International Journal of Business and Development Studies **Vol. 4, No. 1,** (2012) pp . 5-26

The Strategy of Korean Multinational Enterprises – Multiple versus Single plant

Jung Hur [*] Jiwon Lee[**] Hea-Jung Hyun[***]

Abstract

Using firm-level panel data for Korean MNEs, we make a distinction between being the only affiliate of a parent firm and being the one of the multiple affiliates of a parent firm. Comparisons of correlations between purchases and sales of each group of the foreign affiliates show distinctive difference in the motivations of FDI and the multinational activities, due to the difference in the number of affiliates they possess. Our main empirical results in this paper suggest that productive Korean MNEs not only enlarge their host countries of FDI but also enlarge the number of affiliates in a same host country. We interpret these FDIs are motivated by enjoying information and network advantages by gathering in one location.

Keywords: Foreign Direct Investment, Multinationals, Firm eterogeneity, Location Decision

JEL Classification: F23, D22

1. Introduction

Korea's MNEs (Multinational Enterprises) has consistently shown increase in FDI (Foreign Direct Investment) since year 1994[1]. In 2010, the FDI outflow of Korean MNEs became 23.2 billion dollar and 2,855 foreign affiliates were newly established by Korean MNEs[2].

In general, a profit maximizing firm's decision to engage in an investment to a foreign country is based on efficiency seeking motivation and market seeking motivation. Efficiency seeking motivation is for exploiting low factor prices of a foreign country, and market seeking

[*] Corresponding Author, Department of Economics, Sogang University, #1 Shinsu-Dong, Mapo-Gu, Seoul 121-742, Korea. Email: ecsjhur@sogang.ac.kr.

[**] Department of Economics, Sogang University, #1 Shinsu-Dong, Mapo-Gu, Seoul 121-742, Korea. Email: jiwon74@gmail.com.

[***] College of International Studies, Kyung Hee University, 1732 Deogyeong-daero, Giheung-gu, Yongin-si, Gyeonggi-do, 446-701, Korea. Email: hjhyun@khu.ac.kr.

[1] The FDI outlow of worlds as well as Korea has shown upwared trend exept for a stiff drop during the financial crisis.

[2] FDI report 2010, export import bank of Korea.

motivation is for opening up a new market with saving international trading costs. In addition to the traditional motivations, MNEs may have extra motivations to directly invest in foreign countries. For example, Korean MNEs data shows that foreign affiliates of Korean MNEs are densely populated in the host countries of China or US. Motivations of such an agglomeration are information and network advantages that the MNEs may achieve from the subsequent FDIs in one location. Information advantage seeking motivation is for saving the fixed cost from market information gathering, and network advantage seeking motivation is for enjoying complementary effect among foreign affiliates located in the same host country. The issue that we attempt to examine in this paper is a difference between the first FDI and subsequent FDIs to provide the evidence of possible extra motivations mentioned above.

In order to explain FDI and multinational activities of MNEs, recent international trade studies have focused on firm heterogeneity in productivities, differences between MNEs that differentiate parent firms' decision on whether to export or to directly invest in foreign countries. According to the existing studies, only the firms that are productive enough to control the fixed investment cost such as construction cost and management cost are shown to open foreign affiliates. Recent papers have also found out that productivity differences not only affect decisions of engaging in FDI, but also affect diverse FDI strategies by MNEs.

In this paper, when analyzing Korean data, we note that Korean MNEs' investments tend to be concentrated in the limited number of countries, such as China or US. In this context, our analysis in this paper is starting from an idea that having multiple affiliates may also reflect parent firms' productivity issues, but does not necessarily indicate an increase in the number of countries that the parent firms invest in. In doing so, we made a distinction between being the only affiliate of a parent firm and being the one of the multiple affiliates of a parent firm. Purpose of dividing into groups is to capture the differences in multinational activities between the two groups. In addition, being the only affiliate represents the case of the first FDI of Korean MNEs, and being one of the multiple affiliates represents the case of the subsequent FDIs after the first FDI. Therefore, by comparing the difference in multinational activities between the two groups, we also compare the difference in motivations between the first and the subsequent FDIs. Comparisons of correlations between purchases and sales of each group of the foreign affiliates show distinctive difference

in the motivations of FDI and the multinational activities, due to the difference in the number of affiliates they possess. Our main empirical results in this paper suggest that productive Korean MNEs not only enlarge their host countries of FDI but also enlarge the number of affiliates in a host country. We interpret these FDIs are motivated by the information and network advantages by gathering one location. This is a new approach to the existing findings of the more productive MNE's investment in a larger number of foreign countries, since we show more productive firms also increase the number of foreign affiliates in a same host country where they already have their foreign affiliate.

We organize this paper as follows. First, in section 2, we will review on the existing literatures regarding firm heterogeneity and FDI, and move on to show a data description for Korean MNE activities in section 3. We will also carry out preliminary studies using the model of Yeaple (2009) with Korean MNE's data. Section 4 will be focused on explaining the distribution of Korean affiliates located in China, and suggest the possible extra motivations of having the subsequent FDIs in a same host country by comparing the case of a Chinese affiliate when it is being the only affiliate of a Korean MNE and when it is being the one of multiple affiliates. Section 5 concludes.

