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Provincial Characteristics and Foreign Direct Investment Location Decision within China

by

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1 Introduction

Foreign direct investment (FDI) is one of the most dramatic features of China's move from a planned economy toward a market economy. Since the passing in late 1979 of the Equity Joint Venture Law which granted legal status to FDI in Chinese territory, China has gradually liberalised its FDI regime, and an institutional framework has been developed to regulate and facilitate such investments. The liberalisation of the FDI regime and the improved investment environment have greatly increased the confidence of foreign investors in China. Consequently, FDI inflows into China increased rapidly after 1979, and particularly during the early 1990s. The total accumulated amount of FDI at current prices rose from the initial US$0.109 billion in 1979 to reach US$133.19 billion in 1995, at an annual growth rate of 55.93 percent.[1]

[1] However, we should note that this high annual growth rate is also partly because of the very low base of FDI in China in 1979.

In 1991, China ranked only thirteenth in the world and third among the developing countries in terms of FDI inflows (United Nations, 1994, p. 68). Since 1993 China has become the second largest FDI recipient in the world (following the United States) and the single largest host country among the developing countries (United Nations, 1995, p. 54). Over the course of the last 16 years from 1979 to 1995, FDI became well-established in China's economy, and the activities of Multinational Enterprises (MNEs) came to assume increasing importance in capital formation, labour training, technology transfer, international trade, and in accelerating the transition of China from a planned economy to a market economy. As a result, FDI has increasingly integrated the Chinese economy into the world economy.

Table 1 and Figure 1 present the growth pattern of realised FDI inflow into China from 1979 to 1995. In this period there were three distinct phases: 1979-83, 1984-91, and 1992-95.

In the initial period of 1979-83, following the establishment of the four Special Economic Zones (SEZs) in Guangdong and Fujian provinces,[2] accompanied by the special incentive policies for FDI offered by the Chinese government in these SEZs, FDI inflows into China were highly concentrated in Guangdong and Fujian provinces, and particularly in the four SEZs. For example, Guangdong and Fujian provinces absorbed more than 70 percent of total FDI inflows in 1983 (State Statistical Bureau, 1992, p. 353). However, since the Chinese government was very cautious about introducing FDI into its domestic economy, foreign investors were also cautious about making investments in China in the initial stage of China's opening up to the outside world. During this period, therefore, China's performance in attracting FDI inflows were not very impressive. The inflows of realised FDI were only US$109 million in 1979 and US$636 million in 1983, averaging US$351 million annually.

[2] Shenzhen, Zhuhai, and Shantou in Guangdong Province, and Xiamen in Fujian Province.

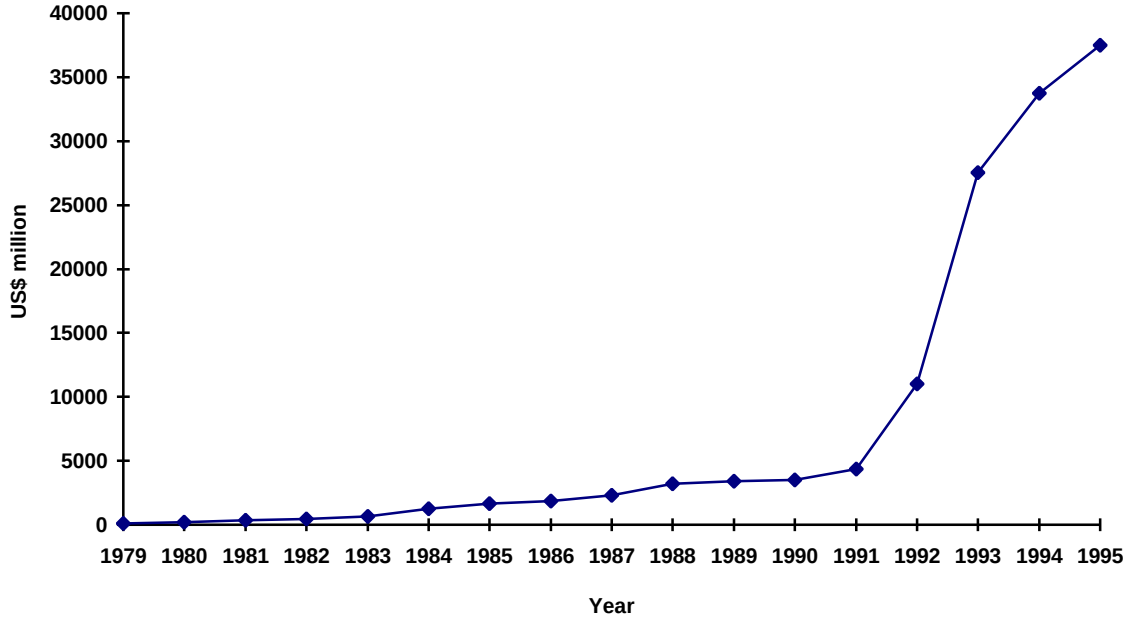
Table 1 Realised FDI inflow into China, 1979-1995
(millions of US dollars at current prices)

Year	FDI inflow
1979	109
1980	195
1981	375
1982	440
1983	636
1984	1258
1985	1661
1986	1874
1987	2314
1988	3194
1989	3392
1990	3487
1991	4366
1992	11007
1993	27515
1994	33767
1995	37521

Sources: Data for 1979-82 are from Chung Chen, Lawrence Chang and Yimin Zhang (1995), "The Role of Foreign Direct Investment In China's Post-1978 Economic Development", *World Development*, Vol. 23, No. 4, pp. 691-703.

Data for 1983-95 are from various issues of the State Statistical Bureau, *Zhongguo Tongji Nianjian* [China Statistical Yearbook], Zhongguo Tongji Chubanshe, Beijing.

Figure 1 Realised FDI inflow into China, 1979-1995 (current prices)



Source: As Table 1.

The second phase began in 1984 when Hainan Island and fourteen coastal cities across ten provinces were opened to FDI. As in the SEZs, a series of special economic policies were introduced in these open coastal cities. Consequently, in 1984 the inflows of realised FDI into China doubled the amount of that in 1983, reaching US$1,258 million, and contracted FDI in the fourteen coastal cities exceeded that in the four SEZs, indicating a new phase in attracting FDI inflows into China. The momentum of FDI inflow into China continued from 1984 to 1988 with an annual growth rate of 38 percent. However, in 1989, mainly due to the Tiananmen events, the growth rate of FDI inflows into China fell sharply from 38 percent in 1988 to 6 percent in 1989. The downturn continued in 1990, when the growth rate of FDI inflows into China further declined to only 3 percent. Although the growth rate in 1991 recovered to 25 percent, the annual growth rate of FDI inflows into China was only 11 percent from 1989 to 1991. This was the lowest growth rate in the entire period from 1979 to 1995. However, during the period 1984 to 1991, the Chinese government made a lot of effort to attract FDI inflows. These included opening more and more areas and regions to FDI, such as the Yangzi River delta, the Pearl River

delta, the Min Nan region, the Shanghai Pudong New Development Area and the entire coastal areas, and introducing a series of laws and regulations to encourage FDI inflows. As a result, FDI inflows into China continued to increase in absolute terms during the whole period from 1984 to 1991.

