Strategic Foreign Investments of South Korean Multinationals

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March 10, 2006

Abstract

Using unpublished data on foreign affiliates of South Korea for 2000-2004, we examine two possible motivations of foreign direct investment (FDI): factor proportion (vertical-FDI) or market access (horizontal-FDI). First of all, we find clear evidence of vertical FDI, which is considered an important part of the overall picture of South Korean FDI. Affiliate sales destined for exporting to the parent firm negatively correlate with the host-country's economic size and skill-intensity. Second, consistent with the existing literature, we also find evidence for market-seeking behavior or horizontal FDI. The standard view of horizontal FDI is that it originates towards affiliate sales exclusively for the host-country market. Affiliate local sales are higher in countries that have larger markets suggesting that local sales are more attractive in larger markets, which is consistent with a market-seeking FDI. The findings in this paper indicate that South Korean FDI in low-income countries is related to the factor proportions hypothesis, which explains that one of the motives of FDI is to exploit the cheap labor of these countries, while that in high-income countries is related to horizontal FDI, which is a market seeking activity.

Keywords: Expansion strategies; FDI;

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** hslee@kiep.go.kr. I wish to thank Peter Debaere for his suggestions and advice. I am also grateful to Sang-il Park and Chang-han Jung from the Export-Import Bank of Korea, respectively, for providing us with FDI data. Nevertheless, any errors contained herein remain the responsibility of the authors.

1. Introduction

What circumstances lead a firm to export domestically produced goods instead of producing in a foreign affiliate of that foreign market? Why might a firm choose foreign direct investment (FDI) amongst a variety of alternative options?

Among economists there is widespread agreement that FDI plays a key role in the current process of globalization and it is often thought to be beneficial for both the host and home countries.[1] Foreign investment is often thought to raise the productivity of the receiving firm or firms in their geographical proximity. Moreover, there is also the question of whether outward FDI makes the investing firm more productive by giving it access to superior technology.[2] For these reasons, it is not surprising that FDI has garnered a fair amount of attention among international economists and policy makers.

Although the general role of FDI is well recognized, what has received little notice until recently is the fact that firms that invest abroad employ a wide range of expansion strategies. The study by Hanson et al. (2001) was one of the first. There have been a number of influential papers suggesting that the bulk of FDI is essentially horizontal direct investment among countries with similar per capita incomes or similar relative factor endowments. In other words, the market-seeking FDI pattern is the dominant variety (Markusen, 1995; Brainard, 1993). In recent years, however, we have observed increasing FDI flows involving developing countries as either the source or the destination markets. In 1980, developing countries were the source of only 3% of outward FDI in the world, but outward FDI originating in these countries increased by 12% in 2000. In other words, outward FDI as a share of gross domestic product in these countries reached 10% in 2000, compared to only 1% in 1980. In particular, since 1980,

[1] The World Bank (1993) notes that FDI brings considerable benefits: technology transfer, management know-how, and export marketing access. Many developing countries will need to become more effective in attracting FDI flows if they are to close the technology gap with high-income countries, upgrade managerial skills, and develop their export markets.

[2] FDI has long been considered as an important channel for technology diffusion. After all, FDI theory states that firm-specific technology is transferred across international borders by sharing technology among multinational parent companies. However, it is not easy to summarize the existing evidence toward the importance of FDI for international technology spillover. This is, first, because it comes from modes of analysis that often differ. Second, even for a given type of analysis, key results are currently in process. See Keller (2003) for details.

outward FDI from developing Asian countries (such as South Korea, Taiwan, and China) has risen dramatically.

Employing a unique, firm-level dataset, we examine the export and import behaviors, i.e., expansion strategies, of South Korean foreign affiliates. This investigation allows us to distinguish between two types of main motivations for multinational activities, factor proportions and market access, because these two motivations present different predictions about intra-firm trade. The dataset used in this paper is not representative, but it is worthwhile to investigate whether the patterns that we observe confirm what others have found.[3]

The findings indicate that Korean FDI in low-income countries is consistent with motives related to factor proportions hypothesis, which states that one of the determinants of FDI is to exploit the cheap labor of host countries. Affiliate sales destined for exporting to the parent firm are negatively correlated with the host-country's economic size. Some of these findings are consistent with earlier results, particularly those of Hanson et al. (2001).

We also found evidence that appears to be market-seeking or horizontal in nature. The standard view of horizontal FDI is that it originates towards affiliate sales exclusively for the host-country market. Affiliate local sales are higher in countries that have larger markets, suggesting that local sales are more attractive in larger markets, which is consistent with a market-seeking FDI.

The rest of this paper is organized as follows. Section 2 reviews the related literature while section 3 overviews general yearly FDI outflow patterns. After section 4 investigates detailed characteristics of foreign affiliates by distinguishing affiliate activities based on whether their primary market is local or exports, section 5 presents estimation results to investigate what forces drive the choice of either local sales or exports. Section 6 contains a summary of the major findings.

2. Literature Review

[3] Hanson et al. (2001) documented multinational expansion strategies using US multinationals.

Existing literature on the pattern of FDI outflows of multinational firm models under general equilibrium framework has focused on either horizontal or vertical FDI, and most empirical findings indicate that market-seeking FDI is more common than FDI motivated by factor price differentials.[4] The horizontal model states that, given moderate to high trade costs and plant-level as well as firm-level scale economies, multinational activity will occur between similar countries. The fixed costs of two-plant firms are less than double those of a single-plant firm, and therein lies the motive for multinational production. In this model, multinationals are defined as firms that produce the same product in multiple plants, serving local markets with local production. Extensions of this model are found in Horstmann and Markusen (1987, 1992) and Brainard (1993a), who referred to this approach as the "proximity-concentration" hypothesis.[5]

On the other hand, the model of multinationals developed by Helpman (1984) and elaborated on by Helpman (1985) and Helpman and Krugman (1985) takes a different route. We refer to these as "factor proportion" models. The main idea of factor proportion is that multinationals arise to take advantage of international factor-price differences.

[4] In the course of discussing the relevant models, Markusen and Maskus (2001) clearly distinguished the vertical model from the horizontal model. Specifically, they consider that vertical firms will refer to single-plant firms that fragment the production process into several stages based on factor intensities and locate activities according to international differences in factor prices. Recently, there have been some attempts to integrate the models of horizontal and vertical FDI into a single framework. Markusen et al. (1996) and Markusen (1997) have developed the knowledge-capital model. This model integrates the horizontal and vertical models and allows for both multi-plant scale economies and the exploitation of factor-price differences. Carr et al. (2001) adopted a broader approach in estimating the knowledge-capital model. Their innovation lies primarily in incorporating non-linear terms into the econometric explanation of affiliate sales in order to capture complexities in the simulation model. Their basic estimation equation relates the real volume of affiliate sales of either U.S. owned manufacturing affiliates abroad or foreign owned manufacturing affiliates in the United States to fundamental country characteristics. Blonigen et al. (2003) argued that Carr et al. (2001)'s estimation of the knowledge-capital model misspecifies the underlying theory in its central estimating equation. When corrected, they found that absolute skill differences reduce affiliate sales. This instead supports the horizontal model of the multinationals and suggests that it cannot be rejected in favor of the integrated knowledge-capital model. They found robust evidence for alternative specifications using both U.S. and OECD data. In response, Carr et al. (2003) argue that the equations to estimate alternative "absolute difference" proposed by Blonigen et al. (2003) make no sense from a theoretical perspective. Since they propose relationships that are not consistent with any existing theories, they can be interpreted as a crude test to choose between the horizontal and vertical models, but certainly not the knowledge-capital model.

[5] Brainard (1997) contributes a more accurate measure of transport costs and a different estimation approach that avoids the simultaneity problems between affiliate production and exports encountered in earlier works by using an instrumental-variables specification for estimating the levels. In

They predict that multinational firms with corporate headquarters located in one market and production plants located in another will arise to exploit potential factor cost differentials, as long as the headquarters and production activities have different factor intensities. When factor prices differ across countries, in other words, firms become multinational by locating production bases in those countries where manual-labor costs are low while by locating headquarters in those countries where skilled-labor costs are low.

In a more detailed exposition, Helpman (1984) modeled a sector (X) as having two activities, a headquarter's activity that produces blueprints and a production activity. These two activities have different factor intensities, and can be geographically separated without cost. In addition, Helpman (1985) and Helpman and Krugman (1985) assume zero trade costs.[6] In this model, all varieties of a final good produced by a foreign affiliate should be exported back to the headquarters market while the horizontal FDI model predicts that multinationals will substitute overseas production for trade in final goods.

