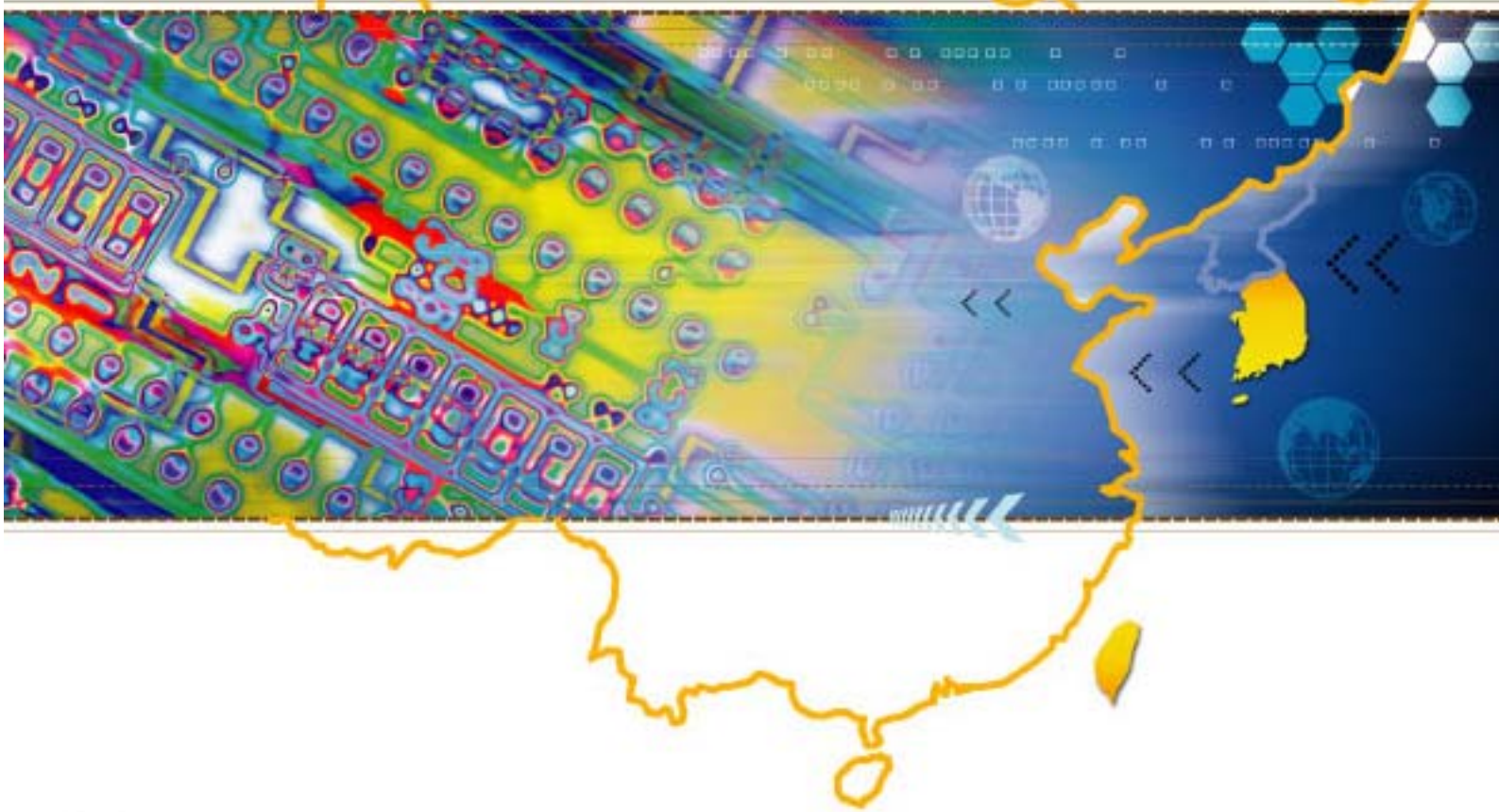
Taiwan Institute of Economic Research
Samsung Economic Research Institute

Joint Research Project of

Study on Korean and Taiwanese Investment Patterns in China



Study on Korean and Taiwanese Investment Patterns in China

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A Joint Research Project by

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Foreword

This project was jointly conducted by the Samsung Economic Research Institute (SERI) in Korea and the Taiwan Institute of Economic Research (TIER) in Taiwan from January 2007 to June 2007 with the purpose of producing a final research paper: *Study on Korean and Taiwanese Investment Patterns in China.*

In this paper, SERI is responsible for chapter I, Evaluation of Korean and Taiwanese Economic Performance, and chapter III, Characteristics of Korean Investment in China and Impact on Its Economy. Whilst TIER is focusing on chapter II, Taiwanese Investment in China, and chapter IV, Comparison of Korean and Taiwanese Investments in China, and in Search of Cooperation.

TIER and SERI both held seminars inviting local experts and scholars for discussions and suggestions before the results were finalized. TIER is particularly grateful for the assistance from Industrial Development Bureau (IDB) from the Ministry of Economic Affairs (MOEA) of Taiwan. During the research period, IDB provided sufficient information for the paper' results whilst the analysis and formulations were done by TIER alone.

We hope that by publishing this book, the readers could gain knowledge on following aspects: 1) Korean and Taiwanese firms' current investment patterns in China; 2) Both countries' historical and present investment cooperation with China; 3) How Korean and Taiwanese investment in China influences their domestic economy; 4) Chances of further cooperation between two countries will be studied with consideration of changes in China.

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Chapter I

Development of the Korean and Taiwanese Economies and Challenges

1.1 Introduction

Korea and Taiwan share many points in common in their development trajectory after World War II, including a shared history of Japanese colonization, civil war, and rapid economic development.[1] Both countries suffered from low natural resources and a very limited experience with industrialization at the outset. Both countries also pursued industrialization by cooperation between the government and industry, exploiting the increasingly open global economy of the time. By the 1960's, Korea and Taiwan had begun leveraging their low cost labor advantage to export textiles, shoes, toys, and plywood. Later on, both countries would use opportunities provided by changes in the global economic environment (including the changes induced by the 1985 Plaza Accord) to upgrade their industrial structure into a more technology and capital intensive one. Presently, Korea and Taiwan function as both competitors and partners in leading the world's electronics and semiconductor markets.

Both countries have also maintained a degree of competition in their economic relationship since the 1960's. Competition between firms in the two countries in textiles, shoes, and electronics has helped to alter the structure of the global market, and by the 1980's, competition had produced enough technological progress that both countries could launch manufacturing of semiconductors and LCDs. Both countries experienced dramatic growth in the late 1980's to the early 1990's, when they made massive investments in their main industries. However, since the mid 1990's, both countries experienced slowing growth on an oversupply in production and assembly, and increased competition from China as a manufacturing base. This would prove to be one of the major causes behind the foreign exchange crisis in the late 1990's.

As if in tandem, both economies also rapidly lost their former dynamism after the financial crisis. As China rapidly increased its competitiveness in exports, Korea and

[1] In the 1950's, both Korea and Taiwan were "low-profile" countries; so low as to be practically unknown outside of Asia. Ballassa noted that they were regarded as "hopeless" at the time.
Balassa, Bela, "The Lessons of East Asian Development: An Overview," *Development and Cultural Change*, April 1988 Supplement, Vol. 36, Issue 3, p. 275

Taiwan suffered eroding market share and decreased price competitiveness in advanced countries, while simultaneously suffering worsened terms of trade. Moreover, internal factors like stagnant population growth and sluggish investment started a steep decline in once plentiful manufacturing jobs. Growth, standing at 7.0% in the 1980's, had fallen to 4-5%, and even though both countries had a $10,000 GNI by the mid 90's (Taiwan in 1992 and Korea in 1995), both countries have remained stuck in the $10,000 "trap" since then.

As conditions worsened, businesses in both countries commenced a wave of overseas investment beginning in the late 1980's, with China becoming the overwhelmingly preferred destination after relations with the mainland thawed. This investment would also provide somewhat ambiguous results, because while investment in China expanded trade in parts and intermediary materials, it also stoked concerns of a possible negative influence on domestic production and employment. At the same time, the focus of foreign relations for both countries, would shift from the US to China, indicating that political and economic changes in China had brought massive changes to both Korea and Taiwan.

That said, despite all the apparent similarities in the development process of the two countries, it is equally clear that Korean and Taiwan differ in very substantial ways. Some of these differences include the amount of government intervention in the private economy, as well as the role played by large enterprises versus small-and medium-sized firms. Other differences include a divergence in the industrial structures of both countries, as Taiwan has a very IT-centered economy, while Korea has a more diversified economy.

This chapter will evaluate the past and present of the Korean and Taiwanese economies by examining the economic growth process in both countries and by reviewing accounts of their economic development in past research. It also considers pending issues for the two economies. Chapter 2 will review various interpretations of economic development in the two countries, while Chapter 3 will examine the challenges facing the two countries in terms of the deterioration of economic dynamism,

and the potential for “hollowing out” of their native industries. The last chapter will focus on ways in which the two countries can cope with these challenges.

1.2 Economic Development Processes

(1) Economic Growth in Both Countries

1) Economic growth

Korea and Taiwan commenced economic development under a laundry list of similar conditions. Both countries had been a colony of Japan and underwent a bitter civil war. Both countries were absent of significant natural resources, and had to rely on supplies imported from overseas. Both countries implemented extensive agricultural land reforms in an attempt to turn agricultural capital into industrial capital. Both countries also made their first steps towards industrialization through the export of labor intensive light industrial products during the height of the cold war.

Taiwan attained a measure of political stability earlier than Korea, and kick-started its first 4-year economic development plan in 1953. At the beginning of its industrialization process, Taiwan relied heavily on the food and beverage industry, particularly on the sugar manufacturing that had been the island’s mainstay during the colonial era. By the 1960’s, sugar was Taiwan’s No. 1 export item, accounting for over 40% of total exports, while textile products accounted for about 10% of the total. After the first-stage 4-year economic development plan was completed, Taiwan would continue to carry out economic reforms on a gradual basis, expanding into exports of other labor-intensive products like textiles, plywood, and shoes.

Korea, after many unfortunate detours and stumbles, would also proceed down the same path. After emerging from a devastating civil war and an era of rampant political instability, Korea would launch its first government-initiated economic development plan in 1962. Although Korea’s economic development program was similar to Taiwan’s, Korea’s economic plans proved to be more far reaching, with the government directly orchestrating the cultivation of major industries. By the 1970’s Korea had

launched its Heavy/Chemical Industry Drive ("HCI"), when the government borrowed foreign capital to establish large companies and to build industrial complexes for heavy industry and chemical production. Although HCI drive would cause problems for the country during the second oil crisis, Korea's industrialization campaign overcame both this and many other hurdles reasonably well.

Korea's annual economic growth rate averaged 7.7% in the 1960's and rose to 8.3% in the 1970's, paralleling that of Taiwan's. It then rose to 10.3% in the 1970's from 9.2% in the 1960's. Economic growth in Taiwan continued to outpace Korea until the 1980's, but Korea finally caught up with the island nation, at least in terms of growth, by the 1990's. Unfortunately, such growth, fueled by heavy investment in the early 1990's, would prove unsustainable upon the outbreak of the Asian financial crisis in the 1990's, clearing the way for Taiwan to once more decisively overtake Korea. Korea would only regain its growth lead in the 2000's.

Table 1. Trajectory of growth in Korea and Taiwan

(Unit: %)

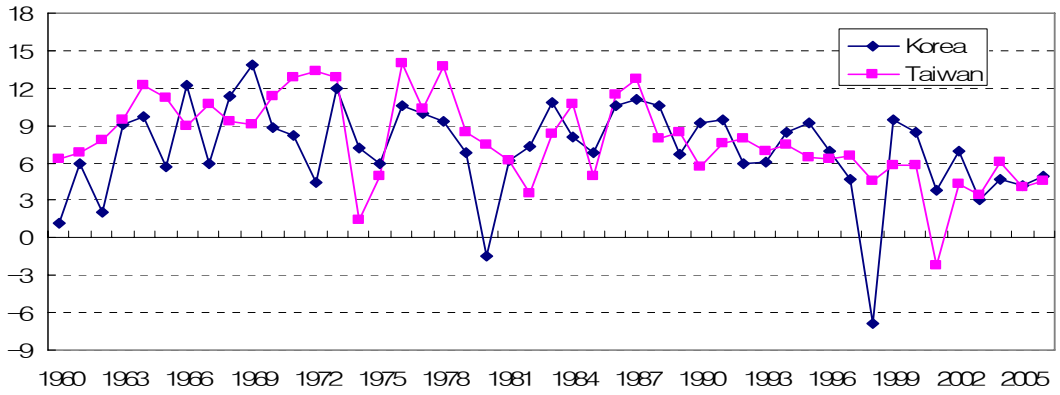
	1960-69	1970-79	1980-84	1984-89	1990-94	1995-99	2000-06
Korea	7.7	8.3	6.2	9.2	7.8	4.7	5.2
Taiwan	9.2	10.3	7.2	9.1	7.1	6.0	3.7

Note: The growth rate for each period is an average of the growth rates for each year therein

Source: The Bank of Korea and the Directorate General of Budget, Accounting and Statistics (DGBAS)

Economic results in Korea and Taiwan depended largely on exports, and were accordingly considerably influenced by changes in the overseas economic situation. After the 60's, Korea would experience negative growth on two occasions, in 1980, the year of the second oil crisis, and in 1998, during the Asian financial crisis. Taiwan suffered negative growth in 2001 when the US IT bubble burst, as well as comparatively feeble 1.4% growth during the first oil crisis of 1974.

Figure 1. Trends in growth in Korea and Taiwan



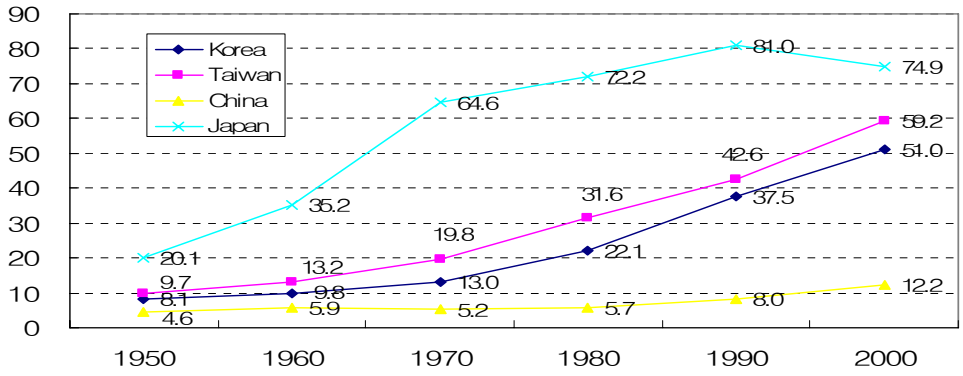
In 1960, Korea's and Taiwan's per capita GDI stood at $79 and $156 respectively, indicating that the two countries were typical third-world countries. Atypically however, GDP in both countries soon grew at an explosive pace. Korea's GDP shot up to $8.1 billion in 1970, a more than 4-fold jump from the 1960 figure, with per-capita income estimated at $254, an over 3-fold jump over ten years. Taiwan also witnessed strong growth in GDP during this period. Both countries' per-capita GNI had topped $10,000 by 2000, with Korea's GDP exceeding the $500 billion level. Korea's GDP reached $887.4 billion in 2006, with its per-capita GNI standing at $18,372. Taiwan's GDP and per-capita GNI amounted to $355.6 billion and $16,098, respectively, in 2006.

Economic developments in the two countries were remarkable. According to the estimates of the distinguished economist Maddison (2006), if the Korean and Taiwanese per-capita incomes for 1950 were converted to 1990 International Geary-Khamis dollars, they would be equivalent to $770 and $924, respectively, only 8.1% and 9.7% of the United States' $9,561. However, thanks to robust economic growth, the gap with the US narrowed rapidly, with per-capita incomes equivalent to 13.0% and 19.8% of the US in 1970, and 51.0% and 59.2% of that of the US in 2000.

As can be seen from the comparison with China, the two countries achieved very pronounced economic development. China's per-capita income stood at $439 in 1960, equivalent to 4.6% that of the US. By 1980, China's per-capita income had only

reached $1,067, or 5.7% that of the US. Since then, the gap with the US has begun to narrow on China's market oriented reforms, with per-capita income at 8.0% of the US in 1990, and 12.2% in 2000. Such growth, however, was still not fast enough to duplicate the advances made by Korea and Taiwan previously. Meanwhile, Japan which had achieved much better results than both Korea and Taiwan, had its per-capita income stand at 20.1% that of the US in 1950.

Figure 2. Per-Capita Income Trends for Korea, Taiwan, China, and Japan (US=100)



Per-capita GDP is based on constant international dollar prices for 1990

Source: Maddison Angus, World economy Vol 1. Vol 2, 2006, OECD.

2) Industrial Structure

Economic growth, meaning the movement of production factors from low productivity areas to higher productivity areas, would also transform the industrial structures of both countries. The postwar industrial structure of both countries has been characterized by a relentless decline in the role of agriculture and an increased presence for the industrial sector, especially manufacturing. Agriculture as a share of Korea's GDP had plunged to 3.2% in 2006, from 16.2% in 1980 and 39.1% in 1960. In contrast, manufacturing had soared to 29.4% of GDP in 2000, up from 24.6% in 1980, and 13.8% in 1960. Although manufacturing had declined slightly in the 2000's, it still accounts for a 27.8% share of Korea's GDP in 2006.

Taiwan exhibited a similar pattern, with the share of manufacturing in GDP rising to 36.0% in 1980 from 19.1% in 1960. In contrast with Korea, however, manufacturing

has been on a downward slope since the mid 1980's, with services taking over 70% of the economy in 2003. Much like the industrialized countries, Taiwan is fast moving towards a service-centric economy.

Table 2. Industrial Structure of Korea and Taiwan

(Unit:%)

		1960	1970	1980	1990	1995	2000	2003	2006
Korea	Agricultural & fisheries	39.1	29.2	16.2	8.9	6.3	4.9	3.8	3.2
	Industry-manufacturing	15.9 -13.8	26.1 -17.8	36.5 - 24.6	41.6 - 27.3	41.9 -27.6	40.7 - 29.4	39.0 - 26.4	39.6 - 27.8
	Services	45.0	44.7	47.3	49.5	51.8	54.4	57.2	57.2
Taiwan	Agriculture	28.5	15.5	7.7	4.0	3.3	2.0	1.7	1.6
	Industry Manufacturing	26.9 - 19.1	36.8 -29.2	45.7 - 36.0	38.4 - 31.2	32.8 - 25.3	29.1 -23.8	26.6 -22.5	25.0 - 21.4
	Services	44.6	47.7	46.6	57.6	63.9	68.9	71.7	73.4

Source: Statistical Offices of Korea and Taiwan

Manufacturing underwent a drastic expansion in employment, accounting for 23.4% of employment in 1985, and then falling to 18.5% in 2005. By way of comparison, the number of people employed in agriculture & fisheries totaled 4.57 million persons in 1963, accounting for 63% of the nation's total employment (or 7.56 million persons). In the same year, manufacturing industry employed only 0.63 million who accounted for 7.9% of the total employment. However, as industrialization proceeded, employment in manufacturing would expand to 1.27 million persons, or 13.2% of total employment, in 1970, and 3.83 million persons in 1986, while agriculture & fisheries fell to 3.66 million persons.

In 1989, employment in manufacturing reached an all-time high at 27.8% of the nation's total, while persons engaged in manufacturing were estimated at 5.16 million persons in 1991. These years were a veritable golden age for the Korean manufacturing industry. After peaking during these years, employment in manufacturing soon fell downwards, as an increasing number of Korea's footwear and textile factories relocated overseas.

In Taiwan, the labor force likewise flowed into manufacturing. In 1952, agriculture accounted for 56.1% of the nation's total employment, much higher than the

manufacturing industry's 12.4%. However, as employment in agriculture fell to 36.7% of the nation's total in 1970, manufacturing rose to 20.9%. Since then, employment in manufacturing continued on an upward trend, with manufacturing workers accounting for 35.2% of the nation's total workforce in 1987. However, employment in the manufacturing industry has been waning as the Taiwanese economy transitioned towards services. The share of manufacturing in the nation's total employment fell to 27.4% (2.77 million persons) in 2006.

3) Exports

The economies of Korea and Taiwan gained their initial growth momentum by shipping labor-intensive products like textiles to the US and other countries from the 1960's. The two countries drew on a diverse range of policies to promote export growth, including currency devaluation, and exemption of taxes on the import of raw materials. By leveraging their competitive advantage in labor-intensive goods, Korea and Taiwan were able to expand into light industrial products from the mid 1960's. Exports from Korea and Taiwan amounted to $800 million and $1.4 billion, respectively by 1970. Since then, both countries have placed top priority on exports, boosting yearly exports to over $65 billion each in 1990. Korea would finally overtake Taiwan in 2000 in exports, and would maintain its lead in 2006, when exports amounted to $325.5 billion against Taiwan's $224 billion.

Table 3. Trends in exports & imports

Unit: 100 Million $

		1970	1980	1990	2000	2006
KOREA	EXPORTS	8.4	175	650	1,723	3,255
	IMPORTS	19.8	223	698	1,605	3,094

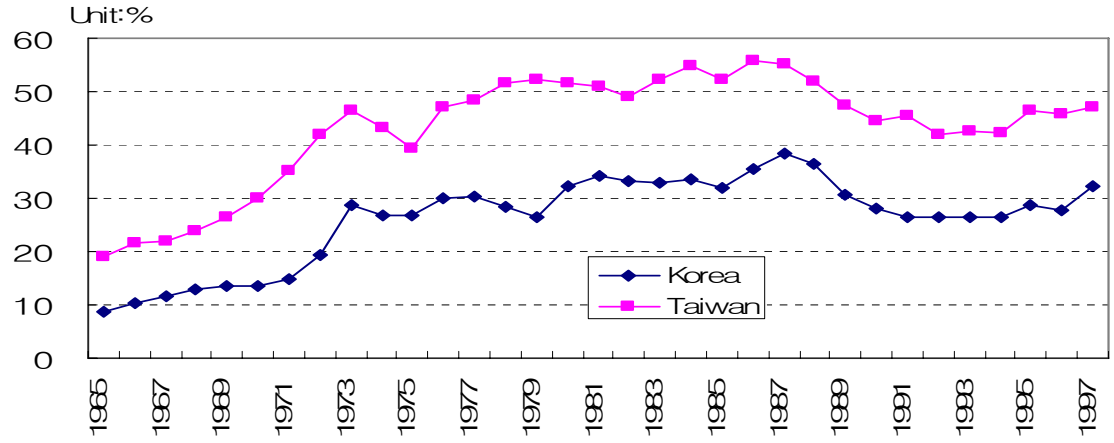
TAIWAN	**EXPORTS**	**14**	**198**	**672**	**1,520**	**2,240**
	IMPORTS	**15**	**197**	**547**	**1,407**	**2,027**

Source: Statistical authorities of Korea and Taiwan

Imports for the two countries have also been growing at a steady pace. Both countries depend heavily on imports for primary goods, capital goods, and intermediary goods. The Korean economy, being larger than the Taiwanese economy and more focused on heavy industry and chemicals, had more periods when imports exceeded exports, thus suffering longer periods of trade deficit. Korea has, overall, shown a surplus since the late 90's.

As exports have grown, both countries have become more and more dependent on them to prop up their economies. During the period from the 1960's to the early 1970's, the share of exports in GDP grew drastically. Although exports stagnated or even diminished after the first oil crisis, they rebounded again later. After stagnating once more after to the second oil crisis, exports continued to take a higher share of GDP, reaching its maximum in the late 1980's when the Plaza Accord made the Japanese yen strong. Thereafter, the share of exports in the economy has declined gradually, while remaining relatively high. The increased dependency on exports indicates that market opening for these two economies has expanded, and growth was attained through increased connections and ties with the rest of the world. Exports also made a substantial contribution to economic growth in the two countries up late 1980's, i.e., there is a high correlation between economic growth and export growth.

Figure 3. Dependency of the Korean and Taiwanese economies on exports (1965-1997)



Source: Statistical authorities of Korea and Taiwan

Export items also became more diversified and advanced in their structure. In the initial stages, both countries relied on labor-intensive products like textiles, apparel, footwear, and stuffed animal toys. However, this would soon shift towards heavy industry and chemical products and especially electronics goods. Korea at first relied on exports of apparel, shoes, and leather products in the late 1970's. Such labor-intensive export items were replaced by more industrialized products like semiconductors, automobiles and vessels in 1995. Korea's export of apparel amounted to $2.56 billion in 2006, a sharp decline from $7.99 billion in 1990, while automobiles shot up to $30.5 billion in 2006, from $1.3 billion in 1990. Taiwan also initially depended on exports of apparels and footwear in the late 1970's. Now, however, Taiwan ranks as one of the world's leading suppliers of IT parts and components, including computers and peripherals.

(2)Evaluation

1) Evaluation of growth in East Asia

Numerous efforts have been made to account for high growth in the countries of East Asia (including Korea and Taiwan). As East Asia's growth after World War II was

practically unprecedented, many economists began to propose the existence of an "East Asian growth model." Research on this area has focused on the relationship between the government and the market, the mobilization and distribution of resources, and the relationship between domestic demand and exports. Such studies have sought to explain how different actors in the economy act and react to each other.

Those claiming the existence of this model pointed to the fact that Korea and Taiwan are both economies with a history of substantial government intervention. Taiwan established its first economic development plan in the years 1953-1956, and continued to implement centrally administered economic plans up to the 1990's, while Korea began pushing economic development plans from 1960 onwards. These economic development plans presented economic goals for economic growth, as well as methods for mobilization and allocation of resources to fulfill these goals.

Korea and Taiwan are also countries where the government, rather than the private sector, was involved in the nurturing of primary industries, at least at the outset of industrialization. Korea began to experiment with directly nurturing manufacturing businesses from the 1960's, in petroleum refining (today's SK), and steel (POSCO), while maintaining laws to develop the textile, machinery, electronics, and automobile industries, and to create industrial complexes in each area. Taiwan's government acted similarly, with the government maintaining primary industries as public enterprises. As a result, the share of public enterprises in total fixed assets amounted to 34.0% as of 1960, 29.7% in 1970, and then 34.4% in 1980. Public enterprises took 24.4% of investment in 1990, slipping to 9.8% by 2000.

Kuznets (1988) identified five characteristics shared by the development models of Japan, Taiwan, and Korea. These included high investment ratios, a small public sector, a competitive labor market, efforts to expand exports, and a high degree of government intervention.[2] Kuznets also implied that even though such high growth was limited to countries in East Asia, their economic model could be repeated elsewhere. The World

[2] Kuznets, Paul W., "An East-Asian Model of Economic Development: Japan, Taiwan, and South Korea," *Economic Development and Cultural Change*, April 1988, Supplement, Vol. 36, Issue 3, p. 12

Bank in a more recent study also emphasized the role of the government, describing the growth of eight countries in East Asia between 1965 and 1990 as a "miracle." The World Bank's study depicted East Asia's growth as originating from flexible and pragmatic policies that enabled the intrinsic abilities of the market to function. The World Bank argued that neither the neoclassical model that emphasized the role of the free market nor the revisionist model that emphasized government intervention was sufficient to explain East Asia's economic miracle. Instead, the World Bank emphasized a "functionalist" approach to economic growth. "Functionalism" as used by the World Bank focuses on the relationship between policy and growth, and views the government as having deployed diverse economic policies where appropriate, including free market oriented policies, as well as "guided development" policies, to help enable growth, accumulation, efficient resource allocation, and rapid acquisition of technology (i.e. improved productivity). In economic policy, basic policies that emphasize the free market were implemented in parallel with policies that allowed for discretionary government intervention. Ultimately, however, the World Bank concluded that there is no "East Asian development model" per se. Even though all of the countries of East Asia have achieved improved income distribution and high growth, the experience of each country is unique and particular, and massive discrepancies exist between the countries concerned in their political and economic systems. In light of such considerations, the World Bank concluded that no "East Asian model" can be said to exist, and that the examples of Japan, Taiwan, and Korea are *sui generis.* Accordingly, characteristics of these economies like openly stated production targets, discretionary government intervention, and government monitoring of corporate results, while feasible in the global economic environment of 1960-1970, are no longer viable or applicable in other developing countries.[3]

[3] The World Bank differentiates Northeast Asia from Southeast Asia, and claims that it may be difficult for other developing countries to follow the paths the Northeast Asian countries took. However, Southeast Asian countries carried out market liberalization in parallel with the inducement of high levels of foreign investment and greater opening of the financial market, thus servings as a constructive model for other developing countries.

Malaysian economist Jomo (2001), while disagreeing with the World Bank's contention that the example of Southeast Asia is more applicable to developing countries, also concurred that there is in fact no single East Asian development model, and that the development process even within Southeast Asia differs among countries. He also noted that foreign direct investment ("FDI") had little role in the development of the economies of Northeast Asia, stating that "those most successful in developing their industrial capabilities, namely Japan, the Republic of Korea, and Taiwan, have made very little use of FDI." (p.6). Furthermore, despite the fact that Korea and Taiwan are both East Asian nations, state-owned enterprises played a much larger role in the case of Taiwan. Industrial and technological policy also exhibits marked differences as well, with Korea oriented towards very large enterprises (i.e. the "chaebol"), and Taiwan oriented towards small or mid-sized businesses.[4]

Other evaluations of East Asia have suggested that its development model differed in the methods used to mobilize resources or to develop markets for products. Some analysts at Morgan Stanley claimed that Korea and Taiwan are part of a "Northeast Asian economic model" that falls under a larger "East Asian Economic Model".[5] These economists described East Asia overall as characterized by a high degree of investment and heavy export orientation. "East Asia" can then be further broken down into a "Northeast Asian" and "Southeast Asian" model with respect to their methods of capital acquisition. Northeast Asia had domestic businesses as the main actors in the accumulation of capital, while Southeast Asia relied heavily on foreign direct investment. Differences arose in the Northeast Asian model as well, with Korea focused on large businesses and Taiwan focused on smaller ones.

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[4] Jomo K.S., "Growth After the Asian Crisis: What Remains of the East Asian Model?", G-24 Discussion Paper Series No. 110, March 2001, pp. 6-11

[5] Daniel Lian, "Asia Pacific: First Steps in Dismantling the East Asia Economic Model," *Global Economic Forum*, Morgan Stanley, 2001/5/16.

Such studies focus on differences between Northeast from Southeast Asia, and point primarily Northeast Asia's policy focus on its own businesses (i.e. Korea's chaebol and Taiwan's small and mid-sized business groups) as against Southeast Asia's focus on multinational corporations.

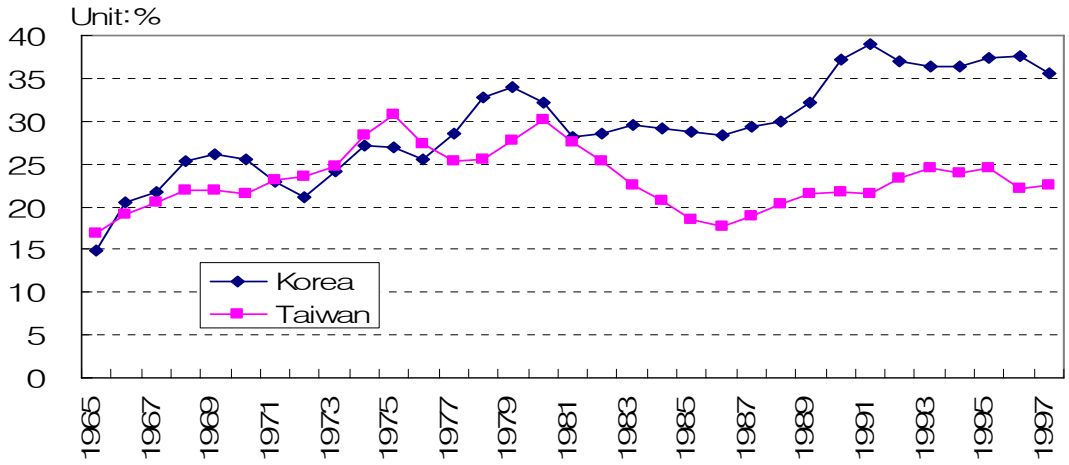
2) Growth by Factor Accumulation and Technological Progress

Many different opinions have been raised over what propelled the extraordinary economic growth in East Asia, including Korea and Taiwan. Many analysts believe that East Asia's economic growth was driven by factor accumulation, rather than by productivity growth or technological progress.

Gross fixed capital formation (GFCF) for Korea and Taiwan stood at around 10% in the early 1960's, and over 20% by 1970. Until the early 1970's, Korea's gross fixed capital formation rate was higher than Taiwan's, as Korea relied more on heavy industry & chemicals than Taiwan. By the mid 1970's, Taiwan's gross fixed capital formation had surpassed Korea's, with Korea catching up again in the late 1970's. In 1980, Korea underwent restructuring in its heavy industry & chemicals business, thereby undergoing a drop in fixed capital formation. However, by the late 1980's, fixed capital formation had recovered on an economic boom to more than 35%. Total annual investment in Korea went up to 37.0% on average by the early 1990's, an increase of more than 5 % point vis-à-vis the late 1980's. During the same period, Taiwan also witnessed a rise in overall investment. In the early 1980's, its investment rate was quite low, but by the 1990's investment rates had risen by 4 % points compared to the late 1980's.

On the other hand, Taiwan's gross fixed capital formation fell from 30% to less than 20% in the 1980's. By the early 1990's, when the rest of East Asia was enjoying an investment boom, Taiwan saw its GFCF stay below 25%.

Figure 4. GFCF to GDP ratio for Korea and Taiwan (1965~1997)



Source: Statistical authorities of Korea and Taiwan

In 1994, Paul Krugman famously drew attention to the deficiencies of growth in East Asia by noting the disproportionate role played by factor accumulation in comparison to actual increased productivity. Based upon a study by Young(1992) on total factor productivity ("TFP") in Hong Kong and Singapore, Krugman argued that East Asia's economic growth would ultimately be unsustainable, as it relied on, in his words, "perspiration not inspiration"[6]. Since then, much research has focused on TFP in East Asian countries, with Korea and Taiwan at the heart of these studies.

According to Young's study on the four "Asian tigers" (1995), the non-agricultural sector of Korea's economy grew at an annualized rate of 10.3% between 1966 and 1990, while TFP growth was only 1.7%, accounting for just 16.5% of the total growth. Taiwan' TPF growth during the same period was also unimpressive, at 2.6 %, against overall economic growth of 9.4%, and 27.6% of overall economic growth. According to Collins and Bosworth (1996), from 1960 to 1994, Korea's growth rate was 5.7% and Taiwan's, 5.8% in terms of output per worker, while TFP in the two nations grew by 1.5% and 2.9% respectively, indicating that TFP accounted for only a small fraction of the performance of the two countries' economy (26.3% and 34.5%, respectively.) These two studies that calculated TFP using the growth accounting method demonstrated that Taiwan and Korea benefited little from increased TFP in their overall economic growth.

[6] Krugman Paul, "The Myth of Asia's Miracle," *Foreign Affairs*, Nov/Dec 1994, pp.62-77

Table 4. Putative Sources of growth in Korea and Taiwan

	YOUNG (1995)		COLLINS AND BOSWORTH (1996)		IWATA ET AL. (2003)	
PERIOD	1966-1990		1960-1994		1960-1995	
	GROWTH RATE (NON-AGRICULTURAL SECTOR)	TFP GROWTH	GROWTH RATE (OUTPUT PER WORKER)	TFP GROWTH	GROWTH RATE	TFP GROWTH
KOREA	10.3	1.7 (16.5)	5.7	1.5 (26.3)	8.2	3.7 (45.1)
TAIWAN	9.4	2.6 (27.6)	5.8	2.0 (34.5)	8.3	3.8 (45.8)

Note: Figures in parentheses denote the contribution of TFP to output growth.

Sources: Young (1995), pp.660-661. Collins and Bosworth (1996), p.157., Iwata et al (2003), p. 167.

In contrast, Iwata et al. took a different approach to estimate TFP growth by using so-called nonparametric derivative estimation techniques (2003). They concluded that TFP growth was in fact the driving force behind the economic success of Korea, Taiwan, Hong Kong, and Singapore during the period 1979-1999. TFP growth rates in the four nations did not differ greatly from each other at 3.4~3.9%, accounting for 44%~47% of overall economic growth. This conclusion is not in line with other studies that relied on a crude factor accumulation hypothesis to account for Asian economic performance.[7]

[7] Iwata Shigeru, Mohsin S. Khan, and Horoshi Murao. Sources of Economic Growth in East Asia: A Nonparametric Assessment," *IMF Staff Papers,* Vol. 50, no. 2

Most economists agree that East Asian countries, including Korea and Taiwan have had lower productivity growth vis-à-vis the advanced economies, a characteristic that is easily understandable in light of the much lower production factor costs in developing economies. Moreover, one study using the traditional growth accounting method found that Taiwan's TFP growth was higher than that of Korea. This conclusion was accounted for by Korea's emphasis on heavy industry & chemicals, in contrast to Taiwan's focus on small and medium-sized businesses.

3) Role of Investments and Exports

Investments and exports are commonly called "engines of economic growth" in Korea and Taiwan. Investments helped expand production capacity in both countries, while exports boosted efficiency by helping secure target markets. Investment was the basis for capital accumulation and encouraged by export-oriented strategies rather than import substitution. Exports contribute to improved efficiency through facilitation of competition. In fact economic growth in the two countries was possible due to foreign currency attained via exports which enabled to import commodities and capital goods.

According to Balassa (1988), exports distribute resources to industries with comparative advantage while investments recruit capital for industries with comparative advantage, enhancing efficiency. Exports also help develop economies of scale and enable production facilities to operate at capacities beyond those feasible in small-scale domestic markets. Exports also create horizontal and vertical specialization, leading to cost reductions, while export industries introduce technological progress when exporters seek modern technologies to boost market shares.[8] Simply put, economic growth in these countries depends heavily on export growth, particularly in Korea and Taiwan. In line with these circumstances, experts like the World Bank have concluded that East Asian economic growth was shaped mainly by exports.

However, some analysts hold a different view, arguing that investments played a

[8] Balassa Bela, "The Lessons of East Asian Development: An Overview", *Economic Development and Cultural Change, April 1988 Supplement*, Vol.36, Issue 3, pp 274-290.

larger role than exports, believing capital accumulation to be ultimately more important than productivity growth in East Asia. According to Rodrik, the sharp increase in the export- GDP ratio in the mid 1960's could not be attributed to the increase in the relative profitability of export. As exports were very minimal at the time, exports only accounted for a small part of overall growth, and it was not yet clear if exports had enough technological influence or cumulative productivity benefits to lead the entire economy.[9] According to another study by Aw, Chung, and Roberts (2000,) the theory that companies with higher productivity will tend to participate in exports does not apply to the Korean economy. The study also notes that there is no evidence that exporters will see greater increases in productivity than non-exporters.

1.3 Economic Challenges Facing Korea and Taiwan

(1) Declining Economic Dynamism

1) Slowdown in Growth Rate

Economic growth in both countries slowed noticeably after the financial crisis of the late 1990's. Growth rates, much lower in the late 1990's even than in early 1990, continued to descend after 2001. While growth started picking up again between 2005 and 2006, it still remains well below the pre-crisis level. Korea and Taiwan had negative growth in 1998 and 2001 respectively after the financial crisis. Taiwan's negative growth was influenced by instability in the global economy after the collapse of the US "new economy" bubble and the 9/11 attacks. Exports from Taiwan were also greatly affected by the shock, decreasing by 16.9% year on year to $126.3 billion in 2001. Korea, on the other hand, was directly struck by the Asian financial crisis, while Taiwan, though only indirectly affected by the crisis, experienced a slow-down in economic growth. This economic growth led to an increase in unemployment and a

[9] Servass and Naastepad, C.W.M (2005), 'Strategic Factors in Economic Development: East Asian Industrialization 1950-2003', *Development and Change* 36(6), p. 1078.

wave of restructuring in which many companies were sold overseas.

Table 5. Growth Rates and Price Increases in Korea and Taiwan

(Unit: %)

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Korea	Growth Rates	5	-6.9	9.5	8.5	3.8	7	3.1	4.6	4.2	5.0
	Price Increases	4.4	7.5	0.8	2.3	4.1	2.7	3.6	3.6	2.7	
Taiwan	Growth Rates	6.7	4.6	5.4	5.8	-2.2	4.2	3.4	6.1	4.0	4.6
	Price Increases	0.9	1.7	0.2	1.3	0	-0.2	-0.3	1.6	2.3	

Source: ADB, Asian Development Outlook 2006, Korean Bureau of Statistics

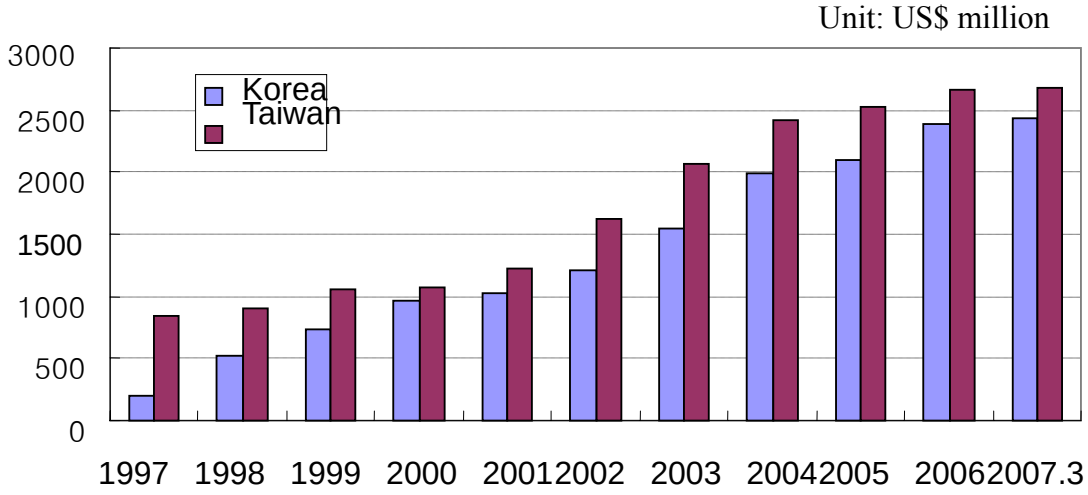
Korea and Taiwan had maintained nearly full employment since the mid 1980's, when the distribution of population had been mobilized into industries. Taiwan's unemployment rate in 1996 was still low at 2.6%, but grew to 5.2% in late 2002. Fortunately, the number dwindled down again to 3.9% in 2006. Korea's unemployment has exhibited similar patterns, soaring to 7% right after the financial crisis, but falling to 3.5% at the end of 2006. Although unemployment ultimately went down in both nations, the "quality" of employment is not as good as before, with more contract workers than regular employees. College graduates in particular are having difficulties finding a job, an issues which is attracting increasing concern in both nations.

Despite a slow-down in economic growth rates and deterioration in employment, the two economies are also managing to run a current account surplus. Growth potential has decreased and investment has become sluggish due to slow economic growth and stagnant growth in population, although exports continue to climb. Korea, which experienced a financial crisis, saw a sharp drop in its foreign exchange reserves in late 1997, but as result of a large current account surplus, reserves increased to $102.8 billion in 2001, and again to $210.3 billion in 2005. As of late March 2007, reserves are at $243.8 billion.

Taiwan, which did not directly undergo a financial crisis, had $83.5 billion in foreign exchange reserves in late 1997. Reserves exceeded $200 billion in 2003, and as of March 2007, have reached $267.5 billion. Taiwan is especially replete with foreign

exchange reserves, which are important in maintaining stability in international transactions, but can also weigh down the economy.

Figure 5. Foreign exchanges reserves of Korea and Taiwan



2) Sluggish investments

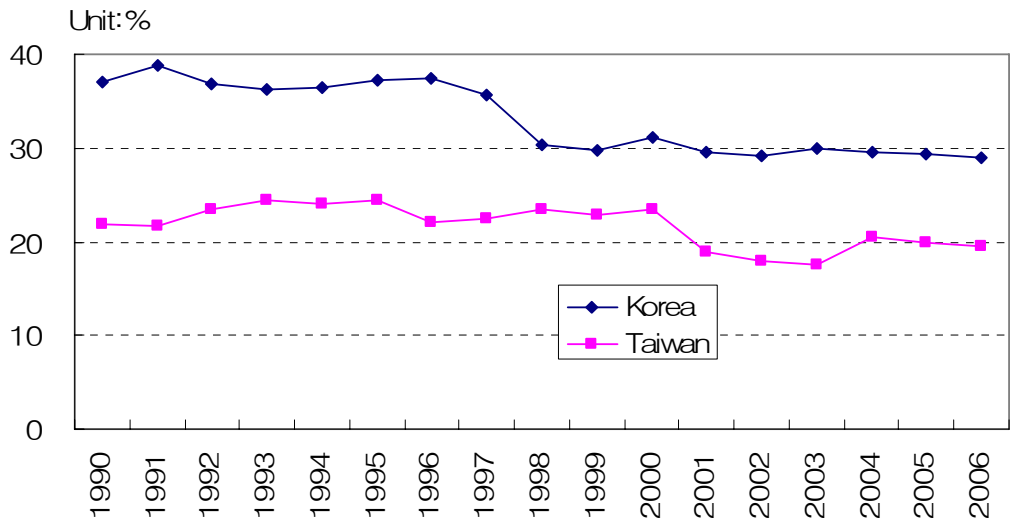
As mentioned above, Korea and Taiwan relied upon capital accumulation for economic growth, and accordingly, slow economic growth after the crisis is largely due to sluggish investments. In these two economies, where population growth is slow and urbanization is almost complete, productivity in capital investments is the main source of economic growth. Sluggish investments, however, have slowed down capital accumulation, while productivity growth has slowed down dramatically.

Korea saw a sharp drop in investments between 1997 and 1998, and investments in machinery and equipment rolled back by much as 39.6% in 1998. Except for 2001, investments have since been rising, but fixed capital formation growth from 2003 and 2006 was very far from the level of overall economic growth. Investments in Taiwan during the East Asian financial crisis also grew continuously. However, as the IT bubble burst in the US, Taiwan's overall investments including machinery and equipment investment, suffered negative growth between 2001 and 2003. Investments in

machinery and equipment again posted negative growth in 2005.

As a consequence, the share of gross fixed capital formation to GDP also went down. In the early 1990's, investment rates in Korea were over 35%, but following the financial crisis, they fell to 29% in 2006. After 1998, investments remained almost unchanged. Taiwan's investment rates rose around mid-20% in the early 1990's. However, Taiwan also saw a drop in investment below 20% between 2000 and 2002. While investment was to rebound later, investment remained around 20% in 2005 and 2006.

Figure 6. Gross Fixed Capital Formation Rates to GDP of Korea and Taiwan



Source: Bank of Korea , The Directorate General of Budgets, Accounting, and Statistics.

Investment started decreasing around the financial crisis, and as of 2005, fell much below its highest levels. The larger problem is lackluster facility investment for corporate production activities. Korea's facility investment rate (measured against GDP) was 8.9% in 2005, down from 12.8% in 2000, and 9.6% in 2003. Taiwan's facility investment rate had been sliding after it reached 13.8% in 2001, but started picking up at slightly at 10.2% in 2005.

Table 6. Facility investment/ GFCF in Korea and Taiwan

(Unit: %)

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Korea	Facility Investment	34.3	27.6	34.6	41.2	37.1	35.8	32.0	31.2	30.7	30.8
	Machinery and Equipment	26.2	22.3	26.0	31.3	28.3	26.6	24.7	24.9	24.6	24.4
Taiwan	Facility Investment	47.0	49.0	52.0	58.5	54.6	52.8	51.9	51.2	51.3	
	Facility Investment	40.3	41.6	46.8	52.9	47.3	46.5	45.4	44.9	42.8	

Source: Bank of Korea, Taiwan's National Statistics

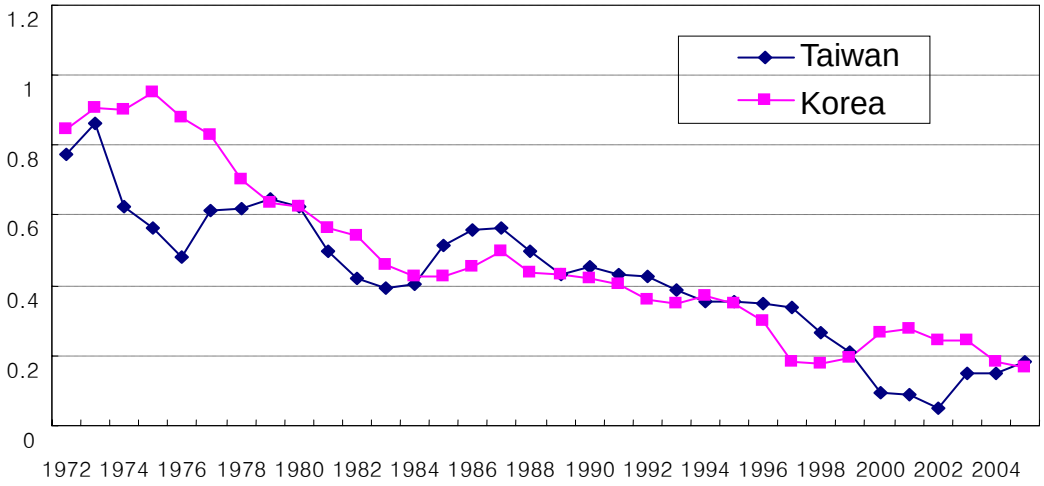
3) Causes for the slowdown in investment

Korea and Taiwan grew on their "late-comer" advantage from the 60's onward in accordance with the "Flying Geese" industrial development model (where Japan leads and neighboring Asian nations follow). Both nations eventually caught up with other economies and achieved substantial economic growth by emulating Japan's industrial policy and acquiring its technology. However, as their economies grew, returns on investment plunged downwards. Accordingly, capital began to accumulate, while returns on capital began to decline. Simply put, the law of diminishing returns was starting to make itself felt. Marginal production on capital in the two economies decreased continuously. The two nations have now reached an end point in their race to "catch-up," and now face the same challenges faced by advanced nations.

In this paper I have used reciprocals of the incremental capital output ratio ("ICOR") (Δ GDP/ I.) as a proxy for marginal production of capital (Δ GDP/ Δ K.) The chart below displays the pattern of changes in marginal production of capital in Korea and Taiwan. In the early 1970's, when capital grew by one unit, GDP rose by 0.8 units. But as seen in the chart, returns eventually started to decline. Korea in particular witnessed a drastic drop in its marginal production of capital as a result of excessive industrialization. In the mid 1980's, when the heavy and chemical industries underwent restructuring and the Plaza Accord was reached, allowing for a temporary boost in labor-intensive industries, capital productivity appeared to bounce back slightly, only to decline again. Although the IT boom has accounted for a slight increase, capital productivity has recently returned to a downward trend.

A similar pattern can be observed in Taiwan. Taiwan is also experiencing a continuous fall in productivity, although productivity saw a slight rise in the mid 1980's. In the late 1990's, Taiwan's productivity growth fell faster even than that of Korea. Diminishing returns are clearly visible in the overall economy, indicating that investment opportunities for companies to secure profits are decreasing.

Figure 7. Marginal products of capital in Korea and Taiwan (Three-year moving average)



Note: Reciprocals of ICOR are a proxy for marginal production of capital. Assessed based on nominal GDP figures.
Source: Based upon GDP statistics from Korea and Taiwan

Another cause for sluggish investments in Korea and Taiwan are the demographic factors inherent to their population. Both nations have stagnant population growth and a rapidly aging society. Taiwan's population was 23.80 million in 2005, up just 0.5 million from 22.30 million in 2000. Over the same period, annual population growth was 0.4%, even lower than that of Korea at 0.5%. In 2005, the proportion of people aged 65 and over in Korea was 9% while in Taiwan it now numbers 10%. According to the Asian Development Bank, the labor force of Korea and Taiwan will increase by only 0.40% and 0.28% respectively every year from 2005 and 2015.[10]

[10] ADB, *Asian Development Outlook 2007*, p. 289.

Increasingly stringent risk management is another reason behind the sluggish investments. After the Asian financial crisis, Korean and Taiwanese businesses began to place heavier priority on risk management. In the early 1990's when the two economies enjoyed rapid growth, companies made massive investments. After the crisis, the companies emphasized more secure returns in their investment planning process, with banks placing more focus on provision of collateral to attain loans.

When uncertainties are high in the business environment, companies cannot obtain funds through external financing. Internal financing in facility investment for Korean manufacturers was 25.5% from 1995-1997, and has grown to 80% in 2003. Such growth was due to strong efforts by companies to reduce debt, improve profitability, and attain greater return on investment.[11]

In Taiwan, deflation occurred between 2002 and 2003, making it difficult for businesses to expand profits, and exerting a negative influence on corporate investment. Prospects for exports worsened as the IT bubble burst and the global economy went into a slump after 2000, making companies reluctant to make further investments. Furthermore, the September 11 bombing and the collapse of the late 90's American "new economy" bubble decreased exports from both Taiwan and Korea, resulting in a drop in overall investments in 2001. While the correlation between slow exports and investment in Korea is not as high as in Taiwan, this is a result of Korea's economy being both larger and less dependent on exports than Taiwan.