2. Literature Review

There are many existing studies on theoretical models and empirical evidences about the relationship between productivity difference and MNEs' multinational activities. Tomiura (2007) documents how productivity varies with globalization modes, such as exporting, outsourcing, and investment abroad. Even after controlling for industry, firm size, and factor intensity, there is an ordering of the productivity among the Japanese firms regarding their multinational activities, which is very consistent with the theory. The most productive firms are participating in FDI; less productive firms perform foreign outsourcing or exporting, and the least productive firms operate in the domestic market.
While the studies above explain the phenomena of the sorting of heterogeneous firms investing in the foreign markets, Yeaple (2009) empirically investigates on the relations between the heterogeneous U.S MNEs' multinational activities and the host country characteristics, based on the firm heterogeneity model from Helpman et al (2004). First of all, he finds that the more productive U.S. firms show the greater scope (number

of affiliates) and scale (size of its affiliates) in their multinational activities. In addition, he verifies the 'pecking order' among US MNEs, which is shown in the data that the more productive firms tend to invest in the countries which are considered as tougher markets. For example, host countries which are in a greater distance with home country and which have a smaller GDP and a smaller GDP per capita are considered as tougher markets due to the higher transportation cost, smaller market size, and smaller effective demand, respectively. Yeaple (2009) also confirms the specific country characteristics which affect the multinational activities with aggregated US firm data. Chen and Moore (2010), based on Helpman et al (2004), have empirical investigation on productivity distribution of French MNEs and their multinational activities, and focus on how productivity differences among MNEs may lead to differential effects of host-country attributes and consequently distinct choices of the foreign production locations. However, contrary to Yeaple (2009), by adopting the various methods such as using past production performance data at home, implying two stage control function, and controlling unobserved country and firm heterogeneity, Chen and Moore (2010) contribute to clarify ambiguous causality between the firm productivity and the FDI activity.

There are other studies that are dealing with the heterogeneous firms' FDI activities as well as types or strategies of FDIs and the location decision of MNEs. Yeaple (2003), in a theoretical paper, explains a FDI strategy of complex integration, which combines vertical integration strategy and horizontal integration strategy.Vertical integration and horizontal integration are different in their motivation of the investment, as the motivation of a firm involving in the vertical integration is exploiting a factor price difference in a host country, while that of a firm involving in the horizontal integration is saving cost from the international trade. When assuming home country as one of the developed country in the north, there are four strategies that a MNE can choose. By using three country model with two developed countries of the North and one developing country of the South, he answers a question about the circumstances for a MNE to choose complex integration strategies. He points out the transportation cost as an important factor to focus on, to explain the behavior of MNEs to choose the complex integration strategy. Grossman et al (2006) modify and extend Yeaple's studies. They design more complicated model with an intermediate good and a final good; therefore derive the concept of export platform FDI into the model. Moreover, they also show that the firms

producing differentiated products are heterogeneous, and the parent firms with different productivity levels may choose different integration strategies. Aw and Lee (2008) further modify the model of Grossman et al (2006) by focusing on reflecting circumstances of middle income country, using Taiwanese data in 2000. They explicitly model the effect of firm heterogeneity and the effect of country different productivity levels for MNEs to choose different production locations and FDI strategies. According to the study, among the Taiwanese firms which invest in China, US, and both of the countries, the most productive firms invest in both of the counties, and the less productive firm than the invest in US or China only, and the least productive firm choose to be a national firm.

One of main difference between the existing literature and our work is that we found a fact that parent firms with higher productivity increase the number of affiliates in a specific country while the existing studies focus on the fact that the parent firms with higher productivity invest in a wider scope of host countries. Although the level of productivity of parent firms matters for having multiple affiliates, our empirical results suggest a requirement of adequate explanations on the multinational activities of Korean MNEs agglomerated in one location. Some of potential explanations are information and network advantages that the Korean MNEs may achieve from the subsequent FDIs in one location. Information advantage may be important for firms to save fixed costs of information gathering, and network advantage may also matter in order to enjoy complementary effect among foreign affiliates located in the same host country.

3. Structure of Korean MNE's Activities

In this section, first, we briefly describe the empirical specifications of the MNE model used in Yeaple (2009) and the Korean data used in our paper. We, then, analyze empirical results to explain the multinational activities of Korean MNEs.

