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Interdependence between Manufacturing and Service Foreign Direct Investments of Korea*

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In a view of constructing global value chains, this study attempts to examine interdependence between the outbound FDIs of the Korean manufacturing and producer service sectors, using panel data from 1996 to 2012. We find that (i) a presence of manufacturing FDIs has a positive effect on new investments in producer service sectors, and (ii) a presence of producer service FDIs also has a positive effect on new investments in manufacturing sectors. Our empirical results imply that Korean multinational firms are expanding their role as headquarter service providers in the world through both manufacturing plants and regional business service subsidiaries.

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1. INTRODUCTION

With global production network systems in the world economy, foreign direct investments (FDIs) are essential for the development of a nation. Not just manufacturing, but also headquarters or retail services have become important sectors in which countries attempt to host foreign investments. In 2004, the United Nations Conference on Trade and Development (UNCTAD, 2004) pointed out that services sector's share of FDIs was increasing every year. In the early 1970s, service sector accounted for only one-quarter of the global FDI stock. A recent UNCTAD (2015) report states that the service sector represents more than two-thirds of the FDI stock.

A similar trend has been recently observed in Korea's outward FDIs. According to FDI data provided by the Export-Import Bank of Korea, manufacturing sector's share of FDIs experienced a downward trend after 2004. However, service sector's share of FDIs has accounted for a gradually increasing proportion of the total FDIs. Korean FDI patterns have been known as a good research subject since Korea was an exemplary emerging country of "first-time" investor abroad. Korea FDIs have continued to grow for 20 years, and their composition has been changed in favor of service FDIs. Korea has become a "second-time" investor abroad in service sectors, and the role of service FDIs in the context of manufacturing FDIs needs to be examined.

To understand the increasing trend of service FDIs of Korea, this study focuses on producer-service FDIs and their relationship with manufacturing FDIs.[1)] In general, producer services aim at maintaining continuity in the industrial production process, improving productivity, and promoting technological progress. In addition, producer services engage into most phases of manufacturing production chains and they serve manufacturing firms. Hence, producer services play an important role in developing

[1)] According to the OECD definition, there are five subsectors in producer services: information and communications; financial and insurance activities; real estate activities and renting and leasing; professional, scientific and technical activities; and business facilities management and business support services.

manufacturing industries, thus, in principle, they have a significant impact on global production networks. In this regard, we focus on the linkage between manufacturing FDIs and producer-service FDIs and highlight the role of producer services.

In doing so, we use FDI data from the Export-Import Bank of Korea at the industry level. The dataset contains information about a large number of FDI host countries, 80 destination countries of Korean firms' FDIs over a period of 17 years (1996-2012). With this comprehensive FDI dataset, we examine the interdependence between manufacturing FDIs and service FDIs. Unlike previous studies that examined the aggregated service sector or focused on a certain area of service sectors,[2] we further disaggregate producer services into 5 different subsectors, and examine the temporal linkage between manufacturing FDIs and the 5 subsectors of producer-service FDIs. Our main finding suggests that the increasing trend of producer-service FDIs is due to the rise of outbound manufacturing FDIs. This may imply an important role of headquarter services of Korean firms when they own manufacturing plants in foreign countries. Indeed, producer services are activities that regional headquarters of multinational firms can provide for their foreign affiliates.[3]

This paper proceeds as follows. Section 2 presents a literature review providing various theoretical foundations for the interaction between the two types of FDI. Section 3 provides an understanding of FDIs of Korean firms, and analyzes regional and industrial specificities of producer-service FDIs and manufacturing FDIs. In section 4, we construct an econometric model for appropriate statistical tests and present empirical results noting the presence of a networking mechanism between manufacturing FDIs and producer-service FDIs. In addition, we show that the factors determining location choice are different for the two types of FDI. Section 5 summarizes our empirical

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[2] Ramasamy and Yeung (2010) examined the entire service sector and Gross *et al*. (2005) studied the location choices of Japanese MNEs in Europe.

[3] We do not consider firm-level data for the role of headquarters on foreign affiliates in this paper. Although this topic is interesting and important, we leave it for a future study due to the lack of data on headquarters services of Korean multinational firms.

results.

2. OUTLINE FOR A THEORETICAL FOUNDATION AND LITERATURE REVIEW

2.1. Outline for a Theoretical Foundation

Although it is hard to find out a formal model in the literature of FDIs that may successfully explain the interdependence between manufacturing and service FDIs, in this subsection we may outline a hypothesis for service and manufacturing FDIs of Korea borrowing the theory of Gross *et al*. (2005) as follows.

Suppose that, as market demand for differentiated goods in a host country is larger and the wage rate for workers is lower, the host country becomes more attractive to Korean firms. As more firms enter the market, we expect several effects in product and factor markets to occur in a series as follows. First, there is a competition effect in final goods market. The increase in the number of final good producers would reduce market shares and profits of each firm. Second, since the total output may increase as well from the increased numbers of the firms, this in turn generates a greater demand for inputs in the host country. The increased demand in input markets would make a positive effect on total sales and profits of input suppliers in the country. Third, due to the rise in profits of suppliers in the input market, the host country becomes more attractive to input suppliers and thus more input suppliers from Korea would as well follow to enter the market of the host country. Fourth, then the profit margin for each input supplier gets smaller and thus each input supplier would have an incentive to reduce the production costs of the inputs. As for the type of these inputs, we can extend them to include business services such as transportation, retails and wholesales, product design, R&D services, etc. Fifth, when the service providers become efficient due to the efforts in reducing the production costs of services, the

location would be even more attractive for Korean manufacturing firms. Lastly, these whole processes of interdependence between entries of final good producers and input suppliers (including both intermediate goods and service inputs) would be amplified in presence of switching costs, i.e. if buying inputs from non-Korean input suppliers is more costly. In sum, manufacturing FDIs and service FDIs of Korea are attracting each other more as switching costs are larger.

The above outline may tell us one hypothesis that the two types of FDIs are complementary each other. Now, we briefly summarize the previous empirical works on this nature of the two FDIs as follows.

2.2. Service FDIs following Manufacturing FDIs

For the relationship between manufacturing and service sector, UNCTAD (1989) commented that service quality is the most important component for multinational firms (MNEs) in order to compete with local firms. However, to some extent, it is difficult to ascertain the high quality of a service. Although MNEs offer higher quality of headquarter services than local firms, customers may prefer to use incumbent service providers (that is, local services) that are more familiar to them. Using data on US outward FDIs to 25 countries from 1976 to 1995, Raff and von Der Ruhr (2007) found that MNEs could face obstacles arising from cultural differences and incomplete information while planning to enter a host country market. Under such circumstances, a foreign-service producer would better follow downstream firms from its own country, as this could be a chance to enter new markets. Using the data on OECD countries, Ramasamy and Yeung (2010) found empirical evidence supporting the view that service FDIs follow their manufacturing sector counterparts.