In the Spring of 1992, Deng Xiaoping made a tour to China's southern coastal economically opened areas and SEZs, and made a speech, which subsequently became famous. His aim was first to push China's overall economic reform process forward, and second to emphasise China's commitment to the open-door policy and market-oriented economic reform in order to increase the confidence of foreign investors to invest in China. His speech explicitly declared his support for the successful economic development assisted by foreign direct investment in the economically opened areas and SEZs, and expressed a desire to see the pace of liberalisation quickened. Deng Xiaoping's visit, which turned out to be a landmark, set the scene for China's move away from the uneven regional priority toward nationwide implementation of open policies for FDI. The Chinese government then adopted and implemented a series of new policies and regulations to encourage FDI inflows into China. The results were astounding. In 1992 the inflows of realised FDI in China reached US$11,007 million, double the figure of 1991. In 1993 the inflows of realised FDI again doubled the figure of 1992, reaching US$27,515 million. This figure was even higher than the total inflows of realised FDI into China from 1979 to 1991. In 1994 and 1995, the inflows of realised FDI reached US$33,767 million and US$37,521 million respectively. As a result, since 1993 China has become the second largest FDI recipient in the world and the single largest host country among developing countries.

However, among China's thirty provinces, the magnitude of FDI inflow into each individual province differs greatly. Consequently, the provincial distribution of FDI inflows into China has been very uneven, with the coastal provinces accounting for nearly 90 percent of the total. This raises the questions of what are the causes of the uneven provincial distribution of FDI inflows into China and what provincial characteristics determine the FDI location decision within China?

This paper investigates the causes of the differences in the aggregate magnitude of FDI inflows from all source countries into each of China's provinces. At

this level of analysis we take each individual province as the basic potential destination for hosting FDI inflows from all source countries in the world in order to find out what provincial location factors determine the provincial distribution of FDI inflows. This topic is particularly interesting in light of the increasing efforts of each individual province to attract FDI inflows to boost local economic development.

The paper is structured as follows. In section 2 we examine the provincial differences in the distribution of FDI inflows during 1983 to 1995. Section 3 presents the framework of analysis and derives the basic model. Section 4 discusses the hypotheses of provincial location factors affecting the FDI location decision. Section 5 conducts the empirical tests for the hypotheses. The final section summarises the basic findings.

2 Provincial Distribution of FDI Inflows

As shown in Section 1, at the national level the aggregate inflow of realised FDI into China grew steadily from 1979 to 1991, but increased very rapidly from 1992 to 1995 when there was an unprecedented surge. However, what has been the provincial distribution of FDI inflows? This section will analyse this question.

To facilitate the analysis of the provincial distribution of FDI inflows, following the commonly used method of regional division in China and also according to the economic development levels and the geographical locations of provinces, we group China's thirty provinces into three regions namely the east region, the central region

and the west region.[3] The reason for the division into regions is primarily for comparing the regional differences and dynamic changes in attracting FDI inflows. In addition, we also will analyse the performance of individual provinces in attracting FDI inflows within each region.

The following tables and figures provide the basic statistics and information of realised FDI distribution among China's thirty provinces and three regions from 1983 to 1995. The tables and figures reveal several important characteristics.

First, as shown in Table 2, FDI inflows into China in the early period were overwhelmingly concentrated in the four special economic zones (SEZs). This was shown by the huge FDI inflows into Guangdong and Fujian provinces whose combined share of annual FDI inflows was more than 60 percent of the national total from 1983 to 1986.

Second, with the development of overall economic reform, from 1984 to 1990 China gradually opened more and more areas to foreign investment. As we discussed in Section 1, this included the opening up of the fourteen coastal cities and Hainan Island in 1984, the three "development triangles" in 1985, and the entire coastal areas in 1988. Furthermore, in the early 1990s the Chinese government moved the implementation of the open policies to FDI toward a more level playing field throughout China. This major policy move was especially enhanced by Deng Xiaoping's call for deeper, faster and wider economic reform and liberalisation in early 1992. Assisted by these policy changes from the mid 1980s to the early 1990s, FDI inflows into China gradually spread from the initial concentrated areas to other provinces. Increasingly the most important areas for hosting FDI are the Yangzi River

[3] The east region includes 12 relatively developed and opened coastal provinces which are Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi, and Hainan.

The central region includes 9 central and intermediate developed provinces which are Shanxi, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, and Sichuan.

The west region includes 9 west and less developed provinces which are Inner Mongolia, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang.

Table 2 FDI inflows into China's host provinces 1983-1995

(millions of US dollars at 1980 constant prices)

Province	1983-86	1987	1988	1989	1990	1991	1992	1993	1994	1995
Beijing	68	77	350	213	176	148	205	380	762	584
Tianjin	23	97	43	21	23	80	63	299	564	822
Hebei	5	7	13	29	28	34	66	226	291	296
Shanxi	0.1	4	5	7	2	2	32	49	18	35
Inner Mongolia	3	4	4	3	7	1	3	49	22	31
Liaoning	17	66	91	84	162	219	303	729	800	770
Jilin	5	5	7	7	11	19	44	157	134	221
Heilongjiang	6	10	48	38	18	13	42	132	193	279
Shanghai	59	155	162	280	110	88	290	1801	1374	1564
Jiangsu	19	63	87	84	84	133	859	1621	2091	2806
Zhejiang	12	26	30	36	31	56	141	588	639	680
Anhui	7	2	19	6	9	6	32	147	206	261
Fujian	48	40	101	231	202	285	836	1635	2063	2186
Jiangxi	5	4	6	6	5	12	59	119	145	156
Shandong	21	47	62	109	117	131	589	1068	1418	1454
Henan	4	10	45	31	7	23	31	174	215	259
Hubei	4	19	16	19	20	28	119	308	334	338
Hunan	8	2	9	15	9	15	78	249	184	274
Guangdong	499	534	871	879	998	1175	2173	4308	5257	5546
Guangxi	21	33	15	35	22	19	107	504	465	364
Hainan	12	44	82	71	65	107	266	403	510	574
Sichuan	17	18	28	9	15	49	66	326	512	293
Guizhou	4	1	7	8	7	9	12	24	35	31
Yunnan	1	5	6	5	5	2	17	55	36	53
Tibet	0	0	2	0	0	0	0	0	0	0
Shaanxi	12	53	78	65	30	19	27	134	133	175
Gansu	3	0.2	2	0	1	3	0.2	7	49	35
Qinghai	0.2	0	2	0	0	0	0.4	2	1.3	0.9
Ningxia	0.1	0.02	0.2	0.7	0.2	0.1	2	7	4	2.1
Xinjiang	5	13	4	0.6	3	0.1	0	30	27	30
By Regions:										
East Region	804	1189	1909	2073	2019	2475	5899	13564	16233	17644
Central Region	56	74	182	137	96	168	503	1661	1941	2115
West Region	28	75	102	82	52	34	61	308	307	357
National Total	**888**	**1337**	**2193**	**2292**	**2167**	**2677**	**6463**	**15533**	**18482**	**20116**