3.1 Empirical Specification of Yeaple (2009)

In the model of Yeaple (2009), representative consumers are assumed to have constant elasticity of substitution utility and firms are assumed to have Pareto distributed productivity. There are J countries indexed by j, and a firm faces a single input of the labor cost. Mass of the firms in country j is Nj, and wage in country j is wj. Mass of the firms and the

wage of the home country are marked with subscript *h*. A firm in the home country is confronted with two options of producing in home country or producing in a foreign country. If a firm decides to produce in home country, the costs that the firm encounters are home country labor cost wh and iceberg transportation cost τhj. If a firm decides to produce in foreign country, the costs that the firm encounters are investment fixed cost Fj and foreign country labor cost wj. To rule out the case of export platform FDI and vertical FDI, $wh\ \tau hj > wj$ is assumed. Facing these costs, a firm chooses its entry mode to a foreign country. Instead of solving for general equilibrium model, reduced form approach in relating a firm's multinational activity to country characteristics is used to implement the empirical works. It is novel that the theory of MNE takes into account country characteristics that may affect the structure of multinational activity across countries. The first is related to country-specific scale, which is measurable using data on the aggregated sales of affiliates in country *j* and the aggregated sales of their parent firms in country *h*. The second mechanism that country characteristics affect the multinational activity is through the effect of the magnitude of country specific fixed cost relative to the measure of unit cost saving of multinational activity[3]. Hence, the econometric specifications regarding the two mechanisms derived in the model are as follows:

$$\ln(\frac{S_j}{S_h}) = \beta_0 + \beta_1 \ln(GDP)_j + \beta_2 \ln(GDP\,per\,Capita)_j + \beta_3 \ln(Dis\tan ce)_j + \varepsilon_j$$

$$\ln(\frac{S_j}{N_j}) = \beta_0 + \beta_1 \ln(GDP)_j + \beta_2 \ln(GDP\,per\,Capita)_j + \beta_3 \ln(Dis\tan ce)_j + \varepsilon_j$$

Sj is aggregated affiliate sales in country *j*, Sh is aggregated parent firm sales in home, and Nj is aggregated number of Korean affiliates in country *j*. Logarithm of gravity variables of *GDP*, *GDP per capita*, and *Distance* are included as country characteristics. The coefficients of β summarize effects of country characteristics on affiliate scale in the first model, and the relative size of concentration cost versus proximity benefits of FDI in the second model. Next, when explaining the investment behavior of individual Korean MNEs, the most important assumption in the model is that every firm in a country has different productivity. In order to analyze the FDI decision of individual firms with the headquarters located in the

[3] When organizing the model in the study of yeaple (2009), the relative costs have the fixed cost as a numerator the unit cost saving from fdi as a denominator.

home country, two different marginal cost of serving country *j* for heterogeneous parent firms with productivity φ can be derived. From each of the marginal cost, a firm's sales revenue in each market can also be derived. The firm's sales revenue is proportional to its productivity index. Therefore, the empirical model derived from the MNE theory can be organized as followings:

$$\ln (\text{Affiliate Sales})_{ijt} = \alpha + \beta \ln (\text{Parent firm Sales})_{ijt} + \varepsilon_{ijt}$$

$$\ln (\text{Affiliate Sales})_{ijt} = \alpha + \beta (\text{Parnet Firm TFP})_{ijt} + \varepsilon_{ijt}$$

Both sales and TFP of parent firm are used as the measure of parent firm productivity. Net profit of a firm's choice of opening an affiliate *i* in country *j* in time *t* and that of exporting to the country *j* can also be compared, and the net profit is linear and increasing in a firm's productivity index. According to the model of Yeaple (2009), there is a cutoff productivity φ_{hj} so that a firm with lower productivity than cutoff productivity chooses to export to country *j*, and a firm with higher productivity than cutoff productivity chooses to engage in FDI in country *j*. Therefore, it is expected from the theory that firms with large home market sales also invest in a larger number of countries since their productivity index will exceed the cutoff productivity in a larger number of countries.

3.2 Empirical analysis and the results

We use a firm-level panel data of Korean MNEs and their foreign affiliates. The data includes three-year information on 401 foreign affiliates and their parent firms of Korean MNEs, through 2005 to 2007[4]. Since the industries of the 401 foreign affiliates which belong to 219 parent firms are including various industries of manufacturing and service, we sort out a case when the industries of both parent firm and foreign affiliates are manufacturing sectors and found that, among the 401 foreign affiliates of the total sample, 229 foreign affiliates are counted as affiliates which themselves and their parent firms are both in manufacturing industry. We will separate our empirical results for those belonging to

[4] Suorece for each of the data are as foloows: information on Korean MNEs foreign affiliates is from export-import bank of Korea. Information on Korea MNEs is from KISVALUE. KISVALUE is Korean firm's information system supported by national information and credit evaluation Inc. information on foreign affiliates is from export import bank of Korea. Information on country characteristic such as real GDP and GDP per capita are from world development indictors, and distance between korea and the host country is from CEPII.

manufacturing sectors only and for those in all industrial sectors. As for our first analysis regarding the country-characteristics effect on multinational activities, we aggregate the sales of all Korean affiliates in host country *j*. There are 28 host countries in the aggregated sample. The measure of the number of entrants corresponds to the total number of Korean firms that own affiliates in country *j*. In addition, average parent sales or TFP is the sales or TFP of the parent firms which have their affiliates in country *j*. The summary statistics for host country variables are shown in Table 1.

