0.30%	1994
332	0	0	0	2	2	0.12%	2	1	1	3	0.17%	1727
341	0	0	1	1	2	0.11%	3	1	3	4	0.21%	1876
342	0	0	0	0	0	0.00%	1	0	0	1	0.03%	2864
351	0	2	5	11	18	1.90%	7	1	4	8	0.84%	947
352	1	0	3	6	10	1.00%	1	0	0	1	0.10%	998
353	0	0	0	0	0	0.00%	1	1	2	2	16.67%	12
354	0	0	0	0	0	0.00%	1	0	0	1	0.28%	352
355	0	2	6	2	10	0.63%	5	3	3	8	0.51%	1584
356	0	2	3	10	15	0.43%	1	1	1	2	0.60%	3466
361	0	1	0	1	2	0.41%	1	0	1	1	0.21%	483
362	0	0	0	0	0	0.00%	1	1	1	2	0.60%	335
369	0	0	0	2	2	0.08%	5	2	3	7	0.27%	2626
371	0	0	2	1	3	0.38%	1	0	2	1	0.13%	797
372	0	0	0	2	2	0.30%	0	0	0	0	0.00%	671
381	0	1	0	7	8	0.15%	12	5	5	17	0.31%	5463
382	0	0	1	0	1	0.02%	4	4	5	8	0.14%	5912
383	1	8	8	25	42	0.69%	21	3	9	24	0.39%	6120
384	0	0	0	0	0	0.00%	0	0	0	0	0.00%	2511
385	0	2	3	2	7	0.64%	1	0	2	1	0.09%	1100
390	0	8	18	20	46	1.64%	15	5	12	20	0.71%	2812
SUM	6	40	91	158	295	0.45%	111	46	81	157	0.24%	65684

Note: ASEAN-4 countries include: Philippines, Indonesia, Malaysia, Thailand. The column, 1992h, count only up to the end of June 1992. Subtotal in B is the sum of the cases in 1991 and 1992h. The number of firms count only firms exisiting in each Korean manufacturing sector in 1989. Intensity is defined as total cumulative investment cases divided by the number of firms in each sector.

Source: Author's Data Base complied from the raw data supplied by the Bank of Korea . See Table 2 for sector names.

TABLE 4

SURVEY RESULTS ON MOTIVATIONS FOR DFI (%)

	Southeast Asia	OECD Region
Market expansion	21.1	29.3
Low production cost	33.2	7.6
To avoid trade barriers	7.8	18.2
Raw material	8.6	4.5
Advanced technology		6.0
Relocation of excess capacity	4.7	
Firm expansion strategy	21.6	22.7
Others	3.0	3.0
Total	100%	100%

Source: KBF (1991) survey of 116 cases in operation at the end of 1989.

TABLE 5

PATTERNS OF KOREAN INVESTMENT IN ASIA (ASEAN)

Motivations	Sectors	Features
Cheap Labor	Apparel, Leather & Fur, Rubber Product, Pottery & China, Miscellaneous Product	Strongly labor-Intensive; Rapid increase in unit wage costs
Markets	Industrial Chemical, Other Chemical, Electric & Electronic Product	No rapid increase in unit wage costs or decrease in capital profitability
Raw Material	Wood Product	No rapid increase in unit wage costs or decrease in capital profitability
Special Case	Footwear	Strongly labor-intensive; No rapid increase in unit wage costs or decrease in capital profitability

1991; IITM 1991). Table 4 shows the result of the survey done by the KBF in 1991. As expected, in Korean investment in Southeast Asia, the main motivation is to reduce production costs by hiring cheap labor; the next most important reason seems to be local market expansion, as well as firm growth strategy. However, none of those surveys have matched the different motivations to the different manufacturing sub-sectors.

An empirical hypotheses is that the above mentioned 10 DFI-prone sectors can be classified in terms of their different motivations to go

abroad. Table 5 exhibits the following four types of investment patterns: cheap labor seeking, market-seeking, raw material-seeking investment, and the special case of the footwear sector. The distribution of sectors according to motivations is based on *a priori* reasoning as well as DFI-related stories in each sector.

First, cheap labor-seeking investment includes apparel, leather & fur, rubber products, pottery & china, and miscellanous products. The common features of these sectors are that they are all strongly labor-intensive sectors experiencing a more than average increase in unit wage costs and a decline in capital profitability. In these strongly labor-intensive sectors, Korean DFI firms are not seeking local markets. Most of their products are re-exported to Korea or third-country markets.

According to the IITM survey (1991), in about 61 percent (68 out of 111 cases) of Korean DFI cases in the ASEAN-4 countries, Korean firms did not participate in the local market. The general pattern was that the more labor intensive the DFI in a hosting country, the smaller the share of local market in total market outlets. For instance, in the case of Korean DFI in the Philippines, which attracted the most labor-intensive DFI, the share of the local Philippine market is the lowest.

Second, there are primarily market-seeking (and, maybe, secondarily cheap labor-seeking) investment, as in the cases of industrial and other chemicals, electrical and electronic products. These sectors are capital-intensive or marginally labor-intensive sectors which did not experience a major decrease in its capital profitability.

Classification of these sectors as market-seeking DFI is based on information about the nature of the DFI as revealed in surveys. For instance, according to the KEIB survey (1992), the Korean DFI firms in Asia with a high local market sales ratio are industrial chemicals and cement. The survey also identified the electric and electronic sectors as primarily market-seeking DFI although this market-orientedness is clearer in the case of the OECD region. Among the ASEAN countries, Malaysia attracted more capital-intensive and less labor-intensive Korean DFI than other ASEAN countries. Korean DFI in Malaysia is in chemicals, electric and electronic goods (IITM 1991, p. 95), and the share of local sales is high.

Third, there is one case of raw material-seeking investment, the wood product sector. Wood product is a marginally labor-intensive sector but did not experience either a major increase in unit wage costs or a major decrease in capital profitability. Thus, although cheap labor in Asia would be an additional attraction, it does not seem to be a prima-

ry motivation. Wood resources in the hosting countries seem to be the primary attraction.