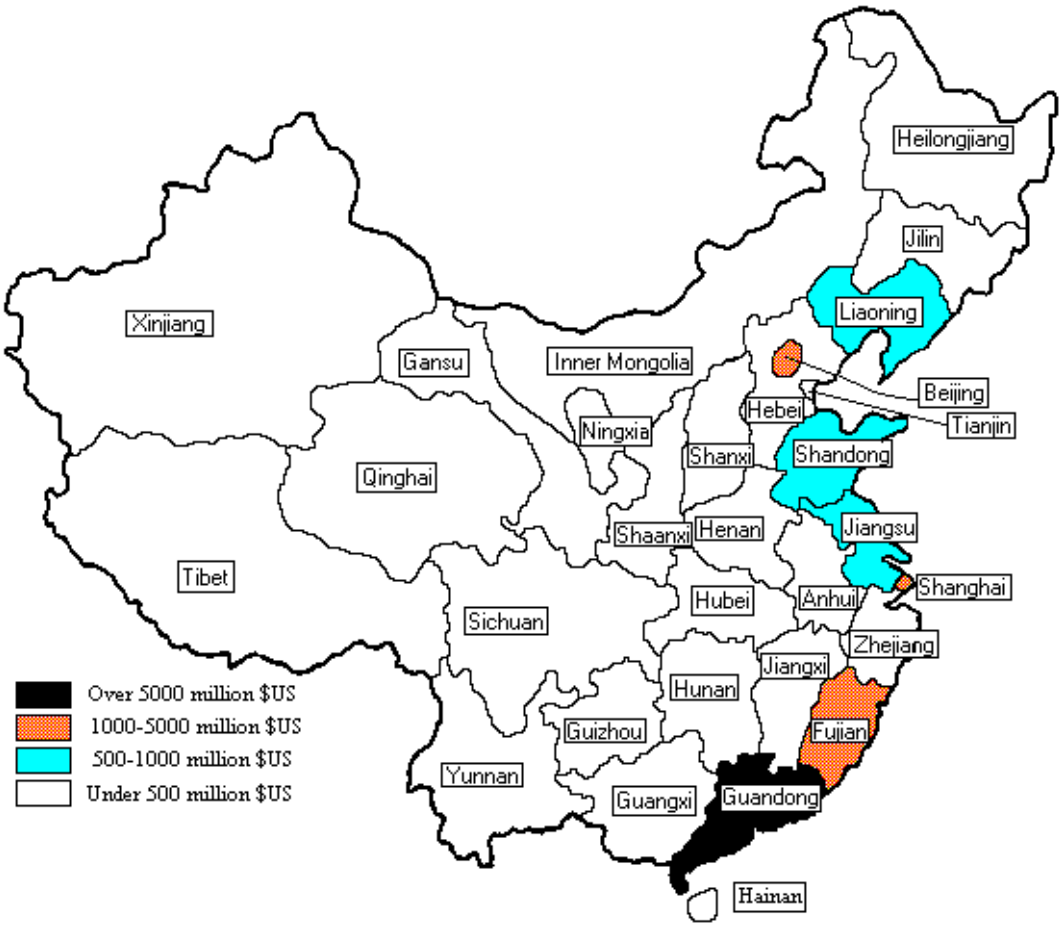
Sources: Data for 1983-91 are calculated from the State Statistical Bureau (1992), *Zhongguo Duiwai Jingji Tongji Daquan 1979-1991* [China Foreign Economic Statistics 1979-1991], China Statistical Information & Consultancy Service Centre, Beijing.

Data for 1992-93 are calculated from the State Statistical Bureau (1995), *Zhongguo Duiwai Jingji Tongji Nianjian 1994* [China Foreign Economic Statistical Yearbook 1994], Zhongguo Tongji Chubanshe, Beijing.

Data for 1994 and 1995 are from the State Statistical Bureau (1996), *Zhongguo Tongji Nianjian 1996* [China Statistical Yearbook 1996], Zhongguo Tongji Chubanshe, Beijing.

Figure 2 Provincial distribution of accumulated FDI in China

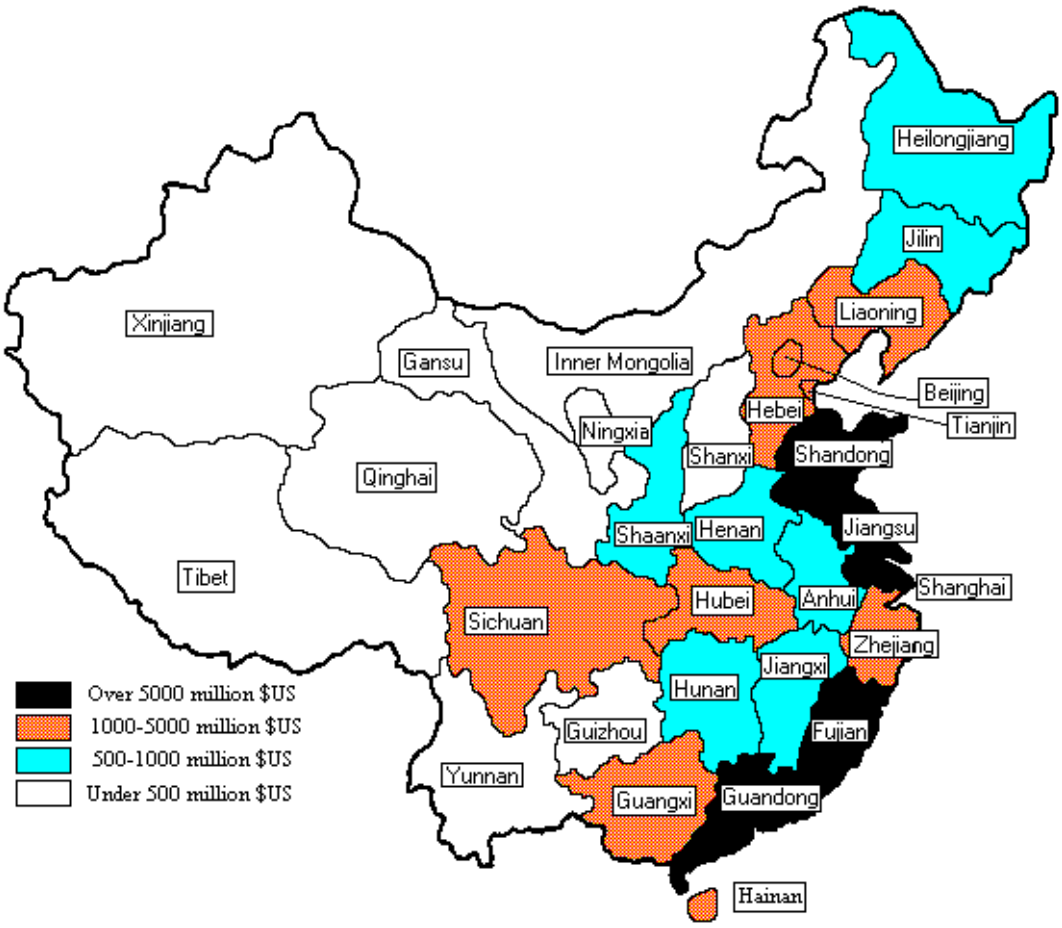
(1980 constant US dollar prices, end 1991)



Source: As Table 2.