Table 1: Host Country Summary Statistics

	Observation	Mean	Standard Deviation
ln(GDP)	26	20.39465	1.387863
ln(GDP per Capita)	26	9.52996	.8336661
ln(DIST)	26	8.306971	.5979407
ln(aggregate sales)	28	14.07302	3.012361
ln(number)	28	.9109503	1.177439
ln(average parent sales)	28	30.54007	2.746844
ln(average parent tfp)	28	13.16207	2.331474

It is noticeable that, comparing the Korean MNEs' foreign activities to those of US MNEs[5], the average GDP and GDP per Capita of the countries where Korean MNEs invest is larger than that of US, and the average distance of the host countries is shorter than that of US MNEs.

As for our second analysis on the investment behavior of individual Korean MNEs, we use the panel data which includes information on Korean parent firms and their foreign affiliates. In addition to the result of the firms in manufacturing industry, we also attached the information of MNEs in all industries, which includes manufacturing and service industries[6].

[5] Information UN us affiliates host countries summary statistics is listed on yeaple (2009), appendix table 2.
[6] Industry list for the parent firms is in appendix-table 1.

Table 2: Parent Firm Summary Statistics

	Manufacturing Industry (168)		Whole Industry (219)	
	Mean	Standard Deviation	Mean	Standard Deviation
ln(Parent firm sales)	26.22742	2.022459	26.016	2.013524
TFP	-.1132014	.7696292	-.217828	.6809887

Table 2 shows summary statistics on the parent firms where the information on the parent firm sales and TFP are slightly lower in whole industries than in manufacturing sectors. In this table, following Yeaple (2009), the Korean TFP is derived from the difference between the observed value and fitted value from the regression of the natural logarithm of sales (output) on the logarithm of fixed assets (capital), the logarithm of the number of workers with year dummies. The coefficients on the TFP regression are 0.3748 and 0.6229 respectively. There are 168 samples of parent firms, which are Korean manufacturing MNEs. 121 of them have only one affiliate in the foreign country and 47 of them have more than one affiliate in the foreign country. The maximum number of affiliates that one parent firm possesses is 22. Appendix-Table 2 shows that parent firms invest in a limited number of countries rather than in wide variety of host countries.

Table 3: Foreign Affiliates Summary Statistics

	Manufacturing Industry (229)		Whole Industry (401)	
	Mean	Standard Deviation	Mean	Standard Deviation
ln(affiliate_sales)	10.406	2.101689	10.12455	1.906233
affiliate_TFP	0.000361	1.984554	-.5141282	1.608244

Summary statistics for foreign affiliates in Table 3 show information on both sales and TFP, and TFP of foreign affiliates is measured exactly the same method as TFP for parent firms. We can see that the average affiliate

sales and TFP of foreign affiliates in the manufacturing industry are slightly lower than that of foreign affiliates in the whole industry.

3.3 Host Country Effect on Korean MNE's Activities

In this section, we investigate the effect of the host country characteristics on aggregate affiliate sales of Korean MNEs. The results reported are shown in Table 4.

Table 4: Aggregate Multinational Activity by Component

	(1) Aggregate Sales $\ln(S_j)$	(2) Number $\ln(N_{hj})$	(3) Average Productivity $\ln(S_h/N_{hj})$	(4) Scale $\ln(S_j/S_h)$	(5) Average Sales $\ln(S_j/N_{hj})$
GDP	.5031399* (.3261853)	.3911479*** (.1842)	.1590383 (.4425194)	-.0470477 (.2137199)	.1119905 (.3093327)
GDP per Capita	-.5906236* (.4334112)	.1421388 (.2506545)	-.3109172 (.605608)	-.0306986 (.286107)	-.3416156 (.4375472)
DIST	-1.371243** (.831122)	-.8127396*** (.3230182)	-1.230094 (.9853978)	.6715783*** (.3418508)	-.558515 (.7802277)
N	26	26	26	26	26
R2	0.2117	0.4480	0.1028	0.1321	0.0590

Notes: heteroskedascity robust standard errors are shown in parentheses. Aggregate sales correspond to local affiliate sales of all manufacturing affiliates owned by Korean parent firms. All independent variables are in logarithms. By construction, the coefficient estimates in column (1) are equal to the sum of the coefficients in columns (2)-(4). The coefficients in columns (4) and (5) have structural interpretations as Scales and Relative Costs.

Column 1 reports the coefficient estimates obtained by regressing aggregated multinational sales on the set of the gravity variables of host countries. Consistent with other studies, the local affiliate sales of Korean multinationals are increasing in the GDP level of host country and decreasing in distance. Inconsistent with other studies, local affiliate sales of Korean multinationals are shown to be decreasing in the GDP per capita. Column 2 reports the coefficients have the same signs as those in column 1 and are smaller in absolute values. A 10% increase in GDP is associated with a 3.9% increase in the number of Korean affiliates present in that country (column 2) and a 5.0% increase in the sales of those

affiliates (column 1), implying that the average affiliate size increases by approximately 1%. Considering the facts that the aggregated sales of column 1 can be decomposed into column 2, 3, and 4, and that coefficients in column 2 are in general more than half the size of the coefficients in column 1, the variation in the extensive margin (the number of entrants) explains more than half of the variation in affiliate sales, except for the variable of GDP per capita.

