

# Policy Implications of Uneven Distribution of FDI among China's Regions and Industries

Jr-Tsung Huang, An-Pang Kao, Shujie Yao

**Abstract:** China is now the world's largest recipient of foreign direct investments (FDI), surpassing the USA. In the literature, FDI is considered to be an important factor responsible for China's fast and sustainable economic growth as well as for its unbalanced regional development and income inequality. Because there are many studies on the linkage between FDI and economic growth, this paper aims to focus on the spatial and industrial distribution of FDI. Following Mookherjee and Shorrocks (1982), we calculate and decompose the Gini coefficient to reveal how FDI is distributed among the regions and industries during 1985-2002. It is concluded that the inequality of FDI distribution among regions and industries was serious, shedding important light on future policies relating to regional and industrial development in China.

**Keywords:** China, foreign direct investment, Gini coefficient, inequality

**JEL Classifications:** D39; F21; P21

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## **I. Introduction**

Since the beginning of economic reforms, the open-door policy and FDI has been an important driver of China's fast economic growth. FDI was used as a vehicle to import foreign technologies, capital and organizational expertise to help develop its export sector and to enhance domestic competition (Yao and Zhang, 2001). Both central and local governments have adopted preferential policies to attract FDI in terms of tax concessions and special privileges for foreign investors.<sup>1</sup> In addition, a driving force for China's exceptional growth performance has been the increasing openness of its economy, particularly to trade and FDI. Indeed, attracting FDI has been a key pillar of China's opening-up policies, and its increasing openness to FDI has contributed importantly to its exceptional growth performance (Wei, 1995). As pointed out by Tseng and Zebregs (2002), FDI inflows to China have contributed to GDP growth by adding to capital formation, through its positive effect on total factor productivity, directly through the establishment of foreign-invested enterprises (FIEs), and indirectly by creating positive spillover effects from FIEs to domestic firms.

However, FDI has left some challenging tasks for China, as it has been unevenly distributed among industries and regions, leading to a rising disparity of regional economic development and growth, as well as a more serious rural-urban divide (Fu, 2004). Rising disparity of inter-regional development and rural-urban incomes can cause social and political instability and impose huge constraints on future development of the national economy. According to the latest official statistics, more than 80% of FDI is concentrated in the eastern areas, but little for the vast central and western regions (NBS, 2003). Out of China's 30 provinces and cities, the two largest

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<sup>1</sup> Moreover, China's efforts to reduce barriers to FDI and to implement policies to improve the investment environment have also played a key role in attracting FDI in China.

recipients, Guangdong and Jiangsu, accounted for over 40% of the country's total FDI, whilst 13 inland provinces accounted for less than 1% each. In addition, over 98% of FDI were concentrated in the urban industries and services, but less than 2% in the rural and agricultural sector.

In order to understand the reason why some regions are more favorable than others for foreign investors, many authors have studied the determinants of FDI in China and other developing countries. Liu et al. (1997) found that bilateral trade, cultural differences, and relative changes in market size, wage rates, and exchange rates are important explanatory variables for FDI in China. Chen (1996) shows that the location choice of FDI in China is influenced by the existence of transportation linkages, technological filtering, and the market-share extension potential. Feng and Zhang (1997) conclude that domestic investment in fixed capital, an open trade policy, and an improvement in infrastructure and communication can attract more FDI. Cheng and Kwan (2000) indicate that a large regional market, good infrastructure, and a preferential policy have a positive effect, but the wage cost has a negative effect on FDI. Hsiao and Gastañaga (2001) explain that the disparity of FDI between the coastal and western regions of China was primarily due to the coastal areas having preferential policies, a high level of economic development, better infrastructure, and human resources.

While many economists have paid much attention to the issue of determinants of FDI location, few have shed light on the issue of how severe the inequalities of FDI distribution among regions and industries are. Therefore, the primary purpose of this study is to provide information regarding the trend and level of the unequal geographical and sectoral distribution of FDI using the official regional and industrial data to calculate and decompose the Gini coefficient, which is the most popular

technique to measure inequality. Following Mookherjee and Shorrocks (1982), the Gini coefficient is decomposed by region and by industry to reveal the extent of regional and sectoral inequality of FDI distribution over the period 1985-2002. The data are derived from the *Statistical Yearbook of China* published by the national Bureau of Statistics (NBS).

The rest of the paper is organized as follows. Section II provides a review on FDI policies in the post-reform period. Section III describes the distribution of FDI. Section IV outlines the research methodology. Section V calculates and decomposes the Gini coefficient by region and by industry. Section VI concludes.

## **II. Evolution of FDI policy in post-reform China**

It is essential to understand the development of FDI policy before exploring the issue of unequal distribution. FDI in China was virtually prohibited before 1978. As economic reforms started in 1978, the government decided to use foreign capital and technologies to develop China's export sector and help transform its domestic industries. As a result, foreigners were allowed to make investments in some key export industries from the late 1970s. The benefits of FDI were directly felt in the special economic zones and the open coastal cities in the early 1980s. Consequently, the government allowed the experiments of FDI to be extended to other areas of the country. The process of FDI policies is evolutionary and progressive, starting from a trial-and-error approach to large-scale and whole-brown encouragement. This evolutionary process can be divided into four distinctive periods, coinciding with the evolution of structural and ideological changes in the domestic economy.

### **II.1 First stage of FDI policies (1979-1984)**

The landmark FDI legislation was the "Equity Joint Venture Law" promulgated

by the National People's Congress in 1979.<sup>2</sup> However, the brevity and vagueness of the "Equity Joint Venture Law" made further clarification necessary. In 1983, the State Council issued "Detailed Implementation Act of the Equity Joint Venture Law" which served two purposes: one was to delineate in greater detail the provisions of the 1979 Equity Joint Venture Law; while the other was to summarize the major legal developments concerning income tax and labor management issues of FIEs after 1978 (Huang, 2003).<sup>3</sup>

The first period of FDI policies was featured with the trial-and-error approach. Due to the lack of experiences in attracting foreign capital, the government set up four special economic zones (SEZs), Shengzhen, Zhuhai, Shantou in Guangdong and Xiamen in Fujian in 1980 and opened up another 14 coastal cities in 1984. Hainan was separated from Guangdong in 1988 to become China's largest open area. It was followed by Shanghai Pudong Development Zone in 1989. Obviously, during this initial period, the amount of FDI in China was small and most FDI was located in the SEZs and other open cities and areas in the coastal provinces.