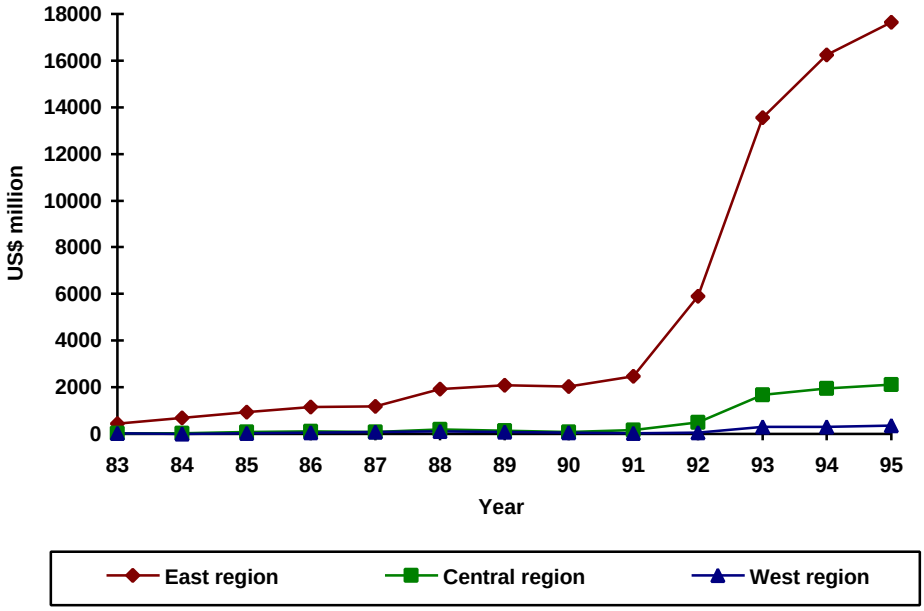
Figure 3 Provincial distribution of accumulated FDI in China

(1980 constant US dollar prices, end 1995)



Source: As Table 2.

Figure 4 FDI inflows into China by regions 1983-95
(1980 constant US$ prices)



Source: As Table 2.

Delta including Jiangsu, Shanghai, and Zhejiang and the Bohai Gulf including Shandong, Hebei, Tianjin, and Liaoning. Several provinces, such as Hubei, Hunan, Henan, and Sichuan in the central region of China, also witnessed relatively large increases in FDI inflows from 1993 to 1995. Therefore, FDI inflows in the early 1990s have diffused from the initially concentrated southern coastal areas towards the south-eastern and eastern coastal areas as well as towards inland areas. The wide distribution of FDI inflows is illustrated in Figure 2 and Figure 3.

Third, as compared with the 1980s, the aggregate annual FDI inflows in the early 1990s have increased remarkably, and particularly since 1992. However, comparing the three provincial groups of the east, central and west regions, as shown in Figure 4, each has experienced different growth patterns. For the east region provinces FDI inflow has been increasing steadily with a remarkably high growth rate, particularly during 1992 to 1995. For the other two provincial groups, the inflows of FDI have been much less, especially for the west region provinces. As a result, the gap between the east region and the central and west regions in terms of the absolute magnitude of annual FDI inflows has actually enlarged since 1992.

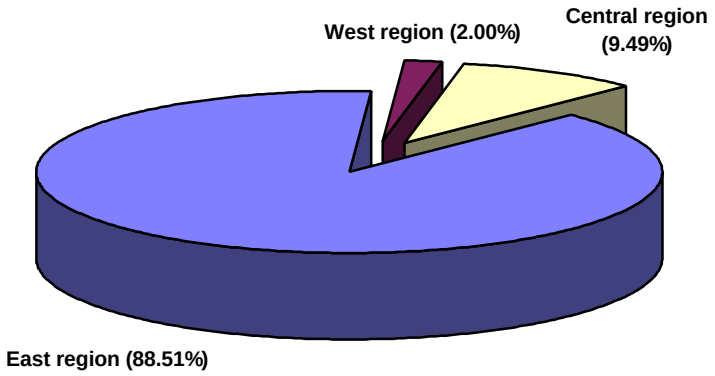
Table 3 Accumulated FDI stock in China's provinces 1983-1995

(1980 constant US dollar prices)

Province	Year 1983 - 1991		Year 1992 - 1995		Year 1983 - 1995	
	FDI stock (million US$)	Share (%)	FDI stock (million US$)	Share (%)	FDI stock (million US$)	Share (%)
Beijing	1236	8.69	1931	3.19	3167	4.23
Tianjin	357	2.51	1748	2.88	2105	2.81
Hebei	132	0.93	879	1.45	1011	1.35
Shanxi	20	0.14	133	0.22	153	0.20
Inner Mongolia	29	0.20	105	0.17	134	0.18
Liaoning	690	4.85	2603	4.30	3293	4.40
Jilin	71	0.50	556	0.92	627	0.84
Heilongjiang	150	1.06	647	1.07	797	1.07
Shanghai	1033	7.27	5029	8.30	6062	8.10
Jiangsu	526	3.70	7377	12.17	7903	10.56
Zhejiang	227	1.59	2048	3.38	2275	3.04
Anhui	71	0.50	645	1.07	717	0.96
Fujian	1051	7.39	6720	11.09	7771	10.39
Jiangxi	53	0.37	479	0.79	532	0.71
Shandong	549	3.86	4529	7.47	5078	6.79
Henan	130	0.91	679	1.12	808	1.08
Hubei	117	0.82	1100	1.81	1217	1.63
Hunan	83	0.58	786	1.30	869	1.16
Guangdong	6454	45.38	17285	28.52	23739	31.73
Guangxi	208	1.46	1439	2.38	1647	2.20
Hainan	418	2.94	1753	2.89	2171	2.90
Sichuan	187	1.31	1196	1.97	1383	1.85
Guizhou	48	0.34	102	0.17	150	0.20
Yunnan	27	0.19	161	0.27	188	0.25
Tibet	2	0.00	0	0.00	2	0.00
Shaanxi	291	2.05	468	0.77	759	1.02
Gansu	18	0.12	90	0.15	108	0.14
Qinghai	3	0.02	5	0.01	8	0.01
Ningxia	2	0.01	15	0.02	17	0.02
Xinjiang	44	0.31	87	0.14	131	0.18
By Regions:						
East Region	12880	90.56	53341	88.03	66220	88.51
Central Region	881	6.19	6221	10.27	7102	9.49
West Region	462	3.25	1033	1.70	1495	2.00
National Total	**14223**	**100**	**60595**	**100**	**74817**	**100**

Source: As Table 2.

Figure 5 Shares of accumulated FDI in China by region (1983-95)



Source: As Table 3.

Fourth, as a group the east region provinces have overwhelmingly dominated the other two province groups for the entire period under study. Table 3 and Figure 5 present the realised FDI stock (at 1980 US dollar constant prices) accumulated from 1983 to 1995. As the table and figure indicate, the distribution of FDI among regions and provinces has been very uneven. The figures highlight the importance of the east region provinces as the main recipients of FDI in China. The percentage shares in the national total of realised FDI stock were 88.51 percent for the east region provinces, 9.49 percent for the central region provinces, and only 2 percent for the west region provinces.

