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CHUNG-HUA INSTITUTION FOR ECONOMIC RESEARCH

THE IMPACT OF MAINLAND CHINA'S  
OPEN DOOR POLICY ON REGIONAL  
INDUSTRIAL DEVELOPMENT

SZE-YUEH WANG  
LEE-IN CHEN CHIU

*DISCUSSION PAPER SERIES No. 9605*

November 1996



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**The Impact of Mainland China's  
Open Door Policy on  
Regional Industrial Development**

by

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THE UNIVERSITY OF CHICAGO

PHILOSOPHY DEPARTMENT

PHILOSOPHY 101

LECTURE NOTES

PLATO'S THEORY OF FORMS

LECTURE 1

THE DIVISION OF LABOR

PLATO

THE REPUBLIC

BOOK I

THE DIVISION OF LABOR

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Sze-Yueh Wang & Lee-in Chen Chiu\*

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# **The Impact of Mainland China's Open Door Policy on Regional Industrial Development\*\***

## **I. Introduction**

Mainland China first adopted its so-called open door policy in 1978, and started to emphasize the role of foreign trade in promoting economic growth. Ever since the establishment of four special economic zones (SEZs) in 1980 to introduce foreign investment to enhance industrial development, the provinces and cities along the coast have been booming. With this success of the open door policy in coastal regions, the problem of "imbalanced development" between coastal and inland regions is becoming more serious every day. Inland provinces and cities are also asking for the same preferential policies for exports and foreign capital which the coastal regions now have. In response, the eighth five-year plan (1991-1995) has made a big shift in

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mainland China's regional industrial development policy from "location-oriented preferential treatment" to "industrial-oriented preferential treatment" (Chiu et al. 1991:3-24). Therefore, in order to develop regional industries, export expansion and foreign capital introduction have been adopted as the major means not only by coastal provinces and cities, but has also become a nationwide development strategy in the 1990s. Is there a causal relationship between this gradual opening of different regions to foreign traders and investors, and regional industrial development? If there is, are there any differences in this relationship between the 1980s and the 1990s? These are the questions that motivate our study.

The contents of the paper are as follows: In Section II, we briefly review mainland China's open door policy and accompanying economic reform measures since 1979. These include: the setting up of SEZs, the opening of 14 coastal cities and the establishment of economic and technological development zones, the reform of the foreign trade system, tax exemptions for foreign investment, among other topics. In Section III, we provide an overview of the data and the relationship between foreign direct investment, exports, and regional industrial development. In Section IV, we review existing studies on the subject of whether exports and foreign direct investment have some impact on regional industrial development, and if so, how. Section 5 presents our methodology and empirical results. The last section contains our concluding remarks.

## **II. A Brief Review of the "Open Door Policy"**

Mainland Chinese authorities have adopted a series of economic reforms since 1979. The open door policy is a key element. Over the past sixteen years, the Chinese government has gradually taken some measures, such as foreign trade system reform, introduction of foreign investment and technology, encouragement of exports, construction of SEZs, increasing the number of

open coastal cities, and foreign exchange system reform, in order to substantiate its open door policy.

We shall list the key points and briefly outline the progress of these measures which are relevant to our studies as follows:

### ***1. The Establishment of the SEZs and the Opening of Coastal Cities and the Establishment of Economic and Technological Development Zones***

In 1979, the communist authorities decided to set up SEZs in Guangdong's Shenzhen, Zhuhai and Shantou and Fujian's Xiamen as an experiment. It uses a strategy of importing materials and processing them to develop export-processing industries, to increase employment, promote industrial development and further economic development. In 1988, Hainan Province was separated from Guangdong Province and became a SEZ. It is now the largest SEZ.

After setting up SEZs, the authorities opened up 14 coastal cities to foreign investment in 1984<sup>1</sup>. Afterwards, twelve of them (excluding Zhanjiang and Beihai) were permitted to set up economic and technological development zones. By the end of 1993, 19 such zones were established. The purpose is to use the existing advantages of these cities to create a better environment to attract foreign investors and speed up the improvement of mainland China's technology and management skill. The zone plan also emphasizes the introduction of new and advanced technologies to hasten industrial upgrading.

In 1992, besides the opening of coastal cities, the open door policy for coastal cities, especially the preferential tax rate for foreign direct investment, was further implemented along the border and the Yangtze River cities. Hence the open door policy was applied gradually from the coastal region to the inland region. This process is summarized in Diagram 1.