## **II.2 Adjustment stage of FDI policies (1985-1991)**

An important regulatory event in the 1980s was the "Regulations to Encourage Foreign Investment" decreed by the State Council in 1986. The goal of the 1986 Regulations was to move China's FDI regulatory regime from "permitting" to "encouraging" FDI. To this end, the 1986 Regulations separated FIEs into two categories. If FIEs were export-oriented and technologically advanced, they would be qualified for favorable policies and regulatory treatments.<sup>4</sup> Those failing to meet the

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<sup>2</sup> This brief document, containing only 15 articles, was historic in that it signified a reversal of the political stance against economic opening and that it laid down the foundation for the vast body of laws on foreign investments that has emerged since 1979 (Huang, 2003).

<sup>3</sup> It contains 118 articles and was the most detailed economic regulatory document to date.

<sup>4</sup> They were allowed to enjoy various benefits related to tax, credit access, input charge, labor

qualifying criteria continued to enjoy the normal tax benefits and other treatments. Furthermore, the authorities promulgated the “Wholly Foreign-Invested Enterprise

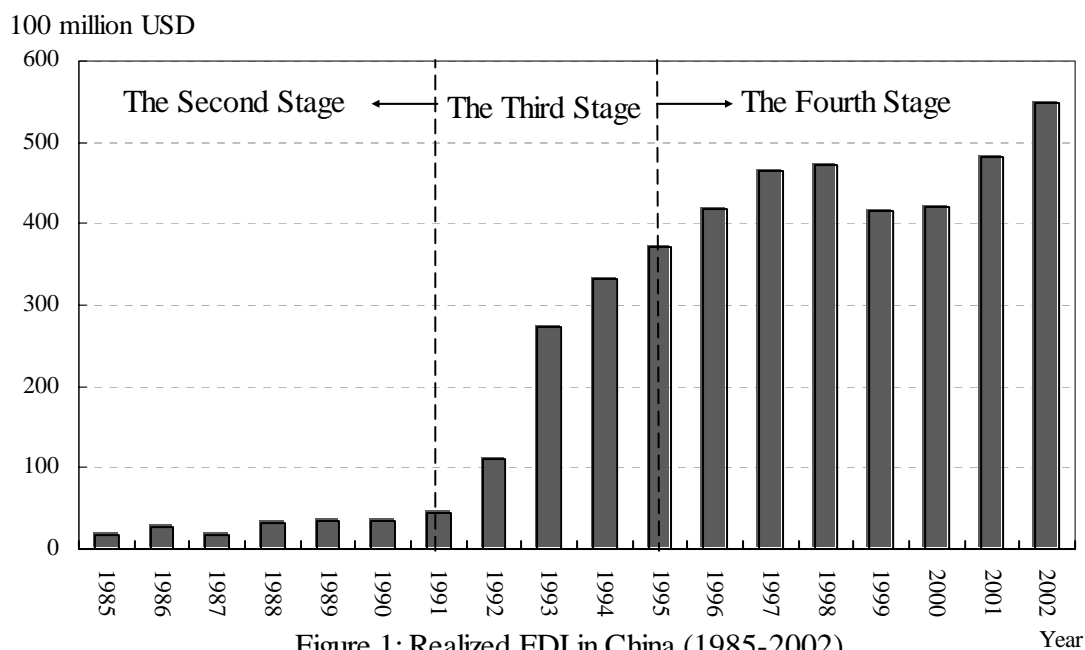


Figure 1: Realized FDI in China (1985-2002)  
 Source: NBS, *China Statistical Yearbook* (1985-2002, various issues).

Law” in 1986 to clarify the legal status of wholly foreign-owned subsidiaries. In 1990, “Amendments to the Equity Joint Venture Law and Wholly Foreign-Invested Enterprise Implementing Rules” was issued, providing a more complete legal structure to facilitate the operations of FIEs.<sup>5</sup> However, as shown in Figure 1, the amount of FDI was still small and less than \$5 billion per year before 1992.

### III.3 Fast development stage of FDI policies (1992-1995)

The famous “South Tour” by Deng Xiaoping in 1992 ushered in a new phase of FDI liberalization, which was facilitated and accompanied by some important legislative and regulatory developments. Deng Xiaoping reaffirmed China’s continued commitment to reforms and policies to open up the economy to the outside world.

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management, export rights, and foreign exchange balance requirement in excess of those treatments as laid out in the policies and regulations prior to the 1986 Regulations.

<sup>5</sup> These laws/rules abolished the stipulation that the chairman of the board of a joint venture should be appointed by Chinese investors and provided for protection from nationalization.

In addition, the Chinese and U.S. governments signed a memorandum of understanding, requiring China to phase out internal trade regulations and onerous import restrictions, such as import quotas and strict sanitary standards. Thanks to the new regulatory policies, FDI inflows entered a stage of high-speed growth after 1992.

China at the same time cancelled the policy of import-substitution and further lowered the tariffs levied on foreign goods. In order to improve the efficiency of utilizing foreign investment, the central government gave more authorization to local governments, allowing them to compete with each other for attracting FDI through providing special treatments, particularly in tax policies and infrastructure. In addition, China unified the two-track exchange rate system and adopted a floating exchange rate system based upon market demand and supply in 1994. This caused a huge currency depreciation of RMB by 46.45% in that year and reduced the opportunity cost of foreigners' investment in China.

Beginning in 1995, the government began to move away from conferring tax benefits on FIEs to an approach that stressed information disclosure and streamlining bureaucratic procedures. In 1995, "Provisional Regulations for Guiding the Direction of Foreign Investment" (subsequently revised in 1997) was issued and classified FDI into four categories: encouraged, permitted, restricted, and prohibited. The regulations aimed to encourage greater geographical dispersion of FDI inflows within China, and to promote FDI inflows into targeted sectors and industries, such as export-oriented and high-tech industries, agriculture, and infrastructure.