Companies are now increasingly prudent in their risk management, and are more sensitive to political conditions than ever before. In Korea, political instability and hard-line labor unions have hindered investment, while in Taiwan, anxiety over the weakness of the ruling party, an increasingly vocal opposition, conflict with the main land, and political isolation in the global community have also been cited as obstacles to investment. In late 2002, Taiwan joined the WTO, but it still remains politically isolated from the rest of the world.

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[11] BOK, Current Trends and Characteristics of Facility Investment, 2004. 7. p. 6.

(2) Foreign Investment & Hollowing-out of Industry

1) Increased foreign investments

Increasing production costs after the success of the pro-democracy movement coupled with the "three lows" (low oil prices, low interest rates, and low dollar values) have encouraged Korean and Taiwanese companies to move their more labor-intensive businesses overseas. Korea continuously reduced regulations on foreign investment up to the early half of the 90's. In June 1996, the government streamlined the foreign investment procedures by adopting an 'automatic approval system.' Outbound investment also surged in Taiwan as it loosened its grip in 1987 on foreign remittances and travel to China after the Plaza Accord. July of this year proved to be a turning point for overseas investment as the Taiwanese government freed all outbound remittances of under US$5 million, irrespective of whether the sender is an institution, a company, or an individual.

In the beginning, investments from both countries were mostly focused on Southeast Asia. The main cause for this was the need for local companies' to find cost-efficient investments after the Plaza Accord, which raised production costs. Korea's textile, clothing and footwear companies chose Indonesia for their production, while Taiwan's electronics companies preferred Malaysia. Labor-intensive products were produced in overseas manufacturing centers and then exported to other countries, including the US. Other regions in the western hemisphere like Central America also became popular investment venues, but this is due solely to their greater access to the American market.

Investments to China increased dramatically during the early 90's. Based on balance of payments, Korea's outbound investment was a mere $1.8 billion on average in the first half of the 90's. After a rush of investment in China, the same figure had nearly tripled to $4.5 billion by the late 90's and has remained constant as of 2005. Taiwan's outbound investment was even more active, reaching an average of $2.9 billion during the early 90's. Taiwanese companies were more willing to invest overseas even after the turbulence of the late 90's, as Taiwan's outbound investment in 2004 surpassed $7.1

billion. In consideration of each countries' economic size, it is reasonable to infer from such statistics that Taiwanese companies are much more open to investing overseas.

Table 7. Changes in outbound investment for Korea and Taiwan

(US$1 Million)

	90~95	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Korea	1,842	4,670	4,449	4,740	4,198	4,999	2,420	2,616	3,425	4,657	4,312
Taiwan	2,917	3,843	5,243	3,836	4,420	6,701	5,480	4,886	5,682	7,145	6,028

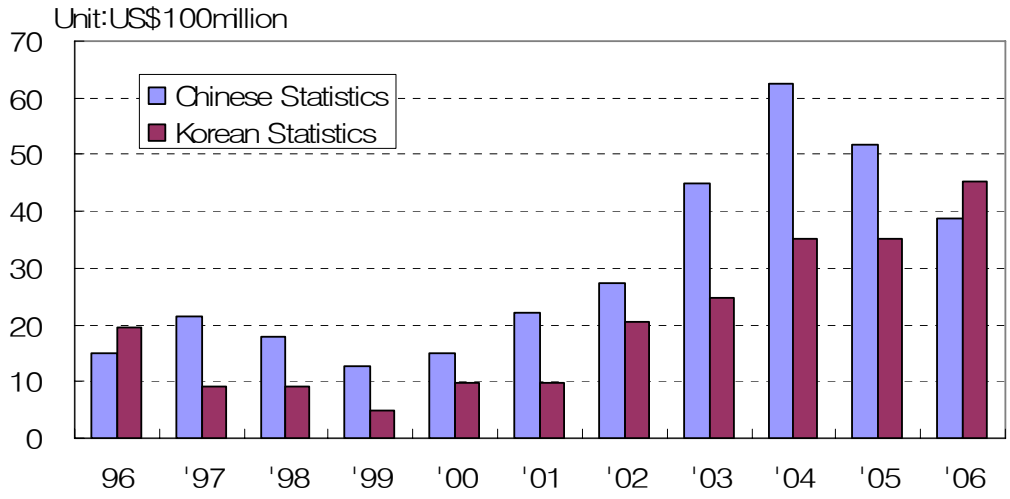
Source: UNCTAD, WIR 2006

Taiwanese companies began investments in China well before their Korean counterparts. Ever since the Taiwanese government began allowing its people to visit China in November of 1987, Taiwanese businesses have begun a vigorous pattern of investment in the mainland.

According to statistics from the Export-Import Bank of Korea, Korean companies' investments in China rapidly increased from US$141 million in 1992, the first year of rapprochement, to $930 million in 1996. This pattern was temporarily interrupted by the 1997 financial crisis, when Korean companies became preoccupied with restructuring plans, and only $366 million was invested in China in 1999. By 2006, however, investment risen to a whopping $3.3 billion. Government statistics show total Korean investment in China amounting to $17.0 billion.

Statistics on the same subject from the Chinese government vary slightly from statistics from the Korean government. For investments after 1999, for example, Chinese statistics show more investment coming from Korea than Korean statistics, claiming $27.5 billion invested from 1999 to 2006.

Figure 8. Korean Investments in China



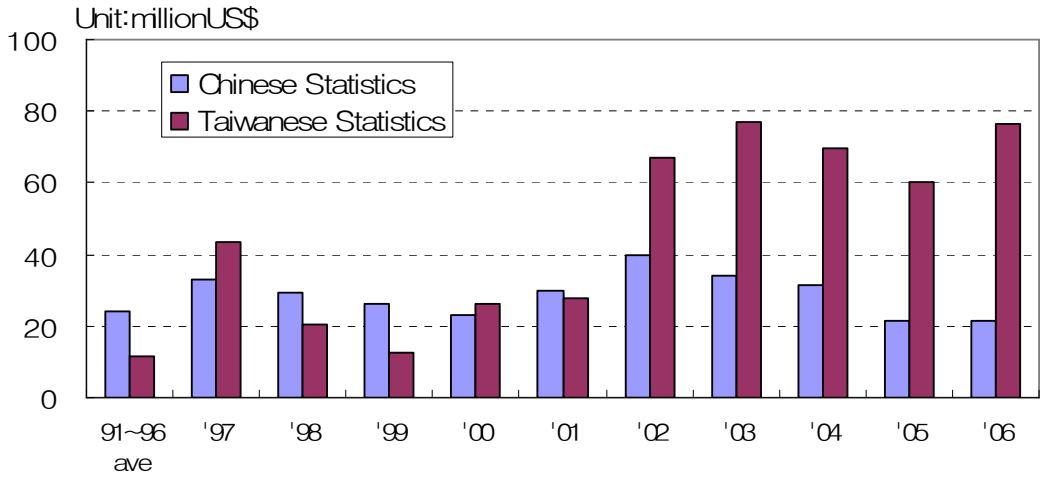
Source: Ministry of Commerce of the People's Republic of China and the Export-Import Bank of Korea

From the late-80's, Taiwanese companies began investments in Fujian and Guangdong Province immediately after being allowed to do so by the Taiwanese government. Investments from apparel, footwear, and toy manufacturing companies came first, and were soon followed by investments from electronic component companies. The Taiwanese government continued to liberalize regulations, and businesses were allowed to engage in indirect mainland investment (via a third country) in October 1990. This law was amended in March 1993. Immediately before China's participation in the WTO, Taiwan's government prepared new policies with respect to relations with China, including mitigation of regulations on investments there. In November 2001, the Taiwanese government scrapped regulations on investment in 122 high tech products, including digital televisions, cellular phones and laptop computers. In addition, the government allowed investments in the mainland's semiconductor industry on condition that there be no rapid technology transfer or hollowing-out of industry within Taiwan.

Following these steps, Taiwan's investments in China increased dramatically. Accurate estimates of Taiwan's investments in China, however, remain difficult, as many investments still rely on indirect methods. The Taiwanese government has

released statistics denoting foreign direct investment along with announcements of the amount of indirect investment in China. The difficulty of ascertaining these statistics has worsened, with some unreported companies settling their numbers only once every few years. What can be certain, however, is that Taiwanese investments in China are rapidly increasing. As of 2006, Taiwan's government estimated that a total of $54.9 billion had been invested in China. The Chinese government, on the other hand, estimated Taiwan's investment at about $43.9 billion. This is because a portion of Taiwan's investments were masked via different nationalities. It is interesting to note that numbers released from Taiwan's government are much higher than those from China's government. This is, perhaps, due to concealment of nationalities in Chinese statistics, while Taiwan's statistics are more accurate as to companies' investment destinations.[12] Actual cumulative investments to China are likely much higher than the official statistics from Taiwan.

Figure 9. Taiwanese Firms' Direct Investment in China



Source: Taiwan Statistics Bureau

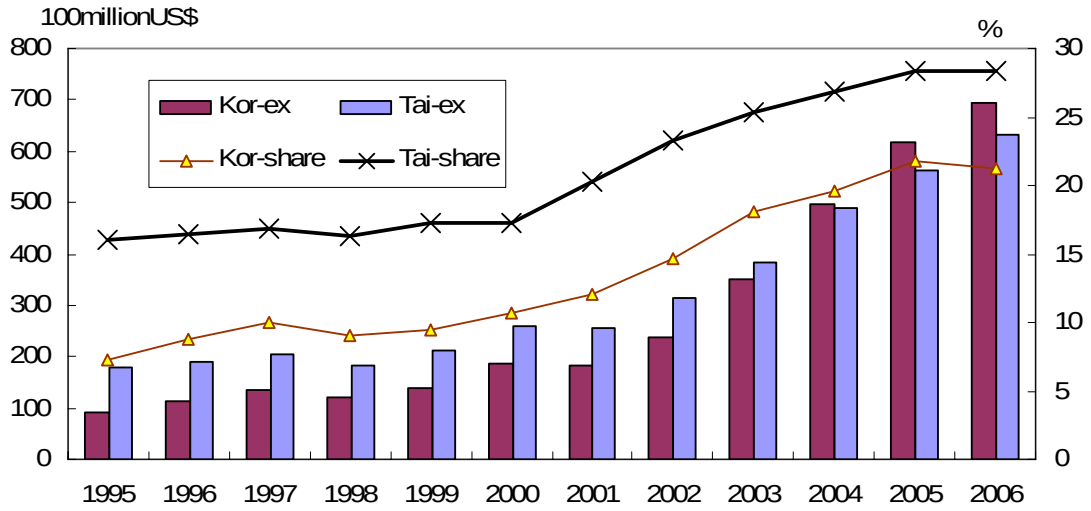
Korean and Taiwanese investments in China have accordingly caused a sharp

[12] Studies show that a large portion of Taiwan's foreign investments heads toward British overseas territories in the Caribbean in order to avoid taxes. Out of $3.296 billion in approved foreign investments, $1.838 billion, or 55.8% were investments 'in' the Caribbean. On average, 40% of annual foreign investments head towards these islands. It is reasonable to assume that these investments 'indirectly' flow into China.

increase in trade volume. Both countries enjoy trade surpluses with China on exports of materials and intermediary goods to support directly invested firms. Exports and domestic sales from foreign companies based in China have increased on a robust economy and thriving Chinese exports.

Taiwan's exports to China exceeded those of Korea by the mid-90's as Taiwan had a head start in exporting to China. In 1995, Korea exported US$9.1 billion to China (accounting for 7.3% of Korea's total exports) while Taiwan exported $17.9 billion (accounting for 16.0% of Taiwan's total exports). Exports to China surged thereafter with approximately 10% of Korean exports and over 20% of Taiwanese exports headed to China in 1997. In 2004, exports from both countries amounted to roughly $50 billion. China became Taiwan's largest export market in 2001 and Korea's in 2003, displacing the US on both occasions.

Figure 10. Share and Volume for Korean and Taiwanese Exports to China



Heavy reliance on the Chinese market has been mostly positive for both countries two points have been raised as matters of concern. One is that many exports are simply supplies to the Chinese subsidiaries of domestic firms, indicating that some exports to China are causing a net loss of domestic jobs and production. Many of the final products produced by the Chinese subsidiaries of Korean and Taiwanese firms are also then exported to developed countries. In other words, exports to China are simply

substitutes for exports from domestic production. Second, heavy reliance on exports to China may leave both countries vulnerable to sudden shifts in China's domestic or foreign policies, leaving Korea and Taiwan with no escape route whatsoever. This was the case when China decided to curtail its booming economy, which limited year on year export growth for 2006 to 12.2% compared to total export growth of 14.4%. Taiwan's year on year export growth in the same year was 12.9% while total exports grew at 12.9%. Until then, both countries' exports to China exceeded total export growth.

2) Fears of "hollowing-out" of industry

There are rising concerns that both Taiwan and Korea are suffering from sluggish domestic investment caused by the investment boom in China. Claims of "hollowing-out of industry" have also become a growing concern. During the period 1991 to 2006, the Taiwanese government's estimate of Taiwan's investment in China amounted to $54.9 billion, or 35,542, but unofficial sources say investments to China may have reached $100 billion and that about 400,000 Taiwanese are now in China.

Hollowing-out of industry has caused the foundation of the economy to weaken by providing fewer jobs and lowering production output in the manufacturing sector. Theoretically, if the manufacturing sector in an industry decreases without affecting economic growth and the overall employment rate, the economy could be said to be "advancing" or reaching a "post-industrial" state. In reality, however, it has yet to be proven that a decline in manufacturing has resulted in greater maturity for the economies of the two countries.

In Taiwan, studies of the manner in which hollowing-out of industry affects the economy began from the late 1980's. Xie Kuan Yu noted that even though hollowing-out had not been an issue up to the late 1990's, that hollowing-out had

actually begun even before then.[13] Chen and Ku (2003) claimed that the employment rate of businesses investing overseas was higher than the employment rate for businesses that did not invest overseas.[14]Chu-Chia Lin claimed otherwise by noting that there were no indications of hollowing-out of industry with respect to investments in China.[15]

For Korea, the rise of the Chinese economy also fueled debate on hollowing-out. Korea Development Bank (KDB) conducted research on levels of hollowing-out in the manufacturing sector. Responses were categorized into Korea: 'is already hollowing-out,' 'on the verge of hollowing-out,' 'has low potential to hollow-out,' and 'is highly unlikely to hollow-out.' The results of the research showed that home appliances industry (CDP and VCR manufacturing) and the footwear industry were considered to be 'highly hollowed-out.'[16] Kang Doo-Young created an index of the 'industrial hollowing out' for countries (production/production + imports) based on their self-subsistence rate. Kang concluded that hollowing-out of industry for Korean manufacturing would not be a significant threat until at least 2002.[17] Research from Hyun-Yeul Shin and Jin-Seok Oh in 2005 noted that overseas investment in the manufacturing sector had little negative effect on the domestic job market for most industries. While outbound foreign investment in light industries like textiles and clothing may have reduced the number of jobs available, it is also likely that such jobs were offset by new jobs in heavy industry & chemicals (including electronics and steel), that involved the management and support of local subsidiaries as well as an increase in

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[13] Xie Kuan Yu, "The Hollowing-out of Taiwanese Industry and the Relocation of Taiwanese Firms Abroad," Bank of Taiwan Journal of Economics & Finance Vol. 35, 8th period, 1998.

[14] Tain-Jy Chen and Ying-Huan Ku, 2003, "The Effect of Overseas Investment on Domestic Employment," *NBER Working Paper Series*

[15] Chu-Chia Lin, "Taiwan: Investment in China and Structural Change", PARK Bun-Soon, et al, *China Rising: East Asian Responses*, Samsung Economic Research Institute, 2006.

[16] Korea Development Bank, 'Studies on Coping With Hollowing-out of industry in the Domestic Manufacturing Sector', *KDB Techno-Report Vol. 29*, 2004

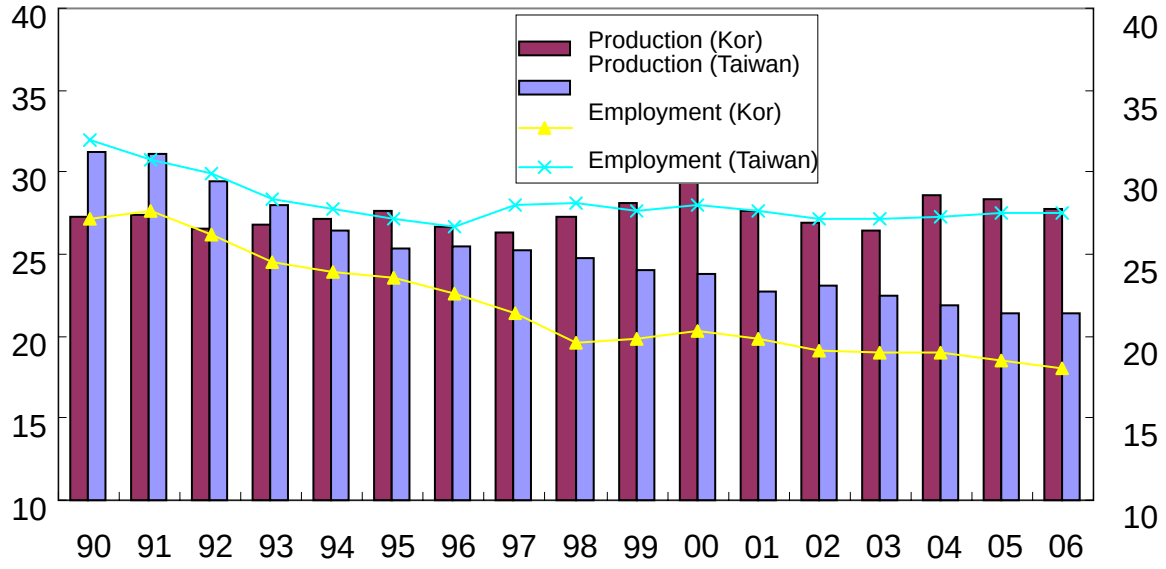
[17] Kang Doo-Young, "Quantitative Assumption of the Index for Industrial Hollowing-out in the Manufacturing Sector,"(In Korean) Economic Analysis, Book No. 10 Third Edition, Bank of Korea's Institute for *Monetary and Economic Research*. P. 49 to 71

jobs in R&D.[18]

While it is true that researchers may come to different conclusions regarding the extent and nature of hollowing-out of industry, it is common sense that massive investments in China will inevitably cause structural changes in both Taiwan and Korea. From the 1990's onward, Korea's manufacturing industry remained steady at about 27% of value-added to the nation's GDP. Manufacturing jobs accounted for 27.2% of total employment in 1990, and then dropped to 18.0% in 2006, roughly a 10% slide. During the same period, the number of jobs offered by the manufacturing industry fell from 4.98 million to 4.17 million. In 1998, right after the financial crisis, total jobs in the manufacturing industry dropped below 4 million, a drop of 620,000 in a single year. In the same period Taiwan had a roughly 10% drop in production in the manufacturing industry from 31.2% to 21.4%, while manufacturing's share of employment dropped from 32.0% to 27.5%. Looking at these statistics, jobs in the manufacturing sector in Korea have plunged significantly while production has remained the same, indicating that Korea has done well in further developing its economic structure.

[18] Shin Hyun-Yeul & Oh Jin-Seok, Impact of Outflow FDI on Domestic Employment in the Manufacturing Sector (In Korean). BOK Monthly Bulletin, November 2005, pp. 23-51

Figure 11. Changes in the manufacturing sector in Korea and Taiwan



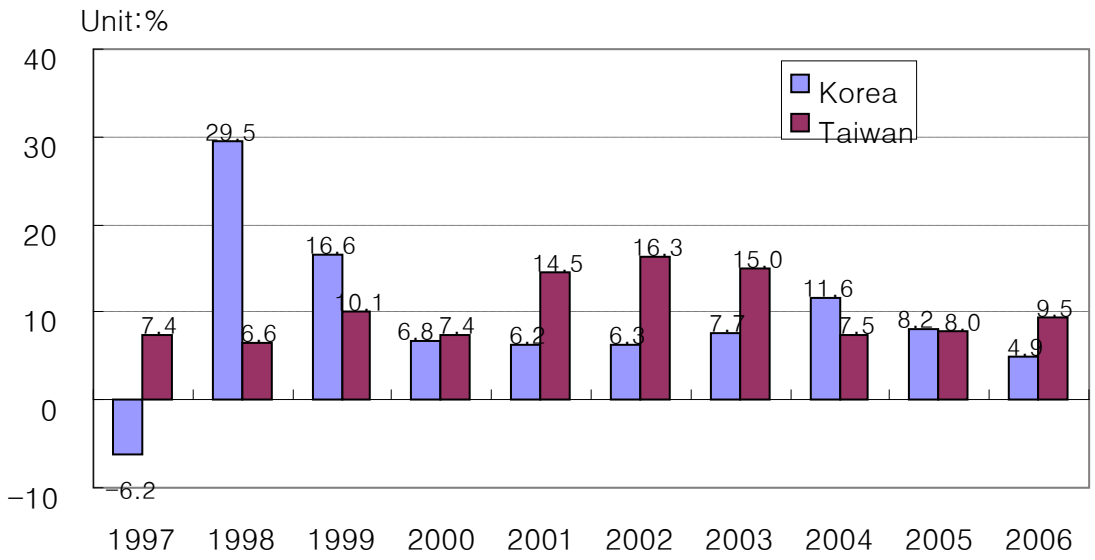
Source: National Statistics of Taiwan and Korea National Statistical Office

Since exports account for such a large portion of the economy, it is reasonable to assume that both countries are on the verge of hollowing-out of industry if their export competitiveness declines in line with the weakening of the manufacturing sector. Korea has traditionally been a trade deficit economy from the 50's to the mid-90's. Thanks to the "three lows" (low oil prices, low interest rates, and low yen exchange rates) from 1986 to 1989, the balance of trade turned positive, but deficits continued from 1990 to 1997.

A trade surplus followed as the financial crisis saw a surging won to dollar exchange rate, and as companies reduced imports via restructuring plans. In 1998, Korea enjoyed a US$39.0 billion trade surplus, but this was immediately revoked after the economic crisis, which led to plummeting imports. In 2004, the trade surplus reached $29.4 billion, but declined again in 2005 and 2006. The trade surplus from total exports decreased from 1998 to 2003 and increased to 2006, when it accounted for 4.9% of total exports (vis-à-vis 8.2% in 2005).

Unlike Korea, Taiwan has been a trade surplus economy ever since the 1970's. Even in this decade, Taiwan's surplus against total exports continued to rise to 16.3 in 2002, almost twice that of Korea. In 2003, the ratio dropped to 15%, falling further to 9.5% in 2006. While the balance of trade has not yet become a deficit, it is worth noting that the surplus has been diminishing rapidly in recent years.

Figure 12. Korea and Taiwan's trade balance vis-à-vis total exports



1.4 Conclusion: Korea and Taiwan Respond to Changing Circumstances

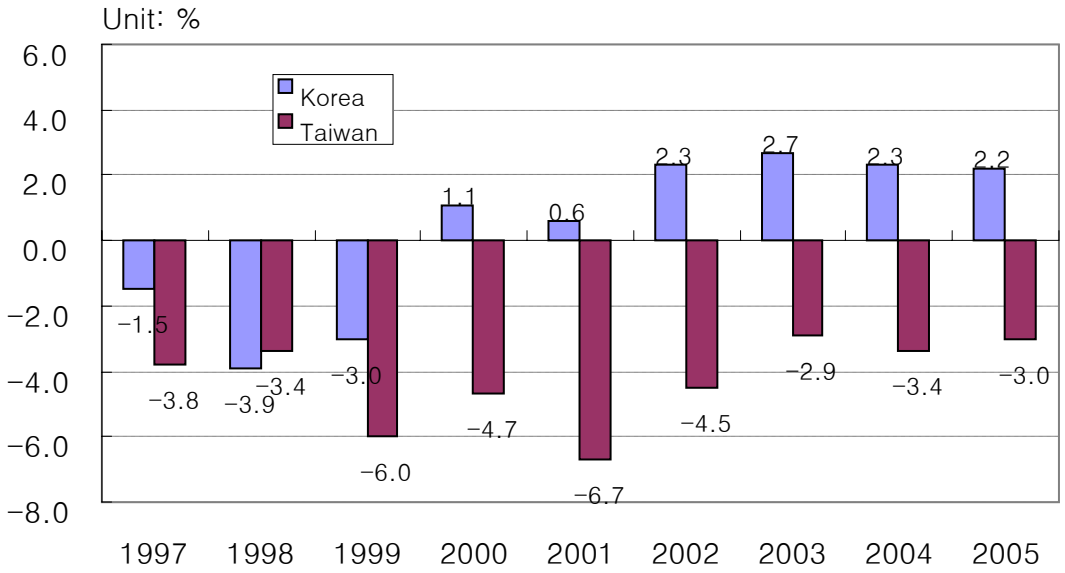
Both Korea and Taiwan are now trying to recover some of the growth momentum lost in their economy. Both countries are trying to make a shift from manufacturing into services. The Korean government is pushing to make Korea 'the business center of Northeast Asia' and is making strenuous efforts to create an environment friendly to the finance and logistics industry. Moreover, the government inaugurated its 'Vision 2030' plan that envisions 'a harmonious and hopeful Korea. The government has laid out plans to 'create a dynamic economy open to innovation,' 'a safe society that guarantees opportunity,' and 'a stable nation that ensures the dignity of its people.' Some of the government's plans include "expanding economic growth engines,' 'fostering human resources adequate for social needs,' 'upgrading social welfare,' 'gathering social capital,' and 'active globalization' are some of the government's plans.

Taiwan is also extremely interested in upgrading its industrial structure. Taiwan is deploying a six-year plan named 'Challenge 2008' from 2002 to 2008, to invest 2.7

trillion New Taiwan dollars to turn Taiwan into an international economic zone. Taiwan is also pushing 7 goals and 10 policy tasks that aim to keep its GDP growth rate above 5% and to develop 15 world-class products. Taiwan has established new plans for 2015, i.e. the "Economic Vision for 2015" and has embarked on its first three year plan (2007~2009) towards this end. The main goals of the 2015 Economic Plan include a $30,000 per capita income, an unemployment rate below 4%, and an annual growth rate of 5%.

Second, Taiwan is looking to strengthen domestic demand in order to boost growth and investment. In the short term, the government will promote consumption to revive investment and over the long term, the government will produce policies to promote consumption to funnel money from high savings that is leading to excessive investment. In this sense, the government is making the most of fiscal policy. Expenses have increased as taxes have been reduced. To encourage corporate investment, corporate taxes have been reduced, while companies' employee pension framework has been changed to the benefit of employers. Furthermore, in early-2003, Taiwan's legislative body passed a law that would allow incomes incurred from investments in the manufacturing sector to be tax free for 5 years. Simultaneously, Taiwan's fiscal balances have fallen into deficit, increasing from -3.8% in 1997 to 6.7% in 2001. Taiwan has yet to emerge from deficit.

Figure 13. Fiscal balances of Korea and Taiwan (against GDP)



Source: IMF, World Economic Outlook 2006

At the same time, both Korea and Taiwan are making extensive efforts to foster a friendlier environment for foreign investors. They are extremely interested in luring high value-added, technology intensive investments from foreign firms. It is also hoped that these investments can further develop the economic structure. Both countries are striving to lure R&D centers and regional head offices into their countries. High value added investments that boost productivity, including R&D hubs and financial and distribution enters are well favored by both countries to minimize possible downsides from foreign investment. The main reason behind Korea's FTA with the US lies in the government's desire to boost the competitiveness of its service industry.

Taiwan is backing its 'Challenge 2008 Plan' to foster itself as a global R&D center. In the process of making Taiwan a center of innovation and R&D, the government has planned to increase R&D expenses to 3% of GDP in six years.

Third, the government has also laid out plans to invest overseas in an "orderly" manner. Sluggish foreign investment from companies has caused both countries to carry large supplies of foreign reserves, which act as a weight on the economy. Accordingly, governments in both countries have liberalized foreign investment, while still

emphasizing “orderly” conditions for such investment, i.e. stressing investment in high end industries as a way to upgrade the industrial structure. Korea has encouraged outbound foreign investment including loosening regulations on buying foreign property, while Taiwan has mitigated restrictions on investments in China. Taiwan, however, faces tough challenges, as it may need to restrict outbound investment to avoid hollowing-out of industry, while simultaneously boosting outbound investment to remain competitive as multinationals rush into China.

Chapter II

Taiwanese Investment in China

Introduction

As a result of economic globalization, the rise of emerging industrialized countries and markets, and integration of regional economies, primary industrialized countries of East Asia have begun to expand their overseas investment since the 1990s. Faced with intensifying international competition, Taiwan, whose economic growth was founded on international trade, also launched global investments in the 1990s. Since the beginning of the new millennium, unleashed cross-strait interactions of the private sectors and the rapid growth of the Chinese economy have resulted in a significant phenomenon – Taiwan's foreign investments have begun to concentrate on China (Table 2-1).

Table 2-1 Major Host Country of Taiwan's Overseas Investment (2001-2005)

Unit：%

	China	U.S.A	HK	ASEAN	Europe	Japan
2001	32.21	12.64	1.10	21.37	0.53	1.96
2002	61.01	5.24	1.52	8.64	1.12	0.21
2003	59.91	3.63	4.99	9.41	0.60	0.78
2004	61.69	4.95	1.24	15.55	0.55	1.33
2005	62.62	3.28	1.12	12.88	3.12	0.44
2006	64.40	4.07	2.29	6.11	3.90	0.09

Source：Investment Commission and Department of Investment Service, MOEA

Analyzing the close trade and investment relations between the two nations from geographic and cultural perspectives, one can easily find it not surprising that China should become one of the strategic areas of Taiwan's overseas investments. Yet, political tension and hostility made it necessary for Taiwan to look at its high economic/trade dependency on China from the standpoint of national security. From the perspective of current global strategy, however, China will be one of the important regions in Taiwanese enterprises' overseas investment strategies, whether it is manufacturing, marketing or R&D. Therefore, deciding how to maintain and sharpen Taiwanese enterprises' relative competitive edge in R&D, manufacturing and marketing deployment while scrutinizing the risk and impact that the Chinese market exposes the Taiwanese economy to will be the primary concern of this

chapter.

2.1 Taiwanese Firms' Investment in China

In terms of overall direction, this section first briefly describes the total amount of Taiwanese enterprises' investments in China, the fields of investments and involved areas. On the level of the enterprises, this section then analyzes the characteristics of Taiwanese enterprises in terms of entry mode, scale of investment, business model, and R&D activity in order to give interested readers a glimpse of the business operations of Taiwanese enterprises in China.

2.1.1 Investment Volume

When it comes to Taiwan's investment in China, discrepancies are present between different versions. Largely speaking, however, we can divide published data on Taiwan's investment in China into 2 categories. The first is based on corporate investment applications approved by the governments of both sides of the Taiwan Strait. On Taiwan's side, it is the investment amount authorized by the Investment Commission of the Ministry of Economic Affairs (MOEA); on China's side, it is the contracted amount sanctioned by the Ministry of Commerce (MOC). On Taiwan's side, it is the amount of investment[19] in China disclosed in the companies' publicly-listed quarterly financial reports; on China's side, it is the real amount published by the MOC.

According to Table 2-2, whether it is based on the official data of Taiwan or China, the difference between the contracted amount and the real amount is expanding. Due to the fact that for their investment in China, Taiwanese enterprises normally take the pre-approval approach, the actual investment decision is often significantly different from the approved amount. The cause of the shrinking investment was closely associated with the changing investment environment of China in recent years, including deteriorating trade conditions, lack of intellectual property protection environment and of a dispute solution channel, tight monetary policy and power

[19] This disclosure began in 2002, so the information is only available for January-September from 2002 to 2006.

shortage, as well as gradual reduction of government-provided investment incentive programs, resulting from increasing difficulty in locating new factory sites, materials and capital, trade disputes and RMB appreciation pressure. This fully demonstrates the fact that China's production investment environment is gradually losing its relative advantage and that its attitude toward foreign firms is shifting.

Another noteworthy observation is the fact that according to various estimates, the actual investment amounts of Taiwanese enterprises published by China are generally underestimated while the contracted amounts tend to be overestimated. The former can be identified by comparing the difference between the amount approved by Taiwan and the actual amount invested in China. The investment amounts of Taiwanese enterprises published by China in 2004 were lower than the amount of investment in China disclosed in publicly-listed companies' quarterly financial reports. The main reason for this underestimation is the fact that some of the Taiwanese enterprises have chosen to invest in China through the 3 duty free ports[20]. Take the year 2005 for example. The contracted amount was US$9.917 billions while the actual investment amount was US$4.192 billions. In reality, therefore, the contracted amount of Taiwanese enterprises' investments in China in 2005 was supposed to be US$20.275 billions while the actual investment amount was reported to be NT$6.344 billions.

If we convert the actual investment amount of each nation published by the Chinese government into percentage of its overall GDP, we discover that Taiwan reached the earlier peak of 1.20% in 1996, and then gradually dropped to 0.71% in 2000 as the Taiwanese government began to curb investment in China. Following the power shift in 2000, Taiwan unleashed investment in China for various manufacturing products in 2002. Its GDP weight quickly surged again to the latter peak of 1.35% that year before gradually subsiding to 0.60% in 2006 as the international economy slowed down and the investment environment in China went through changes (Table 2-3). Compared with other Asian countries, Hong Kong and Singapore registered significantly higher weights for their roles as foreign investments' entry ports into

[20] Ministry of Commerce of PRC toward the end of 2006 published "2006 Report on Investment of Foreign Firms," which indicates Taiwanese enterprises invest in China via 3 duty free ports including British Virgin Islands, Cayman Islands and Samoa.

China, which, however, have been declining. Investments of advanced nations, such as Japan, UK, US and Germany, in China as a percentage of GDP are less than 0.1%. A peer nation, Korea has shown increasing economic and trade dependency on China. Passing Taiwan in 2005, Korea became China's most ardent Asian investor, next only to Hong Kong and Singapore.

Table 2-2 Amount of Outward FDI from Taiwan to China

Unit:100 millions

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Estimate1	10.93	12.29	16.15	15.19	12.53	26.07	27.84	38.59	45.95	69.41	60.07	76.42
Estimate2	10.93	12.29	43.34	20.35	12.53	26.07	27.84	67.23	76.99	69.41	60.07	76.42
Estimate3	31.65	34.82	32.89	29.15	25.99	22.97	29.80	39.71	33.77	31.17	21.52	21.36
Estimate4	31.62	34.75	28.14	29.82	33.74	40.42	69.14	67.41	85.58	93.06	103.58	-
Estimate5	-	-	-	-	-	-	-	-	27.55	37.99	30.91	27.63
Estimate6	-	-	-	--		-	-	-	26.44	36.83	27.14	17.20

Source: China Statistical Year Book、Investment Commission, MOEA、International Financial Statistics, IMF。

Note:

Estimate1 is the amount approved by the Investment Commission, MOEA

Estimate2 is Estimate1 plus some late applications in 2002 and 2003

Estimate3 is the real amount released by the Ministry of Commerce, China

Estimate4 is the contract amount released by the Ministry of Commerce, China

Estimate5 is the gross investments by publicly listed companies in Taiwan. The data in 2006 is from January to September.

Estimate6 is the net investments by publicly listed companies in Taiwan. The data in 2006 is from January to September.

Table 2-3 Ratio of Outward FDI in China to GDP for Major Countries (1995-2006)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
HK	14.5008	13.5312	12.603	11.3132	10.3042	9.3758	10.0756	10.521	10.8528	11.4517	10.0273	N/A
Singapore	2.1781	2.389	2.719	4.0334	3.1125	2.3747	2.5256	2.6874	2.2535	1.8681	1.8879	N/A
South Korea	0.2294	0.3104	0.5034	0.5622	0.3134	0.3228	0.5037	0.5708	0.7415	0.9176	0.6563	N/A
Taiwan	1.19472	1.20354	1.09645	1.05583	0.86984	0.71493	1.02160	1.34688	1.12655	0.96763	0.62118	0.60070
Japan	0.0625	0.0803	0.1047	0.0895	0.0702	0.0612	0.105	0.105	0.1177	0.1188	0.1432	N/A
U.S.A	0.0424	0.0451	0.0428	0.0445	0.0455	0.0447	0.0439	0.0518	0.0382	0.0336	0.0246	N/A
U.K	0.0823	0.1123	0.1443	0.0847	0.0711	0.1855	0.1523	0.1291	0.0413	0.0368	0.0433	N/A
Germany	0.0162	0.0221	0.048	0.0345	0.0652	0.0557	0.0654	0.0467	0.0357	0.0386	0.0549	N/A
Italy	0.0248	0.014	0.019	0.0234	0.0161	0.0195	0.0201	0.0149	0.0216	0.0163	0.0183	N/A
France	0.0187	0.0276	0.0341	0.0492	0.0364	0.0652	0.0403	0.0402	0.0337	0.0319	0.0289	N/A

Source: China Statistical Year Book、Investment Commission, MOEA、International Financial Statistics, IMF。

2.1.2 Field of Investment

In terms of sectors, Taiwanese enterprises' investments in China since 1991 have been primarily targeted at the secondary sector, followed by the tertiary sector and then the primary sector. In 1999, Taiwanese enterprises' investment in the manufacturing industry in China was as high as 93.08%. However, since 2003, the proportion has been waning. According to further observation of the field of investment within the manufacturing industry (Table 2-4), the cumulative investment in electronics and electric engineering is the highest. Until the end of 2006, the cumulative investment had totaled US$19.88 billions, accounting for 36.22% of the overall investment. From 2000 on, the annual investment has been over US$1 billion. Basic metal industries and fabricated metal products manufacturing came in second with an accumulated amount of US$4.299 billions, accounting for 7.83% of the overall investment. Chemicals came in third with US$3.694 billions and 6.73%.

According to the time-series data (Table 2-5), among Taiwan's early investments in China, the domestic staple industry made up a considerable portion. Take food, beverage, and tobacco manufacturing, for instance. Before 1996, its share in the total investment was over 10%. Since 2004, however, the figure has dropped to under 2%. Textile product manufacturing followed the same path, its weight declining from 7%~8% around the turn of the century to 2%~3% in recent years.

On other hand, we have also noticed the increasing weight of investment in the service industry. Similar language and cultural backgrounds help Taiwanese firms grasp consumer routines in China, making it easier for the service industry from Taiwan to enter the Chinese market. Statistical data on Taiwanese firms (Table 2-7) compiled by the Investment Commission of MOEA, indicates that the accumulated investment of the Taiwanese service industry was US$3.68 billions during 1991-2006, in which the scale of investment after 2002 was most significant, registering over US$300 millions each year.

Among Taiwanese enterprises' investments in the service industries in China, the highest amount went to trade, representing 45.6% of the total investment of Taiwanese firms in the service industry during 1991-2006. Information and communication service came in second with 14.7%, followed by transportation,

storage, and communications with 12.1%. Prior to 2000, the investment weight of accommodation and eating-drinking places is higher. Since 2000, however, its weight has been lower than 8%. In 2003, the weight of real estate and renting and leasing reached 34.5%; during other years the figure was lower than 4%.

In terms of an investment trend for the service industry, due to the impact of the Asian financial storm, the investment of Taiwan's service industry in China plummeted in 1998-1999, and did not begin to recover until 2000. The investment slid in 2004 because of the epidemic of SARS, which broke out in mid-2003. Yet. the long-term trend has shown upward movement. Among the service industries, most of the investment from Taiwan's service sector has been directed at trade and transportation, storage, and communications thanks to the expansion of China's internal market. Prior to 2005 investment in this area had mostly ranked second. Increasing weight of the investment and production of Taiwan's manufacturing industry in China, however, boosted development of production related service industries, therefore causing the investment amount and share of professional, scientific, and technical services, and support services to escalate considerably. In 2006, professional, scientific, and technical services replaced transportation, storage, and communications, and ranked second in investment of Taiwan's service industry in China. The weight of support services also rose significantly to demonstrate the fact that Taiwanese firms' investment in China's service industry has gradually shifted from basic commerce to supporting the development of the manufacturing industry.

With China's accession to the WTO and the opening of its financial market, its finance industry became the fastest growing segment of the service industry in terms of foreign investment. In 2005, foreign investors invested US$12.3 billions in China's finance industry, marking an impressive growth rate of 4,781%. Taiwan's finance industry has been highly interested in expanding its financial services and extending its operational outreaches in conjunction with the development of Taiwanese firms in China, and the Taiwanese government has opened the door for insurance and security firms to invest in China. However, limited by policy and legislative constraints of both sides of the Taiwan Strait and the fact that the MOU has not been signed, Taiwanese banks are still unable to invest in related industries in China. Therefore,

investment in the financial service industry is lower than that of trade; transportation, storage, and communications; or professional, scientific, and technical services, and support services developed in association with the manufacturing industry.

In addition, some interesting findings were found from a cross characteristic analysis on industries and the scale of firms (Table 2-6). In the initial stages, Taiwan's average scale of investment in China was under US$1 million. It has to do with the fact that small and medium enterprises (SMEs) from the domestic staple industries made up the majority of those who invested in China. After 1999, the average investment scale of the manufacturing industry quickly rose to over US$2 millions. The average scale of investment in 2004 was as high as US$4.8948 millions. This is associated with the fact that primary investors are from capital-intensive industries such as electronics and electric engineering, basic metal industries and fabricated metal products manufacturing, and chemicals. The average scale of investment of these industries has grown by over 10 times since the early 2000s.

Table 2-4 Taiwanese Firms' Outward FDI to China—by Industries

Unit：Thousands $

Industry	1991~1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Agriculture, Forestry, Fishing and Animal Husbandry	48716	48646	21080	4629	5752	10389	28670	37270	3722	8013	8960	225847
Mining and Quarrying	17841	6522	3084	2300	150	1100	11095	21227	30881	32546	1150	127896
Food, Beverage and Tobacco Manufacturing	775273	333073	70045	58250	43253	58420	152939	353050	89594	53430	99708.32	2087035
Textile Product Manufacturing	592918	275306	140673	40406	57192	91799	203063	407793	195759	188853	165292.5	2359054
Leather, Fur and Allied Product Manufacturing	317003	189774	43055	7624	4191	10235	64591	122162	51032	41083	67169.96	917920
Wood and Bamboo Products Manufacturing	91996	51242	11140	300	2190	10372	24778	20594	12890	10545	10770	246817
Furniture and Fixtures Manufacturing	95317	64449	6764	3690	30	5245	84030	61295	11537	4170	10774.27	347301.3
Paper Products and Printing	168256	108141	33957	26762	34583	92676	162359	143232	147148	146647	76922.85	1140684
Chemicals	482469	230171	145210	143015	107963	162594	473754	591626	447551	362599	547654.9	3694607
Petroleum and Coal Products Manufacturing	2241	1012	1600	0	2820	1190	604	3532	3960	720	1800	19479
Rubber Products Manufacturing	200635	72551	59514	9130	10900	62160	130692	97758	104512	107408	63908	919168
Plastic Products Manufacturing	450932	316266	62825	96340	182410	152351	390072	389171	260095	249466	219756.1	2769684
Non-metallic Mineral Products Manufacturing	361191	383641	87872	33752	83524	106981	214841	451416	421313	179576	386826.7	2710934
Basic Metal Industries and Fabricated Metal Products Manufacturing	580710	368703	116063	95375	170106	161772	534595	600713	676228	547911	446554	4298730
Machinery and Equipment Manufacturing and Repairing	267599	228160	134163	53690	82165	159920	370796	445571	252032	438951	388603.9	2821651
Computer, Communications, and Audio and Video Electronic Products Manufacturing	324204	279043	316753	264905	624970	389197	901478	772135	968537	985156	1140214	6966592
Electronic Parts and Components Manufacturing	348276	283525	281402	154029	412348	600559	1087523	815821	1482225	850106	1618566	7934380
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	502177	314595	160820	118817	427457	265078	629683	742074	593254	560706	664726.1	4979387
Transport Equipment Manufacturing and Repairing	393237	161362	84216	31940	53347	57413	218448	320953	259359	181284	141038	1902597
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	93527	59002	29084	13710	74376	116481	212670	241086	208953	297429	423311.3	1769629
Other Industrial Products Manufacturing	328476	188247	45533	14363	10421	9516	220678	237136	98992	75881	175694.3	1404937
Electricity, Gas, Water and Construction	26396	27314	3380	2700	21380	30009	72275	41120	70819	31322	61686.13	388401.1
Trade	178566	124902	85370	19748	57916	117211	146957	175404	183070	274288	312777.6	1676210
Accommodation and Eating-Drinking places	44855	42451	5694	12000	9815	1495	5693	25183	26641	36220	16410.39	226457.4
Transportation, Storage and Communications	53775	30283	11556	8049	9401	16512	68201	26182	21722	100839	107371.4	453891.4
Financing and Auxiliary Financing	10360	0	0	18000	0	0	625	0	0	0	0	28985
Financing Investment	0	0	0	0	0	0	0	0	100	30040	0	30140
Securities and Futures	1599	100	0	0	0	0	0	140	0	0	0	1839
Insurance Carriers	0	0	0	0	0	0	22850	75220	50839	0	52753	201662
Real Estate and Rental and Leasing	11749	5386	958	1225	329	1414	4880	197684	26188	16273	47882.66	313968.7
Professional, Scientific and Technical Services	21303	73762	31380	9660	40104	62178	169609	90829	116979	130343	231599.2	977746.2
Other Services	82127	66684	41430	8371	78049	29880	114609	191407	124731	65148	143523.1	945959.1
Total	6873724	4334313	2034621	1252780	2607142	2784147	6723058	7698784	6940663	6006953	7633405	54889590

Source: Investment Commission, MOEA.

Table 2-5 The Industrial Structure of Taiwanese Firms' Outward FDI to China

Unit：%

Industry	1991~1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1991~2006
Agriculture, Forestry, Fishing and Animal Husbandry	0.71	1.12	1.04	0.37	0.22	0.37	0.43	0.48	0.05	0.13	0.12	0.41
Mining and Quarrying	0.26	0.15	0.15	0.18	0.01	0.04	0.17	0.28	0.44	0.54	0.02	0.23
Food, Beverage and Tobacco Manufacturing	11.28	7.68	3.44	4.65	1.66	2.10	2.27	4.59	1.29	0.89	1.31	3.80
Textile Product Manufacturing	8.63	6.35	6.91	3.23	2.19	3.30	3.02	5.30	2.82	3.14	2.17	4.30
Leather, Fur and Allied Product Manufacturing	4.61	4.38	2.12	0.61	0.16	0.37	0.96	1.59	0.74	0.68	0.88	1.67
Wood and Bamboo Products Manufacturing	1.34	1.18	0.55	0.02	0.08	0.37	0.37	0.27	0.19	0.18	0.14	0.45
Furniture and Fixtures Manufacturing	1.39	1.49	0.33	0.29	0.00	0.19	1.25	0.80	0.17	0.07	0.14	0.63
Paper Products and Printing	2.45	2.49	1.67	2.14	1.33	3.33	2.41	1.86	2.12	2.44	1.01	2.08
Chemicals	7.02	5.31	7.14	11.42	4.14	5.84	7.05	7.68	6.45	6.04	7.17	6.73
Petroleum and Coal Products Manufacturing	0.03	0.02	0.08	0.00	0.11	0.04	0.01	0.05	0.06	0.01	0.02	0.04
Rubber Products Manufacturing	2.92	1.67	2.93	0.73	0.42	2.23	1.94	1.27	1.51	1.79	0.84	1.67
Plastic Products Manufacturing	6.56	7.30	3.09	7.69	7.00	5.47	5.80	5.05	3.75	4.15	2.88	5.05
Non-metallic Mineral Products Manufacturing	5.25	8.85	4.32	2.69	3.20	3.84	3.20	5.86	6.07	2.99	5.07	4.94
Basic Metal Industries and Fabricated Metal Products Manufacturing	8.45	8.51	5.70	7.61	6.52	5.81	7.95	7.80	9.74	9.12	5.85	7.83
Machinery and Equipment Manufacturing and Repairing	3.89	5.26	6.59	4.29	3.15	5.74	5.52	5.79	3.63	7.31	5.09	5.14
Computer, Communications, and Audio and Video Electronic Products Manufacturing	4.72	6.44	15.57	21.15	23.97	13.98	13.41	10.03	13.95	16.40	14.94	12.69
Electronic Parts and Components Manufacturing	5.07	6.54	13.83	12.29	15.82	21.57	16.18	10.60	21.36	14.15	21.20	14.46
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	7.31	7.26	7.90	9.48	16.40	9.52	9.37	9.64	8.55	9.33	8.71	9.07
Transport Equipment Manufacturing and Repairing	5.72	3.72	4.14	2.55	2.05	2.06	3.25	4.17	3.74	3.02	1.85	3.47
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	1.36	1.36	1.43	1.09	2.85	4.18	3.16	3.13	3.01	4.95	5.55	3.22
Other Industrial Products Manufacturing	4.78	4.34	2.24	1.15	0.40	0.34	3.28	3.08	1.43	1.26	2.30	2.56
Electricity, Gas, Water and Construction	0.38	0.63	0.17	0.22	0.82	1.08	1.08	0.53	1.02	0.52	0.81	0.71
Trade	2.60	2.88	4.20	1.58	2.22	4.21	2.19	2.28	2.64	4.57	4.10	3.05
Accommodation and Eating-Drinking places	0.65	0.98	0.28	0.96	0.38	0.05	0.08	0.33	0.38	0.60	0.21	0.41
Transportation, Storage and Communications	0.78	0.70	0.57	0.64	0.36	0.59	1.01	0.34	0.31	1.68	1.41	0.83
Financing and Auxiliary Financing	0.15	0.00	0.00	1.44	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.05
Financing Investment	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.05
Securities and Futures	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Insurance Carriers	0.00	0.00	0.00	0.00	0.00	0.00	0.34	0.98	0.73	0.00	0.69	0.37
Real Estate and Rental and Leasing	0.17	0.12	0.05	0.10	0.01	0.05	0.07	2.57	0.38	0.27	0.63	0.57
Professional, Scientific and Technical Services	0.31	1.70	1.54	0.77	1.54	2.23	2.52	1.18	1.69	2.17	3.03	1.78
Other Services	1.19	1.54	2.04	0.67	2.99	1.07	1.70	2.49	1.80	1.08	1.88	1.72
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Investment Commission, MOEA.