Column 3 reports from a regression of the average productivity of parent firms (as measured by sales in Korea that own an affiliate in a given country) on the gravity variables. According to the theory of Yeaple (2009), the coefficients on each variable in the average productivity equation have opposite in signs to those in column 2. However, with Korean MNE's data, the result of the regression in column 3 is neither consistent with the theory nor statistically significant. Column 4 reports the coefficient estimates from the specifications relating the logarithm of scale to the set of country characteristics. The results of coefficient of GDP and GDP per capita show that they are statistically insignificant, while the estimated coefficient of distance shows positive sign with significance. Note that the dependent variable of scale has the aggregate foreign affiliates' sales as the numerator, which is divided by the denominator, the parent firms' aggregate sales in Korea. Since the result of the regression of aggregate foreign affiliates' sales on distance produces a negative value, it is expected that when regressing the logarithm of the aggregate parent firms' sales on distance, the coefficient on distance will show a negative sign and a bigger absolute value than -1.37, as shown in column 1. It indicates that as the host country becomes further in distance, only a few firms with a high level of productivity can invest in the countries. Due to the fact that the number of parent firm's that can invest in a long distance host country is very few, which denoted by the coefficient of distance in column 2, the denominator becomes smaller at a larger rate than the numerator does.

In the last column are the results obtained by regressing the logarithm of average affiliate sales to local market on the same gravity variables. According to Yeaple's model, these results can be interpreted as describing the effect of country characteristics on the relative magnitude to country fixed costs to the cost saving of country variable cost. The positive coefficient on GDP is interpreted as evidence that fixed costs are rising in market size, and the negative coefficient on distance is interpreted as

either country fixed cost is decreasing in distance or benefit from saving country variable cost is increasing in distance. However, the result with Korean data does not show statistically significant results.

3.4 The Investment Behavior of Individual Korean MNEs

In this section, we provide an empirical analysis of the foreign activity of individual Korean multinational firms. Two measures of a parent firm's productivity are used in the paper: the values of the parent firm's sales in Korea, and the parent firm's TFP. In order to explain the scale of Korean MNEs' activities, we made a panel regression of the logarithm of individual affiliate's local sales in foreign countries on the logarithm of their parent firms' Korean Sales and their TFP. The results are shown in Table 5.

Table5: The Scale of Korean MNEs' Activities in Host countries

	Panel Data 2005-2007			
	Manufacturing Industry		Whole Industry	
	(1)	(2)	(3)	(4)
ln (Parent firm Sales)	.4574853*** (.0323738)		.4832747*** (.0271717)	
Parent firm TFP		.4527057*** (.1194378)		.2775966*** (.0859414)
Country Fixed Effect	O	O	O	O
industry Fixed Effect	O	O	O	O
Year Fixed Effect	O	O	O	O
Number	678	677	1156	1153
R squared	0.5526	0.3644	0.6288	0.4800

Notes: Standard errors shown in parentheses. TFP is derived from the difference between the observed value and fitted value from the regression of the natural logarithm of sales (output) on the logarithm of fixed assets (capital), the logarithm of the number of workers with year dummies. The number of parent firms in the sample is 219 for total industry and 168 for manufacturing industry, respectively. Industry fixed effect includes affiliates' industry fixed effect.

Column 1 corresponds to the specification in which firm productivity is measured using parent firms sales in Korea, while column 2 corresponds to the specification in which firm productivity is measured using parent firm TFP. Similar to earlier studies, the larger, more productive manufacturing firms are more likely to engage in a larger scale of multinational activities. In column 3 and column 4 of Table 5 we use the data of Korean MNEs for the whole industry. There is no critical

difference in the analysis of Korean manufacturing MNEs' foreign activities. The results also confirm the fact that foreign affiliate's size is increasing in the parent firm's productivity.

4. A case Study: Korean MNEs' Affiliates in China

In this section, we consider the Korean MNEs' activities in China as a case study. We choose China as the main host country of interest in this study, since 40% of the foreign affiliates in the whole industry are located in China. Considering only the foreign affiliates in manufacturing industries, 58% of all are in China. In doing so, we will investigate the correlations between purchases and sales, to capture the multinational activities of Korean foreign affiliates in the host country. The activity of purchases is consisted of local purchases, and importing from a parent firm. The activity of sales is consisted of local sales, exporting to a parent firm, and exporting to third countries. Therefore, six correlation combinations of these purchases and sales activities of every foreign affiliate are arranged. We divide the foreign affiliates into two groups, which include the case of being the only affiliate and the case of being the one of multiple affiliates, in each of the host countries. The correlations of purchases and sales show how the foreign affiliates' multinational activities will be differentiated by the group they belong to and the host country they are located in.