#### **II.4 Development of central-western China stage (1996- )**

In order to balance the economic development among regions and areas, the National People's Congress approved "The Ninth Five-Year Plan" in 1996. This plan

aims to fulfill a balanced economic development among 7 economic areas: Greater Bohai Sea, Northeast Area, Changjiang River Delta, Midland Five Provinces, Southeast Coastal Area, Southwest and Southern Area, and Northwest Area based upon their respective advantages and characteristics. The central government had a specific policy to encourage foreign investors to invest in the western areas.

The Asian financial crisis had a significant negative impact on China's FDI inflows. In response to the crisis, the government significantly streamlined the FDI project approval procedures by abolishing in 1998 the requirement that projects in excess of \$30 million be subject to a review by the central government. The most far-reaching FDI liberalization was the decision during 1999-2001 to accede to the terms of the World Trade Organization (WTO). Under the WTO accession terms, China was obligated to general commitments including a non-discriminatory treatment of foreign and domestic enterprises, adherence to WTO rules on intellectual property rights, and the elimination of various requirements on FDI, including foreign exchange and trade balancing, technology transfer, local content, and export performance. China was also obligated to eliminate all import quotas by 2006 and all tariffs on computers, semiconductors, and related products by 2005.<sup>6</sup> Foreign enterprises would be allowed to own up to 50% of FIEs in the telecom and insurance industries. Foreign importers could own domestic distribution channels, and foreign banks would be able to conduct local currency business with Chinese enterprises within 2 years of accession. China became the 143<sup>rd</sup> member of WTO in December 2001. By the end of June 2004, one hundred foreign banks had been allowed to conduct local currency business, and 53 of which were allowed to conduct such business with local enterprises (People's Daily, 2004).

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<sup>6</sup> Tariffs on industrial products are to decline from an average of 24.6% to 9.4%. Tariffs on motor vehicles are to decline from 80-100% to 25% by 2006.



As shown in Figure 1, the decentralization policies and WTO accession enabled China to attract much more FDI in 2001 after two years of stagnation in 1999 and 2000. In 2002, FDI inflows reached a record high of \$54.74 billion, making China the world's largest recipient, surpassing the USA for the first time.

### **III. The distribution of FDI in post-reform China**

Since FDI has been an important driver for China's rapid economic growth, understanding the trend and distribution of FDI among regions and industries is necessary. This is because the uneven distribution of IFD has been closely associated with the uneven regional economic growth and income (Fu, 2004). However, prior to 1985 the *China Statistical Yearbook* provides regional FDI information only for the accumulated amount from 1979 to 1984, not for the inflows of individual years. Furthermore, with respect to the industrial FDI information, the industrial categories are consistent only after 1997.<sup>7</sup> Therefore, this study only discusses the regional distribution of FDI from 1985 to 2002 and the industrial distribution of FDI from 1997 to 2002.

Figure 2 sketches the coefficient of variation (CV) showing the unevenness of FDI distribution among regions and industries.<sup>8</sup> As for spatial distribution, FDI was highly unequally distributed in the first and second stages of development. The result is consistent with the discussion in the previous section as FDI was highly concentrated in the SEZs and other coastal cities and areas. After Deng's Southern Tour, FDI was encouraged to flow into both coastal and inland areas from 1992. As a result, the inequality of FDI distribution was reduced in this period. This trend continued up to the most recent years. However, despite the decline of unevenness

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<sup>7</sup> For example, there were 10 industries in 1996, but 12 industries in 1997.

<sup>8</sup> CV is a measure of how much variation exists in relation to the mean. It is equal to the standard deviation divided by the mean. A higher value implies more variation or inequality..

from the initial stages to the later stages of FDI development, the level of inequality was persistently high, as the value of CV was still as high as 1.68 by 2002.

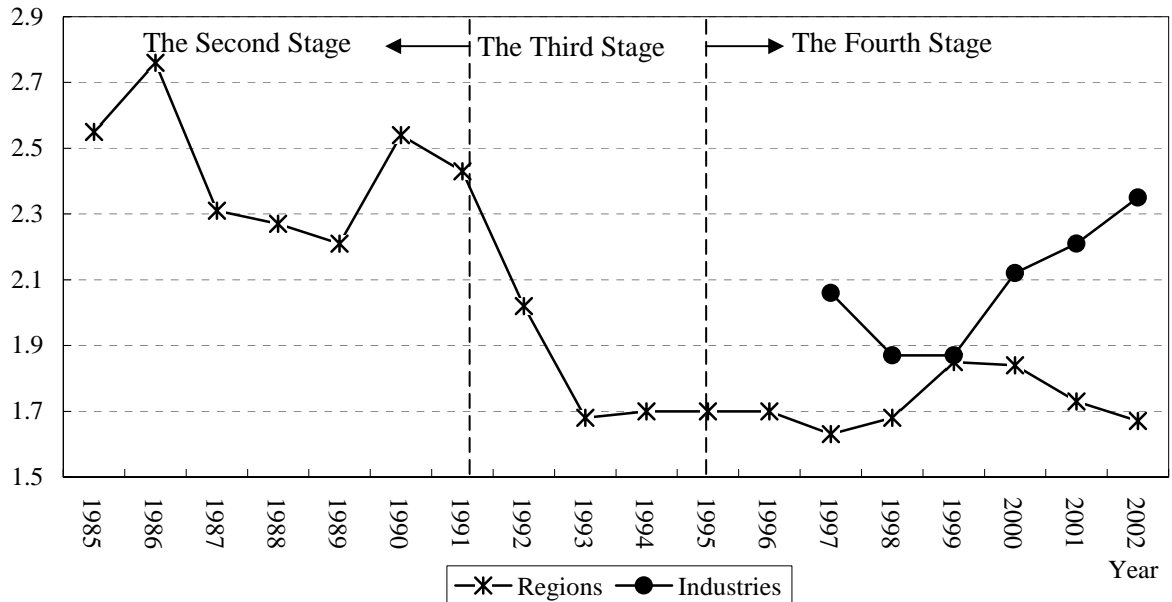


Figure 2: CV of Realized FDI in China (1985-2002)

Source: Same as in Figure 1.