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<sup>1</sup> The fourteen open coastal cities are: Dalian, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai.

- 1979 *The decision to set up Special Economic Zones was made*
- 1980 *The gradual establishment of four Special Economic Zones (located in Guangdong and Fujian Provinces)*
- 1984 *The opening of fourteen coastal cities to foreign investment*
- 1984 *The establishment of economic and technological development zones in coastal cities*
- 1988 *Hainan became a province and the 5th Special Economic Zone*
- 1992 *Open door policy for coastal cities<sup>2</sup> was further implemented along the border (which includes cities in Heilongjiang, Jilin, Inner Mongolia, Xinjiang, Guangxi and Yunnan Provinces), and along the Yangtze River (cities of Chongqing, Yueyang, Wuhan, Jiujiang, Wuhu), and also inland provincial capitals such as, Taiyuan, Hefei, Nanchang, Zhengzhou, Changsha, Chengdu, Guiyang, Xian, Lanzhou, Xining, Yongchun.*

Source: Collected and organized by the authors.

**Diagram 1. Illustration of Chronological and Geographic Order of Mainland China's Open Door Policy**

## ***2. Reform of the Foreign Trade System***

This is the most influential measure of mainland China's open door policy, and the one which has experienced the most changes. We can only name a few of the most important. Those policy measures that are not so relevant to the subject are given as notes, e.g. reform of the foreign exchange system<sup>3</sup>, the

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<sup>2</sup> The preferential tax rate and other measures that were applied in cities along the border are slightly different from those in the fourteen coastal cities.

<sup>3</sup> Since the adoption of the open door policy, the PRC government's control over foreign exchange has not been relaxed much. This is because rapid economic growth requires great amounts of capital, and the foreign debt of mainland China has been increasing year by year on the one hand and the current account was in the red in the early stages of reform on

strengthening of tariff and nontariff controls and the gradual opening of the import market<sup>4</sup>.

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the other. Hence the foreign exchange policy is conservative and the authorities cannot relax their grip on foreign exchange controls. Furthermore, the renminbi (RMB) was externally overvalued for a long period of time. In order to promote exports, they adopted a "dual exchange rate system." A higher rate was applied to exports, and imports were given a lower official rate. Exports were thus given an exchange rate subsidy to improve their competitiveness. There was also a "retention system" under which enterprises could retain a given percentage of their foreign exchange earnings and get favorable rates so as to subsidize exports.

Once mainland China was opened to foreign business and tourism, the government issued "foreign exchange certificates" (FECs) for the sake of discriminatory pricing. Foreigners, overseas Chinese, and Taiwanese were required to use them. Nominally the value of the certificates was equal to that of RMB, but since some commodities could be bought only with certificates, their value was higher than RMB, hence there was the peculiar phenomenon of "one country, two currencies" (RMB and FEC). However, the foreign exchange certificate was abolished at the end of 1993, but could still be used until the end of 1994. To meet the need of foreign investors to balance their foreign exchange, foreign exchange swap centers were set up in major cities in 1980 so that foreign trade companies could trade their foreign exchange surplus with foreign investors. Therefore, the exchange rate of the RMB possessed the even more special scenario of "one currency, three prices" (official rate, swap rate, and black market rate). On January 1, 1994, the Chinese authorities initiated foreign exchange system reform and the RMB was depreciated from 5.8 RMB to US\$1 to 8.7 RMB to US\$1 (about 50%), to a level which was approximately the same as the swap rate. Hence the three prices were unified. After the reform, the export subsidies available via the dual exchange rate and the retention system were automatically terminated. But since the degree of depreciation was very large, exports benefited substantially.

<sup>4</sup> In order to compensate for the relaxation of restrictions on imports or exports, the mainland Chinese government has strengthened tariff and nontariff means to control trade, such as import (or export) licenses, quotas, curbing the sale of commodities that can gain windfall profit (like TV sets in the early 1980s, or cars). Sometimes the foreign trade authorities of the PRC use export taxes or export licenses to prevent Chinese companies from exporting certain products cut prices and compete with each other. This on the one hand would damage current production-sale orders, and on the other would cause accusations of dumping. The real cause behind these problems is the unhealthiness of the foreign trade system, even after reforms. Foreign trade companies are responsible only for gains but not for losses. Hence they can expand exports at any cost. At the same time, they use the foreign exchange they get from exports to import commodities that are in short supply so as to gain profits. In addition, now, in order to join the World Trade Organization, the central authority has to lower the tariff rate of many commodities gradually and reduce import control items in order to open the market step by step.

