Roles of MNCs in Regional Development and their Locational Determinants: The Case of China

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Abstract

This paper investigates the regional investment pattern of foreign and domestic firms in comparison to each other and identifies their locational determinants using the provincial data of China between 1994 and 2001. From the data, it is concluded that foreign firms tend to generate a high degree of agglomeration compared with local counterparts. Many of the least developed regions may become increasingly marginalized from the dynamics of international production unless conscious efforts are made both by the national and regional governments.

I INTRODUCTION

Income inequality is a contentious issue in China. According to one study, the inequality in China as a whole has been rising since the end of the 1970s. The Gini coefficient for the whole country, indeed, increased from 0.382 in 1988 to 0.452 in 1995   Li 2002: 152 .

One of the most important factors in causing income disparity in China seems to lie in regional disparity. According to Lin et al.   2002: 39 , the interregional component always had the largest impact on overall regional disparity in China. The same study also points out that regional growth and income disparities in China since 1978 are mainly reflected by the differences among the Eastern, Central, and Western regions.

The large regional income gap, in turn, seems to be attributable to the investment and industrial structure of the region. Modern sectors such as manufacturing tend to concentrate in the coastal area, while traditional sectors are concentrated in other regions. As a result, the enhancement of regional investment activities and industrial development has been one of the most important objectives of development plans of China since the mid-1990s.

Recently, China's central government began to adopt a series of measures which include encouraging foreign direct investment   FDI   in the Central and Western Regions   Sun et al. 2002: 85 . In addition, every province is seeking further inward FDI   Wei et al. 1998: 858 . This is because foreign companies have played a significant role in industrial development of China since 1979. Overtime, as economies become more integrated, the distinction between domestic and foreign investment is becoming less important   UNCTAD 2001: 85 . An understanding of regional characteristics influencing locational decisions of foreign enterprises is essential for improved policies to encourage FDI.

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The purpose of this paper is, therefore, to find out the role and locational determinants of multinational corporations MNCs in comparison with domestic firms, and to conclude with a policy recommendation for China. First of all, the paper examines the recent role of MNCs in regional development. Second, the determining factors of locational decisions of foreign firms are also considered by using both the theory of FDI and some of the empirical results of previous studies. Third, the paper explains the analytical framework and regression model used in this study, followed by the discussion of the empirical findings. Finally, it concludes with a policy recommendation for the regional development of China.

II REGIONAL DEVELOPMENT OF CHINA AND THE ROLE OF MNCS IN IT

1 Regional Development of China

The recent developments in economic geography make it easy to understand the difficulty in promoting regional economies in the early stage of industrial development. According to recent studies, there is a trade-off between the dispersal and agglomeration, or centrifugal and centripetal forces Neary 2001: 536 . Since the modern sectors such as the manufacturing sector are often characterized by increasing returns to scale, spatial agglomeration may be a possible outcome though not an inevitable one. This study begins with an examination of the regional development pattern of China in the 1990s.

Table 1 shows the regional shares of Gross Domestic Product GDP and regional per capita Gross Regional Product GRP relative to the national average. According to the table, it becomes clear that not only has the issue of regional disparity not been solved, but the regional income gap between East and West has also increased significantly. The regional share in total GDP in the East increased, while that of West declined.

Table 1 Regional Share of GDP and Per Capital GRP

| | GDP Sahre ％ | | | Per Capital GRP National Average=100 | | |
	EAST	CENTRAL	WEST	EAST	CENTRAL	WEST
1991	0.55	0.29	0.16	167	105	61
1992	0.57	0.28	0.15	174	103	59
1993	0.58	0.27	0.15	177	102	57
1994	0.58	0.27	0.14	178	102	53
1995	0.58	0.28	0.14	176	104	50
1996	0.58	0.28	0.14	180	107	51
1997	0.58	0.28	0.14	182	107	52
1998	0.59	0.27	0.14	186	105	52
1999	0.59	0.27	0.14	187	106	54
2000	0.60	0.27	0.14	187	106	54

Source: the author's calculation based on *China Statistical Yearbook*, various years.