2.3. Manufacturing FDIs following Service FDIs

On the other hand, in order to obtain better services, manufacturing MNEs

may choose a foreign country where they can have access to headquarter services from the home country. In this case, service FDIs play a positive role in boosting foreign investments in the manufacturing sector. Von der Ruhr and Ryan (2005) used a logit model to analyze the relationship between Japanese multinational banks and manufacturing investments in the 1970s, and found that the presence of Japanese multinational banks resulted in a large amount of Japanese manufacturing FDIs in Europe.

2.4. Manufacturing and Service FDIs following Each Other

The above studies by Raff and von Der Ruhr (2007), Von der Ruhr and Ryan (2005), and Ramasamy and Yeung (2010) considered only one direction — how manufacturing FDIs affected service FDIs or vice versa. Unlike these studies, Gross *et al*. (2005) found that the presence of Japanese manufacturing FDIs had a positive effect on attracting other Japanese investors in both manufacturing and services in the 1970s. However, after the mid-1980s, the presence of Japanese service firms attracted manufacturing ones. The author proposed a theory suggesting that Japanese manufacturing and service firms follow each other in entering host countries because of switching costs. Switching costs include the direct costs of establishing a new business relationship — the costs of adjusting production equipment, learning to use new inputs and uncertainty about their quality, etc. For example, switching costs arise when Japanese MNEs use inputs from non-Japanese suppliers. Therefore, inter-sectoral links exist in between service and manufacturing FDIs.

2.5. What We Do in This Paper

We depart from Gross *et al*. (2005) as follows. First, while Gross *et al*. (2005) focused on service FDIs as a whole, we disaggregated the service sector into 5 different categories. MNEs' headquarter services can be also relocated to host countries, and the main types of such services are mostly captured by

the 5 different types of producer services. Second, Gross *et al*. (2005) considered a limited number of European countries (17), whereas we examine the interactive nature of the two FDIs for 80 countries over 17 years (1996-2012). This enables us to further investigate any different role of service FDIs arising from different regions such as Asia, Europe, and North America.

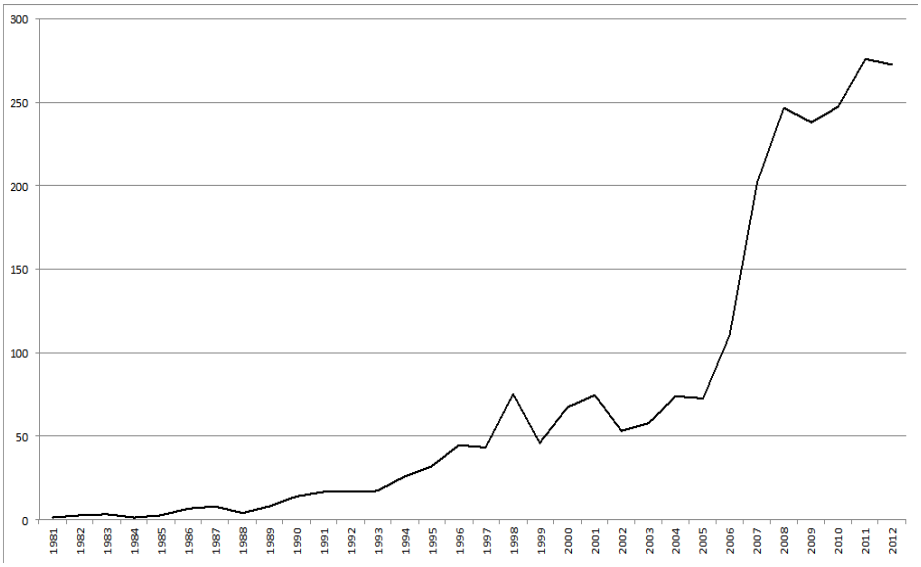
In particular, from the latter extension, our study may contribute to the Korean literature in that the consideration of the disaggregated types of producer-service FDIs has implications for MNEs' headquarter services. The location of a firm headquarter service has been an important element for the success of production network systems. For instance, Okubo and Tomiura (2016) recently showed that separation of a firm headquarter station from its own manufacturing plants is positively related to the size of plants and the amount of material purchases. Although in the study they focus on Japanese domestic markets, we can infer that MNEs may prefer to locate their regional headquarters in a host country, so that they can manage their multiple plants in that country. In addition, they may further increase the number of manufacturing plants in foreign countries where the plants can access regional headquarters' services of their parent firm. We will investigate this phenomenon of outward FDIs of Korean firms at industry level.

3. FDIS OF KOREAN FIRMS

Using the FDI dataset of the Export-Import Bank of Korea, figure 1 shows the time trend of FDIs of Korean firms from 1981 to 2012. The invested amounts developed rapidly after 1988. In 1998, the Asian financial crisis hit Asian countries, and Korea was not an exception. Accompanied by the economic blow, the amount of FDIs decreased to a great extent. According to Nicolas *et al*. (2013), since then the Korean government has implemented a series of legal, insurance, financial, and other policies to achieve the liberalization of foreign investments in the country. With the improvement of financial policies, the amount of FDIs has increased dramatically since

Figure 1 Outbound Foreign Direct Investments of Korea (1981-2012)

(unit: 100 million USD)



Source: Export-Import Bank of Korea.

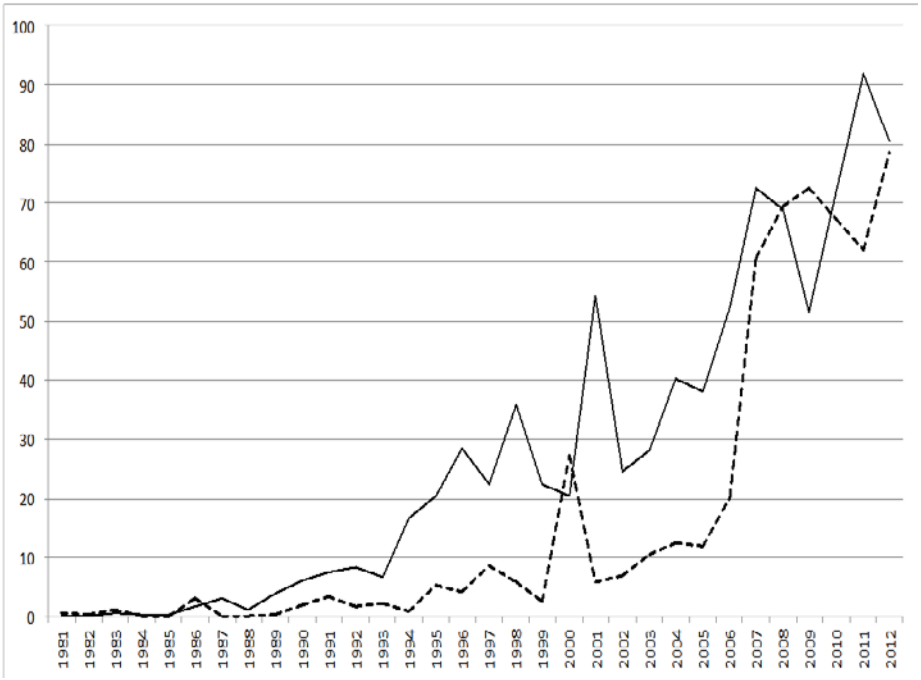
2005.