However, here the terminology is not consistent. Helpman (1985) used the term "horizontally integrated multinationals" to refer to firms producing a set of differentiated final goods, some at home and others abroad, with each variety being traded intra-firm. From this point of view, Helpman's definition does not fit very well into either the horizontal or the vertical approach. It does, however, fit nicely into Brainard's (1993b) term as "factor-proportions explanations" for multinational activity.

One of the separable indicators between these two types of motivations is the destination of the final good. Foreign affiliate production destined for exporting back to the parent country is the category of activity most likely to be associated with factor proportions, while local sales in the foreign market are more likely to be associated with horizontal expansion. In other words, the horizontal FDI theory predicts that overseas production is a substitute for trade in final goods, so that exports back to the home market should be zero.

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particular, it is the first work to use a direct product- and country-specific measure of transport costs as well as disaggregate data on tariffs.

[6] See also Feenstra and Hanson (1995) for vertically motivated FDI. Feenstra and Hanson (2001) relate this view to models of foreign outsourcing.

Empirical literature has thus far provided little evidence that FDI is related to differences in factor endowments across countries. Markusen (1995) and Lipsey (1999, 2001) showed that most FDI flows from large and rich countries to other similar countries. These findings are consistent with the explanations of multinational activity that depend more on market access than on factor-proportion differences. In addition, Brainard (1997) and Carr et al. (2001) found that the U.S. total volume of affiliate sales is strongly increasing in trade tariffs and transport costs. This finding suggests that jumping over trade barriers, rather than differences in factor proportions and income, motivates a substantial part of multinational activity. That is, these results provide only weak evidence of factor proportion motivation for multinational activity outside of the Unites States in the late 1980s. However, Hanson et al. (2001) revisited the factor proportions hypothesis using recent and detailed data on U.S. multinational firms, and found clear evidence of vertical FDI.[7]

Based on those models above, if FDI largely serves host-country markets by replicating what these firms do at home, then this FDI motivation is primarily horizontal in nature. Here, FDI is not motivated by international factor-cost differences between countries but rather by the combination of the fixed costs of headquarter services and the trade costs of shipping goods internationally. In this case, affiliate exports are lower both in absolute terms and relative to local sales because higher barriers provide affiliates with a captive local market, making local sales relatively attractive, or because higher barriers raise the cost of importing intermediate inputs, making goods produced by affiliates less competitive in the world market. On the other hand, vertical FDI motivation suggests a higher ratio of exports to parent firms to total affiliate sales. A higher ratio of exports to sales indicates that business enterprises fragment the production process into several stages based on factor intensities, which would be consistent with vertical FDI. With this motivation, foreign affiliates can resell goods purchased from their parent firms.[8]

[7] In addition, Yeaple (2001) developed a model that untangles market access from comparative advantage as motives for FDI. He shows that market access motivation for FDI is independent of a country's comparative advantage, and that factor endowment differences between countries play a key role in the pattern of FDI at the level of the industry rather than in the aggregate.

[8] There are two kinds of affiliate exports: those to parent countries and those to third-party countries. Markusen et al. (2003) explicitly modeled export-platform FDI which is defined as investment and production in a host country where the output is largely sold in the third-party markets, not in the

3. The Pattern of Outward FDI

The analysis in this paper was conducted by using a Korean firm-level data at both the country and industry level. The Export-Import Bank of Korea (KEXIM) publishes the *Overseas Direct Investment Statistics Yearbook*, providing data on FDI outflows. However, this dataset contains only the aggregate outward FDI flows at a country-by-industry level for South Korea.[9]

Korea is no longer only a recipient of FDI. It has also been steadily and rapidly emerging as a source of outward FDI over the past two decades. This can be explained by several factors. First, Korea liberalized its policy governing outward FDI by domestic firms in 1980s. Second, since 1989, investment up to US$ 2 million does not require approval. Third, KEXIM gives subsidized loans for overseas investments financing up to 80% of the investment. Finally, the government offers tax incentives such as a reserve for losses incurred by FDI. It also offers avoidance of double taxation, and Korean firms can subtract the corporate tax paid abroad from their domestic corporate tax liabilities.[10]

Using aggregate KEXIM data, Figure 1 shows the flows of outward FDI. Korean firms considerably stepped up their outward FDI in the middle of the 1980s and from then on FDI continued to grow throughout the 1990s.[11] The number of new affiliates increased significantly from 49 in 1981 to 3,770 in 2004. In addition, the total amount of investment increased from US$28 million to US$5,968 million in 2004.

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parent or host country markets. It is not clear how to view these investments in the binary terminology of current FDI theory, horizontal and vertical, as export-platform FDI has both elements.

[9] FDI in this paper is defined as an investment involving a long-term relationship and reflecting the lasting interest and control of a foreign direct investor or a parent firm. That is, FDI implies that the investor exerts a significant degree of influence on the management of the firm in the other economy. According to Korean Foreign Exchange Transactions Acts, a foreign affiliate is an incorporated or unincorporated enterprise in which an investor owns more than a 10 % equity stake or in which the parent enterprise directly owns more than a half of the shareholder's voting power and has the right to appoint or remove a majority of the members of the administrative, management or supervisory body.

[10] See Lee (2003) for details.

[11] In the aftermath of the financial crisis, South Korea's outward FDI fell off. That is, the number of affiliates in 1998 was only half of that in 1996 and the total volume of direct investment decreased by 26 % in 1999 compared to the pre-crisis level.

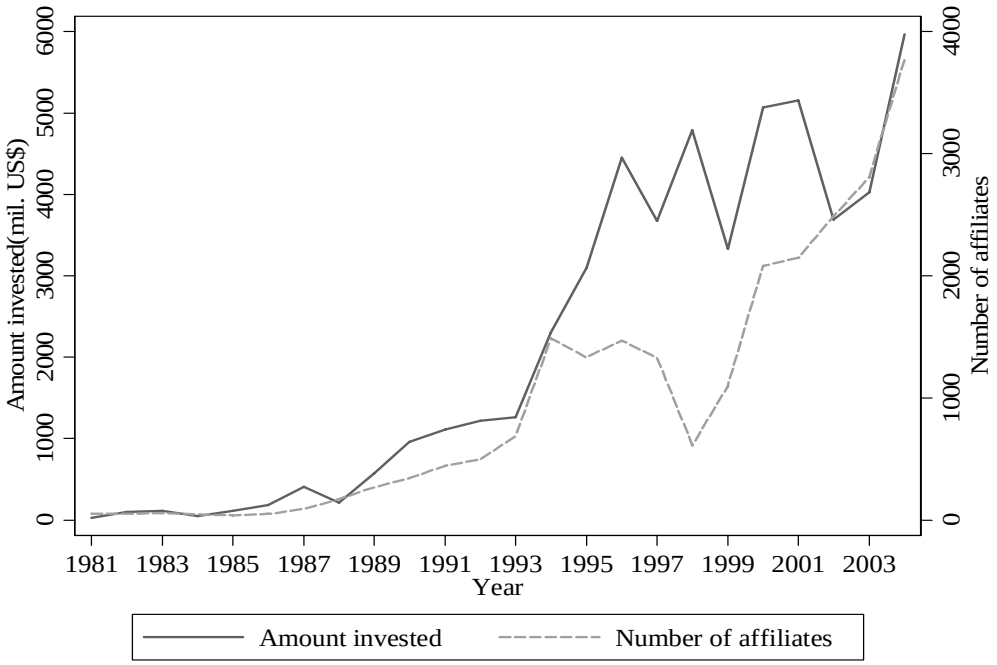

Figure 1: Trend of Outward FDI, 1981-2004

At the same time, a major part of Korean FDI shifted from natural resource industries to manufacturing ones. Figures 2 and 3 show that the share of the primary sectors (agriculture, fishery and mining), in terms of the amount and the number of affiliates, tended to decrease continuously over the same period. They indicate that sectoral distribution has changed considerably over time. Outward FDI was concentrated in the extractive sector, designed to supplement natural resources for local production. The share of the amount invested in the primary industry (such as mining, agriculture and fishing, and forestry) shows a steady decrease from 38.1% in 1980 to 2.1% in 2004, while in the manufacturing sector it increased from 16.2% in 1981 to 56.8% in 2004. The share of service sector shows a steady decrease to reach a minimum in 1987 (in 1993 in terms of share of the number of affiliates in Figure 3) and then a steadily increasing trend. As of 2004 the share was 37.5% and 38.9% in terms of amount invested and number of affiliates, respectively.