Table 2-6 The Average Scale of Taiwanese Firms' Outward FDI to China –by Industries

Unit：Thousands $

Industry	1991~1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1991~2006
Agriculture, Forestry, Fishing and Animal Husbandry	278.38	231.65	843.20	925.80	958.67	1731.50	610.00	690.19	744.40	1602.60	2986.67	417.46
Mining and Quarrying	849.57	171.63	616.80	766.67	150.00	550.00	1008.64	1117.21	3088.10	8136.50	0	1121.89
Food, Beverage and Tobacco Manufacturing	797.61	289.38	1228.86	3065.79	4325.30	2246.92	1644.51	3362.38	2635.12	1908.21	4985.42	829.84
Textile Product Manufacturing	538.53	475.49	2009.61	2126.63	2199.69	2185.69	1611.61	2146.28	2796.56	3372.38	4031.52	1016.83
Leather, Fur and Allied Product Manufacturing	397.25	434.27	1001.28	1089.14	465.67	1137.22	1845.46	1471.83	2041.28	1867.41	9595.71	622.32
Wood and Bamboo Products Manufacturing	292.05	326.38	445.60	300.00	1095.00	2593.00	825.93	624.06	1074.17	1506.43	1538.57	416.22
Furniture and Fixtures Manufacturing	882.56	749.41	450.93	922.50	30.00	874.17	2801.00	1495.00	1153.70	1042.50	3591.42	1127.60
Paper Products and Printing	541.02	434.30	998.74	8920.67	3458.30	4413.14	1824.26	1705.14	4904.93	8626.29	3662.99	1312.64
Chemicals	647.61	432.65	1631.57	4333.79	3271.61	3781.26	2392.70	2830.75	5327.99	6251.71	11176.63	1782.25
Petroleum and Coal Products Manufacturing	74.70	77.85	800.00	0	705.00	595.00	604.00	883.00	3960.00	0	900.00	330.15
Rubber Products Manufacturing	1497.28	954.62	4251.00	1521.67	2180.00	4144.00	5227.68	2172.40	5500.63	9764.36	5809.82	2546.17
Plastic Products Manufacturing	589.45	528.87	951.89	4379.09	4053.56	2418.27	2053.01	1562.94	3024.36	5939.67	4578.25	1274.00
Non-metallic Mineral Products Manufacturing	719.50	673.05	1351.88	2410.86	10440.50	7132.07	2310.12	3730.71	8964.11	7807.65	16818.55	1830.48
Basic Metal Industries and Fabricated Metal Products Manufacturing	649.56	539.04	1115.99	3815.00	1890.07	1650.73	2607.78	2145.40	5984.32	5590.93	6202.14	1614.24
Machinery and Equipment Manufacturing and Repairing	557.50	457.23	1328.35	1731.94	1956.31	1738.26	1519.66	1456.11	1714.50	3568.71	4134.08	1306.92
Computer, Communications, and Audio and Video Electronic Products Manufacturing	790.74	920.93	3726.51	4272.66	5895.94	3671.67	3453.94	3313.88	6414.15	10156.25	15619.37	3691.89
Electronic Parts and Components Manufacturing	931.22	768.36	3854.82	3020.18	3964.88	3144.29	5203.46	4058.81	12249.79	13711.39	17218.78	4291.17
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	626.16	578.30	1132.54	1543.08	3213.96	3082.30	1973.93	2055.61	3731.16	4485.65	6330.72	1745.32
Transport Equipment Manufacturing and Repairing	1010.89	701.57	1871.47	1774.44	2319.43	1979.76	2141.65	2031.35	4052.48	4421.56	5641.52	1692.70
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	354.27	333.34	938.19	652.86	2324.25	4853.38	2105.64	2274.40	3602.64	5611.87	8639.01	1931.91
Other Industrial Products Manufacturing	304.14	360.63	722.75	1595.89	1157.89	1359.43	1329.39	862.31	1867.77	2231.79	5856.48	624.97
Electricity, Gas, Water and Construction	253.81	700.36	563.33	0.00	3054.29	1034.79	8030.56	1787.83	2622.93	3132.20	8812.30	1488.13
Trade	694.81	435.20	1816.38	759.54	1287.02	1065.55	738.48	687.86	572.09	1918.10	2085.18	911.48
Accommodation and Eating-Drinking places	275.18	758.05	474.50	6000.00	2453.75	498.33	355.81	559.62	350.54	1393.08	1025.65	540.47
Transportation, Storage and Communications	604.21	2018.87	5778.00	1609.80	3133.67	2064.00	4546.73	793.39	700.71	6722.60	6315.97	1948.03
Financing and Auxiliary Financing	3453.33	0	0	0	0	0	0	0	0	0	0	9661.67
Financing Investment	0.0	0	0	0	0	0	0	0	100.00	15020.00	0	10046.67
Securities and Futures	799.50	0	0	0	0	0	0	140.00	0	0	0	613.00
Insurance Carriers	0	0	0	0	0	0	22850.00	37610.00	50839.00	0	26376.50	33610.33
Real Estate and Rental and Leasing	1068.09	897.67	479.00	612.50	164.50	471.33	1626.67	3240.72	1870.57	2324.71	4352.97	2573.51
Professional, Scientific and Technical Services	191.92	515.82	922.94	483.00	742.67	450.57	757.18	499.06	726.58	965.50	3735.47	773.53
Other Services	361.79	430.22	1534.44	2790.33	3001.88	3735.00	1548.77	1650.06	1685.55	1329.55	2990.07	1172.19
Total	590.68	496.77	1584.60	2567.17	3103.74	2347.51	2157.59	1986.78	3463.40	4631.42	7003.12	1544.36

Source: Investment Commission, MOEA.

Table 2-7 Taiwanese Firms' Outward FDI to China in Service Industries

Unit: Thousands $

Industries / Year	Total	Trade	Transportation And Storage	Accommodation and Eating-Drinking places	ICT	Finance And Insurance	Real Estate
1991~1996	403,819	178,566	50,294	44,855	18,573	13,890	6,959
1997	269,992	124,902	30,283	42,451	4,601	62,629	5,126
1998	114,160	85,370	11,524	5,694	9,871	1,031	670
1999	66,579	19,748	8,049	12,000	7,347	18,210	1,225
2000	130,623	57,916	9,401	9,815	53,491	0	0
2001	193,807	117,211	16,512	1,495	55,077	3,162	350
2002	380,413	146,957	68,086	5,693	88,028	71,559	90
2003	571,202	175,404	25,597	25,183	65,402	82,605	197,011
2004	367,520	183,070	20,972	26,641	51,222	69,877	15,738
2005	564,162	274,288	99,039	36,220	106,252	35,063	13,300
2006	617,372	312,778	104,781	16,410	81,166	84,434	17,803

(Continue)

Industries / Year	Technical Service	Support Service	Public Defense	Education	Health Care and Social work	Recreation	Others
1991~1996	16,291	8,944	0	2,560	990	47,449	14,448
1997	8,473	530	0	0	2,450	59,081	3,042
1998	21,119	2,633	0	575	0	37,026	930
1999	2,103	0	0	0	0	7,498	873
2000	7,670	329	0	0	0	7,290	49,702
2001	6,713	1,064	0	0	0	1,966	25,140
2002	43,443	13,961	0	250	2,695	58,531	29,561
2003	18,507	21,690	0	756	11,475	78,916	71,262
2004	47,709	13,347	0	220	37,075	15,453	60,212
2005	25,519	10,659	0	0	7,450	17,085	26,650
2006	123,672	36,260	6,515	471	19,060	48,189	57,278

Source: Investment Commission, MOEA.

2.1.3 Location of Investment

Taiwanese firms' location of investment went through drastic changes in the last

two decades. In terms of choice of investment location, the eastern region[21] and the south-central region[22], especially Guangdong, Jiangsu, Fujian, and Zhejiang provinces, have been the converging areas of assembling-and-export-oriented Taiwanese firms since the time China implemented its open policies because of geographic proximity and cultural similarity and because they were among the first opened to foreign investment. Today, they are still the investment focuses of the manufacturing industry. According to the Investment Commission of MOEA data as shown in Table 2-8, the eastern region and the south-central region of China attract 87.26% of Taiwanese firms' investment during 1991-1996. During the years of 1997-2005, the two districts combined accounted for over 90% of the investments from Taiwan. In 2005, that figure peaked at 95%.

With the gradual opening of the Chinese market, and China's admission to the WTO, Taiwanese firms in China began to increase the weight of domestic sales in recent years. These firms' investments have also extended into areas other than the southeastern region along the coastline. In 2006, for instance, Taiwanese firms' investment in the northern[23] and the southwestern[24] regions of China increased rapidly. In the northern region, except for the Beijing Municipality and the Tianjin Municipality, the Shanxi Province registered the fastest growth as Taiwanese investment rose speedily from US$18 millions in 2005 to US$56 millions in 2006 at a rate of over 3 times in a year. In the southwestern region of China, Taiwanese investment in the Chongqing Municipality and in the Sichuan Province was even more impressive. In 2006, Taiwanese firms invested US$390 millions in the Chongqing Municipality and US$100 millions in the Sichuan Province, showing a growth rate of 31 times and 3.3 times from 2005 respectively.

[21] Including Shanghai City, Jiangsu, Zhejiang, Anhui, Fujiang, JIangxi and Shandong.

[22] Including Henan, Hubei, Hunan, Guangdong, Hainan and Guangxi Autonomous Region.

[23] Including Beijing Municipality, Tianjin Municipality, Hebei Province, Shanxi Province and Nei Mongol Autonomous Region.

[24] Including Chongqing Municipality, Sichuan Province, Guizhou Province, Yunan Province and Xizang Autonomous Region.

Table 2-8 Geographic Distribution of Taiwanese Firms' Outward FDI in China

Units：Thousands $, %

Year	Amount	Areas					
		North	North-East	East	South	South West	North-West
1991~1996	6,873,724	7.4	2.4	53.1	34.2	2.3	0.6
1997	4,334,313	5.5	1.4	48.1	43.1	1.7	0.2
1998	2,034,621	4.8	0.5	49.7	43.6	1.3	0.2
1999	1,252,780	4.8	0.8	49.4	41.5	3.1	0.4
2000	2,607,142	3.6	0.6	55.4	39.3	1.0	0.1
2001	2,784,147	4.5	0.7	64.1	29.7	0.8	0.1
2002	6,723,058	4.1	0.9	68.1	25.8	1.0	0.1
2003	7,698,784	3.8	1.0	64.9	29.1	0.9	0.3
2004	6,940,663	2.8	0.7	71.9	23.0	1.4	0.1
2005	6,006,953	3.6	0.5	73.5	21.5	0.8	0.2
2006	7,638,385	4.7	0.8	68.2	19.7	6.5	0.1

Source: Investment Commission, MOEA.

The Pearl River Delta and The Yangtze River Delta have been the two focal points of Taiwanese investment in China. In recent years, however, the center of Taiwanese investment in China is shifting northbound, and the number of Taiwanese firms in the northeastern region and the Bohai Golf is increasing rapidly. With their concentrated populations, expansive markets, and the business potential of the 2008 Summer Olympics, Beijing and Tianjin have become quite attractive to large-scale business, logistics, real estate, rental and leasing.

As production costs of the southeastern coastal provinces rose, and the Chinese government began to adjust its regional development policies, investment development strategies of Taiwanese firms also changed. The Yangtze River Delta and The Pearl River Delta still attract most of the Taiwanese investment, yet, the shares from the Jiangsu Province, the Guangdong Province, and the Shanghai Municipality have all declined from a few years ago. As the new corporate tax law is scheduled to take effect in 2008, Taiwanese firms can be expected to move to the great western region where they can access production resources at lower costs and continue to

enjoy tax incentives. In addition, since the Fujian Province introduced the West Coast Economic Region Development Strategy and obtained the endorsement of the central government, the investment of Taiwan's domestic staple industry in the Fujian Province has also quickly picked up.

2.1.4 Traits of Investors

According to a random questionnaire survey[25] of the Chinese National Federation of Industries in 2006, 47.3% of the Taiwanese firms began to invest in China between 1994 and 2000, while 35.6% did not start until 2001 and after. This outcome may have to do with the fact that the government's registration system was not established until 1993; in other words, the sample itself determines the outcome. However, that a significantly high share of the firms started investing in the post-1994 period indicates that China's economic growth in recent years is, indeed, the main magnetism that draws Taiwanese investment to China.

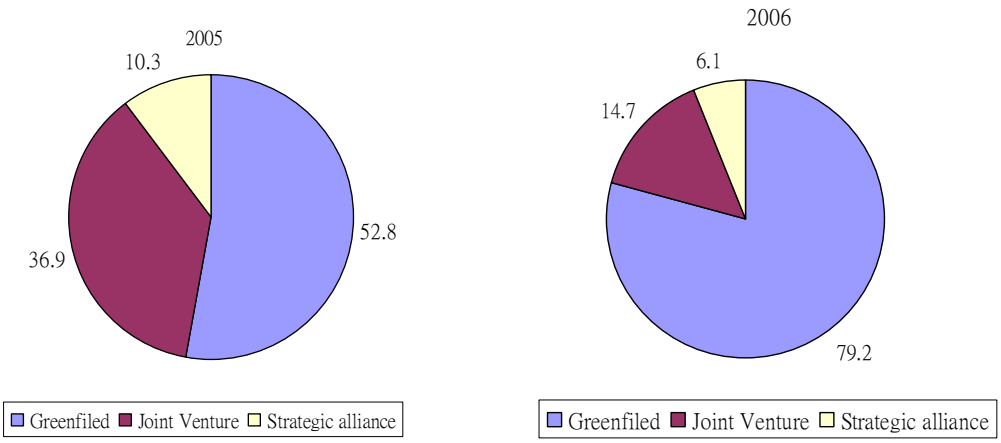
From the perspective of the entry mode, most of the Taiwanese firms that invested in China during the early days did so through joint venture. Greenfield and strategic alliance were less frequently seen. Joint venture was popular because Taiwanese firms have better access to information about local market conditions through their Chinese partners. Furthermore, China promulgated the "Guideline for Offering Incentives to Taiwanese People," which limits certain investment options to joint venture.

At present, most of the investments of Taiwanese firms in China are Greenfield. As a matter of fact, Taiwanese firms' entry mode is mainly determined by the extent of the risk they are willing to take. Those who are more concerned about managerial control risks and technology spillover risks are more inclined to Greenfield. Those who are more concerned about political risks and market risks tend to opt for joint venture. Thereby Taiwanese firms currently choose to enter the Chinese market through Greenfield mainly for the purpose of securing more managerial and

[25] From November 15 to December 10, 2006, the Chinese National Federation of Industries randomly selected 2,000 firms out of the population of 20,000 registered Taiwanese firms to answer a questionnaire survey. 304 questionnaires were received back, and the return rate was 15.2%. Within the confidence interval of 95%, the sampling error is 5.36%.

operational independence, and for avoiding excessive intervention from the Chinese side. A questionnaire survey of the Chinese National Federation of Industries in 2006 indicates that 79.2% of Taiwanese firms are Greenfield while joint venture and strategic alliance account for 14.7% and 6.1% respectively. The share of Greenfield has risen considerably from the 52.8% of 2005 to indicate that currently, Taiwanese firms are seeking higher operational liberty via Greenfield.

Figure 2-1 Entry Mode of Taiwanese Firms in China



Source：Chinese National Federation of Industries

The proportion of Taiwanese firms in each scale of investment is shown in Table 2-9. A noteworthy trend is that the weight of Taiwanese firms with a scale of investment of over US$10 millions has increased significantly. The share of Taiwanese firms with a scale of investment of over US$20 millions has risen from 4.7% in 2005 to 16.2% in 2006, indicating the primary component of Taiwanese firms investing in China has gradually shifted from SMEs in the past to large corporations today.

Table 2-9 Scale of Investment for Taiwanese Firms in China

unit：%

Scale	2005	2006
Less than 1 million	28.8	26.6
1 ~ 5 millions	36.0	35
5~ 10 millions	20.8	12.5

10~20 millions	9.7	9.8
More than 20 millions	4.7	16.2

Source：The Chinese National Federation of Industries

2.1.5 Business Models and R&D Activities

Taiwanese firms' business models in China during the early days were mainly for manufacturing and marketing products under their own brands (the share was as high as 65%), and secondarily for OEM activities (see Table 2-10). Yet, as multinational corporations of the ICT industries began to relocate their production bases to China, the weight of OEMs escalated from 32.5% in 2004 to 40.5% in 2006. Similarly, the proportion of ODMs has also increased drastically. However, the share of R&D-centered corporations is still low (3.78% in 2005). This indicates that Taiwanese firms' primary purpose for investing in China is for "marketing in the Chinese market," followed by "employing Chinese laborers for OEM/ODM production." The share of "R&D" or "distribution center" is very low.

Table 2-10 Main Operation of Taiwan's Manufacturing Affiliations in China

Unit：%

	2003	2004	2005
Manufacturing and Sales of own brand products	53.91	65.84	65.98
OEM	32.47	38.47	40.51
ODM	5.48	14.76	14.87
Wholesale and Retail	1.96	4.87	5.34
Distributing Center	1.41	4.39	5.26
R&D	1.80	2.87	3.78
Others	2.97	3.43	3.53

Note: Multiple answer questions
Source：2004-2006 Report on Foreign Investment Strategies of the Manufactures, MOEA

In terms of technology sources, according to Table 2-11, "support from the parent" is the major technology source of Taiwanese firms (the weight is over 80%). Over 20% of the technology is developed by the subsidiary in China; 12.74% is from cooperative companies; and 7.72% is from collaborative projects. The data

demonstrates the fact that Taiwanese firms still rely on their mother companies as the primary source of production technology.

Table 2-11 Technology Sources of Taiwan's Manufacturing Affiliations in China

Unit：%

	2003	2004	2005
Support from parent	90.92	88.43	86.85
Local subsidiaries' own R&D efforts	18.39	21.95	20.46
From cooperative companies	13.54	13.57	12.74
From collaborative projects	8.37	7.82	7.72
Learning from consultants & tutors	5.24	5.51	5.18
Learning from Internal Industry	4.07	4.71	5.26
IT Purchasing	3.91	3.35	2.96
R&D Outsourcing	2.66	2.87	2.55
From the recruited talent	1.64	1.36	1.15
Others	1.17	0.64	1.81

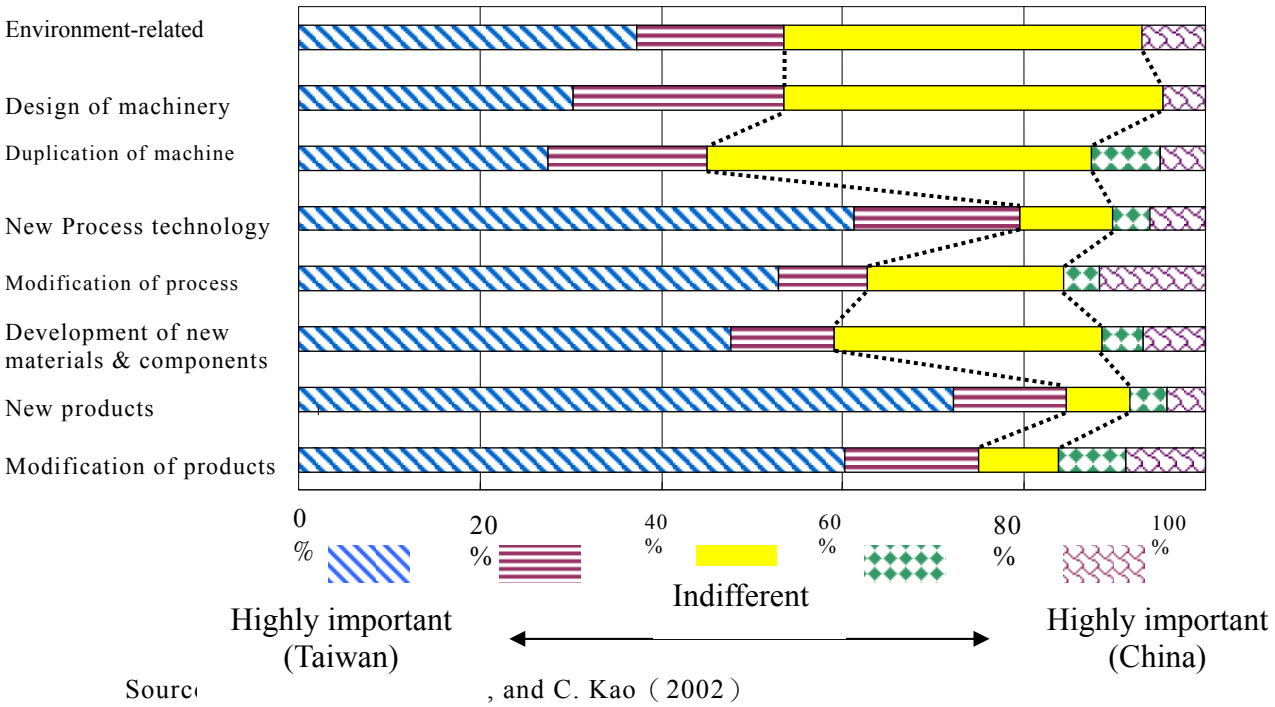
Note: Multiple answer questions
Source：2004-2006 Report on Foreign Investment Strategies of the Manufactures, MOEA

Taiwanese firms' current strategies can be characterized by a cross-strait division of labor derived from the business model of international OEM/ODM. In terms of division of the value chain activities, the Chinese subsidiary still focuses on production, and the mother plant in Taiwan provides major innovative technology, plus parts and materials for the Chinese subsidiary to form a vertical relationship. Such an international cooperation enhances the efficiency of resource allocation. Yet, in technical enhancement and operational function, the Chinese subsidiary only plays limited roles.

In their study, Chen Shin-horng, Shi Hui-Tze and Gao Charng (2002) investigate cross-strait R&D strategies of Taiwanese ICT firms in China and ask the Taiwanese firms to evaluate the focuses of their R&D endeavors in China (see Figure 2-2 for detail). Generally speaking, the parent company in Taiwan remains the center for

current product improvement, new product development, new material/part development, new process technology development, and process technology improvement. Noteworthy is the fact that when it comes to new material/part development and process technology improvement, a significant portion of the Taiwanese firms believe there is no difference between the R&D environments on both sides of the Taiwan Strait. For instance, in terms of "improvement of duplication machinery," "independent design of machinery" and "reduction of energy consumption and pollution" the proportion of those who say there is no difference between the two sides of Taiwan Strait is nearly the combined proportion of those who say Taiwan is more important and those who say Taiwan is relatively more important. This means that despite the fact that Taiwan is the still the important base for R&D, Taiwanese firms in China gradually emphasize more on product innovation and process innovation; the role of the Chinese production base in improving part of the manufacturing processes and machinery is becoming more significant.

Figure 2-2 Relative Significance of cross-Strait R&D by Taiwanese Electronic Firms



Sourc , and C. Kao（2002）

According to the data compiled for this study, in recent years, more and more

Taiwanese high-tech corporations, such as VIA and the Inventec Group, are establishing Greenfield R&D centers (see Table 2-12). From their R&D content and focus, we can largely identify the reasons why Taiwanese firms are setting up R&D centers in China – the main purpose is to tap into the local market and meet the demand for technology development manpower. To meet market demand or enhance market shares, some may establish R&D bases locally for products such as computer hardware. Others may do so for the purpose of utilizing advantageous human resources of the local area to develop new products, such as software products and chips, for domestic or global marketing.

Table 2-12 The Status of Taiwanese ICT Firms' R&D Centers in China

Firm	Research Center	Established time/Established place	Research Field
VIA Technologies	VIA Beijing R&D Center	-2001 Beijing	X86 system platform chipsets, wireless communication chipsets, network chipsets, optic storage chipsets, multi-media chipsets, and chipsets for consumer products
	VIA Shanghai R&D Center (VIA Technologies)	-2001 Shanghai Pudong	GPU in 90-65 nano process
	Hangchow R&D Center -- VIA Telecom and VIA Software	-VIA Telecom since 2003 -VIA Software since 2000	- VIA Telecom focuses on CDMA chipsets. -VIA Software focuses on embedded system design
	Shenzhen technologic Support center VIA Technologies Co., Ltd (Shenzhen)	-2000 Shenzhen	Providing tech support/service to clients in China
Trend Micro	China R&D Center (CDC)	-1997 Nanjing	Anti-virus and internet security products
Inventec Group	Shanghai、Nanjing、Xian、Beijing and Shenzhen R&D Center		Game software, multi-media products, laptop, network server, wireless communication products, and digital home application

BenQ	Suzhou R&D Center	-1996 Suzhou	Software, hardware, firmware, optical/mechanic design, system engineering and test
	Nanjing R&DCenter	-2002 Nanjing	Wireless communication system
	Shanghai R&D Center	-December 2006 lay off 40% workers.	
ACER	ACER Beijing R&D Center	-2002 Beijing	R&D in home application
MiTAC Group	Shanghai R&D Center (MiTAC computer(Shanghai))	-2000 Shanghai	Computer, electronic products, and business software.
MiTAC Technology	Shanghai R&D Center	-2006 Closed	Laptop products
Wistron Group	Shanghai engineering R&D Center	-Taking over Acer R&D Group in Shanghai	
Wistron Software	Software Development Center in Taipei、Wuhan、Dalian、Hangchow、Zhuhai		Localization、ERP、SCM、CRM
Kinpo Electronics	Kinpo Electronics (Beijing)	-1998 Beijing	R&D in software and hardware of IT product.
Delta Electronics	Shanghai R&D Center –Delta Electronics electric and electronic R&D Center	-1999 Shanghai	
Accton Group	Shanghai Global R&D Center	-1999 Shanghai -This department focuses on R&D	Network communication products and advanced consumer electronic products
Data Systems Consulting	DCMS Shanghai R&D Center DCMS Nanjing R&D Center (DCMS is Digital China Management Systems Limited which is a joint venture by Data Systems Consulting and Digital China (China)	-Shanghai R&D Center established in 2001 - Nanjing R&D Center established in 2006	Market demand and ERP system
Softstar entertainment	Beijing R&D Center		Game software

	-Softstar Technology（Beijing）		
Soft-world international	Beijing R&D Center	-Established in 2001	Game software
Interserv international	Beijing R&D Center		Game software
Iasolution	Beijing R&D Center	-Established in 2002	Wireless communication solutions

Source: Collected from the websites of enterprises and related news, compiled by TIER.

2.1.6 Summary

We can summarize Taiwanese firms' current China investment strategies via Table 2-13. Generally speaking, Taiwanese firms continue to invest mainly in SMEs of the domestic staple industry and chemicals industry, and in mid-to-large Greenfield plants of electronics, electric engineering, basic metal industries, and fabricated metal products manufacturing. The Pearl River Delta and The Yangtze River Delta are the two primary bases of Taiwanese firms for production and marketing of their own products and for international ODM/OEM activities. The know-how mainly comes from the mother company in Taiwan.

Table 2-13 Main Traits of Taiwanese Firms Investing in China

Item	Main Trait	Trend
Investment Volume	Approved amount has been over 6 billion since 2002.	Increasing gap between contracted and real investment.
Industry	Electronics, Basic Metal, and Chemicals jointly account for 50.78% of the accumulated investments from 1991 to 2006.	Importance of the service industry is rising
Location	The Pearl River Delta and The Yangtze River Delta	Firms are moving toward northern and Midwestern regions
Entry mode	Mostly Greenfield	More firms choose Greenfield
Scale	SME with investments of less than 1 million	More MNCs with investment over 20 million
Business model	Manufacturing and sales of own brand	More OEM and ODM firms

	products, OEM	
Source of Technology	From parent firms in Taiwan	More is from the local subsidiaries' own R&D efforts

Source：Organized by TIER

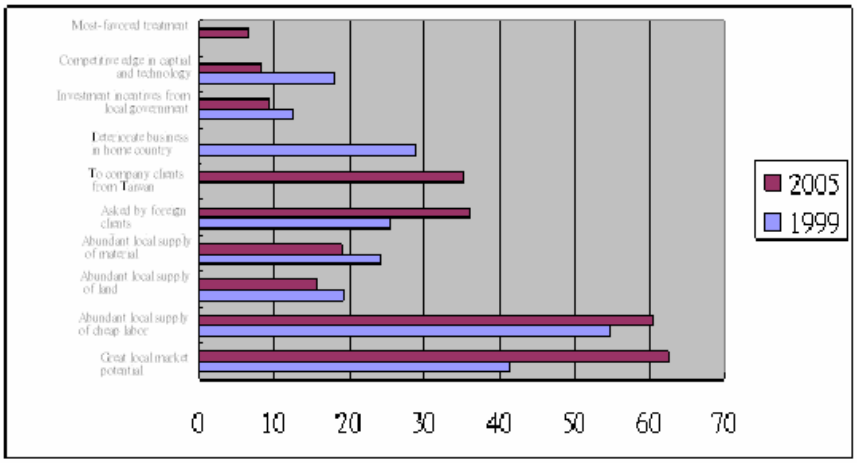
2.2 Changes of Taiwanese Firms' Investment Strategies in China

Due to rapid changes of the investment environment in China, Taiwanese firms of different industries have gone through changes in investment motives, strategies, and performances. In general, we can identify the following observations:

2.2.1 Investment motive turned from defensive to aggressive

In the past, Taiwanese firms invested in China mainly for its cheap land and labor. According to the Report on Foreign Investment Strategies of the Manufactures in 1999, as much as 54.61% of Taiwanese firms consider utilization of abundant local supply of cheap labor a very significant reason underlying their investment in China. The second important reason is great local market potential (41.35%). Yet, as a result of recent rapid economic development, land and labor costs have begun to rise while the problem of insufficient water and power supply has also surfaced. Economic growth boosted average income per capita and caused the domestic market to continue to expand. China, in the eyes of large Taiwanese firms, has progressively turned from a factory place that serves the world to an emerging market. According to the Report on Foreign Investment Strategies of the Manufactures in 2005, the primary factor that motivates Taiwanese firms to invest in China has been great local market potential (62.45%), followed by utilization of abundant local supply of cheap labor (60.48%).

Figure 2-3 Motives for Taiwanese Firms to Invest in China



Note: The percentages refer to the proportion of firms choosing the reason as very important.
Source：2000 and 2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

2.2.2 Localization of personnel and supply chain

During the early investment stages of SMEs, business owners normally would go in person to take charge of the administration. With their experiences and expertise, core managerial and professional staffs are then sent to help with local operation and management. The advantage of sending parent company personnel to work in China is that they better understand the managerial concept and approach of the parent company, that the company's production and marketing secret can be better protected, and that they can also help train local employees. The disadvantage is that delegated personnel costs more and means greater financial burden to the company. In recent years, however, we noticed that Taiwanese firms' human resource policies are turning toward local hiring. In addition to the cost consideration mentioned above, the local hiring policy can be expected to enhance human resources and efficiency when the scale of a corporation reaches a certain level. Such a policy helps discover local talents, reduce cultural differences in management, and further understanding of the local market. Since the beginning of this year, China has increasingly limited foreigners' tax incentives. The cost of hiring Taiwanese staff has risen further. Based on the consideration of cost and future competitiveness, Taiwanese firms have begun to train local supervisory staffs to make up for the deficiency of Taiwanese managers.

In the past, Taiwanese firms' investments mostly originated from individual corporate strategies, and the cluster effect was not significant. In recent years, however, as multinational corporations continue to augment the scales of investment, and China has begun to plan various special economic zones and coastal economic

developmental regions, an investment cluster of upstream-downstream relations in the industrial chain, led by major downstream international vendors, has begun to take shape. SMEs from Taiwan also duplicated Taiwan's center-satellite system in China. In the past, it required importation of production materials and middle products from Taiwan. After upstream vendors began to move to China with their downstream customers and China's local providers grew bigger and stronger, supply chain localization has also surfaced.

Table 2-14 Trend of Supply-Chain Localization

unit：%

%	1995	1996	1997	1998	1999	2003	2004	2005
Materials								
Imported from Taiwan	52.47	50.31	45.15	49.8	43.16	39.32	35.06	35.62
Imported from other countries	12.12	12.63	12.86	12.25	13.04	12.93	13.11	11.67
From local Taiwanese firms	17.22	17.57	21.02	18.06	21.85	25.52	25.93	26.18
From other local foreign affiliations	18.19	19.49	20.97	19.89	21.95	22.33	25.9	26.53
Intermediate Goods and Components								
Imported from Taiwan	56.26	53.04	47.99	52.86	46.56	46.11	40.88	39.65
Imported from other countries	6.8	7.86	7.97	7.98	7.92	7.27	7.68	7.74
From local Taiwanese firms	18.26	18.56	22.06	20.56	23.98	24.87	25	26.49
From other local foreign affiliations	18.78	20.53	21.99	18.59	21.54	21.75	26.44	26.12

Source：1994-2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

From Table 2-14, we can see that the proportions of production materials, intermediate goods, and components imported from Taiwan have dropped respectively from 52.47% and 56.26% in 1995 to 35.62% and 39.65% ten years later. This phenomenon reflects the possibility that Taiwan's current industrial strategy of moving toward upstream components and allowing the downstream entities to relocate to low-cost areas may be faced with serious challenges as China's industrial technology upgrade accelerates.

2.2.3 The focus has shifted from production to higher value-added activities such as R&D and marketing

As Taiwanese firms' investment and operational activities in China deepen, in addition to production, high-level value chain activities such as R&D activities have also been gradually localized. Cross-strait industrial collaboration or competition is no longer limited to the manufacturing/assembling level. It has been progressively expanded to the level of industrial technology. According to the study of Chen Shin-horng and Shi Hui-Tzu (2003) we notice that the Taiwanese firms' investment location in China has moved from the Pearl River Delta, up north through the Yangtze River Delta, all the way to Beijing, indicating a transformation from labor-intensive to capital-intensive and technology-intensive industries, from production to R&D activities. Therefore, as the supply chain is becoming more and more localized, and the innovative network is taking shape, some of the Taiwanese firms have begun to involve themselves in activities of latter-process stages, such as testing, engineer supporting, and program development. To a certain extent, this strategy mirrors the fact that Taiwan and China each have its own location advantage in R&D, and that manufacturing-oriented collaboration has been gradually turned toward R&D/innovation-oriented collaboration.

Observation of how Taiwanese firms employ China's technology manpower for R&D activities and for US patent application according to the nationalities of the assignees and first inventors of USPTO patents[26] also demonstrates the fact that Taiwanese firms or even global corporations' utilization of China's human resources has expanded from production activities to R&D activities. According to the number of USPTO patents granted, since 2000, over 100 patent applications from China have been granted by the US each year. The figure has grown rapidly. In 2006, the total number of granted US patent applications reached 970, and the number of utility patents rose to 661. In the last 10 years (1996-2005), the average annual growth rate of China's utility patent applications was 35%, which in comparison with the 2.8% of

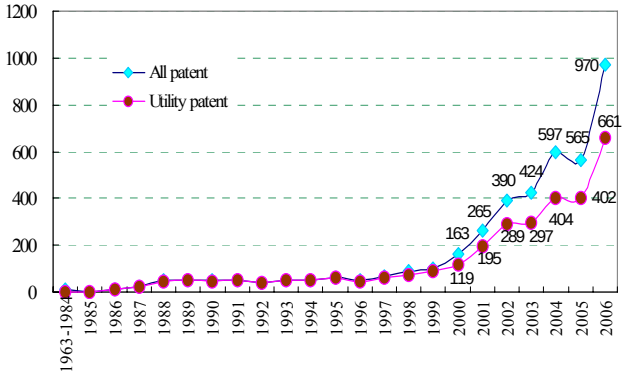
[26] The US has the largest technology market in the world, and its patent application and maintenance fees are very high. Therefore, US patent applications will only be filed for innovative technologies. Analysis of US patents is reliable to certain extent.

the previous 10 years (1986-1995) indicates that China's invention activities have become more alive than ever, as shown in Figure 2-4. Further examination of the nationality of the assignees of patents whose first inventors are Chinese (Table 2-15) reveals that in 2006, China (40.89%) topped the list, followed by Taiwan, (29.92%), the US (21.53%) and Hong Kong (4.24%) while Japan and Korea accounted for only 1.14% and 0.10% respectively. If we divide the years 1995-2006 into two time periods, we will see that the shares of the patents whose assignees are Taiwanese and American have grown by 19% and 6% respectively, clearly indicating the trend in which more Taiwanese firms and US firms are utilizing China's human resources for R&D activities. Japan and South Korea are not employing Chinese manpower for US patent applications as much as others. It may have to do with the fact that the IPR policies of Japan and South Korea are more concerned with technology protection.

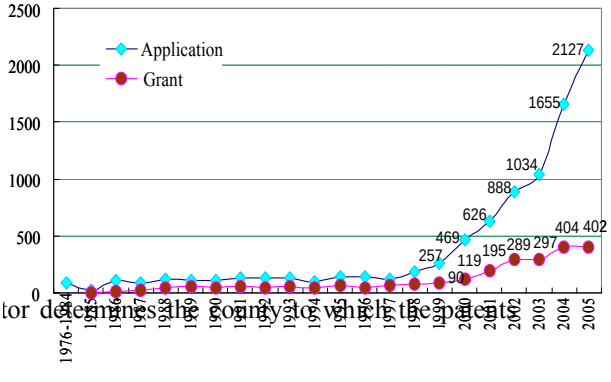
Among the leading corporations that employed China's R&D manpower for USPTO patent applications during 1995-2006 (Table 2-16), Taiwan's Foxconn topped the list. Its R&D forces are mostly employees of the Foxconn group and of the Hong Fu Jin Precision Industry (Shenzhen) Co. Microsoft came in second in the list with 114 patents that utilize China's R&D manpower. Although founded in 1998, Microsoft's Asia research center in China has begun to bear fruit in patent from China's R&D manpower. During the last 3 years, Chinese inventors in the center have been contributing more than 10 patents each year to the USPTO. In addition, some Taiwanese companies like Winbond Electronics, UMC, Foxconn Technology, BenQ and Inventec Group each held at least 10 patents based on Chinese employees' inventions.

Figure 2-4 The number of Applications and USPTO Granted patents to China

The number of patents granted by the U.S



The number of utility patents applied and granted



tor determines the county to which the patents

Notes: 1. The country of residence for the first inventor determines the county to which the patents belong.
Source：USPTO.

Table 2-15 Country Distribution of Assignee for the Patents Invented by Chinese - USPTO 1995-2006

	Total	Share	China	Share	Taiwan	Share	USA	Share	Hong Kong	Share	Japan	share	Others	Share
1995	65	100.0	53	81.54	4	6.15	5	7.69		0.00	1	1.54	2	3.08
1996	48	100.0	32	66.67	6	12.50	4	8.33	3	6.25	3	6.25	0	0.00
1997	67	100.0	40	59.70	5	7.46	14	20.90	2	2.99	2	2.99	4	5.97
1998	91	100.0	64	70.33	5	5.49	12	13.19	7	7.69	1	1.10	2	2.20
1999	95	100.0	67	70.53	7	7.37	11	11.58	6	6.32		0.00	4	4.21
2000	159	100.0	91	57.23	19	11.95	27	16.98	18	11.32	3	1.89	1	0.63
2001	264	100.0	122	46.21	68	25.76	54	20.45	10	3.79	3	1.14	7	2.65
2002	391	100.0	176	45.01	139	35.55	45	11.51	10	2.56	7	1.79	14	3.58
2003	421	100.0	191	45.37	108	25.65	91	21.62	15	3.56	3	0.71	13	3.09
2004	596	100.0	253	42.45	170	28.52	122	20.47	20	3.36	3	0.50	28	4.70
2005	565	100.0	279	49.38	134	23.72	115	20.35	16	2.83	6	1.06	15	2.65
2006	966	100.0	395	40.89	289	29.92	208	21.53	41	4.24	11	1.14	22	2.28
1995-2000	525	100.0	347	66.10	46	8.76	73	13.90	36	6.86	10	1.90	13	2.48
2001-2006	3203	100.0	1416	44.21	908	28.35	635	19.83	112	3.50	33	1.03	99	3.09

Notes: 1. The country in residence of the first inventor determines the county of the patent.
Source：USPTO, TIER calculated.

Table 2-16 Number of USPTO Patents Invented by Chinese and Owned by Foreign Enterprise

Assignee	Country	2004-2006	1995-2006
Hon Hai Precision Inc. Co., Ltd.	Taiwan	475	755
Microsoft Corp.	USA	103	114
Great Neck Saw Manufacturers, Inc.	USA	37	57
International Development Corp	USA	37	53
Winbond Electronics Corp	Taiwan	15	32
Colgate-Palmolive Company	USA	4	29
International Business Machines Corporation	USA	20	29
SAE Magentics (H.K.) Ltd.	Hong Kong	24	28
United Microelectronics Corp.	Taiwan	0	26
Intel Corporation	USA	21	24
Golden Bright Manufacturer Ltd.	Hong Kong	1	23
The Procter & Gamble Company	USA	13	19
Foxconn Precision Components Co., Ltd.	Taiwan	3	15
FIH Co., Ltd.	Taiwan	12	12
Molex Incorporated	USA	12	12
Zreative Product Inc.	USA	5	12
BenQ	Taiwan	11	11
Inventec Corporation	Taiwan	3	11

Source：USPTO, TIER calculated.

While OEM/ODM profits continue to wane and competition pressure continue to intensify as a result of globalization, many OEM/ODM-centered Taiwanese firms

have begun to look for breakthroughs in recent years. More and more large corporations are moving toward creating their own brands. In view of the similarity of the Chinese market in terms of opportunity and language/culture, many Taiwanese firms see the Chinese market as a home market, in hopes that they can enhance their shares in the global market via entry to the Chinese market. Yet, in the last few years, it became obvious that the main marketing challenge facing Taiwanese firms in China is its evasive marketing channels. Due to the fact that Chinese distributors divide marketing channels into national, provincial, and city levels, the easiest way for a vendor to introduce its products to different parts of the nation is to find a national distributor. Yet, according to the brand awareness of most Taiwanese firms, the willingness of national distributors in China to market the products is not very high. Even if they are willing, the conditions are often very strict, and Taiwanese firms' profits can be easily devoured by the national distributor. Some of the Taiwanese firms attempt to look for provincial and city-level distributors in order to establish their own marketing network. However, the endeavor to investigate the distributors of each province and city, to negotiate distribution terms, and to define product segment and price among the provinces and cities is a task that requires much money and manpower. For Taiwanese firms' limited marketing manpower and resources, undoubtedly, it is an extremely heavy undertaking. Taiwanese firms, therefore, have to decide which option works better for them.

2.2.4 Operational performance continues to improve

According to official survey data published by the Taiwanese government, more Taiwanese firms are making profits in China in recent years. The MOEA Report on Foreign Investment Strategies of the Manufactures indicates the ratio of profitable firms has risen from 37.99% in 2002 to 43% in 2005. The proportion of Taiwanese firms in the red is also climbing, however, probably due to the fact that some of the companies, in their attempt to evade taxes, have doctored their financial statements to show deficit. According to the survey of 6,282 Taiwanese firms conducted by Hong (2007)[27], in 2006, about 58.01% of the Taiwanese firms were profitable, 19.05%

[27] There are 740 valid samples. Within the confidence interval of 95%, the sampling error is 3.6%.

broke even, and 22.94% were unprofitable. In comparison with the previous years when profitable, break-even, and unprofitable firms each made up one-third of the total, the actual operations recently should have improved.

Table 2-17 Profitability of Taiwanese Firms in China 2002-2005

unit：%

	Samples	Total	Unprofitable	Break-even	Profitable
2002	1232	100.00	34.17	27.84	37.99
2003	1278	100.00	37.17	19.17	43.66
2004	1253	100.00	36.07	20.67	43.26
2005	1217	100.00	37	20	43

Source：2003-2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

We further explore factors behind the changes of Taiwanese firms' profitability. From Tables 2-18 and 2-19, we can see that increasing input cost and competition caused Taiwanese firms to suffer losses. Whether it is in the export market or the domestic market in China, Taiwanese firms not only have to compete with local vendors and other foreign firms, they have to face competition from among themselves – the intensity of which can sometimes be greater than that of the former. The attempt to undercut each other places some Taiwanese firms in a difficult situation – even if they have relocated their production bases to China where the factor prices are lower, they are still unable to see any significant improvement in profitability. The factors contributing to enhanced gains are more diversified. Besides internal managerial improvement and increased demand of the Chinese and international markets, sound marketing channels and new product development are also quite significant, indicating Taiwanese firms' incomes are not just from OFM/ODM activities. The contributions of R&D and marketing activities have also begun to show their significance. In the future, it can be expected that as the competition in the Chinese market intensifies, Chinese consumers' sensitivity to brand image and production innovation will be higher and higher, thus making it more difficult to manage China's domestic market.

Table 2-18 Factors in Making Losses

	Number of firms	Low local demand	High competition among local firms	Competition from imported goods	Low demand in Taiwan	Low demand in other export market	High sunk costs	Personnel issues	Financial issues	Lack of marketing channels	Increasing input costs	Others
2003	481	9.77	48.86	6.24	5.61	10.60	36.17	4.57	7.28	19.54	28.27	14.55
2004	454	13.00	55.51	5.07	6.83	9.69	29.96	3.96	7.71	20.04	43.39	15.20
2005	461	9.76	58.13	4.12	4.12	11.06	28.20	2.17	6.29	17.35	42.95	13.45

Note: Multiple-answer questions

Source：2004-2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

Table 2-19 Factors in Making Profits

	Number of firms	New product development	Better production technology	Sound Marketing channels	High demand in Taiwan	High demand in other export market	Increasing local demand	Decreasing input costs	Sound management	Sound financial conditions	Others
2003	570	27.19	34.21	25.09	8.95	28.77	51.05	12.46	35.96	13.16	3.86
2004	561	27.09	37.97	27.27	7.84	30.84	45.99	9.80	39.93	12.66	4.81
2005	530	25.85	35.66	25.28	8.87	27.74	47.92	13.21	37.55	10.00	7.17

Note: Multiple-answer questions

Source：2004-2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

2.2.5 Changes in profit management

As their performances in China gradually pick up, the way Taiwanese firms manage their profits changes with the shifting of the investment environment in China. The MOEA Report on Foreign Investment Strategies of the Manufactures reveals the fact that in recent years, more and more Taiwanese firms are converting their profits to capital reserve due to the fact that operational efficiency improvement reduces the need to make up for past losses. In addition, Taiwanese firms have begun to adopt more conservative investment strategies because of reduced investment environment incentives and deteriorated operational conditions in China. From Table 2-20, we can see that the combined percentage of firms which choose to use their profits for reinvestment in their own local business or other local businesses has declined from 37.67% in 1998 to 32.05% in 2005. The lowered investment ratio and an elevated level of capital reserve indicate that Taiwanese firms are more conservative about whether they should continue to invest in China.

Table 2-20 Profit Management for Taiwanese Affiliations in China

	Capital Reserve	Recover loss	Reinvest in local business	Invest in other local business	Declare dividends	Reinvest in domestic operation	others	No profits
1998	28.88	32.4	**29.66**	**8.01**	17.85	6.75	2.11	20.66
1999	31.24	35.97	**31.79**	**10.47**	18.76	6.92	2.91	17.58
2003	31.74	35.39	**24.03**	**7.79**	18.67	5.03	3.57	21.19
2004	37.99	33.04	**22.51**	**7.02**	16.84	5.52	4.07	19.47
2005	39.19	31.64	**24.82**	**7.23**	17.09	3.45	3.37	19.56

Note: Multiple-answer questions
Source：1999-2006 Reports on Foreign Investment Strategies of the Manufactures, MOEA

There are many reasons behind the turn of Taiwanese firms' investment attitudes toward conservatism. Besides the fact that the Chinese government has been cutting the incentives it offers to foreign investors through policy adjustment, deterioration of the Chinese business environment as a whole was also the primary cause that led to the slashed investment of Taiwanese firms. The questionnaire survey

of Taiwanese firms conducted by Hong (2007) shows that Taiwanese firms feel more of the impact of such policy factors as "gradual cancellation of various incentives" and "increased social security burden." The impact felt by the domestic staple industry, and by the metal and machinery industries, which are more labor-intensive and capital-intensive, is more significant. The service industry did not feel the impact as much because it uses less land and energy, and recent corporate tax law reforms were relatively more advantageous for the service industry. In terms of adverse overall market factors, Taiwanese firms generally consider "increased wages" and "appreciated RMB" to be the most significant causes. As wages in the coastal regions of China lose their international advantage, Taiwanese firms have begun to relocate to Vietnam and other ASEAN countries.

2.2.6 Summary

In summarizing the investment strategy changes that Taiwanese firms went through in China, we can see that as the primary purpose of foreign firms' investments in China has been turned toward the development of the domestic market, localization of the supply chain and human resource supply, as well as clustering of upstream and downstream entities, has become a general strategy adopted by nations around the world to save cost while facing stiff competition. As a result, these firms' investments in China do not have significant effect in boosting the export trade of their mother nations with China. In addition to expanded vertical integration of production for cost reduction, localization of R&D and marketing activities is also take shape in order to tap further into the special demand and market sensitivity of the Chinese market. According to the Flying Geese Theory, collaboration of the entire East Asia may go through reconstruction at any time because of the rise of the local market in China. In terms of profit, the ultimate concern of foreign firms, the efficiency and competitiveness enhanced due to localization of value chain activities must happen in order to overcome various deteriorated management conditions—thus ensuring continuous improvement of investment performance in China. For SMEs that lack R&D and marketing abilities, the pressures from China's cancellation of investment incentives and appreciation of RMB prompt them to consider withdrawing their

operations in China and to invest in countries like Vietnam, whose resources are cheaper. Hence, under considerations of profit and risk, SMEs, which base their competition solely on cost, will begin to leave China in the future because it is no longer an advantageous operational environment. Only larger foreign firms will stay on, and only those that are able to stay on top of the marketing channels and continue to innovate in order to meet the need of Chinese consumers will remain profitable.

Localization of value chain activities is, indeed, able to help foreign firms improve their efficiency, competitiveness, and profitability. Yet, overseas investment may engender negative impact on the economy of the mother country. Not only does it directly affect the export and production of the mother country, it may also impact labor market demand, and so, domestic employment. Furthermore, in the long run, the cluster effect and R&D localization may also generate positive externality, such as accelerating the spillover effects and learning-by-doing effect in order to quickly upgrade the competitiveness of the invested nation, thus shortening the gap between the invested nation and the homeland. All these are factors taken into consideration by the government of the mother country when evaluating global strategies of the corporate world. Therefore, in the section below, through simple hypotheses and models, we will estimate the impact of investment in China on Taiwan's export, production, and employment under different assumptions in order to clarify a reasonable target area for the overseas investment policy.

2.3 Simulation of the Impact of Taiwan's Investment in China on Taiwan's Export, Production, and Employment

Cross-strait trade and economic development are both beneficial and detrimental to Taiwan. To a certain extent, cross-strait trade volumes engendered as a result of Taiwanese firms' industrial collaboration involving both sides of the Taiwan Strait can contribute to continuous economic development of Taiwan. Initially, Taiwanese firms invested in China primarily to utilize China's cheap labor and resources in order to extend their production bases, reduce production cost, and sharpen the competition edge of Taiwanese products in the international market. Yet, whether massive westward movement and accelerated industrial relocation lead to substitution effects in overseas market in terms of domestic production, export, and employment has also drawn extensive attention. Long-term lopsided distribution of manpower, capital, and technology toward China caused by cross-strait trade and economic activities has impacted Taiwan's industrial competitiveness in a very significant way. The study of Yeh (2005) reveals that Taiwan's investment in China has prompted outward relocation of the upstream industries. Despite the fact that Taiwan's export industry is becoming more and more dependent on the Chinese market, its share in China's import market is decreasing. Following cross-comparison on investment and export competitiveness of the industry, the study discovers that within 1-5 years after its investment in China reached its peak, the Taiwanese industry's market share in China has begun to wane. This indicates the obvious fact that Taiwanese firms' investments and production in China replace Taiwan's exports to China.

Therefore, the main purpose of this section is to evaluate the impact of investment in China on Taiwan's economy via collection of secondary data and estimate of the simple input-output model. Since the weight of the service industry in overseas investment is still low, and the extent of its relocation has not been significant, this section will focus on the manufacturing industry.

2.3.1 Impact on trade

1. Theoretic model

In accordance with different strategic forms of the value chain, the path through

which overseas investment affects trade of the homeland can be divided into three types: The first is the investment-driven trade in which overseas production bases boost the demand for materials, components, and intermediate goods from the homeland; the second is the substitution effects in which overseas production bases replace the exports of the homeland; the third is migration effects in which products of overseas production bases are sold back to the homeland. The mathematic models for the three effects are established as follows:

$$\Delta T = \sigma \cdot A \cdot [\sum I_t \cdot (Y^* / K)] \quad (1)$$

$$\Delta X = \beta \cdot [\sum I_t \cdot (Y^* / K)] \quad .(2)$$

$$\Delta M = \alpha \cdot [\sum I_t \cdot (Y^* / K)] \quad (3)$$

Here, ΔT, ΔX and ΔM respectively represent added export resulting from investment-driven trade, reduced export resulting from substitution effects in the overseas market, and increased import from migration effects in the domestic market; σ, β and α represent the proportion of investment-driven trade, substitution effects in the overseas market, and migration effects in the domestic market derived from historical data. Since past investment will affect current output, the model employs the cumulative investment $\sum I_t$ to be multiplied by the overseas capital-output ratio (Y^* / K)[28], which represents different technology types in order to estimate the output capacity created by overseas investment. Due to the input of materials, components, and intermediate goods based on investment-driven trade, it is necessary to multiply the formula by the input-output matrix (A) in order to estimate the need for intermediate input.

2. Source of Data

Data of coefficients, σ, β and α, comes from the Report on Foreign Investment Strategies of the Manufactures compiled by the MOEA. The accumulated amount of investment in China $\sum I_t$ is based on the cumulative amount during

[28] During numerical simulation, we will establish the preset parameter values of overseas capital-output ratio as 1.2 times, 2 times, 2.4 times and 4 times that of Taiwan.

1993-2005, published by the Investment Commission of the MOEA and the MOC. The capital-output ratio (Y^* / K) is determined according to calculations based on the 2001 industrial and commercial census data. The input-output matrix (A) comes from the input-output table released by the Directorate-General of Budget, Accounting, and Statistics of the Taiwanese government in 2001.

3. Simulation outcome

(1) Investment-driven trade

According to various assumptions of overseas capital-output ratio, the cumulative overall value of investment-driven exports of the manufacturing industry until 2005 is US$13.162, US$21,937, US$26.325 and US$43.874 billion. Moreover, investment-driven exports account for 10.98% to 36.59% of total exports to China (see Table A-1). In terms of specific industries, the top three industries with the greatest amount of investment-driven trade are electronic parts and components manufacturing, chemical material manufacturing, and basic metal industries (all of which are more of the upstream segment), indicating that investment in China can, indeed, further foster the export and development of Taiwan's upstream industries. The industries whose amount of investment-driven trade account for a greater percentage of the total export value to China include wood and bamboo products manufacturing, food and beverages manufacturing, and rubber products manufacturing—indicating that the export of these industries to China comes mainly from the contribution of Taiwanese firms. Cross-strait trade and economic stability, therefore, affects these industries more than other industries.

