# Inward FDIs' Location Choices: Differences in Source Countries[*]

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Economic variables do not always affect FDIs' location decision. Such invisible factors as cultural intimacy and historical relationship could be regarded as important determinants in location choice. Even though we cannot directly measure the effect of such invisible variables on the choice, it can be possible to identify the existence of those effects through model specification in the location choice estimation of FDIs. The location choices of 1,173 FDIs from the US, Europe and Japan into Korea are investigated. We can find distinctive features in the location choice patterns of each country and the important role of invisible factors.

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# 1. INTRODUCTION

The Republic of Korea has established free economic zones to stimulate regional economies through foreign direct investments since 2003. Until now, 6 regions such as Hwanghae, Daegu-Kyoungbuk, Saemangeum-Gunsan, Incheon, Busan-Jinhae and Gwangyangman have been designated as free economic zones. However, until recently, the total size of attracted foreign direct investments in each zone is far behind what they expect. Several reasons including 'Races to the bottom' type policies and homogeneous attraction policies among free economic zones are suggested. Even though Korea has experienced an increasing trend of inward FDIs since 2000, the poor performances of each free economic zone in FDIs recruitment indicates that each zone needs to pay attention to the location decision process of FDIs.

When we survey the recent researches concerning the distribution of FDIs in a country, we find that location choice patterns by nation and industry have distinct features.[1] For example, industries of a country with high competitiveness locate to a specific region in a host country according to their global management strategy. That is, we can observe various location patterns depending on whether or not FDIs regard a candidate host country as a market for their final goods or regard a host country as their export base or production places for intermediate goods, etc. Even, in national choice level itself, when FDIs make a host country selection, they consider the level of overall labor qualities of candidate host countries.[2] Thus, we need to consider not only the economic and the industrial development stages of a candidate host country and but also those of origin country when making a location decision.

In the literature pertaining to business studies, we can also find that the extent of cultural intimacy between a host country and a country of origin in investment can affect the location choice of foreign companies not only at the

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[1] For example, refer to Spies (2010), Crozet *et al.* (2004) and He (2003).
[2] Refer to Becker *et al.* (2005).

country level but also at a regional level.[3]   Cultural similarity based on historical relationships between a host country and a country of origin can work as a compensation for uncertainties of the selected location in a host country.   Furthermore, the corporate relationship among businessmen in both countries strengthened by cultural intimacy can also affect the location choice of FDIs.   It explains that the extent of information concerning the host country can affect the location choice of foreign investors, too.

Thus, such intangible factors as mentioned above affect the regional location choice of FDIs in a host country considerably.   In reality, we can find the role of those factors in location choice from the interview with four FDIs located near Daegu City, South Korea.   When we asked them why their company chose to locate there, they said they made their location selection based on the mutual trust of each other established from long time business relationships, historical private relationships between CEOs and former working experiences in the origin companies of FDIs as the main location decision factors.   Also, as time goes by, a scale economy has worked for a factor which makes them hold the location.   Therefore, regional governments need to focus on the role of such intangible factors in order to boost the regional economy by attracting FDIs into their regions, which can help to suggest creative attraction policies beyond such traditional attraction strategies as the free provision of social overhead capital or tax exemption.

However, it is too difficult to measure such factors because they are 'intangible'.   Further, there are no exact proxies.   One way to handle this problem is to estimate the location choice model by each nation within a host country.   Since each country can have a specific relationship with a host country not only in view of culture and history but also regarding physical distance and industry composition of a nation, we can indirectly infer the role of those intangible factors on location choice through the estimation by country of origins.   So we examine FDI location choice behavior

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[3] Refer to Davidson (1980).

concerning the US, some European countries and Japan between 1999 and 2005 within South Korea.[4]   First, we estimate the model with the conditional logit estimation and then check the model specifications.   Then, we estimate the model with the nested logit estimation, again.   In this estimation process, we can find that each nation has its own specific location pattern.   If these distinct location patterns are considered into the attraction policy of regional governments, then it will be advantageous for them to attract FDIs.

## 2. LITERATURE SURVEY

Helpman *et al*. (2004), show that companies with high productivity among several other companies engage in foreign trade.   Again, they show that companies in the upper group of productivity can operate their plants in foreign countries.   The reason companies with high productivity can engage in foreign trade is that the productivities of those companies are high enough to overcome fixed costs or uncertainties when faced with foreign trade or entry into new markets.[5]   Then the location choice of FDIs could be involved with the minimization of such expenditures as fixed costs or costs raised from uncertainties when they enter into new places or foreign markets.

Empirical studies about the location choice of FDIs prove those tendencies, especially at the regional level.   With regards to Germany, the

[4] Some European countries are all EU member states.   It includes Austria, Belgium, Bulgaria, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden and United Kingdom.   Afterwards in this article, European Union means this group of European nations.   Note that it is not easy to extend data after 2006 because Korea Standard Industry Classification is changed often.   Because of inconsistency in KSIC, it is difficult to calculate the agglomeration data of each country, again.   Therefore, we cannot but limit our estimation period: 1999-2005.   In this period, 8th KSIC is used. The data used to calculate the agglomeration are re-classified based on 8th KSIC.

[5] Helpman *et al*. (2004) introduce the concept of 'proximity-concentration trade-off' in their paper.   It explains that companies can engage in foreign direct investment when the benefits from avoiding trade costs is higher than the cost of multiple regional operation of plants.

regional distribution of FDIs into Germany depends on specific fixed costs as well as industrial characteristics in invested regions (Spies, 2010).   Whether or not each region shares the border with the country of origin of FDIs, and specific industries are concentrated in the region are some of the important factors associated with location decision.   The region which shares borders with other countries makes it possible for FDIs  to retain the closed relationship with mother companies in the country of origin so that they can minimize the costs which are raised from the uncertainties of the new market entry in regards to the foreign area.   In addition, the localization or agglomeration of a specific industry into a region allows FDIs to save on production costs, which can sustain the high productivity of those companies when they operate plants in unfamiliar areas.   Crozet *et al*. (2004) investigates those patterns in the location choice of FDIs for France. Interestingly, they insist there are learning effects so that the location choice shows dynamic patterns such as, movement from the border area when they start to the market centers in inner France as time goes by.   This demonstrates that there exist differences in the location patterns by industry and nation.