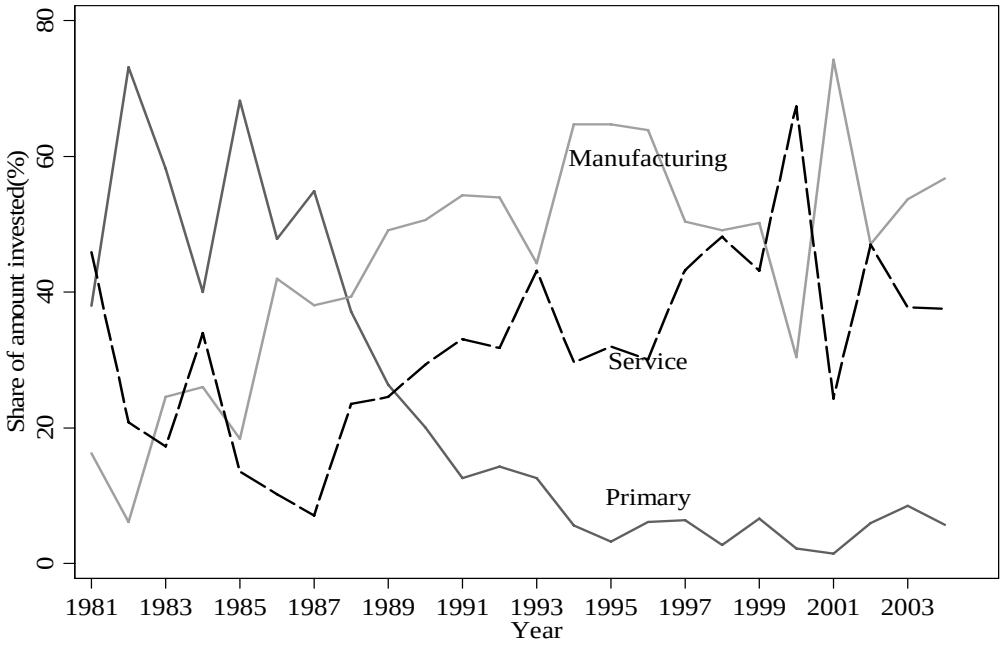

Figure 2: Share of Outward FDI by Industry: Amount, 1981-2004

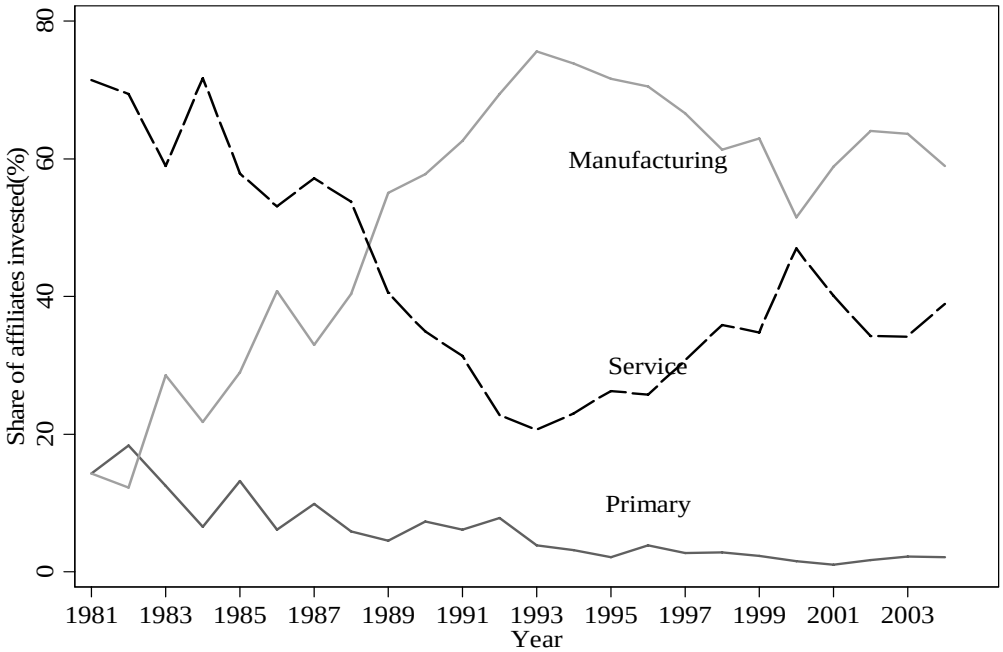

Figure 3: Share of Outward FDI by Industry: Affiliates, 1981-2004

Tables 1 and 2 report the share of each industry in the manufacturing and service sectors during 1981 to 2005. It is interesting to compare the traditional manufacturing

industries with the high-tech manufacturing industries. In manufacturing, the share of traditional industries such as food and beverages, textiles and apparel, and leather and footwear was very low. Moreover, the share of chemicals and allied products, non-metal mineral products and fabricated metals decreased significantly. The high-tech industries (mainly electronics and communications equipment), in contrast, increased dramatically. For example, the share of electronics and communications equipment in the manufacturing sector increased from 8.7% for 1981-85 to 40.9% for 2001-2005 (Table 1). In addition, wholesale trade and the retail industry has consistently had the highest share of the service sector with a share of about 60% in the service sector (Table 2).[12]

Table 1: Trends of FDI Outflows in the Manufacturing Sector

Unit: US$ million(%)

Industry	81-85	86-90	91-95	96-00	01-05
Food & beverages	3.3	70.6	200.3	376.1	588.2
	(4.7)	(6.5)	(3.8)	(3.7)	(4.0)
Textiles	2.9	159.7	890.6	952.8	1,394.3
	(4.0)	(14.7)	(16.7)	(9.3)	(9.5)
Footwear	0.9	43.0	225.8	184.4	340.9
	(1.3)	(4.0)	(4.2)	(1.8)	(2.3)
Wood & Wood Product	6.8	21.1	137.5	65.6	74.2
	(9.6)	(1.9)	(2.6)	(0.6)	(0.5)
Paper & Publishing	0.0	42.0	94.1	161.5	138.2
	(0.0)	(3.9)	(1.8)	(1.6)	(0.9)
Chemicals & Allied Products	11.0	93.5	360.5	928.9	1,408.5
	(15.5)	(8.6)	(6.8)	(9.1)	(9.6)
Non-metal Mineral Products	27.4	12.2	369.2	299.8	333.6
	(38.5)	(1.1)	(6.9)	(2.9)	(2.3)
Primary Metals	1.4	324.2	301.4	649.5	856.6
	(1.9)	(29.9)	(5.7)	(6.3)	(5.8)
Fabricated Metals	9.0	37.9	265.9	134.6	363.5
	(12.7)	(3.5)	(5.0)	(1.3)	(2.5)
Machinery & Equipment	0.4	15.0	365.1	1,087.1	967.0
	(0.5)	(1.4)	(6.9)	(10.6)	(6.6)
Electronic & Other Electric Equipment	6.2	69.6	1,313.1	3,461.5	6,015.4
	(8.7)	(6.4)	(24.7)	(33.8)	(40.9)
Transport Equipment	0.0	156.8	538.9	1,620.6	1,661.1
	(0.0)	(14.4)	(10.1)	(15.8)	(11.3)
Other	1.9	39.9	254.9	331.7	561.6

[12] The large value in Finance and Insurance in 2000 is due to investment of ASIANET Corp. Lt. to Bermuda by US$ 1,382 million.

	(2.7)	(3.7)	(4.8)	(3.2)	(3.8)
Total	71.1	1,085.4	5,317.2	10,254.1	14,703.1

Table 2: Trends of FDI Outflows in the Service Sector

Unit: US$ million(%)

Industry	81-85	86-90	91-95	96-00	01-05
Construction	18.9	27.7	144.2	423.4	258.2
	(22.2)	(5.3)	(4.8)	(4.2)	(3.2)
Wholesale & Retail	55.2	370.4	1,852.0	4,897.7	4,347.6
	(65.0)	(71.1)	(62.3)	(48.6)	(53.3)
Transport & Storage	1.1	5.4	83.6	157.7	182.7
	(1.3)	(1.0)	(2.8)	(1.6)	(2.2)
Telecommunications	0.0	0.0	308.5	937.8	366.0
	(0.0)	(0.0)	(10.4)	(9.3)	(4.5)
Finance & Insurance	0.7	1.2	0.0	1,384.7	55.0
	(0.8)	(0.2)	(0.0)	(13.7)	(0.7)
Hotels & Restaurants	3.4	76.4	280.6	628.6	450.0
	(4.0)	(14.7)	(9.4)	(6.2)	(5.5)
Other Services	5.6	22.5	177.3	1,144.9	1,921.2
	(6.6)	(4.3)	(6.0)	(11.4)	(23.6)
Real Estate	0.0	17.2	128.1	507.5	573.1
	(0.0)	(3.3)	(4.3)	(5.0)	(7.0)
Others	0.0	0.0	0.0	2.0	1.0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Total	84.9	520.9	2,974.3	10,084.2	6,745.4

Even though the data used above presents the long-run trend of outflows starting from the initial year of investment, it includes limited information such as the number of affiliates and amount accepted and invested by year, host country and industry. Thus it is insufficient to merely investigate the overriding pattern of FDI outflows. Datasets for multinational sales and other information (exports, imports, and skill intensity, etc.) on multinationals both across countries and across industries are hard to obtain.