Among the east region provinces, Guangdong's performance in attracting FDI has been very impressive. Its share of accumulated FDI stock from 1983 to 1995 was one third of the national total, far exceeding all other provinces including Jiangsu, Fujian, and Shanghai, each of which possessed around 10 percent of the national total, and ranked second, third and fourth among China's thirty provinces.

Source: As Table 3.

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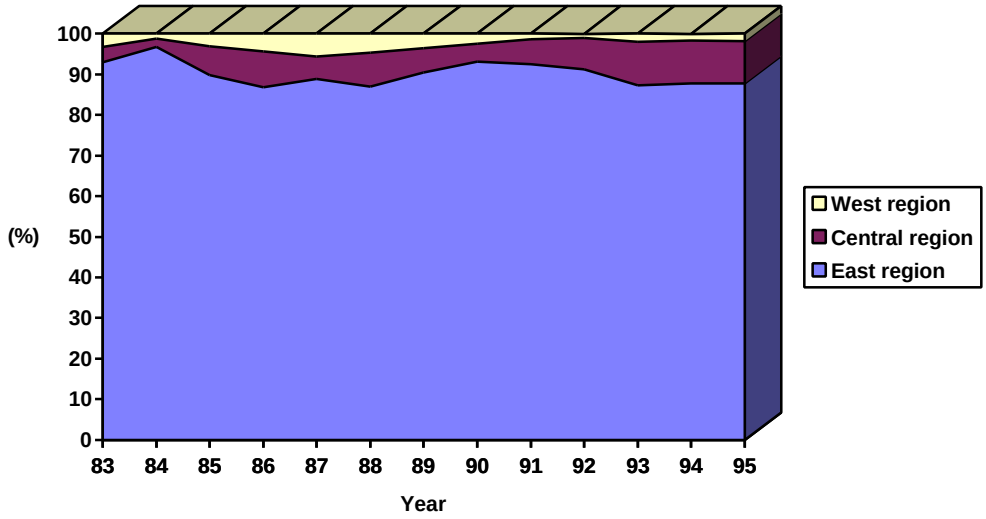
Finally, let us examine the share changes of annual FDI inflows into the three regions. As demonstrated in Figure 5, the shares of FDI inflows for the three regions were roughly stable from 1983 to 1995, with minor fluctuations. The combined share of the east region provinces in the national total annual FDI inflow has been around 90 percent, with a slightly declining trend since 1991. However, if we analyse this province group one step further, we find that among them, the shares of each province have gradually changed. Two obvious changes can be found. First, the share of Guangdong has declined both at the national level and at the group level. In contrast, the shares of other coastal provinces opened later, such as Jiangsu, Shanghai, Zhejiang, Shandong, and Hebei, have increased steadily. Second, there is a gradual but obvious expansion of FDI inflows from the south coastal provinces towards the south-east and east coastal provinces. The direct beneficiaries are Jiangsu, Shanghai, Zhejiang, Shandong, and Hebei provinces, whose shares both in the group and in the national FDI stock have increased dramatically.

The share of the central provinces in the national annual FDI inflows has increased gradually from round 6 percent in the 1980s to more than 10 percent in the 1990s, particularly during 1993 and 1995. The main contributors are Sichuan, Hubei, and Hunan provinces, and their shares of FDI inflows in the national total doubled from 1980s to the 1990s. This situation suggests that the provincial distribution of FDI inflows has spread from the opened coastal provinces into the inland provinces.

The western less developed provinces received a very small amount of FDI inflows. Their share in the national annual FDI inflows has been declining from around 4 percent in the 1980s to less than 2 percent in the 1990s. However, Shaanxi and Xinjiang attracted relatively more FDI inflows than the other provinces in this group. But in Tibet there was only US$20,000 (at constant 1980 prices) invested in 1988.

Figure 6 Shares of FDI inflows into China by regions (1983-95)



Source: As Table 2.

In general, the above brief description of the provincial distribution of FDI has clearly revealed the uneven FDI distribution among China's provinces. This raises the questions of what are the location determinants affecting FDI distribution across provinces in China and why FDI has been mainly concentrated in the east region provinces? The following sections will examine and answer these questions.

3 Framework of Analysis and the Model

Based on the spirit of the gravity model, the fundamental model used in this study can be written as:

$$FDI_{ij} = f(X_i, X_j, R_{ij}) \quad (1)$$

$$i = 1, 2, 3, \ldots I$$

$$j = 1, 2, 3, \ldots J$$

where:

FDI_{ij} = the magnitude of FDI inflow from source country i into host country or province j

X_i = source country variables

X_j = host province variables

R_{ij} = linkage variables

As elaborated by Dunning's "OLI" theory of FDI (Dunning, 1993), many factors influence the flows of FDI. Since these factors are located in different areas, the general argument for the use of the gravity model in line with the "OLI" theory is that each factor may be categorised as a source country factor (the ownership advantages), a host country or province factor (the location advantages) or a linkage factor (bilateral factors). Source country factors reflect the capacity of a source country to conduct FDI in all possible host countries or provinces, while host country or province factors are characteristics of the overall attractiveness of a host country or province to attract and locate FDI inflows from all source countries. Linkage factors take account of the relationships between a particular pair of source country and host country or province.

In this study, in presenting the specified determinants of the provincial distribution of FDI inflows from all source countries into China's host provinces, we shall therefore classify the determinants as: source country variables; host province variables; and linkage variables.

As regard to the functional form of equation (1), we consider the use of the linear and log-linear forms.

First, the linear form of equation (1) can be written as:

$$FDI_{ij} = \alpha_0 + \alpha_1 X_i + \alpha_2 X_j + \alpha_3 R_{ij} \qquad (2)$$

Since our interest is in examining the location determinants of FDI inflows from all source countries into China's host provinces, therefore, to obtain the host

province aggregate equation FDI_{*j}, the aggregate FDI inflows from all source countries into a host province j, we use the identity:

$$FDI_{*j} = \sum_{i=1}^{I} FDI_{ij} \tag{3}$$

Substituting (2) for (3),

$$\begin{aligned} FDI_{*j} &= \sum_{i=1}^{I} (\alpha_0 + \alpha_1 X_i + \alpha_2 X_j + \alpha_3 R_{ij}) \\ &= I\alpha_0 + \alpha_1 \sum_{i=1}^{I} X_i + I\alpha_2 X_j + \alpha_3 \sum_{i=1}^{I} R_{ij} \\ &= I\alpha_0 + \alpha_1 X_* + I\alpha_2 X_j + \alpha_3 R_{*j} \end{aligned} \tag{4}$$

Since a source country i's variables X_i which measure the overall outward investment potential of source country i are determined by its own technological and economic development levels, the key feature of these variables is that they are common to all outward FDI of source country i and are independent from and irrespective of destinations. In addition, since all host provinces face the same set of source countries, the source country variables X_* become a constant for each of the host provinces. In the actual implementation, we use the intercept term to capture the effects of source country variables X_*. As a result, we have the following equation:

$$FDI_{*j} = \beta_0 + \beta_2 X_j + \beta_3 R_{*j} \tag{5}$$

where:

$\beta_0 = I\alpha_0 + \alpha_1 X_*$

$\beta_2 = I\alpha_2$

$\beta_3 = \alpha_3$

Thus the equation for FDI_{*j} is a function of host province variables and linkage variables only. It states that, given the source country variables (supply-side factors), the host province variables (demand-side factors) and the linkage variables are the

only things that matter to determine the distribution of FDI inflows from all source countries into each of the host provinces. Therefore, we call equation (5) the host province aggregate FDI equation.