The disparity between the two regions is also seen in the widening per capita income gap between the East and West Table 1 . The average income level in the East was about 70 percent higher than

the national average in the early 1990s. Income levels for people in the East rose to nearly 90 percent higher than the national average by 2000. Per capita income in the West, on the other hand, continued to decline relative to the national average. This indicates that the income disparity between the two regions became wider.

2 Role of MNCs in Regional Development -dispersal or agglomeration?

In recent years both the central and regional governments have sought to attract MNCs not only to developing countries, but also developed ones as well. Presently, even the local governments of Japan are becoming more aggressive in inviting foreign investors than before, although Japan is well known for its reluctance in accepting foreign capital in the past. Will MNCs contribute to a more balanced regional development as desired by recipient governments such as China, or not?

Table 2 shows the regional share of investment in fixed assets by the type of ownership. According

### Table 2 Regional Share of Investment in Fixed Assets by Type of Ownership

| | Foreign | | | Taiwan, HK and Macao | | | Domestic | | |
	EAST	CENTRAL	WEST	EAST	CENTRAL	WEST	EAST	CENTRAL	WEST
1992	0.94	0.04	0.02	0.82	0.14	0.04	0.64	0.22	0.14
1993	0.83	0.12	0.05	0.86	0.11	0.03	0.64	0.23	0.13
1994	0.83	0.13	0.04	0.81	0.14	0.05	0.64	0.23	0.13
1995	0.83	0.12	0.05	0.83	0.13	0.04	0.62	0.24	0.14
1996	0.82	0.14	0.04	0.85	0.11	0.04	0.60	0.25	0.15
1997	0.85	0.11	0.03	0.82	0.12	0.06	0.59	0.25	0.16
1998	0.85	0.11	0.04	0.82	0.11	0.07	0.60	0.24	0.17
1999	0.82	0.13	0.05	0.83	0.10	0.07	0.65	0.27	0.19
2000	0.84	0.11	0.05	0.85	0.10	0.05	0.57	0.25	0.18

Source: Table 1.

Figure 1 Coefficient of Variation of Provincial Investment in Fixed Assets by Type of Ownership

Source: the author's calculation.

Figure 2 Gini Coefficient of Provincial Investment in Fixed Assets by Type of Ownership
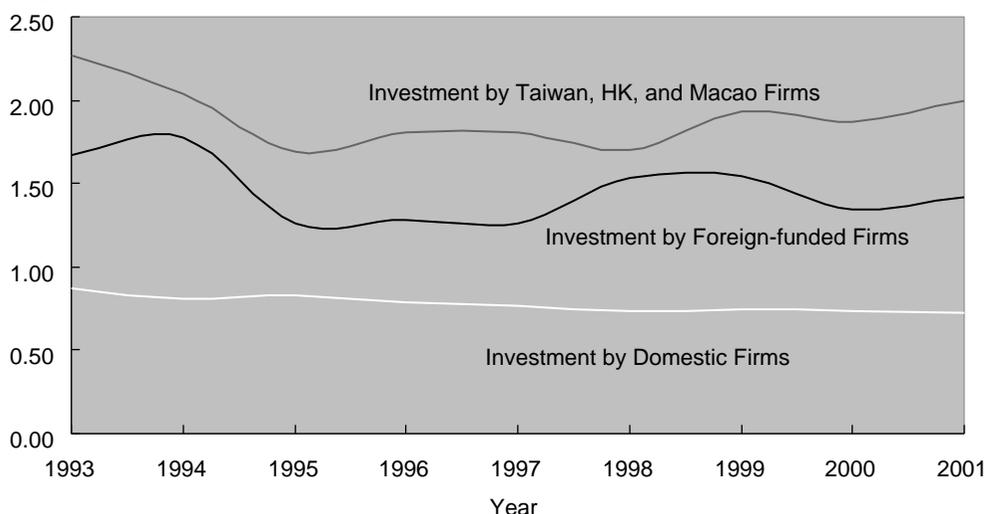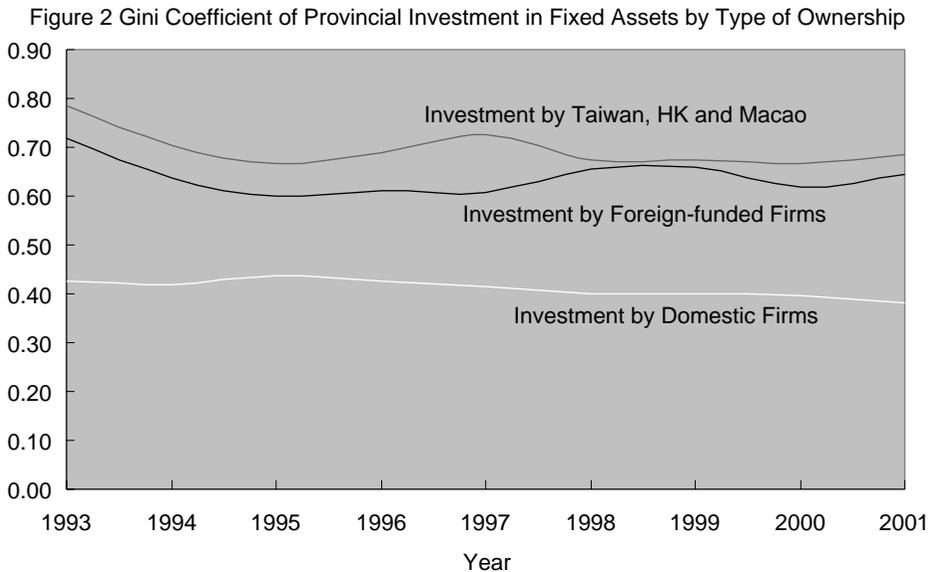
to the table, the regional investment patterns of foreign and overseas Chinese are very similar. Both of them are concentrated in the coastal areas of China. In contrast, investment activities of domestic firms show a pattern of more geographical diversification.