Figure 2 presents the trend of both manufacturing and producer-service FDIs from 1981 to 2012. It should be noted that we have five subsectors ((1) information and communications; (2) financial and insurance activities; (3) real estate activities and renting and leasing; (4) professional, scientific and technical activities; (5) business facilities management and business support services) belonging to producer services. From figure 2, we find that, overall, manufacturing and producer-service FDIs show an increasing trend. However, there are also some differences. Firstly, before 2008, the amount of manufacturing FDIs is always higher than the amount of producer-service FDIs except in 2000. Secondly, after 2001, producer-service FDIs showed a higher growth rate than manufacturing FDIs, implying that we should pay more attention to the producer services sector.

Next, table 1 shows changes in FDIs in different regions. We find that Asia is the region attracting the largest amount of manufacturing FDIs,

Figure 2 Manufacturing and Producer Service FDIs of Korea

(unit: 100 million USD)



Notes: The solid line indicates the manufacturing FDI and the dashed line indicates the producer services FDI (Information and communications; Financial and insurance activities; Real estate activities and renting and leasing; Professional, scientific and technical activities; Business facilities management and business support services).

Source: Export-Import Bank of Korea.

accounting for more than half of total investments. This is because Asian countries are geographically closer to South Korea than any other country, and have cheaper labor surpluses than Korea. Nonetheless, as for producer-service FDIs, the share of investments by Korean firms is more dispersed, since most of the investments were made in America, while Europe and Asia followed. Over time, the share of producer-service FDIs in America decreased from 80% to 54%, while producer-service FDIs in Europe increased from 2% to 22%.

The invested amount for both types of FDIs in the top 19 countries is presented in table 2. We find that Korean firms made most of their

Table 1 Foreign Direct Investment of Korean Firms in Different Regions

(unit: 1,000USD)

Years	Oceania		Africa		America		Europe		Asia	
	M	PS	M	PS	M	PS	M	PS	M	PS
1996	10,790 (0.00)	2,405 (0.00)	10,640 (0.00)	0 (0.00)	1,222,235 (0.43)	688,770 (0.80)	214,659 (0.08)	14,665 (0.02)	1,377,010 (0.49)	158,321 (0.18)
1997	60,195 (0.03)	42,152 (0.04)	11,498 (0.01)	11,121 (0.01)	703,474 (0.32)	443,176 (0.41)	290,832 (0.13)	35,985 (0.03)	1,147,239 (0.52)	557,697 (0.51)
1998	80,333 (0.02)	495 (0.00)	68,088 (0.02)	44 (0.00)	663,930 (0.19)	597,311 (0.62)	818,902 (0.23)	170,055 (0.18)	1,922,909 (0.54)	197,001 (0.20)
1999	23,599 (0.01)	85 (0.00)	17,220 (0.01)	0 (0.00)	1,032,345 (0.46)	303,607 (0.65)	176,212 (0.08)	2,370 (0.01)	997,024 (0.44)	161,298 (0.35)
2000	31,582 (0.02)	4,971 (0.00)	34,568 (0.02)	12,908 (0.01)	786,342 (0.38)	1,330,162 (0.74)	58,576 (0.03)	149,758 (0.08)	1,145,702 (0.56)	289,551 (0.16)
2001	7,937 (0.00)	1,860 (0.00)	6,256 (0.00)	1,580 (0.00)	1,457,361 (0.27)	1,121,523 (0.88)	2,423,536 (0.45)	20,658 (0.02)	1,534,087 (0.28)	131,545 (0.10)
2002	55,383 (0.02)	2,112 (0.00)	2,953 (0.00)	4,461 (0.00)	306,919 (0.12)	645,175 (0.61)	380,249 (0.15)	135,589 (0.13)	1,715,095 (0.70)	266,976 (0.25)
2003	21,423 (0.01)	1,333 (0.00)	1,415 (0.00)	36 (0.00)	471,326 (0.17)	597,747 (0.62)	87,496 (0.03)	41,145 (0.04)	2,225,151 (0.79)	318,197 (0.33)
2004	27,456 (0.01)	3,224 (0.00)	5,192 (0.00)	10,453 (0.01)	619,885 (0.15)	957,250 (0.69)	458,011 (0.11)	44,051 (0.03)	2,909,724 (0.72)	373,445 (0.27)
2005	44,479 (0.01)	21,075 (0.01)	488 (0.00)	295 (0.00)	415,292 (0.11)	1,076,352 (0.65)	398,242 (0.11)	77,054 (0.05)	2,930,940 (0.77)	480,085 (0.29)
2006	28,151 (0.01)	30,654 (0.02)	1,285 (0.00)	5,019 (0.00)	706,464 (0.14)	784,646 (0.40)	823,672 (0.16)	75,833 (0.04)	3,645,645 (0.70)	1,054,744 (0.54)
2007	22,253 (0.00)	112,225 (0.01)	3,956 (0.00)	5,178 (0.00)	633,083 (0.09)	3,634,636 (0.45)	1,319,133 (0.18)	1,712,224 (0.21)	5,235,082 (0.73)	2,600,517 (0.32)
2008	16,027 (0.00)	114,353 (0.01)	4,530 (0.00)	27,579 (0.00)	1,289,312 (0.19)	3,626,220 (0.43)	993,100 (0.15)	988,563 (0.12)	4,543,256 (0.66)	3,762,417 (0.44)
2009	40,772 (0.01)	122,340 (0.01)	5,809 (0.00)	8,160 (0.00)	937,617 (0.18)	3,736,105 (0.42)	923,060 (0.18)	3,141,228 (0.35)	3,185,879 (0.63)	1,890,933 (0.21)
2010	79,694 (0.01)	13,413 (0.00)	66,791 (0.01)	4,824 (0.00)	733,901 (0.10)	5,149,683 (0.59)	792,446 (0.11)	1,473,062 (0.17)	5,450,914 (0.77)	2,080,029 (0.24)
2011	61,968 (0.01)	84,189 (0.01)	21,492 (0.00)	1,287 (0.00)	1,785,181 (0.20)	6,499,589 (0.69)	1,204,479 (0.13)	844,003 (0.09)	5,992,214 (0.66)	2,055,522 (0.22)
2012	7,427 (0.00)	3,220 (0.00)	14,888 (0.00)	1,764 (0.00)	1,659,596 (0.21)	5,229,295 (0.54)	819,216 (0.10)	2,152,359 (0.22)	5,450,170 (0.69)	2,381,316 (0.24)

Notes: 1) M is manufacturing FDI and PS (Information and communications; Financial and insurance activities; Real estate activities and renting and leasing; Professional, scientific and technical activities; Business facilities management and business support services) is producer services FDI. 2) Numbers in brackets are the share of total FDI in the same year.