(2) Substitution effects in the overseas market

Evaluation of the substitution effects in the overseas market is based on the weights of Taiwanese firms in China and domestic firms in Taiwan in terms of total export value to the international market. According to various assumptions of the overseas capital-output ratio, from 1993 to 2005, the simulated total export value of the Taiwanese manufacturing industry in China to the international market from is US$22.705, US$37,843, US$45.411 and US$75.686 billion (see Table A-2). In other

words, the higher Taiwanese firms' technology level is, the higher the total export value of the Taiwanese manufacturing industry in China to the international market will be, and it may further impact the export of domestic firms in Taiwan to the international market. The weights of Taiwanese firms in China and domestic firms in Taiwan in terms of total export value to the international market are 1.37%, 2.28%, 2.74% and 4.56% respectively.

In terms of specific industries, the top three Taiwanese industries in China with the greatest total export value to the international market are: computer, communications, and audio and video electronic products manufacturing; electronic parts and components manufacturing; and electrical machinery, supplies and equipment manufacturing and repairing. In essence, the phenomenon reflects the value chain strategy of the electronic industry in Asia. The export value of Taiwanese firms in China to the international market is closer to that of domestic firms in Taiwan in printing and related support activities; leather, fur and related products manufacturing; and rubber products manufacturing. The phenomenon shows the fact that these industries are faced with the difficulty of relocation and that the competition between Taiwanese firms in China and domestic firms in Taiwan in the international market is becoming stronger than ever.

(3) Migration effects in the domestic market

Evaluation of migration effects in the domestic market is based on the portion of Taiwan's total import value from China that comes from production of Taiwanese firms in China. With technology improvement of Taiwanese firms in China, the simulated amount of migration effects in the domestic market from 1993 to 2005 is US$10.919, US$18,198, US$21.838 and US$36.396 billion. The weight ranges from 12.22% to 40.74% (see Table 3 attached). In terms of specific industries, reflecting the value chain deployment of the electronic industry in Asia, the top three Taiwanese industries in China with the greatest amount of substitution effects in the domestic market are computer, communications, and audio and video electronic products manufacturing; electronic parts and components manufacturing; and electrical machinery, supplies and equipment manufacturing and repairing. The industries with

higher weights include basic metal industries, machinery and equipment manufacturing and repairing, and other industrial products manufacturing.

Essentially, the outcomes from simulation of the impact of investment in China on Taiwan's trade and economy is in line with the theoretic effect of investment-driven trade, substitution effects in the overseas market, and migration effects in the domestic market. A higher capital-output ratio indicates that under the particular technology type, each dollar of fixed investment can be turned into higher production capacity to augment the demand for raw materials and intermediate products while exerting positive effect on the parent country's export and trade balance via investment-driven trade. The production of the final product, however, will increase with technology upgrade and engender negative impact on the parent country's trade balance via competition with domestic firms in both overseas and domestic markets. The actual net effect, therefore, will be determined by the industrial structure of each country and the value chain deployment of each industry within the region. According to simulated amounts of the three effects above, we discover that the negative impact of investment in China on trade balance is, in essence, greater than the positive impact. Therefore, the net effect of investment in China on Taiwan's trade balance is negative.

From the discussions of the previous section, we notice that Taiwanese firms' demand for raw materials and intermediate products from the homeland is decreasing with the formation of local production clusters. Therefore, the factors of investment in China that benefit Taiwan's national economy have gradually faded out. Instead, now there is heated competition between Taiwanese firms in China and domestic firms in Taiwan in the international market. Taiwanese firms' investment in China may have begun to profit. Yet, as Taiwan's investment environment is still in need of significant improvement, and many limitations are still present to curb international capital movement, it is hard to attract investment needed to help developing emerging industries in Taiwan. In the future, if we desire to enhance the positive effect of overseas investment on the trade of the homeland, we need to shape up an investment environment that is advantageous for the development of knowledge economy in Taiwan, and properly remove regulations in the capital market in order to enhance domestic investment and trade via continuous complementary effects with overseas

investment strategies.

2.3.2 Impact on output of the parent country

1. Theoretic model

If we directly examine the way overseas investments affect output production of the homeland, overseas investments have both positive and negative influence on domestic production. The positive effect refers to the fact that firms engaged in overseas investments need to purchase materials and machines from the mother country, and thereby boost local production. Negative effect, on the other hand, is due to the fact that overseas investments are primarily in search of more advantageous operational conditions. Industrial relocation tends to reduce the investment and production of the homeland, while firms that choose to stay in Taiwan may be faced with the pressure of production reduction or shutdown because of competition from foreign firms. These factors will indirectly affect upstream and downstream industries via input-output relations.

To a certain extent, the impact of overseas investments on domestic output is determined by the complementary or substitution relations between overseas and local investments. To simplify the model, therefore, we will respectively simulate two situations where there is a complete or partial substitution relation between overseas and local investments. Under complete substitution, increase in overseas investment will result in the reduction of domestic investment by the same amount. Under partial substitution, increase in overseas investment will result in reduction of domestic investment in Taiwan by 50% or 75% of the same amount. Under this assumption, the impact of overseas investment on domestic output can be expressed via the following mathematic formula:

$$\begin{aligned} \Delta Y &= \Delta Y_1 + \Delta Y_2 \\ \Delta Y_1 &= (1-D)^{-1} \cdot \Delta T \\ \Delta Y_2 &= \rho \cdot \sum I_t \cdot (Y/K)(1-D)^{-1} \end{aligned} \tag{4}$$

Here ρ is the ratio by which the amount of overseas investment replaces domestic investment in Taiwan. The expression $\rho = 1$ indicates complete substitution relation, while the expression $\rho = 0.75$ or $\rho = 0.5$ represents partial substitution relation.

Respectively $\Delta Y_1, \Delta Y_2, \Delta Y$ represent the positive effect, negative effect, and net effect of investment in China in stimulating increase in export product value; $(1-D)^{-1}$ represents Taiwan's input-output matrix.

2. Source of data

Data of Y/K and $\sum I_t$ also come from the previous section, which discusses the model of the trade effect. The input-output matrix is based on computation of data from the 2001 industrial and commercial census.

3. Simulation Outcome

The outcomes of model simulation (see Table A-4) with complete substitution relation ($\rho = 1$) between investment in China and domestic investment will generally reduce the total output of Taiwan's domestic manufacturing. Due to the different technological levels between the two sides of Taiwan Strait, the estimated reduction of Taiwan's domestic manufacturing caused by cumulative investment in China during 1993-2005 (as a percentage of the total production value of the manufacturing industry) ranges from -0.39% to -1.47%. However, when overseas investment and domestic investment show partial substitution relation, and the degree of substitution is lowered, the impact on the production value of Taiwan's domestic manufacturing will gradually shrink. According to simulation outcomes, when $\rho = 0.75$ and $Y^*/K = 4(Y/K)$, the production value of domestic manufacturing will increase by US$4.762 billion, which accounts for 0.12% of the total production value of domestic manufacturing during that period of time (see Table A-5). Meanwhile, when $\rho = 0.5$ and Y^*/K is $2.4(Y/K)$ and $4(Y/K)$ respectively, the production value of domestic manufacturing will increase by US$335 million and US$24.935 billion respectively, accounting for 0.01% and 0.63% of the total production value of domestic manufacturing during that period of time (see Table A-6). In other words, when the production capacity stimulated by overseas investment is higher, and the substitution ratio between overseas investment and domestic investment is lower, the net effect on domestic production value will be positive.

2.3.3 Impact on domestic employment

1. Theoretic model

Theoretically, capital and labor may be in complementary or substitution relations because of different technology types, yet output and labor will always be in positive relations. Therefore, based on the way overseas investment affects output, the marginal effects of overseas investment on domestic employment will largely be the same as what we saw in the last section with the assumption that there is no drastic change to the domestic industrial structure. In other words, when overseas investment results in more drastic capacity expansion in the future, through investment-driven trade, it will cause domestic upstream industries to experience more significant growth in demand and stimulate derived demand for labor, which means more employment opportunities. When the substitution effect between overseas investment and domestic investment is not significant, or when the two are in complementary relations, the deindustrialization effect of overseas investment will be mitigated, and its impact on demand for labor will also be alleviated. The final net effect on employment will be positive.

In evaluating the effect of overseas investment on domestic employment, the production value net effect is multiplied by the labor compensation input coefficient for determining the affected labor compensation, which is then divided by the average wage to determine the overall effect of overseas investment on domestic jobs. The mathematic expression is as follows:

$$\Delta L = (A_w \cdot \Delta Y)/W \tag{5}$$

Here, ΔL stands for the extent of the job changes; A_w is the labor compensation coefficient, which refers to the labor compensation required for the manufacturing industry to generate one unit of output value; ΔY is the output net effect derived from the last section; W represents the average annual wage.

2. Source of data

Data of ΔY comes from the simulation outcome of the last section, while

data of A_w and W is obtained respectively from the 2001 industrial and commercial census and the industrial statistics monthly report.

3. Simulation outcomes

Model simulation outcome confirms the estimate introduced in the beginning of this section (see Table A-7). Complete substitution relation ($\rho = 1$) between investment in China and domestic investment will generally have negative impact on Taiwan's total domestic manufacturing jobs. With different technological levels, the reduction of Taiwan's domestic manufacturing jobs as a percentage of the total number of the manufacturing jobs ranges from -1.11% to -2.16%. However, when overseas investment and domestic investment show partial substitution relation, and the degree of substitution is lowered, the impact on Taiwan's domestic manufacturing jobs will gradually wane. According to the simulation outcomes, when $\rho = 0.75$, the impact on Taiwan's domestic manufacturing jobs will be reduced to the range of -0.44%~-1.51% (see Table A-8). When $\rho = 0.5$ and $Y^* / K = 4(Y / K)$, domestic manufacturing jobs may even increase by 17,900, which accounts for 0.23% of the total number of manufacturing jobs during that period of time (see Table A-8). It is obvious that only when the substitution relation between overseas investment and domestic investment becomes less significant will it be possible for overseas investment to have positive effect on domestic investment.

2.3.4 Summary

Summarizing the impact of investment in China on Taiwan's industry, we propose the following observations:

1. Positive effect on Taiwan's trade is decreasing, and negative effect is increasing

Taiwan's export to China in recent years mainly consists of intermediate products and machines for the production requirement of Taiwanese firms in China. The two account for over 90% of Taiwan's total export value to China. Meanwhile, the import stimulated by migration effects of Taiwanese firms in the domestic market has been growing steadily. We also discover that the investment-driven trade the and migration

effects in the domestic market estimated via the model are largely in line with actual changes of cross-strait trade. In other words, according to the current value chain collaboration system, Taiwanese firms' investments and production in China still have positive effect on Taiwan's trade surplus to China. However, whether the volume of trade surplus will gradually shrink with the localization of Taiwanese firms' supply chain is yet to be observed.

The key factor that determines the net effect of investment in China on Taiwan's overall trade comes from Taiwanese firms' substitution of domestic firms in a third market. The weights of printing and related support activities; leather, fur and related products manufacturing, and rubber products manufacturing are higher in this area. The phenomenon may have to do with the fact that the scale of relocation of these industries has been quite significant. In terms of the absolute amount, the top three industries of the highest degree of substitution are computer, communications, and audio and video electronic products manufacturing; electronic parts and components manufacturing; and electrical machinery, supplies and equipment manufacturing and repairing. Currently, these industries still need Taiwan for provision of upstream parts, components, and managerial staffs, yet their impact on Taiwan's final production output and employment has already been quite significant. The cluster effect has also encouraged mid-to-upstream vendors to invest in China. Before the emerging industries mature, for the benefit of the mother country and overall economic development strategy, it is necessary for the government to improve Taiwan's investment environment through assistance and incentives in order to slow down or prevent deterioration of industrial structure and job loss caused by continued industrial relocation.

2. Utilizing investment momentum to upgrade existing industries and develop emerging industries is the key to ensuring output and employment performance

How investment in China affects the domestic output and employment will be mainly determined by whether it deprives Taiwan of its domestic investment. Yet, value chain shifting and industrial structure adjustment will also cause output and employment performance to undergo changes. When an industry is relocated from its

homeland to another country for more benefits, it implies that the industrial structure of its homeland is going through transformation and adjustment. Therefore, even if overseas investments do not have a significant crowding-out effect on domestic investment, we still need to make effective use of investment momentum to develop emerging industries and to form new industrial clusters as primary global suppliers. This needs to be done in order to fend off deindustrialization and to place Taiwan in charge of the situation. Due to the fact that it is difficult to take industrial structure changes into account via theoretic assumptions when adjusting the input-output matrix, the simulated output and employment effects of the second and third parts of this section begin with a static market structure and are based on the current industrial structure and upstream-downstream value chain relations. Yet, it takes a long time for the effect of overseas investment on output and employment performance to manifest. Therefore, if Taiwan can take hold of the opportunity, aggressively upgrading existing industries and developing emerging industries, overseas investment may begin to exert positive effect on its output and employment performance because departure of ineffective industries will allow Taiwan to better distribute its limited resources. The key, therefore, is whether industrial upgrade can keep up with the pace of industrial relocation.

2.4 The Future of Taiwanese Firms in China

The rise of the Chinese economy not only becomes a magnate that threatens to hollow industries out of the East Asian economies, through the spillover effect of FDI, China has also begun to rapidly accumulate technological and human resources. According to the PRC Ministry of Science and Technology statistics, in 2006, total R&D investment in China was 300 billion RMB, or 1.4% of the GDP. Based on purchasing power parity, the OECD estimates that by the end of 2006, China's total R&D investment will surpass Japan's and rank second in the world, next only to the US. In addition, China's quick accumulation of R&D investment owes much to the contribution of foreign investors. One of the UN's recent surveys indicates that China has become the most attractive R&D investment target in the world. More and more multinational companies are setting up R&D centers in China. Besides significant increase in the number of institutions, R&D investment in China is growing fast. Data from the National Bureau of Statistics of China reveals that in 2005, foreign firms' R&D investment reached 23.1 billion RMB, which made up 18.5% of the R&D investment of all mid-to-large enterprises, up by 7.5% from 2000. For countries like Taiwan and Korea with shallow-saucer technology, it will be an important challenge to figure out how to stay ahead of China's hot pursuit of technology and make effective use of China's technological resources for development of product technologies appropriate for local or global market.

In recent years, China has enjoyed a 2-digit economic growth, yet, structurally, it has overly depended on investment and trade activities for economic development, and it has overlooked domestic demands and consumer activities. In order to adjust the industrial structure, and to lessen trade disputes and environmental pollutions that came with economic development, the Chinese government, in its 11th 5-year plan, highlights the focus on intensifying domestic demands via expanded consumer activities of the farming villages, mitigated city-township, and regional differences. Expanded domestic demands must be founded on improved household income. As the external trade-oriented development model continues, China would first cancel all taxation and investment incentives for foreign firms in order to give domestic entities a fair competitive environment, encourage development of China's national industries,

and break away from a foreign investment-dominated trade development model. In the future, as China continues to carry out the policy of helping domestic firms grow, alleviating regional differences, and enhancing household income, the potential of China's domestic market will be further developed, and the magnetic effect of its market will be far greater than that of its cheap resources, making the Chinese market the center of focus of all foreign firms.

Therefore, in the last section of this chapter, we will expound on Taiwanese firms' future R&D and marketing opportunities in China in an attempt to identify the model that developmentally helps strengthen Taiwanese firms' competitive niches and promote Taiwan's economic development.

2.4.1 The future of the manufacturing industry

1. R&D-oriented strategy

Economic globalization is characterized by the free flow and distribution of product, technology, trade service, capital, resource, and information in a world that has no national boundaries in order to form a situation where the economies around the world are knitted together. Under the condition of economic globalization, market competition uncertainty and product differentiation competition make it uneconomical to have concentrated technological R&D for all production lines in the homeland. Therefore, different technological R&D bases must be established for different types of products. Due to product standardization and production processes disintegration, strategies to decentralize technological R&D activities can be a more viable approach to differentiate the function of regional production bases and to diverse technological R&D risks. At present, globalized technological R&D of multinational companies has become the mainstream. The underlying drive comes from factors of international management and global resource distribution, which prompt multinational companies to adopt the strategy of "localized R&D and localized cash-in" as a turn from the past situation where technological R&D activities were limited to the homeland of the investment.

From 2001 until now, multinational companies' China strategy has changed drastically with shifting of internal/external factors in China, such as legislative

environment and core competitiveness of firms. According to the report of the Samsung Economic Research Institute (2007), multinational companies' strategic adjustment in China has entered the 4th phase, from the "production base" of phase 1 (1992-1997) to the "marketing" of phase 2 (1997-2001), and to the "human resource" center of phase 3 (2001-2004). In recent years (2004-2006), multinational companies fastened its strategic focus on the "R&D center." This transformation reflects China's abundant low-cost R&D talents and promising market outlook, which are encouraging multinational companies to transform from "production-base type" to "market-development type" or "R&D type."

How can Taiwanese firms respond to this trend? In view of China's expansive market and rich R&D manpower supplies, it is unavoidable that Taiwanese firms need to increase the weight of their R&D activities in China. Yet, it is not necessary that they should look at the trend from the perspective of a zero-sum game. As a matter of fact, with Taiwanese firms' manufacturing and production activities in China and gradual localization of some of the operational functions, R&D in China begins to carry the positive meaning of technology hunting and market connection. In order for Taiwan to benefit from its firms' investment in China, however, the attention of policy consideration should be focused on how to prevent Taiwanese firms' operations from "complete localization". Taiwanese headquarters' ability to attain the orders of leading international vendors and to enhance technology integration will help Taiwanese firms become "first-tier suppliers" of these international name brands via the advantage of "technology integration service providers." This way, both sides of the Taiwan Strait will benefit.

2.4.2 The future of the service industry

China's industrial structure is founded on the manufacturing industry, and the weight of the service industry is relatively lower. Take the 2005 data for example. According to Table 2-21, the weight of the service industry in China is only 40%, which is lower than in Taiwan, Korea and other leading countries. This indicates that as China's national income continues to improve, there is still room for the domestic

market-oriented service industry to grow. In the past, nations around the world invested in China primarily for export-oriented processing and manufacturing. In recent years, however, as foreign firms began to race to secure China's domestic market, product marketing channels and supporting services needed for corporate operations became the new focus of foreign investments. Besides coastal regions, which have served as the primary base of foreign firms, areas that were more domestic economy-oriented and opened later than the coastal regions (such as those surrounding Bohai, those of northeast China and the six populated provinces of central China), have all become the strategic focus of foreign firms for domestic-business opportunities.

Table 2-21 International Comparison on GDP Structure — by Sector (2005)

Country	Percentage of total GDP (%)			Country	Percentage of total GDP (%)		
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary
U.S.A	1	22	77	Russia	5	35	60
Japan	1	33	66	India	23	24	53
Germany	1	26	69	**Taiwan**	**2**	**25**	**74**
China	**12**	**47**	**40**	Singapore	0	32	67
U.K	1	26	73	**S. Korea**	**3**	**36**	**60**
France	2	21	76	H.K	0	10	90
Italy	3	27	70	Thailand	9	39	52
Canada	2	33	66	Indonesia	13	46	41
Spain	3	29	67	Philippine	14	33	53
Brazil	10	39	51	Malaysia	8	42	50

Source：The IMD, The World Competitiveness Yearbook 2006.

To Taiwanese firms, especially those in the service industry, its local market has approached full-capacity because of stagnant population growth and limited income development. Yet, China's similar social and cultural backgrounds and Taiwanese firms' successful experience in China cause many Taiwanese firms to see China's service market as where their futures lie. China has just opened its door to foreign firms in the service industry. There are still many legal restrictions, and the basic facility and environment have yet to be perfected. The governments on both sides of the Taiwan Strait have imposed investment limitations on some of the industries (such as the financial industry), and there are significant disparities among different regions

in terms of the extent of economic development and socio-cultural background. Together, these factors make managerial challenges and risks in China's service market higher than in the export market. The key to future development will be how service providers incorporate Taiwanese manufacturers' established foundations in China through cooperation to create business opportunities in China's domestic market.

In addition to technology backup, capital supply is one of the crucial supports required for rapid development of the manufacturing industry. Since the growth of Taiwan's local market is limited, Taiwan-based financial institutions have expected to extend their operational outreaches in conjunction with the progress of the manufacturing industry. As China begins to open more of its domestic financial market, Taiwan's financial service industry will have an opportunity in the future to increase its investment in China. Therefore, the schedule by which China opens its financial market and the development plan of Taiwan's financial institutions will determine how Taiwan's financial service industry will invest in the Chinese market. In the following paragraphs we will discuss the way China opens its financial industry to foreign investment, as well as the current situation and future prospects of Taiwanese financial institutions' investment in China.

1. Opening of China's financial industry to foreign investment

In the 1980s, China approved the establishment of foreign banks, mainly in association with its plan to recruit investors for its special economic zones along the coastline and boost international trade. Financial institutions from Hong Kong made up the majority of the foreign firms that established operational bases during this wave of opening, and most of the bases were set up in international trade cities and cities where most of the foreign firms built factories--cities such as Shenzhen of Guangdong and Xiamen of Fujian. European, American, and Japanese financial institutions were more conservative toward China's economy. As an initial attempt, they first invested in Beijing and set up representative offices there. The scale of their investment was generally insignificant. After 1992, when the Chinese government further opened its banking industry and capital market, Shanghai became the first city outside the special economic districts where foreign banks were permitted to set up business institutions.

At the same time, the Shanghai security exchange and the Shenzhen security exchange were unveiled, and the capital market began to take shape. During this particular period of time, due to China's fast economic development and the fact that its interest rate was higher than the international market, foreign firms' direct investment and financial investment both increased dramatically. Their need for bank loans intensified, and foreign financial institutions became more willing to invest in China.

In the late 1990s, Asian financial storms caused China's international trade to slow down to the degree of recession. The business of trade-oriented foreign banks shrank. To stabilize China's economic development, the People's Bank of China lowered the interest rate nine times in a very short time span in order to lower local banks' capital costs. The expectation for RMB depreciation encouraged corporations to reduce their foreign currency loans and increase RMB loans from local banks. The trend considerably slashed foreign banks' assets by 16.17% from US$37.92 billion in 1997 to US$31.79 billion in 1999. In 2001, China acceded to the WTO, promising that it would permit foreign banks to provide RMB services for domestic enterprises in two years, and remove all regional restrictions in five years. In 2002 the State Council and the People's Bank of China respectively promulgated the Foreign Financial Institution Management Guideline, its implementation rules, and its management regulations, which gradually removed limitations on the establishment, regions, and operations of foreign financial institutions. This allowed the operational scope of foreign firms to be expanded from Shanghai and Shenzhen to 25 cities, including Beijing; it also permitted foreign firms to offer RMB and derivative products and to function as insurance agents.

In comparison with the banking industry, in December 2004, three years after its accession to the WTO, China lifted regional and operational limitations on the insurance industry. Branch offices of foreign insurance companies were freed from regional restrictions and were authorized to provide health insurance, group insurance, and annuity policies for Chinese citizens and foreign nationalities. Due to the fact that the insurance industry is affected by cultural traits, in the initial stages after China opened its insurance market, foreign insurance companies did not have significant impact on local competitors. Yet, presently, most of the major financial institutions

around the world have entered China's insurance market. With their rich managerial experiences and prudent operational approaches, as well as diversified products, innovative ability, and joint venture with local entities, foreign insurance companies can be expected to gradually sharpen their competitive edge in the Chinese market.

Due to relatively conservative policies toward capital market, China's security industry falls far behind that of the insurance and banking industries. According to the WTO agreement, three years after China's accession, foreign security companies and investment banks may form joint-venture companies (of which the share of foreign investment may not exceed 33%) with local security companies to participate in the underwriting of A stock, B stock, H stock, and government bonds. In addition, foreign firms are permitted to found joint-venture asset management companies with local companies, and the share of foreign firms may be raised to 49%, also within three years of China's accession to the WTO. Currently, China has opened fund management, security underwriting, QFII (qualified foreign institutional investor) of A stock investment, sales of state-owned and corporate shares of listed companies to foreign firms, and foreign investment for reorganization of state-owned enterprises.

2. Investment of foreign and Taiwanese financial institutions in China

According to the statistics of the Banking Supervision Commission of China, up to the end of September, 2006, China has opened RMB services to foreign banks in 25 cities. There were 14 Greenfield foreign banks and joint-venture banking institutions with 17 branches or subsidiaries. The total asset in foreign currencies reached US$105.1 billion, accounting for approximately 1.9% of the total asset of the banking industry in China. The total amount of deposit was US$33.4 billion, and the loan balance was US$54.9 billion. Contrary to the business development difficulties they experience in Taiwan, Taiwan-based banking institutions' overseas branches and OBU have continued to grow in profitability. Because most of Taiwan-based banking institutions major in providing corporate financing services for Taiwanese firms in their overseas operations, corporate loan interests and fees are the major income sources of overseas branches and OBU. It is different from the situation in Taiwan where consumer financing is the primary source of revenues.

3. The establishment of a cross-strait financial monitoring mechanism is the key that unlocks the door for Taiwan's banking industry to enter China

Currently, Taiwan's financial institutions that cross the application threshold established by China are mainly state banks or leading banks such as Cathay United and China Trust. Yet, limited by legal constraints of both sides of the Taiwan Strait, and by the fact that an MOU has not been signed, these institutions are still not able to invest directly or indirectly in China's financial industry. Only a few institutions were able to enter the Chinese market via the CEPA model or planned stock participation and joint venture with the partner bank of the region/city. Recently, the PRC State Council indicated that China is willing to promote cross-strait civil financial organizations and to participate in negotiations on establishment of a cross-strait financial monitoring mechanism in order to find solutions. Meanwhile, Taiwan's Council of Mainland Affairs believes banking monitoring differs from charter flight negotiation in that if in the future Taiwan's financial agency needs to audit branches or subsidiaries of Taiwan-based banking institutions in China, it will not be able to delegate private institutions to fulfill the part that requires exercise of public power.

Furthermore, policy governing Taiwan-based banking institutions' investment in China involves the responsibilities of Executive Yuan agencies, such as the Ministry of Economic Affairs, the Ministry of Finance, the Financial Supervisory Commission, and the Mainland Affairs Council. It would be difficult to formulate the overall policy for Taiwan-based banking institutions to invest in China before the internal opinions can be effectively integrated. Unless China's investment policy undergoes substantial changes, investment in China will remain a dream to the banking industry of Taiwan. It is noteworthy, however, that for quite some time, Taiwan's banking industry has stayed ahead of its Mainland counterpart in terms of administrative quality and technique. After Taiwan's financial reform in 2002, foreign investors remained far more interested in taking over China's banking institutions than Taiwan's. Yet, since 2006, foreign investors, including Temasek and the Shinsei Bank, have invested Taishin, E-Sun and Jih Sun Holdings. Recently, Citibank and the Standard Chartered Bank, respectively merged with the Bank of Overseas Chinese and the Hsinchu International

Bank. In view of the fact that China has just opened its RMB services across the board, foreign banks' cross-strait strategy is quite obvious.

2.4.3 Summary

Presently, the R&D centers of most large manufacturers that have invested in China remain in Taiwan. However, for the purpose of staying close to the market, the R&D units for designing some of the final products are being relocated to China. Hence, to maintain Taiwan's advantage in industrial technology, Taiwan must gradually increase the weight of product innovation and pioneering technology R&D in order to take hold of key technologies and position itself as the production and test center for products with high added value such as technology-intensive products, products that respond to quickly to market demand, products that integrate new concepts, and key materials and components.

Keeping the new product/technology R&D core in Taiwan necessitates introduction of higher-level technology experts. Therefore, Taiwan needs to consider how to attract specialized international teams to make transformation and upgrade possible. On the other hand, we believe the government does not have to be overly concerned about the strategy of R&D and the localization of marketing talents adopted by Taiwan-based firms for the Chinese market because effective use of local talents may help Taiwanese managers quickly grasp the structure and consumer inclination of China's domestic market. The government should make sure that the profits and intellectual property rights that Taiwan-based multinational firms obtain from China in turn contribute to Taiwan's industrial upgrade, becoming something that people in Taiwan will benefit from. Therefore, we also believe that as globalization of multinational manufacturers has become an inevitable trend, the government should begin to make plan for allowing Taiwan's financial institutions to enter the Chinese market, under the condition that Taiwan's domestic financial soundness is not undermined, so cross-strait capital flows may be managed according to each entity's strategic considerations and improvement of Taiwan's investment environment can be accelerated. Accordingly, we will be able to ensure simultaneous progress of globalization and industrial upgrade of local industries as the two continue to stimulate

the development of each other.

Table A-1 FDI Driven Exports Generated by Investments in China

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	13162332.71	10.98	21937221.18	18.30	26324665.41	21.96	43874442.37	36.59
Food and beverages Manufacturing	132509.06	71.28	220848.43	100.00	265018.12	100.00	441696.86	100.00
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	576218.96	12.03	960364.94	20.06	1152437.93	24.07	1920729.88	40.11
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	75411.71	21.98	125686.19	36.63	150823.43	43.95	251372.38	73.26
Leather, Fur, and Related Products Manufacturing	155388.88	17.79	258981.47	29.65	310777.76	35.58	517962.94	59.30
Wood and Bamboo Products Manufacturing	86010.62	72.55	143351.04	100.00	172021.25	100.00	286702.08	100.00
Furniture and Fixtures Manufacturing	24802.79	12.50	41337.98	20.83	49605.57	25.00	82675.96	41.66
Pulp, Paper, and Paper Products Manufacturing	181697.02	17.48	302828.37	29.13	363394.04	34.95	605656.73	58.25
Printing and Related Support Activities	29849.50	27.11	49749.17	45.18	59699.00	54.22	99498.34	90.36
Chemical Material Manufacturing	1905373.36	8.28	3175622.26	13.79	3810746.72	16.55	6351244.53	27.58
Chemical Products Manufacturing	646793.75	23.25	1077989.58	38.75	1293587.49	46.50	2155979.16	77.50
Petroleum and Coal Products Manufacturing	249467.06	29.50	415778.43	49.16	498934.12	58.99	831556.87	98.32
Rubber Products Manufacturing	156103.97	97.89	260173.28	100.00	312207.94	100.00	520346.57	100.00
Plastic Products Manufacturing	699569.85	25.82	1165949.75	43.03	1399139.70	51.64	2331899.51	86.06
Non-metallic Mineral Products Manufacturing	76296.60	9.18	127160.99	15.30	152593.19	18.37	254321.99	30.61
Basic Metal Industries	1336809.01	13.54	2228015.02	22.57	2673618.02	27.08	4456030.04	45.13
Fabricated Metal Products Manufacturing	742718.91	17.16	1237864.84	28.60	1485437.81	34.32	2475729.69	57.20
Machinery and Equipment Manufacturing and Repairing	513942.31	4.59	856570.51	7.65	1027884.62	9.18	1713141.03	15.29
Computer, Communications, and Audio and Video Electronic Products Manufacturing	469808.31	9.40	783013.85	15.66	939616.62	18.79	1566027.70	31.32
Electronic Parts and Components Manufacturing	3827345.92	8.91	6378909.86	14.86	7654691.83	17.83	12757819.72	29.71
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	849654.45	16.47	1416090.75	27.45	1699308.90	32.94	2832181.51	54.90
Transport Equipment Manufacturing and Repairing	180753.09	12.43	301255.15	20.71	361506.18	24.86	602510.30	41.43
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	149690.79	10.32	249484.65	17.20	299381.58	20.64	498969.30	34.40
Other Industrial Products Manufacturing	96116.79	19.67	160194.65	32.78	192233.58	39.34	320389.30	65.57

Source：Computed by TIER

Note: The percentage refers to the proportion of exports from Taiwan to China actually demanded by Taiwanese affiliations.

Table A-2 Substitution in Exports Generated by Investments in China

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	22705746.65	1.37	37842911.08	2.28	45411493.29	2.74	75685822.15	4.56
Food and beverages Manufacturing	493952.51	1.65	823254.18	2.76	987905.02	3.31	1646508.37	5.51
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	761741.73	0.60	1269569.56	0.99	1523483.47	1.19	2539139.11	1.99
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	2034683.54	5.19	3391139.24	8.64	4069367.08	10.37	6782278.47	17.29
Leather, Fur, and Related Products Manufacturing	1667088.86	6.42	2778481.44	10.70	3334177.73	12.84	5556962.88	21.39
Wood and Bamboo Products Manufacturing	53832.03	0.85	89720.05	1.41	107664.06	1.70	179440.10	2.83
Furniture and Fixtures Manufacturing	574942.65	2.11	958237.75	3.52	1149885.30	4.23	1916475.50	7.05
Pulp, Paper and Paper Products Manufacturing	137956.10	1.25	229926.84	2.09	275912.20	2.51	459853.67	4.18
Printing and Related Support Activities	325684.78	12.79	542807.96	21.32	651369.56	25.59	1085615.93	42.65
Chemical Material Manufacturing	333496.35	0.37	555827.25	0.61	666992.70	0.74	1111654.50	1.23
Chemical Products Manufacturing	212215.34	0.79	353692.23	1.32	424430.68	1.58	707384.46	2.63
Petroleum and Coal Products Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rubber Products Manufacturing	630011.88	6.30	1050019.81	10.50	1260023.77	12.60	2100039.61	21.01
Plastic Products Manufacturing	1681043.09	3.03	2801738.49	5.04	3362086.19	6.05	5603476.98	10.09
Non-metallic Mineral Products Manufacturing	533287.73	3.50	888812.89	5.83	1066575.47	7.00	1777625.78	11.66
Basic Metal Industries	211669.37	0.32	352782.28	0.54	423338.73	0.64	705564.56	1.07
Fabricated Metal Products Manufacturing	1152763.67	1.22	1921272.78	2.04	2305527.34	2.45	3842545.56	4.08
Machinery and Equipment Manufacturing and Repairing	857949.79	0.71	1429916.32	1.18	1715899.58	1.41	2859832.64	2.36
Computer, Communications, and Audio and Video Electronic Products Manufacturing	3269597.86	1.42	5449329.77	2.36	6539195.73	2.83	10898659.55	4.72
Electronic Parts and Components Manufacturing	2581846.66	0.63	4303077.76	1.05	5163693.32	1.26	8606155.53	2.10
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	2183908.81	2.37	3639848.02	3.95	4367817.62	4.74	7279696.04	7.90
Transport Equipment Manufacturing and Repairing	669255.72	0.92	1115426.21	1.53	1338511.45	1.83	2230852.41	3.06
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	896815.81	3.33	1494693.01	5.55	1793631.62	6.66	2989386.03	11.11
Other Industrial Products Manufacturing	1442002.35	3.19	2403337.24	5.31	2884004.69	6.37	4806674.48	10.62

Source: Computed by TIER

Note: The percentage refers to the ratio of exports from Taiwanese affiliations in China to total exports from domestic Taiwanese firms.

Table A-3 Taiwan's Imports Made by Taiwanese Firms in China

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	10918918.22	12.22	18198197.03	20.37	21837836.43	24.45	36396394.05	40.74
Food and beverages Manufacturing	213093.13	0.27	355155.21	0.44	426186.25	0.53	710310.42	0.89
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	255074.85	0.75	425124.75	1.24	510149.70	1.49	850249.50	2.49
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	302949.76	1.19	504916.26	1.99	605899.51	2.39	1009832.52	3.98
Leather, Fur, and Related Products Manufacturing	9433.12	0.04	15721.86	0.06	18866.23	0.07	31443.72	0.12
Wood and Bamboo Products Manufacturing	67684.97	0.12	112808.28	0.21	135369.93	0.25	225616.56	0.41
Furniture and Fixtures Manufacturing	161660.57	1.84	269434.29	3.07	323321.14	3.68	538868.57	6.14
Pulp, Paper and Paper Products Manufacturing	70974.20	0.22	118290.33	0.37	141948.40	0.45	236580.67	0.75
Printing and Related Support Activities	103224.06	0.21	172040.10	0.35	206448.12	0.42	344080.20	0.70
Chemical Material Manufacturing	158817.86	1.84	264696.43	3.06	317635.71	3.67	529392.85	6.12
Chemical Products Manufacturing	267727.57	1.29	446212.62	2.15	535455.14	2.58	892425.24	4.30
Petroleum and Coal Products Manufacturing	141.08	0.00	235.13	0.00	282.16	0.00	470.26	0.00
Rubber Products Manufacturing	126802.90	0.35	211338.17	0.58	253605.80	0.70	422676.33	1.17
Plastic Products Manufacturing	492719.53	24.97	821199.21	41.61	985439.06	49.93	1642398.43	83.22
Non-metallic Mineral Products Manufacturing	310809.34	38.22	518015.56	63.70	621618.67	76.44	1036031.12	100.00**
Basic Metal Industries	268582.96	100.00**	447638.26	100.00**	537165.91	100.00**	895276.52	100.00**
Fabricated Metal Products Manufacturing	783879.29	10.42	1306465.49	17.37	1567758.59	20.84	2612930.98	34.73
Machinery and Equipment Manufacturing and Repairing	678548.59	100.00**	1130914.31	100.00**	1357097.17	100.00**	2261828.62	100.00**
Computer, Communications, and Audio and Video Electronic Products Manufacturing	1573877.16	7.80	2623128.60	12.99	3147754.32	15.59	5246257.20	25.99
Electronic Parts and Components Manufacturing	2000531.56	6.70	3334219.26	11.16	4001063.12	13.40	6668438.53	22.33
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	1370115.42	20.58	2283525.71	34.30	2740230.85	41.16	4567051.41	68.60
Transport Equipment Manufacturing and Repairing	570409.01	14.57	950681.68	24.29	1140818.02	29.15	1901363.37	48.58
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	601642.59	3.41	1002737.65	5.69	1203285.18	6.83	2005475.29	11.38
Other Industrial Products Manufacturing	530218.73	100.00**	883697.88	100.00**	1060437.45	100.00**	1767395.75	100.00**

Source: Computed by TIER

Note: * The percentage refers to the proportion of imports from China actually made by Taiwanese affiliations.

TableA-4 Net Impacts on Output Generated by Investments in China ($\rho = 1$)

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-58054652.23	-1.47	-48026204.52	-1.22	-38479362.12	-0.98	-15400721.01	-0.39
Food and beverages Manufacturing	-2353036.38	-0.93	-2293498.49	-0.91	-2193321.96	-0.87	-2027307.79	-0.80
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	-2059581.04	-1.08	-2009178.61	-1.05	-1168501.82	-0.61	-524046.58	-0.27
Apparel, Clothing Accessories. and Other Textile Product Manufacturing	-2375800.87	-3.81	-2295234.71	-3.68	-2287948.81	-3.66	-2148814.60	-3.44
Leather, Fur, and Related Products Manufacturing	-1790320.78	-4.52	-1670058.89	-4.22	-1620661.59	-4.09	-1387293.57	-3.50
Wood and Bamboo Products Manufacturing	-358394.30	-1.78	-298266.20	-1.48	-252444.18	-1.25	-121682.66	-0.60
Furniture and Fixtures Manufacturing	-812076.03	-2.23	-788265.80	-2.16	-785902.68	-2.16	-744643.55	-2.04
Pulp, Paper and Paper Products Manufacturing	-1359766.24	-1.64	-1067442.21	-1.29	-1013314.68	-1.22	-490022.95	-0.59
Printing and Related Support Activities	-641442.35	-1.80	-626436.08	-1.76	-590879.94	-1.66	-542165.41	-1.52
Chemical Material Manufacturing	-2794079.31	-0.86	-1127997.68	-0.35	1074299.65	0.33	5319300.59	1.63
Chemical Products Manufacturing	-2543511.74	-2.84	-1941132.69	-2.17	-1775179.25	-1.98	-660578.53	-0.74
Petroleum and Coal Products Manufacturing	-646527.21	-0.28	-101130.70	-0.04	23864.95	0.01	1016189.58	0.45
Rubber Products Manufacturing	-1495221.05	-4.26	-1329480.93	-3.78	-1286258.87	-3.66	-981210.64	-2.79
Plastic Products Manufacturing	-3923818.54	-2.26	-3302239.87	-1.90	-2883983.24	-1.66	-1569181.03	-0.90
Non-metallic Mineral Products Manufacturing	-1976296.28	-1.73	-2028001.33	-1.78	-1833764.85	-1.61	-1790448.94	-1.57
Basic Metal Industries	-1673850.54	-0.51	-1850132.99	-0.56	880538.95	0.27	2407182.82	0.73
Fabricated Metal Products Manufacturing	-4264863.43	-2.04	-3206513.67	-1.54	-3257313.05	-1.56	-1527263.04	-0.73
Machinery and Equipment Manufacturing and Repairing	-3715932.80	-1.63	-3190597.97	-1.40	-3072580.08	-1.35	-2118343.44	-0.93
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-6292976.61	-1.47	-5865362.94	-1.37	-5606193.14	-1.31	-4720723.83	-1.10
Electronic Parts and Components Manufacturing	-4688823.50	-0.98	-1700090.12	-0.35	-58688.98	-0.01	6016800.74	1.26
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-4881430.49	-2.47	-4277953.25	-2.16	-3853490.47	-1.95	-2564719.89	-1.30
Transport Equipment Manufacturing and Repairing	-2875888.26	-1.14	-2723130.53	-1.08	-2650149.39	-1.05	-2346899.08	-0.93
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-1970619.65	-5.69	-1867020.02	-5.39	-1814537.04	-5.24	-1606882.35	-4.64
Other Industrial Products Manufacturing	-2560394.85	-3.26	-2467038.86	-3.14	-2452951.66	-3.12	-2287966.88	-2.91

Source: Computed by TIER

Note：* The percentage refers to the ratio of output changes derived from investment in China to total output (ΔY/Y).

Table A-5 Net Impacts on Output Generated by Investments in China ($\rho = 0.75$)

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-38647166.64	-0.98	-27863282.51	-0.71	-19071876.54	-0.48	4762200.99	0.12
Food and beverages Manufacturing	-1724848.68	-0.68	-1653576.19	-0.66	-1565134.26	-0.62	-1387385.49	-0.55
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	-1321915.97	-0.69	-1135600.95	-0.59	-430836.75	-0.23	349531.08	0.18
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	-1759887.64	-2.82	-1684821.00	-2.70	-1672035.58	-2.68	-1538400.90	-2.46
Leather, Fur, and Related Products Manufacturing	-1300325.79	-3.28	-1181852.84	-2.99	-1130666.60	-2.86	-899087.52	-2.27
Wood and Bamboo Products Manufacturing	-242308.19	-1.20	-179553.76	-0.89	-136358.07	-0.68	-2970.23	-0.01
Furniture and Fixtures Manufacturing	-602513.68	-1.65	-580293.79	-1.59	-576340.33	-1.58	-536671.54	-1.47
Pulp, Paper and Paper Products Manufacturing	-933211.79	-1.12	-656226.84	-0.79	-586760.24	-0.71	-78807.59	-0.09
Printing and Related Support Activities	-468441.16	-1.31	-448759.39	-1.26	-417878.75	-1.17	-364488.72	-1.02
Chemical Material Manufacturing	-1128464.74	-0.35	765826.31	0.24	2739914.22	0.84	7213124.58	2.22
Chemical Products Manufacturing	-1715550.68	-1.92	-1135710.98	-1.27	-947218.19	-1.06	144843.18	0.16
Petroleum and Coal Products Manufacturing	-317297.37	-0.14	203482.05	0.09	353094.80	0.16	1320802.32	0.58
Rubber Products Manufacturing	-1069175.24	-3.04	-910043.13	-2.59	-860213.06	-2.45	-561772.83	-1.60
Plastic Products Manufacturing	-2682905.08	-1.55	-2043415.19	-1.18	-1643069.78	-0.95	-310356.36	-0.18
Non-metallic Mineral Products Manufacturing	-1446589.35	-1.27	-1461612.90	-1.28	-1304057.92	-1.14	-1224060.51	-1.07
Basic Metal Industries	-616790.53	-0.19	-323270.79	-0.10	1937598.96	0.59	3934045.02	1.19
Fabricated Metal Products Manufacturing	-2946759.98	-1.41	-1985072.59	-0.95	-1939209.60	-0.93	-305821.96	-0.15
Machinery and Equipment Manufacturing and Repairing	-2626111.42	-1.15	-2124884.85	-0.93	-1982758.70	-0.87	-1052630.31	-0.46
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-4548036.59	-1.06	-4112862.43	-0.96	-3861253.13	-0.90	-2968223.32	-0.69
Electronic Parts and Components Manufacturing	-2359083.99	-0.49	654155.13	0.14	2271050.52	0.47	8371045.98	1.75
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-3404087.86	-1.72	-2780156.59	-1.41	-2376147.85	-1.20	-1066923.24	-0.54
Transport Equipment Manufacturing and Repairing	-2100481.47	-0.83	-1948290.03	-0.77	-1874742.61	-0.74	-1572058.59	-0.62
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-1438944.08	-4.16	-1335230.60	-3.86	-1282861.48	-3.71	-1075092.92	-3.10
Other Industrial Products Manufacturing	-1893435.34	-2.41	-1805511.15	-2.30	-1785992.15	-2.27	-1626439.18	-2.07

Source: Computed by TIER

Note：* The percentage refers to the ratio of output changes derived from investment in China to total output (ΔY/Y).

Table A-6 Net Impacts on Output Generated by Investments in China ($\rho = 0.5$)

Unit：Thousands $, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-19239681.06	-0.49	-7700360.51	-0.20	335609.04	0.01	24925123.00	0.63
Food and beverages Manufacturing	-1096660.98	-0.44	-1013653.89	-0.40	-936946.56	-0.37	-747463.19	-0.30
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	-584250.91	-0.31	-262023.29	-0.14	306828.31	0.16	1223108.74	0.64
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	-1143974.41	-1.83	-1074407.30	-1.72	-1056122.34	-1.69	-927987.19	-1.49
Leather, Fur, and Related Products Manufacturing	-810330.80	-2.05	-693646.79	-1.75	-640671.61	-1.62	-410881.47	-1.04
Wood and Bamboo Products Manufacturing	-126222.09	-0.63	-60841.33	-0.30	-20271.97	-0.10	115742.21	0.57
Furniture and Fixtures Manufacturing	-392951.34	-1.08	-372321.78	-1.02	-366777.99	-1.01	-328699.52	-0.90
Pulp, Paper and Paper Products Manufacturing	-506657.34	-0.61	-245011.48	-0.30	-160205.79	-0.19	332407.78	0.40
Printing and Related Support Activities	-295439.97	-0.83	-271082.71	-0.76	-244877.57	-0.69	-186812.03	-0.52
Chemical Material Manufacturing	537149.83	0.17	2659650.30	0.82	4405528.79	1.35	9106948.57	2.80
Chemical Products Manufacturing	-887589.62	-0.99	-330289.27	-0.37	-119257.13	-0.13	950264.89	1.06
Petroleum and Coal Products Manufacturing	11932.48	0.01	508094.79	0.22	682324.64	0.30	1625415.07	0.71
Rubber Products Manufacturing	-643129.43	-1.83	-490605.32	-1.40	-434167.26	-1.24	-142335.02	-0.41
Plastic Products Manufacturing	-1441991.62	-0.83	-784590.52	-0.45	-402156.32	-0.23	948468.32	0.55
Non-metallic Mineral Products Manufacturing	-916882.42	-0.80	-895224.47	-0.78	-774350.99	-0.68	-657672.08	-0.58
Basic Metal Industries	440269.48	0.13	1203591.41	0.36	2994658.96	0.90	5460907.22	1.65
Fabricated Metal Products Manufacturing	-1628656.53	-0.78	-763631.52	-0.37	-621106.15	-0.30	915619.11	0.44
Machinery and Equipment Manufacturing and Repairing	-1536290.04	-0.67	-1059171.72	-0.46	-892937.32	-0.39	13082.82	0.01
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-2803096.57	-0.65	-2360361.92	-0.55	-2116313.11	-0.49	-1215722.81	-0.28
Electronic Parts and Components Manufacturing	-29344.49	-0.01	3008400.37	0.63	4600790.02	0.96	10725291.23	2.24
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-1926745.24	-0.97	-1282359.94	-0.65	-898805.22	-0.45	430873.42	0.22
Transport Equipment Manufacturing and Repairing	-1325074.69	-0.53	-1173449.54	-0.47	-1099335.83	-0.44	-797218.09	-0.32
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-907268.52	-2.62	-803441.17	-2.32	-751185.92	-2.17	-543303.50	-1.57
Other Industrial Products Manufacturing	-1226475.83	-1.56	-1143983.44	-1.46	-1119032.65	-1.43	-964911.47	-1.23

Source: Computed by TIER

Note：* The percentage refers to the ratio of output changes derived from investment in China to total output (ΔY/Y).

Table A-7 Net Impacts on Employment Generated by Investments in China ($\rho = 1$)

Unit: Persons, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-673899	-2.16	-588605	-1.89	-527411	-1.69	-344458	-1.11
Food and beverages Manufacturing	-19078	-1.29	-18595	-1.26	-17783	-1.21	-16436	-1.11
Tobacco Manufacturing	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Textiles Mills	-24790	-1.29	-24183	-1.26	-14064	-0.73	-6307	-0.33
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	-52485	-4.47	-50706	-4.32	-50545	-4.30	-47471	-4.04
Leather, Fur, and Related Products Manufacturing	-21636	-3.17	-20183	-2.96	-19586	-2.87	-16766	-2.46
Wood and Bamboo Products Manufacturing	-7255	-2.00	-6038	-1.67	-5110	-1.41	-2463	-0.68
Furniture and Fixtures Manufacturing	-20098	-3.62	-19509	-3.51	-19450	-3.50	-18429	-3.32
Pulp, Paper and Paper Products Manufacturing	-15803	-2.04	-12405	-1.61	-11776	-1.52	-5695	-0.74
Printing and Related Support Activities	-15693	-2.11	-15325	-2.07	-14455	-1.95	-13264	-1.79
Chemical Material Manufacturing	-8111	-0.90	-3275	-0.36	3119	0.34	15442	1.71
Chemical Products Manufacturing	-28024	-3.41	-21387	-2.60	-19559	-2.38	-7278	-0.89
Petroleum and Coal Products Manufacturing	-1015	-0.48	-159	-0.07	37	0.02	1596	0.75
Rubber Products Manufacturing	-26378	-6.04	-23454	-5.37	-22692	-5.19	-17310	-3.96
Plastic Products Manufacturing	-55066	-2.64	-46343	-2.22	-40473	-1.94	-22021	-1.06
Non-metallic Mineral Products Manufacturing	-24611	-2.13	-25255	-2.19	-22834	-1.98	-22296	-1.93
Basic Metal Industries	-8051	-0.60	-8899	-0.67	4236	0.32	11579	0.87
Fabricated Metal Products Manufacturing	-70629	-2.61	-53102	-1.96	-53944	-1.99	-25293	-0.93
Machinery and Equipment Manufacturing and Repairing	-53214	-1.86	-45691	-1.60	-44001	-1.54	-30336	-1.06
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-59361	-2.34	-55327	-2.18	-52882	-2.08	-44530	-1.75
Electronic Parts and Components Manufacturing	-22057	-0.67	-7997	-0.24	-276	-0.01	28303	0.86
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-42890	-2.33	-37587	-2.04	-33858	-1.84	-22534	-1.22
Transport Equipment Manufacturing and Repairing	-29634	-1.67	-28060	-1.58	-27307	-1.54	-24183	-1.36
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-25837	-5.78	-24479	-5.47	-23791	-5.32	-21068	-4.71
Other Industrial Products Manufacturing	-42184	-4.22	-40646	-4.07	-40414	-4.05	-37696	-3.77

Source: Computed by TIER

Note：* The percentage refers to the ratio of employment changes derived from investment in China to total employment (ΔL/L).

Table A-8 Net Impacts on Employment Generated by Investments in China ($\rho = 0.75$)

Unit: Persons, %

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-468802	-1.51	-380417	-1.22	-322314	-1.04	-136270	-0.44
Food and beverages Manufacturing	-13985	-0.95	-13407	-0.91	-12690	-0.86	-11249	-0.76
Tobacco Manufacturing	0	0	0	0	0	0	0	0
Textiles Mills	-15911	-0.83	-13668	-0.71	-5186	-0.27	4207	0.22
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	-38879	-3.31	-37221	-3.17	-36938	-3.14	-33986	-2.89
Leather, Fur, and Related Products Manufacturing	-15715	-2.3	-14283	-2.09	-13664	-2	-10866	-1.59
Wood and Bamboo Products Manufacturing	-4905	-1.35	-3635	-1	-2760	-0.76	-60	-0.02
Furniture and Fixtures Manufacturing	-14911	-2.69	-14362	-2.59	-14264	-2.57	-13282	-2.39
Pulp, Paper and Paper Products Manufacturing	-10845	-1.4	-7626	-0.99	-6819	-0.88	-916	-0.12
Printing and Related Support Activities	-11460	-1.54	-10979	-1.48	-10223	-1.38	-8917	-1.2
Chemical Material Manufacturing	-3276	-0.36	2223	0.25	7954	0.88	20939	2.31
Chemical Products Manufacturing	-18902	-2.3	-12513	-1.52	-10436	-1.27	1596	0.19
Petroleum and Coal Products Manufacturing	-498	-0.23	320	0.15	554	0.26	2074	0.97
Rubber Products Manufacturing	-18862	-4.32	-16055	-3.67	-15176	-3.47	-9911	-2.27
Plastic Products Manufacturing	-37651	-1.81	-28677	-1.38	-23058	-1.11	-4355	-0.21
Non-metallic Mineral Products Manufacturing	-18014	-1.56	-18201	-1.58	-16239	-1.41	-15243	-1.32
Basic Metal Industries	-2967	-0.22	-1555	-0.12	9320	0.7	18923	1.42
Fabricated Metal Products Manufacturing	-48801	-1.8	-32874	-1.21	-32115	-1.19	-5065	-0.19
Machinery and Equipment Manufacturing and Repairing	-37608	-1.31	-30430	-1.06	-28394	-0.99	-15074	-0.53
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-42901	-1.69	-38796	-1.53	-36423	-1.43	-27999	-1.1
Electronic Parts and Components Manufacturing	-11097	-0.34	3077	0.09	10683	0.32	39378	1.2
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-29909	-1.63	-24427	-1.33	-20877	-1.13	-9374	-0.51
Transport Equipment Manufacturing and Repairing	-21644	-1.22	-20075	-1.13	-19318	-1.09	-16199	-0.91
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-18866	-4.22	-17507	-3.91	-16820	-3.76	-14096	-3.15
Other Industrial Products Manufacturing	-31196	-3.12	-29747	-2.98	-29426	-2.95	-26797	-2.68

Source: Computed by TIER

Note：* The percentage refers to the ratio of employment changes derived from investment in China to total employment (ΔL/L).