Figures 1 and 2 give even stronger empirical support to agglomeration of foreign firms including overseas Chinese. Both figures show the coefficients of variation（CV）and Gini coefficients of provincial investment activities by the type of ownership respectively. It is clear that both foreign and overseas Chinese firms tend to have high ratios in both coefficients compared with domestic ones. Besides this point, both foreign and overseas Chinese firms showed slightly increasing tendencies of agglomeration in 2001.

The next question is whether current efforts by the provincial governments in China to attract foreign firms into the Interior will be successful or not. That will, in turn, depend on what are the location determinants of the MNCs.

III DETERMINANT FACTORS ON FDI

1 Traditional Theory

As Braunerhjelm and Svensson（1996）correctly points out, the theoretical foundation of FDI is still rather fragmented, compiling bits and pieces from different fields of economics to explain its geographical distribution.　However, more relevant to this study is the location theory. The theory is often applied to explain why a foreign firm would choose to invest in a particular host country or region. Many of the previous studies investigating the distribution pattern of FDI or the location of MNCs assume firm-specific advantages and internalization advantages to be given. Locational

advantages are then assumed to be the main concern of MNCs Wei et al. 1998: 858 .

The main traditional factors driving FDI location is often said to be large markets, the position of natural resources, and access to low-cost unskilled or semi-skilled labor UNCTAD 2001: Xvii . This is consistent with the implication of the traditional industrial location theory in which wages as well as transportation costs are emphasized as important determinants of the firms decision of location Wei et al. 1998: 858 . It is interesting to examine whether this traditional factors driving FDI location do not have any explanatory power in explaining the geographical pattern of foreign firms in China. If they are, to what extent are they successful in explaining it?

2 New Locational Theory

UNCTAD 2001 hypothesizes that although the above-mentioned traditional factors driving FDI may still remain relevant, they are diminishing in importance in the era of globalization, particularly for more dynamic and high-tech industries. Instead, location decisions of MNCs are seen to be increasingly based on the ability of host countries to provide complementary skills, infrastructure, suppliers, and institutions UNCATD 2001: xviii . Even labor-intensive activities often need to be combined with advanced skills and new technology.