Mainly, even though the following papers explain location decision at national level, economic and cultural characteristics of countries can affect location decisions regarding which country is most appropriate for their investment.   For example, Becker *et al*. (2005) empirically prove that German companies invest mainly in countries which are affluent of skilled workers when they invest in Central Eastern Europe.   Somewhat differently, in the case of Swedish companies, that tendency is relatively weak.   This indicates that the development stage or composition of industry in a country can make different choice patterns concerning investment destination. Barrios *et al*. (2010) explain the role of cultural similarity on the investment destination decision in Latin America, especially, in the case of Spain. Studies about the effect of factors such as cultural intimacy, corporate experiences within the investment region and the availability of a potential network based on ethnic or cultural relationship regarding location choice are

available in several business studies area.[6]

Such research suggests the importance of non-market factors when dealing with decisions surrounding location choice. However, these phenomena are not confined to Western Europe, North and South America. He (2003) estimates the location choice pattern of FDIs from several areas in China. Like any other continent, He also finds that the characteristics for the country of origin are reflected in the location choice within some industry sectors. For example, in the case of US companies, they prefer industrial centers as their investment destination when entering into the Chinese market. On the contrary, since Japanese companies regard China as an export base or supply area of intermediate goods, they prefer port areas.[7] Taiwanese and Hong Kong companies prefer areas where it is easy for them to access the Chinese market. Hence, not only in developed countries but also in developing country, the location pattern concerning the country of origin can be clearly observed.

Location choice patterns of FDIs in South Korea may be somewhat different from those of German, France and China. Since the market sizes of those three countries are relatively larger than that of South Korea, FDIs in three countries mainly target the host country as their final good market.[8] So there are some possibilities that the countries of origin regard South Korea somewhat differently from those, for example, as an export base for China or places for intermediate goods provision. The location pattern regarding the country of origin in South Korea can be distinctive from those of other countries. Therefore local governments need somewhat different strategies in regards to traditional ones for attracting FDIs.

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[6] For example, the effects of corporate experience on location decisions are explained in Davidson (1980). Jun *et al*. (2001) talks about the cultural proximity for the well-being of expatriates in location choice. Manev and Stevenson (2001) deals with the network availability based on ethnic and cultural relationship. Galan *et al*. (2007) investigates the role of cultural link on location choice in Spanish companies in South America.

[7] The location strategy of Japanese companies are well reported in Shatz and Venables (2000), Rauch (2001) and Head *et al*. (2004).

[8] Of course, the goal can be different from industry and country of origin. Lee, Hwang and Lee (2008) estimate the overall inward FDI location choice in South Korea.

## 3. DISTRIBUTION PATTERN OF FDIS IN SOUTH KOREA

To estimate the location choice, the location data of US, European and Japanese FDIs in South Korea are collected. The data source is the Foreign Investment Company Information of South Korea's Ministry of Knowledge Economy. This set includes the names and addresses of companies, their industry classification codes, the first year of investment in South Korea, and their major investment source, — that is, the country of origin. In particular, we analyzed a data-set collected in 2007: In this data, between 1992 and 2005, 624 FDI companies came from the US, 391 from the EU and 1,107 from Japan.[9]

We divide South Korea into two large regions. The first one encompasses the metro capital area which includes two major cities and one province such as: Seoul, Incheon and Gyunggi. The second one concerns the outer area of the metro capital area which includes five large cities such as: Busan, Daegu, Daejeon, Gwangju and Ulsan, and 8 provinces such as Gangwon, Chungbuk, Chungnam, Jeonbuk, Jeonnam, Gyungbuk, Gyungnam and Jeju, respectively. The metro capital area is the heavily concentrated area in view of industry and population. Nearly half of the total population and GDP are concentrated at this area.

The geographical distribution of industries invested in by domestic and foreign companies is shown in table 1. The chemical products industry, Electronic components industry and Motor vehicles industry are chosen because these three industries are main industries heavily invested by foreign investors. Furthermore, overall FDIs and companies from the US, EU and Japan are scattered among each other on the map of South Korea in figure 1.

In table 1, we can find some interesting facts. The concentration of FDIs in metro capital areas is somewhat higher than that of domestic companies. When we focus on companies from the three economic regions (US, EU and

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[9] We use pooled data from 1992 to 2005 in the estimation, because the observation numbers of location decision are not enough each year when we consider the number of choice alternatives, 16. Furthermore, once location decision of a company is observed, there is no way to trace the relocation of that company in the data. So the data set is not panel.

**Table 1    Distribution of Domestic and Foreign Establishments in Manufacture**

| 2005 | | Domestic Establishments | FDIs | Source of Origins | | |
|---|---|---|---|---|---|---|
| | | | | US | EU | Japan |
| Metro Capital Areas (M) | | 67,079 (57.4) | 2,043 (60.0) | 427 (68.4) | 264 (67.5) | 679 (61.3) |
| Others Areas (O) | | 49,681 (42.6) | 1,366 (40.0) | 197 (31.6) | 127 (32.5) | 428 (38.7) |
| Chemistry and Chemical Products | M | 1,991 (49.0) | 258 (50.8) | 58 (56.3) | 48 (69.6) | 90 (61.2) |
| | O | 2,096 (51.0) | 250 (49.2) | 45 (43.7) | 21 (30.4) | 57 (38.8) |
| Electronic Components Industry | M | 3,849 (75.3) | 384 (70.1) | 92 (91.1) | 29 (87.9) | 90 (62.5) |
| | O | 1,262 (24.7) | 164 (29.9) | 9 (8.9) | 4 (12.1) | 54 (37.5) |
| Motor Vehicles and Trailer Industry | M | 1,286 (33.4) | 102 (42.0) | 22 (45.0) | 26 (49.1) | 25 (33.8) |
| | O | 2,562 (66.6) | 143 (58.0) | 27 (55.0) | 27 (50.9) | 49 (66.2) |

Note: Cumulative number of companies up to 2005.    Percentage numbers are shown in ( ).