Table A-9 Net Impacts on Employment Generated by Investments in China

($\rho = 0.5$)

Unit: Persons,%

	Y*/K							
	1.2 times of Taiwan		2 times		2.4 times		4 times	
	Amount	%*	Amount	%	Amount	%	Amount	%
Manufacturing Total	-263706	-0.85	-172229	-0.55	-117217	-0.38	71918	0.23
Food and beverages Manufacturing	-8891	-0.6	-8218	-0.56	-7597	-0.52	-6060	-0.41
Tobacco Manufacturing	0	0	0	0	0	0	0	0
Textiles Mills	-7032	-0.37	-3154	-0.16	3693	0.19	14722	0.77
Apparel, Clothing Accessories, and Other Textile Product Manufacturing	-25272	-2.15	-23735	-2.02	-23332	-1.99	-20501	-1.75
Leather, Fur, and Related Products Manufacturing	-9793	-1.44	-8383	-1.23	-7743	-1.13	-4966	-0.73
Wood and Bamboo Products Manufacturing	-2555	-0.7	-1232	-0.34	-410	-0.11	2343	0.65
Furniture and Fixtures Manufacturing	-9725	-1.75	-9215	-1.66	-9077	-1.64	-8135	-1.47
Pulp, Paper and Paper Products Manufacturing	-5888	-0.76	-2847	-0.37	-1862	-0.24	3863	0.5
Printing and Related Support Activities	-7228	-0.97	-6632	-0.89	-5991	-0.81	-4570	-0.62
Chemical Material Manufacturing	1559	0.17	7721	0.85	12789	1.41	26437	2.92
Chemical Products Manufacturing	-9779	-1.19	-3639	-0.44	-1314	-0.16	10470	1.27
Petroleum and Coal Products Manufacturing	19	0.01	798	0.37	1071	0.5	2552	1.2
Rubber Products Manufacturing	-11346	-2.6	-8655	-1.98	-7659	-1.75	-2511	-0.57
Plastic Products Manufacturing	-20236	-0.97	-11011	-0.53	-5644	-0.27	13311	0.64
Non-metallic Mineral Products Manufacturing	-11418	-0.99	-11148	-0.97	-9643	-0.84	-8190	-0.71
Basic Metal Industries	2118	0.16	5789	0.43	14405	1.08	26268	1.97
Fabricated Metal Products Manufacturing	-26972	-1	-12646	-0.47	-10286	-0.38	15163	0.56
Machinery and Equipment Manufacturing and Repairing	-22001	-0.77	-15168	-0.53	-12787	-0.45	187	0.01
Computer, Communications, and Audio and Video Electronic Products Manufacturing	-26441	-1.04	-22265	-0.88	-19963	-0.79	-11468	-0.45
Electronic Parts and Components Manufacturing	-138	0	14152	0.43	21642	0.66	50453	1.53
Electrical Machinery, Supplies and Equipment Manufacturing and Repairing	-16929	-0.92	-11267	-0.61	-7897	-0.43	3786	0.21
Transport Equipment Manufacturing and Repairing	-13654	-0.77	-12091	-0.68	-11328	-0.64	-8215	-0.46
Precision, Optical, Medical Equipment, Watches and Clocks Manufacturing	-11895	-2.66	-10534	-2.36	-9849	-2.2	-7123	-1.59
Other Industrial Products Manufacturing	-20207	-2.02	-18848	-1.89	-18437	-1.85	-15898	-1.59

Source: Computed by TIER

Note：* The percentage refers to the ratio of employment changes derived from investment in China to total employment (ΔL/L).

Chapter III

Korean Investment in China and its Impact on the Korean Economy

3.1 Overview of the Study

(1) Purpose

Twenty years after Korean firms first began investing in China from 1988, the country has become one of Korea's most important investment destinations. Cumulative investment in China in late 2006 amounted to 15,909 cases and US$17 billion, comprising 47.7% and 24.4%, respectively, of Korea's total of 33,346 cases of outbound investment amounting to $69.5 billion. Such a rapid rise in investment in China was largely due to the Korean manufacturing sector. As of the end of 2006, 84.2% of Korea's investments in China were in manufacturing.

Overseas investment by Korea's manufacturers was spearheaded in the mid-1980s by labor-intensive light industrial companies aiming to take advantage of inexpensive production factors in Southeast Asia. Footwear, textile, and electronic manufacturers moved in large numbers to the region to escape declining competitiveness at home due to rising labor costs. Korea's Southeast Asian investment at that time took the form of semi-finished and intermediate goods exports to Southeast Asia and finished good exports to third parties, expanding the trade of both home country and host country. The Korean investment was similar to Asian investments by Japanese companies what Kojima(1978) called the "Japanese-style direct investment".

Initial Korean investment in China also began by the transfer of faltering labor-intensive light manufacturing, and was similar to Southeast Asian investment in its creation of China's exports to the industrialized countries. Early investments were from textile and garment companies leveraging cheap Chinese labor, whose products were in turn exported to the United States and other third party markets.

However, China's growth is changing the nature of Korean investment in China. Conglomerates such as Samsung and LG that targeted the Chinese market have seen success with their investments, and most companies are placing more emphasis on the local market than in the past. The changing nature of Korean investment in China has sparked increasing debate and discussion, which is in turn causing the issue of an industrial "hollowing out" of Korea.

The purpose of this chapter is to perform a multidimensional analysis of the status and characteristics of Korean investment in China and its effects on the Korean economy. The second section of this chapter analyzes statistics of Korean investment in China and examines general investment structures in China by Korean corporations. Section 3, "Investment in Chinese manufacturing and the changes in trade structure," analyzes the changes in the trade structure between Korea and China and examines the effects of direct investment by studying intra-industry trade. Section 4 analyzes

employment and sales data for Korean manufactures to determine whether hollowing out is related to manufacturing investment in China. The fifth section lists policy responses as determined by the results of this study.

(2) Methodology and data

Official statistics and various surveys will be used to determine the current status and characteristics of Korean investment in China. First, trends over time, investments by industry, and target regions will be examined via structural analysis. Investment purpose, profitability, raw and secondary material procurement and markets will be studied to determine the management situation. Data produced by the Export-Import Bank of Korea, which disseminated official Korean overseas investment statistics, will be utilized for the above analysis.

The Export-Import Bank publishes two types of official statistics. The first is the "Overseas Investment Statistics Database," an official compilation of direct investment statistics based on data reported by companies that invest overseas. The Overseas Investment Statistics Database provides the numbers and amounts of investments, destination countries, and sectors among other things. In the case of China, EXIM Bank provides the investment statistics by province. The Bank's statistics are used as basic resources for determining the general nature of Korean investment in China, including annual statistics, data per industry, scale and size, and investment by region.

The other set of statistical data compiled by the Export-Import Bank is the "Korea Foreign Direct Investment Local Subsidiary Management Status Analysis," created by organizing the business reports and financial statements submitted in accordance with foreign currency exchange laws by Korean companies carrying out foreign direct investment. This report organizes the management analysis material for companies and provides information on the general status of local subsidiaries, financial status, and sales and purchasing structures. The Export-Import Bank also publishes a separate report titled, "Local subsidiaries of Korean companies in China."[29] The fact that the Bank publishes reports on only larger corporations[30] and does not maintain uniform criteria for the companies it surveys makes the Bank's reports difficult to use in a time series application. More generally, however, one-time sample surveys are used in determining corporate trends and characteristics over time.

In addition to data from the Export-Import Bank, surveys made for individual

[29] Data for China and the United States are published together after fiscal year 2004.

[30] The companies included in the report until 2003 were companies with an investment balance of more than US$10 million, but the list was expanded to companies with over $1 million from 2004. The report covers the years of 2000 and 2002-2005.

researchers and institutions can also be utilized. Although there are surveys conducted by the Korea International Trade Association(KITA), the Ministry of Commerce, Industry and Energy(MOCIE), the Korea Chamber of Commerce and Industry(KCCI), and the Korea Institute for International Economic Policy(KIEP), most of these surveys are one-off events, and thus cannot be readily utilized to determine the changing nature of investment over a period of time.[31] The surveys used mainly for this study include the KOTRA & SERI 2006 survey, conducted jointly by KOTRA, the Korea Economic Daily, and the Samsung Economic Research Institute(SERI). Although KOTRA has conducted similar joint surveys with the Korea Economic Daily in 2004 and 2005, the lack of consistency in these reports mandated the exclusive use of the 2006 survey in which SERI participated. In addition to the fact that these studies were performed only once, the surveys in question also focused primarily on large and healthy companies. Many of the smaller privately held companies, which form the backbone of Korean companies' inroads into China, are thus missing from these surveys.

The transformation of the investment and trade structures of Korean companies is founded upon the presumption that direct investment transforms trade structure. Generally, direct investment expands trade. Thus if Korean direct investment began as a way of utilizing China's inexpensive factors of production, the resulting products would be exported to other countries including Korea. In general direct investment begins some time after trade commences, However Korea's economic relations with China are characterized by the simultaneous commencement of direct investment and trade. Consignment manufacturing took off immediately after the establishment of diplomatic relations between the two nations, with trade taking the form of parts and material exports to China and imports of some finished goods. Considering this relationship, direct investment in China has had a significant effect on trade structure and expansion between Korea and China.

Changes in trade structure were examined by analyzing the share of intra-industry trade, using the methods used by Greenaway, et al. (1995) to calculate one-way trade, vertical intra-industry trade (VIIT), and horizontal intra-industry trade (HIIT). Considering the technological gap between Korea and China, the development of intra-industry trade will likely result from the increasing trade of differentiated products in the same industry which means VIIT. However, Korea's direct investment in China will provide the impetus for another form of VIIT by expanding both exports of parts and raw materials from Korea and imports of finished products.

Despite the active debate on whether manufacturing industry investment in China is

[31] These studies often contain a serious defect, the largest of which is the fact that too few companies are surveyed compared to the large number of companies that have expanded into China. For example, while 15,909 companies have expanded into China to date, the largest study only cites 600 companies.

causing hollowing out in Korea, there is a dearth of studies addressing this issue, and relevant information is difficult to find. This study will thus attempt a micro-analysis, addressing changes in sales and employment levels over time between Korean manufacturing companies investing in China versus those not investing in China. The companies selected for analysis were drawn from the manufacturing companies listed on the Korean stock exchange. Companies whose employment and sales figures could be quantified and compared for 2001, 2003, and 2006 were divided into three categories, with their pertinent data analyzed. The three categories were: "companies investing overseas", "companies not investing overseas", and "companies concentrating more than 50% of their investment in China". The statistics needed for this analysis includes corporate sales figures provided by the "Korea Investors Service Inc.," employment figures which are also important to analyze were compiled from reports submitted to "The Financial Supervisory Service". And corporate investment figures compiled in the Korea Export-Import Bank's "Overseas Investment Statistics Corporate Overview."

3.2 Current Status and Characteristics of Korean Investment in China

(1) Structure of Investment in China

1) Development of investment

Korea's total foreign direct investment for late 2006 amounted to 33,346 cases, amounting to US$69.5 billion. Korean FDI began with investments in Indonesian forestry development in 1968, but remained stagnant thereafter with an annual average of 48 investments and $80 million invested from 1981 to 1985. However, the Plaza Accord of 1985 boosted Korea's foreign direct investment, especially in the manufacturing industry. The meteoric growth of the Korean economy after the Accord, together with rising corporate profits, and higher labor costs, induced apparel, toy, and footwear companies to begin investing in Indonesia, Thailand and other foreign nations. As a result, annual FDI between 1986 and 1990 rose to 152 cases and $468 million, a significant increase compared to five years ago.

International competitive pressure intensified in the 1990s following the signing of the North American Free Trade Agreement, further expansion of the European Union, and the conclusion of the Uruguay Round negotiations. The Kim Young-Sam administration's "globalization policy" and the end of the Generalized System of Preferences (GSP) after Korea joined the Organization for Economic Cooperation and Development (OECD) spurred many companies to engage in foreign investment. In 1994, FDI rose by 116%, from 689 in the previous year to 1,487—with the dollar

amount rising by 82%, from US$12.64 million to $23.04 million. The number of foreign investment cases remained stable until the financial crisis in 1997, but investment rose steadily during the period before the 1997 crisis, exceeding $3 billion in 1995 and rising to $4.5 billion in 1996.

The financial crisis that also hit Southeast Asia in 1997 adversely affected Korean FDI as well. Investments fell to 617 in 1998, less than half those of the previous year. However, the total dollar amount of foreign investments remained unchanged, with large companies continuing their globalization initiatives and compensating for the falling investment levels of small and medium sized business. In addition, companies stepped up their investments to protect businesses already in place overseas. Korean foreign direct investment began to rise again after 1999, exceeding 3,000 cases for the first time in 2004 and rising to 5,185 cases in 2006, breaking the US$10 billion mark.

Table 1. Korea's Global and Chinese Investments by Year

(Unit: case; 1 million US$; %)

	Total		China		Share	
	Cases	Value	Cases	Value	Cases	Value
1990	341	963	24	16	7.0	1.7
1991	444	1,110	69	42	15.5	3.8
1992	497	1,217	170	141	34.2	11.6
1993	689	1,264	382	264	55.4	20.9
1994	1,487	2,304	840	636	56.5	27.6
1995	1,332	3,102	751	842	56.4	27.1
1996	1,472	4,458	740	930	50.3	20.9
1997	1,330	3,710	631	742	47.4	20.0
1998	617	4,812	266	696	43.1	14.5
1999	1,095	3,329	459	366	41.9	11.0
2000	2,082	5,069	774	711	37.2	14.0
2001	2,153	5,164	1,049	639	48.7	12.4
2002	2,490	3,697	1,385	1,028	55.6	27.8
2003	2,809	4,062	1,679	1,666	59.8	41.0
2004	3,764	5,989	2,142	2,298	56.9	38.4
2005	4,389	6,557	2,240	2,647	51.0	40.4
2006	5,185	10,731	2,300	3,310	44.4	30.8
Total	33,346	69,462	15,909	16,981	47.7	24.4

Source: Export-Import Bank Foreign Investment Database.

Korean investment into China first began in 1988, reaching 170 cases and US$1.41 million dollars in 1992, when diplomatic relations were established between the two nations. Subsequent investment in China made up over 50% of Korea's total foreign investments in a number of separate cases until the financial crisis of 1997. China offered a viable alternative to Southeast Asia for Korea's labor-intensive light industrial manufacturing firms. However, the Asian financial crisis hit investment in China hard, as the mainly small and medium sized companies that made up the bulk of Korean companies investing in China suffered from the ensuing economic downturn. As a result,

the number of investments fell between 1998 and 2001, with the percentage of total investment falling around the 10% range.

Korea's direct investment in China underwent another transformation after China joined the WTO in 2002. Investment in China exceeded 1,000 cases for the first time in 2001, with the dollar amount breaking the US$1 billion mark for the first time, at $1,028 million in 2002. The share of investment in China among total foreign investment began to rise again, reaching 59.8% of total cases in 2003 and 41.0% of the total amount. It can be surmised that numerous companies increased their investments to take advantage of China's new status as a member of the World Trade Organization. Since 2004, investment in China has shown relative stability, with the Chinese share falling again as well. This recent phenomenon is more pronounced in the dollar value of investments, with share of investments at 44.4%, but with the dollar value thereof falling to 30.8%.

However, China's own figures for Korean investment in the nation show significant discrepancies with the Korean data. China estimated Korea's investment to be US$3.89 billion in 2006. According to this data, Korea's investment in China, which amounted to only $40 million in 1991, rose to $1.04 billion in 1995 and $6.25 billion in 2004. In 2004, Korea's investment in China exceeded the total amount of investment in China from all of East Asia, except Hong Kong, showing that despite a decline in 2005-2006, Korea's investments still exceed those of Taiwan, Singapore and the United States. Table 2 below indicates that while Korea's investment began later than other nations, the dollar amount increased rapidly. The table also indicates that Korea's investment in China does not lag far behind nations with much larger economies, such as Japan and the United States.

Table 2. Investment Inflow into China by Nation

(Unit: US$ billions)

	1991	1995	1998	2000	2001	2002	2003	2004	2005	2006
Korea	0.04	1.04	1.80	1.49	2.15	2.72	4.49	6.25	5.17	3.89
Taiwan	0.47	3.16	2.92	2.30	2.98	3.97	3.38	3.12	2.15	2.14
HK	2.41	20.06	18.51	15.50	16.72	17.86	17.70	19.00	17.95	20.23
Japan	0.53	3.11	3.40	2.92	4.35	4.19	5.05	5.45	6.53	4.60
Singapore	0.06	1.85	3.40	2.17	2.14	2.84	2.05	2.01	2.20	2.26
US	0.32	3.08	3.90	4.38	4.43	5.42	4.20	3.94	3.06	2.87
Others	0.54	5.22	11.53	11.95	14.08	15.74	16.63	20.86	23.26	27.03
Total	4.37	37.52	45.46	40.71	46.85	52.74	53.51	60.63	60.32	63.02

Source: China Ministry of Commerce.

2) Investment classification by industry

Classified by industry, 84.2% of Korean investment in China in 2006 was made by the manufacturing industry, comprising $14.3 billion of the total investment in China of $17 billion. This represents a much higher concentration of manufacturing in China when compared to the overall 57.1% share for Korea's manufacturing industry in Korea's foreign direct investment (52.8% by dollar value).

The high relative share for the manufacturing industry in China stems from the pursuit of cheaper factors of production, i.e., lower labor costs in China. In the early stages of the investment in China, the primary aim for Korean companies in China was the production of goods using Chinese labor resources to export finished goods to third party nations. In addition, China's reluctance to invite service sector investments also resulted in a relatively heavy presence for the manufacturing industry in China.

In the manufacturing industry, electronics and communications equipment comprises the largest percentage at 26.8%, with transportation equipment at 13.1% followed by petrochemicals and textiles, each comprising 10.8% of the total. In the number of investment projects, the textile and garment industry takes up 18.7% of the total number of manufacturing industry investments, with electronics and communications equipment taking 14.0%, indicating that investment projects from the textile industry are comparatively small in scale.

Table 3. Investments by Industry

(Unit: US$ millions)

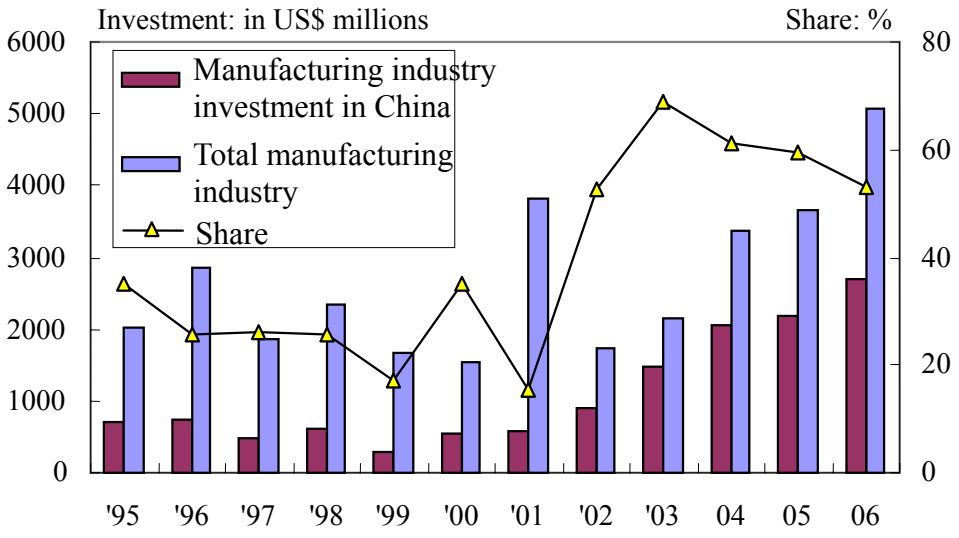
	2000	2001	2002	2003	2004	2005	2006	Cumul-ative
Agriculture & Fishery	1	2	4	5	11	10	13	73
Mining	-	-	-	8	3	14	20	59
Manufacturing	543	593	914	1,488	2,069	2,172	2,691	14,294
Construction	16	-	30	12	35	62	71	394
Wholesale & retail	50	14	24	73	90	208	240	828
Logistics & warehousing	22	2	5	4	2	27	11	124
Communications	4	-	-	7	-	-	-	95
Finance & insurance	-	-	-	-	-	-	-	1
Food & lodging	58	3	5	6	20	25	23	329
Service	13	23	41	46	59	96	170	476
Real estate	3	-	4	16	8	31	69	308
Misc.	-	-	-	-	-	-	-	1
Total	711	639	1,028	1,666	2,298	2,647	3,310	16,981

Source: Export-Import Bank of Korea.

China's share of manufacturing investment out of Korea's total overseas manufacturing industry investment has fluctuated, but shows an overall increase over the years. Korea's manufacturing investment spiked in 2001 due to the overseas investments of a single conglomerate that year, resulting in the share of investment in China falling to 10%. However, after China joined the WTO in 2001 the China's share of manufacturing investment again rose to 52.4%, rising to 68.9% in 2003. Since then, the share has fallen to the 50% range and has remained stable thereafter.

The concentration of manufacturing investment in China has spawned worries over industrial hollowing out in Korea. China's industrial technology is developing at a rapid pace, with Western, Japanese and Taiwanese companies increasing their investments in China in order to dominate the Chinese domestic market. In order to secure a competitive edge in the Chinese market, Korean companies must maintain production quality levels that do not lag behind those of the home country. Korean manufacturers must also encourage parts and components manufacturers to move production facilities to China, leading to a shift in the Korean parts and components industry as well.[32] This will in turn result in the weakening of the manufacturing industry in Korea.

Figure 1. Share of Manufacturing Industry Investment in China



Source: Export-Import Bank of Korea.

3) Investments by scale of investors

Investments in China can also be examined by classification based on company size.

[32] Investment risk has been increasing recently, as China has been reducing investment incentives for labor-intensive industries. Experts in Korea are also calling for the expansion of investments into India and Vietnam in order to reduce the Korean economy's dependence on China.

Accumulated investments in late 2006 amounted to 733 cases by large enterprises, 9,650 by small and medium enterprises (SMEs), and 5,526 by individuals or individual enterprises, comprising 4.6%, 60.7%, and 34.7%, respectively. In dollar amount, large enterprises took up 51.3% of the total with US$8,706 million, while SMEs took up 42.7%, or $7,254 million. Individuals or individual enterprises invested 6.0%, or $1,021 million.

Investments organized by year show that investment cases by individuals and individual enterprises between 2005 and 2006 comprised over 50% of the total, marking a significant rise, with the total dollar amount for 2005 and 2006 exceeding the entire investment amount of the preceding years. This appears to be the result of broadening of investment from large companies to smaller individual enterprises that are benefiting from better investment information.

Table 4. Investment in China According to Investing Entity

(Unit: US$ millions)

	Number of investment cases				Investment value			
	Large enterprises	SMEs	Others	Total	Large enterprises	SMEs	Others	Total
-1995	240	1,886	115	2,241	951	971	27	1,949
1996	72	495	173	740	562	342	26	930
1997	45	450	136	631	535	185	21	741
1998	18	179	69	266	595	92	8	695
1999	11	283	168	462	253	96	16	365
2000	16	558	200	774	487	201	23	711
2001	25	745	279	1,049	301	299	39	639
2002	46	935	404	1,385	497	473	59	1,029
2003	55	1,134	490	1,679	754	827	86	1,667
2004	68	1,098	976	2,142	957	1,163	179	2,299
2005	75	937	1,228	2,240	1,156	1,249	242	2,647
2006	62	950	1,288	2,300	1,658	1,356	295	3,309
Total	733 (4.6)	9,650 (60.7)	5,526 (34.7)	15,909 (100.0)	8,706 (51.3)	7,254 (42.7)	1,021 (6.0)	16,981 (100.0)
Korea Total	10.4	53.2	36.4	100.0	69.7	25.7	4.6	100.0

Source: Export-Import Bank of Korea.

Figures for the end of 2006 show that large enterprises comprised 10.4% of total Korean outward investment; with SMEs taking up 53.2%, and others accounting for the remaining 36.4%. In terms of dollar amounts, large enterprises were responsible for 69.7% of total overseas investment, with SMEs contributing 25.7% and others the remaining 4.6%. In other words, Korean investment in China shows a relatively small presence of large enterprises compared to overall overseas investment. However, a comparison of the number of investment cases to dollar value reveals that the scale of Korean large enterprises' investment in China is higher compared to overall overseas

investment. These figures indicate that SMEs are relatively well represented in the number of investments in China, while large enterprises tend to make comparatively larger investments.

The change in scale over time is especially noteworthy. The average dollar amount per project in 2006 was US$1.44 million, a significant increase over the 2001 figure of approximately $610,000. This increase was especially significant for large enterprises, rising from $12.04 million in 2001 to $26.74 million in 2006.

4) Investment by region

Korean companies are concentrating their investments in the Yellow Sea coastal region. The investment balance at the end of 2006 by Korean companies shows a 35.9% concentration in Shandong province, and a 20.1% concentration in the Beijing-Tianjin-Hebei region. Investment is highest in Liaoning province among the three provinces of the Dongbei Tri-province Region, and it can thus be said that Korean investment is mainly concentrated in the eastern coastal region. By dollar amount, investments in the Shandong province comprise 26.7% of the total, followed by 22.1% in the Beijing-Tianjin-Hebei region and 11.6% in the Dongbei Tri-province Region. Investment in the Yangtze Delta and the Pearl River Delta (Guangdong province) amounts to 17.5% and 3.0% by case, and 31.6% and 3.8% by investment amount, respectively.

Although the Pearl River Delta region is one of the three major economic zones in China, the geographical proximity of the Shandong region appears to be the reason why Korean investment in the region is higher than that in the more distant Pearl River Delta region. It is noteworthy that investments in the Shandong region display a lower dollar value compared to the number of cases, indicating that smaller projects are concentrated in this region compared to the rest of China. SMEs have established clusters of Korean manufacturing facilities in Yan Tai, Qingdao and other coastal cities in Shangdong province in order to take advantage of lower labor costs in producing consumer goods.

Another interesting observation emerges from an examination of Korean corporate investment by region. First, investments are shifting from the northeastern regions and the Yellow Sea coast which were traditional destinations for investment, into the Changjiang Delta, indicating that factors other than geographical proximity and cultural familiarity are driving the investment pattern. As the Yangtze Delta region, which includes the vibrant city of Shanghai, becomes the center of Chinese economic development and the site of industrial concentration and outward orientation, Korean companies are shifting their investment into this area. Since 2000, more than 20% of total investments by case are being funneled into the Changjiang Delta region, with

dollar amounts rising to a high of 34.2% in 2002-2004 and 37.3% in 2005-2006. While investment in the Shandong region by the number of cases is remaining stable at over 35%, investment dollar amounts are continuing a downward trend. Investments in the Dongbei Tri-province Region are also falling in terms of both the number of cases and dollar value thereof.

Table 5. Korean Manufacturing Industry Investment in China by Region

(Unit: %)

	Case						Amount					
	-92	93-97	98-01	02-04	05-06	Total	-92	93-97	98-01	02-04	05-06	Total
Dongbei Tri-province Region	33.2	37.3	26.2	14.9	16.4	22.1	22.3	19.8	12.3	9.2	8.2	11.6
Beijing-Tianjin	17.3	19.0	15.0	18.4	20.1	18.5	25.3	20.7	24.7	22.0	21.9	22.1
Shandong	35.8	28.4	39.5	38.6	36.5	35.9	36.2	28.4	29.5	26.1	24.7	26.7
Yangtze Delta	7.0	10.3	14.4	21.2	20.7	17.5	8.1	24.8	24.1	34.2	37.3	31.6
Guangdong	4.8	2.1	2.4	3.8	3.0	3.0	6.0	3.3	4.7	4.2	3.3	3.8
Others	1.8	2.9	2.5	3.1	3.3	3.0	2.1	3.0	4.7	4.4	4.6	4.2

Source: Export-Import Bank Foreign Investment Database.

Second, it is noteworthy that investment amount per case in the Yellow Sea coastal region is falling, while it is rising for investment in the Yangtze river Delta region. The size of the investment per case exhibits almost a twofold difference between the two regions. This indicates that investments in the Shangdong province consist largely of labor-intensive third country exports, while large enterprises are increasing their investments in the new growth regions of the Yangtze Delta region that includes Shanghai and Jiangsu province.

(2) Management of Korean Investment Companies

1) Goals for investing in China

Two methods can be employed to determine the motives behind the expansion of Korean companies into China. The first is through an examination of their motivations as reported at the time of the investment, and the second is a survey of the investment motives of companies currently conducting production activities. The former was published by the Export-Import Bank for the period between 2003 and 2004.[33] Among a total of 1,701 cases of investment in China during 2003 organized according to purpose, utilization of low labor costs was reported as the primary motivation in 634 cases or 37.3%, followed by export promotion in 545 cases or 32%. Among companies

[33] Export-Import Bank of Korea, "*Analysis of Management Status of Korean Corporate Subsidiaries in China: Fiscal Year 2002*," February 2004, p. 9, and "*Analysis of Management Status of Korean Corporate Subsidiaries in China: Fiscal Year 2003*," p. 9.

that filed such reports in 2004 for a total of 2,233 cases, 616 companies cited export promotion for 27.6% of the total, and 840, or 37.6%, cited low labor costs as their primary motive.

A survey of manufacturing companies conducted by MOCIE showed that Among the reported investments in China between January and September of 2003, 36.6% of companies cited development of the local market as their primary motivator, followed by cost control (including labor costs) (35.7%), and partners moving overseas (15.2%). Among large enterprises surveyed by the ministry, 63.6% of companies cited local market development as their goal, which was significantly higher than the responses among SMEs(34.5%) that cited the same reason.

Another source of data is the surveys conducted by the Export-Import Bank of companies currently operating in China. In a survey of 463 companies whose investments in the fiscal year of 2004 exceeded $1 million, (the survey allowed multiple responses), market orientation was the highest at 39.4%, followed by 31.0% who cited labor and other factors. Among companies who cited market orientation, 51.8% aimed for the domestic market in the host country, 27.5% for third party countries, and 20.6% for exports back to Korea. Among the companies that were production factor- oriented, production cost-reduction was the primary goal.[34]

Table 6. Major Surveys for Motivating Factors for Corporate Expansion into China

Survey	Company size	Cost factors	Market factors	Notes
Ministry of Commerce, Industry and Energy (2003)	Total	Labor and other cost factors (35.7%)	Local market development (36.6%)	959 manufacturing industry investments
	Large enterprises	13.6%	63.6%	
	SMEs	37.0%	34.5%	
KOTRA (2004)	Total	Secure low labor costs (25.8)	Exploitation of local market (26.8)	529 Companies with 693 multiple responses
	Large enterprises	16.3%	34.9%	
	SMEs	28.2%	24.7%	
KIEP(2004)	Total	Low labor costs+ manpower (36.2%)	Expansion into the local market (25.6)	298 companies with multiple responses
	Large enterprises	26.6	45.3	34 (part of 30 major corporate groups)

Source: Ministry of Commerce, Industry and Energy, September 2003, "Analysis of Overseas Manufacturing Industry Investment Status and Practices," pp. 4-5; KIEP,

[34] Export-Import Bank of Korea, "*Analysis of Management Status Korean Corporate Subsidiaries in China and the U.S.: Fiscal Year 2004*," p. 83.

"Management Status and Suggestion for Companies Investing in China," *Policy Analyses* 04-14; and Korea Trade-Investment Promotion Agency, *Survey on Management Status of Korean Companies Investing in China*.

A survey conducted by KOTRA in 2004 drew 529 responses and revealed that 26.8% of companies cited the local market as their primary motive, followed by 25.8% that pursued low-cost labor, 13.1% that cited raw material procurements, and 10.0% that cited the worsening business environment in Korea. Unfortunately, this survey does not include specific responses for motivations for overseas investment.

According to a survey conducted by the Korea Federation of Small and Medium Business in December 2003, targeting only SMEs, 43.7% of surveyed companies cited cost reduction, followed by 33.9% citing overseas market development and strategic partnerships, and 12.5% citing manpower shortages in Korea. Although this survey was limited to SMEs and only 63 companies responded to the survey, the results indicate a stronger desire for cost reduction compared to the results found in the Export-Import Bank survey, indicated that SMEs are more sensitive to production costs.

Since it could be assumed that these goals and motivations could change over time, there has not been a survey to date that carried out a systematic and uniform study of investment motivations. Fortunately, the Federation conducted a survey before and after the financial crisis on the motivations for overseas expansion. The results of this survey indicate that cost reduction as a motivation rose by 1.3 percentage points after the financial crisis, but overseas market development and strategic partnerships rose by 12.1% as the prime motivator. Thus, as time passes, investment in China is shifting away from a desire for simple cost reduction towards investment into development of the host market.[35]

2) Profitability and growth potential

There are numerous resources on the profitability of companies that have expanded into China. According to the KOTRA & SERI 2006 survey, corporate management conditions in China are on average favorable. Among the 506 companies that responded to the survey, 40.3 reported "slight profits," followed by 29.8% that reported "balanced operations," 23.3% reported "slight losses," 3.4% companies reported "large losses," and the remaining 3.2% reported "large profits." According to statistics compiled by the Export-Import Bank, 289 out of 598 companies surveyed reported net profits during the 2005 fiscal year, with the remaining 309 reporting losses. These figures indicate that about half of the Korean companies in China are operating at a loss.

[35] Korea Federation of Small and Medium Business, January 2001, *Management Environment and Investment Satisfaction Survey for Companies Investing in China*, p. 8.

However, it is highly likely that the companies that responded to this survey are the ones who are faring relatively well. In the case of the Export-Import Bank, only companies with investments of over US$1 million were involved, and the results are probably more positive then they actually are. Unofficial evaluations of SMEs' operating conditions in China are bleaker, with the most-often heard comment being, "Korean companies in China are fleeing in the dead of night."

The total net profits of Korean companies invested in China that were in the black during the 2005 fiscal year, as surveyed by the Export-Import Bank, amounted to US$1.11 billion, with the total losses of companies that operated at a loss being $610 million, for a total net profit of $510 million.[36] The largest net profit was reported by the Beijing subsidiary of Hyundai Motors at $170 million, with Samsung Electronics' subsidiaries also reporting large profits. BOE Hydis, a Korean TFT-LCD manufacturer, reported the largest net loss at $50.08 million. POSCO's cold strip plant in Jiansu province reported a loss of $43.66 million, and the company's cold strip product plant in Shandong province also reported a loss of $20.58 million. These net losses by POSCO's subsidiaries appear to result from the fact that the company's large investments in the region are still in their early stages of operation.

Overall business success appears to have been achieved mostly by individuals and individual enterprises, followed by large enterprises and SMEs. Only seven individuals or individual enterprises were surveyed, rendering some of the results somewhat unreliable (with one company's figures overshadowing those of the rest). SMEs reported an average gross margin of 7.5%, with an operating profit of 0.2% and an ordinary profit of 0.2%, significantly lower than the corresponding figures for large enterprises, which were 10.9%, 1.7% and 1.7%, respectively.

The Export-Import Bank also compiles management analysis results for companies that report management information for three consecutive years. While only 52 companies were surveyed for this report, the changes over the survey period offer valuable insights into growth and profitability trends. The sales for these companies amounted to US$8,974 million in 2003, $12,054 million in 2004, and $15,374 million in fiscal year 2005, indicating a relatively favorable rate of increase of 34.3% in 2004 and 27.5% in 2005. Low rates of sales growth were reported by textile, leather and bag manufacturers, but communications equipment and automobile manufacturers enjoyed higher rates of growth.

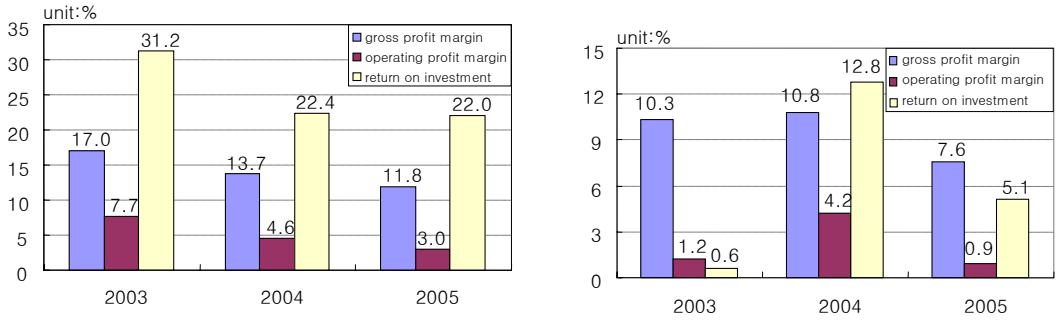
The gross margin for 2005 reached US$2,050 million for a growth rate of 13.3%. Operating profits fell by 16.8% to $464 million. Gross profit fell during the three years surveyed, from 17% in 2003, to 13.7% in 2004, and 11.8% in fiscal year 2005.

[36] Export-Import Bank of Korea, 2005, p. 21.

Operating profits also fell from 7.7% in 2003, to 3.9% in 2005. Return on investment (for every industry) reached 31.2% in 2003 and fell to 22.0% in 2005, still maintaining a relatively high level. Worsening profits for large enterprises operating in China are widely attributed to competitive pressures in China.

However, despite falling profitability, investment in China still exhibit higher returns than investment in the United States. Korean companies in China revealed significantly higher gross profit margins and operating profit margins than in the United States where 12 subsidiaries were surveyed, along with higher return on investment ratios.

Figure 2. Profit and loss for Korean manufacturers in China and the United States



Note: Return on investment is the ratio of investment returns (net profit + interest on loans + royalty) / investment balance

Source: Export-Import Bank, *Fiscal Year 2005 Management Analysis for Foreign Direct Investment in China and the U.S.*, December 2006.

3) Market conditions

Statistics compiled by the Export-Import Bank reveal that the sales ratios of Korean subsidiaries with more than US$1 million in investment in the Chinese market were 51.0% in fiscal year 2005, with 36.3% for the third countries. The Chinese domestic sales ratio for the manufacturing industry was 54.4%, with 30.7% for exports to third party countries. Shares of Chinese market increased from 2004's 48% local sales rate, and 37.1% export rate.

The local sales ratio of large enterprises in the total industry is 49.7%, with 61.6% for SMEs and 88.5% for other companies (individuals or individual enterprises) in 2005. Exports to third party nations were highest for the subsidiaries of large enterprises at 39.2%, significantly higher than the 13.5% rate for SMEs, indicating the reliance of SMEs on the domestic market. Large enterprises, on the other hand, target both the Chinese domestic market and overseas markets for their sales. This phenomenon indicates that the majority of Korean SMEs have expanded into China in order to produce and supply parts and components or intermediate goods to the subsidiaries of

major Korean corporations operating in China.

A comparison of sales between affiliated (parent company and group affiliates) and non-affiliated companies indicates that only a quarter of sales in China can be attributed to affiliated firms, but 90% of exports to Korea were made by affiliates. This indicates that there is active trade between subsidiaries and their parent companies in Korea. Some companies may rely on Chinese facilities for the production of low- and medium-cost goods, while some may rely entirely on Chinese production, maintaining only the brand in the home country. It is also noteworthy that sales to affiliates contributed 63% of exports to third party nations.

Table 7. Local subsidiary sales by region

(Unit :%)

	FY 2004				FY 2005			
	China	Korea	Others	Total	China	Korea	Others	Total
Total industry	49.4	14.5	36.2	100.0	51.0	12.6	36.3	100.0
− Large enterprises					49.7	11.1	39.2	100.0
− SMEs					61.5	25.0	13.5	100.0
− Individuals					88.5	9.0	2.5	100.0
Manufacturing	48.0	14.9	37.1	100.0	54.4	14.8	30.7	100.0
− Affiliates	25.4	92.7	71.5		26.4	90.2	63.0	
− Non-affiliates	74.6	7.3	28.5		73.6	9.8	37.0	
− Electronics and communications	31.8	17.6	50.6	100.0	30.1	19.1	50.8	100.0
− Automobiles	93.2	2.6	4.2	100.0	96.3	1.1	2.6	100.0
− Basic metal	88.5	5.4	6.1	100.0	89.8	6.7	3.5	100.0
− Textiles, garments and footwear	35.3	12.2	52.5	100.0	16.0	46.5	37.5	100.0

Source: Export-Import Bank o Korea.

Electronics and communications, the industry with the highest sales, exported 50.8% of its production to third party nations, with a domestic sales ratio of 30.1%. Automobiles and basic metals exhibit much higher ratios of domestic sales, these industries mainly produce materials and non-traded goods. On the other hand, the textile, garment and footwear industry is a prime example of a labor-intensive light industry, whose products are mainly exported to Korea or other third party nations. These industries have lost competitiveness in Korea and were thus outsourced to China.

4) Procurement conditions

Statistics compiled by the Export-Import Bank show that Korean companies in China

acquired 40.8% of their parts and components and intermediate goods from China in fiscal year 2005, with 42.9% imported from Korea and 16.3% from other nations. These statistics show that imports from Korea fell and those from third party nations rose compared to 2004. Manufacturing companies have the heaviest reliance on local materials at 44.5%, an increase of over 38.9% in 2004.

Among materials acquired in China, 80.4% were procured from non-affiliated firms, indicating a very high reliance on local Chinese companies for parts and components and an increase over the 77.4% figure of 2004. Around 90% of materials and parts imported from Korea were from parent or affiliated companies in the group, indicating that the majority of Korean exports to China are intra-firm trade.

Within the manufacturing sector, electronics and communications firms showed an import reliance of 51%, with 28.4% of materials etc. acquired in China and 20.6% from other third party countries. These figures reveal an increase in imports from other nations, reflecting the recent fragmentation and industrial specialization trends in East Asia led by the electronics industry. In contrast, automobile companies acquired 71.4% of their materials and parts locally, a significant increase over the 54.2% figure in 2004 and an indicator of increasing localization of parts. The basic metals industry relies almost entirely on imports from Korea for its raw materials, which it then processes in facilities in China.

Table 8. Purchasing by Region for Local Manufacturing Subsidiaries in China

(Unit :%)

	Fiscal year 2004				Fiscal year 2005			
	China	Korea	Others	Total	China	Korea	Others	Total
Total industry	40.8	48.8	10.4	100.0	40.8	42.9	16.3	100.0
− Large enterprises					40.1	42.3	17.6	100.0
− SMEs					46.3	49.0	4.7	100.0
− Individuals					96.6	3.4	0.0	100.0
Manufacturing	38.9	51.3	9.9	100.0	44.5	39.9	15.6	100.0
− Affiliates	22.6	89.5	34.6		19.6	90.6	47.4	
− Non-affiliates	77.4	10.5	65.4		80.4	9.4	52.6	
− Electronics and communications	34.4	55.6	9.0	100.0	28.4	51.0	20.6	100.0
− Automobiles	54.2	44.8	1.0	100.0	71.4	28.0	0.6	100.0
− Basic metals	29.1	70.9	0.0	100.0	36.2	62.3	1.5	100.0
− Textiles, garments and footwear	25.7	52.2	22.1	100.0	26.4	54.9	18.7	100.0

Source: Export-Import Bank of Korea.

Korean investment has resulted in a rapid increase in export creation effects over the past several years. As large enterprises expand their investments, exports to local

subsidiaries in China have increased as well. These exports rose significantly after 2003 and reached over 200% of the investment balance in 2004. The rapid increase in exports in 2004 and a slower rise in imports during the same period resulted in a favorable trade balance of 160% of outstanding investment.

However, this situation changed in 2005 as exports to local subsidiaries fell and imports rose to produce a lower trade surplus at 103.3% of accumulated investment. Falling exports to local subsidiaries was the result of a higher local reliance on parts and components. Coupled with rising imports, this new trend produced a lower trade surplus.

Table 9. Trade Creation Effect of Companies Operating in China

(Unit: US$ million; %)

	Outstanding investment (A)	Exports to subsidiaries in China		Imports from subsidiaries in China		Trade balance effect (B/A)-(C/A)
		Amount (B)	Export creation (B/A)	Amount (C)	Import creation (C/A)	
2000	1,439	1,225	85.1	1,139	79.2	6.0
2002	1,869	1,481	79.2	1,260	67.4	11.8
2003	2,037	3,732	183.3	2,203	108.2	75.1
2004	4,597	11,457	249.2	4,068	88.5	160.8
2005	6,218	11,160	182.4	4,841	79.1	103.3

Source: Export-Import Bank of Korea.

Box 1. Case of S Co: Parts and components procurement

"S" Corporation's local electronics subsidiary in Suzhou manufactures refrigerators, washing machines and air-conditioners. The company began its investment in China in 1996 by producing refrigerators. The company currently supplies its products to third party countries as well as to the Chinese domestic market. Currently, in April 2007, the company acquired 85-90% (based on cost) of its parts and materials locally, with the remaining 15-20% imported from Korea. In addition, some of the chemicals and other imports from Korea will soon be acquired locally. The company purchases 40% of its materials from some 41 parts manufacturers who have moved to China from Korea, and the remaining 60% from some 240 Chinese companies. Among the 41 component manufacturers that have expanded into China, 15 set up their operations before the year 2000, around 20 had done so by 2003 and the rest had done so by 2004. These companies each employ around 300-500 workers in their Chinese facilities. These companies deal almost exclusively with "S" Corporation, as Chinese companies maintain a practice of offering payment only after the sale of their finished goods. Around 350 primary vendors used to supply parts and materials to "S" corporation in Korea, but companies that have not followed "S" to China are facing severe difficulties, while the 41 companies that have established operations in China have severely scaled back their home operations or switched to other businesses.

- Interview with a local company official on April 6, 2007

5) Production and technological management

According to the KOTRA & SERI 2006 survey, 37.4% of Korean companies that have invested in China produced "growth stage products", while 40.5% produce "maturity stage goods". Products in the "decline stage" amounted to 14.9%, but 7.2% were still in the "introduction stage." The production of introduction and growth stage products indicates that the product lines of the parent company and the subsidiary do not differ.

In setting up production facilities, 37.1% were new facilities brought in from Korea, 36.3% were Chinese facilities, and 18.1% were constructed from used equipment brought in from Korea. Only 3.5% of surveyed companies used facilities acquired from other nations, and the remaining 5.1% were from other sources. This represents a drop in second-hand facilities brought from Korea, as the response to the 2005 KOTRA survey was 25.6%. The fact that 37.1% of facilities were newly transferred from Korea indicates the ease of technological transfer between the two nations.[37]

In a survey of 464 companies, 45.4% responded that they maintained a research and development facility in China, with 54.6% responding in the negative. Regarding plans to operate a development-related body, 35.7% of companies responded that they are already operating such a department, while 13.7% responded that they were planning to create a development body within one year, with 20.3% planning to create one within two to three years. However, 27.1% of companies surveyed responded that no such plans existed for their companies.

The majority of companies in China acquire their technology from their parent companies in Korea. Among 393 companies, 68.0% received their technology from parent companies in Korea, with 17.8% utilizing locally developed technologies. In addition, 24.4% of surveyed firms believed that technology transfers to China are highly likely to enhance the competitiveness of Chinese firms in the industry and eventually act as a detrimental factor to Korean firms, while 39.9% responded that such possibilities are unlikely. Among 465 companies surveyed, only 13.3% responded that their technological competitiveness over Chinese companies will continue, while 66% responded that Chinese companies will achieve equal footing within three years.

[37] A large part of industrial technology is embodied in machinery. New facilities acquired by the subsidiary for production will result in a transfer of technology.

6) Sales and employment changes at Parent companies

Investment in China will inevitably affect employment and production in Korea. Although Korean companies can enhance the efficiency of their Korean operations by making investments in China, leading to increased production and employment, a more realistic assessment would be that Chinese and Korean production are probably in a "replacement" relationship, and that employment and production in Korea may drop. This section will examine whether investment in China by major Korean manufacturers is in fact affecting employment and production at home.

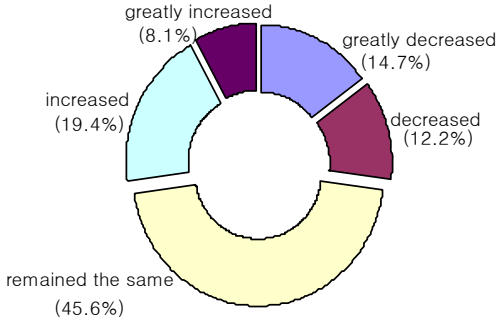
In general, if export-oriented companies that have expanded into China to cut costs transfer their production facilities, domestic production will contract and employment will fall. The decision by companies investing in China in order to develop the local market, whether to produce differentiated products or products similar to those in the home market, will produce different effects. If the company decides to produce different goods, and thus concentrates on producing high value-added goods in Korea and standardized goods in China, production levels in Korea may actually rise. However, since labor-saving production methods will probably be adopted for more expensive goods, employment elasticity will decrease. If the firm decides to produce similar goods in both markets for the sole purpose of avoiding tariffs, exports to China, domestic production, and employment, will all decrease. SMEs that have expanded into China in order to supply final assembly firms with parts and components may decide to completely transfer their production facilities to China. Even if such extreme measures are not employed, domestic production and labor will decrease in most cases.

The KOTRA & SERI 2006 survey reveals an interesting effect of the investment in China on Korean production and employment. First, large numbers of respondents stated that home office sales did not change very much as production began in China, leading to decreasing production levels at home. Among 360 companies who responded, 14.7% stated that sales had "greatly decreased," while 12.2% said that sales had "decreased." However, 8.1% and 19.4% of respondents replied that sales "greatly increased" or "increased," respectively, indicating that the majority of respondents felt that overall sales increased.

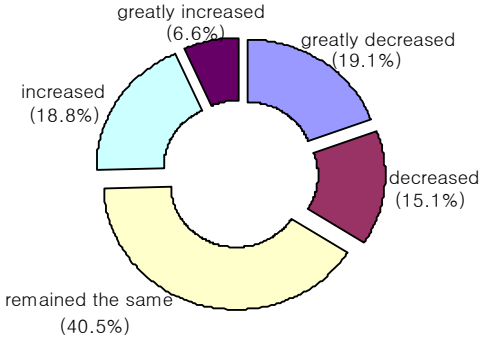
On the other hand, among the 351 companies that responded to questions about the scale of production, 19.1% and 15.1% replied that production "greatly decreased" or "decreased," respectively, for a total of 34.2%—with 6.6% responding that production "greatly increased" and 18.8% responding that production "increased," for a total of 25.4%. More respondents stated that production fell than rose. This stands in contrast to the responses for sales, which showed a slight increase, indicating that while production levels decreased in Korea, product differentiation led to the production of higher-value

more expensive goods.

Figure 3. Sales and production changes for companies investing in China



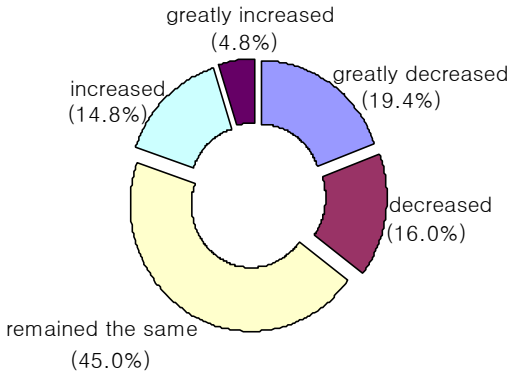
Note: 360 companies responding



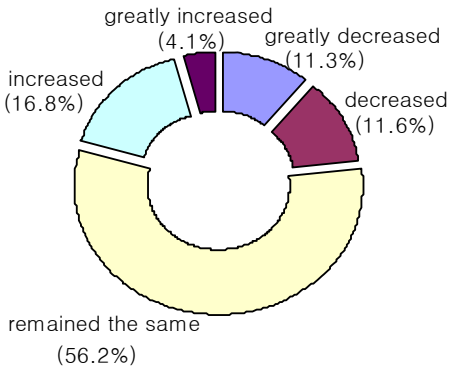
Note: 351 companies responding

An examination of hollowing out from the perspective of employment reveals somewhat different results. According to a survey of 351 companies, 19.4% responded that parent company employment "greatly decreased," and 16.0% responded that it "decreased" for a total of 35.4%. In contrast, 4.8% answered that parent company employment "greatly increased," with 14.8% stating that it "increased" for a total of 19.6%. With the responses for drops in employment levels more prevalent, investment in China appears to have had a negative effect on employment.