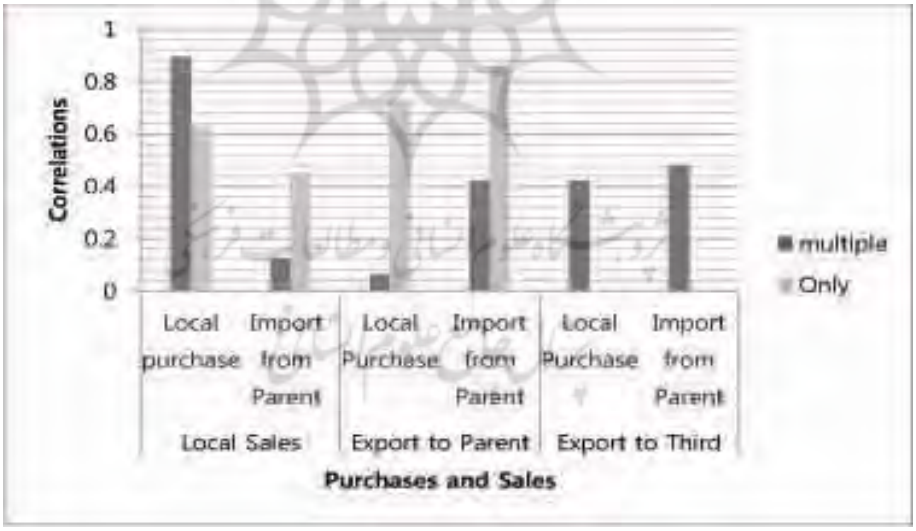

Figure 1: Correlation between Purchases and Sales Activity of Affiliates in China

Figure 1 show graphs which indicate correlations between purchases and sales activities of the foreign affiliates in China and US. The darker bar in the graph represents correlations of the affiliate which a parent firm possesses among its multiple affiliates. The lighter bar represents that the affiliate is the only affiliate of a parent firm. In Figure 1, we can find that the correlations are positive, regardless of small or large, from the darker bars. This implies a diverse multinational activities indicating that when a Korean MNE possesses multiple affiliates, its foreign affiliates in China are involved in a variety of activities, such as local purchases and sales, assembling, and exporting to the third countries. On the contrary, the lighter bars show positive correlations only between local purchases and exporting to a parent firm, or importing from a parent firm and exporting to third countries. This indicates that major role of a MNE's only foreign affiliate in China is focused on supplying the local raw materials with the lower price or on assembling the components from the parent firms in Korea. There is zero correlation between local purchases and exporting to a parent firm, and between importing from a parent firm and exporting to third countries. Therefore, it can be interpreted that the motivation of investing the only affiliate or the first affiliate in China is majorly an efficiency seeking.

From the inspection of the dataset, we note that a Korean MNE tend to choose China again as the next target of foreign investment, instead of choosing other countries with lower productivities. From this aspect, in order to explain the significance of the productivity in Korean MNE's multinational activities, we will examine a firm's potential to have multiple affiliates, rather than to show the scope or numbers of countries that a parent firm invests in. Since the distinctive evidence of difference between being the only affiliate and being the one of multiple affiliates is shown from the above correlation comparison analysis, an empirical test is required to confirm that productive Korean MNEs actually decide to have multiple affiliates in a same host country. The empirical model for this assumption is as following:

$$Prob\ (Parent\ firm\ having\ multiple\ Affiliates) = \alpha + \beta ln\ (Parent\ firm\ Sales)_{ijt} + \varepsilon_{ijt}$$

$$Prob\ (Parent\ firm\ having\ multiple\ Affiliates) = \alpha + \beta\ (Parnet\ Firm\ TFP)_{ijt} + \varepsilon_{ijt}$$

The models show the probability of parent firms of foreign affiliate *i* in country *j* in time *t* to have multiple affiliates. We analyze the model for a pair of a parent and affiliates in a same manufacturing sector, and for those in whole industrial sectors, respectively. In order to confirm whether this

probability of having multiple affiliates in a specific country increases with the increase of the parent firm's productivity, we restrict the data in a range of the foreign affiliates located in China. In addition, by regressing logarithm of numbers of affiliates a parent firm possesses in China on parent firm productivity variables as follows, we conduct a detailed examination on the relation between productivity of a parent firm of Chinese affiliate *i* and the number of other Chinese affiliates it possesses.

$$Ln\ (Number\ of\ affiliates\ in\ China)_{it} = \alpha + \beta ln\ (Parent\ firm\ Sales)_{it} + \varepsilon_{it}$$

$$Ln\ (Number\ of\ affiliates\ in\ China)_{it} = \alpha + \beta\ (Parnet\ Firm\ TFP)_{it} + \varepsilon_{it}$$

Table 6 shows the summary statistics for manufacturing Korean MNEs which have Chinese affiliates, regarding the case when an affiliate is being the only affiliate versus when an affiliate is being the one of multiple affiliates. The summary statistics show that the parent firms with multiple affiliates have higher sales and better TFP in average.