Japan), the extent of their concentration in metro capital areas are stronger than that of overall FDIs.    Especially, companies from the US and EU tend to place their investment into those areas a lot.    So, at first glance, the location pattern of companies from those countries looks similar to one another.

However, when we focus on the location pattern of each industry, there are distinct features among nations.    In regards to the chemistry industry, its distribution pattern between domestic and foreign companies is similar. Here, however, the investments from the EU are highly concentrated in metro capital areas.    The tendency of concentration in the case of Japanese FDIs is lower than that of EU but higher than US.    That of US companies is relatively the least weak among them, even though their tendency of concentration is higher.    In the case of the electronic industry, companies from both domestic and foreign areas demonstrate a high concentration in metro capital areas.    Companies from the US and the EU show the strongest tendency of concentration.    However, in contrast, the extent of concentration

**Figure 1    Distribution of FDIs (Overall, US, EU and Japan)**



FDI Total                                        USA
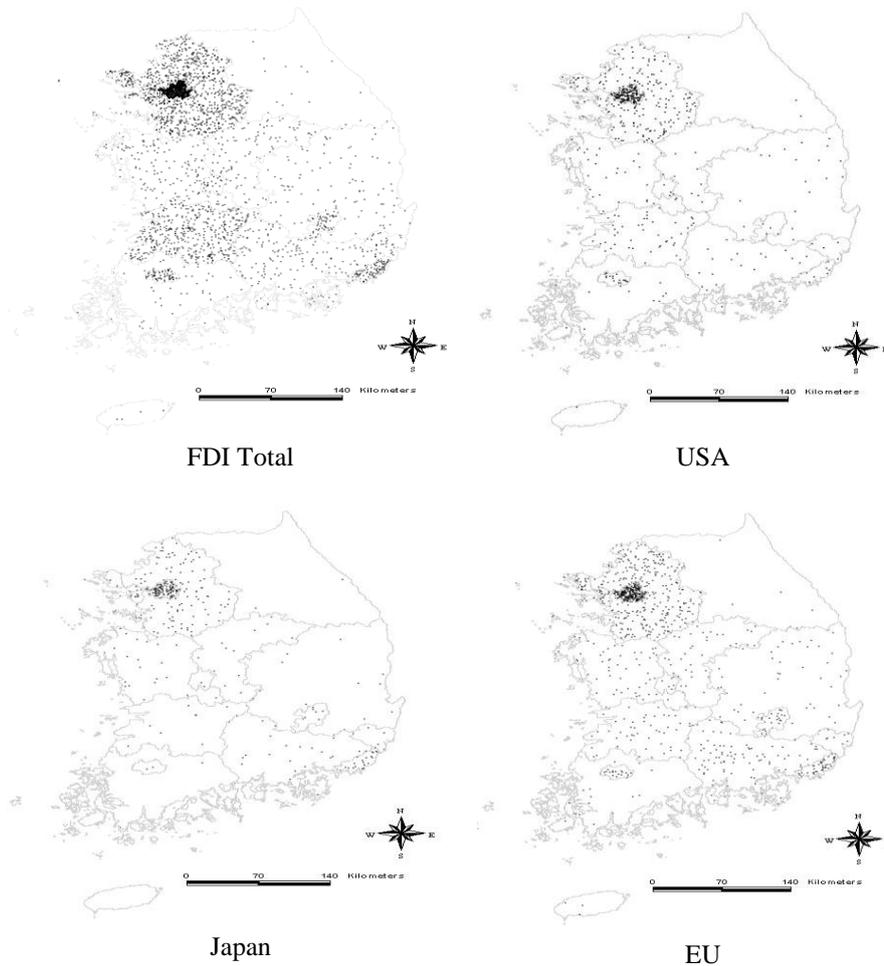
Japan                                          EU

of Japanese FDIs is even lower than that of domestic companies.   Lastly, with regards to the motor vehicle industry, both domestic and foreign companies are similar concerning location pattern but in this case they spread over metro capital areas and other areas.   However, on the one hand companies from the US and the EU are rather highly concentrated at metro capital areas.   On the other hand, Japanese FDIs, different from overall

FDIs, follow the location pattern of Korean companies.

As mentioned above, this suggests that the geographic distribution of FDIs by source countries looks similar to each other.   More than 60% of FDIs from the three economic regions are concentrated in metro capital areas. However, when location patterns of FDIs by the country of origin are investigated by industries, the countries have a different location distribution pattern even though the same industries are considered.   This suggests that when the location of FDIs are estimated differently with each source of the country, we can determine how each country considers the host nation and how they overcome the fixed costs within each region since the weights for the location decision factors of FDIs from each nation can be different. This study seeks to determine just how great that difference is across countries and whether or not we can explain the difference of location pattern for each country.   Such findings can provide basic information that can enhance the strategies of local governments in attracting FDIs to help augment its economic development.


## 4. ESTIMATION MODEL AND DATA


In this study, we focus on the location choice of US, EU and Japan FDIs from 1999, the time when the Korean economy attempts to overcome the effect of the foreign exchange crisis, to 2005.   There are 1,173 FDIs within our data; among them, 380 FDIs come from the US, 259 from the EU and 534 from Japan.   Among them, 786 FDIs are located in the metro capital areas and 387 FDIs in the outer areas.   When we look at this by country, 72% of US FDIs, 65% of EU and Japanese FDIs locates in the metro capital areas.