This observation seems to be consistent with the new location and growth theories. The former emphasizes pecuniary externalities among the determinants of the location of firms Krugman 1991a, Krugman 1991b, and Venables 1996 , while the latter stresses technological externalities or knowledge spillovers in the growth process. In the new location theory, low transportation costs, a large manufacturing sector, and economies of scale are considered to foster concentration of production or agglomeration through pecuniary externalities. If they gain an importance for a firms' competitiveness, agglomeration economies seem to play a significantly greater role in the industrial location. Another reason for agglomeration can be derived from the new growth theory Braunerhjelm and Svensson 1996: 834 . Companies may choose to locate to appropriate spillovers of knowledge-enhancing activities of other firms.

The location analysis is usually applied to the analysis on the location patterns of firms within countries, although many of the studies were extended to analyze the location behaviors of firms between countries. In the process, this has allowed more light to be shed on the tendencies toward agglomeration in FDI.

This study, therefore, empirically investigates location determinants of foreign firms including those of overseas Chinese in China compared with domestic ones, and the possibility of whether the entry of foreign firms can eventually contribute more to equal regional development or not.

IV ANALYTICAL FRAMEWORK, METHODOLOGY AND SOURCES OF DATA

1 Analytical Framework

This study bases its analysis on a location choice model developed by Head et al. 1999 . In such a modell, a representative firm is considered to manufacture a unique product with the log demand curve: $\ln D\ p\ =\ {}_y \ln y\ {}_p \ln p + e_d.$ 1 .

In Eq. 1 , y is the income of consumers of the good, p is the price, and e_d is a demand shock. An elastic demand curve is assumed, i.e. ${}_p$ 1. Profit maximizing firms select a price that is determined by a markup over the marginal cost c:

$$p = {}_p / {}_p \ 1\ c. \qquad 2$$

Log profits are given by $\ln\ = \ln\ 1\ t_c\ + \ln\ p\ c\ + \ln D\ p\ .$ 3

In Eq. 3 , t_c is a corporate income tax rate.

Substituting Eq. 1 and Eq. 2 into Eq. 3 provides

$$\ln\ = \ln\ 1\ t_c\ + {}_y \ln y\ {}_p\ 1\ \ln c + {}_p\ 1\ \ln\ {}_p\ 1 + 1\ {}_p\ \ln\ {}_p\ + e_d. \qquad 4$$

The log cost function is assumed to be

$$\ln c = {}_w \ln\ w\ + {}_k \ln\ k\ + {}_m \ln\ m\ +\ \ln\ \text{Agglo} + e_c. \qquad 5$$

In this expression w, k, and m represent the wage, the cost of capital, and the price of intermediate inputs respectively. ${}_w$, ${}_k$, and ${}_m$ are cost-share parameters. If impacts of agglomeration economies are big enough, cost is hypothesized to decline although everything else remains constant. That means the negative coefficient of .

Now, Eq. 5 is substituted into Eq. 4 . Since foreign investors compare the profitability of each region, any terms common to all regions are dropped out of the estimating equation. That is, the variation of the profitability of each region is affected mainly by the size of the local market, tax incentives, wages, intermediate input prices, and the degree of agglomeration in each region. That is to say,

$$\ln\ = f[\ln\ 1\ t_c\ ,\ \ln\ y\ ,\ \ln\ w\ ,\ \ln\ m\ ,\ \ln\ \text{Agglo}\ ],\quad 5\ .$$

This study assumes that all others are invariant across the regions. Since multinational firms can mobilize financial resources globally, it can be assumed that the cost of capital for foreign investors is not affected by the destination of their location.

2 Regression Model Specification and Estimation Methods

Previous studies have applied two different approaches to empirically investigate the determinants of the location of FDI. The first approach is under the framework of a conditional logit model. It includes studies such as Head et al. 1995, 1999 , Urata and Kawai 2000 , Fukao and Yue 1997 , Fukao and Chung 1996 , and Tokunaga and Ishii 1994 . The second approach used a regression model to identify the determinants of the location of FDI. It includes such studies by Wheeler and

Mody 1992 , Smith and Florida 1994 , Wei et al. 1998 , and Sun et al. 2002 . The study done for this paper applies the second approach leaving the first one for future research.