With respect to the industrial distribution of FDI, it is found that during the period 1997-2002 the value of CV first decreased and then increased sharply from 2000. The inequality of industrial FDI distribution in 2002 was much higher than in any other year over the data period.

Table 1 The Geographical distribution of realized FDI (\$10,000)

Area/Region	Second Stage (1985-1991)		Third Stage (1992-1995)		Fourth Stage (1996-2002)	
	Amount	Share (%)	Amount	Share (%)	Amount	Share (%)
Greater Bohai Sea	346,164	16.81	1,684,853	15.48	5,679,748	17.64
Beijing	173,213	8.41	346,835	3.19	1,246,551	3.87
Tianjin	59,382	2.88	325,738	2.99	1,342,312	4.17
Hebei	20,379	0.99	157,971	1.45	655,138	2.03
Shanxi	3,340	0.16	23,580	0.22	171,310	0.53
Inner Mongolia	4,047	0.20	18,834	0.17	69,021	0.21
Shandong	85,803	4.17	811,895	7.46	2,195,416	6.82
Northeast Area	140,054	6.80	682,979	6.28	2,117,148	6.58
Liaoning	105,657	5.13	466,030	4.28	1,554,440	4.83
Jilin	11,210	0.54	100,055	0.92	248,354	0.77
Heilongjiang	23,187	1.13	116,894	1.07	314,354	0.98
Changjiang River Delta	273,440	13.27	2,595,448	23.85	8,577,625	26.64
Shanghai	157,904	7.67	901,956	8.29	2,639,471	8.20
Jiangsu	78,866	3.83	1,326,092	12.19	4,688,447	14.56
Zhejiang	36,670	1.78	367,400	3.38	1,249,707	3.88
Midland Five Provinces	72,106	3.50	662,634	6.09	2,275,415	7.07
Anhui	12,041	0.58	116,486	1.07	251,802	0.78
Jiangxi	7,278	0.35	85,845	0.79	327,301	1.02
Henan	19,544	0.95	122,335	1.12	377,944	1.17
Hubei	19,437	0.94	197,064	1.81	766,080	2.38
Hunan	13,806	0.67	140,904	1.29	552,288	1.72
Southeast Coastal	1,064,581	51.68	4,303,557	39.53	11,780,003	36.58
Fujian	167,650	8.14	1,205,516	11.08	2,770,611	8.60
Guangdong	896,931	43.54	3,098,041	28.47	9,009,392	27.98
Southwest and Southern	112,115	5.44	833,407	7.66	1,436,760	4.46
Guangxi	27,157	1.32	257,553	2.37	439,925	1.37
Hainan	49,215	2.39	313,981	2.89	410,593	1.28
Sichuan	24,575	1.19	214,688	1.97	476,857	1.48
Guizhou	7,090	0.34	18,339	0.17	25,891	0.08
Yunnan	4,078	0.20	28,846	0.27	83,494	0.26
Northwest Area	51,365	2.49	119,427	1.10	332,858	1.03
Tibet	3.00	0.00	0.00	0.00	0.00	0.00
Shaanxi	44,122	2.14	84,270	0.77	249,653	0.78
Gansu	1,153	0.06	16,398	0.15	40,909	0.13
Qinghai	285	0.01	797	0.01	9,181	0.03
Ningxia	111	0.01	2,342	0.02	13,837	0.04
Xinjiang	5,691	0.28	15,620	0.14	19,278	0.06
Total	2,059,825	100.00	10,882,305	100.00	32,199,557	100.00

Sources: Same as in Figure 1.

Note: Since 1997, Chongqing has been separated from Sichuan and designated as a special municipality. However, in order to make the number of observations consistent before and after 1997, the information of Sichuan includes that of Chongqing during the whole research period.

In order to further understand the distribution of FDI among regions, the share and

realized amount of each region's FDI in each stage are presented in Table 1. The Southeast Coastal Area (Guangdong and Fujian) was the most popular region for FDI in all three stages, particularly in the second stage when they accounted for over one half of the national total inflow. The importance of the Southeast Coastal Area declined in the third and fourth stages. In the last stage (1996-2002), its FDI share declined to 36.58%. By contrast, the Chiangjiang River Delta emerged to become the second largest region in terms of FDI inflows. Its FDI share doubled from 13.27% to 26.64% from the second stage to the last stage of development. Another favorable region of FDI is the Greater Bohai Sea Area. It contributed more than 15% to China's FDI in all three stages. It is worth noting that FDI in the Northwest Area has increased by 136% from the third stage to the fourth stage when China adopted "The Plan of Great Development of Western Area". However, the share of FDI invested in the Northwest Area has shown a downward trend. It was only 2.49% in the second stage, falling to 1.10% in the third stage, and further to 1.03% in the fourth stage.

As for FDI among 30 provinces and municipalities, it is found that the geographical distribution of realized FDI is amazingly concentrated. Even after the government encouraged investors to invest in the western areas during the latest stage of development, their FDI share continued to decline. Guangdong is the most popular host for FDI among all provinces and metropolitan cities. Its share in the total national FDI inflows was 43.54% in the second stage, although it declined to around 28% in the third and fourth stages.<sup>9</sup> The second most favorable province for foreign investors is Jiangsu, which is followed by Fujian. Other coastal regions, such as

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<sup>9</sup> Liu *et al.* (1997) indicated that this is jointly due to three natural advantages: Guangdong's geographic location is near Hong Kong and Macao; Guangdong's history and ethnicity connect closely with overseas Chinese; and Guangdong's government is experienced in dealing with the outside world and has conducted four direct efforts, including for example, an entrepreneurial government, infrastructure development, development planning and industrial specialization, and the transformation of its economic structure.