Conditional logit analysis, a typical empirical tool for location choice analysis, is adopted as a basic model to estimate the location decision process.   First, the companies which want to choose a location will compare the benefits from each alternative.   Second, the region which provides the

highest number of total benefits will be chosen as the destination for the company.   In this process, the profits from alternatives depend on the attributes of each region.   Thus, we can set up both the profit and the choice function as follows;

Profit function from $i$ region at tome $t$:

$$\pi_{ti} = \beta x_{it} + e_{it},\qquad(1)$$

$\pi_{it}$: profits from $i$ region at time $t$,   $x_{it}$: regional attributes vector of $i$ region at time $t$,   $e_{it}$: error term

Choice function:

$$I_i = 1 \ \text{if} \ \pi_{it} - \pi_{jt} = \beta(x_{it} - x_{jt}) + (e_{it} - e_{jt}) > 0$$
$$0 \ \text{otherwise.}\qquad(2)$$

If we assume that $(e_{it} - e_{jt})$ is the extreme value distribution in (2), then we can use the choice function as logit model.   Therefore, we can estimate the effect of regional attributes on location choice with the conditional logit model.

However, to acquire an unbiased estimator from the conditional logit model, we must check whether the model satisfies the independent irrelevant axiom (IIA) or not.   That is, the correlation or reciprocal relationship among errors of alternatives must not exist.   However, when we look at the geographic distribution of FDIs, we realize that the alternatives in the metro capital areas, Seoul, Gyeonggi and Incheon, can be regarded as similar to one another.   This shows that they may not be independent of each other because FDIs are strongly concentrated at those regional alternatives. Hence, to foreign investors, those particular regions can be regarded as one metro region.   Since it violates the IIA condition, we must control this problem in the estimation process.   Subsequently, we can set up the model,

**Table 2    Explanatory Variables**

|  | Variables |
|---|---|
| Agglomeration | Cumulative number of foreign companies in the same industry and nation<br>Cumulative number of domestic companies in the same industry |
| Cost (Direct) | Wage per unit production by industry / Wage by industry<br>Estimated rent per unit space in regional industry parks (proxy for rent) |
| Business Environment | Number of service industry employees per unit space in the same region<br>Share of college or higher degree holder among total employee in the region.<br>Total weights of air freight in the region |
| Market Potential | Investment for the fixed capital formation of the region or Personal consumption expenditure of the region |

which treat those regions in one nest and others are in another nest.    Then we can test whether our way of nesting region is correct or not.    This can be done within the Nested logit model and through an inclusive value test we can confirm whether our way of nesting regions are acceptable in the estimation process.    This methodology provides us with not only an unbiased estimator but also a deep understanding concerning choice process. For example, if inclusive parameters representing a nest of regions are statistically significant, then it reveals that these unobserved amenities from a nested region are necessary to support high productivity for maintaining such organizational form as FDIs themselves or reduce fixed costs of FDIs.    If not, the amenities may not be regarded as benefits by FDIs.

Regions are classified with administration unit with regards to 16 metropolitan cities and provinces.    The variables which represent attributes of a region are classified into agglomeration variables, direct cost related variables, business-environment related variables and variables which present market potential.    Table 2 shows the names of explanatory variables in detail.    With these, regional profits are compared and the location is chosen at the place where the highest regional profit is obtained.[10]

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[10] Definitions of some variables are listed in Appendix table A1.

The following table 3 shows regional values regarding variables at 2005. Especially, it shows that the business environments in capital metro areas are better than those in other areas.   For example, the industrial average share of college degrees or more holders in capital metro areas is higher than that in other regions.   This reflects the fact that labor quality in capital metro regions can be higher than that in other areas.   Furthermore, wage per unit production as the productivity proxy is also lower in capital metro areas. Besides, service employments availability and accessibility to the region are superior to those in other regions.   The only unfavorable aspect in metro capital areas is land price.   However, because the size of population relative to total land size in metro capital areas is so high, it cannot be avoided.

The estimation stage with the above data is as follows.   First, a basic location decision model is estimated with the conditional logit method. When the model is estimated, variations of model specification are allowed. At first, we estimate the model with the regional cumulative number of foreign companies in the same industry.   Second, we use the cumulative number of companies of the same nationality instead of the above aggregate variables.   By doing this (in the second estimation) we attempt to catch the possibility of networking among companies of the same nationality as well as other nationalities.   According to Rauch and Watson (2004), in their theoretical paper, the companies which start at an intermediary level tend to expand their business to customers from the same nationality and then towards other nationalities as time goes by.   Even though the aggregation variable itself does not represent the exact networking behavior, from this estimation process, we can infer the development of the networking stage for each different country.

Second, we estimate the model with the nested logit method.   We estimate several variations regarding this model through wage variables and regional dummy changes.   As mentioned earlier, the setup of the nest is checked, that is, whether unobserved attributes of the metro capital regions can affect the location decision of FDIs or not.   We check the justification of nesting through inclusive variable tests.   That is, to check the reasonability

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**Table 3   Aggregate or Average Value of Variables at 2005 by Industries in Manufacturing**