Source: Export-Import Bank of Korea.

Table 2 Invested Amount of Korean Firms in Different Countries

(unit: 1,000USD)

Manufacturing FDI		Producer Service FDI	
Country	Invested Amount	Country	Invested Amount
China	39,950,630	U.S.A.	19,985,865
U.S.A.	13,409,419	Cayman Islands	8,643,713
Vietnam	7,027,880	Hong Kong	7,794,121
Indonesia	4,415,035	China	5,458,597
Hong Kong	3,641,932	Netherlands	3,261,077
India	3,262,863	U.K.	2,836,550
Brazil	3,225,569	Singapore	2,753,719
Malaysia	2,309,951	Ireland	2,508,509
Philippines	2,295,411	Japan	2,436,831
Netherlands	2,144,951	Bermuda	2,172,510
Mexico	1,729,785	Norway	1,686,472
Thailand	1,477,481	Luxembourg	1,682,475
Russia	1,353,545	Panama	1,639,042
Poland	1,277,779	Vietnam	1,428,486
Slovak Republic	1,201,672	Belgium	1,254,568
Japan	1,128,182	Kazakhstan	1,128,562
Czech Republic	1,101,415	Australia	1,081,437
Germany	1,093,102	Cambodia	973,378
U.K.	1,022,005	Jersey	911,561

Source: Export-Import Bank of Korea.

manufacturing investments in China, for an amount more than three times the investments in the US. According to the statistics by the Export-Import Bank of Korea, Korea FDIs in China only amounted to $119 million USD in 1992, but in 1997, they reached $2,142 billion USD, with an average annual increase of 78%. In 2012, manufacturing FDIs amounted to $4 billion USD. In the producer-service sector, US is ranked first among the 19 countries, followed by China. Compared to the top countries in the manufacturing sector, in the producer-service sector there are less Asian countries.

With such country and time variation (80 countries over 17 years) in service and manufacturing FDIs, we now empirically investigate whether there is interdependence between service and manufacturing FDIs of Korea. In particular, in the following sections we examine different types of producer-

service FDIs.

4. EMPIRICAL ANALYSIS

4.1. Variables Description

We use the annual amount invested in manufacturing and producer services to represent Korea's FDIs. The data is collected at industry level by the Export-Import Bank of Korea and covers 80 host countries from 1996 to 2012. We convert FDIs nominal values to real ones before conducting the empirical analysis, as nominal values are likely to be vulnerable to exchange rate and price changes.[4] In order to avoid data loss, the FDI values are defined by the logarithm of one plus the amount of FDIs in real terms (*mamount* and *samount* for manufacturing and service FDIs, respectively).[5]

The control variables are real GDP, trade, wages, the number of patent applications, and geographic distance. Because market indicators are key factors that affect the FDI location choice, existing studies have used GDP or population variables to represent market size and market potential. In our study, we choose real GDPs of host countries to control for the effect of market size on FDIs. We expect that firms would be more likely to invest in a country with a high real GDP. The corresponding log-transformed variable (ln*realgdp*) is measured in US dollars at constant 2005 prices and constant 2005 exchange rates. Data is processed by the USDA based on the World Development Indicators by the World Bank and the International Financial

[4] The original data is in nominal US dollars. Firstly, we use the current annual exchange rate to convert FDI values to Korean wons. Secondly, such values are deflated by the 2005 GDP deflator. Lastly, we apply the 2005 exchange rate to express them in US dollars. In this way, we attempt to remove the effects of price and exchange rate changes. This method follows the practice by the US Department of Agriculture (USDA) Economic Research, in providing the real GDPs of countries. Note that we use the real GDPs as one of explanatory variables for location choices of Korean firms' FDIs.

[5] The presence of zero FDI values is not so frequent. If there are no Korean FDIs in a host country, they are not included in our sample. However, if zero FDIs are reported for a host country, we keep them, although in small proportions, as zeros.

Statistics by the International Monetary Fund (IMF).

Trade is the sum of exports and imports of goods and services as a share of GDP, and is considered to measure the economic openness of host countries. We collect the data from the World Development Indicators in the World Bank Database. Because a large portion of investments is trade related, a higher degree of openness of the economic environment is conducive to attracting foreign investors. Thus, we expect to find a positive relationship between the openness level and the invested amount.

The variable for wages (ln*wage*), also retrieved from the World Bank Database, is measured by log-transformed real GDP per worker. The difference in labor cost between home and host country is an important determinant of FDIs. With the won exchange rate and wages increasing, the lower cost of labor in host countries attracts investments by Korean firms. Thus, the location choice is negatively connected with the wages earned by workers in host countries.

ln*patent* is also log-transformed, and indicates the worldwide patent applications by host countries' residents, reflecting the level of technological development in the country. In addition, for this variable, data is collected from the World Bank Database. We expect that a positive relationship may exist between the amount of FDIs and the level of technological development.

In our analysis, *km* indicates the geographic distance between Korea and host countries.[6] Firms will consider the geographic location of a host country before investing. The farther a host country is from the home country of an investing firm, the greater the transport costs will be. Furthermore, the investment risk will also increase if the host country is located far from the home country. On the other hand, differences in culture, customs, language, and other aspects are smaller if a host country is close to the home country. A higher degree of cultural integration may affect investment preferences. We expect the geographic distance of host country to have a negative effect on Korean FDIs. The main statistical results are

[6] Distance calculation (available at: http://www.distance24.org/widget.xhtml).

Table 3 Basic Statistical Results

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
ln(1+*samount*)	1,819	2.9125	4.2857	0	14.6094
ln(1+*mamount*)	1,819	4.5585	4.6520	0	15.0828
ln*realgdp*	1,812	10.9412	2.1091	4.8745	16.4701
trade	1,754	90.0468	61.4860	0.3088	531.7374
ln*wage*	1,496	9.6508	0.9816	7.1066	11.1328
ln*patent*	1,242	6.0807	2.4915	0	13.1906
km	1,819	8.8753	4.0760	0.9440	19.5460

shown in table 3. Although we already described industry and host country variations of FDIs in table 1 and 2, we verify that the overall average of manufacturing FDIs is larger than that of service FDIs. For the control variables, we have enough variation for our empirical study.