Shanghai, Shandong, Tianjin, Liaoning, Beijing, and Zhejiang have become attractive locations for foreign investors. The other regions have shared very little of the spoils from FDI inflow throughout the three stages.<sup>10</sup> Out of China's 30 provinces, 13 shares less than 1% each of the country's total investment. At the most extreme, the combined share of Tibet, Qinghai, Guizhou, Ningxia, Xinjiang and Yunnan was less than 1%.

Regarding the industrial distribution of FDI, this study follows the *China Statistical Yearbook* to categorize 12 industries into three main sectors, namely, primary sector (agriculture), the secondary sector (industry), and the tertiary sector (services). The sectoral distribution of FDI is presented in Table 2. It is obvious that FDI's sectoral distribution is also highly unequal. Over 70% of FDI were concentrated in the industrial sector, followed by the services sector. Although agriculture accounted for 15-20% of the gross domestic product (GDP) over the data period, it received only 1.68% of FDI. Among 12 industries, the largest portion of FDI went to manufacturing, which took up almost 63% of total realized FDI during 1997-2002. The second favorable industry for foreign investors is real estate management making up 12.02% of the total FDI. In addition, social services received 5.61% of the total FDI during the same period.

According to the above description of spatial and industrial distribution of FDI, there are several features that can be summarized. First, the unequal distribution of FDI among regions shows a downward trend during 1985-2002 based the values of CV.

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<sup>10</sup> More detailed contents are discussed in Huang (2004).

Table 2 Sectoral distribution of realized FDI (\$10,000)

Industry	The Fourth Stage (1997-2002)		
	Amount	Share (%)	Annual Growth Rate (%)
The Primary Sector	456,384	1.68	1.10
Farming, Forestry, Animal Husbandry, and Fishery	456,384	1.68	1.10
The Secondary Industry	19,551,501	72.04	1.04
Mining and Quarrying	405,092	1.49	0.91
Manufacturing	16,985,717	62.59	1.06
Electric Power, Gas, and Water Production and Supply	1,476,740	5.44	0.92
Construction	683,952	2.52	0.87
The Tertiary Sector	7,129,491	26.27	1.00
Transportation, Storage, Postal, Telecommunications	768,564	2.83	0.89
Wholesale & Retail Trade and Catering Services	650,771	2.40	0.92
Real Estate Management	3,262,421	12.02	1.02
Social Services	1,522,555	5.61	1.08
Health Care, Sports, and Social Welfare	79,287	0.29	0.92
Education, Culture and Arts, Radio, Film and Television	33,126	0.12	0.87
Other Sectors	812,767	3.00	1.01
Total	27,137,376	100.00	1.03

Sources: Same as in Figure 1.

Secondly, focusing on the fourth stage, there was quite a different scenario between the unequal distribution of FDI among regions and that among industries. The former was mitigated significantly from 2000, but the latter was aggravated. Lastly, the geographical and industrial distributions of realized FDI are both highly concentrated in a few regions or industries.

#### IV. Further measurement of inequality and decomposition

The Gini coefficient is the most popular technique to measure the inequality of family income (e.g. Tsaur, 1996; Tsui, 1996; Yang, 1999),<sup>11</sup> and is the most common

<sup>11</sup> The other techniques include the Generalized Entropy method, the coefficient of variation, and the maximum-minimum ratio. Although the Generalized Entropy method is also popular for conducting a similar issue, it is unable to be calculated in this study, because some regions, such as Tibet, have zero

indicator to measure income distribution.<sup>12</sup> Recently, this technique has been adopted to analyze some issues beyond family income distribution (e.g. Huang et al., 2003). This study applies the same technique to measure the inequality of FDI distribution among China's regions and industries. The value of the Gini coefficient ranges from 0 to 1. If this value is equal to 0, it implies a situation of perfect equal distribution; and if it is equal to 1, it implies perfect inequality. That is to say, the higher the value of the Gini coefficient, the more serious the inequality will be.

Most studies examine inequality by calculating the *L*-Gini coefficient. This study decomposes the aggregate value of the Gini coefficient, *G*, based upon Yang (1999). Thus, the aggregate value of the Gini coefficient can be calculated by the following:

$$G = \frac{\left(\frac{1}{2n^2}\right) \sum_i \sum_{j \neq i} |y_i - y_j|}{\mu}, \quad (1)$$

where  $y_i$  denotes the nominal realized FDI of the  $i$ th region or industry;  $n$  is the number of regions or industries which are 30 and 12, respectively;  $\mu$  is the average realized FDI of all regions or industries; and  $\mu = \frac{1}{n} \sum_{i=1}^n y_i$ .

In their discussion of the regional inequality of consumption in India, Bhattacharya and Mahalanobis (1967) calculate statistical measures by decomposing the Gini coefficient into the between-group and within-group effects. Paglin (1975) further identified the between-group effect by *P*-Gini and asserted that *P*-Gini, in fact, represented the inequality in family income. Comments with respect to *P*-Gini and the *P*-Curve have been numerous, and some have even recently supported the argument

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FDI in the research period.

<sup>12</sup> The original definition of the Gini coefficient can be seen in many textbooks discussing income distribution, such as Kakwani (1980). However, GINI has its shortcoming, such as Mookherjee and Shorrocks (1982) demonstrating that an increase in subgroup inequality is expected to increase overall GINI, but the reverse result could happen.

that  $P$ -Gini is so affected by the arbitrary choice of the age grouping that it makes one question the validity of the age-related measure (Formby et al., 1989). However, “most pointedly”, Paglin (1989) said, “with a sufficiently narrow age partition, the  $P$ -curve can always be driven to the  $L$ -curve”.