Instead, we use more suitable data for the purpose of this paper. The data are drawn from the unpublished KEXIM sources for 2000 through 2004. Our dataset includes very fruitful information on various characteristics of foreign affiliates and parent companies, even though the number of foreign affiliates covered in the data is limited to those with investments of US$10 million or more. Thus, it is worthwhile to investigate whether the patterns that we observed are in agreement with those of other researchers. The dataset contains relatively large affiliates and includes all sectors in the

manufacturing and services industries and traces the annual performance of individual affiliates. The dataset provides information on the number of affiliates, sales, capital stock, and employees and so on by country and by industry, and includes 71 major host countries. Affiliate activities are classified by 3-digit Korean Standard Industry Classification (KSIC) codes that are closely related to 3-digit ISIC codes.

Table 4 presents recent performance trends of foreign affiliates: sales, assets, debt, profits and employees. For the period from 2000 to 2004, total sales, assets, debt and capital show a decreasing trend. Total sales per affiliate decreased from US$343 in 2000 to US$161 million in 2004. However, current and net profits increased significantly while operating profits decreased. In terms of employees, the share of local workers was almost 98%.

Table 4: Performance of Foreign Affiliates

Unit: US$ million, number (%)

	2000	2001	2002	2003	2004
Total Sales	343.2	220.9	261.7	327.3	161.1
Assets	187.4	149.4	146.0	150.4	69.8
Debt	160.7	124.4	114.2	115.3	51.0
Capital	56.9	53.1	55.1	54.5	22.0
Operating profit	7.0	0.6	3.0	6.4	2.6
Current profit	0.9	-2.4	0.8	3.2	2.2
Net profit	-0.2	-4.0	0.2	1.3	2.0
Employees		703.8	655.2	656.3	396.1
Employee: local	-	691.9(98.3)	640.8(97.8)	640.2(97.6)	385.4(97.3)
Employee: home	-	11.8(1.7)	14.4(2.2)	16.1(2.5)	10.7(2.7)
Number of affiliates	220	311	318	319	1,023
Primary	6(0.5)	10(3.2)	10(3.1)	12(3.8)	26(2.5)
Manufacturing	114(51.8)	165(53.1)	166(52.2)	161(50.5)	673(65.8)
Service	100(45.5)	136(43.7)	142(44.7)	146(45.8)	324(31.7)

Tables 5 and 6 present the fraction of exports in total sales and of imports in total purchases. Recall that the factor proportions theory of multinational activity predicts that all varieties of a final good produced abroad are exported back to the headquarters market, and that such activity arises between countries with significantly different factor proportions. The horizontal theory predicts that overseas production substitutes for trade in final goods, so that exports back to the home market should be zero. Therefore, we

focus on affiliate sales destined for exporting back home as the category most likely to reflect factor proportions considerations, and contrast these sales to local sales as the least likely category. Over the years there has been a stable trend of exports accounting for over 60% of production. In addition, exports to the home country (parent company) constituted about 15% (11%) annually. In terms of outsourcing of affiliates, imports accounted for about 70% of total purchase with about 49% of imports coming from the home country.

Table 5: Trends of Total Sales and Purchases of Foreign Affiliates

Unit: US$million (%)

	2000	2001	2002	2003	2004
Total sales	343.2	220.9	261.7	327.3	161.1
Local sales	218.1	135.2	161.5	224.5	100.7
	(63.6)	(61.2)	(61.7)	(68.6)	(62.5)
Exports	125.1	85.7	100.2	102.8	60.4
	(36.4)	(38.8)	(38.3)	(31.4)	(37.5)
Exports to home country	56.1	30.5	33.3	39.6	25.2
	(16.3)	(13.8)	(12.7)	(12.1)	(15.6)
Exports to parent company	45.4	25.1	26.0	36.3	17.6
	(13.2)	(11.3)	(9.9)	(11.1)	(10.9)
Exports to third countries	69.0	55.2	66.9	63.2	35.2
	(20.1)	(25.0)	(25.6)	(19.3)	(21.8)
Purchases	332.3	189.1	211.1	284.0	126.4
Local purchases	100.9	48.6	67.2	86.4	42.0
	(30.4)	(25.7)	(31.8)	(30.4)	(33.2)
Imports	231.4	140.6	144.0	197.7	84.4
	(69.6)	(74.3)	(68.2)	(69.6)	(66.8)
Imports from home country	161.5	95.3	106.6	135.2	56.8
	(48.6)	(50.4)	(50.5)	(47.6)	(45.0)
Imports from parent company	152.6	88.5	83.2	127.1	50.6
	(45.9)	(46.8)	(39.4)	(44.7)	(40.0)
Imports from third countries	69.9	45.3	37.3	62.5	27.6
	(21.0)	(24.0)	(17.7)	(22.0)	(21.8)

By industry, Table 6 shows that the share of local sales in the service sector was about 68.1% which is consistent with the main characteristics of the service sector. This supports the hypothesis that the service sector has relatively market oriented characteristics in host countries. The share of the manufacturing sector was 53.3% and

that of the primary sector was 45.9%. In contrast, the share of local purchases was 71.4, 34.9 and 29.3% in the primary, manufacturing and service industries, respectively.

Table 6: Share of Foreign Affiliates and Total Sales by Industry

Unit: US$million, number (%)

	Affiliates	Sales	Local sales	Exp. to home	Purchase	Local purchase	Imp. from home
Primary	63.0	49.1	22.5	16.5	16.2	11.5	2.8
			(45.9)	(33.6)		(71.4)	(17.1)
Manufacturing	1,278.0	111.9	59.7	14.4	83.7	29.2	37.5
			(53.3)	(12.8)		(34.9)	(44.8)
Services	837.0	413.5	281.4	60.6	364.3	106.7	178.4
			(68.1)	(14.7)		(29.3)	(49.0)

4. Characteristics of Foreign Affiliates

In this section, we examine the export and import behavior of foreign affiliates by more detailed industries. In doing so, horizontal activity motivated by proximity advantages and vertical activity motivated by factor cost differences can be distinguished as an attempt to evaluate the factor proportions hypothesis. In order to discover hidden variations across regions and industries, we look at trends of the same variables from the previous section over more detailed countries and industries.

Table 7 reports the shares of local sales in total affiliate sales and of local purchases in total purchases by region and country.[13] A first glance at the geographical distribution suggests that those shares fluctuate widely across regions. Local sales make up a higher fraction of total sales in Africa, North America, Latin America, and Europe. This may suggest that the threat of rising trade barriers in the wake of economic blocks such as NAFTA and the single market in the EU has induced major Korean firms to set up manufacturing bases in these countries. The activity of these Korean affiliates could be regarded as consistent with horizontal FDI.

Broken down by country, affiliate activities in Asian low-income countries (such as Vietnam, the Philippines and China) show more distinct features compared to other

[13] Sales is the sum of local sales, export to home country and export to third-party countries, while purchase includes local purchase, import from home country and third-part countries. In Tables 7 to 10, exports to and imports from third-party countries are excluded.

countries. The sales ratio of products destined to be sold back home is the highest in the Philippines (42.2%), Singapore (34.2%), and Japan (38.7%), where the factor proportions explanation is highly applicable, with the exception of Japan. Note, here, that the ratio of exports to parent countries out of total sales in Oceania (e.g. Australia) is also higher than that of all other regions except for Africa. We know that South Korean firms have invested in the Oceania region for the purpose of natural resource acquisition. It is interesting to note that even though Japan is not a labor abundant country, Japan holds a high share of exports to Korea in total sales, with 38.7% of total sales.

In terms of outsourcing, the share of imports from home and third-party countries was high for the Middle East (96.8%) and Europe (82.7%). North America (53.4%) and Africa (73.3%) accounted for a high share of imports from the home country. In Asia, Japan showed the highest share, 54.0%.