Figure 4. Parent company employment and R&D staff changes for companies investing in China



Note: 351 companies responding



Note: 345 companies responding

For research and development personnel, 11.3% answered that the number of such employees "greatly decreased" and 11.6% responded that it "decreased," while a total of

22.9% of companies claimed that R&D personnel decreased. Only 4.1% responded that such numbers "increased," with 16.8% claiming that they "increased greatly," for a total of 20.9%. While the difference is slight, it appears that parent company research and development activities for companies investing in China may actually have contracted.

(3) Evaluation and Conclusion

In light of the data presented above, the characteristics of Korean corporate investment in China can be summarized as follows:

First, investment has increased at a vigorous pace. While Korean investment in China began in earnest only in the mid-1990s, it increased more rapidly than investment from other nations that had entered China earlier.

Second, the majority of Korean investment in China is in the manufacturing industry, with almost half of Korea's total overseas manufacturing investments going to China.

Third, while SMEs make the up the largest number of investments and account for the highest dollar value, large enterprises are increasing their investment. Per-project investment for these large corporations is high compared to the Korean average. Investment in China first began with labor-intensive light industrial SMEs, but since then Korea's large enterprises have increasingly intensified investment in China. Electronics (Samsung and LG), automotive (Hyundai) and steel (POSCO) firms are making large-scale investments in China. Information technology firms are also making noteworthy investment. Automobile sales have almost doubled, indicating success for Korean automobile manufacturers like Hyundai, in the Chinese market.

Fourth, Korean companies are shifting investment from Shangdong province region to the Yangtze river Delta region. Large enterprises in particular are stepping up their investments in the Delta region to take advantage of burgeoning local markets. Fifth, motivations for investment are changing. Labor-intensive manufacturers first invested in China to take advantage of inexpensive labor, but investments today are targeting the Chinese domestic market itself. As large enterprises increase their investment, increasing amounts of investment are now aimed at China itself.

Sixth, localization is proceeding at a brisk pace, in the form of local parts and components acquisition and rising sales in the Chinese market. Automobiles, basic metals and other durable good manufacturers are increasing their share of the domestic market. As parts and component manufactures also move production facilities to China, SMEs are increasingly regarding China as their primary market. In addition, share of local procurement is continuing to increase.

Seventh, business conditions in China are deteriorating. Returns on investment as

well as sales and operating profit margins are still relatively high for Korean manufacturers in China compared to those in the United States or other countries. However, profitability has been faltering recently, which is probably related to the intensifying competition in China. Eighth, it is presumed that Korean corporate investment in China will aid in the nation's technological development. Among investing companies, 44.6% are manufacturing goods in introduction and growth stages, and more companies are introducing new production facilities instead of second-hand lines into China's subsidiaries.

Eighth, even though more businesses investing in China said that their home country production had increased rather than decreased, changes in revenue were largely similar. This suggests that businesses are using investment in China as a way to increase added value. In contrast, for employment, more businesses investing in China reported that employment had declined rather than increased. Moreover, businesses investing in China reported that R&D personnel were decreasing rather than increasing, indicating that investment in China had produced large negative effects on employment.

3.3 Manufacturing Investment in China and Changes in Trade Structure

(1) Foreign Direct Investment and Changes in Trade Structure

1) Fragmentation and increase in trade

There has been a great deal of research on the relationship between direct investment and trade. Kojima (1978) claimed that the concentration of Japanese investment in Asia into local sectors with potential comparative advantage results in the growth of that industry, trade expansion and economic development. In other words, such investments create trade for the host country. Direct investment promotes the export of parts and intermediate goods for the home country as well as the export of finished goods for the host country to other third party nations. The salient question here is whether investment replaces existing trade. If direct investment leads to local production and sales in the local market instead of exports from the home country, exports will fall. If local production is carried out through investment without preexisting exports to that country, two situations can arise: First, if the investing home country brings in parts and intermediate goods to the host nations and sells finished goods to third party countries, the home country's exports will increase. If instead local resources are utilized for production and export, the host country's exports will rise.

Studies on the increase in East Asian intra-regional trade after 1980 conclude that a vertical division of production through fragmentation is the main reason for this

phenomenon. Vertical division of production is a type of division of labor wherein multiple nations participate in the production of goods that allow for fragmentation (this is also referred to as "production sharing" or "vertical specialization"). In this process, the production of a good that had been formerly produced by a single firm is fragmented in order to maximize comparative advantage between nations arising from differences in technology or factor endowments, as companies carry out foreign investment to take charge of a particular part of the process or foreign companies participate in the process (Ng and Yeats, 1999).[38]

This type of vertical division of production is most evident in the electric and electronics industries. Ng and Yeats (1999) reported that intra-regional trade in East Asia between 1984 and 1996 rose at an annual average rate of 11%, but growth in regional component exports as the result of division of production among nations averaged 15%, 4% higher than the growth rate for total exports.[39] In addition, as the electric and electronic industries comprised the majority of industries engaging in vertical division of production, the percentage of trade for parts and components for business and accounting devices (SITC 759) and communications equipment (SITC 764) accounted for 37.5% and 27.7%, respectively, of the entire East Asian parts and component trade in 2001.[40]

In order for direct investment to expand trade, a vertical link between nations that results in specializations of certain stages of production must take place. According to Hummels, et. al., vertical specialization is the importing of goods by a country that uses such goods them as components to produce a finished good, which in turn is exported to other countries. In this form of direct investment, a company invests in another nation to produce intermediate goods, which are imported to the home country to be assembled into finished goods and then exported to third-party nations.[41] For example, China may import parts and intermediate goods from Korea to assemble in China then export to a third country, creating the typical vertical specialization between Korea and China.

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[38] Fragmentation indicates that the process for producing a good can be split into two or more separate processes. The production process can be split to allow for production in separate sites, and production sharing occurs when the total assembly cost for this divided production is less than the production cost incurred in a single facility, taking into account the additional service link cost that occurs in fragmentation in order to put together components produced in different sites.

[39] Ng Francis and Yeats Alexander, "Production sharing in East Asia: Who does what for and why?" *World Bank*, 1999.

[40] Ng Francis & Yeats Alexander, "Major Trade Trends in East Asia," *World Bank*, 2003.

[41] Hummels, et. al. distinguish vertical specialization from outsourcing, the latter of which removes the element of export to a third country. Thus, if Korea imports intermediate goods from China and assembles goods that will be consumed in Korea, this would be considered as outsourcing. David Hummels, Dana Rapoport, and Kei-Mu Yi, "Vertical Specialization and the Changing Nature of World Trade," *FRBNY Economic Policy Review*, 1998, pp. 79-99.

2) Types of Korean investment in China and trade creation

Investment in China by Korean corporations can be largely classified into cost-reduction investment (vertical investment) and market-creation investment (horizontal investment), the latter of which can further divided into investment by local market-oriented large corporations and component manufacturers that have followed finished goods manufactures into China. It has become increasingly difficult in recent years to classify companies based on these criteria, as firms that had initially invested in China in order to export to third country have also begun sales in the local market as the Chinese economy continues to grow, and as large enterprises seeking to exploit the domestic market have begun exports to third countries. What is certain is that investment in China began as production base investment for third country export of labor-intensive goods is shifting to investment focusing on local demand.

Regardless of the type of investment, Korean investments in China have created intra-firm trade. Labor-intensive companies that expanded into China to export finished goods to the United States, to third party nations, or back to Korea, tend to rely on their parent companies or other Korean firms for intermediate goods. Since the target of third country trade is the same as the export market for Korean goods, this type of trade replaces traditional exports, and may even lead to increases in imports as these finished goods are imported back into Korea. However, the export of parts and components to China is resulting in export expansion. Generally exports of parts and intermediate goods by parent companies are expected to be greater than increases in imports of finished goods from China.

Large enterprises tend to target the massive Chinese domestic market with their investments. Although the automobile industry has faced difficulties in getting established in China as an export industry, the Chinese market is nevertheless growing at a rapid pace amidst stiff competition from other multinational corporations. Included in this growth are materials suppliers for steel and petrochemicals, who is experiencing explosive demand on China's rapid industrialization. These markets are mainly within China. Therefore, exports can be adversely affected as former exports of finished goods are replaced by production. However, as these companies acquire parts and intermediate goods from Korea or from parts manufacturers that have accompanied the larger companies into China, the subsequent rise in exports of parts and intermediate goods make the exact evaluation of the net trade effect for these types of firms difficult to determine. However, as time passes, increasing percentages of parts and components will inevitably be supplied locally, leading to a reduction in the net export effect.

Lastly, there are the SMEs component manufacturers that have expanded into China in order to supply larger assemblers. These companies are also local market-oriented investors but are characterized by the fact that their major buyers are Korean companies. Numerous SMEs in the automobile and electronics industries have expanded into China. The movement of these parts manufacturers abroad results in the replacement of formerly imported products with locally produced parts and intermediate goods in China, resulting in a fall in exports. If these companies continue to maintain a part of their production facilities in Korea and export primary components to China for assembly and resale, then exports will remain stable or rise. If these companies move their entire facilities to China, however, exports will fall.

Table 10. Korean Investment in China and Trade

Type of investment	Market and purchasing source	Details	Trade effect
Offshore exporters - Investments for cost reduction	Market	Korea, global market	Increased imports Substitute for the global market -Reduced exports
	Procurement	Parent company and Korean companies	Increased exports in parts and intermediate goods
Major conglomerate in pursuit of the local market	Market	Chinese market	Substitute for finished goods exports -Reduced exports
	Procurement	Parent company, partners accompanying the firm into China	Increased exports in parts and intermediate goods
Parts suppliers targeting the local market	Market	Local companies − Korean subsidiaries in China	Substitute for parts exports -Reduced exports -Increased imports
	Procurement	Parent company and foreign companies	Increased parts exports Reduced exports if the business in Korea is disbanded

Source: Author's compilation.

(2) Changes in the Korea-China Trade Structure

1) Rapid increase in trade

Trade between Korea and China first resumed in the early 1990s. Trade in 1992, when diplomatic relations were established, amounted to US$6.38 billion with a $1.07 billion deficit for Korea. Exports to China for this year only contributed 3.5% to Korea's total exports. Three years later, in 1995, Korea's exports rose to $9.14 billion on 7.3% of its total exports, with a $1.74 billion trade surplus. Since then trade between

the two nations has increased rapidly, with China overtaking the United States to become the largest export market for Korean goods. In 2006, Korean exports to China amounted to $69.5 billion, with imports of $48.6 billion, resulting in a surplus of $20.9 billion. Total trade between the two countries amounted to $118.1 billion, accounting for 18.6% of Korea's total trade, 21.3% of exports and 15.7% of imports.

The most significant characteristic of Korea's trade with China is Korea's sustained trade surplus. Trade with China before diplomatic normalization in 1992 was marked by a deficit, but this turned to a surplus in 1993, increasing to more than $10 billion to $13.2 billion in 2003, exceeding $20 billion in 2004 and reaching an all-time high of $23.3 billion in 2005. The trade surplus fell slightly to $20.9 billion in 2006, or 130% of Korea's total export surplus of $16.1 billion.

Table 11. Size and Balance of Korea's Trade with China

(Unit: US$ billions, %)

	1992	1995	1998	2000	2002	2004	2006
Size of trade	6.38 (4.0)	1.654 (6.4)	18.43 (8.2)	31.25 (9.4)	41.15 (13.1)	79.35 (16.6)	118.02 (18.6)
Exports	2.65 (3.5)	9.14 (7.3)	11.94 (9.0)	18.45 (10.7)	23.75 (14.6)	49.76 (19.6)	69.46 (21.3)
Imports	3.72 (4.6)	7.40 (5.5)	6.48 (7.0)	12.8 (8.0)	17.4 (11.4)	29.58 (13.2)	48.56 (15.7)
Total trade balance (A)	-5.14	-10.06	39.03	11.79	10.34	29.38	16.08
Trade balance with China (B)	-1.07	1.74	5.46	5.66	6.35	20.18	20.90
Share (B/A)	20.8	-17.3	14.0	48.0	61.4	68.7	130.0

Note: Figures in parentheses indicate weighted percentage.
Source: KITA.

Using the SITC 2-digit unit of assessment to examine the trade structure between China and Korea reveals that the top export item is electrical machinery (SITC 77), comprising 17.7% of total export. Organic chemicals (SITC 51) come in second, with US$7.2 billion. The third is office and automatic data processing machines (SITC 75) at $6.1 billion, followed by imports of telecommunications and audio equipments. It can be noted that the majority of the top-10 export items are in the electrical and electronics industries or the heavy chemicals industry.

A comparison with 1995's export shows that the export structure has changed significantly over the past 10 years. The top export item in 1995 was textile yarn and related products (SITC 65), amounting to US$1.4 billion or 14.9% of total exports, followed by plastics in primary forms (SITC 57) at $1.1 billion. While the top-10 list consists of a combination of heavy chemicals and light industry, the majority of trade

was in the intermediate goods like parts and components or materials needed for the labor-intensive industrialization of China at the time.

However, after 1995 and at least until 2006, light industrial materials and resources (mainly textiles and leather) are no longer the main export items. During the past 10 years, China has managed to further develop its industry beyond including leather and textiles, and has reduced its reliance on materials imports from Korea.

Table 12. Top-10 exports and percentages (SITC 2-digit)

(Unit: US$ million; %)

	1995		2006	
	Item	Percentage	Item	Percentage
1	Textile yarn and related products	1,359 (14.9)	Electrical machinery, apparatus and appliances, n.e.s.	12,314 (17.7)
2	Plastics in primary forms	1,123 (12.3)	Organic chemicals	7,182 (10.3)
3	Organic chemicals	767 (8.4)	Office machines and automatic data processing machines	6,125 (8.8)
4	Leather, leather products and dressed furskins	613 (6.7)	Telecommunication and sound recording apparatus	5,824 (8.4)
5	Iron and steel	576 (6.3)	Professional and scientific instruments, n.e.s.	5,194 (7.5)
6	Specialized machinery	573 (6.3)	Petroleum, petroleum products and related materials	5,187 (7.5)
7	Textiles fibers and their wastes	457 (5.0)	Plastics in primary forms	4,093 (5.9)
8	Petroleum, petroleum products and related materials	452 (4.9)	Iron and steel	3,184 (4.6)
9	Electrical machinery, apparatus and appliances, n.e.s.	426 (4.7)	Road vehicles	3,158 (4.5)
10	Telecommunications and Sound recording apparatus	352 (3.9)	Non-ferrous metals	2,424 (3.5)
Total	-	6,698 (73.3)	-	54,685 (78.7)

Note: Figures in parenthesis represents percentage.

The top import of 2006 was also electrical machinery at US$9.5 billion or 19.5% of total imports. Iron and steel (SITC 67) came second at $5.4 billion, followed by SITC 75 and 76, which also ranked the same on the list of exports. In 1995, the top import item was textile yarn and related products, followed by iron and steel. Third and fifth

were petrochemicals and coal products, making up the list of major raw materials along with iron and steel. Textiles, raw materials and electronics were the main imports at this time.

Another characteristic of the Korea-China trade emerges when exports and imports are compared. The two lists reveal that similar goods are actively traded between the two countries for a vibrant intra-industry trade. Textiles, organic chemicals, electronics, communications and sound recording equipment were already mutually traded products as far back as 1995. Similarly, exports and imports in 2006 occurred for both sides in similar items, including electronics.

Table 13. Top-10 imports and percentages (SITC 2-digit)

(Unit: US$ million; %)

	1995		2006	
	Item	Percentage	Item	Percentage
1	Textile yarn and related products	1,345 (18.2)	Electrical machinery, apparatus and appliances, n.e.s.	9,465 (19.5)
2	Iron and steel	1,243 (16.8)	Iron and steel	5,437 (11.2)
3	Petroleum, petroleum products and related materials	507 (6.9)	Office machines and automatic data processing machines	4,334 (8.9)
4	Articles of apparel & clothing accessories	426 (5.8)	Telecommunication and sound recording apparatus	2,969 (6.1)
5	Coal, coke and briquettes	353 (4.8)	Articles of apparel & clothing accessories	2,922 (6.0)
6	Organic chemicals	257 (3.5)	Non-ferrous metals	2,290 (4.7)
7	Electrical machinery, apparatus and appliances, n.e.s.	256 (3.5)	Textile yarn and related Products	1,785 (3.7)
8	Telecommunication and Sound recording apparatus	249 (3.4)	Manufactures of metal, n.e.s.	1,295 (2.7)
9	Non-ferrous metals	234 (3.2)	Coal, coke and briquettes	1,260 (2.6)
10	Miscellaneous manufactured articles, n.e.s.	222 (3.0)	Non metallic mineral products, n.e.s.	1,231 (2.5)
계	-	5,092 (68.8)	-	32,988 (67.9)

Note: Figures in parentheses represent percentages.

2) Trade specialization analysis

An examination of Korea's trade structure through the Trade Specialization Index

(TSI) reveals a constantly changing environment. The TSI shows how specialized a certain business or product is for export or import, and is also known as the Net Export Ratio Index or the International Competitive Power Index. The TSI is calculated as the proportion of a product's net exports as a proportion of the total trade amount, where -1 represents total import specialization, 0 represents a neutral competitive advantage, and +1 represents total export specialization.

$$\text{Trade Specialization Index} = \left(\frac{X_{ij} - M_{ij}}{X_{ij} + M_{ij}}\right)$$

X_{ij} : Country i's product j total exports over a certain period of time

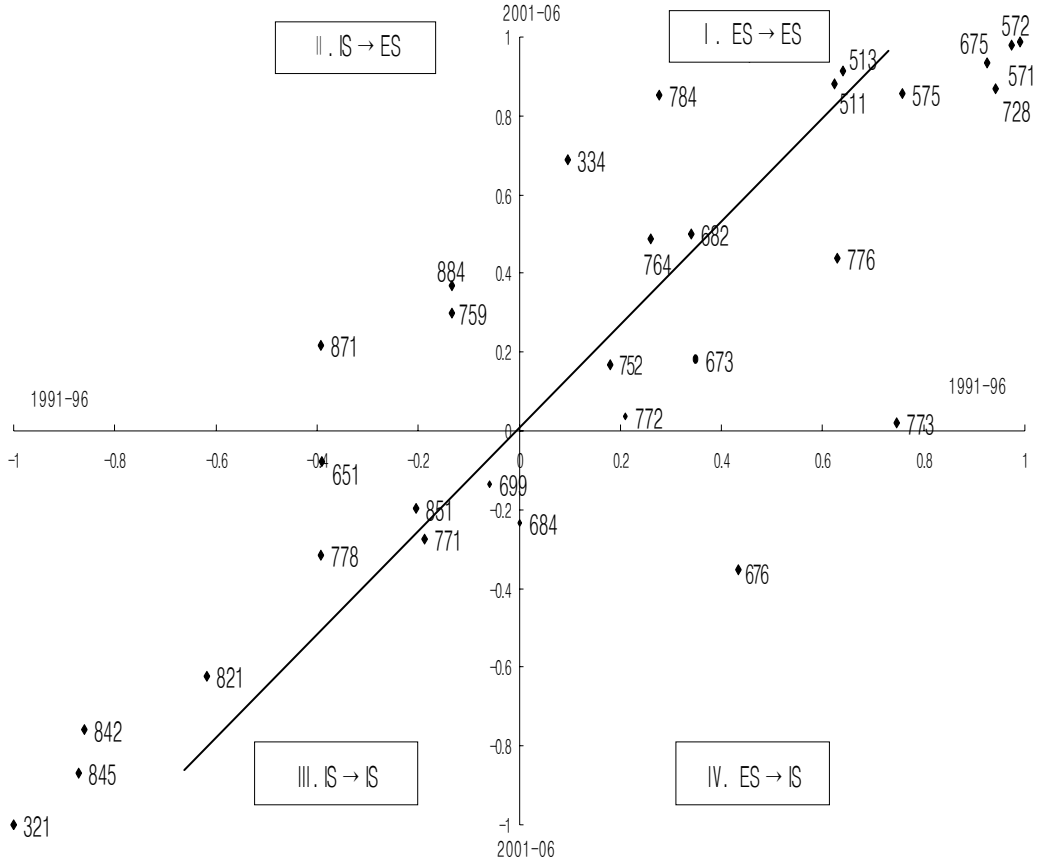
M_{ij} : Country i's product j total imports over a certain period of time

Export specialization = TSI $\geq$ 0.75

Import specialization = TSI $\leq$ -0.75

A comparison of the Trade Specialization Indexes of today's top-30 trading goods in Korea and China between 1991 to 1996 and 2001 to 2006 produces the following figure 3. The most important information in the figure is the clear degree of specialization between the two countries. Korean industries with clear export specialization in the early 1990s and early 2000s still maintain their position, and companies with import specialization similarly maintain their positions. The TSI index has generally increased for export items, motor vehicle parts and components(784), petroleum and bitumen (excluding crude oil) and their products(334), and unspecified communications equipment, mainly mobile phone set(764) were export-specialized products in 1991 to 1995, and become even more export-specialized between 2001 and 2006. Coats, women's coats and jackets, suits, brassieres and other unspecified textile apparel still remain import-specialized goods.

Figure 5. Classification by the Trade Specialization Index for Major Items



Note: IS represents Import Specialization, ES represents Export Specialization

A handful of industries, including iron bars, and angled and shaped steel (SITC 676) as well as aluminum (SITC 684) shifted from export to import specialization between the early 1990s and 2000s, indicating a decline in comparative advantage. Office and data processing machines (759), eyeglass lenses (884) and optical instruments (871) were the only categories that shifted from import to export specialization.

(3) Intra-industry Trade and Division of Production

1) Rising trade in intermediate goods

The expansion in trade between Korea and China and the rise in intra-industry trade occurred concurrently with the increase in parts and intermediate goods exports and finished goods imports in Korea. The structure of traded goods is thus changing as intra-industry trade expands in both nations. Considerable research already exists regarding the increase in parts and intermediate goods trade in East Asia, most of which has concluded that the trade in parts and components is a feature of fragmentation and the basis for the rise in regional trade.

The following is the shares of imports and exports of parts and components for two categories of items, SITC 7 (machinery and transport equipment) and SITC 8 (other manufactured items), using the methodology of Ng and Yeats (2003). The parts and components here are all used for the assembly of finished goods. As seen in table 14, parts and components exports for SITC 7-8 amounted to US$17.4 billion in 2006, contributing 43.3% of total SITC 7-8 sector exports and 25.1% of total exports. The percentage of parts exports rose from 2.6% in 1992 to 10% in 2000, and 27.7% in 2004. In other words, nearly half of SITC 7-8 exports in 2004 were in parts and components.

In imports, parts and components account for 26.8% of sector 7-8 imports and 14.5% of total imports, which are lower percentages than exports in the same categories. However, the percentage of parts and component imports has also increased steadily since 1992.

Notably, the percentage of parts in Korea's exports to China in 2006 actually fell. In 2004, parts exports for SITC 7-8 accounted for 49.1%, but fell to 43.4% in 2006, falling from 27.7% to 25.1% of total exports as well. It is too early to tell whether this is a temporary or enduring phenomenon, but it is nevertheless a marked reversal from previous trends. Increasing numbers of Chinese parts and component manufacturers, and localization of materials by Korean corporations through local investment is credited for this change, and it seems unlikely that parts and component exports will return to their previous levels.

Table 14. Share of the parts and components trade in total trade with China

(Unit: US$ million; %)

		1992	1995	1998	2000	2002	2004	2006
Exports	Total (A)	2,654	9,144	11,944	18,455	23,754	49,763	69,459
	SITC7-8 (B)	464	2,562	3,202	6,528	11,557	28,087	40,248
	Parts and components in SITC 7-8(C)	68	486	750	1,841	5,151	13,799	17,408
	C/A (%)	2.6	5.3	6.3	10.0	21.7	27.7	25.1
	C/B (%)	14.7	19.0	23.4	28.2	44.6	49.1	43.3
Imports	Total (A)	3,725	7,401	6,484	12,799	17,400	29,585	48,557
	7-8 units (B)	391	1723	2,386	5,756	8,864	15,683	26,344
	Parts and components in SITC 7-8 (C)	40	321	509	1.181	2,034	3,584	7,053
	C/A (%)	1.1	4.3	7.9	9.2	11.7	12.1	14.5
	C/B (%)	10.3	18.6	21.3	20.5	22.9	22.9	26.8

Note: SITC 87199 LCD parts were added to the parts and components list of Francis Ng and Alexander Yeats, "Major Trade Trends in East Asia," 2003, pp. 54–55.

2) Inter- and intra-industry trade developments

A further classification of the Korea-China trade will now be made, pointing to the distinction between inter-industry trade (one-way trade) and intra-industry trade (IIT). Intra-industry trade is the trade of products in a similar statistical range between or among certain nations. Significant theoretical and practical research has been conducted regarding this occurrence. Intra-industry trade accounts for a large part of world trade, and economies of scale, product differentiation, imperfect competition as well as country-specific determinants are cited as some of the important factors behind this type of trade.[42]

Product differentiation is noted to be one of the major reasons for IIT, and such product differentiation can be divided into horizontal and vertical product differentiation. Horizontal product differentiation occurs when different products of the same type exhibit similar quality levels, whereas vertical product differentiation indicates different products of the same type with different quality levels. These classifications are linked directly to horizontal intra-industry trade (HIIT) and vertical intra-industry trade (VIIT). HIIT is differentiation within a product category on certain attributes, such as function and design, whereas VIIT is differentiation based on quality.

However, some observers claim that VIIT in East Asia, unlike that of the West, is more strongly affected by other factors other than quality. In other words, much can be explained by trade arising from the division of production resulting from direct investment as part of fragmentation. Ando (2005) points out that the explosive rise in East Asia's VIIT is the result of the expansion of the parts and components trade via a vertically fragmented production process between nations rather than via intra-industry trade of quality-differentiated commodities.[43] In other words, the vertical international production sharing that resulted from fragmentation in East Asia is the main reason for the expansion of vertical intra-industry trade.

The following equation is used to determine whether trade in a certain category is inter-industry or intra-industry trade. Between Korea and China this indicates that a significant difference in the imports and exports of a certain product between the two countries usually signifies inter-industry trade rather than intra-industry trade. Thus, if the larger part of trade between Korea and China is 10 times larger than the smaller part,

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[42] Greenaway David, Hine Robert and Milner Chris, "Vertical and Horizontal Intra-industry trade: A cross industry analysis for the United Kingdom", *The Economic Journal*, 105(November), pp. 1505-1518.

[43] Ando Mitsuyo (2005) "Fragmentation and Vertical Intra-industry Trade in East Asia," paper presented at Claremont Regional Integration Workshop with Particular Reference to Asia, Claremont McKenna College, p. 20.

this is presumed to be inter-industry or unilateral (one-way) trade. The smaller of Korea's exports (China's imports) and Korea's imports (China's exports) was placed in the numerator and the larger in the denominator, the significance of which is that a more than 10-fold difference between the imports and exports of a certain product indicates inter-industry trade, while lower values indicates intra-industry trade.

$$\frac{Min(M_{kk'j}, M_{k'kj})}{Max(M_{kk'j}, M_{k'kj})} \leq 0.1$$

$M_{kk'j}$: imports of country k from trading partner k'
$M_{k'kj}$: imports of country k' from trading partner k

The difference between horizontal intra-industry trade (HIIT) and vertical intra-industry trade (VIIT) can be said to be the reflection of the difference in quality on price. If in the trade of a certain commodity the unit export price for both nations is within a certain margin (25%), the difference in quality is determined to be minimal and thus is classified as HIIT. In contrast, VIIT is when the price difference exceeds 25%, which indicates a difference in quality. The threshold in practical examination is usually 15% or 25%, and the 25% figure is used here.[44]

Horizontal Intra-industry Trade

$$\frac{1}{1.25} \leq \frac{UV_{hh'j}}{UV_{k'kj}} \leq 1.25$$

Vertical Intra-industry Trade

$$\frac{UV_{kk'j}}{UV_{k'kj}} \leq \frac{1}{1.25} \qquad 1.25 \leq \frac{UV_{kk'j}}{UV_{k'kj}}$$

$UV_{kk'j}$: Unit value of commodity j of country k to trade partner k'
$UV_{k'kj}$: Unit value of commodity j of country k' to trade partner k

Using the above equation produces table 15 and figure 4 below of the Korea-China trade structure based on the SITC 5-digit classification. In 2006, inter-industry trade (one-way) between Korea and China accounted for only 35.9% of the total, with intra-industry trade taking up the remaining 64%. Inter-industry trade decreased as time passed, giving way to intra-industry trade. When diplomatic relations was established

[44] Greenaway, et al. (1995).

between the two nations in 1992, inter-industry trade accounted for 87.1% of total trade, but fell to 35.9% in 2006. Intra-industry trade rose from 12.9% to 64.0% in 2006, indicating a significant structural change in the trade between the two nations. The percentage of intra-industry trade between Korea and China is much higher than the percentage of IIT in East Asia and the EU as analyzed by Fukao, et al.[45]

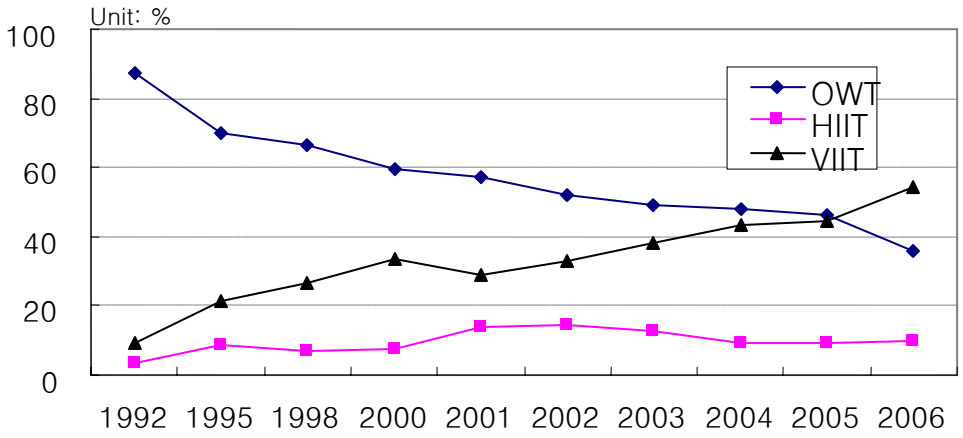
Another important feature is that within intra-industry trade, vertical intra-industry trade increased more rapidly than horizontal intra-industry trade. The percentage of VIIT in 1992 only amounted to 9.3%, but rose to 21.5% in 1995 and over 40% in 2004. In contrast, HIIT rose from 3.6% in 1992 to 13.9% in 2001, but fell after 2003 to 9.6% in 2006.

Table 15. Characteristics of Korea-China Trade

(Unit :%)

	Inter-industry Trade	Intra-industry Trade		
		Subtotal	Horizontal	Vertical
1992	87.1	12.9	3.6	9.3
1995	70.1	29.9	8.4	21.5
1998	66.7	33.3	6.7	26.6
2000	59.3	40.7	7.4	33.3
2001	57.1	42.9	13.9	29.0
2002	52.2	47.8	14.6	33.2
2003	49.3	50.8	12.7	38.1
2004	47.7	52.3	9.0	43.3
2005	46.5	53.5	9.0	44.5
2006	35.9	64.0	9.6	54.4

Figure 6. Development of the Characteristics of Korea-China Trade



According to the definitions of vertical intra industry trade, the increase in VIIT

[45] According to their research, inter-industry (one-way) trade in the EU in 2000 was 34.1%, with 40% for vertical intra-industry trade and 25.8% for horizontal intra-industry trade.

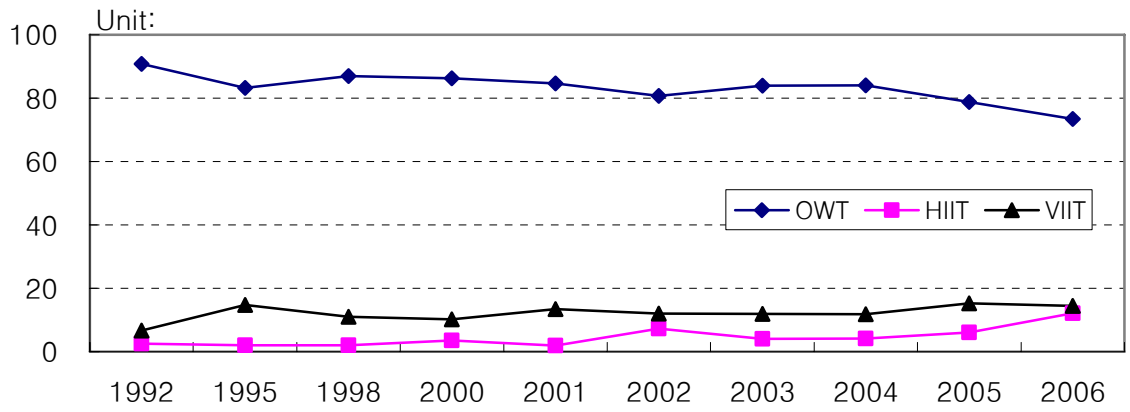
indicates that the two nations trade in products in the same industry, but display a significant difference in price in the traded commodities, signifying that Korea is exporting expensive items while China is exporting cheaper goods. If indeed the rise in VIIT between Korea and China reflects reality, the situation is favorable toward Korea, as it would appear that the two countries are undergoing a division of production through product differentiation, and Korea is specializing in more technologically advanced goods compared to China.[46]

3) Intra-industry trade structure classified by industry

An examination of the intra-industry trade structure can be classified by the type of business within the manufacturing sector. Chemicals and related goods (SITC 5) is a typical inter-industry trade commodity. In 2006, inter-industry (one-way) trade accounted for 73.4%, with the remaining 26.6% in intra-industry trade. Share for intra-industry trade did rise from 13.1% in 1992 to 26.6% in 2006.

However, there are marked differences among the items that form SITC 5. For example, for subcategory 58 (plastics) trade remained in inter-industry form in the 1990s, but has since shifted to intra-industry, and especially vertical intra-industry, trade. Trade in subcategory 59 (chemical materials n.e.s.) is also rapidly transforming into vertical intra-industry trade.

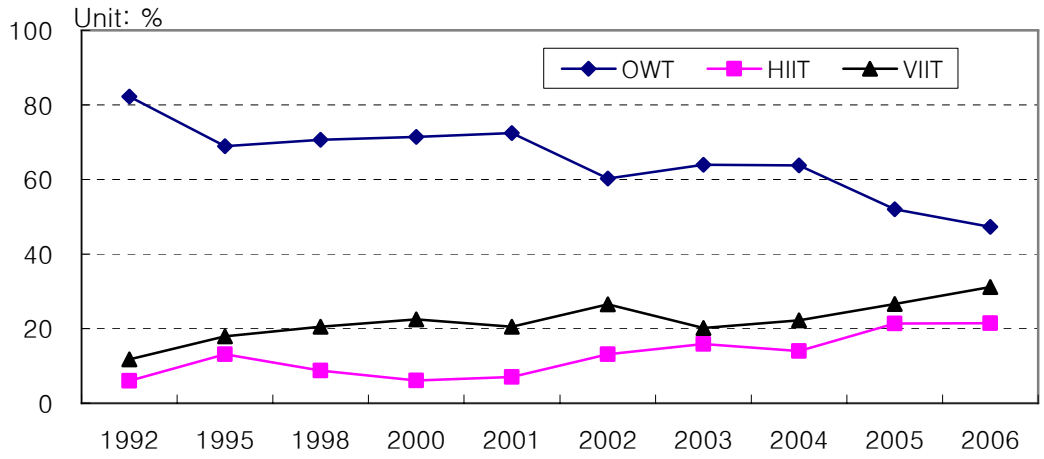
Figure 7. Chemicals and Related Products (SITC5) Industry Trade Index



[46] However, the increase in vertical intra-industry trade in East Asia is regarded to be the result of production sharing due to fragmentation rather than product differentiation.

Classified manufactured goods (SITC 6) include textiles, paper, steel, metals and other materials. As competitive power in China in labor-intensive sectors increased due to China's rapid industrialization, intra-industry trade rose from 17.8% in 1992 to 52.7% in 2006. Although Korea's share of superior-quality vertical trade is higher in the materials intra-industry trade with China, it must be noted that the level of horizontal intra-industry trade is increasing as well. Subcategory 67 (steel and iron), the sector in category 6 with the highest amount of exports for Korea, amounted to US$3.2 billion in 2006 and $5.4 billion in imports, creating a trade deficit. Korea boasted a surplus in this trade in the early 2000s, but this has recently turned towards a deficit, as imports of medium- and low-quality steel from China have increased in recent years. While one-way trade in the iron and steel sector remains above 70%, vertical intra-industry trade has nevertheless been rising recently.

Figure 8. Classified Manufactured Goods (SITC6) Industry Trade Index

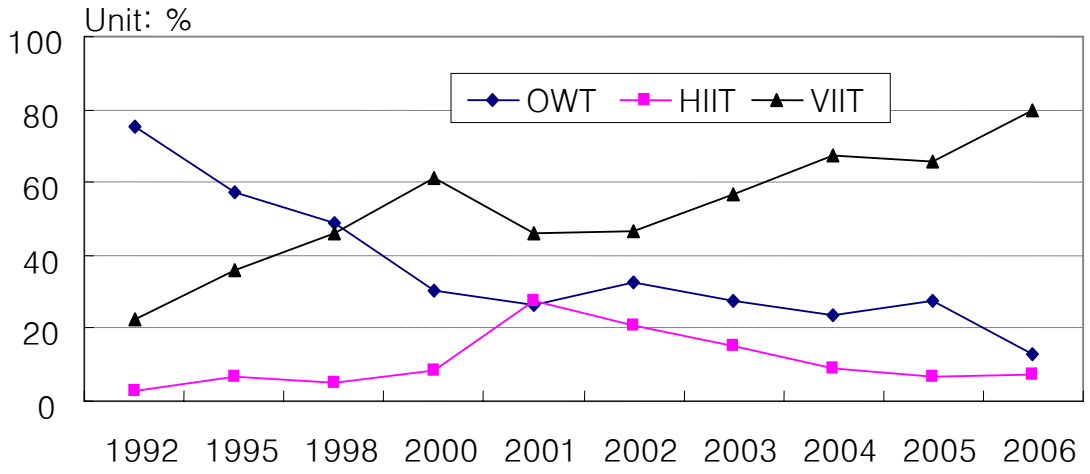


In non-ferrous metals (68), trade in bronze and aluminum is high between the two nations. A similar shift away from one-way trade to intra-industry trade is also occurring in this sector, although vertical intra-industry trade remains less than 10%. Korea's exports in textile products (65) in 2006 were US$2.27 billion, a slight drop from $2.34 billion in 2005. Imports in the same period rose from $1.49 billion to $1.79 billion. While the percentage of one-way trade was high in the past, intra-industry trade has become more significant in recent years. As Korea's exports falter and imports from China continue to rise, vertical intra-industry trade has been increasing since 2004.

Machinery and transportation equipment (SITC 7) is Korea's most important export category, and includes various kinds of machinery, communication and electric equipment, and various transport vehicles. Intra-industry trade rose significantly, from 24.8% in 1992 to 86.9% in 2006, indicating that as trade between the two nations

expanded, more products displayed an increasing price gap. The rapid rise of vertical intra-industry trade in this sector is especially noteworthy.

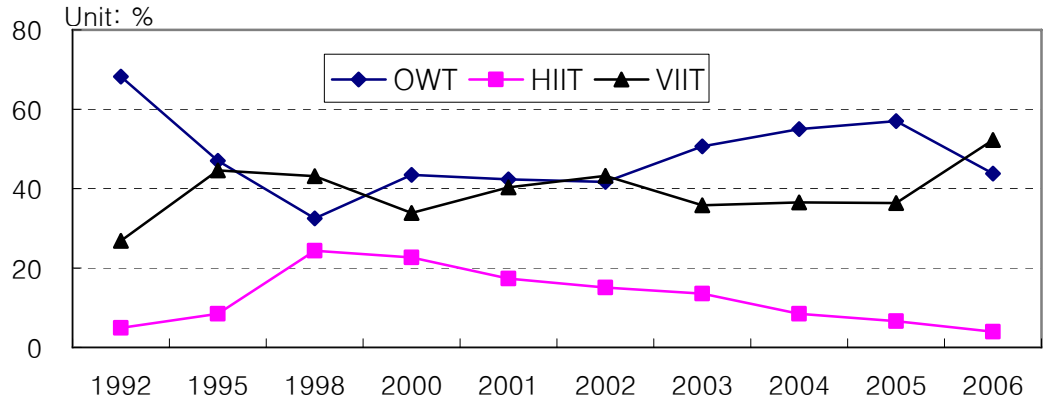
Figure 9. Machinery and Transportation Equipment (SITC7) Industry Trade Index



The subcategories for 7 include electrical machinery, including semiconductors (77), which accounts for US$12.3 billion of Korea's exports and $9.5 billion in imports. Trade in category 75, which includes office equipment and computers, accounts for $6.1 billion in exports and $4.3 billion in imports, in which vertical intra-industry trade forms 99% of total trade. In telecommunications, sound and video equipment (76), exports amount to $5.8 billion and imports $3 billion, more than 90% of which during 2005-2006 was vertical intra-industry trade. In comparison, 90% of trade in road vehicles (78) is made up of inter-industry trade, but a slight percentage of vertical intra-industry trade has surfaced since 2005. Exports fell in 2006 in this industry due to the rising percentage of locally procured intermediate goods.

Miscellaneous manufactured products (SITC 8), which include garments, footwear, optical instruments and other miscellaneous items, displayed a marked rise in vertical intra-industry trade. Several different types of industries are included in this sector, and among these subcategory 87, which includes LCD products, has seen rapid increases in exports in recent years. This category may be the most significant. Korea's exports in this industry amounted to US$5.2 billion in 2006, with imports at only $800 million. Exports in this sector have increased dramatically since 2004, showing evidence of vertical intra-industry trade. Clothing and accessories (84) is Korea's import industry. Korea imported $2.9 billion in this category in 2006, with exports of only $400 million. Although one-way trade is dominant in this sector, vertical intra-industry trade has been rising since 2003.

Figure 10. Miscellaneous Manufactured Goods (SITC8) Trade Index



(4) Evaluation and ConclusionS

Trade between Korea and China grew at a rapid pace after the establishment of diplomatic relations. China has been Korea's largest market since 2003, as well as the trading partner with whom Korea maintains its largest trade surplus. Trade between the two countries appears to be closely related to investment in China by Korean firms. Korea's parts and components exports to China increased significantly in recent years, becoming a main feature of the trade between the two nations.

Various studies on East Asian trade conclude that fragmentation results not only in trade expansion but the rise in vertical intra-industry trade (VIIT) as well,[47] and correspondingly analysis of this aspect of Korea-China trade has also revealed that VIIT is increasing rapidly. VIIT between the two nations is rising rapidly while one-way trade is falling, and horizontal intra-industry trade (HIIT) remains below 10%. While the quality difference between the products of Korea and China is responsible for part of the rise in VIIT, the main cause is likely to be the increase in parts and intermediate goods trade that resulted from Korea's direct investment. In other words, while differences in quality account for the proliferation of VIIT in the West, trade on division of production as the result of direct investment can explain a large part of the increase in VIIT between Korea and China.

The following procedure will employ a simple method in order to determine whether investment in China by Korean manufacturing firms is related to VIIT, under the

[47] In a recent study, Wakasugi (2007) stated that the share of VIIT in East Asia in increasing, the main reason for which is the increasing level of trade. Wakasugi Ryuhei, 2007, "Vertical intra-industry trade and economic integration in East Asia," *Asian Economic Paper* 6(1), pp. 26-39.

presumption that greater investment in China will lead to an increase in VIIT. A regression analysis was made on the relationship between investment amounts in China and the weight of VIIT primarily for the manufacturing industry in 1992, 1995, 1998, and the years between 2000 and 2005. The presumption, again, is that VIIT rises with investment.

Three different equations were created, as outlined below. The first assumes that VIIT has a linear relationship with investment (in thousands of dollars). The second equation assumes a linear relationship between VIIT and the log of the investment amount. The third uses the log value of both the dependant and independent variables for the calculation.

Table 16. Relationship between investment in China and VITT

	Dependent variable	Independent variable	coefficient	t-value
1	VIIT	INVESTMENT	0.0002	(3.24)
		Constant	0.2722	(17.94)
		No. of Observations	246	
		Adjust R^2	0.0182	
2	VIIT	Log INVESTMENT	0.0404	(4.89)
		Constant	-0.1347	(-1.47)
		No. of Observations	240	
		Adjust R^2	0.0165	
3	Log VIIT	Log INVESTMENT	0.1813	(3.53)
		Constant	-3.9142	(-6.87)
		No. of Observations	240	
		Adjust R^2	0.0101	

The results indicate that no matter which equation is used, the share of VIIT by industry is related to investment. For example, in the case of the third equation, a 1% increase in investment results in a 0.18% increase in the share of VIIT.

3.4 Large Manufacturing Investment and Hollowing Out

(1) Methodology and Data

1) Method of analysis

An empirical case study will be analyzed to determine whether Korean investment in China indeed has a real effect on parent companies' sales and employment. The purpose

of this analysis is to discover whether sales and employment increases for companies investing in China are different compared to firms that do not invest or carry out a diverse range of investments. Among the 1,572 companies listed on the Korean stock exchange as of late 2006, the top-300 firms by sales were selected as the targets for this analysis. The total sales for the 1,572 companies were 728 trillion Korean won, with approximately 1.07 million employees.

These companies were divided into "overseas investors" and "non-investors," with the overseas investors further divided into "investors concentrating in China" (more than 50% of total investments made in China) and "diversified investors" (less than 50% in China). Simple comparisons were made using the sales and employment (classified as production line workers and non-production line workers) statistics for 2000-2003 and 2003-2006 respectively.

In addition, a further analysis will be made by classifying the industries that each corporation is a part of, i.e. high-tech, medium high-tech, medium low-tech, and low-tech industries as classified by the OECD, determining the results for each industrial category based on the assumption that sales and employment ratios will be different for each group in each industry.

2) Data for analysis

The data needed for this process are the sales and employment figures as well as the corporate investment amounts by region for each reported year. The sales figures for individual companies were acquired from Korea Investors Service Inc., with employment figures compiled from corporate financial reports filed with the Financial Supervisory Service(FSS). The "Korea Overseas Company Information System ," collected annually by the Export-Import Bank, was used to determine the amount of foreign investments and geographical distribution of individual companies. With one company excluded for statistical problems, the 299 companies in 2006 can be organized as follows:[48]

Among the total of 299 companies, 89 were non-investors and 210 were overseas investors, indicating that overseas investment has become the norm for major Korean manufacturers today. "Investors concentrating in China" with more than 50% of their investments in the nation numbered 94 companies, with 116 "diversified investors" investing less than 50% of their investments in China. Total sales in 2006 amounted to 424 trillion won, among which overseas investors contributed 77.7% or 329 trillion won.

[48] Sixteen companies among the total sample population of 300 reflect the data from 2001, as 2000 employment figures were not available

Investors concentrating in China posted sales of US$5.7 billion, with diversified investors reporting sales totaling $27.3 billion dollars, showing that there are still relatively few companies with higher investments in China.

Table 17. Overview of Selected Companies (as of 2006; 299 companies)

	Total number of companies	Non-investors	Overseas investors	Investors concentrating in China	Diversified investors
Number of companies (A)	299	89	210	94	116
Sales(trillion won) (B)	424	95	329	57	272
Employment (thousand people) (C)	639	101	537	109	428
Average sales(B/A)(billion won)	1,417	1,062	1,568	604	2,349
Average employment (C/A) (thousand people)	2.14	1.14	2.56	1.16	3.69
Labor productivity (B/C) (million won)	663	933	613	520	636

Employment in 2006 totaled 639,000 people, with 537,000 employees working for overseas investors and 101,000 working for non-investors. For companies with more than a 50% investment concentration in China, employment numbered 109,000, with 428,000 in companies with less than 50%.

Several interesting observations arise from an examination of corporate size (sales and employment) and labor productivity. First, companies that invest overseas tend to be larger than those that do not. The average sales for overseas investors amounted to 1,568 billion won while sales of non-investors barely reached one trillion won. The average number of employees for overseas investors was 2,560, while non-investors averaged 1,140 employees.

Second, there was a large difference between the average sizes of companies that concentrated their investment in China and those that do not. Sales of investors concentrating in China amounted to only a third of the companies with diversified investments. It would appear that larger companies can employ more resources and therefore can afford to diversify their investments. Third, labor productivity of non-investors was significantly higher than that of investors, with 930 million won per person for non-investors but 610 million won per person for investors. However, there is almost no difference in labor productivity between investors concentrating in China and diversified investors.

Revenue and employment for the firms in question were analyzed over time. 260 firms with consistent statistical data on revenue and employment for 2000, 2003, and 2006 were available. Revenue for these businesses increased to 250 trillion won in 2000, and to 302 trillion won in 2003, for an increase of 20.7%, thereafter increased to 406

trillion won in 2006 for a 34.5% increase. Employment showed an increase from 564,000 people in 2000 to 609,000 people in 2006, decreased by 3.8% from 2000 to 2003, and then increased by 12.2% from 2003 to 2006.

When divided into production versus non-production workers, production line workers accounted for 313,000 people, while non-production line workers accounted for 296,000 people, a sizeable gap. Although production line workers declined by 7.9% from 2000 to 2003, this was in marked contrast to the 1.5% increase in non-production line workers. Although employment increased for both production and non-production line workers alike between 2003 and 2006, the breadth of such increases was not so large for companies concentrating investment in China. However, from 2003 to 2006, employment for production line workers also diminished

Table 18. Sales and employment of 260 companies by year

		2000	2003	2006	Rate of increase (%)	
					2000-03	2003-06
Sales (trillion won)	Total	250	302	406	20.7	34.5
	Overseas investors	2030	2423	3166	19.36	30.64
	Non-investors	472	596	895	26.35	50.12
	Investors concentrating in China	302	367	488	21.67	32.75
	Diversified investors	1728	2055	2677	18.95	30.26
Employment (thousand people)	Total	564	543	609	-3.8	12.2
	Overseas investors	4840	4615	5132	-4.63	11.20
	Non-investors	798	810	954	1.49	17.82
	Investors concentrating in China	962	920	950	-4.32	3.27
	Diversified investors	3878	3695	4182	-4.71	13.18
Production	Total	315	290	313	-7.9	8.0

worker	Overseas investors	2699	2432	2604	-9.88	7.05
	Non-investors	446	463	524	3.86	13.19
	Investors concentrating in China	535	496	495	-7.28	-0.27
	Diversified investors	2163	1936	2109	-10.52	8.93
Non-Production worker	Total	249	253	296	1.5	16.9
	Overseas investors	2140	2183	2528	1.98	15.82
	Non-investors	352	347	430	-1.53	24.00
	Investors concentrating in China	426	423	455	-0.61	7.43
	Diversified investors	1714	1759	2073	2.63	17.85

(2) Hollowing Out of Large Manufacturing Enterprises

1) Comparison of average growth rates of sales and employment

Here we examine the differences between average sales and employment growth rates for individual companies between groups. Excluding companies with time-series data problems, 294 companies out of the total of 300 provided the data below, with 85 non-investors and 209 overseas investors. Of the latter, 117 were diversified investors and 92 were investors concentrating in China. Based on technology, 50 companies were categorized as belonging to high-technology industries, with 103 designated as medium high-technology, 76 for medium- low-technology, and 65 for low-technology industries.

Table 19. Groups based on investment behavior and technology level (294 companies)

Industry Classification / Group Classification	Total (294)	High-tech (50)	Medium high-tech (103)	Medium low-tech (76)	Low-tech (65)
Overseas investors	209	40	76	51	42
− Concentrating in China	92	19	33	21	19
− Diversified	117	21	43	30	23
Non-investors	85	10	27	25	23

Note: missing values in time-series resources resulted in a maximum sample size of 294; numbers in the parentheses and the table represent the number of companies in each group.

Next, we will examine the differences in the averages of sales and employment increases for companies in each subgroup compared with the entire group of companies. During the years 2000 to 2003, the sales growth rate for overseas investors were 113.2 percentage points higher than the rate of increase for non-investors, and 12.7 percentage points higher between 2003 and 2006. The rate for employment between 2000 and 2003

was 2.6 percentage points lower for overseas investors compared to non-investors, but rose 8.0 percentage points between 2003 and 2006. Classified as production line and non-production line employees, the growth rate for overseas investors for production line employees was 18.95 percentage points lower between 2000 and 2003, but overtook the rate for non-investors between 2004 and 2006. In non-production line employees, overseas investors exhibited higher rates of increase for both periods.