Specifically, this study estimates the following regression model to investigate the determinants of the location of foreign firms in China compared with domestic ones, assuming that the same set of the determinants of the profit maximization of firms in equation 5 influences the investment activities in an equal manner. That is,

$$\ln I_i = {}_0 + {}_k \ln X_{ik} . \qquad 6$$

In this expression, the subscript i stands for a province, and the X_k are the determinants of the profitability of investors. A linear specification of natural logarithmic form has been adopted.

Data are drawn from a panel of 29 provinces for the period of 1994-2001. Following Wheeler and Mody 1992: 61 , the coefficients are estimated without province-specific dummy variables because much of the interesting variation in the data is across provinces, reflecting conditions which change slowly. This study also deals with the time-series issue the non-stationality of provincial data series by translating Eq. 6 to the following equation which determines investment in province i relative to some comparison province j. This eliminates the main source of the time-series problem, that is, the common effect of annual fluctuations in the nominal values of aggregate investment Wheeler and Mody 1992: 62 .

Specifically, the study estimates the following equation:

$$\ln \ I_i / I_j \ = {}_a \quad {}_g + \quad {}_k [\ln \ X_{ik} \quad \ln \ X_{jk} \ ]. \qquad 7 \ .$$

3 Data

The data used in this study to test the factors determining the location of firms are mainly from the *China Statistical Yearbook* compiled by China's State Bureau of Statistics. Provincial data for the period of 1994-2001 are used for several reasons. First of all, the provincial data of investment in fixed assets by ownership by source of fund has only been available since 1993. Second, the amount of investment by the wholly- owned foreign enterprises for the year of 1993 was very small.

The dependent variable is the amount of investment in fixed assets by ownership investment by foreign funded enterprises; by Hong Kong, Macao, Taiwan as well as domestic firms . The independent variables are selected in accordance with the previous discussion. They include real GRP as a proxy of the regional market size RGRP , the average provincial wage of employees in the manufacturing sector as a proxy of labor cost WAGE , provincial imports as a percentage of GRP as a proxy of input costs INPUT , provincial stock of FDI and an infrastructure variable as a proxy of the degree of agglomeration AGGLO$_{fdi}$, AGGLO$_{infra}$,[10] and a dummy variable for provinces located in the Eastern region as a proxy of policy variable EAST .[11] In addition, this study includes a variable NEIGHBOR to test Tobler's first law of geography as follows: "everything is related to everything else, but near things are more related than distant things" Coughlin and Segev 2000: 15 .

More specifically, the study tests whether investment activities in a province are affected by those of neighboring provinces, while expected signs of independent variables are summarized in Table 3.

Table 3 Expected Signs of Independent Variables in a Parametric Model

Independent Variable	Expected Sign
The size of the market	
RGRP = Real Gross Regional Product	+
Cost of labor	
WAGE = Average Wage of Employees in US dollars	
Cost of intermediate inputs	
INPUT = Imports as a Percentage of GRP	+
Agglomeration	
AGGLO fdi = Stock of FDI after 1983.	+
AGGLO infra = Road Length Adjusted by Area	+
Policy	
EAST = A Dummy for the Eastern Provinces	+
Tobler's first law of geography	
NEIGHBOR = Lagged Value of Total Investment	+
in Neighboring Provinces	

4 Empirical Results

Table 4 shows the empirical results. First of all, foreign enterprises and those from Hong Kong,