Table 7: Share of Foreign Affiliates and Total Sales by Region

Unit: US$million, number (%)

	Affiliates	Sales	Local sales	Exp. to home	Purchase	Local purchase	Imp. from home
Asia	1,305	172.7	85.0	40.5	139.7	44.6	59.5
	(59.9)		(49.2)	(23.5)		(31.9)	(42.6)
China	684	75.9	40.2	12.7	59.3	24.8	26.4
	(31.4)		(52.9)	(16.7)		(41.9)	(44.5)
Japan	69	644.3	369.0	249.1	633.1	278.0	341.6
	(3.2)		(57.3)	(38.7)		(43.9)	(54.0)
The Philippines	42	33.1	7.5	13.9	22.2	2.3	8.8
	(1.9)		(22.7)	(42.2)		(10.2)	(39.4)
Hong Kong	117	314.4	112.5	90.0	295.6	56.1	118.5
	(5.4)		(35.8)	(28.6)		(19.0)	(40.1)
Malaysia	31	236.9	65.2	10.1	137.1	59.4	32.5
	(1.4)		(27.5)	(4.3)		(43.3)	(23.7)
Singapore	48	767.1	288.8	262.5	673.3	70.5	210.8
	(2.2)		(37.6)	(34.2)		(10.5)	(31.3)
Thailand	41	135.4	71.3	8.3	98.5	31.6	23.6
	(1.9)		(52.7)	(6.1)		(32.1)	(24.0)
Indonesia	98	125.1	31.6	15.2	77.4	38.2	20.2
	(4.5)		(25.3)	(12.2)		(49.4)	(26.1)
Vietnam	98	32.5	12.9	2.9	22.1	7.6	8.3
	(4.5)		(39.6)	(8.9)		(34.3)	(37.7)
North America	388	408.1	353.1	23.8	369.4	133.5	197.1
	(17.8)		(86.5)	(5.8)		(36.1)	(53.4)
Europe	304	305.5	176.5	21.5	245.2	42.3	123.7
	(14.0)		(57.8)	(7.0)		(17.3)	(50.5)

Oceania	48	68.7	47.3	6.4	58.7	19.5	25.8
	(2.2)		(68.8)	(9.3)		(33.2)	(44.0)
Latin America	105	100.5	78.0	11.0	77.2	31.3	32.0
	(4.8)		(77.7)	(11.0)		(40.6)	(41.5)
Africa	21	33.2	30.1	2.1	25.0	5.7	18.3
	(1.0)		(90.6)	(6.2)		(22.7)	(73.3)
The Middle East	7	150.8	74.6	0.4	120.1	3.9	63.3
	(0.3)		(49.5)	(0.2)		(3.2)	(52.7)

Tables 8 and 9 show the shares of affiliate sales and purchases across detailed industries. In general, as Table 6 shows, local sales as a share of total sales are higher in the service sectors (68.1%) than in manufacturing (53.3%). However, the share of the aggregate sector hides considerable variations across more disaggregate industries. In other words, the distribution of sales and purchases, however, has very different features within aggregate industries. In the manufacturing sector, so-called high-tech industries (such as transport equipment (83.0%), primary metals (82.4%), and machinery and equipment (81.9%)) have the highest shares in local sales, while traditional industries (such as footwear (97.4%), wood and wood products (86.9%) and textiles (73.7%)) have been exported mostly to Korea or to third-party countries.[14] In addition, the share of local purchases to total purchase was high for footwear (65.1%) and chemicals and allied products (55.6%). The share of other industries was similar at about 37 to 45%.

To summarize, the evidence in Tables 7 and 8 shows more detailed features of South Korean foreign affiliates. For manufacturing, most sales are for the local market in relatively capital-intensive industries (such as motor vehicles, metal, and electronics and communications) and in countries like North America, Europe and Latin America. But most sales are intended for export back to Korea and to third-party countries in relatively labor-intensive industries (such as footwear and textiles) and labor-abundant countries (such as the Philippines, Malaysia, and Indonesia).

Table 8: Share of Foreign Affiliates and Total Sales of Manufacturing

Unit: US$million, number (%)

Industry	Affiliates	Sales	Local sales	Exp. to home	Purchase	Local purchase	Imp. from home

[14] Some Korean overseas manufacturing projects have been primarily involved in exports to the third countries. In these cases, it is obvious that the ability of these firms to market the merchandise in international markets facilitates their entry into the host countries.

Food & Beverages (15)	69	36.1	18.6	2.3	16.8	7.6	2.0
			(51.7)	(6.5)		(45.5)	(11.9)
Textiles (17, 18)	142	31.0	8.2	11.8	23.6	6.7	9.5
			(26.3)	(38.0)		(28.6)	(40.2)
Footwear (19)	51	54.0	1.4	24.8	39.5	25.7	19.0
			(2.6)	(46.0)		(65.1)	(48.2)
Wood & Wood Products (20)	13	18.7	2.4	9.4	10.4	3.2	5.5
			(13.1)	(50.2)		(30.5)	(53.2)
Paper & Publishing Products	18	43.8	27.0	0.5	31.8	10.8	15.5
(21, 22)			(61.5)	(1.1)		(33.9)	(48.6)
Chemicals & Chemical Products	183	52.7	40.8	4.4	35.2	19.6	11.4
(23, 24, 25, 26)			(77.5)	(8.4)		(55.6)	(32.5)
Basic Metals (27)	104	89.1	73.0	4.7	72.1	29.9	28.7
			(82.4)	(5.3)		(41.5)	(39.9)
Fabricated Metals (28)	35	3.7	2.0	1.0	2.6	1.0	1.2
			(53.1)	(26.9)		(37.6)	(47.8)
Machinery & Equipment (29)	45	82.5	67.5	2.9	67.9	23.9	43.3
			(81.9)	(3.6)		(35.2)	(63.8)
Electronics & Other Electric	452	207.7	93.5	30.3	162.1	51.1	73.3
Equipment (30, 31, 32, 33)			(45.0)	(14.6)		(31.5)	(45.2)
Transport Equipment (34, 35)	118	128.7	106.8	2,659.1	75.7	33.1	39.6
			(83.0)	(2.1)		(43.8)	(52.3)
Others (36)	48	11.6	2.8	7.5	7.4	2.9	4.2
			(24.3)	(64.4)		(38.8)	(56.7)

In disaggregated service industries of Table 9, as we expected, the share of local sales was quite high, with 100% for electricity, gas, steam and hot water supply, hotels and restaurants, public administration and education. Other services with a relatively lower share are transport equipment (40.0%), financial institutions and insurance (53.4%) and business activities (48.9%). These industries are relatively tradable due to highly developed information and communications industries. Furthermore the industries with a relatively higher share of local sales tend to have a higher share of local purchase as well.

Table 9: Share of Foreign Affiliates and Total Sales of Services

Unit: US$million, number (%)

Industry	Affiliates	Sales	Local sales	Exp. to home	Purchase	Local purchase	Imp. from home
Electricity, Gas, Steam	7	3.1	3.1	0.0	0.0	0.0	0.0
& Hot Water Supply (40)			(100.0)	(0.0)		(0.0)	(0.0)
Wholesale & Retail (50)	504	650.2	438.8	98.9	575.2	153.7	293.4
			(67.5)	(15.2)		(26.7)	(51.0)
Hotels & Restaurants (55)	40	15.0	15.0	0.0	6.6	6.6	0.0
			(100.0)	(0.0)		(100.0)	(0.0)
Transport (60, 63)	67	69.0	27.6	8.1	46.0	11.0	13.7

			(40.0)	(11.7)		(23.9)	(29.9)
Post & Telecommunications (64)	20	504.8	501.2	0.3	488.8	488.2	0.5
			(99.3)	(0.1)		(99.9)	(0.1)
Financial Institutions & Insurance (65)	11	1.7	0.8	0.9	0.9	0.0	0.0
			(46.6)	(53.4)		(0.0)	(0.0)
Real Estate & Renting and Leasing (70)	62	6.7	6.3	0.4	3.4	2.4	0.9
			(93.8)	(5.6)		(72.3)	(27.7)
Business Activities (72, 73, 74, 75)	93	19.1	9.3	3.1	12.8	7.0	2.6
			(48.9)	(16.2)		(54.3)	(20.3)
Public Administration & Defense; Compulsory Social Security (76)	4	1.9	1.9	0.0	1.3	1.3	0.0
			(100.0)	(0.0)		(100.0)	(0.0)
Education (80)	4	0.3	0.3	0.0	0.0	0.0	0.0
			(100.0)	(0.0)		(0.0)	(0.0)
Other Community, Repair & Personal Service Activities (90, 93)	25	33.4	24.9	0.03	22.4	22.4	0.0
			(74.8)	(0.1)		(100.0)	(0.0)

The previous tables presented the general trends of local sales and purchases by aggregated and disaggregated industries. Table 10 shows their share over per capita income levels and GDP of host countries. GDP is considered a proxy that reflects the market size of host countries. Per capita GDP, however, indicates two contrasting implications: the purchasing power and productivity level of the host country. In terms of the quintile of each variable, the number of affiliates is distributed very evenly without concentration on low- or high-income countries. For example, the number of affiliates for 0 to 20% and 81 to 100% of per capita income was 432 and 411, respectively. The share of local sales tended to show higher values in the countries with a higher per capita income and GDP. For example, the share of local sales for 0 to 20% quintile of per capita income was 59.7% while that of 81 to 100% was 80.3%. In contrast, the share of local purchase was not sensitive to the level of income per capita or GDP.