4.2. Empirical Models

For our main empirical model, we use system generalized method of moments (Sys-GMM) for the following reasons. First, because the dataset contains a large number of host countries, heteroscedasticity may occur. At the same time, since Korea is the only home country in our analysis, there might be cross-country correlation when firms choose FDI destination countries. To deal with these potential problems, we employ GMM. Second, with panel data, it would be possible to use the model by Arellano and Bond (1991), who obtained difference GMM estimators by setting instrumental variables. However, in this case some important time-invariant information would be lost once the difference method is converted. One of our control variables, distance (*km*), has been known as an important geographic factor for FDIs location choice. Furthermore, the difference method would reduce the effectiveness of the instrumental variables and the asymptotic efficiency of the estimators. To solve these problems, Arellano and Bover (1995) proposed the Sys-GMM method, which uses the information from differential equations and level equations simultaneously; it also uses

instrumental variables in differential conversions. For these reasons, we choose Sys-GMM for our main empirical analysis. We employed the following econometric models in our study.[7)]

Model 1:

$$\begin{aligned}\ln\left(1+samount\right)_{it,\,k} &= c+\alpha_1\ln\left(1+mamount\right)_{it-1}+\alpha_2\ln\left(1+samount\right)_{it-1,\,k}\\ &+\alpha_3\ln realgdp_{it-1}+\alpha_4\ln wage_{it-1}+\alpha_5 trade_{it-1}\\ &+\alpha_6\ln patent_{it-1}+\alpha_7 km_i+\varepsilon_{it}.\end{aligned} \quad (1)$$

Model 2:

$$\begin{aligned}\ln\left(1+mamount\right)_{it} &= c+\beta_1\ln\left(1+samount\right)_{it-1,\,k}+\beta_2\ln\left(1+mamount\right)_{it-1}\\ &+\beta_3\ln realgdp_{it-1}+\beta_4\ln wage_{it-1}+\beta_5 trade_{it-1}\\ &+\beta_6\ln patent_{it-1}+\beta_7 km_i+\theta_{it}.\end{aligned} \quad (2)$$

In the two models, *i* and *t* represent, respectively, countries and time. *k* indicates the overall producer services (*k*=0): financial and insurance activities (*k*=1); real estate activities, as well as renting and leasing (*k*=2); business facilities management and business support services (*k*=3); professional, scientific and technical activities (*k*=4); and information and communications (*k*=5).

4.3. Results

4.3.1. Basic results

The estimation results for both models are shown in table 4 (Model 1 with producer-service FDIs and Model 2 with manufacturing FDIs as dependent variable, respectively). The coefficient of lagged FDIs is positive and statistically significant in both models. Specifically, the coefficient of Model

7) Generally, time dummies should be included in models to take into account time-specific effects such as macroeconomic effects over time. However, they are statistically insignificant and increased the number of instruments. Hence, we did not include them in the final model.

Table 4 Basic Results (*k*=0)

	Model 1	Model 2
	ln(1+*samount*)	ln(1+*mamount*)
ln(1+*samount*) *t*–1	0.2184*** (4.45)	0.2467 *** (5.41)
ln(1+*mamount*) *t*–1	0.2171*** (5.08)	0.2135*** (3.43)
ln*realgdp* *t*–1	0.6243*** (2.92)	1.0870*** (4.89)
ln*wage* *t*–1	–0.5484* (–1.95)	–0.9901*** (–3.36)
trade *t*–1	0.0174*** (5.45)	0.0064** (2.01)
ln*patent* *t*–1	0.1919 (1.44)	–0.0178 (–0.12)
km	–0.1107* (–1.89)	–0.1630** (–2.35)
Cons.	–1.9361 (–0.89)	1.4049 (0.58)
Obs.	1113	1113
Hansen test	0.018	0.150
Arellano–Bond test for AR (1)	0.000	0.000

Notes: 1) Numbers in brackets are *t* values. 2) *, **, *** represent significant at 10%, 5%, 1% level of significance. 3) The number of instruments is 23, which includes lagged $\ln(1+samount)_{t-1}$ for 16 years $\ln(1+mamount)_{t-1}$, $\ln realgdp_{t-1}$, $\ln wage_{t-1}$, $\ln patent_{it-1}$, $trade_{t-1}$, and *km*.

1 is 0.2171, which means that if manufacturing investments in year *t*–1 increased by 1%, producer-service investments in year *t* would increase by 0.217%. The coefficient of Model 2 is 0.2467, which means that if producer-service investments in year *t*–1 increased by 1%, manufacturing investments in year *t* would increase by 0.2467%. This indicates the existence of a year-by-year networking mechanism between manufacturing FDIs and producer-service FDIs.

The results for the other variables are as follows. Model 1 results show that past investment in producer services is positively related to new investment, and the same is true for manufacturing. One potential explanation is an agglomeration effect. As shown in Kim and Hur (2015),

the incumbent Korean firms may share information about the host country and local industries with newly investing firms. Thus, it is more secure for a Korean firm to invest in countries in which other Korean firms have already invested.

Other variables relate to location characteristics. The coefficients of real GDP are 0.6243 in Model 1 and 1.0870 in Model 2, and are both significant at the 1% level. This indicates that the market size of host countries has a positive effect on manufacturing and producer-service FDIs of Korean firms. The effect is greater for manufacturing than for producer services.

The coefficients of wages are –0.5484 in Model 1 and –0.9901 in Model 2. These are also statistically significant, at the 10% and 1% level, respectively. From these results, we can infer that manufacturing FDIs are more sensitive to wages in host countries than producer-service FDIs. This may imply that Korean firms pay more attention to low labor costs if they invest in the manufacturing sector.

Coefficients of trade are positive (0.0174 in Model 1 and 0.0064 in Model 2) and significant at the 1% and 5% level, respectively. Our findings indicate that the free movement of goods and services plays an important role in attracting FDIs. The greater the proportion of foreign trade in a region, the higher the potential role of openness in economic development, which may also imply a lower cost of doing business.

For the technical level of a host country, the coefficients for the number of patent applications are 0.1919 in Model 1 and –0.0178 in Model 2, and both are not significant. In general, due to a spillover effect, a firm may realize a benefit by investing in a country with a better technological level. However, this is not the case in our sample. A possible explanation is that patent applications may be not a good proxy for capturing spillover effects. In fact, the technological level (or education level) in Korea may be higher than most host countries in our sample, thus the patent variable could not generate enough variation in our regression.[8)]

[8)] We tried education level, but the results were similar to the ones obtained with the patent application variable.

The coefficients of geographical distance are found to be negative and significant in both models, supporting our hypothesis that geographical distance is negatively correlated with the amount invested.

4.3.2. Five subsectors of Producer-Service FDIs

Table 5 presents results for the manufacturing FDIs and 5 subsectors of producer-service FDIs.[9] As shown in the table, GDP, wages, and trade have positive impacts on manufacturing FDIs and the 5 subsectors of producer-service FDIs. Patent applications have still a non-significant effect on FDIs. The coefficients of geographical distance are negative and significant for manufacturing FDIs of Model 2. However, although the coefficients of the distance are mostly negative in Model 1, the absence of statistically significant results seem to suggest that distance does not matter for each subsectors of producer services, except for "real estate activities, renting and leasing (k=2)."