As is usual in the use of a gravity model in studies of international trade flows, we also adopt the log-linear form as the basic functional form to connect the magnitude of FDI inflows from all source countries to host province j to the relevant explanatory variables (host province variables and linkage variables). Therefore, equation (5) can be rewritten in log-linear form as:

$$\ln FDI_{*j} = \beta_0 + \beta_2 \ln X_j + \beta_3 \ln R_{*j} \qquad (6)$$

Thus based on the principle of gravity model, we have derived the basic equation. In equation (6) the estimated coefficients of the $\ln X_j$ and the $\ln R_{*j}$ variables will be elasticities.

Equation (6) is the form of a "modified" gravity model used to explain the magnitude of FDI inflows from all source countries into a host country or province j. In fact, almost all empirical studies of location determinants of FDI inflows or stocks have used the functional form of this "modified" gravity model without systematically conducting the derivation of the model. Since our interest is to investigate the location determinants of FDI inflows into China's host provinces, equation (6) is the fundamental equation in this study. The following section will describe the location determinants and establish the independent variables.

4 Location Determinants of FDI Distribution within China --- The Hypotheses

Building on the FDI literature, our general hypothesis is that facing the same set of source countries in the world, the provincial differences in FDI inflows are caused by the differences in location factors of each province. In this study, we take the following location factors as important in determining the magnitude of FDI inflows into each of China's host provinces.

(1) Market size of host province

The provincial market size is a very important indicator of the overall capacity of the economic activities of a host province. We expect the level of economic activities to be greater the larger is the market of the host province. Consequently, we may hypothesise that the level of FDI inflow will be greater the larger is the market of the host province. However, one point needs to be justified with respect to using provincial market size as a location factor determining the provincial distribution of FDI inflows within China. We argue that the provincial market size can be justified as important for FDI for both export-oriented FDI or FDI aimed at serving the whole national market. This is because larger economies can provide more opportunities for industries and enterprises to benefit from external economies of scale and spill-over effects. In these circumstances, the influence of provincial market size will still be positive on the inward FDI to host provinces. The measure of market size used in this study is the Gross Domestic Product of the host province, denoted by GDP. The value of GDP for each of the host provinces is from 1986 to 1993 at 1980 constant *Renminbi* prices.

(2) The level of economic development of host province

The level of economic development is a comprehensive economic and social indicator of a province. A higher economic development level not only indicates good overall

economic performance and higher purchasing power but also implies higher productivity associated with good labour quality and advanced technology, better local infrastructure, and an overall better investment environment. Since the economic development levels of China's provinces are very different, we expect that the provincial economic development level has a positive impact on the provincial distribution of FDI inflows into China. In this study per capita GDP, denoted as PGDP, is used as a proxy for provincial economic development level. The value of PGDP for each province is from 1986 to 1993 at 1980 constant *Renminbi* prices.

(3) Labour costs in host province

In the FDI literature, the most important factor cost in the determination of FDI flows is the wage rate, especially when FDI is export-oriented. Therefore, we take the relevant factor cost in the decision to locate FDI in the host province as that of labour costs. In particular, we expect lower labour costs to include higher levels of FDI inflows, especially for export-oriented FDI. However, we should argue that a lower wage rate may also be accompanied by lower productivity, and thus the efficiency wage may not be low. Therefore, the best measure of labour costs should be the "efficiency wage" rather than the absolute wage rate. Following this argument, in this study we use the efficiency wage as a measure of labour costs in each host province. The efficiency wage may be directly measured as:[4]

$$EW_j = \frac{W_j}{\Pi_j}$$

where EW_j is the average efficiency wage in host province j, W_j is the absolute wage rate in host province j, and Π_j is the average productivity of labour in host province j. The efficiency wage as a measure of labour costs has the advantage of being unit free. It is expected to be negatively related to the level of FDI inflows.

[4] A similar definition of efficiency wage was used by Nankani (1979) in a study of intercountry distribution of direct foreign investment in manufacturing in developing countries.

Because of the constraints of the Chinese statistical methods and the data limitation, in this study we use the average wage rate of all employees in host province j as W_j, and the overall industrial labor productivity of the corresponding host province as Π_j. The value of both measures is at 1980 constant prices. However, two points should be noted here. First, though we use the average wage rate of all employees, the differences between the average wage rate of all employees and the average wage rate of industrial workers are very small for all provinces, and they do change in the same direction. Second, the calculation of overall industrial labour productivity in Chinese statistics is the total industrial output value divided by the total number of workers, rather than the conventional measure which is the ratio of total value added in industry to the total number of workers. However, since we use the same measure for all host provinces for all the periods under study, there should not be a major problem.

(4) The level of accumulated FDI

The level of accumulated FDI stock has been found to be an important explanatory factor of current FDI inflows in several previous studies (Petri, 1995; Dobson, 1993; Mody and Shrinivasan 1991). Based on the results of the previous studies, we argue that the level of accumulated FDI stock may have certain demonstration effects on the investment location decision of foreign investors. Consequently, our hypothesis is that a higher level of accumulated FDI stock indicates an overall better investment environment in host provinces, which may generate demonstration effects and induce higher level of FDI inflows. We, therefore, expect the level of provincial accumulated FDI stock to have a positive effect on attracting FDI inflows. The accumulated FDI, denoted as FDIS, is the FDI inflows accumulated since 1983 of each host province at 1980 US dollar prices.

(5) Intensity of transport infrastructure in host province

The level of transport infrastructure in each host province might be another important consideration for foreign investors. Consequently, we assume that more highways,

more railways and more interior transport waterways, adjusted for the size of host province, are positively related to FDI inflows. The proxy for the intensity of transport infrastructure used in this study is the ratio of the sum of the kilometres of highways, railways and interior transport waterways divided by the size of the corresponding host province, denoted as TI. The unit of the intensity of transport infrastructure is kilometres per 100 square kilometres of the host province land area.

(6) Policy dummy

Since China opened its door to the world economy an evolving series of policies towards FDI has been implemented. Have these policies had any significant impact on provincial distribution of FDI inflow? In this study we do not intend to test all of the policies during the entire period. However, among the FDI policies we do want to test are the impact of the uneven regional open policies and the set of FDI policies implemented since 1992.

The uneven regional open policies for FDI were implemented from the establishment of four SEZs in 1979, to the opening up of fourteen coastal cities in 1984, and then to the expansion of open policies to the eleven coastal provinces in 1988. In the early 1990s the Chinese government has gradually moved toward a more level playing field throughout China. This major policy move was especially enhanced by Deng Xiaoping's call for deeper, faster and wider economic reform and liberalisation in early 1992 during his famous visit to the south. Deng Xiaoping's landmark visit set the scene for China's move from the uneven regional priority toward a more nationwide implementation of open policies for FDI. Therefore, since 1992 open polices have been implemented throughout China.