Table 10: Share of Foreign Affiliates and Total Sales by per capita Income of Host Countries

Unit: US$million (%)

	Affiliates	Sales	Local Sales	Exp. to Parents	Purchase	Local Purchase	Imp. from Parent
Per capita GDP							
Low, -20%	432	113.6	67.8	12.7	64.4	29.7	23.4
			(59.7)	(11.2)		(46.1)	(36.3)
21-40%	577	67.4	35.4	10.4	52.2	21.3	23.1
			(52.5)	(15.4)		(40.8)	(44.3)
41-60%	292	162.5	93.7	12.8	121.6	40.4	45.6
			(57.7)	(7.9)		(33.2)	(37.5)

61-80%	439	447.8	248.1	80.7	398.8	66.9	203.4
			(55.4)	(18.0)		(16.8)	(51.0)
81-100%	411	372.9	299.4	46.2	335.5	145.4	161.4
			(80.3)	(12.4)		(43.3)	(48.1)
GDP							
Low, -20%	439	164.6	61.2	42.9	133.3	24.0	45.4
			(37.2)	(26.1)		(18.0)	(34.1)
21-40%	425	227.6	133.2	24.6	155.0	44.1	63.8
			(58.5)	(10.8)		(28.4)	(41.2)
41-60%	757	100.5	54.2	14.9	81.6	25.1	35.2
			(54.0)	(14.8)		(30.8)	(43.1)
61-80%	107	458.0	270.0	61.0	409.1	70.1	258.0
			(58.9)	(13.3)		(17.1)	(63.1)
High, 81-100%	423	452.0	368.0	53.3	425.5	166.0	214.3
			(81.4)	(11.8)		(39.0)	(50.4)

5. Estimation: Exports to Sales and Imports to Purchase

This section utilizes a regression estimation to examine the factors that determine affiliate exports versus affiliate local sales in South Korean multinationals. Unfortunately the companies in service sector are excluded due to missing values of main independent variables. To find the main determinants for exports to sales and imports to purchase, our foreign affiliate data is combined with a number of industry- and country-varying characteristics. Host-country data includes information on market size, distance from the home country and trade barriers approximated by tariffs. Total market size and income level are measured by total and per capita GDP respectively, supplied by the World Bank. Bilateral distance refers to the distance between South Korea and capital cities, cited from Jon Haveman's Web site. Tariff data are obtained from the TRAINS (Trade Analysis and Information System) and WTO database.

In addition, we consider the impact of the industry characteristics of the host country. Industry-varying data includes average employment and average skill intensity for the industries. Average skill intensity is measured by the ratio of capital to labor, as calculated from the Bank of Korea dataset, *Financial Statement Analysis*. These data are available only for the manufacturing sector.

Characteristics of a parent firm include its size and productivity. Total size is measured by the average employment of a parent firm, and productivity is calculated by

the value added over total employment. These data are obtained from the KIS (Korea Information Service) database.

To explain the export and import behavior of foreign affiliates relative to affiliated local sales, a standard estimating procedure is used. In addition, we compare the importance of factor proportion differentials in determining affiliate sales destined for exporting back to the home market with their importance in determining affiliate sales for the local market.

Several recent papers have examined which country and industry characteristics correlate with affiliate total sales. It is interesting, however, that empirical literature on multinationals commonly treats all outputs by foreign affiliates as destined for the local market (Brainard, 1997; Yeaple, 2000; Carr et al., 2001). One notable exception is Hanson et al. (2001). They provided a detailed discussion on estimating equations from the literature, and examined how country and industry characteristics influence affiliate exports relative to affiliate local sales. In relation, Shatz (2000) studied exports by foreign affiliates of U.S. multinationals.

Following the methodology of Hanson et al., we run the following specification using data at the country (*j*), industry (*i*) and firm (*z*) level for foreign affiliates of South Korean multinationals for year (t) 2000-2004.

$$\ln Y_{ijzt} = \alpha + X_{jt}^{host}\beta + X_{it}^{home}\varphi + X_{it}^{parent}\gamma + D_{ij}\delta + \varepsilon_{ijzt}. \qquad (1)$$

Independent variables are grouped into four categories. The first (X_{jt}^{host}) reflects host country characteristics: GDP, per capita GDP and tariffs. It is expected that exports to the home country negatively correlates to the GDP of the host country, causing local sales to have a positive sign with GDP, consistent with the market-seeking FDI theory. The second, per capita GDP relative to South Korea, is expected to positively relate to exports to the home country, because the factor proportions hypothesis says that firms may decide to relocate the stages of production abroad to take advantage of factor price differences. Finally tariffs, the average tariff rate for the country and industry, are considered to measure the perceived costs of exporting to the host country. The

coefficient for tariffs is expected to be positive in overall affiliate sales, consistent with horizontal FDI motivation.

The second group of independent variables (X_{it}^{home}) reflects the industry characteristics of the home country. They are average employment and the ratio of capital to labor for the industry in South Korea. The sign of the capital-intensity is expected to be negative, because affiliate sales destined for exporting back to the parent country are concentrated in less capital-intensive industries in order to exploit the cheap labor of the host countries. The data is recorded only for 18 manufacturing industries.

The third group (X_{it}^{parent}) reflects the following parent-firm characteristics: the number of employee as an approximation of parent firm size and labor productivity which is measured by value added over total employment for the parent firm. They are expected to have a positive sign because good firms may simply self-select into FDI, implying that relatively larger and more efficient firms invest abroad.[15]

The last group (D_{ij}) includes distance between the host country and South Korea and regional and industry dummies. Moreover, $\alpha, \beta, \varphi, \gamma$ and δ are vectors of parameters to be estimated and ε_{ijzt} is a well-behaved stochastic error term.

Two groups of dependent variables ($\ln Y_{ijt}$) are assumed. The first is centered on the sales performance: total exports, exports to the home country, local sales, the ratio of exports to local sales, and the ratio of exports to the home country to local sales. The second is the outsourcing pattern: total imports, imports from the home country, the ratio of imports to local purchases, and the imports from the home country to local sales. The second group of dependent variables is included to understand vertical integration by South Korean multinationals. Affiliate imports from the home country are direct evidence of one kind of vertical integration, in which South Korean parent companies provide inputs for their foreign affiliates.

Thus the model specification (1) distinguishes between affiliate exports back to the parent country (or imports from the home country) and affiliate local sales (affiliate local purchase), and captures the differential impact of country, industry and parent firm

[15] See Lee (2003) for details.

characteristics on the ratio of affiliate exports (or imports) to affiliate local sales (or total purchases)[16]

The estimation results for the first dependent variables of equation (1) are reported in Tables 11 and 12. Table 11 excludes tariffs because of data availability.

The first column reports the results using log affiliate exports as the dependent variable. Affiliate exports to the parent company are negatively correlated with GDP but positively with per capita GDP. In addition, affiliate exports are positively and significantly correlated with scale but negatively with the productivity of the parent firm. That is, affiliate exports are lower in larger and more productive parent firms while they are higher to larger parent firms. Other host country characteristics are not shown to be significant.

Column (2), using log affiliate local sales as a dependent variable, shows similar results. These results are broadly consistent with the findings of recent empirical literature on affiliate total sales in other countries.

Interestingly, affiliate exports to the parent country are negatively (but not significantly) correlated with market size while affiliate local sales are higher in countries that have larger markets. This indicates that local sales are more attractive in larger markets, which is consistent with market-seeking FDI, but that affiliate exports back to the parent country are more attractive in smaller markets. This result is confirmed again in column (3). Since the dependent variable is the log difference between affiliate exports and affiliate local sales, the negative coefficient for GDP means that affiliate exports are more attractive in the smaller markets of host countries.