Fourth, the case of footwear is special. It is a strongly labor-intensive sector, but it did show neither a major increase in unit wage costs nor a decrease in capital profitability at least until 1989 (although the situation turned into a more serious crisis in 1991 and 1992). The story of DFI in the footwear industry is special. This sector is one of those sectors where outward DFI began earlier than in other industries. The peak of outward DFI from footwear industry was 1989. However, the "outward" boom resulted in the so-called "excessive competition" among Korean investors; for instance, Indonesia attracted 3 Korean footwear investors in 1988 and 8 in 1989. With the declining domestic footwear export volumes and rising worry about de-industrialization in the Korean footwear industry, the Korean government designated footwear as a DFI-restricted industry and as an object of "industry rationalization" (Ministry of Commerce 1992; KEIB 1992). Due to these moves, outward DFI from footwear suddenly dropped and domestic exports increased again. The perception was that the Korean footwear industry did not need to go abroad because it could still maintain competitiveness. As a matter of fact, many of those firms are said to have come back to the home country because domestic production proved to be still competitive and they were disappointed at the low productivity of foreign workers.

Thus, outward DFI by the Korean footwear industry during these years should be understood as "aggressive," not defensive, DFI based on the strong ownership advantage of advanced production technology.[3] However, since 1990 the price competitiveness of Korean footwear products seems to have rapidly eroded as the quality of products from other Asian footwear makers improved. As shown in Table 2, captal profitabiltiy, capital productivity, and unit wage cost all worsened seriously in the footwear sector, whereas in most other sectors situation became favorable than before. Actually in 1992 many major Korean footwear makers went bankrupt. It seems that the government's restrictive DFI policies toward footwear industry are partly responsible for the current situation, and Korean producers should have pursued more outward DFI in Southeast Asia.[4]

[3]Ownership advantages refers to some tangible and intangible assets a firm has exclusively, such as special production technologies, brand names, marketing channels, and so forth. For more, see Lee and Plummer (1992) and Dunning (1988).

TABLE 6
DETERMINANTS OF KOREAN INVESTMENT IN ASEAN-4

A. Dependent variable: SEA8790

Estimated Parameters of Independent Variables

	INT	*L/K2*	*L/K*	*RAW*	*MKT*	*FWEAR*	Ad. R^2	*F*
(1)	0.0008		27.226	0.0030	0.0097	0.0123	0.453	6.59**
	(0.53)		(2.46)*	(0.65)	(3.42)**	(2.50)*		
(2)	-0.0005	-64498	50.656	0.0027	0.0099	0.0117	0.445	5.33**
	(-0.2)	(-0.82)	(1.64)#	(0.54)	(3.46)**	(2.33)*		

B. Dependent Variable: SEA9192

	INT	*L/K2*	*L/K*	*SEA8790*	*MKT*	*FWEAR*	Ad. R^2	*F*
(1)	0.0178		-87.023		-0.0086	0.0097	-0.06	0.44
	(1.74)+		(-1.1)		(-0.4)	(0.28)		
(2)	0.0300	768245	-345.70				0.050	1.71^
	(2.31)*	(1.50)#	(-1.8)+					
(3)	0.0300	770604	-347.57	0.035			0.011	1.10
	(2.25)*	(1.46)#	(-1.7)+	(0.03)				

Notes: *t*-statistics in the parentheses under the coefficients; **, *, +, #, and ^ marks mean significant at 1, 5, 10, 15, and 20 percent, respectively.

Variable List:

SEA8790: Investment intensity measured as the number of DFI cases divided by the total number of firms in each sector for investment in ASEAN 4 countries from 1987 to 1990.

SEA9192: Investment intensity measured as the number of DFI cases divided by the total number of firms in each sector for investment in ASEAN 4 countries during 1991 and the first half of 1992.

INT: intercept term in regression model

L/K: labor-capital ratio in Korean manufacturing sectors in 1988

L/K2: Square of *L/K* [= (*L/K*)(*L/K*)]

RAW: dummy for wood product sector

MKT: dummy for industrial chemical, other chemical, and electronic sectors

FWEAR: dummy for footwear sector

The results of a regression analysis presented in Table 6 basically support our classification and related arguments on Korean DFI behav-

[4]Only in 1993, the Korean government abolished "unjustifiable" restrictions against outward DFI, for instance by Korean footwear makers. However, it came too late.

ior in ASEAN. The cross section regression (model A) has a relatively small number of observations, but the adjusted R^2 is fairly high and the overall significance of the models is also high as shown by F-statistics.

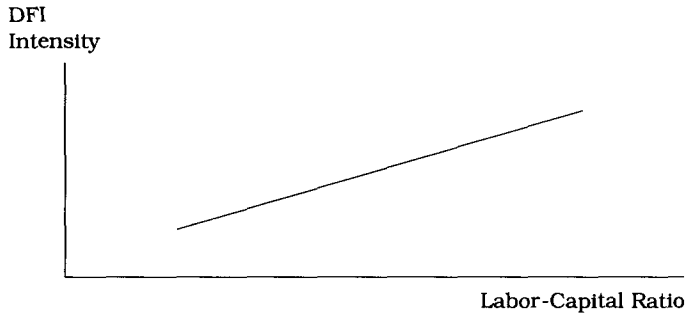
In model A, the dependent variable is DFI intensity during the period, 1987 to 1990, the first stage of Korean DFI in ASEAN. In the first equation (A-1), DFI intensity is regressed against the labor-capital ratio and three dummies (first for the wood product sector, second for the industrial and other chemical and electronics sectors, and third for the footwear sector). Since the labor-capital ratio and change in the unit profit (= 1 – unit wage cost) turned out to be highly correlated, we omitted the unit profit variable. The labor-capital ratio is significant at 5 percent, and two dummy variables, one for market-motivated DFI sectors (*MKT*) and the other for the footwear sector (*FWEAR*), are also significant. However, the dummy for the wood product sector was insignificant, as expected from the relatively low outward DFI intensity of the sector. The second equation (A-2) examines the possibilty of a quadratic function relationship between the DFI intensity and the labor-capital ratio by adding a square of the labor-capital ratio. The linear relationship implied by model (A-1) turns out to be better, as the adjusted R^2 ratio declines when the quadratic term is included in the model (A-2).

The regression results in model A confirms, first, that outward DFI from those four groups of DFI-prone sectors can be explained by different motivations, and, second, that for the first group, strong labor intensity and hence rising unit wage costs, is the primary reason for outward DFI. For the other three groups, the regression results do not identify explanatory variables themselves, since these groups are introduced as dummy variables. However, the significance of the dummy variables confirms that their DFI is not primarily based on finding cheap labor. Marketing, raw material, and other sector-specific reasons for DFI from the remaining three groups are stated and justified by survey information.