The fact that sales growth rates for overseas investors were higher than those of non-investors indicates that overseas investors do not contribute to domestic hollowing out, and in fact encourage higher growth through increased efficiency. Production line workers during the first period were adversely affected, indicating that overseas investments were in a "replacement relationship" with domestic investments. However, employment rose faster along with sales from 2003 to 2006, suggesting a complementary relationship. Non-production line employment (administrative staff and R&D personnel) for overseas investors during 2003 to 2006 rose 23.35% more than employment for non-investors, producing a statistically significant result.

A comparison of investors concentrating in China and non-investors reveals that sales and employment figures for investors in China are rising faster than those of non-investors. While there was a 24.8 percentage point difference in the first period in sales, a 10.17 percentage point difference remained during the second period. A smaller difference was observed for employment, but a gap nevertheless remains. For production line jobs, the growth rate for investors concentrating on China was lower by 1.81 percentage points, but rose 2.64 percentage points from 2004 to 2006. The gap for non-production line jobs widened even further between the first and second periods. It would be difficult to conclude that investment in China is related to hollowing out by using these particular figures.

Table 20. Gaps in sales and employment by group (294 companies)

		2000-2003	2003-2006
Overseas investors vs. Non-investors	Sales	113.20	12.69
	Employment	-2.58	8.03
	(Production worker)	-18.95	7.49
	(Non- Production worker)	0.19	23.35
Investors concentrating on China vs. Non-investors	Sales	24.82	10.17
	Employment	4.23	3.51
	(Production worker)	-1.81	2.64
	(Non- Production worker)	2.46	31.07
Investors concentrating on	Sales	-156.77	-4.51
	Employment	11.87	-8.06

China vs. Diversified investors	(Production worker)	29.71	-8.71
	(Non- Production worker)	3.96	13.78

Note: the above figures represent the average difference between the rates of increase of sales and employment for the stated periods.

The rate of growth for sales and employment between investors concentrating in China was found to be significantly lower compared to companies with diversified investment. Sales during the two periods differed by 156.8 and 4.5 percentage points, respectively. While the gap in the growth rate of sales is narrowing, the rate is nevertheless lower in companies that concentrate their investments in China. Employment rose for investors concentrating in China during the first period, but the reverse occurred during the second period. However, a higher rate of growth was observed for non-production line jobs for investors concentrating in China. These results seem to indicate that investment that is concentrated in China has a negative impact on sales and employment in Korea compared to diversified investment.

2) Comparison of sales and employment growth rates by technological classification

Next, manufacturing companies were classified into four groups based on technological levels. A difference can be seen between overseas investors and non-investors in different industry groups (Table 21). Growth rates for sales for overseas investors were higher than those of non-investors in high-tech and medium high-tech industries. This gap was considerably larger for the high-tech industry, indicating that companies investing overseas either increased sales by improving their products or their production methods. For employment, employment in businesses investing overseas in high tech industries has increased more rapidly than firms that have not invested.

For employment, employment in firms investing overseas in high tech industries has increased more rapidly than business that have not invested. However, employment was either worse for overseas investors (2000-2003) or almost the same (2004-2006) for companies in medium high-tech industries, with lower employment growth rates for production line jobs for overseas investors.

Sales growth rates for overseas investors were lower for non-investors during both periods in the medium low-tech industry. The figure was lower for firms in the low-tech industry from 2000 to 2003 and only slightly different between 2003 and 2006. However, the gap in sales growth rates between overseas investors and non-investors decreased over time. Overseas investment in the two lower-tech sectors resulted in

temporary falls in the sales growth rate, but improvements appeared over time. The same can be seen for employment rates, with growth rates for overseas investors lower during 2000-2003 but moving in the opposite direction in 2003-2006. One reason for lower growth rates of sales for the medium low-tech and low-tech industries may be the relative reduction in production in Korea as the result of overseas investment.

Table 21. Gaps between overseas investors and non-investors based on technology level

		2000-2003	2003-2006
High-tech industry	Sales	596.00	38.19
	Employment	8.91	12.06
	(Production worker)	69.99	31.09
	(Non- Production worker)	-1.01	22.35
Medium high-tech industry	Sales	17.89	5.42
	Employment	-7.75	0.94
	(Production worker)	-98.11	-4.39
	(Non- Production worker)	6.67	38.63
Medium low-tech industry	Sales	-13.29	-1.95
	Employment	-7.39	10.85
	(Production worker)	-7.66	10.15
	(Non- Production worker)	-14.45	4.97
Low-tech industry	Sales	-37.44	2.63
	Employment	-2.88	-0.43
	(Production worker)	2.51	-3.06
	(Non Production worker)	6.98	15.87

For sales rates among investors concentrating in China and non-investors, both high-tech and medium high-tech industries showed higher rates of growth for companies concentrating in China compared to non-investors. However, it is noteworthy that this gap fell significantly over time. For firms in the medium low-tech industry, sales grew at a lower pace for investors in China, indicating that investment in China for this particular industry resulted in lowered domestic sales. For the low-tech industry, it appears that firms concentrating their investments in China have successfully undergone structural reforms and are achieving higher rates of sales growth through new types of competitive advantage than non-investors.

Employment is different for each industrial group. Growth rates were higher for investors in China compared to non-investors in the high-tech industry. While the gap was smaller during the latter period, a difference nevertheless remains. Employment growth rates for investors concentrating in China were lower during the period 2000 to 2003 in the medium high-tech industry, but increased during the second period. However, the gap in employment growth was significant between production line and

non-production line jobs. For medium low- and low-tech industries, employment effects appear to be negative.

Table 22. Gaps between investors focusing on China and non-investors based on technology level

		2000-2003	2003-2006
High-tech industry	Sales	65.56	36.53
	Employment	27.88	3.03
	(Production worker)	128.40	9.41
	(Non Production worker)	22.17	14.61
Medium high-tech industry	Sales	22.17	14.61
	Employment	-8.95	4.98
	(Production worker)	-100.61	-6.38
	(Non- Production worker)	2.34	66.27
Medium low-tech industry	Sales	-13.50	-19.23
	Employment	3.77	-3.50
	(Production worker)	2.41	-0.71
	(Non- Production worker)	3.04	3.41
Low-tech industry	Sales	-23.52	3.40
	Employment	-0.35	-6.03
	(Production worker)	15.11	5.21
	(Non- Production worker)	-14.80	15.18

The difference between investors concentrating in China and diversified investors is illustrated in the table 23. In the high-tech industry, sales growth rates for investors concentrating in China were significantly lower than those for diversified investors. Although this gap narrowed during the second period, the difference remains. This appears to indicate that companies that invested in China moved relatively more production facilities, thereby reducing their domestic production. In the medium high-tech and low-tech industries, the sales growth rates for investors in China were higher. It is worth noting that this gap narrowed considerably during the second period. In the medium low-tech industry, investors concentrating in China showed poorer performance, indicating that companies investing in China faced stiff pressure for restructuring compared to companies that did not exclusively invest in China.

For employment figures, companies investing in China showed lower rates of job growth compared to diversified investors from 2003-2006 in the high-tech and medium low-tech industries. This gap narrowed considerably over time for the high-tech industry as well as the medium low-tech industry. Both production line and

non-production line jobs for both industries grew at a slower pace in companies that concentrated their investments on China between the two periods. For production line employment, every industry with the exception of the low-tech industry shows lower growth rates for investors concentrating on China.

Table 23. Gaps between investors concentrating on China and diversified investors based on technology level

		2000-2003	2003-2006
High-tech industry	Sales	-1010.40	-3.17
	Employment	36.68	-17.11
	(Production worker)	113.00	-43.36
	(Non Production worker)	44.82	-14.67
Medium high-tech industry	Sales	58.43	5.44
	Employment	-2.04	7.02
	(Production worker)	-4.25	-3.46
	(Non- Production worker)	-7.37	48.04
Medium low-tech industry	Sales	-0.36	-29.36
	Employment	18.34	-25.11
	(Production worker)	16.53	-19.02
	(Non- Production worker)	28.73	-2.72
Low-tech industry	Sales	24.81	1.41
	Employment	4.61	-10.18
	(Production worker)	22.35	14.96
	(Non- Production worker)	-39.60	-1.26

(3) Evaluation and Conclusions

While there is considerable debate on whether investment in China is leading to hollowing out of the Korean manufacturing industry, few studies offer any concrete affirmation of this belief. This study used a simple process to determine the relationship between investment in China and the hollowing out of the manufacturing sector, by classifying a sample of major listed corporations into overseas investors, non-investors, investors concentrating in China, and diversified investors in order to compare growth rates for sales and employment after 2000.

The above analysis offers several important implications.

First, it cannot be claimed that overseas investment leads to hollowing out. The sales of overseas investors increase much faster than that of non-investors. The sales of investors concentrating on China also increase faster relatively than non- investors. Parent companies can increase sales through initiating structural change following overseas investment, or may expand sales in the home country by exporting parts and

components. In addition, it can be noted that between 2003 and 2006, both production line worker and non-production line work for overseas investors increased at significant rates.

Second, investors that concentrate in China achieve higher sales and employment growth than non-investors. The single lower rate was seen for production line employment between 2000 and 2003, but even this figure became higher than that of non-investors during the period 2004 to 2006. Non-production line employment here also increased at a higher rate.

Third, growth rates of sales for companies concentrating in China were much lower than those for companies with diversified investment. Production line employment also fell during 2003-2006 for companies concentrating in China compared to diversified investors. It has already argued that the size of investor concentrating on China is smaller than that of diversified investors in terms of sales and employment. So it is reasonable to say that companies with investment in China were facing more urgent necessity of restructuring when they started to invest in China.

Fourth, sales and employment growth rates are higher for overseas investors compared to non-investors in higher-tech industries. This result was also reflected between investors concentrating in China and non-investors. Thus, domestic sales and employment increases for high-tech companies when they invest overseas, but companies in low-tech industries experience negative effects in sales and job growth when overseas investment is attempted. This result indicates that overseas investment by low-tech industries results in larger production and employment adjustment in the Korean economy.

Fifth, overseas investment creates different effects for production line and non-production line employment. Production line jobs are on the whole negatively affected by overseas investment, but non-production line employment increased much more rapidly for overseas investors vis-a-vis non-investors. The same result can be seen between companies concentrating on China and companies not undertaking overseas investment.

However, this analysis has limitations. As previously noted, the subjects of the study were limited to large enterprises, and thus this analysis cannot explain the whole of Korea's manufacturing industry. Furthermore such analysis does not distinguished the time of investment. As this fails to reflect the time wherein companies invested overseas and commenced production, it is insufficient in accounting for the cause/effect relationship between changes in revenue and changes in employment.

3.5 Policy Responses

(1) Efforts to maintain the technological edge

Direct investment transfers Korean technology to China via a variety of routes. A problem with Korean corporate investment in China today is the lack of differentiation between goods produced in Korea or in China. There is a high possibility that companies will have to transfer a considerable amount of technology in order to compete with local Chinese firms or other multinationals, mandating the production of goods that do not lack in quality compared to items produced in Korea. In addition, these manufacturers will have to move parts and components production to China or acquire parts locally.

As parts manufacturers follow major companies into China, parts and components industry technology is also transferred. For example, Hyundai Motors in China procures 70.3% of its parts locally, with the remaining 28.9% imported from Korea. Parts manufacturers that have expanded into China have no choice but to transfer vital technologies in order to maintain quality levels.

Thus, the most important task for the Korean economy is maintaining its technological edge over China. The gap between the final assembly industries of the two countries must be maintained, and the rate of expansion of investments by these firms into China must be scaled back. If assemblers move into China, they must ensure that the goods they produce in China are different from those produced in Korea by the parent companies. Investment in China must also be incremental rather than in sudden or reckless, as investment has tended to be until now. While China is growing at a remarkable pace, its comparative advantage, given its huge population, is still in labor-intensive industries. Korean corporate investment in China must be made in such a way that comparative advantage over China is maintained.

In addition, the pace of investment in China by core components manufacturers must be controlled. Efforts should be made to ensure that vital parts and intermediate goods with high value-added are produced in Korean plants.

(2) Efforts for export expansion

As investment in China continues to rise, numerous companies have imported raw materials from their parent companies or from other firms in Korea, leading to a large increase in exports. However, this pattern in exports to China will inevitably change in the future.

China will pursue the localization of parts and materials. As Chinese companies increase their technological prowess and new companies expand investment into parts and materials, imports of such items by China will naturally decrease. In this process,

China can attract multinational companies to invest in the local parts and components industry, which includes some Korean companies. As multinational corporations increase their investments in China, Korean firms facing pressure of competition will inevitably turn to local parts and materials, either by attracting partners in Korea to move to China or acquiring parts from local firms.

Whatever the outcome of such developments, Korea's investments in parts and materials manufacturing in China will increase, leading to an adverse effects on exports. Thus, the benefits of the expansion of China's import demands on the Korean economy will continue to decrease, and eventually become detrimental.

Korea must not lose momentum from continuous exports to China. Several measures will help to ensure this. First, as stated above, the pace of investment in the parts industry must be controlled, with investment shifted if possible into the domestic industry. Second, finished goods should be different and higher in value and quality. Third, as China continues to develop its poorer regions, commodities related to development must be marketed.

(3) Discovery of new industries

Korean investment in China has expanded at a rapid pace since 2002, shifting from labor-intensive light industries for third country export to investment in the local market by large enterprises. The rise in these investments may cause hollowing out for Korea's own economy. As the investment environment in Korea continues to worsen, overseas investments are rising faster, compared to Japan and Taiwan, due to the large amount of investments being undertaken by large enterprises. With the lack of alternative industries to manufacturing, such as the service sector, hollowing out may reduce employment and adversely affect the livelihoods of Korean people.

Thus, the opportunities presented by China's growth must be pursued while preventing hollowing out at home. In order to achieve this goal, current negative attitudes toward the manufacturing and assembly industries should be dispelled. Rather than treat the shipbuilding, automobile, steel, electronics and other high-employment manufacturing industries as "dinosaurs" that will eventually have to be abandoned, the prevalent attitude should be extending the lives of these industries through improvements and higher added value. Wider product ranges should be developed through stringent differentiation. These manufacturing industries can easily remain viable through technological development and the growth of small and medium enterprises and parts and components manufacturers.

In addition, there should be enhanced awareness of the parts and intermediate goods industry, which will only face stiffer competition from China in the future. This industry

must be strengthened to maintain vertical division of production with China. Korea should maintain its control of the upper stream of the vertical integration in order to maintain the division of production that it currently maintains with Japan. Investment should also be devoted to service industries that can take advantage of China's industrialization. The government should do its part in increasing social overhead capital and R&D activities to enhance the external environments of Korean corporations.

(4) Responses to worsening investment environments in China

The changes in China's investment policy will undoubtedly be a cause for concern for companies that have expanded into China in order to cut production costs there. Korea's small and medium enterprises in China are being especially hard hit. As revealed in a variety of surveys, only half of the companies in China are reporting profits, even among large corporations with favorable operating conditions. Smaller labor-intensive companies are now facing the heat from China's reduction in investment incentives, and new initiatives that raise labor costs and upgrade its industrial structure.

It would be a significant waste of resources for these companies to immediately cease production. Systematic and relevant information about other investment destinations, such as India, Vietnam, and elsewhere in the Indochina peninsula must be gathered and disseminated. The retreat to other countries must be organized and in an orderly fashion.

A more important task is to improve the investment environment in Korea. Rising labor costs and rents in Korea are forcing companies to expand their overseas investment. Thus, the rise in factor costs in Korea must be suppressed. Development should be made in less-developed parts of Korea to enable investments to be shifted away from China, and eventually attract foreign companies into investing in Korea.

(5) Pursuit of a Korea-China FTA

An important tool for stopping the rush of investment into China and enhance export competitiveness for domestic firms by creating a favorable external environment is the creation of a Korea-China Free Trade Agreement, which will reduce transaction costs as well as stem the flow of investments by Korean firms into China. In other words, lower tariffs that result from an FTA will reduce the need for Korean firms to invest heavily in China, thereby reducing some of the negative effects on production and employment of investing in China.

A Korea-China FTA will enhance transparency for China's policies for companies that have already expanded or plan to expand into China, thus reducing the risk of uncertainty. One of the major problems that Korean firms in China face is the lack of

consistency in Chinese government policy, which did not improve even after China joined the WTO. Korean companies will be able to demand their due rights in the investment structure, intellectual property rights and in the service industry.

Chapter IV

Comparison of Korean and Taiwanese Investments in China, and in Search of Cooperation

There are many similarities in the economic developments of Korea and Taiwan, such as the focus in Asian economics and trade, industrial structure, and direction of future industrial development; furthermore, both face threats from a rising China in regional economic development. Therefore, not only do the Chinese investment policies of Korea and Taiwan affect each other's interests in China, each can use the policy of the other as a mirror to reflect upon itself. With this motive, this chapter aims to compare the current situation and strategy of Korean and Taiwanese activities in China using three aspects of the industry value chain: Manufacturing; R&D; and Service, and to understand the emphasis of these activities. Discussions of strategies will be directed toward changes in entry modes to China in hopes of finding common interests, thereby proposing a strategy that can be referenced for the development of manufacturers in both Korea and Taiwan.

4.1 Comparison of Korean and Taiwanese Manufacturing Activities in China

4.1.1 Investment Course and Motive Transition

Taiwan began investment activities in China as early as 1987; Korea, however, waited until establishing diplomatic relations with China in 1992. Although Korea and Taiwan had different starting points, the courses of their investments in China were very similar. Both went through three investment phases: the period of rapid growth; the period of adjustment; and the period of resurgence, each represented by different investment concepts. The investment concepts of the three phases will be briefly described in the following paragraphs.

Table 4-1 A Time Line of the Three Different Phase of Investment in China

Phase of investment	Time line	
	Taiwan	Korea
The period of rapid growth	1987~1994	1992~1997
The period of adjustment	1995~1999	1997~1999
The period of resurgence	2000~	2000~

Source: Organized by TIER

1. The period of rapid growth

This is the phase that Korean and Taiwanese investments in China were most active and grew most rapidly. The main factors include the gradual fading of competitiveness of industries in Korea and Taiwan; China's relatively advantageous investment environment; and the improvement of relations and interactions with China. In terms of domestic business environment and industrial competitiveness, after the Plaza Accord in the mid-80s, the value of the New Taiwanese Dollars and the Korean Won appreciated significantly in a short period of time, causing a rapid increase of wages and of asset prices in both countries. As a result, staple industries that originally operated on low cost, such as textile, apparel, and leather industries, lost their international competitiveness. Seeking to survive internationally, these enterprises moved their production bases overseas. Starting from 1992 and 1987 respectively, Korean and Taiwanese investments in China began growing significantly under China's policy reform to actively promote international trade.

2. The phase of adjustment

During the second half of 1995, Taiwan was affected by cross-strait political tension, and many plans for investing in China were left aside. In 1997, to protect Taiwan's industries and economic development against any drastic impact of Taiwanese firms' investment in China, Taiwan's government administered political guidelines and restrictions on investments in China, thus succeeding in reducing the amount of money invested by Taiwanese investors in China. At the end of 1997, Korea began to experience the impact of the Asian Financial Crisis, and investments in China decreased rapidly. The strength of Korean enterprises in overseas investments declined significantly. The scale of investments during 1998~1999 shrunk to only half of that during 1996~1997. Therefore, during this phase, Taiwanese firms either slowed down investments or transferred investments to Southeast Asia; Korea was heavily impacted by the financial crisis, and many Korean businesses in China faced operational difficulties.

3. The period of resurgence

Korea's economy was swift in emerging from the financial crisis, and after the new DPP government, Taiwan began to allow mature industries to invest in China. Therefore, investments in China from both Korea and Taiwan began resurging in 2000, and the growth became even more significant after China's accession to the WTO in 2001. As China's economy continued to grow and the income of people living in costal regions of China continued to climb, investments of both countries became market oriented; the invested industries and business activities of manufacturers diversified.

Table 4-2 Cause of Transitions for Three Phases

Phase of investment	Cause of Transition	
	Korea	Taiwan
The period of rapid growth	Diplomatic relations Factor endowment and price	Cross-strait openness Factor endowment and price
The period of adjustment	Asian Financial Crisis	Political tension
The period of resurgence	Economic recovery	Deregulation

Source: Organized by TIER

4.1.2 Investment Volume

According to statistics of the Chinese Ministry of Commerce, in December 2006, the number of Korean investors in China was 6,115, and the total investment amount reached US$5.168 billion, ranking 4th among the top 10 FDI source countries of China. The official figures for Taiwan were 3,907 and a mere US$2.152 billion, ranking only 7th (Table 4-3). However, manufacturers from both Korea and Taiwan have also made investments in China through three duty-free ports: the Virgin Islands, the Cayman Islands, and Samoa. The number of Taiwanese investors through these ports was 1,517 with a total investment of US$4.192 billion, whereas the figures for Korea were 6 and US$214 million. Therefore, the real amount of Taiwanese and Korean investments in China should be US$6.344 billion and US$5.204 billion, ranking 3rd and 4th respectively.

Up to the end of 2005, the total number of Taiwanese and Korean establishments

in China reached 76,162 and 38,898. Contracted investment amount was US$135.594 billion and US$70.829 billion, and real investment amount was US$62.119 and US$313.18, respectively. Concerning the number of establishments and real investment amounts, Taiwan accounted for 13.77% and 9.98% of all the foreign firms, and Korea accounted for 7.03% and 5.03%. The accumulated number of establishments and real investment amounts of Taiwan were both higher than that of Korea because of Taiwan's head start. Rankings of Taiwan and Korea are 2nd and 5th respectively, in terms of accumulated real investment amounts.

Observations of the time series and trend of investment amounts, excluding the duty free ports, reveal that investment amounts from Korea have been growing at a significant pace after 1999, which is the beginning of the period of resurgence. By comparison, Taiwan has shown negative growth, starting from 2003. Therefore, although Taiwanese investments in China were all higher than Korean investments before 2002, Korea surpassed Taiwan in 2003, and has remained substantially ahead since then.

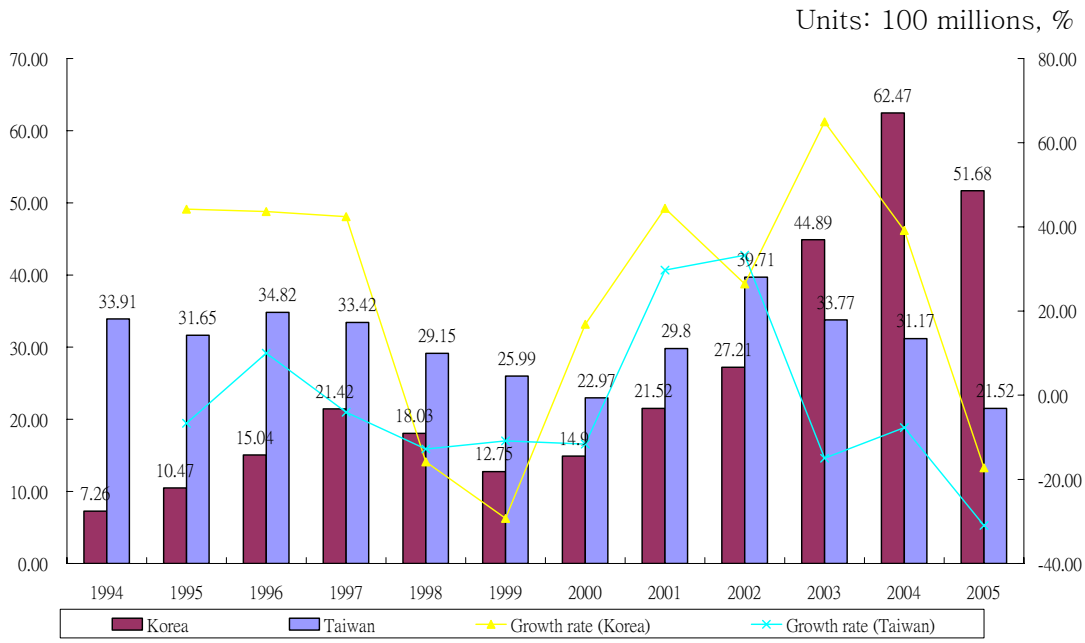
Table 4-3 The Top 10 FDI Source Countries of China in 2005

Unit：100 millions, %

Ranking	Country	Real amount	Percentage
1	HK	179.49	29.75
2	BVI	90.22	14.96
3	Japan	65.30	10.82
4	S. Korea	51.68	8.57
5	USA	30.61	5.07
6	Singapore	22.04	3.65
7	Taiwan	21.52	3.57
8	Cayman Islands	19.48	3.23
9	Germany	15.30	2.54
10	Samoa	13.52	2.24
	Top 10	509.15	84.40
	Total	603.25	100.00

Source: The 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

Figure 4-1 Time Series Trend of Investment from Korea and Taiwan to China



Source: The 2006 China Statistical Yearbook

By using the real investment amounts announced by the Chinese government to calculate the proportion of investments in China to GDP for Korea and Taiwan, we can calculate that after reaching the peak of 1.4% in 2002, Taiwan has gradually declined to around 0.6% in recent years. On the other hand, the share of investments in China to GDP for Korea has been gradually increasing year by year, and although it dropped to around 0.7% in 2005 after reaching the peak of 0.9% in 2004, it is still higher than that of Taiwan. This shows that Korea is more aggressive about investing in China, and that Taiwan, with its emphasis on dispersing risk globally, has adopted the policy to channel investments in China otherwise.

Table 4-4 Share of Investments in China to GDP for Korea and Taiwan

Unit：%

	1997	1998	1999	2000	2001	2002	2003	2004	2005
Korea	0.50	0.56	0.31	0.32	0.50	0.57	0.74	0.92	0.66
Taiwan	1.09	1.06	0.87	0.71	1.02	1.35	1.13	0.97	0.62

Source: The 2006 China Statistical Yearbook、International Financial Statistics, IMF

4.1.3 Investment Industries

Taiwanese and Korean investments in China are mainly made by the secondary sector (the manufacturing and energy industries); percentages of its accumulated number of establishments and investment amounts have both surpassed 70%. In 2005, for example, the number of new Korean and Taiwanese industrial (manufacturing and energy industries) establishments were 4,874 and 2,835, accounting for 79.71% and 72.56%; real investment amounts were US$4.614 billion and US$11.809 billion, accounting for 89.26% and 84.06% respectively. In the gradually growing service industry, the number of Korean and Taiwanese service establishments in 2005 were 1,109 and 907, accounting for 18.14% and 23.21%; real amounts were US$435 million and US$ 289 million, accounting for 8.42% and 13.43% respectively.

Table 4-5 Sectoral Distribution of FDI in China for 2005

	Establishment				Utilized investment			
	Korea		Taiwan		Korea		Taiwan	
	number	%	number	%	amount	%	amount	%
Primary sector	132	2.16%	165	4.22%	1.2	2.32%	0.54	2.51%
Secondary sector	4,874	79.71%	2835	72.56%	46.13	89.26%	18.09	84.06%
Tertiary sector	1,109	18.14%	907	23.21%	4.35	8.42%	2.89	13.43%

Source: The 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

According to the statistics of the Chinese Ministry of Commerce, in the various industries of manufacturing, Korean investments are more concentrated on transport equipment, textile, petrochemistry, steel, and electronic communication equipment industries while Taiwanese investments are mainly in computer, electronic communication equipment, basic metal, medicine, textile, and food and beverage industries. Both countries usually rank top five in their main investment industries. During 2005, the top three industries for Korean investments in the service industry were rental and business services, real estate, and trade industries; Taiwanese investments in the service industry were mainly in the trade, logistics, and rental industries.

Table 4-6 The Major FDI Source Countries for Chinese Manufacturing Industries in 2005

Industry	Amount of Investments (100 millions)	Major FDI Source Countries			Ranking for Taiwan	Ranking for S. Korea
Automobiles	135.9	HK (24%)	S. Korea (20%)	Japan (15%)	7%(5)	20%(2)
Electronics and Communications	480.19	HK (27%)	S. Korea (20%)	BVI (11%)	8%(5)	20%(2)
Computers	11.44	HK (44%)	BVI (11%)	Taiwan (10%)	10%(3)	7%(4)
Cell phones	11.28	HK (52%)	BVI (40.8%)	S. Korea (2.1%)	N/A	2.1%(3)
IC	36.12	HK (21.1%)	HK (20.6%)	U.S.A (14.5%)	N/A	11.8%(4)
Software	9.32	HK (31%)	BVI (15%)	Japan (13%)	2%(10)	5%(6)
Steel	11.71	HK (44.5%)	E.U (26.5%)	S. Korea (13.1%)	2.9%(6)	13.1%(3)
Nonferrous metals	11.44	HK (43%)	BVI (19%)	Japan (9%)	7%(5)	N/A
Medicine	50.78	HK (44%)	USA (12%)	BVI (10%)	5%(4)	N/A
Electricity	93.88	HK (45.2%)	BVI (22.3%)	USA (8.26%)	2.3%(7)	1.4%(8)
Petrochemistry	171.71	HK (33.2%)	S. Korea (10.3%)	USA (9.6%)	4.8%(6)	10.3%(2)
Textiles	197.88	HK (39.9%)	S. Korea (16.1%)	Taiwan (7.2%)	7.2%(3)	16.1%(2)
Beverages	41.45	HK (38%)	BVI (13%)	Taiwan (8%)	8%(3)	3%(10)
Tires	16.73	HK (23%)	Japan (21%)	S. Korea (17%)	N/A	17%(3)
Paper	83.25	HK (30%)	USA (9%)	Taiwan (8%)	8%(3)	7%(4)

Source: 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

4.1.4 Investment Regions

Most Korean and Taiwanese manufacturers choose to make their investments in the coastal provinces of east China. In 2005, for example, the number of Korean and Taiwanese establishments were 5,804 and 3,297, accounting for 94.93% and 84.39% of overall establishments of each country; actual investment amounts were US$5.016 billion and US$1.882 billion, accounting for 96.75% and 87.45% respectively. Cross-analysis of statistical data, such as trend of investment amount change, industrial structure and region selection, reveal that even though Korean investments in China have continued to grow, Korean manufacturers still choose to invest in coastal provinces where the wages are higher and the investment conditions are less attractive, indicating that the attention of regional considerations of Korean manufacturers is not just fastened on land and industrial clusters; they also target

consumers of the flourishing eastern coastal provinces. Looking back on Taiwan, we find that most Taiwanese investors are SMEs and service providers of the domestic staple industry, who tend to move towards central and west China provinces in search for relatively cheaper resources and new internal markets. That explains the reason why the number of Taiwanese establishments and investment amounts in eastern coastal regions is less than Korea's.

Table 4-7 Regional Distribution of FDI in China for 2005

	Establishment				Utilized investment			
	Korea		Taiwan		Korea		Taiwan	
	number	%	number	%	amount	%	amount	%
East region	5,805	94.93%	3,297	84.39%	50.16	96.75%	18.82	87.45%
Central region	245	4.01%	427	10.93%	1.47	2.84%	2.44	11.35%
West region	65	1.06%	183	4.68%	0.21	0.41%	0.26	1.19%

Source: 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

Table 4-8 lists the most concentrated regions of Korean and Taiwanese investments. Due to differences in factors such as investment course, distance from the mother country, and industrial clusters, Korea has chosen areas surrounding the Bohai sea in Shandong, Liaoning, and Tianjin as its main regions of investments, and Korean activities have gradually moved towards Jiangshu and Zhejiang of the Yangtze River Delta in recent years. Taiwan, however, has chosen Guangdong, Jiangshu, and Zhejiang of the Pearl River Delta and the Yangtze River Delta as its main regions of activities, and has been gradually moving towards the areas surrounding the Bohai sea in Shandong and Hebei. When looking at the development regions that Korea and Taiwan have in common, we can see that the development in the Yangtze River Delta and areas surrounding the Bohai Sea will cause the cooperation and competition of Taiwanese and Korean firms to intensify—which could develop into a situation where both parties possess new forms of industrial clusters with comparative advantages.

Table 4-8 Major Location of FDI in China for 2005

Country	1th	2nd	3rd	4th	5th
Korea	Shandong	Liaoning	Jiangshu	Tianjin	Zhejiang
Taiwan	Jiangshu	Shandong	Zhejiang	Guangdong	

Source: The 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

4.1.5 Transition of Entry Mode

In the past, Korean and Taiwanese manufacturers were mostly SMEs that pursued cheap production; they established facilities in China for manufacturing, and then sold their products to a third country or back to the mother country. Early investments were mostly made by labor-intensive industries. Korean and Taiwanese manufacturers simply moved their equipment to China, while product sales and cash management were still controlled by headquarters in the mother country. Therefore, in order to reduce transportation and operation costs, and to effectively manage local workers, both countries chose to invest in regions that are geologically or culturally similar to their own, and the entry modes were generally Greenfield.

However, the makeup of Korean and Taiwanese investors has been changing in recent years, and large enterprises have gradually become the main force of investments in China. Large enterprises focus on the expansion of China's domestic market, which is different from SMEs that focus on resource utilization. The difference between large Korean and Taiwanese enterprises is that large Korean enterprises have the advantage of powerful international brands. Therefore, market coverage of Korean enterprises is generally larger than that of Taiwanese enterprises of the same industry when it comes to expanding China's domestic market. Also, most Taiwanese manufacturers adopt the OEM business model, and have weaker owned brands internationally, which is why they adopt a gradual strategy for China's domestic market. Furthermore, differences in Korea's and Taiwan's industrial structure have resulted in different targets for their activities in China's domestic market. Large Korean heavy industry groups are very competitive internationally, and public infrastructures and facility expansions are a part of their target market. For example, the LG Group's investments in automobile, motor, heavy equipment and cement industries in Shandong aim at government and corporate markets. Taiwan's

advantages in language, culture, and earlier activities, have directed the focus more on requirements of the domestic staple department, such as food, beverage, and medicine.

Both countries view China as an important domestic market, therefore, both countries have been gradually increasing the investment percentage of their R&D and marketing service activities and are developing towards localized resources, enlarged scales, and integration of their up and downstream value chains. Korean and Taiwanese industries, excluding ICT industries, have different target markets. However, in their main ICT and communication products, value chain activities of both countries will gradually begin to interfere with each other, and the cooperation and competition of international enterprises from both countries will intensify even more.

Comparison of entry point transition for Korea and Taiwan can be organized into table 4-9.

Table 4-9 A Comparison between Korea and Taiwan on the Dynamics of Investments in China

Dynamics of Changes	Korea	Taiwan
Major Player	From SMEs to MNCs	
Motivation	From cost-saving to market expansion	
Major operation	From manufacturing to R&D and marketing	
Industry	From the manufacturing sector to the service sector	
Area	From the Bohai Gulf to the Yangtze Delta	From the Yangtze Delta to the Bohai Gulf
Business model of MNCs	OBM	OEM and ODM
The target field in the Chinese domestic market	Public construction and fixed capital formation of business	Staples

Source: Organized by TIER

4.1.6 The effect of investments in China on the economy of Korea and Taiwan.

Globalization has advanced international activities of the industrial value chain and has caused significant growth of trade volume between countries in the same region. Although trade activities are becoming more and more frequent, international relocation of production activities has engendered both positive and negative effects on the county's economy. Outbound FDI is a type of action that follows international comparative advantage principles, moving ineffective production activities overseas and allowing limited domestic resources to be used for more economic benefit, which basically improves efficiency. However, this discussion is based on the existence of a "superior utilization of resources," meaning that domestic industries must be upgraded or transformed in order to avoid the negative effects of overseas investments on domestic welfare, including reduction of investments, output, and employment. Therefore, besides the impact of overseas investments on the domestic economy, more important is the discussion of whether or not the industrial structure and investment environment of Korea and Taiwan are capable of encouraging industrial upgrade and reducing the impact of industrial hollowing-out.

From the discussions of chapter two and three, we can observe the significant trade of components and intermediate products driven by Korean and Taiwanese production activities in China. However, following the effects of industrial cluster and supply chain localization, investment-driven trade has been trending downwards in recent years. According to China's trade data (Table 4-10), the percentage of mechanical equipment and intermediate products A is gradually declining in China's import structure from Korea and Taiwan. Investigations conducted in Korea and Taiwan on related enterprises have led to the same results. For instance, in 2004, studies from the Korean Development Institute (KDI) have shown that the Chinese branches of Korea's two major groups, Samsung and LG, has reduced their purchase percentage in Korea to less than 40%—indicating that the percentage of purchases made in China has reached 50% (Table 4-11). This shows that the positive effects of outbound FDI on domestic exports are also gradually declining.

Table 4-10 The Structure of exports from Korea and Taiwan to China by the World Bank Classification, 1996-2006

Unit:%

		1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Korea	Agriculture, Forestry, Livestock, and Hunting Products	0.25	0.18	0.17	0.15	0.17	0.09	0.11	0.09	0.06	0.05	0.04
	Processed Food	0.41	0.41	0.41	0.33	0.37	0.39	0.28	0.23	0.24	0.25	0.19
	Beverage and Tobacco Preparation	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02	0.02
	Energy and Minerals	0.11	0.14	0.13	0.08	0.07	0.06	0.05	0.05	0.08	0.07	0.07
	Construction Materials	0.05	0.04	0.03	0.01	0.04	0.06	0.04	0.02	0.02	0.02	0.02
	Intermediate Products A	40.96	42.71	46.07	42.23	40.63	38.64	34.06	30.05	28.39	27.01	25.59
	Intermediate Products B	40.59	42.79	42.18	46.51	46.05	46.00	43.22	49.20	55.05	59.60	61.03
	Consumer Non-durable Goods	3.76	3.32	2.95	2.76	2.36	2.34	2.24	1.77	1.56	1.60	1.56
	Consumer Durable Goods	0.91	0.67	0.55	0.61	0.52	0.63	0.72	0.99	0.63	0.43	0.48
	Machineries	11.98	8.53	7.14	6.94	9.37	11.17	18.53	16.65	12.95	9.99	9.95
	Transportation Equipments	0.96	1.20	0.36	0.37	0.41	0.62	0.75	0.94	1.01	0.96	1.04
Taiwan	Agriculture, Forestry, Livestock, and Hunting Products	0.25	0.21	0.18	0.18	0.15	0.11	0.08	0.06	0.05	0.07	0.06
	Processed Food	0.18	0.14	0.12	0.15	0.18	0.14	0.10	0.11	0.09	0.10	0.08
	Beverage and Tobacco Preparation	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.01
	Energy and Minerals	0.14	0.13	0.16	0.17	0.11	0.07	0.04	0.04	0.05	0.06	0.04
	Construction Materials	0.10	0.13	0.08	0.08	0.06	0.04	0.04	0.04	0.03	0.02	0.03
	Intermediate Products A	30.90	33.94	34.65	33.84	34.34	34.82	31.61	29.07	26.16	25.88	22.89
	Intermediate Products B	42.95	45.27	46.40	46.07	44.48	43.79	46.94	51.32	56.80	58.63	63.10
	Consumer Non-durable Goods	3.23	3.03	3.10	2.53	2.06	1.71	1.66	1.46	1.55	1.78	1.60
	Consumer Durable Goods	0.46	0.51	0.59	0.61	0.60	0.81	0.87	0.79	0.40	0.31	0.22
	Machineries	21.61	16.52	14.62	16.17	17.88	18.38	18.54	16.92	14.83	13.12	11.93
	Transportation Equipments	0.18	0.12	0.09	0.18	0.13	0.14	0.13	0.18	0.02	0.03	0.02

Source: Computed by TIER based on Chinese trade data

Table 4-11 Local Sourcing for the Major Korean Firms in China

Unit：%

	Purchases from		Sales to	
	Samsung	LG	Samsung	LG
China	49	51	36	33
Korea	38	39	11	2
Others	13	10	47	65

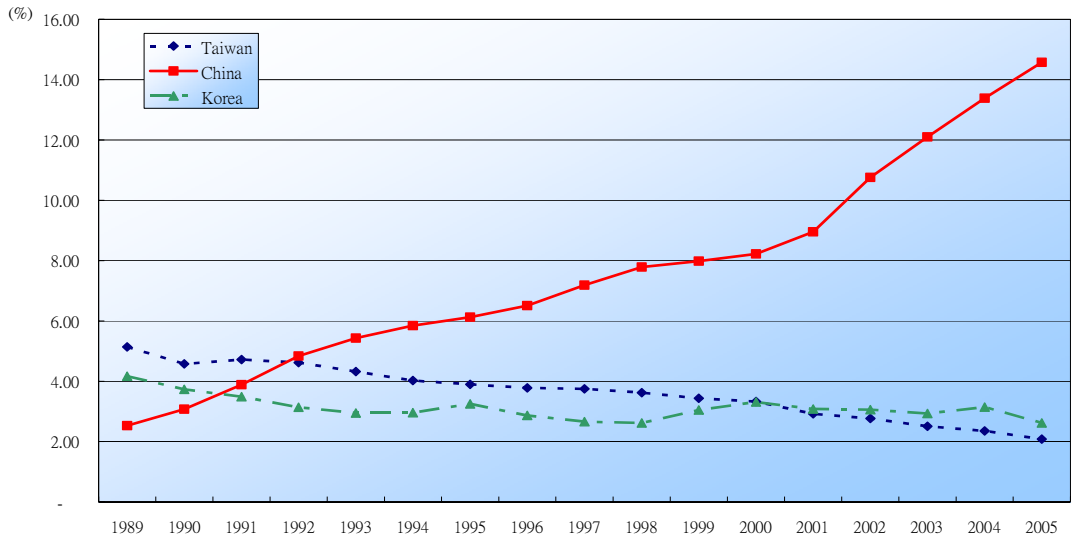
Source: “Economic Integration in East Asia and its Impact on the Korean Economy,” KDI, 2004

The supply chain of Korean firms in China mainly comprises of subsidiaries of a large group, or is partially provided by manufacturers of other countries (including Taiwan). Upstream supply abilities of Korea’s domestic SMEs are relatively less competitive, which is why the percentage of their entering China’s local supply chain or forming industrial clusters is less than the percentage of Taiwanese SMEs. Therefore, even though the decline of investment-driven trade has affected exports of Korean and Taiwanese upstream manufacturers, in terms of effects from supply chain localization, Taiwanese SMEs has obtained higher profits than Korean SMEs.

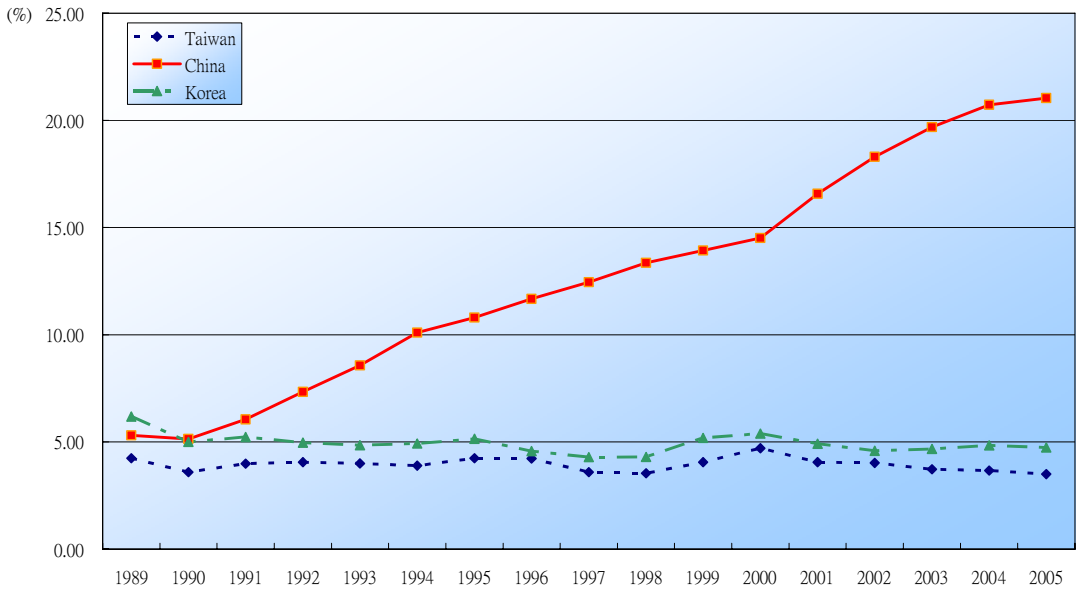
After observing the degree to which Korean and Taiwanese firms substitute domestic manufacturers in main market exports, we find that Korean and Taiwanese shares in American, Japanese, and EU markets have either slowed down or are declining and that China’s shares in these markets are rapidly increasing (Figure 4-2).

Figure 4-2 Shares of Korea and Taiwan in the Import Market of the U.S and Japan

The United States



Japan



Source: Computed by TIER based on the United States and Japanese trade data

After further observing the positions of Korean and Taiwanese firms in China's exportation (Table 4-12), we find that 12 of China's top 100 exporting firms are Korean and 18 are Taiwanese, in which Hongfujin Precision Industry Co., Foxconn

Technology Group's investment in China is the top exporting firm in China, showing that substitution effects in overseas market should be fairly significant. Investments of Taiwanese firms in China mainly export to European and American markets and focus less on China's domestic market than that of Korean firms. Furthermore, Korea is in a better trade position than Taiwan for export to European and American markets. Therefore, Taiwan's domestic manufacturers will receive a harder blow than Korea's domestic manufacturers from export substitution.

Table 4-12 Korean and Taiwanese Affiliations Listed in China's Top 100 Exporting Firms

Taiwan			Korea		
Ranking	Name	Exports	Ranking	Name	Exports
1	Hong Fu Jin Precision Industry (Shenzhen) Co	14,474	9	Samsung Semiconductor (Suzhou)	3,538
5	ASUS Tek Computer Inc	6,212	27	LG Electronics Inc (Huizhou)	1,803
6	Inventec Corporation	4,199	32	Samsung SDI (Suzhou)	1,468
8	QSMC Shanghai (F2)	4,040	43	LG. Philips LCD (Nanjing)	1,216
11	QSMC Shanghai (F1)	3,363	45	Samsung Communication (Tianjin)	1,178
12	QSMC Shanghai (FP)	3,238	54	LG Electronics Inc (Tianjin)	959
14	Compal Electronics (Kun Shan)	2,797	59	Samsung Computer (Suzhou)	885
15	Inventec (Shanghai)	2,513	69	LG Electronics Inc (Nanjing)	798
18	Compal Computer Inc (Kun Shan)	2,376	71	Samsung Electronics (Huizhou)	791
20	BENQ	2,363	73	Samsung Communication (Shandong)	784
21	TPV Technology Ltd	2,336	88	Samsung Electronics (Suzhou)	701
25	Foxconn (Shenzhen)	1,916	99	Samsung SDI (Dongguan)	658
26	AU Opronics (Suzhou)	1,831			
66	QSMC Shanghai (F4)	814			
80	Askey Technology (Jiangsu) Ltd	744			
84	Compal Computer Inc (China)	730			
85	Compal Communications, Inc (Nanjing)	717			
92	Wistron (Kun Shan)	684			

Source: The General of Administration of Customs, China

By observing the extent to which various Chinese products have substituted Korean and Taiwanese products in European and American markets in terms of product technology, we discover that since Taiwan lifted restrictions in 2002 against the investments of various industries in China, the percentage of various products

being substituted by Chinese products in American, Japanese, and EU markets has increased significantly. The phenomenon is especially obvious with low technology products. However, in 2005, Taiwan's efforts to elevate the technology level and differences in high-tech products has successfully reduced substitution percentages.

Table 4-13 The Proportion of Taiwanese Products Substituted by Chinese Products in the U.S, Japanese, and EU Markets

Unit：%

American Market

	1990	2000	2003	2006
High Tech	1.08	2.29	18.18	7.02
Mid-High	3.9	6.53	6.63	7.52
Mid-Low	4.57	3.57	5.07	4.79
Low Tech	9.75	6.14	12.34	9.78

Japanese Market

	1990	2000	2003	2006
High Tech	2.11	1.38	13.84	4.04
Mid-High	2.69	5.29	10.75	4.47
Mid-Low	4.74	4.03	4.71	3.39
Low Tech	4.21	8.26	6.86	9.26

European Market

	1990	2000	2003	2006
High Tech	1.59	3.12	15.84	6.48
Mid-High	2.6	3.37	5.32	2.90
Mid-Low	7.03	2.88	4.08	4.21
Low Tech	5.63	5.67	7.29	10.47

Source: Trade Data from U.S.A, Japan, and the EU

Korea started investment activities in China at a later time than Taiwan; therefore, effects of investments in China on exports of various Korean domestic products to advanced countries didn't start surfacing until 2004. At this time, the degree to which high-tech and low-tech products were substituted by Chinese products were most significant in American and EU markets. In comparing the substitution trends for Korea and Taiwan in advanced markets, not only have we found differences in the timeline, but also in the margin of change. In recent years,

Taiwan has been putting effort into enhancing product differentiation, investing in and managing technologies of high-tech industries, and developing towards upstream industries of key components. Therefore, Taiwan has been able to gradually separate its high-tech products from China and reduce its degree of substitution. Korea has been relatively active in China's domestic market and R&D; the main products they have invested in manufacturing are mostly end merchandise. Therefore, even through Korean product lines for the American and EU markets are different from those for China's domestic market, in 3C products, which has basically mature technology, cheap-end merchandise manufactured in China are still inflicting enormous pressures on Korean firms in European and American markets.

Table 4-14 Proportion of Korean Products Substituted by Chinese Products in the U.S, Japanese, and EU Markets

Unit：%

American Market

	1990	2000	2003	2006
High Tech	1.38	2.57	8.55	13.20
Mid-High	1.82	1.48	2.67	2.22
Mid-Low	2.46	3.69	5.08	4.73
Low Tech	5.28	4.04	8.13	10.62

Japanese Market

	1990	2000	2003	2006
High Tech	1.63	1.82	5.05	2.08
Mid-High	4.01	3.73	5.16	4.21
Mid-Low	1.6	1.44	2.11	2.66
Low Tech	5.8	12.02	10.35	10.85

European Market

	1990	2000	2003	2006
High Tech	2.42	2.75	9.2	4.79
Mid-High	1.64	1.43	1.9	1.76
Mid-Low	6.48	2.52	3.42	3.93
Low Tech	5.33	4.05	6.3	7.83

Source: Trade Data from U.S.A, Japan, and the EU

Finally, in terms of the effects on output and employment, although overall domestic investment strategies of both Korea and Taiwan are developing towards industrial upgrade, the growth margins of emerging industries are unable to make up for the margins of leaving industries. Therefore, we have found that investments in China have generally caused negative effects on Korea's and Taiwan's output and employment. Furthermore, overseas investments are also interrupting domestic production networks. According to a research of the KDI, Korean SMEs have long-term dependence on orders or investments from large Korean enterprises; their productivity has always been weaker than SMEs of other countries. Therefore, after various products are moved to China, if Korea's domestic SMEs wish to continue their supply chain relationship with large enterprises, they will have to accept substantially increased cost; those that are unable to accept the increased cost will have a hard time finding new supply chain allies or markets. Thus, Korea's SMEs are facing severe operational challenges. The percentages of local workers hired by Korean firms in China are generally above 90% (Koreans are only employed on the management level), which is why overseas investments also have significant impact on the employment of Korean workers.

In spite of the severe challenges, the Korean government has put a lot of effort into improving its domestic investment environment. Besides ensuring continuous development of main domestic industries to strengthen the foundation for domestic manufacturing, the Korean government has also employed methods such as encouraging venture capitals to invest in SMEs that possess technology, and enhancing attractions to foreign firms, to increase domestic investments and alleviate the impact from Korean enterprises that are moving overseas. To improve its investment environment, Korea has adopted a flexible immigration system for attracting international talents; offers attractive rental tax conditions compared with neighboring countries; and actively negotiates Free Trade Agreement (FTA)—all of which attracts foreign firms and alleviates pressure from insufficient domestic resources and industrial hollowing-out. Taiwan has launched a series of investment promotions for attracting Taiwanese firms to return and make investments in Taiwan. New industrial policies concerning middle to long-term industrial upgrade and

transformation have also been implemented to encourage enterprises to research and develop their own brands, and to create industrial clusters and local cultural creative industries, in hopes of accelerating industrial upgrade through the enhancement of non-tradable goods and developing knowledge economics. These examples show that both countries are trying to alleviate the impact from overseas investments on domestic output and employment by designing industrial policies to attract foreign firms and nurture new industries.

4.1.7 Summary

Finally, we will summarize the above using the localization trend for Korean and Taiwanese firms and possible cooperation models under this trend. From the contents of chapter two and three, we know that the purpose of Korean and Taiwanese investments in China has been gradually transformed into expanding China's domestic market. Therefore, in order to respond to local market demands faster and more efficiently, firms of both countries have expanded their operational activity range and have increased percentage of resources used for localization. In strategies and various management adjustments for managing China's market, firms of both countries are also given greater and greater autonomy. The percentages of decisions made by the mother companies in both countries are declining year by year. This shows that following the elevated levels of firms internationally and growing years of establishment, firms in China from both countries are becoming more and more independent.