The coefficient for per capita GDP remains positive and significant. This indicates that the higher income levels in the host-country induce affiliates to export. This is related to the factor proportion hypothesis. In other words, to take advantage of factor price differences, firms may decide to relocate certain stages of production abroad. By assumption, the more different a country is from South Korea in terms of endowments, the greater the scope for vertical integration. Distance and Asia dummy variables are positive and significant for column (3) but negative and significant for column (4). Since

[16] Brainard (1997) used a similar regression. To control for simultaneity between trade flows and multinational sales, she used the ratio of US exports to US exports plus sales by foreign affiliates of

the dependent variable of column (4) is the log share of the ratio of exports to the home country to local sales, it can be interpreted that proximity to Korea does induce affiliates to export back to the parent country.

Table 11 offers additional evidence for the industry and parent firm characteristics on affiliate exports relative to affiliate local sales.[17] The coefficient of industry capital-labor ratio is negative in column (3) but not significant. This indicates that average skill intensity does not matter for affiliate exports relative to affiliate local sales in this selective sample. Only local sales are concentrated in high capital-intensive industries. There is a strong positive correlation between industry scale and overall affiliate activities as shown in columns (1) and (2), but the correlation is weak in exports relative to local sales in column (3).

Focusing on parent firm characteristics, the coefficient of parent firm size becomes positive and significant in affiliate exports and local sales in columns (1) and (2). However, there is a negative correlation between parent firm size and the ratio of affiliate exports back to the parent to affiliate local sales in column (4), whereas its coefficient for exports to the home country is negative but insignificant. The negative sign in column (4) can be explained by the relatively small coefficient for exports of column (1) to that of local sales of column (3). This indicates that overall affiliate activity (exports and local sales) is higher in larger parent firms, but that the affiliate sales destined for export back to the parent country are concentrated in relatively smaller parent firms.

In South Korea, capital-intensive firms are normally larger than labor-intensive firms, and these results are therefore very consistent with the industry characteristics seen above: e.g., affiliate sales destined for export are concentrated in less capital-intensive industries and smaller parent firms. There is also evidence that more productive parent firms are associated with higher affiliate exports and local sales.

US multinationals as a dependent variable.

[17] These industry-varying data (such as average employment, average skill intensity) come from different sources. These are overall industry averages, drawn from the Bank of Korea dataset.

Contrary to results in the literature, the coefficients for tariffs of Table 11 are not shown to be significant except for the ratio of exports to local sales with a negative and significant coefficient (column (5)).[18]

Table 11: Regression Results: Exports to Korea relative to Local Sales

	Exports	Exp. to Korea	Local sales	Exp./ Sales	Exp./local sales	Exp. to Korea/local sales
Log(gdp)	-0.314	-0.213	0.309	-0.029	-0.188	-0.034
	(2.20)**	(1.58)	(2.86)***	(3.53)***	(3.67)***	(0.89)
Log(per capita gdp)	0.436	0.441	-0.046	0.027	0.124	0.056
	(2.71)***	(2.95)***	(0.36)	(2.94)***	(2.53)**	(1.64)
Log(distance)	-0.222	-1.08	1.016	-0.054	-0.245	-0.23
	(0.97)	(4.67)***	(5.90)***	(4.26)***	(3.66)***	(4.41)***
Log(average K/L)	-2.556	-0.03	2.26	-0.179	-0.998	-0.509
	(1.25)	(0.01)	(1.36)	(1.59)	(1.54)	(0.81)
Log(average employees)	-2.15	0.926	3.357	-0.199	-0.058	-0.237
	(0.73)	(0.30)	(1.29)	(1.07)	(0.05)	(0.24)
Log(parent productivity)	-0.112	-0.198	0.123	-0.012	-0.012	-0.015
	(1.83)*	(3.53)***	(2.33)**	(2.68)***	(0.48)	(0.71)
Log(parent employees)	0.278	-0.128	0.836	-0.021	-0.082	-0.118
	(2.94)***	(1.44)	(10.51)***	(3.45)***	(2.42)**	(4.44)***
=1 if year=2001	0.147	-0.499	-0.111	0.002	0.034	-0.045
	(0.25)	(0.85)	(0.25)	(0.05)	(0.18)	(0.30)
=1 if year=2002	-0.345	-0.973	0.42	-0.041	-0.142	-0.129
	(0.56)	(1.67)*	(0.95)	(1.28)	(0.77)	(0.87)
=1 if year=2003	-0.622	-0.853	0.203	-0.039	-0.156	-0.207
	(1.01)	(1.44)	(0.43)	(1.16)	(0.83)	(1.31)
=1 if year=2004	-2.277	-2.225	-0.233	-0.116	-0.647	-0.552
	(3.91)***	(3.97)***	(0.50)	(3.45)***	(3.33)***	(3.44)***
Constant	39.425	6.145	-60.29	4.263	13.981	11.115
	(1.09)	(0.17)	(2.02)**	(1.95)*	(1.10)	(1.00)
Observations	1,036	1,036	1,036	945	823	823
R-squared	0.18	0.13	0.31	0.20	0.23	0.20

Notes: t-statistics are in parentheses. ***, ** and * denote significance at 1%, 5% and 10%, respectively. All regressions include sectoral dummy variables.

Table 12: Regression Results: Exports to Korea relative to Local Sales

	Exports	Exp. to Korea	Local sales	Exp./Sales	Exp./local sales	Exp. to Korea/local sales
Log(GDP)	0.229	0.485	0.216	0.648	-0.045	0.075

[18] Recent empirical studies found a positive correlation between trade barriers and affiliate activity. See Brainard (1997) and Yeaple (2000) for more details.

	(0.87)	(1.89)*	(1.50)	(3.06)***	(0.49)	(1.20)
Log(per capita GDP)	-0.504	-0.177	-0.253	0.119	-0.175	-0.091
	(1.62)	(0.55)	(1.18)	(0.40)	(1.51)	(1.22)
Log(distance)	0.894	0.296	0.966	1.56	-0.143	-0.109
	(2.65)***	(0.81)	(5.02)***	(6.37)***	(1.50)	(1.66)*
Log(average K/L)	-1.92	-0.772	1.416	1.779	-1.075	-0.663
	(0.84)	(0.31)	(1.03)	(0.89)	(1.38)	(0.83)
Log(average employees)	-0.55	2.484	4.754	2.769	-0.244	0.251
	(0.17)	(0.71)	(2.19)**	(0.90)	(0.20)	(0.22)
Log(parent productivity)	0.024	-0.127	0.121	0.095	0.034	0.007
	(0.32)	(1.84)*	(2.01)**	(1.51)	(1.18)	(0.28)
Log(parent employees)	0.329	-0.129	0.615	0.775	-0.091	-0.134
	(2.97)***	(1.16)	(7.63)***	(7.83)***	(2.15)**	(3.89)***
Log(tariff)	-0.3	-0.135	-0.152	0.029	-0.176	-0.076
	(1.33)	(0.59)	(1.03)	(0.14)	(2.23)**	(1.17)
=1 if year=2001	-0.706	-0.937	-0.923	-0.114	-0.045	-0.028
	(1.11)	(1.28)	(2.90)***	(0.18)	(0.21)	(0.16)
=1 if year=2002	-0.75	-1.529	-0.358	0.261	-0.07	-0.05
	(1.07)	(2.01)**	(1.13)	(0.43)	(0.30)	(0.26)
=1 if year=2003	1.314	1.352	-0.951	0.088	-0.05	-0.08
	(1.89)*	(1.83)*	(2.36)**	(0.14)	(0.22)	(0.4)
=1 if year=2004	-2.863	-2.87	-1.749	-0.802	-0.642	-0.539
	(4.24)***	(3.93)***	(4.99)***	(1.32)	(2.71)***	(2.62)***
Constant	12.202	-21.575	-61.48	-63.567	13.621	4.093
	(0.30)	(0.50)	(2.34)**	(1.73)*	(0.99)	(0.31)
Observations	695	695	695	695	527	527
R-squared	0.27	0.14	0.31	0.28	0.27	0.23

Notes: t-statistics are in parentheses. ***, ** and * denote significance at 1%, 5% and 10%, respectively. All regressions include sectoral dummy variables.

Regression results for imports and purchase behavior are reported in Tables 13 and 14. Five dependent variables are assumed. In general, most of the estimated coefficients, especially ratio variables, are not statistically significant.

The results indicate that local purchase is higher in countries with a larger market size (column 1 of Tables 13 and 14), which suggests that South Korean parent companies import a substantial amount of intermediaries from home or third-party countries that are very different from South Korea. The ratio of total imports to total purchase is negatively correlated with market size of the host countries.

The distance is positive and significant in Table 13 but becomes insignificant after tariffs are controlled for in Table 14. Without controlling for trade barriers, the coefficient of distance from South Korea is positive and significant, indicating that proximity to

Korea does not matter for Korean multinational activities. However, it is noted in Table 14 that tariffs are negatively correlated with all dependent variables. In particular, imports from the home country are significantly and negatively correlated with tariffs. This suggests that imports from the home country are sensitive to trade barriers.