Bearing in mind that the main purpose of this study is to examine the inequality of regional and industrial FDI distribution, it is necessary to clearly understand the regional and industrial inequalities of FDI distribution and to identify their main sources. To do so, separating the Gini coefficient on the basis of between-group and within-group effects to extract information pertaining to disparities is not just necessary, but also meaningful. Following the method introduced by Mookherjee and Shorrocks (1982), if  $N_k$  represents the subset of regions or industries in group  $k$ , and this group numbers  $n_k$  with mean  $\mu_k$ , then the aggregate value of the Gini coefficient measured by Equation (1) can be presented as follows:

$$G = \frac{1}{2n^2\mu} \sum_k \left( \sum_{i \in N_k} \sum_{j \in N_k} |y_i - y_j| + \sum_{i \in N_k} \sum_{j \notin N_k} |y_i - y_j| \right). \quad (2)$$

Furthermore, equation (2) can be rewritten as follows:

$$G = \sum_k \left( \frac{n_k}{n} \right)^2 \frac{\mu_k}{\mu} G^k + \frac{1}{2n^2\mu} \sum_k \sum_{i \in N_k} \sum_{j \notin N_k} |y_i - y_j|, \quad (3)$$

where  $G^k$  denotes the Gini value for the  $k$ th group alone. If regions and industries in any group  $k$  do not overlap with those of any other group  $h$ , then it can be found that

$$\sum_{i \in N_k} \sum_{j \in N_h} |y_i - y_j| = n_k n_h |\mu_k - \mu_h|, \quad k \neq h, \quad (4)$$

and Equation (3) can be further decomposed as follows:

$$G = \sum_k v_k^2 \lambda_k G^k + \frac{1}{2} \sum_k \sum_h v_k v_h |\lambda_k - \lambda_h|. \quad (5)$$

The first and second parts of the right-hand side of equation (5) are the within-group



and between-group effects in order. Terms  $v_k$  and  $v_h$  denote the proportion of regions or industries belonging to groups  $k$  and  $h$ , respectively. That is to say,  $v_k = n_k/n$  and  $v_h = n_h/n$ . Terms  $\lambda_k$  and  $\lambda_h$  are the ratios of the average realized FDI in groups  $k$  and  $h$ ,  $\mu_k$  and  $\mu_h$ , to the average realized FDI of all regions or industries  $\mu$ , respectively. In other words,  $\lambda_k = \mu_k / \mu$  and  $\lambda_h = \mu_h / \mu$ .

## **V. Decomposition analysis on unequal distribution of FDI**

Regional FDI data from 1985 to 2002 and industrial FDI data from 1997 to 2002 are used to calculate the Gini coefficient and decomposed into the between and within group components based on the formulae presented in the previous section.

### **V.1 Inequality of FDI distribution among regions and its components**

The Gini coefficients for both regional and industrial distributions of China's FDI are calculated based on equation (1) and drawn in Figure 3. It is found that the Gini coefficient of regional FDI distribution ranges from 0.65 to 0.77, which is

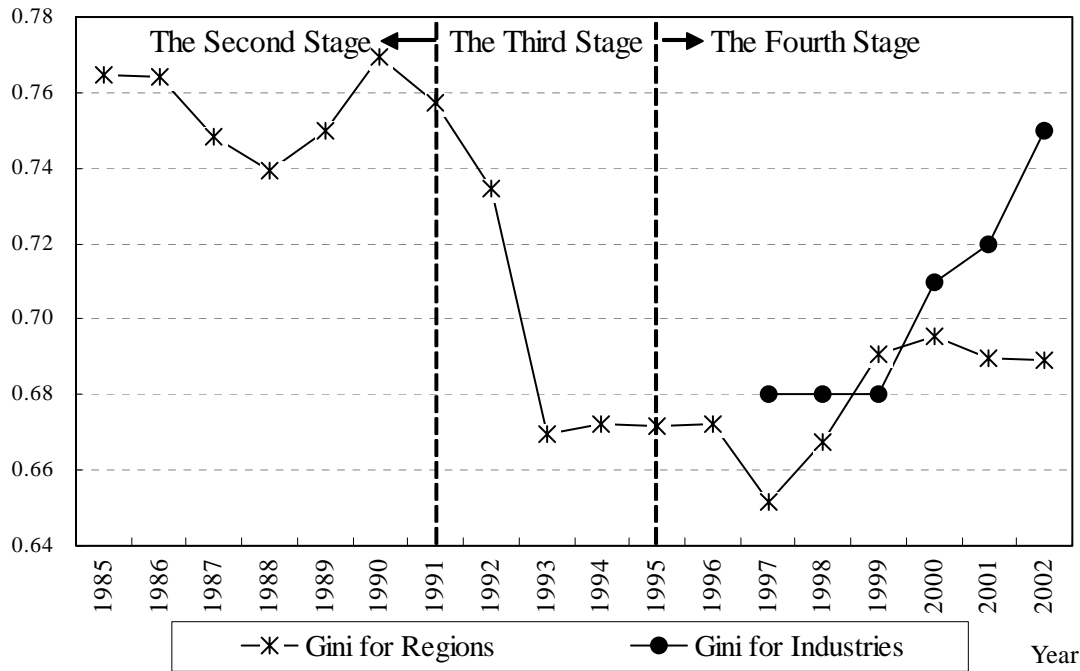


Figure3: Gini coefficient of FDI distribution among regions & industries

close to 1, implying that the inequality of FDI distribution among regions was serious during the data period. Even if 13 provinces with a share of FDI less than 1% were excluded, the pattern of this Gini coefficient would be still the same as that with all provinces, but would move down parallel.

By dividing the period 1985-2002 into three sub-periods, 1985-1991 (the second stage), 1992-1995 (the third stage), and 1996-2002 (the fourth stage), Figure 3 illustrates that the Gini coefficient in the second stage is higher than in the other two stages. That is to say, the unequal distribution of FDI among regions is more severe during 1985-1991 than during the rest of the data period. Over the four periods of FDI development, the Gini coefficient shows a U-shape; that is, it decreased from the second to the third period, but rose in the fourth period.

The unequal distribution of FDI was mitigated significantly during 1992-1995, particularly as the Gini coefficient dropped from 0.73 in 1992 to 0.67 in 1993. Deng

Xiaoping's South Tour and the reaffirmation of China's continued commitment to reforms and policies to open up the economy to the outside world indeed contributed to the sharp decline in the Gini coefficient in 1993. Under this "opening-up" atmosphere and relaxation of central government control, all provinces and municipalities aggressively provided preferential policies, such as tax concessions and special privileges, to attract FDI.<sup>13</sup> Since all regions competed mutually to attract FDI, the geographic distribution of FDI was not as unequal as it was in the second stage of development.