In Model 1, past FDIs in manufacturing are found to have a significant and positive effect on current FDIs in the 5 subsectors of producer services. The greatest effect is on financial and insurance activities (k=1), while the least effect is on real estate activities, renting and leasing (k=2). In Model 2, past FDIs in the 5 subsectors have a significant and positive effect on current manufacturing FDIs, with business facilities management and business support services (k=3) having a larger effect, and financial and insurance activities (k=1) having a smaller effect. Moreover, the same-sector relationship exists in both models.

[9] Hansen tests are supported in most cases of table 4 to table 8.

Table 5 Manufacturing FDI and Producer Services FDI Sub–Sector Results

	Model 1					Model 2				
	ln(1+*samount1*)	ln(1+*samount2*)	ln(1+*samount3*)	ln(1+*samount4*)	ln(1+*samount5*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)
ln(1+*samount1*) *t*–1	0.4459*** (7.32)					0.1400*** (2.91)				
ln(1+*samount2*) *t*–1		0.1453*** (2.73)					0.2373*** (5.09)			
ln(1+*samount3*) *t*–1			0.3005*** (4.25)					0.2729*** (4.58)		
ln(1+*samount4*) *t*–1				0.3652*** (5.03)					0.1722*** (3.44)	
ln(1+*samount5*) *t*–1					0.3083*** (4.33)					0.2094*** (3.59)
ln(1+ *mamount*) *t*–1	0.0867*** (3.76)	0.0209*** (4.66)	0.0841*** (4.20)	0.0799*** (2.81)	0.1050*** (3.21)	0.2094*** (3.27)	0.2201*** (3.44)	0.2170*** (3.37)	0.2055*** (3.12)	0.1980*** (2.99)
ln*realgdp* *t*–1	0.2245** (2.18)	0.4040** (1.87)	0.3059*** (3.26)	0.5066*** (3.52)	0.4663*** (3.28)	1.3192*** (5.13)	1.1786*** (4.92)	1.2229*** (4.97)	1.2641*** (4.84)	1.2490*** (5.08)
ln*wage* *t*–1	–0.4784*** (–2.77)	–0.6487** (–1.87)	–0.3758** (–1.94)	–0.3812 (–1.58)	–0.6803*** (–3.09)	–1.1269*** (–3.32)	–1.0207*** (–3.48)	–1.0722*** (–3.33)	–1.1403*** (–3.34)	–1.0339*** (–3.17)
trade *t*–1	0.0126*** (4.47)	0.0108** (2.30)	0.0066** (2.47)	0.0127*** (4.18)	0.0094*** (3.00)	0.0096** (2.63)	0.0087*** (2.85)	0.0095*** (2.88)	0.0092** (2.45)	0.0097*** (2.77)
ln*patent* *t*–1	0.1380 (1.62)	0.2289 (1.47)	0.0618 (0.7)	0.0471 (0.46)	0.1683 (1.57)	0.0133 (0.08)	–0.0147 (–0.09)	0.0154 (0.09)	0.0143 (0.08)	–0.0193 (–0.12)
km	0.0239 (0.69)	–0.1426** (–2.09)	–0.0422 (–1.12)	–0.0577 (–1.33)	–0.0650 (–1.28)	–0.2185*** (–2.80)	–0.1612** (–2.21)	–0.1944** (–2.57)	–0.2028** (–2.55)	–0.1977** (–2.55)
Cons.	0.1449 (0.15)	1.4786 (0.60)	–0.1771 (–0.17)	–2.3378 (–1.45)	0.6141 (0.42)	0.7775 (0.28)	0.6822 (0.27)	0.9744 (0.36)	1.3332 (0.47)	0.5519 (0.21)
Obs.	1113	1113	1113	1113	1113	1113	1113	1113	1113	1113
Hansen test	0.140	0.224	0.184	0.117	0.116	0.132	0.144	0.129	0.347	0.218
Arellano-Bond test for AR (1)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: 1) Numbers in brackets are *t* values. 2) *, **, *** represent significant at 10%, 5%, 1% level of significance. 3) *k*=1 to 5 indicates financial and insurance activities (*k*=1); Real estate activities and renting and leasing (*k*=2); Business facilities management and business support services (*k*=3); Professional, scientific and technical activities (*k*=4); Information and communications (*k*=5) respectively. 4) The number of instruments is 23, which includes lagged $\ln\left(1+samount\right)_{t-1}$ for 16 years, $\ln(1+mamount)_{t-1}$, $\ln realgdp_{t-1}$, $\ln wage_{t-1}$, $\ln patent_{it-1}$, $trade_{t-1}$, and *km*.

4.3.3. Different regions —Asia, North America, and Europe

Next, we analyze the networking mechanism between manufacturing and producer-service FDIs of Korean firms in different regions. According to the Export-Import Bank of Korea, Korean firms' investments are primarily concentrated in Asia, North America, and Europe. In this study, we aggregated Europe, North America, and Mexico (NEM) because North America only has two countries (US and Canada).[10] The results are shown in table 6. We also analyze the relationship between manufacturing FDIs and five subsectors of producer-service FDIs by regions, as shown in table 7 (Asia) and table 8 (NEM).

Tables 6, 7 and 8 focus on Asia. The networking mechanism in Asia exists not only between producer-service and manufacturing FDIs, but also between the 5 producer-service subsectors and manufacturing FDIs. The impact of wages is not significant for producer-service FDIs, but it is negative for manufacturing FDIs (table 6). Moreover, if we analyze this relationship by subsector, the same result is confirmed (table 7). This means that cheap labor is more conducive to attracting investments in the manufacturing sector in Asia. As for the effect of GDP, the coefficients are not significant for both types of FDIs (table 6). However, results in table 7 show that GDP plays a positive effect on business facilities management and business support services (k=3), as well as on professional, scientific and technical activities (k=4) in Model 1. Trade also has a positive relationship with both FDIs (table 6). Looking at the results in table 7, the same relationship holds, except for financial and insurance activities (k=1) in Model 1. Nonetheless, patent applications have a positive and significant effect on producer service FDIs in Asia (table 6). This is because Korean firms tend to invest in a country with a relatively high level of technological development of information and communications, as shown in table 7. Distance (km) is negatively and significantly related to producer-service FDIs, and insignificantly related to manufacturing FDIs (table 6). Furthermore, the effect of the same sector is insignificant for both types of FDIs in Asia. However, if we analyze the

10) The country lists are in the Appendix.