These changes not only improved the existing unfair competition between the coastal and inland regions, but also offered more preferential treatment to foreign investors. First, the application of preferential policies gradually shifted from regional priority to accommodating national and local industrial development policies. For example, any FDI project, as long as it is in line with state or local industrial policy and involves high or new technology, is entitled to preferential treatment, regardless

of its location. Second, fifty-two cities, including all the inland provincial capitals (except Lhasa in Tibet and Urumqi in Xinjiang), and the areas along the Yangzi River were granted the preferential policies given to the fourteen coastal cities. Third, more than fifteen border cities and counties in the south-west, north-west, north and north-east of China were declared open border cities. Fourth, FDI was allowed in some service industries, such as aviation, telecommunication, banking and retail trade. Fifth, to develop foreign trade and processing industries in the coastal areas further, more bonded zones were to be established. Sixth, the government allowed foreign business people, either those with an intention to set up FDI firms in a later stage or land developers, to buy land use rights for building infrastructure facilities, including residential, commercial, industrial, and recreational real estate (Liu Xiangdong et al., 1993, pp. 868-870; United Nations 1994, p. 68; and Wei Jia 1994, p. 67).

Therefore, two dummy variables, denoted as OP and GP, for the regional open policy and policy changes in the early 1990s are used to test their impact on the inflow of FDI. For the dummy variable OP, we give a value of one for the eleven coastal provinces from 1987 to 1994,[5] and a value of zero from 1987 to 1991 and of one from 1992 to 1994 for other provinces. For the dummy variable GP, we give a value of zero for the years from 1987 to 1991 and a value of one for the years from 1992 to 1994.

[5] The eleven coastal provinces are Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Guangxi, and Hainan.

5 Location Determinants of FDI Distribution within China --- An Empirical Analysis

In this section we conduct an empirical analysis of the location determinants of provincial distribution of FDI inflows within China.

5.1 Variable specification and the model

The relationship between FDI inflows and the location variables in China's provinces is investigated over time and across provinces. Twenty-nine provinces from 1987 to 1994 are included.[6] In this study, the dependent variable, denoted as $FDI_{*j,t}$, is the aggregate inflow of realised FDI from all source countries into China's host province j in year t. The value of FDI is at constant 1980 US dollar prices. There are seven independent variables which are summarised in Table 4.

Based on the modified gravity model (equation 6) developed in Section 3, incorporating the variables discussed above, we establish the following equation to test the location determinants of provincial distribution of FDI inflows into China.

$$\begin{aligned} \ln FDI_{*j,t} = {} & \beta_0 + \beta_1 \ln GDP_{j,t-k} + \beta_2 \ln PGDP_{j,t-k} + \beta_3 \ln EW_{j,t-k} + \beta_4 \ln FDIS_{j,t-k} \\ & + \beta_5 \ln TI_{j,t-k} + \beta_6 OP_{j,t} + \beta_7 GP_t + \varepsilon_{j,t} \end{aligned} \qquad (7)$$

where $\varepsilon_{j,t}$ is stochastic disturbance, the βs are the regression parameters to be estimated, and the variables are as defined above. The estimated coefficients of lnGDP, lnPGDP, lnEW, lnFDIS, and lnTI variables will be elasticities.

[6] Tibet is excluded because of missing data.

Table 4 List of variables of provincial aggregate FDI inflows

Variable name	Specification of variables	Source
Dependent variable		
$FDI_{*j,t}$	Aggregate FDI inflows from all source countries into province j in year t. Ten thousand US dollars at 1980 constant prices.	*China Foreign Economic Statistics 1979-1991*, *China Foreign Economic Statistical Yearbook 1994*, and *Almanac of China's Economic Relations and Trade 1995/96.*
Independent variables		
$GDP_{j,t}$	Gross Domestic Product of province j in year t. *Renminbi* billion yuan at 1980 constant prices.	Various issues of State Statistical Bureau, *Zhongguo Tongji Nianjian*, [China Statistical Yearbook].
$PGDP_{j,t}$	Per capita GDP of province j in year t. *Renminbi* yuan per capita at 1980 constant prices.	Same as above
$EW_{j,t}$	Efficiency wage of province j in year t.	Same as above
$FDIS_{j,t}$	Accumulated FDI of province j in the end of year t. Ten thousand US dollars at 1980 constant prices.	*China Foreign Economic Statistics 1979-1991* and *China Foreign Economic Statistical Yearbook 1994*.
$TI_{j,t}$	Transport intensity index of province j in year t. Kilometres per 100 square kilometres.	Various issues of State Statistical Bureau, *Zhongguo Tongji Nianjian*, [China Statistical Yearbook].
$OP_{j,t}$	Regional open policy dummy variable. One for the eleven coastal provinces from 1987 to 1994, and zero from 1987 to 1991 and one from 1992 to 1994 for other provinces.	
GP_t	Policy dummy variable. Zero for the years 1987 to 1991, and one for the years 1992 to 1994.	

The independent variables, except for the dummy variable OP and GP, are all lagged k years. This model assumes that the effect of the independent variables at time t-k appears only within period t and is fully completed within that period. The relationship shown in equation (7) will be examined for k=1, the most likely appropriate lag. In addition, another possibly appropriate lag (k=2) will be investigated.

5.2 Regression results and explanations

Table 5 shows the regression results of the provincial aggregate FDI inflow equation with the explanatory variables, except for the dummy variables, lagged 1 year (k=1) for 29 provinces for the period 1987 to 1994.

For model 1, we include all the independent variables. We find that the variables GDP, EW, FDIS, TI, OP and GP have the expected signs and the coefficients are statistically significant at the 0.01 level. However, the coefficient of variable PGDP not only is not significantly different from zero at the conventional statistical level but also has the wrong sign.

Since there are seven independent variables in the regression, the insignificance and wrong sign of the variable PGDP might be caused by the problem of high collinearity between PGDP and other independent variables. If this is the case, the effect of variable PGDP on FDI inflows may be captured by other variables, if we regress all of the independent variables in the same equation.

We examined the correlation coefficients between the independent variables. We found that the correlation coefficients between PGDP and EW, and PGDP and FDIS were -0.51 and 0.57 respectively. The relatively high correlation between PGDP and EW, and PGDP and FDIS may be the cause of the insignificance and wrong sign of PGDP in the regression.

Table 5 Regression results of provincial aggregate FDI inflow equation, 1987-94 (with lag k=1)

Variables	Model 1	Model 2	Model 3
Constant	4.6425	3.1907	-5.4874
	(3.554)***	(2.954)***	(-5.275)***
LGDP	0.51619	0.56316	1.2979
	(5.642)***	(5.667)***	(10.99)***
LPGDP	-0.23773		0.97786
	(-1.668)		(5.524)***
LEW	-1.6558	-1.5537	
	(-5.639)***	(-5.354)***	
LFDIS	0.50046	0.46443	
	(8.580)***	(7.732)***	
LTI	0.41467	0.35660	0.50768
	(2.553)***	(2.248)**	(2.910)***
OP	0.50517	0.49329	0.86600
	(4.433)***	(4.324)***	(5.808)***
GP	0.58308	0.59282	0.86793
	(6.150)***	(6.215)***	(8.455)***
BUSE-R^2	0.81	0.79	0.70
DF	224	225	226
F-statistics	134.20	141.27	104.64

Note: t-statistics are in parentheses.