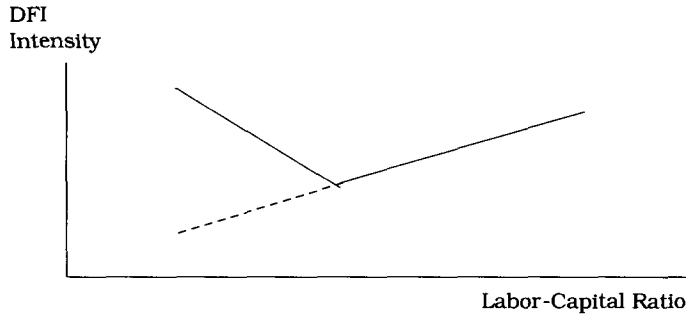
B. The Changing Pattern in the 1991-92 Period

As we mentioned above, the pattern of Korean DFI in ASEAN during the second period (1991-92) is different from the first period. As seen in Table 3, the absolute decline in the number of cases is mostly concentrated in the labor-intensive sectors of apparel, leather goods, footwear, and miscellaneous manufacturing, as well as in the market-motivated sectors of industrial and other chemicals and electronics sectors. Those

(A) First Period (1987-90)



(B) Second Period (1991-92)



(C) In the Future?

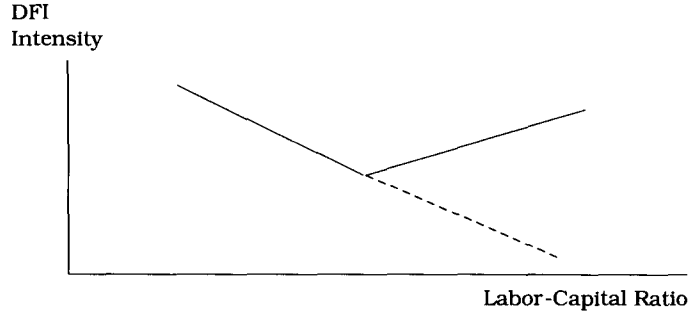


FIGURE 1
CHANGES IN THE PATTERN OF KOREAN DFI IN ASEAN

sectors which are now attracting more Korean DFI and also gaining in terms of DFI intensity include: petroleum products, glass products, non-ferrous metal products, fabricated metal products, and machinery and equipment industries.

Regression results in Table 6 verify such transitional patterns in Korean investment in ASEAN. The model (B-l) shows that the same regression model which worked well in the earlier period can no longer explain the DFI pattern for the more recent period. The coefficient of the labor-capital ratio variable is insignificant, and the adjusted R^2 became negative.

The second model (B-2) represents an attempt to find a new relationship between DFI intensity and the labor-capital ratio during the second period by adding the square of the labor-capital ratio as a new regressor. The result shows a much improved fit. The labor-capital ratio has a negative coefficient, and is significant at the 15 percent level, while the square of the labor-capital ratio is positive, and is significant at the 20 percent level. As in Figure 1, these results imply a new U-shaped quadratic function between DFI intensity and the labor-capital ratio for the second period, as opposed to the upward-sloping linear function for the first period. This change is mostly due to the recent increase in capital-intensive DFI.

IV. Korean Investment in China

Table 7 shows sectoral distribution of Korean investment in China from 1988 to 1992 (approval basis). Dividing these case numbers by the total number of firms in each sector, we attempt to measure the tendency to go abroad. According to the DFI-intensity column, Korean investment in China concentrated in (beginning with the sectors showing the highest intensity) leather & fur, miscellaneous products (toys, etc.), pottery & china, apparel, footwear, glass products, food products, wood product, and electronics industries. In terms of the absolute number of cases, the sectoral order runs from miscellanous goods, apparel, leather & fur, electronics, textiles, to food products.

It is clear that DFI intensive sectors correspond to labor-intensive sectors. Compared to the case of Korean investment in ASEAN, there are fewer local market-motivated investments in China, due to the closed nature of China's domestic market. As a matter of fact, DFI intensity is very low in the chemical and other chemical industries and is at an average level in the electrical and electronic industries. Such a pattern is in contrast to the pattern of Korean investment in ASEAN where both cheap labor and local market-seeking DFI are observed.

Regression results in Table 8 support the above arguments. The coefficients on the labor-capital variables are higly significant (at the one

TABLE 7
TRENDS IN KOREAN INVESTMENT IN CHINA, 1987-92
(number of cases approved)

Sector	1988	1989	1990	1991	1992h	1992	Total 1	Total 2	Intensity	Firm No's
311	1	1	5	6	4	15	17	28	0.4%	3981
314	0	0	0	0	0	1	0	1	0.0%	683
313	0	0	0	0	0	0	0	0	0.0%	21
321	0	0	2	7	11	18	20	27	0.3%	7858
322	0	0	3	19	26	53	48	75	0.7%	6497
323	0	2	3	10	13	24	28	39	2.2%	1290
324	0	0	1	4	0	1	5	6	0.7%	704
331	0	0	3	3	2	10	8	16	0.4%	1994
332	0	0	0	2	2	4	4	6	0.2%	1727
341	0	0	0	2	2	4	4	6	0.2%	1876
342	0	0	0	0	0	0	0	0	0.0%	2864
351	0	1	0	0	0	4	1	5	0.1%	947
352	0	1	1	0	1	3	3	5	0.3%	998
353	0	0	0	0	0	0	0	0	0.0%	12
354	0	0	0	0	0	0	0	0	0.0%	352
355	0	0	2	0	0	0	2	2	0.1%	1584
356	1	0	1	0	1	2	3	4	0.1%	3466
361	0	1	0	0	0	2	1	3	0.2%	483
362	0	1	0	1	0	3	2	5	0.6%	335
369	0	0	1	1	1	8	3	10	0.1%	2626
371	0	0	1	1	0	3	2	5	0.3%	797
372	0	0	0	0	0	3	0	3	0.0%	671
381	0	0	1	4	4	11	9	16	0.2%	5463
382	0	0	0	4	2	5	6	9	0.1%	5912
383	0	1	3	11	10	32	25	47	0.4%	6120
384	0	0	1	0	1	1	2	2	0.1%	2511
385	0	0	0	1	0	1	1	2	0.1%	1100
390	0	2	4	26	22	47	54	79	1.9%	2812
SUM	2	10	32	102	102	255	248	501	0.4%	65684

Notes: The column, 1992h, count only up to the end of June 1992. Total 1 is the sum of cases up to the first half of 1992, and total2 is the sum of cases up to the end of 1992: The number of firms counts only firms present in each Korean manufacturing sectors in 1989. Intensity is defined as the total cumulative investment cases divided by the number of firms in each sector. See Table 2 for sector names.