Increased independency is first reflected in the transition of division of labor models. The value chain's vertical division of labor model, in which technology and key components are provided by companies in the mother country while subsidiaries in China are responsible for assembly and logistics, has been gradually replaced by the horizontal division of labor model, in which companies of the mother country are responsible for manufacturing new products with high added value while subsidiaries in China are responsible for manufacturing more mature products. Furthermore, China's production technology and management levels have been increasing at a very high speed in recent years; we have found that the quality levels of products produced

by subsidiaries and mother companies are becoming closer and closer. This demonstrates that subsidiaries in China and China's local manufacturers have the ability to rapidly implant products that were originally manufactured in Korea and Taiwan. Therefore, to protect the performance of products exported to the European and American markets from adverse impact, both countries tend to keep the production and development of those products in their own countries. However, some differences do exist in Korean and Taiwanese strategies for the ICT industry, which is the main industry of Korea and Taiwan. Korea is affected by the Korea Premium strategy adopted by its two major brands, Samsung and LG, when managing the ICT product market. The strategy is to create a leading brand position in China's market with high level products, making them more active than Taiwan in terms of product technology levels. Taiwanese ICT manufacturers mostly adopt the OEM business model and have relatively low percentages of sales in China; Taiwan's product investments in China are mainly invested in coordination with international clients with a relative lack of overall market strategy. Therefore, for the ICT industry, Korea elevates independency based on the expansion of China's domestic needs; Taiwan receives orders for production in China, and then elevates independency in a third country.

The first effect that increased independency of the subsidiaries in China has on the economies of Korea and Taiwan is the continuous decline of trade driven by overseas investments. Taiwanese firms are mostly OEM manufacturers, and will easily feel cost pressures from international clients, making Taiwan's localization in China passive. When compared with Korea's active localization in order to be closer to China's market demands, the investment-driven trade of Taiwan is affected by international business, and declines at a faster pace than that of Korea. Concerning substitution effects in overseas markets, in the past, made-in-China products replaced products made in the mother country mostly through the low-price advantage. However, in recent years, comparative advantages in China's investment environment are gradually fading. Therefore, differences in quality and technology of products from subsidiaries in China and mother companies have become the key to the significance of substitution effects. Although cost advantage has allowed

Chinese-made products to continuously substitute for Taiwanese-made products in European and American markets, Taiwanese firms have been relatively conservative in expanding product variety, and therefore, overall substitution effects, especially in high-tech products, have gradually been alleviated. As for Korean firms, being relatively active in expanding product variety in China might cause the substitution effects in European and American markets to be more significant than those of Taiwan.

Even though target markets of Korean firms and Taiwanese firms in China are slightly different, the difficulties that they face are generally the same. In the system, joint venture limitations, limitations on hiring local workers, and limitations on the obligation to transfer technology have become obstacles against the development of both countries in China. In managing China's domestic market, both countries are threatened by product prices of China's local manufacturers, and more importantly, both are suppressed by China's local distributions. The cost of China's sales distribution is fairly considerable, and local professional distributors often possess great bargaining power. Even if dealership is concentrated and handed over to one national distribution, an equal negotiation position with local distributors will still be hard to acquire. Also, financial risks and extra promotion expenses will have to be assumed, and the many marketing activities of the distributors, including price reduction promotions, will also work against the product's original image positioning. Therefore, to gradually reverse the various problems that foreign firms' products face in the Chinese market, possible future directions of cooperation between Korean and Taiwanese firms in China includes uniting to advocate for system improvements and enhanced investment protection for foreign firms. Finally, firms from both countries may also cooperate in the common regional markets to create a professional distribution mechanism that separates itself from China's local distributions with various service contents.

4.2 Comparison of Korean and Taiwanese Patenting in China

China, the world's largest emerging economy, attracts enterprises from all over the world, not only to invest in manufacturing, but also to establish R&D centers as a

way to utilize China's abundant work force and R&D manpower. This contributes to the active expansion of China's immense domestic market. To protect the rights of their own technology, international enterprises have built up entire barriers for their intellectual property rights. Not only are they actively constructing the patent thickets, they are also administering various strategies for patent infringement lawsuits. The cases of patent infringement in 2002-2004 of various groups from numerous countries demanding higher patent royalties from China's DVD manufacturers preludes China's patent crisis. Starting in March, 2007, each digital TV set that China exports to America will face a royalty of US$10, which definitively shows that the patent war will become a severe challenge for China.

This section starts from a competition point of view and analyzes the situation of Korean and Taiwanese patenting in China in order to understand how major countries construct patent blocking in China to protect their own technologies and to prevent China from catching up. This section further analyzes the competitiveness of technologies from major countries and the situation of their patent performance in China.

4.2.1 Patent applications and patents granted

1. Number of applications

Table 4-12 shows the six countries with the most patent applications submitted to the State Intellectual Property Office (SIPO) of the PRC during 2001-2005, in which China accounted for 74.4%, followed by Japan 7.71%, Taiwan 5.51%, USA 4.25%, South Korea 1.70%, and Germany 1.59%. As for patents granted, China accounted for 74.8%, followed by Japan, Taiwan, USA, Germany, and Korea. Using patent applications and patents granted, the main patent contenders in SIPO are China, Japan, Taiwan, USA, Korea, and Germany. After comparing the number of patent applications between 1996-2000 and 2001-2005, we find that the number of Korean patent applications grew 207.14%, which is higher than Taiwan's 117.51%. However, the number of invention patent applications from Taiwan grew nearly 455.75% in the last five years, which is higher than Korea's 197%.

Above statistics show that in high-tech industries such as semiconductor, telecommunications, and optics industries, both Korea and Taiwan have been deploying massive patents in China to protect their intellectual property rights. This strategy enables Taiwanese and Korean firms to utilize China's abundant production factors while create technological barrier of entry to potential Chinese competitors in high-tech industries.

Table 4-12 2001-2005 Patent Applications and Granted by the SIPO – by Country

country	Patent Applications				Patents Granted			
	All Type	Share %	Invention	Share	All Type	Share %	Invention	Share
Total	1,594,762	100.00	552,214	100.00	833,119	100.00	177,591	100.00
China*	1,186,454	74.40	253,708	45.94	623,256	74.81	55,085	31.02
Japan	122,917	7.71	103,915	18.82	60,842	7.30	45,465	25.60
Taiwan	87,865	5.51	30,316	5.49	53,678	6.44	6,111	3.44
USA	67,809	4.25	60,204	10.90	29,629	3.56	24,130	13.59
Korea	27,099	1.70	23,319	4.22	11,558	1.39	8,682	4.89
Germany	25,410	1.59	22,485	4.07	13,326	1.60	11,270	6.35

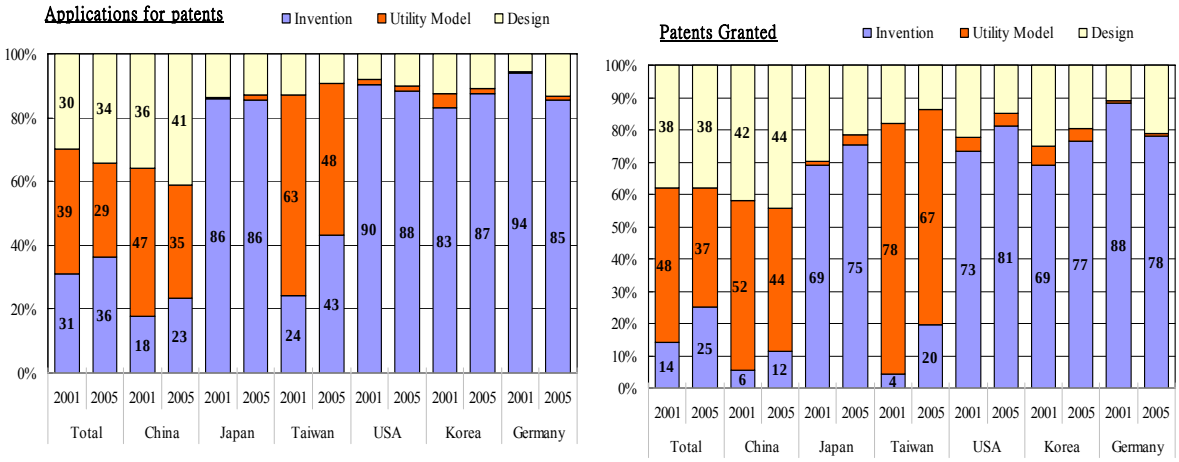
Note：* The number of China excludes the patents of Taiwan, Hong Kong and Macao.
Source: The SIPO, the SIPO Annual Report, 2000-2006.

2. Patent type

In the distribution of types of patent applications from European and American countries, Japan, and Korea submitted to the SIPO in the past five years, 80~90% were invention patents, of which 70~80% were granted. In opposition, the types of patent applications from China and Taiwan were mostly utility model patents with relatively low originality; invention patents granted for both countries in 2005 were only 12% and 20%. However, China and Taiwan have gradually realized the importance of patent activities in recent years, and percentages of invention patent applications have increased from 18% and 24% in 2001 to 23% and 43% in 2005, meaning that percentages of utility model patents have been gradually declining

(Figure 4-3).

Figure 4-3 the Three Kinds of Patents Applied and Granted by the SIPO for Major Countries



Note：* The number of China excludes the patents of Taiwan, Hong Kong and Macao.
Source: The SIPO, the SIPO Annual Report, 2000-2006.

4.2.2 Change of patent activities in major technological fields

In the categories of technology fields for patents, this research adopts the EU's definition on the range of 29 technological fields and compares the share of patents that China, Taiwan, and Korea have in these fields; it also compares how they have changed during the past six years.

1. Share of invention patents

Due to the geographical localization effect during 2003-2005, China has the highest share of invention patents in almost all fields in early publication. China's shares of patents in agriculture, food chemistry, agricultural and food processing machinery and apparatus, pharmaceutics, and environmental technology have all surpassed 70%. However, China is substantially weaker in ICT-related fields, having only 26.57% of the patents—which means 73.43% of the patents in these fields are owned by foreigners. The share of telecommunication technology, a field that China considered as the "national industry", reached 34%. The share of patents for

information technology is 27.5%; and the share for the optics is 16.74%. In the audio-visual technology field and the semiconductor technology field, the shares are all less than 20%. This shows that despite the fact that China is gradually becoming the world's factory for high-tech ICT products, the patent foundation for local enterprises is still weak (see Table 4-13).

As to Taiwan's share of invention patents in early publications during 2003-2005, the semiconductor technology field is 19.77%, followed by information technology with 15.91%, and optics with 14.30%. Taiwan's shares of patents in these three fields are all higher than that of China. Taiwan also has 9.17% of the patents in audio-visual technology and 7.46% in the electrical devices/electrical engineering/electrical energy fields. Between 2000-2002 and 2003-2005, Taiwan's share of patents increased the most in optics, from 4.67% to 14.30%. Next in line are the semiconductor technology field and the audio-visual technology field; they increased by 5.18% and 4.74% (see Table 4-2). During earlier periods, Taiwanese patent activities in China were mainly for traditional industrial technology patents; movement in the information technology, semiconductor and optics technology fields only became active in the last two to three years. Taiwan's ICT patent activities in China are expected to become even more dynamic in the future.

South Korea's patents in China are mainly from enterprise groups (Samsung, LG), and are originally concentrated in traditional home appliances (such as audio-visual stereos and white home appliances). However, the patent activities have become lively for the ICT industry in recent years. In South Korea's share of invention patents in the early publication during 2003-2005, the highest shares are in the audio-visual technology and optics technology fields, both being above 10%, followed by thermal processes and apparatus (9.6%), telecommunications (7.6%), and electrical equipment/engineering/energy (7.4%). During 2003-2005, in all of the technology fields that Korea has over 5% of the patents, the optics' patent applications show the most significant increase, from 6.36% to 11.0%, followed by the electrical equipment/engineering/energy and audio-visual technology fields with 2.86% and 2.63%. (refer to Table 4-13).

2. Technological fields

In comparing early publications of China during 2000-2002 and 2003-2005, China's invention patents showed the most significant growth in the semiconductor (574.52%), telecommunications (487.41%), optics technology (326.20%), and audio-visual technology (279.19%) fields, all showing growth of over 250%. In technological fields that Taiwan had over 100 patents during 2003-2005, fields that showed the most significant growth were the optics technology (983.33%), audio-visual technology, semiconductor (441.19%), telecommunications (348.51%), and engines, pumps, turbines (311.90%) fields, all showing growth of over 300%. Invention patents of South Korea showed the most significant growth in the optics technology (510.48%), semiconductor (495.77%), electrical equipment /engineering/energy (279.74%), audio-visual technology (246.55%), engines, pumps, turbines (224.79%), and consumer goods and equipment (217.08%) fields. Please refer to Table 4-13.

Table 4-13 Share of Patents for 29 Technological Fields in the Early Publication of the SIPO – China, Taiwan, and Korea (2003-2005 vs. 2000-2002)

Field of Technology	China			Taiwan			Korea		
	'00-'02	'03-'05	Growth Rate %	'00-'02	'03-'05	Growth Rate %	'00-'02	'03-'05	Growth Rate %
Environmental technology	63.18	70.19	147.41	2.71	2.63	116.28	3.08	2.26	63.27
Organic fine chemistry	44.29	44.59	35.82	0.16	0.53	341.18	1.10	1.39	70.43
Macromolecular chemistry, polymers	36.35	46.15	151.83	1.45	1.63	122.35	1.64	2.02	144.79
Pharmaceutics, cosmetics	65.74	72.96	118.08	0.20	0.43	327.27	0.61	0.64	105.80
Biotechnology	57.19	61.26	63.25	0.57	1.20	220.00	1.58	2.06	98.55
Agricultural and food processing machinery and apparatus	65.60	71.87	161.80	1.10	1.25	173.33	2.70	2.02	78.38
Agriculture, food chemistry	84.84	85.70	89.07	0.42	0.61	175.00	0.62	0.61	83.33
Optics	13.89	16.74	326.20	4.67	14.30	983.33	6.36	10.98	510.48
Analysis, measurement, control technology	38.45	47.15	236.63	3.05	4.49	303.89	2.12	2.13	175.20
Medical technology	35.99	37.49	122.36	2.53	2.74	131.00	1.65	1.79	132.31
Chemical engineering	43.93	52.81	137.87	1.26	1.91	200.00	1.40	1.71	142.31
Chemical industry and petrol industry, basic materials chemistry	59.78	67.26	84.91	0.73	0.92	109.30	0.63	1.09	186.49
Materials processing, textiles	32.70	36.56	90.76	4.61	4.25	57.27	1.82	2.16	102.30
Paper Machine tools	33.99	43.32	173.85	4.41	4.14	101.69	2.05	1.89	98.18
Mechanical elements	32.29	35.63	183.00	2.27	2.77	213.46	2.36	2.72	196.30
Handling, printing	19.39	22.02	139.42	4.12	4.66	138.04	2.49	3.31	180.18
Engines, pumps, turbines	32.84	35.70	192.13	1.62	2.48	311.90	4.52	5.46	224.79
Nuclear engineering	23.59	27.69	107.46	0.35	0.60	200.00	0.70	4.58	1050.00
Materials, metallurgy	57.03	66.50	151.21	1.18	1.06	93.02	1.24	1.34	133.33
Surface technology, coating	32.04	41.34	194.48	2.78	3.35	174.60	2.12	2.32	150.00
Thermal processes and apparatus	49.74	59.80	220.05	1.85	1.76	153.19	8.59	9.58	196.79
Transport	36.15	34.55	117.41	3.26	3.24	126.09	3.15	4.06	193.69
Space technology, weapons	51.48	65.46	134.53	0.74	1.81	350.00	1.85	0.80	-20.00
Electrical devices, electrical engineering, electrical energy	19.94	26.05	203.95	4.91	7.46	253.82	4.52	7.38	279.74
Semiconductors	6.69	11.29	574.52	14.59	19.77	441.19	4.56	6.81	495.77
Information technology	24.94	27.50	210.02	14.50	15.91	208.62	4.44	4.66	194.69
Telecommunications	13.97	34.00	487.41	2.99	5.56	348.51	7.53	7.57	142.73
Audio-visual technology	9.56	13.11	279.19	4.43	9.17	472.64	10.42	13.05	246.55
Consumer goods and equipment	43.84	51.09	170.52	4.19	3.74	106.78	4.13	5.64	217.08
ICT Field*	18.86	26.57	284.34	6.36	10.15	335.43	5.88	7.37	241.87

Note: 1.The number of China excludes the patents of Taiwan, Hong Kong and Macao.
2. ICT field includes Optics, Analysis, measurement, control technology, electrical devices, electrical engineering, electrical energy, semiconductors, information technology, telecommunications, audio-visual technology.

Source: The SIPO, China Patent CD – 1985-2005, calculated by TIER.

3. Technological Specialization

The technological specialization or revealed technological advantage for Taiwanese, Korean, and Japanese patents in China can be determined from the technological indicators for invention patents in the early publications of China during 2001-2005. From Table 4-14, we can see that Taiwan possesses superb technological specialization in the optics, semiconductor, and information fields, which are the fields that Taiwan has the most advantage in. These fields are followed by the fields of audio-visual technology, chemical industry, petroleum industry, and the basic materials chemistry (most are semiconductor related chemical process technology patents, which are included in the chemistry field), in which Taiwan also has excellent technological specialization. South Korea has superb technological specialization in the optics technology, thermal processes and apparatus, and audio-visual technology fields, and also has considerable technological competitive advantage in the telecommunications technology, and electrical equipment/engineering/energy fields.

Table 4-14 Technological Specialization of Korea and Taiwan

(2001-2005 invention patents in early publication by the SIPO)

	Technological Specialization Index, TSI		
	TSI>2.0	1.5<TSI<=2.0	1.0<TSI<=1.5
Korea	• Optics • Thermal processes and apparatus • Audio-visual technology	• Telecommunications • Electrical devices, electrical engineering, electrical energy	• Engines, pumps, turbines • Semiconductors • Consumer goods and equipment
Taiwan	• Optics • Semiconductors • Information technology	• Audio-visual technology • Chemical industry and petrol industry, basic materials chemistry	• Electrical devices, electrical engineering, electrical energy

Source: The SIPO, China Patent CD – 1985-2005, calculated by TIER.

4.2.3 Korean and Taiwanese Enterprises' Patenting in China

According to the SIPO's statistics on the top 50 patenting companies in China in 2005, 18 were Chinese companies (in which two were related enterprises of Hon Hai, three were investments of South Korea's LG in China), 14 were Japanese companies, 6 were American companies, 5 were Taiwanese companies, 3 were South Korean, and 2 were German. South Korea's Samsung was the number one patenting company in 2005, submitting applications for over 3,400 patents, marking an increase of over 1,000 applications from 2004. LG's investment in China, LG Electronics Inc. (China Tianjin), ranked 7th; South Korea's LG Electronics Inc. was number 10; Samsung SDI and LG Electronics Inc. (China) R&D Center ranked 14th and 15th; and the joint venture of LG Electronics and China-Shanghai LG Electronics Co., Ltd. came in at 40. Taiwan's Hon Hai Precision Ind, Co., Ltd. and Hong Fu Jin Precision Industry (Shenzhen) Co., Ltd. both placed in the top ten, ranking 5th and 8th respectively. Inventec Corporation ranked 33rd; AU Opronics Corporation ranked 37th; Hon Hai's related enterprise, Foxconn (Kunshan) Computer Connector Inc., was 38th; BENQ ranked 43rd; and MiTAC International Corporation came in 50th out of 364 applications. Please refer to Table 4-15.

Among the top 50 patenting companies of invention patents in China in 2005, 17 were Japanese; 9 were China's companies (one was Hon Hai's related enterprise in China and four were LG's investments in China); 7 were Taiwanese; another 7 were American companies; 4 were South Korean; 3 were German; and one each for Holland, Finland, and France. Among the top ten patenting companies of invention patents, China's Huawei Technologies Co., Ltd. ranked number 1 with 3,164 patents, and Korea's Samsung Electronics Co., Ltd. came in 2nd, trailing by merely 5 patents (3,159). Korea's LG Electronics, Inc. (China Tianjin) and LG Electronics, Inc. also made top ten, ranking number 5 and number 10, respectively. Other Korean companies that also have considerable numbers of patents are Samsung SDI (12th); LG Electronics Inc. (China), R&D Center (14th); Shanghai LG Electronics Co., Ltd. (30th); LG. Philips LCD Co., Ltd. (38th); and LG Electronics, Inc. (China Shenyang)

(47th). As for Taiwanese companies that have been listed, Hon Hai Precision Ind, Co., Ltd. and Hon Hai's investment in China Hong Fu Jin Precision Industry (Shenzhen) Co., Ltd. ranked 7th and 8th; AU Opronics Corporation ranked 28th; BENQ 31st; Inventec Corporation 40th; Taiwan Semiconductor Manufacturing Co., Ltd. (TSMC) 41st; VIA Technologies, Inc. 45th; and Delta Electronics, Inc. 49th. Please refer to Table 4-15.

Major Taiwanese companies that have patent activities in China are mostly from the manufacturing industries, such as the computer peripheral and components, semiconductor, electronic components, computer system, panel and photonics industries. The computer system company Inventec is the earliest to begin patent activities in China, accumulating over a thousand patents in the early publications of China. In the past, patent applications made by Taiwan's computer peripheral and electronic components industries were mostly utility model patents and design patents, and only a few were invention patents. However, in the past two years, invention patents have become the main patents being applied for, and the figure has been growing rapidly. Yet, the patenting activities in China of Taiwan's ICT industry are relatively less emphasized and less active compared to those of Korea's main enterprises, such as Samsung and LG. Taiwan has prohibited semiconductor, panel, and photonic investment in China. Nevertheless, restrictions on some less-sensitive semiconductor investment items have been recently lifted. Macronix and Winbond from the semiconductor industry are among the earliest in this industry to start patent activities in China. In the last three or four years, UMC and TSMC have also been aggressive in their patent activities in China to protect their intellectual property rights. They are expected to become even more active in the future. As to IC design enterprises, VIA Technologies has already been a major player in China's patenting activities. Since the establishment of their new R&D centers and utilization of China's R&D talents to perform IC design, their patents in China have increased significantly. The number of patent applications from the panel industry and optics industry has been the fastest growing in recent years; even so, Taiwan, Japan, and Korea are still accelerating their patent activities in China. According to data from China's early publications, AUO applied for 386 patents in 2004. This figure increased to 736 in

2005, and accumulated to a total of 1153 applications between 2001 and 2005. Meanwhile, the numbers of patent applications submitted by other panel manufacturers in China are also trending upwards.

Table 4-15 Top 50 Patenting Companies of 2005– based on Patents Applications Received by the SIPO

All type patent		Invention Patent	
Country	Enterprise	Country	Enterprise
Korea	Samsung Electronics Co., Ltd.	China	Huawei Technologies Co., Ltd.
China	Huawei Technologies Co., Ltd.	Korea	Samsung Electronics Co., Ltd.
Japan	Matsushita Electric Industrial Co., Ltd.	Netherlands	Royal Philips Electronics
Netherlands	Royal Philips Electronics	Japan	Matsushita Electric Industrial Co., Ltd.
Ta	Hon Hai Precision Ind,	Ko	LG Electronics, Inc. (Ch

iwan	Co., Ltd.		rea**	ina Tianjin)
China	Shanghai Sdqygl Consultant Co.		Japan	Sony Corporation
Korean**	LG Electronics, Inc. (China Tianjin)		Taiwan	Hon Hai Precision Ind, Co., Ltd.
Taiwan*	Hong Fu Jin Precision Industry (Shenzhen) Co., Ltd		Taiwan*	Hong Fu Jin Precision Industry (Shenzhen) Co., Ltd.
Japan	Sony Corporation		USA	International Business Machines Corporation
Korea	LG Electronics, Inc.		Korea	LG Electronics, Inc.
USA	International Business Machines Corporation		Japan	Toshiba Corporation
Japan	Toshiba Corporation		Korea	Samsung SDI
Japan	Seiko-Epson Corporation		Japan	Seiko-Epson Corporation
Korea	Samsung SDI		Korea**	LG Electronics, Inc. (China) R&D Center
Kor	LG Electronics, Inc. (China) R&D C		Jap	Canon, Inc.

	e a * *	enter		a n	
	C h i n a	ZTE Corpor ation		J a p a n	Fujitsu Limi ted
	J a p a n	Canon, Inc.		U S A	Microsoft C orporation
	J a p a n	Fujitsu Limit ed		C h i n a	ZTE Co.
	U S A	Microsoft C orporation		J a p a n	Sanyo Electr onic Co., Lt d.
	J a p a n	Sanyo Electr onic Co., Lt d.		J a p a n	Sharp Corpo ration
	C h i n a	Chongqing Lifan Corpor ation (Grou p)		G e r m a n y	Siemens AG
	J a p a n	Sharp Corpo ration		J a p a n	Hitachi, Ltd.
	J a p a n	Honda Moto r Co., Ltd.		J a p a n	NEC Corpor ation
	C h i n a	BYD Compa ny Ltd.,		J a p a n	Mitsubishi E lectric Corp oration
	C h i n a	ChangAn A uto Co., Lt d.		J a p a n	Honda Moto r Co., Ltd.
	G e r m	Siemens AG		C h i n	China Petrol eum & Che mical Corpo ration

any		a	
China	Haier Group	USA	General Electric Company
Japan	Toyota	Taiwan	AU Opronics Corporation
Japan	Hitachi, Ltd.	Finland	Nokia Corporation
Japan	Mitsubishi Electric Corporation	Korea**	Shanghai LG Electronics Co., Ltd
Japan	NEC Corporation	Taiwan	BENQ
China	China Petroleum & Chemical Corporation	Japan	Toyota
Taiwan	Inventec Corporation	Germany	BASF AG
Finland	Nokia Corporation	USA	INTEL Corporation
China	Shanghai XinQiSheng Electrical Co., Ltd.	USA	3M Innovative Properties Company
USA	General Electric Company	Jap	Denso Corporation

Taiwan	AU Opronics Corporation	USA	Qualcomm International, Inc
Taiwan*	Foxconn (Kunshan) Computer Connector, Inc.	Korea	LG. Philips LCD Co., Ltd.
China	Hisense Group	Japan	Semiconductor Energy Laboratory Co., Ltd.
Korea**	Shanghai LG Electronics Co., ltd	Taiwan	Inventec Corporation
China	Qingdao Kingking Applied Chemistry Co., Ltd.	Taiwan	Taiwan Semiconductor Manufacturing Co., Ltd. (TSMC)
Japan	Brother Industries, Ltd.	France	Alcatel N.V. or Alcatel-Lucent
Taiwan	BENQ	China	BYD Company Ltd.
China	Shanghai haixing Valve General Factory	Japan	TDK Corporation
USA	3M Innovative Properties Company	Taiwan	VIA Technologies, Inc.
China	Baosteel Co., LTD.	Germa	Infineon Technologies AG

			ny		
	Germany	BASF AG	Korea**	LG Electronics Inc. (China Shenyang)	
	USA	INTEL Corporation	USA	P&G	
	USA	P&G	Taiwan	Delta Electronics, Inc	
	Taiwan	MiTAC International Corporation	Japan	Ricoh Co., Ltd.	

Note: * indicates the affiliates owned by Taiwanese firms, ** indicates the affiliates owned by Korean firms.
Source：State intellectual property office of the P.R.C, the Planning and Development Department. patent statistics report, 2006 1st.

4.2.4 Effects of China's ICT development on Korea and Taiwan

In recent years, the development of China's ICT industry has been fast and stable; the sales of the ICT industry increased 24.8% from 2004, and reached 3,841.1 billion RMB in 2005. The importance of the overall ICT industry has gradually been increasing and now plays a critical role in China's economic growth. From the analysis above, we can understand that the advantages Taiwan and Korea have are most likely in the ICT industry. R&D centers and related investments in China from the manufacturing industries by both Taiwanese and Korean are all in ICT-related industries. Therefore, the cooperation and competition of these three countries will be even more intensified in the future. However, there is a tendency in this situation to split the cooperation and competition relationships into "Korea and China" and "Taiwan and China." Due to the high overlap of Taiwanese and Korean ICT activities in China, relationship of these two countries will focus more on competition than cooperation. The following paragraphs evaluate possible challenges faced by Taiwan and Korea in terms of a development trend for China's ICT industry.

1. Innovation in China's ICT industry is rapid, however, core technologies and

key components are still in the hands of foreigners'

Although China's ICT industry has been growing rapidly, its autonomous innovation ability is still in its beginning stages; 75% of all patents in China's ICT are owned by foreign countries. Even though China's IT top-100 enterprises have made rapid progress in patent application (see Table 4-16), self-sustaining percentage of the industry's overall technologies remain at 20-25%. This is true especially in core technologies and key components, which are 5-10 years behind the international level, putting China in a situation where most of the key components, materials, and technologies are still controlled by others.

Table 4-16 Top 10 for ICT Patent Applications among the 2006 China's IT Top100

Rank	Top 100 Rank	Company Name	Products	R&D Expenses (Ten Thousand RMB)	All Type Patent (piece)	Invention Patents	Utility Model Patents	Percentage of Invention Patent %
1	5	Huawei Technologies Co., Ltd.	Program Control Switching	474,807	5043	4695	348	93.10
2	11	ZTE Corporation	Program Control Switching, Mobile communication system, Mobile phone	195,954	1967	1837	130	93.39
3	1	Lenovo Group	Desktop computer, Notebook Computer, Mobile phone	150,000	1222	717	505	58.67
4	2	Haier Group	Electronic product, Communication products, Computer and appurtenance, Software, Home Appliance Products	456,500	747	151	596	20.21
5	7	Hisense Group	CTV, Air Conditioner, refrigerator and Mobile phone	143,215	500	167	333	33.40
6	4	TCL Group	CTV, Air Conditioner, Computer and Mobile phone	195,000	392	225	167	57.40
7	6	Midea Group	Air Conditioner, refrigerator , Washing Machine, kitchen Appliances and compressor	133,600	278	18	260	6.47
8	23	Tsinghua Tongfang Co., Ltd,	Desktop Computer, Notebook, Video Disk player, Server Storage	51,669	259	117	142	45.17
9	18	Alcatel Shanghai Bell Co., Ltd.	Digital Program Control Switch, Broadband Access apparatus and GSM/CDMA Bass Station	91,232	251	206	45	82.07
10	60	Wuhan Research Institute of Post and Telecommunications (FiberHome Technologies Group)	Communication devices, Optical Fiber, Optical Cable, Optoelectronics	14,651	242	196	46	80.99

Source: The technology office of the Ministry of Information Industry of the P.R.C. The patent situation report of the Information Technology Field. August, 2006.

2. The development of China's ICT industry will face the challenges of high R&D and capital investment

In recent years, the autonomous innovation consciousness of China's ICT enterprises has been awakening. The R&D efforts of ICT enterprises have been significantly increasing. During 2005, major enterprises, such as Huawei, Haier, ZTE, and Legend Holdings, have all invested over RMB$2.0 billion in R&D, doubling the amount from 2000. R&D investments of Huawei and ZTE have remained at 10% of their operational income for the past five years. Although investments in R&D of China's top-100 enterprises have been continuously increasing, there still remains a huge gap between Chinese and global top companies. For example, leaders in the ICT industry, such as Microsoft, IBM, Intel, and Samsung, have all invested over US$5.0 billion in R&D.

Furthermore, semiconductors, the core of ICT industries, is a high-capital and technology-intensive industry. According to a report by investment bank, Pacific Crest, in 2006 for the capital investment ranking of the global semiconductor industry, the world's largest chip manufacturers, Intel and Samsung, invested US$5.5 billion and US$5.739 billion; Hynix invested US$3.2 billion, leaving HuaHong Group and CRM (China's domestic semiconductor manufacturers in the top-100 enterprises) way behind in investment ability. Likewise, the TFT-LCD industry is also a highly R&D and capital-intensive industry. If China desires a breakthrough in the technological domain of the ICT industry, it will have to develop high R&D-intensive and high capital-intensive characteristics.

3. China's ICT industry will face a tougher challenge of the patent thicket

Emphasis on R&D investments and patent activities are important strategies for international enterprises. After the 1990s, patent applications of international enterprises in China have been averaging a 30% growth yearly. This trend shows that upon the rising of China's market and the gradual establishment of autonomous innovation ability of Chinese domestic enterprises, the strategy of creating a closely-knitted patent net in China has become a common practice by almost all

international companies. Such practice allows international enterprises to protect their own technology through patents, while also leaves room to cooperate with Chinese enterprises. When it comes to patenting activities in China for foreign enterprises, not only do they establish intellectual property rights departments, they also monitor and expand patent applications of the company and administer approval strategies to handle affairs of intellectual property rights lawsuits. The activities demonstrate how much large enterprises emphasize strategic patenting activities. Conversely, Chinese enterprises have been less concerned about intellectual property rights, and only a small percentage of the enterprises are capable of patenting activities. Therefore, confronted with the patent barrier of world powers, Chinese enterprises will face tougher challenges on how to enhance the protection of intellectual property rights" and "how to break through the patent thicket.

4. "Leapfrogging" and "Standards" are keys to China for breaking through the international patent blocking problem

China still lags behind in ICT technologies, especially in the semiconductor field, due to the *patent thicket* trend. In the past five years, China's share of invention patents in the early publications was only 10%; its quantity of patents is obviously insufficient. Under the circumstance that all advanced semiconductor technologies are in the hands of international leading manufacturers, unless large quantities of high-quality core patents are obtained, technology blocking created by leading manufacturers will be difficult to circumvent. In the future, Chinese enterprises will have to acquire manufacturing technologies through licensing or technical cooperation—however, only at the price of larger royalties. The center of attention will be on whether or not profits from the end products can cover technology costs.

In addition, it's also worth noting that China has been able to establish a new industrial standard for the 3G wireless technology, TD-SCDMA, and have it approved by the International Telecommunication Union. This is a significant example of the "leapfrogging" development strategy. According to a report titled "Patent Distribution of the Three Standards of 3G" by the Telecommunication Research Institute of the

PRC Ministry of Information Industry, in all the TD-SCDMA's patents, Nokia, Ericsson, and Siemens account for 66%, and China's DaTang Telecom. only account for 7.3%; however, China controls the power for authorizing standards and 3G licensing. Although cross-authorization of TD-SCDMA patents will be facing uneven negotiations, the development of TD-SCDMA has three major meanings to China: (1) The success of 3G business will elevate China's overall ICT industrial technical capability and China's ability to set international standards. It is an important representation of China's emergence from the role of being the world's factory. (2) Reduced import prices for telecommunication equipment and parts, as well as reduced patent royalties. (3) The development of TD-SCDMA technologies, in establishing a more complete TD-SCDMA industry chain, including related system equipment, terminals, and chips, will drive the development of China's overall 3G industry. Thus, enormous economic benefits will surely surpass the costs of royalties. Actively seeking cooperation with manufacturers in China's TD-SCDMA industrial chain shall be the key to whether or not Taiwan and Korea will be able to share the 3G cell phone markets in China and the rest of the world. Since Korea already has international renowned brands and patents for WCDMA, it has an upper hand over Taiwan in this regard.

4.2.5 Summary

As a whole, the IT top-100 Chinese enterprises are the main driving force for China's industrial development. In recent years, an increased emphasis on patents and higher investments on R&D from Chinese enterprises have signaled the elevation of China's autonomous innovation ability. To Taiwanese and Korean enterprises, this trend will continue to be a threat. Only by researching and developing more advanced technologies in the fields that both countries already have an advantage in, and at the same time, carrying out strategic patenting activities will Taiwan and Korea be able to march into China's market while maintaining their competitiveness.

4.3 Comparison of Korean and Taiwanese Service Activities

At the beginning of China's economic reform and opening in the 1980s, foreign company investments were mainly in the labor-intensive manufacturing industry. Following China's economic growth and gradual opening of its domestic market, investments from foreign companies started expanding towards other industries, such as transportation, business and trade traveling, wholesale and retail trade, and social services. During the Asian Financial Crisis in 1998, foreign investments in China temporarily stopped. After China joined the WTO in 2001 and further lifted investment restrictions on foreign service industries, investments from foreign firms in China's service industry began to increase rapidly.

In 2005, the number of foreign establishments in China's service industry was 7,445, up by 8.65%; the contracted amount from foreign firms totaled US$39.031 billion, real amount US$11.679 billion, with growth rates of 45.95% and -4.49%, accounting for 16.92% and 20.64% of total investments from foreign companies,. 18 new banks, insurance companies, and fund management companies were established. The real amount from foreign firms reached US$12.081 billion, up by 279.19%. In non-financial service industries, industries with relatively higher percentages of investments from foreign companies in 2005 were as follows: Real estate—US$5.418 billion (8.98%); rental, lease, and commercial service—US$37.45 billion (6.21%); transportation, storehouse, and postal—US$1.182 billion (3.00%); wholesale and retail—US$1.039 billion (1.72%); information, computer service, and software—US$1.015 billion (1.68%).

4.3.1 Comparison of investments in China from Taiwan's and Korea's service industry

The number of Korean and Taiwanese establishments in China's service industry was 498 and 963 in 2002, and the real investment amount was US$221 million and US$931 million. Taiwan was more active than Korea in both the number of establishments and scale of investments. However, Korean investments in the service industry have been catching up in recent years. The number of Korean and Taiwanese establishments in China's service industry was 1,109 and 907 in 2005, and the real

investment amounts were US$435 million and US$298 million. The number of Taiwanese establishment increased, but the investment amount decreased significantly. On the other hand, the service industry is accounting for higher and higher percentages of Korean investments: the number of service industry establishments accounted for 18.13% of overall establishments, and the real investment amount accounted for 8.41%, mainly because Korea has continuously increased investments in China's rental, lease, and real estate markets. In 2005, for example, the investment amounts of Korea's rental, lease, and commercial service industry, real estate industry, and wholesale and retail industry were US$159 million, US$60 millions, and US$60 million, accounting for 3.09%, 1.17%, and 1.16% of overall investments, respectively.

The real estate industry has been the most attractive among China's service industries to foreign firms. Up to 2005, investments from foreign firms attracted by the real estate industry accumulated to US$49.203 billion. Investments for just that year reached US$5.39 billion, in which Hong Kong had the highest percentage of investments; Korea ranked 4 and accounted for 3% of overall investments; Taiwan ranked 7th with 2%. In observing the percentages and the order of investments of Korea and Taiwan in other industries, we find that besides the tourism market, Korea mainly focuses on supportive services for enterprises, such as the rental, lease, and real estate industry, and the shipping industry; Taiwan mainly focuses on services for average consumers, such as medical services, and the wholesale and retail industry.

Table 4-17 Major FDI Source Countries for Chinese Service industries in 2005

Industry	Amount of Investments (100 million)	Major FDI Source Countries	Ranking for Taiwan	Ranking for S. Korea
Medical Service	0.37	BVI (35%) HK (21%) Thailand (13%)	5%(6)	N/A
Land Transportation	2.72	HK (75%)	1%(9)	N/A
Water Transportation	8.40	BVI (64%) HK (30%)	N/A	1%(5)
Air Transportation	0.79	Singapore (85%) HK (15%)	N/A	N/A
Travel Agency	3.11	HK (64%) USA (12%)	2%(6)	3%(4)
Real Estate	53.9	HK (48%) BVI (13%) USA (8%)	2%(7)	3%(4)
Trade	10.78	HK (30%) Japan (11%)	4%(8)	5%(6)
Rental and Leasing	0.39	Singapore (49%) HK (14%)	10%(3)	3%(7)

Source: the 2006 Foreign Direct Investment Report, the Chinese Ministry of Commerce

4.3.2 Development of the service industry under China's "Eleventh Five" project

China's service industries were mostly internal departments of state-owned enterprises, making it hard for private companies and foreign firms to participate, therefore affecting the overall development of the service industry. In 2006, China's government approved the "Eleventh Five" project, which is an administrative policy for the next five years. The sections in it mention development of the service industry via lifting restrictions and encouraging privatization to increase the percentage of non state-owned service industries. Here, for-profit organizations will be changed into enterprises, and a modern enterprise system will be established. Following the footsteps of state-owned enterprises, the service industry will be the target for the next wave of renovation and reform.

In industrial development, China's government divides the service industry into two categories: production-related and consumption. In production-related services, China's government has listed five key industries; they are the transportation, logistics, finance, information service, and commercial service industries. In transportation, the main concern is the traffic infrastructure in various regions, including increasing density and the total length of the railway network; constructing railway lengths of 17

thousand km (7 thousand km for passenger transport); constructing highway lengths of 2.3 million km (65 thousand km for expressways); increasing river shipping in the Pearl River Delta and the Yangtze River Delta; constructing airports in central, western, and north east regions of China; and fashioning cities such as Shanghai, Tienjin, and Dalian into international shipping centers.

In the logistics and finance industry, China's government is advancing the privatization of logistics departments in large, state-owned enterprises to develop professional logistics enterprises. In the finance industry, China is establishing a complete financial trade system for foreign firms to manage, and trying to make China's overall finance market more complete. In the information service industry, China's government is using the current postal and telecommunications industry as a foundation for developing value-added businesses, such as electronic commerce and electronic government, while encouraging the development of the digital content industry. In other productive service industries, China has also listed law, finance, accounting, consultant, certification, advertisements, and convention as key industries for development.

To respond to the upgrade of the consumption structure of Chinese consumers, the main focuses of consumer services are on the commercial trade, real estate, traveling, public affairs, community service, and sports industries. Specifically, in the real estate industry, the 11th 5-year plan emphasizes development of general housing and economically suitable housing (inexpensive houses), and strict control of large, high-class housing. Observation of the developmental direction of real estate in 2006 reveals affordable national housing is significantly insufficient, while high-class housing is continuously being provided. This has caused the sequential increase of housing prices; how the Chinese government carries through with its policy will affect the future development of other real estate markets.

In terms of the project contents mentioned above, China's service industry's development mirrors their state-owned, industrial enterprises reform, basing itself on the current public service department and privatization of state-owned enterprises and coordinating with infrastructure expansion to develop key industries. However, what's different from the industrial department is that China hasn't emphasized the

importance of foreign firms in the service department. For China to become a manufacturing power, the importance of investments, manufacturing technologies, and management abilities provided by foreign firms in undeniable; China's current service industry output and level can not single-handedly satisfy the demands of Chinese residents after income growth. Furthermore, the main momentum for China's industrial development is currently from exports; likewise, advanced countries mostly consider the service trade as a key point of development. China's service trade status is still in trade deficit; China's service trade reaching international levels or further becoming a key export for China, is beyond the reach of a service industry that solely develops China's domestic needs.

The contribution of industrial developments to China's economy is there for all to see; foreign firms have relatively less contribution to the service industry. China's government is more open in the current account payment and overseas expenses of foreign firm services; however, it has stricter restrictions on the qualifications, methods, shareholding percentages, and business ranges of foreign firms that wish to enter China's market. In accordance with the current situation of China's service industry and contents of the 11th 5-year plan, future development will face the difficulties and challenges mentioned below:

1. **Unclear orientation of the service industry:** In China, many service industries are considered social welfare or non-productive industries; large, state-owned enterprises have been establishing their own service departments during China's planned economics period. Every service needed from the birth to death is provided; large enterprises have subsidiary hospitals, nurseries, schools, restaurants, even legal affairs are dealt with. These practices continue today and haven't been contracted to others. Even independent service enterprises are controlled by the government or large enterprises. Expansion of the service industry is limited due to anachronistic business model and insignificant contribution of the fast growing manufacturing industries to service demand.

2. **Relatively dense protectiveness in the service industry:** China has been

reluctant to open service industries that are involved in domestic needs; the monopolistic industry's ecology limits the elevation of its competitiveness. Therefore, obstacles remain for private enterprises and foreign firms in banks, insurance, telecommunications, civil aviation, railroads, education and healthcare, news and publication, and broadcast and television. The restrictions may be in the form of finance and personnel. For example, strict restrictions in terms of initial capital and years of establishment are imposed on financial industry. Logistics enterprises have also been required to have personnel of over 50 people, while air transport tickets and travel agencies are closed to private enterprises. Also, prices of many services are set by the government, which negatively affects industrial development.

3. **Obstruction from a bureaucratic system:** Besides entry obstacles, strict control over the service industry has been reflected in the logistics, finance, news publication, consultation, and entertainment industries. Most applications require approval from the business, finance, tax affairs, and banking departments of China's government; In the information services, for example, applications even involve approval from the information, culture, communication management, police, news publication, and intellectual property rights departments, resulting in long procedures and long processing periods.

4. **Insufficient professional talents:** International service standards are mostly established by large international enterprises, and foreign language abilities are also very important. Take India and Hong Kong, for example. In recent years, India has been receiving contracts from many European and American enterprises to provide services, and Hong Kong's securities market have been favored by foreign firms; these are benefits from their commercial habits and language abilities established during England's colonization. Conversely, China has insufficient talents in foreign economics, law and market analysis, and R&D for the technology service industry, while the quality of their human resources also haven't reached international standards. Therefore, when China opens up, its

service industry won't be able to compete with foreign enterprises.

5. **Expansion of developmental differences in regions:** Although China's overall development is rapid, great differences exist in China's urban and rural development. Therefore, development of the service industry is still mainly in urban areas, especially in the eastern coastal regions. Service can't be stocked-up, which is why it is usually only furnished to consumers in the same area. Service industries in areas that are less developed usually have to rely on government resources and are provided as social welfare. This has caused development of service industries in the inland and rural areas to be limited and unable to grow effectively.

Besides the problems mentioned above, the developmental strategy for the service industries of advanced countries is to utilize their relative advantages by making large investments in R&D, and to support that strategy with protection measures for their intellectual property rights. In the United States, service trade export is developed through the lifting of trade and restrictions, infrastructure and talent cultivation, and financial support from the finance industry; England focuses on knowledge economics and innovative industries; Japan develops industries for senior citizens and telecommunications in response to their low birth rates and aging society; Holland and Singapore actively establish trade and logistic centers with their geological advantages.

The development strategies of the service industries of the various countries mentioned above have all been coordinated with talent, finance, infrastructure, laws, and government departments. China's development plan for its service industry is still based on the idea of its state-owned industrial enterprise reform. In order to achieve China's political goal, elevate output and levels of its service industry, even expand domestic needs and consumption, a more complete plan in all aspects needs to be proposed—especially in fund provision, law amendment, and government department integration, before more solid results can be obtained.

4.3.3 Development opportunities for Korean and Taiwanese service companies in China

In terms of income statistics for 2005, the average yearly income of China's urban residents is approximately US$1,300, and the average yearly income of China's rural residents is US$400. The significant difference in income has affected changes in the consumption patterns of China's residents. As shown in Table 4-18, for both urban and rural residents, percentages in Food, Home Appliance and Service, and Others have all decreased, and percentages in Education and Recreation, Communications, Clothing, and Medical Care have all increased; the demands on the Education and Recreation category of urban residents are increasing faster than that of the rural residents because of the former group's high and fast-growing income.

Table 4-18 The Dynamics of the Consumption Pattern for Chinese Residents

Unit：%

Percentage / Type of Consumption	Urban Area			Rural Area		
	Percentage in 2000	Percentage in 2005	Changes	Percentage in 2000	Percentage in 2005	Changes
Food	39.18	36.69	-2.49	49.13	45.48	-3.65
Education and Recreation	12.56	13.82	+1.26	11.18	11.56	+0.38
Communications	7.90	12.55	+4.65	5.58	9.59	+4.01
Residence	10.01	10.18	+0.17	15.47	14.49	-0.98
Clothing	10.01	10.08	+0.07	5.75	5.81	+0.06
Medical Care	6.36	7.56	+1.20	5.24	6.58	+1.34
Home Appliance and Service	8.79	5.62	-3.17	4.52	4.36	-0.16
Others	5.17	3.50	-1.67	3.14	2.13	-1.06

Source: China's Statistical Yearbook, 2001 and 2006

In recent years, Korean investments in China have been moving from north to south, and from coastal to inland, in contrast with Taiwanese investments moving

from south to north. During the early stages, Korean investments were mainly concentrated in Beijing, Hebei, Tianjin, Shandong, Liaoning, and Jilin surrounding the Bohai sea because these places have large Korean populations and are close to Korea. Over 90% of direct Korean investments in China were made in this area; relatively fewer investments were made in the inland. However, following China's economic development and investment environment improvement, Korean investments in China have expanded to Jiangshu, Shanghai, and Zhejiang of the Yangtze River Delta and further expanded into the inland.

Korean investments are mainly made by large enterprises with international brands. Therefore, the characteristic of Korean enterprises' operations in China emphasize not only on exports but also on Chinese domestic sales. Although there have been some collective investments in the up and downstream, industrial clustering effects are not significant. Mother companies have high control over overseas subsidiaries, which is why the degree of management localization is low. These companies' marketing strategies are emphasizing market shares, and they increase market shares and brand awareness by expanding production scales through overseas investments.

For Korean enterprises, the Samsung Group is the most active in China's market. During the middle 1970s, Korea's Samsung began conducting trade with China through Hong Kong, and in 1990, established the first Korean enterprise office in China—Samsung Corporation, Shanghai Office. However, real investments in China didn't start until 1992, the year Korea and China established diplomatic relations. In 1995, Korea's Samsung Group established their headquarters in China, directly managing investments and businesses in the Chinese Cycle Market (China, Hong Kong, and Taiwan). Although Samsung's investments in China were later than those of most international enterprises, it considered China a strategic point for main investments, and those investments in China have grown rapidly in the past eight years. Currently, Samsung's investments in China are mainly in ICT-related subsidiaries; the main regions for investments are Tienjin, Jiangsu of the eastern region, and Guangdong of the southern region. Industries of investments have expanded from manufacturing to financial businesses, such as insurance and

securities.

Issues facing Korea's service industry are slightly different from those of Taiwan. Taiwan's service industry faces an insufficient domestic demand, and Korea faces low productivity and weak growth. Concerning productivity of the service industry, in April 2007, Korea's LG Economic Research Institute pointed out in its research on the follow-up effects of American and Korean FTA, the added value of Korea's service industry was only half of its manufacturing industry; the average added value in 2006 for each person in the manufacturing industry was 50.36 million Won; the service industry's figure was only 56% of the manufacturing industry at 28.21 million Won. The main reason for this was because personnel growth in the service industry was faster than value growth. Furthermore, after the Asian Financial Crisis, although the profits and the financial structure of Korea's service industry had improved, the overall growth of the industry was becoming worse and worse. Sales increased at an average of 18.3% before the financial crisis, but this figure dropped to 3.5% after the financial crisis (2002-2005) and therefore increased trade deficit in services. The trade deficit of Korea's service industry reached US$18.76 billion in 2006, increasing US$5.1 billion from 2005. Among Asian countries, Korea's service export is behind Japan's, Hong Kong's, Singapore's, and China's. Korea's service industry export is mainly in the transportation service industry, accounting for as high as 55.8%, and has caused considerable limitations to the expansion of Korea's service trade.

Service industries in Taiwan and Korea both face limited growth in own domestic markets and seek expansion overseas. With the requirement from the WTO to further open service industries and the "Eleventh-Five" project emphasizing on development of service industries, Chinese market offers opportunities for Taiwanese and Korean firms to achieve their developmental goals. Taiwanese firms have an advantage over Chinese firms in logistics, and professional services, such as accountants, doctors, and lawyers, because China's service industry started out later; has relatively lower service levels; are mostly traditional services; and is affected by the developmental differences between country and city, and between different regions. Following the development of China's manufacturing industry, demand on

services for logistics, finance, and electronic commerce has been growing day by day, which attracts Taiwanese firms even more. As for Korean firms, after the rapid development of Korea's video and software industries, in coordination with their brand advantage in the manufacturing industry, their transportation, telecommunication, and entertainment services should all perform well in China's market.

Following investments in the manufacturing industry, Taiwanese companies will gradually be increasing investments in commercial, R&D, logistics, medical, real estate, infrastructure, education, and cultural creative industries. In the cultural field, the Taiwanese Asian Innovative Culture Industry Group plans on investing US$1.2 billion in 5 years, establishing an innovative industry park in Nanjing Pukou, and actively implementing cultural innovation, advertisement, and architectural design activities in areas such as Shanghai and Beijing. Similar customs and language are an advantage that Taiwanese companies have over Korean companies in providing education, culture, entertainment, and medical services to the Chinese. Also, Taiwanese companies have already invested in a foundation for medical services, accounting for 5% of foreign medical service investments in China during 2005, which ranks sixth, They will soon have a breakthrough in China's medical investments by aligning with Taiwanese manufacturers, such as Min-Sheng Healthcare and WantWant Group before entering Hunan Changsha. Taiwanese and Korean companies are behind Hong Kong and Singaporean companies in investments in China's service industry; if Korea's international brands are combined with Taiwan's local experiences, and alliances are joined in technology and distribution, there will be room for cooperation in value-added services of telecommunications, games, videos, and software.

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