Table 4 Regression Results: 1994-2001

Coefficients of	Foreign		HK, Macao and Taiwan				Domestic	
	1	2	1	2	1 '	2 '	1	2
Constant	-0.203	-0.295	-0.097	-0.215	-0.030	-0.080	-0.028	-0.009
	-1.527	-2.408 **	0.690	-1.472	-0.233	-0.594	-0.747	-0.227
Ln RGRP	0.795	0.883	0.841	1.038	0.817	1.023	0.900	0.861
	11.115 ***	16.297 ***	11.721 ***	16.535 ***	11.476 ***	16.143 ***	42.921 ***	48.986 ***
Ln WAGE	0.435	0.274	0.897	0.923	1.107	1.297	0.534	0.526
	1.395	0.935	2.710 ***	2.646 ***	3.422 ***	3.813 ***	6.057 ***	5.822 ***
Ln INPUT	1.517	1.253	1.487	1.663	1.164	1.193	0.112	0.076
	3.480 ***	3.056 ***	3.176 ***	3.357 ***	2.346 ***	2.210 **	0.889	0.581
Ln AGGLOfdi	0.196		0.274		0.303		-0.040	
	4.755 ***		6.121 ***		7.489 ***		-3.471 ***	
Ln AGGLOinfra		0.606		0.355		0.501		-0.031
		7.527 ***		3.676 ***		5.157 ***		-1.276
EAST	0.516	0.637	0.251	0.489			0.048	0.003
	3.641 ***	5.208 ***	1.735 **	3.403 ***			1.266	0.076
GF					0.524	0.815		
					2.430 **	3.470 ***		
Ln NEIGHBOR	0.115	0.009	0.015	0.015	0.011	0.011	0.014	0.027
	1.996 **	0.157	0.351	0.333	0.255	0.233	0.551	1.000
Adj-R²	0.829	0.851	0.828	0.809	0.830	0.820	0.952	0.950
F-value	87.343***	102.076***	86.311***	76.237***	87.661***	76.424***	351.944***	335.237***
No. of observation	232	232	232	232	232	232	232	232

Notes: 1 All of the equations include fixed-effect dummies for years.
   2 GF is a dummy variable for Guangdong and Fujian provinces.
   3 *** indicates statistical significance at the 1 percent level.
   4 ** indicates statistical significance at the 5 percent level.
   5 * indicates statistical significance at the 10 percent level.
Source: the authors' estimates.

Macao and Taiwan's HMT show similar results. The signs for all of the coefficients are as expected, except for the labor costs WAGE. Besides, most of them show high statistical significance. This implies that the size of home market, the cost of intermediate inputs, and the degree of agglomeration are important determinants of the location of both foreign and HMT enterprises. The positive coefficient of wage implies that it is not just the cheapness of labor but the unit labor cost labor cost adjusted for labor quality that seems to count. In other words, the availability of low-cost unskilled labor alone does not attract foreign and HMT enterprises.

The difference between foreign and HMT enterprises lies in the fact that foreign enterprises in general show a strong tendency of agglomerating along the coastal area, while HMT firms tend to concentrate more or less in just two provinces Guangdong and Fujian. In the case of the latter, the coefficient of a dummy variable only for these two provinces GF show a larger value than that of a dummy variable for the Eastern Region in general see Table 4.

The coefficient of variation of investment in fixed assets within three regions East, Central and West confirms this. According to Table 5, in the case of foreign enterprises, investment activities

Table 5 Coefficient of Variation of Investment by Ownership and by Region

	Foreign Enterprises			
YEAR	TOTAL	EAST	CENTRAL	WEST
1993	1.65	0.85	0.92	1.47
1994	1.72	1.19	0.90	1.20
1995	1.22	0.67	0.82	0.96
1996	1.24	0.70	0.86	1.12
1997	1.20	0.65	0.73	1.23
1998	1.48	0.87	0.86	1.14
1999	1.47	0.89	0.82	1.36
2000	1.27	0.75	0.62	1.29
2001	1.36	0.79	0.52	1.41
	HK, Macao and Taiwan			
YEAR	TOTAL	EAST	CENTRAL	WEST
1993	2.20	1.64	0.81	1.63
1994	2.01	1.36	1.09	1.10
1995	1.64	1.13	1.39	1.26
1996	1.76	1.20	1.28	1.26
1997	1.77	1.13	1.51	1.55
1998	1.63	1.11	0.94	1.41
1999	1.87	1.31	0.77	1.14
2000	1.79	1.24	0.72	1.13
2001	1.92	1.31	0.73	1.47
	Domestic Enterprises			
YEAR	TOTAL	EAST	CENTRAL	WEST
1993	0.82	0.67	0.30	0.86
1994	0.75	0.57	0.36	0.89
1995	0.78	0.60	0.42	0.90
1996	0.74	0.58	0.48	0.90
1997	0.72	0.56	0.52	0.85
1998	0.69	0.55	0.48	0.86
1999	0.70	0.55	0.45	0.84
2000	0.70	0.58	0.43	0.84
2001	0.67	0.58	0.39	0.82