Source: Author's Data Base complied from the raw data supplied by the Bank of Korea.

TABLE 8
DETERMINANTS OF KOREAN INVESTMENT IN CHINA

	DEPENDENT VARIABLE: CH9192 Estimated Parameters of Independent Variables						
	INT	*L/K2*	*L/K*	*CH8790*	*MKT*	Ad. R^2	*F*
(1)	-0.0016 (-1.58)+		21.011 (2.87)**	2.434 (4.01)**		0.497	14.35*
(2)	-0.0014 (-1.3)^		20.009 (2.63)**	2.495 (4.01)**	-0.0013 (-0.6)	0.484	

Notes: *t*-statistics in the parentheses under the coefficients; **, *, +, #, and ^ marks mean significant at 1, 5, 10, 15, and 20 percent, respectively.

Variable List:

CH9192: Investment intensity measured as the number of DFI cases divided by the total number of firms in each sector for investment in China during 1991 and the first half of 1992.

CH8790: Investment intensity measured as the number of DFI cases divided by the total number of firms in each sector for investment in China from 1988 to 1990.

INT: intercept term in regression model

L/K: labor-capital ratio in Korean manufacturing sectors in 1988

L/K2: square of L/K [= (*L/K*)(*L/K*)]

MKT: dummy for industrial chemical, other chemical, and electronic sectors

percent level), together with coefficients on DFI intensity in the previous period (1988-90). The significance of the CH8790 variable indicates that Korean investment in China during 1991 and 1992 is replicating previous patterns observed from 1988 to 1990. In regression model (2) in Table 8, the dummy (*MKT*) for the sectors of chemical and electronics industries is insignificant.

Thus, we can say that Korean investment in China is single-factor dominated, namely cheap-labor seeking, export-oriented production for world market. Whether or not and how soon the pattern of China DFI will change to resemble the pattern of Korean DFI in ASEAN remains to be seen. However, it seems very much possible that more labor-intensive Korean DFI in China and less in ASEAN will expedite one more change in the pattern of Korean DFI in ASEAN from the current U-shaped curve to the downward-sloping line in the future (namely, from the B pattern to the C pattern in Figure 1).

TABLE 9

TRENDS IN KOREAN INVESTMENT IN WESTERN EUROPE, 1986-92
(number of cases approved)

Sector	1986	1987	1988	1989	1990	1991	1992	Total	Intensity	Firm No's
311	0	0	0	0	1	0	0	1	0.03%	3981
313	0	0	0	0	0	0	0	0	0.00%	683
314	0	0	0	0	0	0	0	0	0.00%	21
321	0	0	0	0	0	0	0	0	0.00%	7858
322	0	0	0	0	0	0	0	0	0.00%	6497
323	0	0	0	0	0	1	0	1	0.08%	1290
324	0	0	0	0	0	0	0	0	0.00%	704
331	0	0	0	0	0	0	0	0	0.00%	1994
332	0	0	0	0	0	0	0	0	0.00%	1727
341	0	0	0	0	0	0	0	0	0.00%	1876
342	1	0	0	0	0	0	0	1	0.03%	2864
351	0	0	0	0	0	0	0	0	0.00%	947
352	0	0	0	0	1	0	0	1	0.10%	998
353	1	0	0	0	0	0	0	1	8.33%	12
354	0	0	0	0	0	0	0	0	0.00%	352
355	0	0	0	0	0	0	0	0	0.00%	1584
356	0	0	0	0	0	1	0	1	0.03%	3466
361	0	0	0	0	0	0	0	0	0.00%	483
362	0	0	0	0	0	0	0	0	0.00%	335
369	0	0	0	0	0	1	0	1	0.04%	2626
371	0	0	0	0	0	0	0	0	0.00%	797
372	0	0	0	0	0	0	0	0	0.00%	671
381	0	0	0	0	0	0	0	0	0.00%	5463
382	0	0	0	0	1	0	0	1	0.02%	5912
383	1	1	3	3	6	1	4	19	0.31%	6120
384	0	1	0	0	0	0	0	1	0.04%	2511
385	0	0	0	0	0	1	3	4	0.36%	1100
390	0	0	2	0	0	1	1	4	0.14%	2812
SUM	3	2	5	3	9	6	8	36	0.05%	65684

Notes: Number of firms counts only firms present in each Korean manufacturing sector in 1989. Intensity is defined as the total cumulative investment cases divided by the number of firms in each sector. See Table 2 for sector names.

Source: Author's Data Base complied from the raw data supplied by the Bank of Korea.

TABLE 10

TRENDS IN KOREAN INVESTMENT IN CANADA & USA, 1986-92
(number of cases approved)

Sector	1986	1987	1988	1989	1990	1991	1992	Total	Intensity	Firm No's
311	0	0	4	2	3	1	1	11	0.28%	3981
313	0	0	0	0	0	0	0	0	0.00%	683
314	0	0	0	0	0	0	0	0	0.00%	21
321	0	0	0	0	0	3	1	4	0.05%	7858
322	3	2	1	4	2	3	0	15	0.23%	6497
323	0	0	0	3	1	2	1	7	0.54%	1290
324	0	0	0	1	1	0	0	2	0.28%	704
331	0	0	1	1	2	2	0	6	0.30%	1994
332	0	0	0	0	0	0	0	0	0.00%	1727
341	0	0	2	0	1	0	1	4	0.21%	1876
342	0	0	1	1	0	1	0	3	0.10%	2864
351	0	2	0	2	2	0	1	7	0.74%	947
352	0	0	1	3	2	1	0	7	0.70%	998
353	0	0	0	0	0	0	0	0	0.00%	12
354	0	0	0	0	0	0	0	0	0.00%	352
355	0	0	1	0	0	1	0	2	0.13%	1584
356	1	0	0	0	1	1	1	4	0.12%	3466
361	0	0	0	0	0	0	0	0	0.00%	483
362	0	0	0	1	0	0	0	1	0.30%	335
369	0	0	1	0	0	0	0	1	0.04%	2626
371	0	0	0	2	0	1	0	3	0.38%	797
372	0	0	0	1	1	0	0	2	0.30%	671
381	0	0	0	2	3	3	2	10	0.18%	5463
382	0	1	1	2	3	2	2	11	0.19%	5912
383	4	2	0	2	8	6	8	30	0.49%	6120
384	1	0	0	1	0	0	0	2	0.08%	2511
385	0	0	0	0	3	0	0	3	0.27%	1100
390	0	0	0	1	1	0	1	3	0.11%	2812
SUM	9	7	13	29	34	27	19	138	0.21%	65684

Notes: Number of firms counts only firms present in each Korean manufacturing sectors in 1989. Intensity is defined as the total cumulative investment cases divided by the number of firms in each sector. See Table 2 for sector names.