** Statistically significant at 0.05 level.

*** Statistically significant at 0.01 level.

Table 6 Regression results of provincial aggregate FDI inflow equation, 1987-94 (with lag k=2)

Variables	Model 1	Model 2	Model 3
Constant	1.4842	0.65050	-4.5633
	(0.9285)	(0.5751)	(-4.143)***
LGDP	0.57760	0.59867	1.2538
	(4.805)***	(4.777)***	(9.900)***
LPGDP	-0.10965		0.85871
	(-0.5987)		(4.581)***
LEW	-0.75561	-0.66919	
	(-2.528)**	(-2.365)**	
LFDIS	0.49644	0.48004	
	(7.482)***	(7.130)***	
LTI	0.60725	0.60118	0.56219
	(3.249)***	(3.301)***	(3.094)***
OP	0.56288	0.57890	0.85392
	(3.839)***	(3.980)***	(5.121)***
GP	0.87551	0.87340	0.98403
	(7.695)***	(7.685)***	(8.432)***
BUSE-R^2	0.66	0.66	0.64
DF	224	225	226
F-statistics	62.70	72.02	79.60

Note: t-statistics are in parentheses.

** Statistically significant at 0.05 level.

*** Statistically significant at 0.01 level.

One way to solve the collinearity problem between PGDP and EW, and PGDP and FDIS is to enter the variable PGDP into the regression equation separately from the variables EW and FDIS. Therefore, we run another two separate regressions Model 2 and Model 3, each with a different set of explanatory variables. The regression results are presented in Table 5. The two models performed very well. Both regressions have relatively high explanatory power and all the independent variables have the expected signs and are statistically significant.

Another possibly appropriate lag k=2 was also investigated. As shown in Table 6, the regression results of the 2 year lag models also provide support for the acceptance of the hypotheses although the models have relatively lower overall explanatory power as compared to the 1 year lag models.

Thus, the regression results have shown that the provincial differences in FDI inflows can be explained by the differences in provincial location factors. The provincial market size (GDP), the level of economic development (PGDP), the level of accumulated FDI stock (FDIS) and the intensity of transport infrastructure (TI) are positive and statistically significant location determinants of the provincial distribution of FDI, while the provincial efficiency wage (EW), the proxy for labour costs adjusted for productivity, is a negative and statistically significant location determinant. This shows that not only higher efficiency wages deter FDI inflows but also foreign investors are very responsive to the differences in labour costs across provinces. In addition, the regional differentiation in the timing of implementing the open policies (OP) has had a strong impact on the provincial distribution of FDI inflows into China. This shows that, apart from the economic factors, the huge FDI inflows into the east region provinces was enhanced by the implementation of open policies during the 1980s. The gradual but obvious diffusion of FDI inflows into the inland provinces after 1992 is also partially due to the nationwide spread of open policies. Finally, the policy measures (GP) implemented in the early 1990s had strong positive effects on attracting the inflow of FDI into China across all provinces. Therefore, the sharp increase in the inflow of FDI into China between 1992 and 1994 could be explained partially by the major policy changes in the early 1990s.

6 Conclusion

This paper has investigated empirically the provincial distribution of FDI inflows into China during the past 16 years, particularly for the period of the late 1980s to the early 1990s. We found that associated with the huge amount of FDI inflows into China, the provincial distribution has been very uneven. As a group the east region provinces received 88.51 percent and as a single province Guangdong attracted 31.73 percent of the total FDI inflows respectively during the period 1983 to 1995. The causes of this uneven provincial distribution were then subjected to empirical investigation and regression analysis.

First, using Dunning's "OLI" explanation of the causes of FDI by focusing on the location advantages, the empirical analysis of this paper has shown that given the ownership advantages of source countries and the incentives for their multinational enterprises (MNEs) to internalise their ownership advantages in order to reduce transaction costs, the location advantages or the location determinants of host provinces are crucial in attracting FDI inflows. In other words, facing the same set of source countries, provincial differences in the magnitude of FDI inflows received from the same set of source countries are determined by the differences in location advantages of host provinces. Therefore, the uneven provincial distribution of FDI inflows into China is caused by the differences in provincial characteristics and location factors of each individual province.

Second, what are the location factors affecting the provincial distribution of FDI inflows? The empirical regression analysis provided strong support for the acceptance of the hypotheses set out in Section 4. To summarise, the provinces with higher GDP, higher per capita income, higher level of accumulated FDI stock, and more intensive transport infrastructure attracted relatively more FDI inflows, while higher efficiency wages deterred FDI inflows. In addition, the regional differentiation in the timing of implementing the open policies for FDI had a strong impact on the provincial distribution of FDI inflows. Finally the implementation of a series of policy

measures in the early 1990s had a very strong positive effect on attracting FDI inflows into China across all provinces.

Third, why have FDI inflows been mainly concentrated into the east region provinces? As shown in Table 7, taking 1993 as an example, among the three regions, the east region provinces have the largest aggregate GDP, the highest per capita income, the overwhelming amount of accumulated FDI stock, the best transport infrastructure, and the lowest average efficiency wage. It is not surprising therefore that FDI has been mainly concentrated in the east region provinces.

Table 7 Comparison of location factors of the three regions (1993)

Regions	Total GDP (Billion yuan)	PGDP (yuan/person)	Average EW (%)	Total FDIS (million US$)	TI ($Km/100Km^2$)
East region	890	1861	4.16	32343	45
Central region	485	946	7.27	3046	25
West region	153	846	8.49	800	10

Source: Same as Table 4.

Note: The figures are in 1980 constant *Renminbi* and US dollar prices respectively.

Finally, this paper is an initial exploration of a topic that is of increasing importance to China in general and is of direct relevance to the economic development efforts of each individual province in particular. Two important implications for the provincial distribution of FDI in China can be drawn from this study. First, among other location factors, since the main determinants of FDI location decisions within China are the provincial GDP, PGDP, EW, and TI, it is essential for each of the provinces to increase per capita income, to raise labor productivity, and to improve transport infrastructure in order to attract more FDI inflows. Though this is not easy for all of the provinces, particularly for economically backward provinces in the west region, it is the fundamental way to attract more FDI to accelerate economic development. Second, since China launched the overall economic reform in the late 1979, the economic growth rates of the east region provinces, which benefited from

the regionally biased special policies, have been much faster than those of the inland and west less developed provinces. This unbalanced economic growth between the coastal provinces and the inland and western provinces has led to uneven economic development and an increase in income gaps between them. Though the open policies to FDI have been applied throughout China since 1992, the differences between the east region provinces and the central and west region provinces in the levels of economic development resulting from the time lag of the implementation of open policies cannot be reduced in the near future. All of these have had a very strong and direct impact on the location factors attracting FDI inflows. Therefore, if China wanted to help the economic development of inland provinces, particularly the western less developed areas, it could (1) shift the preferential policies for FDI from regional priority to industrial priority, namely to encourage those FDI projects engaged in export-oriented, technologically advanced, transportation, communication, energy and raw materials industries; (2) adjust its regional development strategy by offering special economic and industrial development policies to the central and western regions; and (3) encourage coastal areas to transfer managerial skills and technology accumulated and obtained from attracting and utilising FDI to the inland regions in order to benefit fully from FDI nationwide.

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