Source: See Table 1.

tend to concentrate in the Eastern region. However, within the Eastern region foreign investment tends to diverse rather than agglomerate. On the other hand, HMT enterprises tend to concentrate not only in the Eastern Region but also in a few provinces within the region. In other words, non-domestic enterprises tend to agglomerate not just because of policy incentives but because of some other factors.[12]

Table 4 also shows that the factors determining the location of investment are completely different between foreign, HMT, and domestic investors. In the case of domestic investors, none of the coefficients show statistical significance except the size of the home market. In other words, the determinants of investment location are completely different between foreign and domestic enterprises. Besides this, the coefficient of foreign agglomeration is not only negative but it also shows a high statistical significance in equations of domestic firms. This implies that domestic enterprises generally avoid the province in which a large number of foreign enterprises agglomerate. This may also indicate a lack of effective linkages between foreign and domestic enterprises.

V CONCLUSION AND POLICY IMPLICATION

This paper examined the regional investment patterns of foreign and HMT firms in comparison with domestic ones and then identified their location determinants using the provincial data of China between 1994 and 2001. This research concluded that foreign and HMT firms tend to generate a higher degree of agglomeration in the Eastern region than local counterparts. This is partly due to the ease of access to imported intermediate goods and the availability of solid infrastructure in the East. Foreign and HMT firms, however, show even a stronger preference for investing in the Eastern Region. This could be partly due to past policy incentives provided to the provinces located along the coast by the Central Government. On the other hand, this may also reflect some other factors such as cultural and historical ties that exist between overseas investors and certain provinces, and the problem of asymmetric information that foreign investors encounter in investing in the Interior. Least developed regions may become increasingly marginalized from the dynamics of international production unless conscious efforts are made by both national and regional governments.

NOTES

1　See also Sun et al.（2002）and Wei et al.（1998）for details.

2　See, for instance, Braunerhjelm and Svensson（1996）for the discussion of new locational theory and its connection to the determinants of factors on FDI.

3　See, for instance, Wheeler and Mody（1992）, Head et al.（1995, 1999）, Smith and Florida（1994）. Braunerhjelm and Svensson（1996）, Urata and Kawai（2000）, Fukao and Yue（1997）, Fukao and Chung（1996）, Sun et al.（2002）.

4　Tibet is excluded from the analysis due to the unavailability of some of its data relevant in this study. In

addition, data of Chongqing and Sichuan are combined after 1997 since the separation of their data is impossible before 1996.

5　This study does not, however, use data of a specific province as numeraire. Instead, this study calculates the average of the whole provinces for each variable every year and makes it a numeraire.

6　This excludes the value of investment in fixed assets by Hong Kong, Taiwan, and Macao.

7　The value of investment in fixed assets was deflated by provincial investment deflators.

8　Provincial wages expressed in Yuan are converted into dollar value, as foreign enterprises are integrated into the world economy and the dollar is used most broadly for the purpose of international transaction.

9　Since foreign firms utilize imported inputs substantially, the cost of transportation matters. Provincial imports as percentage of GRP are considered to reveal the ease of access to imported intermediate inputs to some extent.

10　Stock of FDI was calculated through the simple summation of the annual flow of FDI. Data of FDI are utilized since data of the flow of FDI are available since the early 1980s. The degree of development of infrastructure is estimated by total paved load length adjusted by provincial land area.

11　A dummy variable for the Eastern provinces is often used as a proxy of policy variable since the coastal areas were specially assigned as the major regions to attract FDI by the central government. See, for instance, Wei et al.　1998 , and Coughlin and Segev　2000 .

12　It seems to partly reflect familial, linguistic, and cultural ties such as those that exist between HMT investors and two provinces　Head and Ries 1996: 45 . It may also reflect the fact that foreign investors suffer from a condition of adverse asymmetry in information costs compared with the domestic investors　Wei et al. 1998: 859 .

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