Source: Author's Data Base complied from the raw data supplied by the Bank of Korea.

TABLE 11
DETERMINANTS OF KOREAN INVESTMENT IN EUROPE AND NORTH AMERICA

	DEPENDENT VARIABLE: *EUAM8792* Estimated Parameters of Independent Variables					
	INT	*L/K2*	*L/K*	*MKT*	Ad. R^2	*F*
(1)	0.0025		0.106		-0.04	0.00
	(3.36)**		(0.02)			
(2)	0.0014		4.26	0.006	0.51	15.3**
	(2.65)**		(1.09)	(5.53)**		
(3)	0.001	-34044	16.40	0.006	0.52	10.8**
	(1.01)	(-1.2)	(1.5)#	(5.67)**		

Notes: *t*-statistics in the parentheses under the coefficients; **, *, +, #, and ^ marks mean significant at 1, 5, 10, 15, and 20 percent, respectively.

Variable List:

EUAM8792: Investment intensity measured as the number of DFI cases divided by the total number of firms in each sector for investment in Europe, Canada, & the USA from 1987 to 1992.

INT: intercept term in regression model

L/K: labor-capital ratio in Korean manufacturing sectors in 1988

L/K2: square of L/K [= (*L/K*)(*L/K*)]

MKT: dummy for industrial chemical, other chemical, and electronic sectors

V. Korean Investment in Europe and North America

Although Korean investments in Western Europe, Canada, and the USA are mostly in bigger projects than those in Asia, they account for, in terms of the number of investment cases, less than half of the total. Table 9 presents the trends of Korean investment in Western Europe. For the whole period from 1986 to 1992, there are only 36 Korean manufacturing DFI cases (approval basis) in Western Europe. Furthermore, it shows a clear concentration (19 cases) in one sector, electric and electronics (codes 383). In terms of relative intensity, it is the third, next to the scientific and medical equipment sector and the petroleum refinery sector. It is interesting to note that approval of Korean manufacturing DFI in Europe concentrated in 1990, two years before the scheduled beginning (1992) of the European Community (or Union). That means, most of the actual investment of these approved projects must have taken place in 1991, just one year before 1992.

According to Table 10, the cumulative number of Korean DFI cases

(138 cases) in North America is much bigger than that in Western Europe (36 cases). Korean investment in North America also shows concentration in the electric and electronics sector. In terms of relative DFI intensity, the ranks run, in decreasing order, from the highest industrial chemical, other chemical, leather and fur, electric and electronics, to basic metal sectors and to others. Comparing Korean DFI in Europe and North America, we can note, first, that strong incidence in chemical industry and several labor intensive sectors of apparel and leather & fur in the case of Korean DFI in North America. Incidence of labor intensive DFI projects in America is not surprising because they are targetting cheap labor of immigrant and informal sector workers in America.

If we put together Western Europe and North America, the top five in terms of the rank of relative DFI intensity include other chemical (the highest), industrial chemical, electric & electronics, medical and scientific & medical equipment, and leather & fur sectors (this is not reported in any tables). In terms of DFI intensity, the gap between this top-five group and other sectors is substantial; whereas DFI intensity of these five sectors ranges from 0.008 to 0.006, that of other 23 sectors, from 0.004 to 0. These top five sector DFI all seem to have local market penetration as one of the most important motivations for DFI in this region. We have already identified the top three (chemicals and electronics) sectors as primarily market-oriented DFI when we examined Korean DFI in ASEAN countries.

Other than marketing reason, I was not able to find any strong explanatory variables for the sectoral pattern of Korean DFI in Europe and America. Regression results in Table 11 do not seem to verify labor intensity as a significant determinant of Korean DFI in Europe and America. Only with a dummy for market-oriented DFI sectors, the regression result shows a good performance. Thus, my conclusion is that Korean DFI in Western advanced countries is dominated by market-oriented DFI of several sectors, and other than these sectors, Korean DFI is weak and relatively evenly dispersed over the manufacturing subsectors.

VI. The Korean Pattern of Outward Foreign Investment

Structural changes in the Korean economy in the 1980s prompted outward foreign investment by Korean firms. According to Table 12, Korean outward DFI has continued to increase in the 1990s. By the

TABLE 12
TRENDS IN KOREAN OUTWARD INVESTMENT IN MANUFACTURING, 1986-92
(number of cases approved)

Sector	1986	1987	1988	1989	1990	1991	1992	Total	Intensity	Firm No's
311	0	0	7	6	14	12	23	62	1.56%	3981
313	0	0	1	1	1	0	1	4	0.59%	683
314	0	0	0	0	0	0	0	0	0.00%	21
321	0	0	3	9	13	23	38	86	1.09%	7858
322	13	19	18	43	55	47	94	289	4.45%	6497
323	0	1	3	15	23	21	36	99	7.67%	1290
324	0	1	6	9	7	9	4	36	5.11%	704
331	0	4	4	16	0	12	13	49	2.46%	1994
332	1	0	0	0	2	4	6	13	0.75%	1727
341	0	0	2	1	2	7	8	20	1.07%	1876
342	0	1	1	1	0	2	1	6	0.21%	2864
351	0	2	2	8	16	9	13	50	5.28%	947
352	0	1	2	7	10	2	4	26	2.61%	998
353	1	0	0	0	0	1	2	4	33.33%	12
354	0	0	0	1	0	1	0	2	0.57%	352
355	0	0	3	8	5	7	4	27	1.70%	1584
356	2	1	5	5	13	4	6	36	1.04%	3466
361	0	0	2	1	2	3	4	12	2.48%	483
362	0	0	0	2	0	3	4	9	2.69%	335
369	0	1	2	2	4	9	12	30	1.14%	2626
371	0	1	0	4	2	4	6	17	2.13%	797
372	0	0	0	4	4	3	5	16	2.38%	671
381	2	0	1	3	11	19	21	57	1.04%	5463
382	0	1	1	4	5	10	12	33	0.56%	5912
383	5	7	12	25	47	48	62	206	3.37%	6120
384	1	0	1	1	1	1	0	5	0.20%	2511
385	0	0	2	3	5	2	7	19	1.73%	1100
390	0	1	13	29	30	55	73	201	7.15%	2812
SUM	25	41	91	208	272	318	459	1414	2.15%	65684