| | Domestic Establish-ments[a] | FDIs[a] | Wage | Unit Wage (mil. won) | College or more Degree | Land Price (mil. won /square) | Invest-ments[a] (bil. won, constant) | Service Employ-ments (1,000 per.) | Air Freight (10 thousand tons) |
|---|---|---|---|---|---|---|---|---|---|
| **Metro Capital** | 67,079 | 2,043 | 20.98 | 12.63 | 0.34 | 1.54 | 123,973 | 1.67 | 487.31 |
| Seoul | 19,787 | 1,005 | 19.58 | 13.76 | 0.40 | 3.57 | 46,253 | 4.46 | 272.30 |
| Incheon | 9,465 | 200 | 21.50 | 11.81 | 0.28 | 0.71 | 11,725 | 0.38 | 215.01 |
| Gyeonggi | 37,827 | 838 | 21.87 | 12.32 | 0.34 | 0.34 | 65,995 | 0.16 | 0.00 |
| **Others** | 49,861 | 1,366 | 21.06 | 12.86 | 0.17 | 0.29 | 133,568 | 0.23 | 54.20 |
| Busan | 9,080 | 111 | 19.72 | 15.30 | 0.32 | 0.33 | 13,626 | 0.91 | 15.24 |
| Daegu | 6,921 | 60 | 18.23 | 12.31 | 0.15 | 0.35 | 8,063 | 0.51 | 2.06 |
| Daejeon | 1,329 | 31 | 18.66 | 17.25 | 0.43 | 0.42 | 5,702 | 0.52 | 0.00 |
| Gwangju | 2,103 | 73 | 19.51 | 13.15 | 0.16 | 0.41 | 5,047 | 0.55 | 2.48 |
| Ulsan | 1,614 | 31 | 26.33 | 12.66 | 0.13 | 0.29 | 7,776 | 0.19 | 0.43 |
| Gangwon | 1,597 | 18 | 19.30 | 12.04 | 0.08 | 0.25 | 8,322 | 0.02 | 0.07 |
| Chungbuk | 2,968 | 93 | 22.78 | 11.52 | 0.10 | 0.25 | 8,592 | 0.03 | 1.35 |
| Chungnam | 3,932 | 140 | 22.92 | 9.92 | 0.10 | 0.22 | 18,566 | 0.04 | 0.00 |
| Jeonbuk | 2,358 | 476 | 19.97 | 11.82 | 0.10 | 0.25 | 7,700 | 0.04 | 0.17 |
| Jeonnam | 2,576 | 52 | 22.92 | 14.18 | 0.10 | 0.19 | 12,799 | 0.02 | 0.26 |
| Gyeongbuk | 6,139 | 97 | 23.39 | 10.01 | 0.13 | 0.22 | 18,458 | 0.02 | 0.17 |
| Gyongnam | 8,878 | 179 | 24.08 | 11.47 | 0.35 | 0.29 | 16,345 | 0.05 | 0.19 |
| Jeju | 339 | 5 | 15.93 | 15.59 | 0.08 | 0.31 | 2,572 | 0.07 | 31.78 |

Note : a) Aggregate value.

of nesting, the estimated value of profit or utility coming from a nest is included as an explanatory variable in the decision making concerning the upper level choice for each nest.   If the estimated value of this inclusive variable is less than 1, then the nesting can be justified.[10]   Therefore, we set up the null hypothesis in which the estimated value is equal to 1 and check the reasonability of the hypothesis.   If the estimated value of the inclusive variable is less than 1 and the null hypothesis is rejected, then the nesting is acceptable.

Furthermore, we use specific unobserved regional effects.   These regional effects identify the effect of unobserved attributes from the metro capital areas and other regions on location choice decision.   Furthermore, we specify regional dummies to catch the effect of city traits itself and provinces included in upper categorization.   Finally, we use wage variables and unit production wage separately.   Unit production wage is the wage that is adjusted with regional productivity by industry.   Nevertheless, as the wage itself does not have such regional and industrial adjustment, we need a control variable which represents the quality of labor in a region within the estimation stage with a model including the wage variable.   The share of college degree or higher degree holders among total labor force in a region is one candidate capable of doing it.   With those explanatory variables, we estimate the location decision process of FDIs by country and the following tables show the estimation results.

Table 4 shows the estimation results of US FDIs location choice model. We can summarize these as follows.   First, when US FDIs decide their location in Korea, they prefer the region where foreign FDIs in the same industry are agglomerated.   Furthermore, the effect of foreign agglomeration in the same industry in regards to the location decision of US FDIs is stronger than the effect of domestic agglomeration in the same industry.   Second, they do not show any preference to the metro capital areas in location choice.   Especially, the IV (inclusive variable) test shows

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[10] Refer to Hensher *et al*. (2005).

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**Table 4　Estimation Results of US FDIs Location Choice Model**

| USA | CLOGIT | | NLOGIT(UNIT WAGE) | | | NLOGIT(WAGE) | |
|---|---|---|---|---|---|---|---|
| | Foreign Agglo. | USA Agglo. | Foreign Agglo. | USA Agglo. | Region Dummy | Foreign Agglo. | Region Dummy |
| <Agglo.> | | | | | | | |
| Domestic | 0.183(1.39) | 0.241(1.86)[*] | 0.256(1.78)[*] | 0.293(1.89)[*] | 0.169(1.22) | 0.367(3.87)[**] | 0.293(3.40)[**] |
| Foreign | 0.389(3.31)[**] | - | 0.436(3.38)[**] | - | 0.489(3.96)[**] | 0.434(3.41)[**] | 0.453(3.71)[**] |
| USA | - | 0.211(1.99)[**] | - | 0.226(1.99)[**] | - | - | - |
| <Cost> | | | | | | | |
| Wage (Unit) | −0.154(1.70)[*] | −0.184(2.05)[*] | −0.114(1.20) | −0.160(1.66)[*] | −0.119(1.24) | - | - |
| Wage | - | - | - | - | - | 0.716(1.89)[*] | 0.796(2.05)[**] |
| Col. degree | - | - | - | - | - | −1.118(0.48) | 1.290(2.07)[**] |
| Land Price | −1.399(1.03) | −1.395(1.03) | −1.149(0.67) | −1.346(0.87) | −0.765(3.11)[**] | −1.324(0.66) | −0.834(3.51)[**] |
| <Busi. Env.> | | | | | | | |
| Investment | 0.174(0.18) | 0.134(0.14) | 0.254(0.38) | 0.193(0.20) | 0.315(1.56) | 0.420(0.39) | 0.268(1.30) |
| Service Emp. | 1.662(1.07) | 1.712(1.11) | 1.611(1.03) | 1.677(1.08) | 0.318(1.25) | 1.485(0.94) | 0.385(1.42) |
| Air Freights | 0.014(0.32) | 0.012(0.28) | 0.016(0.38) | 0.013(0.30) | −0.029(1.33) | 0.019(0.45) | −0.028(1.27) |
| <Region> | | | | | | | |
| Gy. Icn. | - | - | - | - | −1.913(2.89)[**] | - | −1.587(2.27)[**] |
| City | - | - | - | - | −3.891(2.47)[**] | - | −3.424(2.61)[**] |
| Others | - | - | - | - | −3.982(2.08)[**] | - | −2.468(1.48) |
| IV Test (H_0 : IV=1) | - | - | 0.798(−1.20) | 0.867(−0.58) | 0.843(−0.88) | 0.813(−1.21) | 0.889(−0.78) |
| Log Likelihood | −663.30 | −666.90 | −662.72 | −666.76 | −687.29 | −661.54 | −683.98 |