Under the proposal of "balancing the economic development among regions and areas" (later on called "The Plan of Great Development of Western Area") proposed in 1996, some provinces in the central-western areas were chosen to receive favorable incentives to improve their investment environment and reduce regional differentiation between them and the coastal areas. This anticipation of China's effort to balance the economic development among regions might help push the coefficient to decrease further to 0.65, the lowest during the data period. After 1997, however, there were some problems of economic development which might make foreign investors become more deliberate as they chose the location of investment. Therefore, the Gini coefficient showed a sharp upturn from 1997 to 2000, although it declined slightly in the subsequent two years after China's WTO accession in 2001.

The U-shape pattern of the Gini coefficient implies that the encouragement of investment in the western region from the late 1990s actually failed to stop the rising inequality of FDI distribution. One possible reason for this phenomenon is probably due to the delayed effect of the policy of establishing four SEZs and opening up 14

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<sup>13</sup> Tax incentives for FIEs are mostly in the form of reduced enterprise income tax rates and tax holidays.

other coastal cities, Hainan and Shanghai Pudong Development Area in the initial period of FDI development, when it created a permanent advantage to the coastal provinces over the rest of the country in terms of FDI inflow. Another reason is probably due to the fact that the inland areas are still not well developed and have not yet become as attractive as the coastal areas to foreign investors. This finding has important policy implications on regional development policy, which still has a long way to make the western and other inland areas become popular locations of foreign capital.

Regarding the sources of inequality, this study applies equation (5) to decompose the Gini coefficient into between- and within-group effects that are shown in Table 3. The between-group effect accounts for up to 90% of the Gini coefficient measuring regional inequality. It implies that the inequality of FDI's geographical distribution is primarily due to the difference among 7 economic areas, and only a small proportion is due to the difference among provinces within any specific economic area. According to Table 1, it is obvious that the Southeast Coastal Area, Changjiang River Delta Area, and Greater Bohai Sea Area make up more than 80% of China's FDI. However, FDI in the Northwest Area accounts for a tiny proportion of the country's total amount.

Table 3 Unequal distribution of realized FDI among regions

Stage	Year	Gini Coefficient			Gini ( 17 regions )
			Between-Group (%)	Within-Group (%)	
The Second Stage	1985	0.76	89.12	10.88	0.65
	1986	0.76	86.07	13.93	0.72
	1987	0.75	80.49	19.51	0.66
	1988	0.74	76.88	23.12	0.66
	1989	0.75	84.35	15.65	0.65
	1990	0.77	85.92	14.08	0.67
	1991	0.76	86.27	13.73	0.63
The Third Stage	1992	0.73	86.42	13.58	0.60
	1993	0.67	87.01	12.99	0.52
	1994	0.67	86.96	13.04	0.51
	1995	0.67	88.22	11.78	0.53
The Fourth Stage	1996	0.67	90.03	9.97	0.53
	1997	0.65	88.59	11.41	0.50
	1998	0.67	88.60	11.40	0.50
	1999	0.69	91.00	9.00	0.55
	2000	0.70	89.15	10.85	0.55
	2001	0.69	88.92	11.08	0.54
	2002	0.69	87.00	13.00	0.53

Sources: Same as in Figure 1.

Notes: 1. This study categorizes 30 regions into 7 areas according to the *China Statistical Yearbook*: the Northeast Area includes Liaoning, Jilin, and Heilongjiang. The Northwest Area includes Shanxi, Gansu, Qinghai, Ningxia and Xinjiang. The Greater Bohai Sea Area includes Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, and Shandong. The Midland Five Provinces Area includes Anhui, Jiangxi, Henan, Hubei, and Hunan. The Southwest and Southern Area includes Guangxi, Hainan, Sichuan, Chongqing, Guizhou, and Yunnan. The Southeast Coastal Area includes Fujian and Guangdong. The Changjiang River Delta Area includes Shanghai, Jiangsu, and Zhejiang.

2. The figures shown in the columns of between-group and within-group are the contributions of the between-group Gini coefficients and the within-group Gini coefficients to the overall Gini coefficients.
3. After excluding some regions with less than 1% of the nation's total FDI during 1992-2002 calculated according to Table 1, the remaining 17 regions include: Beijing, Tianjin, Hebei, Shandong, Liaoning, Shanghai, Jiangsu, Zhejiang, Jiangxi, Henan, Hubei, Hunan, Fujian, Guangdong, Guangxi, Hainan, and Sichuan.

## V.2 Unequal distribution of FDI among industries

With regard to the sectoral distribution of FDI, the Gini coefficients are sketched

in Figure 3 and shown in Table 4 for the period 1997-2002 (part of the fourth stage of FDI development). The value ranges from 0.68 to 0.75, implying that, like the geographical distribution, the sectoral distribution of FDI was highly unequal.

The Gini coefficient was almost constant during 1997-1999, but rose sharply from 2000. This was probably due to the fact that China was going to join the WTO in 2001. With WTO obligations, foreign investors would be subject to less restrictive regulations on the choice of location or industry for their investments.

As discussed in section II, the “Provisional Regulations for Guiding the Direction of Foreign Investment” was initially issued in 1995 and subsequently revised in 1997. The regulations classified FDI into four categories - encouraged, permitted, restricted, and prohibited - and promoted FDI inflows into targeted sectors and industries, such as export-oriented and high-tech industries, agriculture, and infrastructure.

Under the consideration of the regulations, foreign investors undoubtedly were more likely to invest in some specific industries, such as manufacturing, real estate management, and social services for the sake of enjoying special treatments and quick returns. By contrast, investments in agriculture and infrastructure continued to suffer despite an apparent policy of encouragement on foreigners to invest in these sectors. The lack of investment incentives in agriculture and infrastructure is understandable, as the returns to such investments are long term and less certain than those in the manufacturing industry and real estates. As a result, the government should not just rely on foreign investors to invest in agriculture and infrastructure, it should rely more on public and domestic investors to remove the infrastructure bottleneck and to stimulate agricultural growth.