In addition, the parent firm size is positively and significantly correlated with total imports, imports from the home country and local purchase (columns (1), (2) and (3) of Tables 13 and 14, respectively). This means that large parent firms are more active in production activities in foreign affiliates through imports and local purchase. However, the relative size of the coefficients cannot be directly compared. In Table 13, the coefficient for total imports (0.674) is higher than that for local purchase (0.533), but the relative size is reversed in Table 14 from 0.649 for total imports to 0.659 for local purchases.

Using a dependent variable as the ratio of affiliate imports to affiliate total sales, we find that the coefficient of capital-labor ratio is now negative but insignificant in column (4), while it is positive for local purchase (column (3)).[19] This suggests that vertical FDI is more common in labor-intensive industries in South Korean multinationals, and this result is consistent with the findings for exports to the parent firm.

Table 13: Regression Results: Affiliate Imports

	Imports	Imp. from Korea	Local purchase	Imp./ purchase	Imp./local purchase	Imp. from Korea/ local purchase
Log(GDP)	0.049	0.13	0.057	-0.01	-0.03	0.05
	(0.40)	(1.06)	(0.42)	(1.54)	(0.50)	(0.88)
Log(per capita GDP)	0.229	0.261	-0.131	0.013	0.033	0.007
	(1.49)	(1.72)*	(0.82)	(1.43)	(0.51)	(0.11)
Log(distance)	0.489	0.403	0.197	0.002	0.028	0.076
	(2.29)**	(1.87)*	(0.90)	(0.20)	(0.34)	(1.02)
Log(average K/L)	-1.058	-1.423	3.379	-0.108	-0.253	-0.189
	(0.62)	(0.84)	(1.80)*	(1.11)	(0.38)	(0.29)
Log(average employees)	0.262	-0.903	-1.385	0.039	0.487	0.464
	(0.10)	(0.35)	(0.48)	(0.23)	(0.39)	(0.39)
Log(parent productivity)	0.055	0.06	0.073	-0.001	0.00	0.014
	(0.94)	(1.04)	(1.28)	(0.14)	(0.00)	(0.40)
Log(parent employees)	0.674	0.596	0.553	-0.004	-0.018	-0.031

[19] Controlling for tariff in Table 14, average capital intensity is positive but not insignificant for local purchase, whereas it is negative and significant for the ratio of imports to purchase.

	(7.64)***	(6.90)***	(6.07)***	(0.66)	(0.49)	(0.87)
=1 if year=2001	-1.358	-1.229	-0.476	-0.021	-0.145	-0.079
	(3.13)***	(2.65)***	(0.88)	(0.77)	(0.80)	(0.47)
=1 if year=2002	-1.307	-1.22	-0.349	-0.023	-0.091	-0.063
	(2.97)***	(2.64)***	(0.62)	(0.87)	(0.46)	(0.34)
=1 if year=2003	-1.723	-1.685	-0.828	0.00	0.082	0.081
	(3.72)***	(3.51)***	(1.47)	(0.01)	(0.41)	(0.43)
=1 if year=2004	-2.605	-2.517	-1.851	-0.043	-0.108	-0.04
	(5.85)***	(5.50)***	(3.40)***	(1.50)	(0.53)	(0.21)
Constant	-5.517	7.786	-2.106	0.497	-3.229	-4.491
	(0.18)	(0.25)	(0.06)	(0.25)	(0.22)	(0.32)
Observations	1028	1028	1028	852	642	642
R-squared	0.29	0.26	0.17	0.2	0.1	0.08

Notes: t-statistics are in parentheses. ***, ** and * denote significance at 1%, 5% and 10%, respectively. All regressions include sectoral dummy variables.

Table 14: Regression Results: Affiliate Imports

	Imports	Imp. from Korea	Local purchase	Imp./ Purchase	Imp./local purchase	Imp. from Korea/ local purchase
Log(GDP)	-0.142	-0.045	0.544	-0.04	-0.118	-0.036
	(0.60)	(0.19)	(2.39)**	(2.81)***	(1.53)	(0.49)
Log(per capita GDP)	-0.557	-0.602	-0.141	-0.033	-0.072	-0.062
	(1.93)*	(2.12)**	(0.46)	(1.97)**	(0.64)	(0.57)
Log(distance)	0.347	0.183	0.995	-0.028	-0.067	-0.035
	(1.11)	(0.57)	(3.46)***	(1.57)	(0.58)	(0.32)
Log(average K/L)	-1.544	-2.727	2.478	-0.206	-0.66	-0.648
	(0.81	(1.45)	(1.19)	(1.85)*	(0.98)	(0.97)
Log(average employees)	-0.700	-2.721	-2.125	0.018	0.198	0.006
	(0.24)	(0.92)	(0.68)	(0.10)	(0.15)	(0.00)
Log(parent productivity)	0.182	0.173	0.184	-0.001	0.022	0.031
	(2.82)***	(2.64)***	(2.73)***	(0.19)	(0.56)	(0.78)
Log(parent employees)	0.649	0.558	0.659	-0.001	-0.006	-0.03
	(6.52)***	(5.68)***	(6.35)***	(0.14)	(0.15)	(0.77)
Log(tariff)	-0.292	-0.412	-0.068	-0.013	-0.019	-0.029
	(1.45)	(2.06)**	(0.33)	(1.05)	(0.23)	(0.36)
=1 if year=2001	-1.816	-1.825	-1.066	-0.032	-0.269	-0.229
	(3.74)***	(3.50)***	(1.85)*	(0.98)	(1.33)	(1.18)
=1 if year=2002	-1.277	-1.319	-0.641	-0.044	-0.28	-0.272
	(2.56)**	(2.58)**	(1.09)	(1.28)	(1.24)	(1.25)
=1 if year=2003	-1.686	-1.607	-1.128	-0.001	-0.127	-0.149
	(3.21)***	(2.99)***	(1.86)*	(0.02)	(0.56)	(0.68)
=1 if year=2004	-2.832	-2.732	-2.829	-0.004	-0.174	-0.139
	(5.76)***	(5.33)***	(4.74)***	(0.12)	(0.73)	(0.61)
Constant	18.069	44.882	-3.907	2.148	4.152	4.714
	(0.50)	(1.22)	(0.11)	(0.96)	(0.27)	(0.31)

Observations	691	691	691	571	481	481
R-squared	0.33	0.31	0.25	0.24	0.12	0.1

Notes: t-statistics are in parentheses. ***, ** and * denote significance at 1%, 5% and 10%, respectively. All regressions include sectoral dummy variables.

6. Conclusion

Recent literature maintains that there are at least two explanations for the motivations of FDI: trade barriers (horizontal-FDI) and the factor proportions hypothesis (vertical-FDI). The first view is that multinationals act in order to overcome trade barriers, while the second is that multinationals act to take advantage of international factor price differences.

The purpose of this paper is to study the motivations of South Korean FDI. Using recent, detailed data on a selective sample of South Korean multinational firms, we examined the export and import behavior of foreign affiliates. In doing so, we investigated to what extent multinational activity is consistent with the factor proportions theory, i.e., to what extent multinational activity is related to cheap factor supplies. Furthermore, we also studied market access motivation for multinational activity.

We find clear evidence of vertical FDI, and despite being concentrated in particular countries and industries, this vertical FDI is clearly an important part of the overall picture of South Korean FDI. Affiliate sales destined for export to the parent firm negatively correlate with the host-country's economic size and skill-intensity. Some of these findings are consistent with earlier results, particularly those of Hanson et al. (2001).

Consistent with the existing literature, we also found evidence for behavior that appears to be market-seeking or horizontal in nature. The standard view of horizontal FDI is that it originates towards affiliate sales exclusively for the host-country market. It is shown here that affiliate local sales are higher in countries that have larger markets. This suggests that local sales are more attractive in larger markets, which is consistent with a market-seeking FDI.

Parent firm size is positively and significantly related with affiliate exports and local sales, while there is a negative correlation with the ratio of affiliate exports back to the parent to affiliate local sales. However, the coefficient for parent firm size for exports

to the home country is negative but insignificant. This indicates that overall affiliate activity (exports and local sales) is higher in larger parent firms, but that the affiliate sales destined for export back to the parent country are concentrated in relatively smaller parent firms.

In sum, the findings in this paper indicate that South Korean FDI in low-income countries is in agreement with the factor proportions hypothesis, which explains that one of the motives of FDI is to exploit the cheap labor of these countries. On the other hand, in high-income countries, motives related to horizontal FDI are more common.

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