Notes: 1) Model is based on Seoul.　2) Region Dummies are dummies for regional group.　For example, Gy. Inc. includes only Gyeonggido and Incheon.　City includes Busan, Daegu, Gwangju, Daejeon and Ulsan.　Others include the last 8 provinces.　3) The estimated value for dummies of each provinces and cities can be provided on request.

that the grouping of alternatives is not appropriate.    Therefore, for the US FDIs location choice model, the conditional logit approach is sufficient.

Third, the wage per unit production is an essential location decision factors. The higher the wage per unit production in the location is, the lower the probability of destination as US FDIs location.    Fourth, the regional business environments are not as affective in the location choice of US FDIs. Based on these estimation results we can infer that FDIs from the US are looking for the area where direct production cost can be saved.    That is, US FDIs mainly prefer previously existing information, which is direct and observable with regards to cost reduction to overall information concerning business environments in their location decision making.

When we compare these estimation results with the location choice estimation result of He (2003) in the case of China, there are both common and different points.    The common points are, first, that US FDIs prefer the location where foreign companies are concentrated, second, where they can save on labor costs, and third, the marginal effect of US nationality agglomeration is not too big.    In our estimation, the first two are the same; however, in the third case we can add that even though the marginal effect of US nationality agglomeration is minimal, the overall FDIs agglomeration is dominant in the case of South Korea.    Different point is that, in China, US FDIs prefer industrial center for domestic market access but we cannot find such propensity in US FDIs location decision in the case of South Korea.

Table 5 shows the estimation results of EU FDIs location choice model. The distinct feature of EU FDIs from US FDIs in location choice is that EU FDIs are affected by regional group; the metro capital areas and other areas. When we look at the test statistics of the IV test in the last column of table 5, the null hypothesis, which is that the estimator of IV is equal to 1, is rejected with statistical significance.    As a result, we can infer that the EU FDIs regard each region in metro capital areas as a region having mutual correlation with each other in the same regional group.    Interestingly, this grouping is justified only when we use wage variables in the estimation process.    If we use wage per unit production instead of wage, grouping cannot

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**Table 5  Estimation Results of EU FDIs Location Choice Model**

| EU | CLOGIT | | NLOGIT(UNIT WAGE) | | | NLOGIT(WAGE) | |
|---|---|---|---|---|---|---|---|
| | Foreign Agglo. | EU Agglo. | Foreign Agglo. | EU Agglo. | Region Dummy | Foreign Agglo. | Region Dummy |
| <Agglo.> | | | | | | | |
| Domestic | −0.074(0.45) | 0.031(0.20) | −0.080(0.48) | 0.032(0.21) | −0.084(0.52) | 0.356(3.15)** | 0.315(2.93)** |
| Foreign | 0.534(4.00)** | - | 0.561(3.65)** | - | 0.581(3.88)** | 0.622(4.24)** | 0.642(4.47)** |
| EU | - | 0.324(2.23)** | - | 0.267(1.58) | - | - | - |
| <Cost> | | | | | | | |
| Wage(Unit) | −0.420(3.48)** | −0.458(3.88)** | −0.420(3.45)** | −0.425(3.91)** | −0.405(3.50)** | - | - |
| Wage | - | - | - | - | - | 1.514(3.26)** | 1.516(3.47)** |
| Col. degree | - | - | - | - | - | −4.469(1.60) | −0.544(0.66) |
| Land Price | −1.069(0.39) | −0.486(0.18) | −1.269(0.43) | −0.182(0.07) | −0.021(0.08) | −3.554(0.97) | −0.105(0.39) |
| <Busi. Env.> | | | | | | | |
| Pers. Con. | 0.242(0.08) | −0.149(0.05) | 0.266(0.09) | −0.106(0.04) | 0.501(2.28)** | −1.158(0.36) | 0.472(1.98)** |
| Service Emp. | −0.902(0.36) | −0.858(0.34) | −0.930(0.37) | −0.816(0.33) | 0.294(0.99) | −0.089(0.04) | 0.254(0.85) |
| Air Freights | 0.027(0.76) | 0.023(0.64) | 0.027(0.75) | 0.024(0.68) | 0.028(1.19) | 0.024(0.65) | 0.029(1.21) |
| <Region> | | | | | | | |
| Gy. Icn. | - | - | - | - | 0.625(0.94) | - | 0.425(0.63) |
| City | - | - | - | - | −1.202(0.48) | - | −4.379(1.68)* |
| Others | - | - | - | - | −0.254(0.10) | - | −3.664(1.27) |
| IV Test (H0 : IV=1) | - | - | 0.933(−0.36) | 1.165( - ) | 0.909(−0.52) | 0.771(−1.78)* | 0.771(−1.92)** |
| Log Likelihood | −487.57 | −493.44 | −487.51 | −493.25 | −497.25 | −487.51 | −497.52 |

Notes: 1) Model is based on Seoul.    2) Region Dummies are dummies for regional group.    For example, Gy. Inc. includes only Gyeonggido and Incheon. City includes Busan, Daegu, Gwangju, Daejeon and Ulsan. Others include the last 8 provinces.    3) The estimated value for dummies of each provinces and cities can be provided on request.    4) Pers. Con. means personal consumption expenditure.

be acceptable.    Thus, we need to be careful in interpreting the role of wage in the location choice decision.