Table 6 : Summary Statistics for Korean manufacturing MNEs in China

Year 2007	The Only Affiliate (309)		One of Multiple Affiliates (93)	
	Mean	Standard Deviation	Mean	Standard Deviation
ln(Parent firm Sales)	25.74385	1.943447	27.56873	2.138699
TFP	-.2688517	.6728417	-.1125475	.564608
ln(Number of Affiliates)	0	0	.9003012	.2598787
Number of Affiliates	1	0	2.548387	.7149966

In order to investigate the existence of additional motivations to have multiple affiliates in a specific country, we examine if the parent firms with higher productivity have higher probability to become a parent firm with multiple Chinese affiliates. Dependent variable becomes 1 if a parent firm of a foreign affiliate *i* possess more than one Chinese affiliate, and 0 if a parent firm possesses only one Chinese affiliate.

Table7: Probability of Having Multiple Foreign Affiliates in China

	Panel Data 2005-2007			
	Manufacturing Industry		Whole Industry	
	(1)	(2)	(3)	(4)
ln (Parent_Sales)	.3127605*** (.0551404)		.3807207*** (.0526342)	
Parent firm TFP		.5878252*** (.1479371)		.3371063*** (.1218014)
Industry Fixed Effect	O	O	O	O
Year Fixed Effect	O	O	O	O
Number	275	274	351	349
R squared	0.2871	0.1563	0.3264	0.1356

Notes: Robust standard errors shown in parentheses. Industry fixed effect indicates affiliates' industry fixed effect

Results in Table 7 show parent firms with higher productivity have higher probability to have multiple Chinese affiliates. With the both of the samples which cover the manufacturing industry and the whole industry, the coefficients on the measure of firm efficiency are positive and statistically significant both in parent firm sales and TFP. The positive signs on the coefficient of logarithm of parent sales and TFP can be interpreted as that the number of countries that a MNE invests is not increasing linearly with the number of affiliates that a MNE possesses. According to Appendix Table 2, Korean MNEs' foreign investment shows high tendency of being concentrated in the limited number of countries.

Referring to the results above, the Korean MNEs that invest in China are confronted with two options when they plan to have more foreign affiliates. One is enlarging the scope of their host countries of investment and the other is having additional affiliates in China. These results require additional studies on the motivations for parent firms to have multiple affiliates in one country. Furthermore, the study requires additional research on the results whether it is a general phenomenon or if it is a peculiarity of Korean MNEs in China. More specifically, we examine the relationship between the number of Chinese affiliates and parent firm productivity. The results in Table 8 show that parent firm productivity also has the positive and statistically significant effect on the number of

Chinese affiliates, in the case of both manufacturing industry and the whole industry.

Table 8: The Number of Foreign Affiliates and a MNE's Efficiency in China

	Panel Data 2005-2007			
	Manufacturing Industry		Whole Industry	
	(1)	(2)	(3)	(4)
ln (Parent_Sales)	.0943*** (.012198)		.1164*** (.0114886)	
Parent firm TFP		.1444*** (.0335808)		.1197*** (.0371468)
Industry Fixed Effect	O	O	O	O
Year Fixed Effect	O	O	O	O
Number	401	400	492	490
R squared	0.4557	0.2914	0.4657	0.2488

Notes: Robust standard errors shown in parentheses. Industry fixed effect indicates affiliates' industry fixed effect

The tendency of regionally concentrated foreign investment is expected to be explained by motivations which are different from the traditional motivations, such as efficiency seeking or market seeking motivations. That is, for the firms which possess a foreign affiliate in a specific host country, there exist additional motivations to derive the firms to invest in the same or near host country where they already have their foreign affiliate. Followings are the possible additional motivations for the firms: Firstly, there can be a motivation related to information advantage from saving market research costs, since the firm already has the required information for investing in the market through the existing foreign affiliate. Additionally, the firms with multiple affiliates in the market can have more channels to gather information about the market. Secondly, there can be a motivation related to network advantage from the complementarities of each foreign affiliate when having multiple affiliates in a market. In fact, the specifications on industry of foreign affiliates in the data show wide ranges of industries, and they are much diversified than the parent firms'industry. It can be expected that the multiple affiliates in a market is in the industries that can complement the multinational activities of other affiliates. The findings are supported by

others. Dunning (1997) insists that transaction and coordination cost variables from inter-personal relations, information asymmetries, language and culture differences are more important than production related variables in determining FDI locations. Following this idea, Safarin (1999) mentions that the motives for FDI are less directed to initial FDI, and more directed to sequential FDI, since there are already many MNEs that are well established. Moreover, Chen & Chen (1998) show network linkage among foreign affiliates is an important determinant of location choice in FDI, using Taiwanese firm data. Ozawa (1993) use Japanese data to show the concerted actions of the members of Keiretsu to penetrate in the foreign market. The above ideas fortify the explanation on the possible additional motivations, through the network or information advantage as suggested in this paper, especially when a MNE is making a sequential decision of establishing foreign affiliates.