Notes: Number of firms counts only firms present in each Korean manufacturing sectors in 1989. Intensity is defined as the total cumulative investment cases divided by the number of firms in each sector. See Table 2 for sector names.

Source: Author's Data Base complied from the raw data supplied by the Bank of Korea.

end of 1992, the cumulative DFI cases is 1414 cases, which means that about 2 percent of Korean manufacturing firms conducted outward DFI. The rank of sectoral DFI intensity as measured by the ratio

TABLE 13

DETERMINANTS OF KOREAN OUTWARD INVESTMENT, 1987-92

	DEPENDENT VARIABLE: *OUTDFI* Estimated Parameters of Independent Variables							
	INT	*RCA*	*L/K*	*D(PROF)*	*MKT*	*PETRO*	Ad. R^2	*F*
(1)	0.0011		161.2	–0.04	0.03	0.31	0.927	0.00**
	(0.18)		(2.57)**	(–1.60)#	(2.46)*	(00.0)**		
(2)	0.005	0.003		–0.06	0.02	0.3	0.932	0.00**
	(0.88)	(3.00)**		(–2.46)*	(2.3)*	(16.7)**		
(3)	0.006		193.6		0.02	0.33	0.922	0.00**
	(0.98)		(3.2)**		(2.25)*	(17.9)**		
(4)	0.014	0.003			0.02	0.32	0.918	0.00**
	(3.43)**	(2.89)**			(1.74)+	(17.5)**		
(5)	0.010	0.003		–0.05		0.30	0.921	0.00**
	(1.62)#	(2.65)**		(–1.95)+		(15.4)**		

Notes: *t*-statistics in the parentheses under the coefficients; **, *, +, #, and ^ marks mean significant at 1, 5, 10, 15, and 20 percent, respectively.

Variable List:

OUTDFI: investment intensity measured as the number of DFI cases divided by the total number of firms in each sector, 1987-92.

INT: intercept term in regression model

L/K: labor-capital ratio in Korean manufacturing sectors in 1988

RCA: Balassa's index of revealed comparative advantage

D(PROF): change in capital profitability over the 1987-89 period.

MKT: dummy for industrial chemical, other chemical, and electronic sectors

PETRO: dummy for petroleum refinery sector

of cumulative DFI cases to the total number of firms in each sector runs from the first leather & fur, miscellaneous goods, industrial chemical, footwear, apparel, electronics, glass product, other chemical, to the ninth pottery & china sector and so on.[5]

To find out what motivated these sector to go abroad, I have tried more regression analyses the results of which are presented in Table 13. As an explanatory variable, both Balassa's revealed comparative advantage (RCA) index and labor-capital ratio are significant, but high-

[5]As a matter of fact, the petroleum sector shows the highest (33.3%) DFI intensity, however this sector is not listed here. This sector is special because there exist a very few number of firms, only 12. In other words, 4 outward DFI cases has been observed out of the total 12 companies present in that sector.

ly correlated each other.[6] In other words, labor intensive sectors tend to show high RCA, which seems natural in light of the fact that Korean export has been dominated by labor-intensive sectors at least until 1980s. Other significant explanatory variables include the change in gross capital profitability (gross profit/capital), and two dummies for the petroleum sector, and for the industrial chemical, other chemical, and electronics sectors, respectively.

Regression model (1) in Table 13 shows the estimation results with labor-intensity, profitability change, and two dummies, and model (2) shows the results with RCA, profitability change and two dummies. Both models show a nice fit with adjusted R-square ratios higher than 0.90 and highly significant F-values. Models, (3), (4) and (5) are trials with some modifications from either model (1) or (2).

The results in this table tell us, first, that labor intensive sectors with high RCA has generated strong flow of outward DFI, especially when capital profitability declined. This interpretation is consistent with direct reading from Table 2 about profit rate changes. In other words, information in Table 2 and Table 12 indicates that every strongly-labor intensive sector in Korean manufacturing, which experienced the major increase of unit labor cost and hence profitability, generated outward investment seeking cheap labor, mostly in China and ASEAN. An exception is the labor-intensive footwear sector which did not experience a major decline in profitability until 1989. In the case of foot-wear, the early motivation to go abroad appears an "aggressive one," and government restrictions have played some role in reducing the outward DFI flow since 1990. However, the more recent motivation for DFI would be "defensive," as competitiveness had eroded rapidly since 1989.

Second, the significant dummy variable of *MKT* indicates that these sectors have different reasons for outward DFI. For these sectors of chemical and electronics, the main motivation to go abroad is to sell in local markets. These sectors have not experienced such a major decline in profitability as the strongly labor-intensive sectors during the first subperiod, however, they generated strong outward investment flows into ASEAN and Western advanced countries.

Korean outward investment from labor-intensive sectors seems to be based on not only location advantage (cheap wage) of host countries

[6]Lee and Plummer (1992) has also found RCA as one of the most important determinants of Korean outward DFI. See Balassa (1965) on the RCA.

TABLE 14
DETERMINANTS OF KOREAN SHARE RATIO IN INVESTMENT PROJECTS

	DEPENDENT VARIABLE: *RATIO* Estimated Parameters of Independent Variables				
	INT	*RCA*	*AUTO*	Ad. R^2	*F*
(1)	65.47 (22.4)**	1.53 (1.79)+		0.08	3.20+
(2)	64.12 (24.0)**	1.64 (2.13)*	31.9 (2.68)**	0.26	5.6**

Notes: *t*-statistics in the parentheses under the coefficients; **, *, and + marks mean significant at 1, 5, and 10 percent, respectively.