If this is the case, why are estimation results so sensitive to the choice of wage variables?   As previously mentioned, wage per unit of production is a wage adjusted by the regional production level.    Therefore, wage per unit production reflects the level of regional productivity.    In the case of wage itself, wage variables can reflect both regional productivity and labor quality in the region.    Thus, we cannot identify whether or not wage is a proxy for production cost or for the quality of labor in the region.    To avoid this problem, we can add a control variable which, we expect, can capture the labor quality effect; the share of college degrees or more degree holders among the total regional labor force.    However, in the estimation result, the control variable turns out to be insufficient in solving the identification problem.    Rather, it appears that the regional classification helps to identify the regional productivity effect in the estimation.    Hence, we can imagine this situation as follows;

For example, let's assume that there are two regions which have the same high technology industry in each region.    Next, assume that the level of labor quality will be same.    However it is possible that there is a difference in productivity due to the regional business environment or amenities.    So, on the one hand, wage capture the labor quality in choice process, on the other hand regional classification variable such as inclusive variable can also capture some of the productivity.    As a result, the location choice of the EU FDIs is estimated to be affected by not only labor quality but also regional environments for maintaining a high level of productivity.

Another distinct feature of the EU FDIs location choice is the role of personal consumption expenditure on location choice.    In the case of the US FDIs, it seems that they regard Korea as the place where their production costs can be saved.    However, with regards to the EU FDIs, they are not only looking for a place offering cost saving but also, a market for their final goods.    This tendency can make the metro capital areas a preferred place.

Finally, the US FDI's and the EU FDIs also depend on the agglomeration

effect of foreign companies in the same region and industry regarding location decision.    At a certain degree, the EU FDIs consider the agglomeration of domestic companies as a location factor but still, the effect of foreign agglomeration is dominant.    Therefore, we find that the interplays among foreign companies in the same region and industries are necessary to attract foreign FDIs.

Table 6 shows the estimation results of Japanese FDIs location choice. The main distinction between the EU and the US is that the effect of domestic agglomeration on Japanese FDIs location choice is similar to the effect of foreign agglomeration in the process of location choice.    That is, Japanese FDIs use domestic information well when they decide their destination.    Japanese firms have maintained close relationships with Korean companies for a long time.    So, in Korean business history, Japanese enterprises deeply affect the formation of Korean *Jaebeol* in modern times.[12]    This historical background can explain some of the usage of domestic firm agglomeration in location choice decision of Japanese FDIs. For example, when we interview a Korean executive working for a Japanese multinational company in Gumi near to Daegu city, he explains us that the start of that company is due to the close friendship between the late owner of Samsung Co. and the owner of that Japanese company.[13]    Of course, Japanese FDIs also regard the foreign agglomeration as one of the important factors in location choice.    Subsequently, these two agglomeration effects are estimated statistically significant and the degree of effects is similar, which are somewhat different from the US and the EU.

This decision pattern is also reflected on the effect of regional business environments on location decision.    While the EU and the USA FDIs focus on the labor quality or unit labor cost in the region, Japanese FDIs consider service availability, which measures the number of service employee per unit area, and rental cost as one of the important location choice factors.

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[12] Historical relationship between Korea and Japanese companies is explained well by Eckert (1991), McNamara (1990).
[13] Refer to Hwang *et al*. (2009).

**Table 6 Estimation Results of Japanese FDIs Location Choice Model**

| Japan | CLOGIT | | NLOGIT(UNIT WAGE) | | | NLOGIT(WAGE) | |
|---|---|---|---|---|---|---|---|
| | Foreign Agglo. | Japan Agglo. | Foreign Agglo. | Japan Agglo. | Region Dummy | Foreign Agglo. | Region Dummy |
| <Agglo.> | | | | | | | |
| Domestic | 0.377(3.28)** | 0.409(3.61)** | 0.395(3.39)** | 0.430(3.74)** | 0.365(3.27)** | 0.491(6.25)** | 0.453(6.06)** |
| Foreign | 0.419(4.21)** | −0.339(3.53)** | 0.485(4.41)** | - | 0.517(4.92)** | 0.498(4.58)** | 0.475(4.52)** |
| Japan | - | | - | 0.388(3.67)** | - | - | - |
| <Cost> | | | | | | | |
| Wage(Unit) | −0.098(1.19) | −0.122(1.51) | −0.085(1.04) | −0.113(1.40) | −0.076(0.97) | - | - |
| Wage | - | - | - | - | - | 0.178(0.57) | 0.166(0.54) |
| Col. degree | - | - | - | - | - | −2.304(1.27) | 1.919(3.54)** |
| Land Price | −2.077(1.79)* | −1.926(1.67)* | −2.195(1.54) | −2.115(1.54) | −0.431(2.41)** | −3.403(1.90)* | −0.634(3.40)** |
| <Busi. Env.> | | | | | | | |
| Investment | 0.297(0.37) | 0.195(0.25) | 0.350(0.44) | 0.237(0.30) | 0.000(0.00) | 0.794(0.91) | −0.106(0.65) |
| Service Emp. | 2.424(1.81)* | 2.395(1.79)* | 2.246(1.67)* | 2.251(1.68) | 0.254(1.25) | 2.034(1.51) | 0.431(1.78)* |
| Air Freights | 0.040(1.20) | 0.035(1.06) | 0.040(1.22) | 0.035(1.06) | −0.020(1.22) | 0.046(1.37) | −0.014(0.82) |
| <Region> | | | | | | | |
| Gy. Icn. | - | - | - | - | −1.128(2.30)** | - | −0.574(1.00) |
| City | - | - | - | - | −2.491(3.78)** | - | −1.873(3.88)** |
| Others | - | - | - | - | −2.020(2.37)** | - | −0.043(0.05) |
| IV Test (H0 : IV=1) | - | - | 0.805(−1.72)* | 0.838(−1.36) | 0.797(−1.79)* | 0.785(−2.03)** | 0.838(−1.43) |
| Log ikelihood | −1,016.01 | −1,018.74 | −1,014.71 | −1,017.92 | −1,039.08 | −1,014.29 | −1,032.85 |

Notes: 1) Model is based on Seoul.    2) Region Dummies are dummies for regional group.    For example, Gy. Inc. includes only Gyeonggido and Incheon.    City includes Busan, Daegu, Gwangju, Daejeon and Ulsan.    Others include the last 8 provinces.    3) The estimated value for dummies of each provinces and cities can be provided on request.