5. Conclusion

In this paper, using Korean MNEs' data, we divide foreign affiliates into two groups of parent firms having only one foreign affiliate and those having multiple foreign affiliates. Two regression models regarding the probability of having multiple Chinese affiliates and the number of Chinese affiliates on parent firm productivities are implemented. Our main results of this paper suggest that there are additional motivations which induce productive Korean MNEs to establish foreign affiliates in China subsequently. From the data, the correlations between purchases and sales activities show distinctive differences in multinational activities between parent firms with one affiliate and with multiple affiliates, and empirical study confirms that the larger the parent firms' sales, the higher probability for the parent firms to possess more than one affiliate in China. From the existing studies, domestic firms that are productive enough to invest abroad are engaging in FDI to take advantage of efficiency seeking motivation or market seeking motivation. Likewise, the MNEs with one affiliate that are productive enough to invest more are engaging in additional FDI, not only to earn benefits from the traditional motivations but also to earn benefits from extra motivations suggested in this paper, such as information advantage and network effect.

References:

1- A. Edward Safarin (1998) "Host Country Policies toward inward Foreign Direct Investment in the 1950s and 1990s", *Transnational Corporations,* vol. 8, no. 2 (August 1999)

2- Aw, B.Y., Lee, Y. (2008), "Firm heterogeneity and location choice of Taiwanese multinationals",*Journal of International Economics*, 75 (1), 167-179.

3- Bernard, A., Eaton, J., Jensen, J.B. (1999), "Exceptional exporter performance: case, effect, or both?", *Journal of International Economics*, 47 (1), 1-25.

4- Bernard, A., Eaton, J., Jensen, J.B., Kortum, S. (2003), "Plants and productivity in international trade", *American Economic Review*, 93 (4), 1268-1290.

5- Chen, M., Moore, M. (2010), "Location decision of heterogeneous multinational firms", *Journal of International Economics*, 80 (2), 188-199.

6- Chen Homin., Chen Tain-Jy (1998), "Linkages and Location Choice in Foreign Direct Investment", *Journal of International Business*, 29 (3), 445-467

7- Dunning (1999), "Globalization and the theory of MNE activity", *The globalization of multinational enterprise activity*, Macmillan, London , pp. 21

8- Grossman, G., Helpman, E., Szeidl, A. (2006), "Optimal integration strategies for the multinational firm", *Journal of International Economics*, 70 (1), 216-238.

9- Head, K., Ries. J. (2008), "Heterogeneity and the FDI versus export decisions of Japanese manufacturers", *Journal of the Japanese and World Economies*, 17 (4), 448-467.

10- Helpman, E., Melitz, M., Yeaple, S. (2004), "Export versus FDI with heterogeneous firms", *American Economic Review*, 94 (1), 300-316.

11- Ozawa, Terutomo. (1993). "The dynamics of Pacific Rim Industrialization: How 466 JOURNAL OF INTERNATIONAL

BUSINESS STUDIES HOMIN CHEN AND TAIN-JY CHEN Mexico 12- can join the Asian flock of fly-ing geese". *Transnational corporations and industrialization, United Nations Library on Transnational Corporations,* Vol. 11. London, UK: Routledge.

13- Tomiura, E. (2007), "Foreign outsourcing, exporting and FDI: a productivity comparison at the firm level", *Journal of International Economics*, 72 (1), 113-127

14- Yeaple, S. (2003), "The complex integration strategies of multinationals and cross country
dependencies in the structure of foreign direct investment", *Journal of International Economics*, 60 (2), 293-314.

15- Yeaple (2009) "Firm heterogeneity and the structure of U.S. multinational activity", *Journal of International Economics*, 78, 206-215

Appendix Table

Appendix-Table 1: Distribution of the Foreign Affiliates' Parent firm Industry

The Only Affiliate		One of the multiple Affiliates	
Parent Firm Industry	Number	Parent Firm Industry	Number
Manufacture of Fabricated Metal Products, Except Machinery and Furniture	20	Wholesale Trade and Commission Trade, Except of Motor Vehicles and Motorcycles	7
Other manufacturing	20	Manufacture of Fabricated Metal Products, Except Machinery and Furniture	6
Manufacture of Electronic Components, Computer, Radio, Television and Communication Equipment and Apparatuses	16	Manufacture of Electronic Components, Computer, Radio, Television and Communication Equipment and Apparatuses	6
Manufacture of Other Machinery and Equipment	12	Manufacture of Motor Vehicles, Trailers and Semitrailers	5
Manufacture of Motor Vehicles, Trailers and Semitrailers	11	Other manufacturing	4
Manufacture of Rubber and Plastic Products	8		

Appendix-Table2: Distribution of the Foreign Affiliates' Host Countries

The Only Affiliate		One of the multiple Affiliates	
Host Country	Number	Host Country	Number
China	98	China	68
United States	19	United States	31
Vietnam	8	Germany	16
Indonesia	6	Japan	12
Hong Kong	3	Vietnam	11
Thailand	3	United Kingdom	9