Table 6 Results on Different Regions

	Model 1		Model 2	
	ln(1+*samount*)		ln(1+*mamount*)	
	Asia	NEM	Asia	NEM
ln(1+*samount*) *t*–1	0.1073 (1.14)	0.2274*** (2.93)	0.3114*** (3.33)	0.1419*** (3.01)
ln(1+*mamount*) *t*–1	0.4193*** (3.95)	0.0948** (2.00)	0.1463 (0.92)	0.1541* (1.90)
ln*realgdp* *t*–1	0.1239 (0.58)	0.8227** (2.37)	0.6074 (1.16)	2.0946*** (5.99)
ln*wage* *t*–1	0.8303 (1.22)	–0.5701 (–1.37)	–1.6899*** (–3.72)	–2.2749*** (–3.20)
trade *t*–1	0.0097** (2.34)	0.0288*** (5.33)	0.0093** (2.20)	0.0104 (1.64)
ln*patent* *t*–1	0.3000* (1.95)	0.4267 (1.61)	0.0877 (0.36)	–0.5557*** (–2.91)
km	–0.4469* (–1.87)	–0.0103 (–0.05)	–0.1740 (–0.84)	–0.1369 (–1.21)
Cons.	–7.6361 (–1.11)	–7.8595 (–0.05)	13.5713** (2.89)	5.7338 (1.21)
Obs.	252	522	252	522
Hansen test	0.860	0.204	0.999	0.401
Arellano–Bond test for AR (1)	0.010	0.000	0.008	0.000

Notes: 1) NEM is North America and Europe (include Mexico). 2) Numbers in brackets are *t* values. 3) *, **, *** represent significant at 10%, 5%, 1% level of significance. 4) The number of instruments is 23, which includes lagged $\ln(1+samount)_{t-1}$ for 16 years, $\ln(1+mamount)_{t-1}$, $\ln realgdp_{t-1}$, $\ln wage_{t-1}$, $\ln patent_{it-1}$, $trade_{t-1}$, and *km*.

inter-sectoral links between manufacturing and the 5 subsectors of producer services, the relationship is positive and significant in Model 1, as shown in table 7.

We now consider the NEM region in table 6, 7 and 8. Inter - and intra - sectoral linkages in both FDIs exist (table 6). However, in table 8, pre-manufacturing FDIs have a positive effect only on real estate activities, renting and leasing (k=2), and business facilities management and business support services (k=3) in Model 1, while pre-real estate activities, renting and leasing FDIs (k=2) positively relate to manufacturing FDIs in Model 2. GDP has a positive impact on producer-service and manufacturing FDIs in table 6. However, in table 8, the positive impact of GDP disappears in Model 1. The

Table 7 Results for Manufacturing and Sub–sector of Producer Services in Asia

	Model 1					Model 2				
	ln(1+*samount1*)	ln(1+*samount2*)	ln(1+*samount3*)	ln(1+*samount4*)	ln(1+*samount5*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)
ln(1+*samount1*) *t*–1	0.3970*** (4.54)					0.1080*** (2.98)				
ln(1+*samount2*) *t*–1		0.1631 (1.04)					0.1873** (2.55)			
ln(1+*samount3*) *t*–1			0.2434* (1.91)					0.1643*** (4.30)		
ln(1+*samount4*) *t*–1				0.1307 (1.01)					0.1929*** (3.84)	
ln(1+*samount5*) *t*–1					0.1990** (2.73)					0.1386** (2.65)
ln(1+ *mamount*) *t*–1	0.1853* (1.78)	0.2574** (2.27)	0.1423** (2.16)	0.2649** (2.41)	0.1834** (2.34)	0.2216 (1.31)	0.2497 (1.34)	0.2844 (1.62)	0.2035 (1.15)	0.2291 (1.22)
ln*realgdp* *t*–1	0.1015 (0.53)	0.3290 (1.15)	0.3341** (2.47)	0.3905* (1.84)	0.2026 (0.85)	0.6873 (1.11)	0.5980 (1.10)	0.5961 (1.04)	0.6473 (1.03)	0..6930 (1.18)
ln*wage* *t*–1	0.1951 (0.39)	0.0925 (0.13)	–0.1402 (–0.31)	0.0788 (0.16)	–0.0400 (–0.07)	–1.5418*** (–3.12)	–1.4132** (–2.94)	–1.3240** (–2.79)	–1.4955*** (–3.13)	–1.4671** (–2.64)
trade *t*–1	0.0089 (1.75)	0.0106* (2.11)	0.0072* (1.90)	0.0116** (2.38)	0.0097*** (3.00)	0.0123** (2.40)	0.0102* (2.06)	0.0108** (2.71)	0.0110** (2.14)	0.01190* (2.09)
ln*patent* *t*–1	0.1851 (0.99)	0.1456 (0.81)	0.2013 (1.37)	0.2668 (1.71)	0.4930** (2.60)	0.1844 (0.64)	0.1448 (0.54)	0.1319 (0.50)	0.1248 (0.41)	0.1011 (0.34)
km	–0.1327 (–0.60)	–0.8233** (–2.67)	–0.2302 (–1.19)	–0.5236** (–2.42)	–0.4861 (–1.72)	–0.2580 (–1.28)	–0.1325 (–0.54)	–0.273 (–1.21)	–0.1994 (–0.74)	–0.2464 (–0.95)
Cons.	–4.3262 (–0.99)	–1.2911 (–0.17)	–2.8345 (–0.83)	–5.1304 (–1.13)	–2.2053 (–0.44)	12.0950* (2.11)	10.7456** (2.30)	10.7379** (2.14)	11.9617* (2.04)	11.2746* (2.04)
Obs.	252	252	252	252	252	252	252	252	252	252
Hansen test	0.126	0.838	0.859	0.766	0.842	0.955	0.922	0.972	0.744	0.917

Arellano–Bond test for AR (1)	0.001	0.003	0.001	0.002	0.007	0.008	0.004	0.008	0.007	0.005

Notes: 1) Figures in brackets are *t* values. 2) *, **, *** represent significant at 10%, 5%, 1% level of significance. 3) *k*=1 to 5 indicate financial and insurance activities (*k*=1); Real estate activities and renting and leasing (*k*=2); Business facilities management and business support services (*k*=3); Professional, scientific and technical activities (*k*=4); Information and communications (*k*=5) respectively. 4) The number of instruments is 23, which includes lagged $\ln(1+samount)_{t-1}$ for 16 years, $\ln(1+mamount)_{t-1}$, $\ln realgdp_{t-1}$, $\ln wage_{t-1}$, $\ln patent_{it-1}$, $trade_{t-1}$, and *km*.