Variable List:

RATIO: Average of ratio of Korean shares in Korean outward DFI projects in each of 28 manufacturing sectors over the 1987-92 period.

INT: intercept term in regression model

RCA: Balassa's index of revealed comparative advantage for Korean 1988 export data in 28 sectors

AUTO: dummy for transport equipment (mainly automobiles) sector

but also some ownership advantage (competitiveness in medium-quality goods) of Korean producers. This can be seen not only from a high correlation of DFI intensity with RCA index but also from a high correlation of RCA with Korean share ratio in investment. Table 14 presents the regression results about the determinants of Korean share ratio in DFI projects. With a dummy for automobile sector which is a exceptional case, it shows a nice fit with RCA as an explanatory variable for the Korean share ratio variable.[7] To the extent that RCA index represents ownership advantage of Korean products, the results can be taken as implying that the more ownership advantage Korean investors have, the less need to share management with foreign partners or the more likely to take the form of wholly-Korean owned ventures.

In fact, those sectors showing highest RCA are footwear, apparel, leather & fur and textile, and in these sectors the ratio of Korean shares are the highest among 28 manufacturing sectors with an average of about 80 percent (see Table 15). These are the sectors in which

[7]The Automobile sector is special. It has generated only 4 cases of outward DFI and in three of the four cases the Korean share account for 100 percent. Since the number of observation is too small in this case, I take it as a special case which does not fit nicely my hypothesis about the relationship between the RCA and share ratio.

TABLE 15
DFI INTENSITY, KOREAN SHARES, AND RCA

Sector	DFI Intensity	Shares (%)	RCA
311	1.56%	60.8	0.7
313	0.59%	71.7	0.1
314	0.00%	n.a.	0.4
321	1.09%	76.2	2.8
322	4.45%	86.4	7.5
323	7.67%	75.1	3.0
324	5.11%	80.7	14.5
331	2.46%	68.2	0.2
332	0.75%	81.0	0.6
341	1.07%	69.8	0.3
342	0.21%	75.0	0.0
351	5.28%	51.0	0.4
352	2.61%	67.3	0.4
353	33.33%	76.7	0.3
354	0.57%	30.0	0.0
355	1.71%	77.6	1.6
356	1.04%	70.3	0.3
361	2.48%	68.1	1.0
362	2.69%	76.4	0.8
369	1.14%	53.7	1.6
371	2.13%	61.2	2.0
372	2.39%	55.2	0.4
381	1.04%	61.1	2.1
382	0.56%	60.0	0.6
383	3.37%	68.5	2.7
384	0.20%	97.6	1.0
385	1.73%	47.1	0.6
390	7.15%	74.9	2.2

Notes: DFI intensity is the ratio of cumulative DFI cases to the total number of firms in 1989 in each sector. Shares is the average ratio of Korean investment shares in investment projects. RCA is the Balassa's revealed comparative advantage estimated using 1988 world and Korea export data. See Table 2 for sector names.

Korean products must have certain ownership advantage as evidenced by good performance in world markets. These sectors have, and used to, dominated Korean investment in China, and ASEAN, respectively, and Korean producers felt the less need to form a joint venture with foreign partners and in many cases took the 100 percent ownership.

In contrast, although the sectors of industrial and other chemicals have generated intense outward DFI flows, RCA's are very low in these

sectors and Korean share ratios are also low. My interpretation is that Korean DFI from these sectors are not based on any strong ownership advantage of Korean products, however they went abroad (including OECD countries) to defend their markets against rising protectionism or learn from their foreign partners. With weak ownership advantage, the role of foreign partner are more important than otherwise, so the Korea share ratio tend to be low. This kind of interpretation partly fit the case of electronics sector, too; it has relatively high RCA and low Korean share ratio. Considering that Korean DFI in Western Europe and North America concentrated in the sectors of chemicals and electronics, we can say that Korean DFI in these regions are, in a certain sense, "premature," not much based on ownership advantage.[8]

VI. Concluding Remarks

Structural changes in the Korean economy in the 1980s prompted outward foreign investment by Korean firms, which continues to increase in the 1990s. Korean outward DFI has been led by the sectors of leather & fur, miscellaneous goods, industrial chemical, footwear, apparel, electronics, glass product, other chemical, and pottery & china.

Korean investment in China is single-factor dominated, seeking mainly cheap labor for export-oriented production, and there is relatively little, local-market oriented DFI.[9] The rise of China as strong attraction for Korean labor-intensive DFI prompted the relative decline of Korean labor-intensive DFI in ASEAN during 1991 and 1992. Thus, more recent Korean DFI in ASEAN is becoming more capital-intensive DFI, whereas prior to 1990 Korean DFI in ASEAN was primarily cheap-labor oriented and only secondarily related to the local market for final goods. Korean investment in Western Europe and North America has been local-market oriented and dominated by the three sectors of electronics, industrial and other chemicals.

[8]Jun (1987) also took the nature of Korean investment in advanced countries as "defensive" and "premature."

[9]Recently, Chinese policies toward foreign companies in China are getting loosened in terms of the restriction on domestic sales of their products. Korean investors are already responding to the rapidly changing conditions in the Chinese market and investment environment. Thus, local-maket oriented Korean investment is springing up from 1993, in particular durable consumer goods industries.

Korean DFI in developing countries are mainly in labor-intensive sectors and based on both ownership advantage of Korean products and locational advantage of host countries. Thus, in this case, the ratio of Korean shares in investment projects tend to be high. In contrast, Korean DFI in advanced coutries are not much based on any strong ownership advantage of Korean producers but to defend Korean shares in local markets in response to rising protectionism or regional economic blocs. Thus, in this case, the ratio of Korean shares tend to be low.

In 1993, the Korean government and big business have reached a common understanding that without internationalization, there will be no future for the Korean economy and no international competitiveness can be created and maintained. Government perception on inward and outward DFI has changed from the old one pre-occupied with the balance-of-payment effects of DFI to the new one focused on its effects on internationalization of production and competitiveness. Thus, in 1993 when they revised laws related to DFI, the Korean government has abolished many restrictions on, and provided more attractions toward, both inward and outward DFI. These changes are expected to stimulate more DFI into and from Korea. Thus, in coming years, we will see a steady flow of Korean outward DFI, based on diverse motivations across diverse sectors.