Furthermore, since the inclusive variable test shows the rejection of the null hypothesis, we can infer that Japanese FDIs are sensitive to geographic information including unobserved amenities in location choice. At some points, a historical relationship between Korea and Japan can demonstrate different pattern of FDI location choice from those of western countries. It can be interpreted as a kind of border effect in Korean context because the cultural similarity or historical experiences affect the location of FDIs.[14]

When we compare the location choice pattern of Japanese FDIs in China (He, 2003) we find interesting facts. In the article by He (2003), the location choice pattern of Japanese companies in some sectors are summarized as follows[15]; Japanese FDIs prefer the industry center where the agglomeration of foreign and domestic companies exists and the port where they can export the products of their FDIs easily. In our estimation of South Korea, Japanese FDIs prefer the place of which business amenities are affluent and are industry centered. Thus, it appears that the distance between the host country and country of origin and the land size of the host country may affect the location choice of Japanese FDIs.

## 5. CONCLUSION

In this paper, FDIs for each nation show similar geographic location patterns to each other in appearance. This is due to the fact that the industries invested by each nation are similar and the foreign FDIs of those industries have similar geographic patterns of location. However, it is not true that this appearance means that FDIs from each country have the same weights on each location decision factor. This is followed because each nation has different features such as the productivity level in each industry and different cultural or historical relationships with Korea. Therefore,

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[14] For the border effect in France case, refer to Crozet *et al*. (2004) and for German, Spies (2010).

[15] Some sectors are Food, Metal and non-metal minerals, Textiles and clothing, General and special machinery and Electronics and electrics sector (He, 2003).

even though the pattern of geographic location distribution is similar at first glance, it is important to know which location decision factors are weighed heavily in the location decision regarding each source country.  Hence, regional governments can use this information to attract FDIs to their region in order to develop their economy.  Furthermore, the policy made by regional governments to attract them can be diversified.  In this paper, we estimate a typical location choice model for the USA, the EU and Japanese inward FDIs from 1999 to 2005 into South Korea with some model specification changes.   The estimation results can be summarized as follows.

First, in the case of Japanese FDIs, they consider not only production cost savings but also the business environment of the region in location decision, which is distinctive to other countries.  Furthermore, they regard the domestic agglomeration as one of the important factors towards deciding on the location, too.   This location pattern of Japanese FDIs can be reflected on the historical business or historical relationships between Japan and Korea.   As a result, we can observe a sort of border effect occurring from cultural similarity.

Second, with regards to both the USA, and the EU FDIs, they strongly prefer places where foreign companies are concentrated.   In addition, production cost savings is a very important location decision factor relative to others.   However, in the case of EU FDIs, they are searching for a place with an intermediate technological labor quality level and a potential market for their final product.

Third, the effect of foreign agglomeration on location choice is greater than the effect of domestic agglomeration.   This suggests that, as Rauch and Watson (2004) indicate, foreign companies can probably serve as intermediaries to other foreign companies having the same or different nationality.

As a result, national features observed by the location choice pattern require regional governments to diversify their policies to attract FDIs into their region.   Thus, it is difficult to attract FDIs with common tools such as tax reduction or exemption and subsidization etc.   Furthermore, the attraction policy should be considered country by country.   Therefore,

attraction policies being appropriate to the regional attributes can be more effective than common policies regarding FDI attraction.

# APPENDIX

### Table A1    Definition of Some Variables

| Variables | Definition / Calculation Formula |
|---|---|
| Domestic Agglomeration | Number of domestic establishments of industry '$i$' in region '$j$' at time $t$.    It is calculated as a cumulative sum of domestic establishments each year by industry and region at a given time. Source: Korea National Statistical Office |
| Foreign Agglomeration | Number of foreign establishments of industry '$i$' in region '$j$' at time $t$.    It is calculated as a cumulative sum of foreign establishments each year by industry and region at a given time. Source: Ministry of Knowledge and Economy in Korea |
| Unit Labor Cost | $uwage_{ijt} = avg(earning_{ijt}) / labprod_{ijt}$ <br> $j$ : region, $i$ : industry sector, $t$ : time <br> $avg(earning_{ijt})$ : average annual gross earnings of '$i$' industry in '$j$' region at time $t$ <br> $labprod_{ijt}$ : labor productivity of '$i$' industry in '$j$' region at time $t$ <br> $= $ Industrial  Production$_{ijt}$ / Total Employment$_{ijt}$ <br> Source: Korea National Statistical Office |
| Land Price | Land sales price (real value) in representative industry parks in a specific region in 2007.    It is interpolated with regional housing price index from 1998 to 2005. Source: Korea Industrial Complex Corporation, Kookmin Bank |
| Service Employments | $serrat_{jt} = servemp_{jt} / Area_{jt}$ <br> $servemp_{jt}$ : number of employers in service sector in '$j$' region at time $t$. <br> $Area_{jt}$ : area size of region '$j$' at time $t$. <br> Source: Korea National Statistical Office |
| Air Freights | Air freight cargo volume in the airports located at '$j$' region at time $t$. Source: Korea/Incheon Airports Corporation |

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