Table 8 Results for Manufacturing and Sub–sector of Producer Services in NEM

	Model 1					Model 2				
	ln(1+*samount1*)	ln(1+*samount2*)	ln(1+*samount3*)	ln(1+*samount4*)	ln(1+*samount5*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)	ln(1+*mamount*)
ln(1+*samount1*) *t*–1	0.4157*** (3.85)					–0.0635 (–0.88)				
ln(1+*samount2*) *t*–1		0.1488** (2.44)					0.2071*** (3.83)			
ln(1+*samount3*) *t*–1			0.2095* (1.75)					0.1713 (1.38)		
ln(1+*samount4*) *t*–1				0.5117*** (5.14)					0.0890 (1.58)	
ln(1+*samount5*) *t*–1					0.2132 (1.68)					0.0226 (0.32)
ln(1+*mamount*) *t*–1	0.0542 (1.40)	0.0965*** (2.58)	0.0548* (1.73)	0.0357 (0.97)	0.0199 (0.61)	0.1396 (1.67)	0.1566* (1.88)	0.1414* (1.71)	0.1453* (1.74)	0.1423* (1.71)
ln*realgdp* *t*–1	1.0544 (0.25)	0.0684 (0.27)	–0.1665 (–0.83)	0.2305 (0.94)	0.3110 (1.19)	2.3273*** (6.00)	2.1869*** (6.08)	2.3133*** (6.38)	2.2560*** (6.20)	2.2972*** (6.12)
ln*wage* *t*–1	–0.3242 (–1.31)	–0.6278 (–1.43)	–0.1340 (–0.50)	0.0584 (0.17)	–0.7114** (–2.16)	–2.5355*** (–3.26)	–2.2243*** (–3.13)	–2.4168*** (–3.36)	–2.4509*** (–3.42)	–2.4501*** (–3.23)
trade *t*–1	0.0146*** (5.08)	0.0062* (1.79)	0.0036 (1.41)	0.0137*** (3.05)	0.0061** (2.07)	0.0169** (2.39)	0.0132*** (2.18)	0.0146** (2.38)	0.0132* (1.85)	0.0153** (2.35)
ln*patent* *t*–1	0.3447 (1.39)	0.6662* (1.99)	0.4458* (1.73)	0.2641 (1.10)	0.4815 (1.59)	–0.4631** (–2.26)	–0.6318*** (–2.87)	–0.5836** (–2.64)	–0.5402** (–2.68)	–0.5069** (–2.47)
km	0.2558 (1.46)	0.0635 (0.23)	0.4080** (2.07)	0.0663 (0.38)	0.2696 (1.03)	–0.1113 (–0.80)	–0.1538 (–1.29)	–0.2205 (–1.50)	–0.1494 (–1.17)	–0.1437 (–1.13)
Cons.	–3.0281 (–1.59)	0.5982 (0.16)	–3.2521* (–1.74)	–6.4645** (–2.12)	–1.8677 (–0.67)	4.6251 (0.90)	4.5894 (0.95)	5.3950 (1.11)	5.6389 (1.17)	4.7574 (0.93)
Obs.	522	522	522	522	522	522	522	522	522	522
Hansen test	0.763	0.427	0.625	0.836	0.500	0.391	0.222	0.569	0.362	0.387

Arellano-Bond test for AR (1)	0.001	0.000	0.004	0.005	0.002	0.000	0.000	0.000	0.000	0.000

Notes: 1) Figures in brackets are *t* values. 2) *, **, *** represent significant at 10%, 5%, 1% level of significance. 3) *k*=1 to 5 indicate financial and insurance activities (*k*=1); Real estate activities and renting and leasing (*k*=2); Business facilities management and business support services (*k*=3); Professional, scientific and technical activities (*k*=4); Information and communications (*k*=5) respectively. 4) The number of instruments is 23, which includes lagged $\ln(1+samount)_{t-1}$ for 16 years, $\ln(1+mamount)_{t-1}$, $\ln realgdp_{t-1}$, $\ln wage_{t-1}$, $\ln patent_{it-1}$, $trade_{t-1}$, and *km*.

effect of wages is insignificant on producer-service FDIs and negative on manufacturing FDIs (table 6) and it is negatively related only with information and communications (k=5) in Model 1 (table 8). In table 6, trade has a positive effect on producer-service FDIs and an insignificant effect on manufacturing FDIs. Patent applications have a positive, but insignificant relationship with producer-service FDIs in table 6. As for the subsectors in Model 1 in table 8, real estate activities, renting and leasing (k=2) and business facilities management and business support services (k=3) are positively related with patent applications. Finally, coefficients of distance are both insignificant in table 6, but the coefficient is positive and significant for business facilities management and business support services (k=3) in Model 1 in table 8.

5. CONCLUSION

Using panel data from the Export-Import Bank of Korea and system GMM econometric models, we find that a networking mechanism exists between manufacturing FDIs and producer-service FDIs. The relationship still holds when the analysis is based on subregions or subsectors. We also find that GDP and trade have a positive effect on FDIs, while the effects of wages and geographical distance are found to be negative. On the other hand, a host country's level of technological development is found to have no significant effect on outbound FDIs of Korea.

With the networking mechanism, one may infer that Korean firms have built up more complete production and service chains in global markets, and that the direct relationship between the subsidiary in foreign countries and the parent company in Korea could tend to weaken in the future. In fact, the study by Chun *et al*. (2017) showed a significant lack of intra-firm trade flows for Korean multinationals.

Our study has some limitations. Firstly, because we used industry level data, whether our main results for FDI decisions hold true also at the firm level

is not certain. Secondly, we need to pay attention to cross-country correlation in panel data. Note that, in our sample, only Korea invests. For example, firms may choose a group of host countries in Asia as a target location. To overcome this problem, we tried to divide our sample into two subregions — Asia, and North America and Europe. Although we checked this out for robustness of our main results, it is worth including all bilateral transactions of FDIs and see whether there is such an interdependence between the outbound FDIs in manufacturing and service sectors. Lastly, the interdependence of the two FDIs is heavily endogenous. Although the purpose of the current study is a fact-finding on the two types of FDIs from the perspective of building up a global Korean supply chain, the endogeneity is certainly the most important issue to be solved both theoretically and empirically. We will leave this to further studies.

APPENDIX

A1. All Countries List Used in This Paper

Algeria, Argentina, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belgian, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, Ethiopia, Finland, France, Georgia, Germany, Guatemala, Holland, Hong Kong, Hungary, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kyrgyz, Latvia, Lithuania, Luxembourg, Madagascar, Malaysia, Malta, Mexico, Morocco, New Zealand, Nigeria, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Saudi Arabia, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Uganda, UK, Ukraine, United Arab Emirates, Uruguay, USA, Uzbekistan, Venezuela, Vietnam, Zambia.

A2. Asian Countries List

Bangladesh, China, Hong Kong, India, Indonesia, Japan, Kazakhstan, Kyrgyz, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Uzbekistan, Vietnam.

A3. NEM Countries List

Austria, Denmark, Ireland, Poland, Sweden, Azerbaijan, Finland, Italy, Portugal, Switzerland, Belgian, France, Latvia, Romania, Turkey, Bulgaria, Georgia, Lithuania, Russia, UK, Canada, Germany, Luxembourg, Slovakia, Ukraine, Cyprus, Holland, Malta, Slovenia, USA, Czech Republic, Hungary, Norway, Spain, Mexico.

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