References

Balassa, Bella. "Trade Liberalization and Revealed Comparative Advantages." *Manchester School of Economic and Social Studies* (No. 2, 1965): 99-124.

Bank of Korea. *Current Status of Overseas Establishments by DFI: As of the end of 1990* (in Korean), 1991.

Dunning, John. *Explaining International Production*. London: Unwin Hyman, 1988.

IITMR (Institute for International Trade and Management Research). *A Study on Investment in the ASEAN-4 Countries by Korean Small and Medium-Sized Firms* (in Korean). Seoul: Foundation for the Promotion of Small and Medium-sized Firms, 1991.

Jun, Yongwook. "The Reverse Direct Investment: The Case of the Korean Consumer Electronics Industry," *International Economic Journal* 1 (No. 3, 1987): 91-104.

KBF (Korean Business Federation). *A Survey on the Performance of Overseas Investment by Korean Manufacturing* (in Korean). Seoul, 1991.

KEIB (Korea Ex-Im Bank). *The Status of Korean Manufacturing Overseas*

Investment and Management (in Korean). Seoul, 1992.

Kumar, K., and McLeod, M. *Multinationals from Developing Countries.* Lexington: Lexington Books, 1981.

Lall, Sanjaya. *The New Multinationals: The Spread of Third World Enterprises.* New York: John Wiley & Sons, 1983.

_____. "Emerging Sources of DFI in Asia and the Pacific." Paper presented at the Roundtable on the Foreign Direct Investment in Asia and the Pacific in the 1990s, Honolulu: East-West Center, 1990.

Lee, Chung H. "Outward Direct Foreign Investment and Structural Adjustment in a Small Open Economy." *Kobe Economic & Business Review* 36 (1990): 1-15.

_____, and Lee, Keun. "A Transition Economy and Outward Foreign Investment: the Case of Korea," *Seoul Journal of Economics* 5, (No. 1, 1992): 89-111.

Lee, Keun, and Plummer, Michael. "Competitive Advantages, Two-way Foreign Investment, and Domestic Capital Accumulation in Korea," *Asian Economic Journal* 4 (No. 2, 1992): 93-114.

MOCT (Ministry of Commerce and Trade), the Korean Government. *A Guideline on Foreign Direct Investment,* 1992.

National Statistical Office (NSO) of Korea. *Major Statistics of Korean Economy,* Seoul: NSO, 1991.

National Statistical Office of Korea. *Report on Mining and Manufacturing Survey* (of 1987, 1988, and 1989), published in 1989, 1990, and 1991, respectively.

Comment

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First of all, I want to express my appreciation to the organizers of this conference for kindly inviting me. I am not a professional economist and probably a little more interested in the political aspect of economic phenomena. Though my orientation may be somewhat different from most of the participants' here, I hope my comments will make sense to the participants in this conference.

I enjoyed reading Professor Lee's paper and learned a great deal from it. I think his paper has contributed to the field of economic study of Korean firm behavior by analyzing Korean DFIs in the late 1980s. Korean DFIs constituted one of the most prominent economic phenomena in the recent period. Professor Lee's analysis, in this sense, is timely and deserves much attention in the future. The paper provides not only an example of a succinct theoretical analysis but also important policy implications for the government as well as private industrial firms. In my opinion, the paper is important in the sense that it can, and I hope it will, initiate more debates on the issue.

Regarding the substance of the paper, I agree with most of his arguments and analysis on the difference in the pattern of Korean DFI in ASEANs and those in China. Instead, I would like to raise a few points about his theoretical position on which his analysis is based. To make his theoretical position stronger, it may be better for Professor Lee to dispute competing alternative explanations first before he begins his own analysis.

For example, exchange rate appreciation has been regarded as a factor causing DFIs. Professor Lee noticed briefly but did not systematically discuss the role of exchange rate appreciation. As we know, the extensive foreign investments since 1986 have occurred exactly when Korean exchange rate appreciated rapidly. For example, the actual exchange rate appreciated from 881 won per dollar in 1986 to 671 won in 1989. (According to a statistics, the real effective exchange rate has

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changed from 123.4 in 1986 to 73.9 in 1989 and 69.3 in 1990. 1985 = 100.) Probably someone may argue that the appreciation of the won rather than the domestic structural adjustments was a more important factor in explaining DFIs in this period. He may continue that domestic structural adjustments followed DFIs instead of preceding them. In other words, the structural adjustment may be a dependent variable rather than an independent variable. Professor Lee did not discuss this possibility in his paper.

Now, I would like to raise another point from a political economy perspective, but in a similar context. Some analysts may argue that government policy factors other than structural adjustments were more important in causing Korean DFIs in both regions. For example, it is not clear from the paper how much importance we should place on Korean government's policy factor (for example, industrial policy or openning of diplomatic relations with China, or other home and host country incentives) in DFI behavior of Korean firms. As Professor Lee has noticed, the role of government policy was decisive in shaping the DFI pattern in the footwear industry. He simply said it was an exception. But can we not say that government policy factors were as important in other industries as in the footwear industry? The only difference between other industries and the footwear industry may be that in other industries, the government has simply let the domestic structural adjustment result in outflowing DFIs. Then, a more decisive factor than domestic structural adjustments may be government policy factors in Korea. Can we simply assume away that the governmental policy is external (or exogenous) factors?

Professor Lee also mentioned in his conclusion that the Chinese government's policy would become a more important factor which might stimulate Korean DFI. Then, he may arrive at the different conclusion. That is, DFI which has been caused by the political factors such as government policies of both home and host countries, may in turn cause structural change of Korean industries by inter-country, intra-industry transfer of industry specific capital. It is more likely in such a small and developing economy as Korea where the government influcence still affects almost every aspect of industrial firm behavior.

If this was mainly caused by the structural adjustment as the author assumes, that is, if the comparative advantage shifted from the labor intensive sectors to the capital intensive sectors, the profit rate in the labor intensive sectors will become lower and the profit rate in the capital intensive sectors will become higher. In that case, Korean firms may

go out in the labor intensive sector, if we follow the Professor Lee's logic, and foreign capital should have come in the capital intensive sectors. But as we observe, the capital investments in these capital intensive sectors have not increased.

This may indicate that factors other than macro-economic structural changes may be more important in explaining Korean DFIs behavior. If these kinds of possible alternative explanations had been persuasively disputed in the beginning part, the argument of the paper might have been stronger. Thank you.