The 12 industries are also aggregated into 3 sectors. Equation (5) is used to explore the primary sources of the Gini coefficient for unequal FDI distribution among industries. Table 4 illustrates that the between-group effect occupies more than half of the Gini coefficient in all the data period. It implies that the inequality of FDI sectoral distribution is mainly due to the difference among the 3 aggregate industrial sectors. However, unlike the conclusion drawn from the geographical distribution, the difference between the shares of the between- and within-group effects is small.

Table 4 Unequal distribution of realized FDI among industries

Year	Gini Coefficient		
		Between-Group (%)	Within-Group (%)
1997	0.68	58.85	41.15
1998	0.68	54.92	45.08
1999	0.68	54.21	45.79
2000	0.71	57.14	42.86
2001	0.72	57.90	42.10
2002	0.75	56.13	43.87

Sources: Same as in Figure 1.

Notes: 1. This study categorizes 12 industries into 3 groups according to the *China Statistical Yearbook*: the Primary Industries include Farming, Forestry, Animal Husbandry, and Fishery. The Secondary Industries include Mining and Quarrying, Manufacturing, Electric Power, Gas and Water Production and Supply, and Construction. The Tertiary Industries include Transportation, Storage, Postal and Telecommunications Services, Wholesale & Retail Trade and Catering Services, Real Estate Management, Social Services, Health Care, Sports and Social Welfare, Education, Culture and Arts, Radio, Film and Television, and Other Sectors.

2. The figures shown in the columns of between-group and within-group are the contributions of between-group and within-group effects on the overall Gini coefficients.

This could be explained by the characteristics of industries within any specific group being quite different. Therefore, the within-group effect also took up 41%-46% of the overall Gini values.

## VI. Conclusions

This paper studies the uneven distribution of FDI among China's regions and industries. It briefly reviews the evolutionary process of FDI development in China,

and then analyses the CV, the Gini coefficient and its decomposition using data for the period 1985-2002.

The analysis on regional distribution of FDI reveals that FDI was highly concentrated in a few regions throughout the data period. The high spatial concentration in the first two periods of development (1978 to 1991) was because FDI was in the experimental stages when foreign investors were only allowed to invest in the SEZs and the coastal open cities. Deng's Southern Tour encouraged FDI to be spread from the SEZs and open cities to all parts of China from 1992. As a result, the third period of development (1992-1995) saw a decline of unevenness of FDI distribution across the regions. During the last period of develop (from 1996 onwards), the central government provides special incentives for foreign investors to invest in the western regions. However, the policies have failed to stop the trend of uneven distribution of FDI. By 2002, FDI was still heavily concentrated in a few coastal provinces. There was significant redistribution from Guangdong and Fujian to the Changjiang River Delta, but there was little redistribution from the coastal to the inland areas.

This paper has the following main findings. First, over 80% of the total FDI is still concentrated in the coastal areas. All the western provinces received less than 1% each of the total national FDI and the combined share of 6 poorest provinces in China is less than 1%. By sharp contrast, the two largest receiving provinces (Guangdong and Jiangsu) account for over 40%. Second, empirical observations and many existing studies show that those regions with larger inflows of FDI tend to grow faster and hence are more prosperous than those with a smaller amount of FDI. Third, the largest receiving provinces are geographically close to each other and clustered along the coastal regions. The smallest receiving provinces are also close to each other and



clustered in the western part of the country. Fourth, the disparity between the coastal and inland areas in terms of FDI distribution continued to widen even after the central government had given greater incentives and autonomy to the western areas. Fifth, in terms of sectoral distribution, about three-quarters of FDI have been concentrated in the industrial sector, and less than 2% in the agricultural sector. The degree of concentration increased over the period 1997-2002.

The above findings may lead to some important challenges on government policies for regional economic development. The first policy issue is whether FDI has contributed to the rising income inequality among the Chinese regions, and between the rural and urban populations. If FDI has indeed led to a rising inequality of income and growth, as some authors have proved so, then what should the government do? Should China start to reduce FDI, or should it try to help channel a much bigger share of FDI into the poor inland areas, and to agriculture? Obviously, the central government has tried the second alternative since 1996 after the State Council set up its Western Development Office. However, the results in this paper show that the special policies given to the western areas have failed to stop the widening gap between them and their coastal counterparts. Empirical evidence shows that the gap in the latest years of the data period has actually increased even further.

This leads to the second important policy issue. That is, what can the government do to reduce the spatial and sectoral gaps of FDI? If past and existing policies have failed, what should be the new policy instruments to be adopted? This issue becomes more difficult and challenging to be resolved because China is now a formal WTO member. There is a limitation as to how the central government can affect investment decision of foreign investors. Apart from some tax concession, there is little that the government can do to help stimulate investments in the western areas and in

agriculture. After joining WTO, over 100 foreign banks and insurance companies set up their subsidiaries in the large coastal cities, but few have done so in the poor western areas. It is also less likely for foreign financial institutions to provide services in the rural and agricultural sector than in the urban industries and services. This will create even more inequality of access to foreign capital between the coastal and inland areas, and between the non-agricultural and agricultural sectors.

One fundamental problem for the lack of investment in the western areas and agriculture is probably due to less investment opportunities and lower returns to capital in these regions and agriculture than in the coastal regions and industry. In other words, the open policies and incentives offered to the SEZs and open coastal cities in the initial stage of FDI development may have created a permanent disadvantage to the western areas. In order to overcome this disadvantage, existing policies on western area development may have to be resigned. For instance, apart from tax concession and more autonomy to the local governments, the central government should consider giving more priority to human capital development in the western areas. Special policies should be given to retain and recruit well qualified engineers and scientists, to provide better education and healthcare, and to improve the natural environment, transportation and other infrastructure. In addition, investments in agriculture should not rely too much on foreign capital as agricultural projects tend to be of long term and less certain on their returns to capital. Large agricultural projects should be supported by local and central governments, especially in research, marketing and extension services. In other words, FDI should not be entirely used as a substitution of domestic investments, it should be treated as a complement to domestic investments if the government wants to reduce inter-regional income inequality and rural-urban income divide.

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