### **(1) Liberalization of the Right to Engage in Foreign Trade**

From 1957, when the communist government completed its nationalization of foreign trade enterprises, until 1978, mainland China's foreign trade was conducted by 10 to 15 import and export companies under the supervision of the Ministry of Foreign Trade. Only after reforms in 1979 was permission to engage in foreign trade granted gradually to other ministries in the central government, to local government, and to a few enterprises that engaged in production. Furthermore, the extent and the speed of expansion of permission to export has been greater than that import. Hence, in the foreign trade data for provinces and cities, the export data better reflects the true situation in the provinces<sup>5</sup>.

In the early stages of reform, only Guangdong, Fujian, the SEZs, and certain coastal cities had enlarged permission to engage in export. In 1988, the foreign trade system was converted to a responsibility system, and the inland provinces and cities gained expanded permission to export. The impact of exports on the industrial development of these areas begins gradually to appear after 1988 as well.

### **(2) The Provision of Export Incentives**

Before reforms, imports and exports were conducted under one single system, that of the Ministry of Foreign Trade and its import and export companies. Under this system, profits and losses of different companies were combined together. At the same time, the exchange rate of the renminbi was overvalued. This was beneficial for imports but disadvantageous for exports. Hence, the true comparative advantage of China's exports was not revealed, and there was no incentive to develop exports. In order to improve this rigid system, in addition to granting certain provinces and cities gain the right to import or export, the central government offered certain incentives to promote the growth of exports. These included subsidies of the exchange rate (we discussed this in detail in footnote 3), export tax rebates, export subsidies, and

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<sup>5</sup> This is also the main reason we use the Export/Industrial Production Value (IND) ratio instead of the Export+Import/IND ratio in our later regression analysis.

low-interest-rate loans. Basically, these are similar to the measures used in capitalist countries. As exports have grown tremendously in different regions, their industrial development has also been affected.

### **(3) Use of Tax Reductions and Exemptions to Encourage Foreign Investment**

In 1984, the Chinese authorities promulgated a law entitled "Interim Provisions of the State Council Concerning the Reduction of and Exemption from Enterprise Income Tax and Consolidated Industrial and Commercial Tax in the Special Economic Zones (SEZs) and the Fourteen Coastal Port Cities." Under this law, the three types of investment enterprises (equity joint ventures, contractual joint ventures, and foreign-capital enterprises) that were allowed established in the above-mentioned areas were subject to enterprise income tax at the reduced rate of 15%. Enterprises engaged in industry and other production-oriented endeavors that will operate for a period of ten years or more are exempt from income tax for the first and second years that they make a profit. In addition, they are allowed a 50% reduction of income tax from the third through fifth years of profitable operation.

All of the above reform measures, along with reforms in agriculture, the urban economy, prices, taxes, and the financial system, have changed mainland China's economic condition greatly. Industry and foreign trade have grown rapidly. Total imports and exports grew from US\$20.6 billion in 1978 to US\$195.7 billion in 1993. The structure of exports has improved significantly. The ratio of industrial products in exports reached 81.8% in 1993. More than that, accumulated realized foreign direct investment reached US\$56.5 billion by 1993. At the same time, however, the reforms have resulted in differences in development between areas, and hence affected the development of different industries in different areas.

In this paper we shall use provinces and cities as regional units to analyze the impact of the open door policy on the industrial development of manufacturing enterprises in different areas of mainland China. Since the above-mentioned reform measures can be grouped into two categories: those

related to foreign trade and those related to foreign direct investment, we shall concentrate our analysis on the impact of the changes in these two major types of business on the regional industrial development of mainland China.

### **III. FDI, Exports, and Regional Industrial Development: An Overview**

Before we review the related literature, we first look at the data to explore the speed of FDI introduction, FDI changes in different regions, and the correlation between FDI, exports, and regional industrial development.

Table 1 lists the amount of accumulated realized FDI in 30 provinces and cities between 1979 to 1993. From the bottom row of the annual growth rate we can see that China had two peak periods of attracting FDI. The first one was in 1983-1985, when the annual growth rate was between 48% and 53%. The second one was in 1991-1993, when the annual growth rate was above 150%. As for the geographic distribution of FDI, according to the data up to 1993, the top five provinces (or cities) hosted 70% of the accumulated realized FDI. The ordering is: Guangdong (36%), Fujian (10%), Shanghai and Jiangsu (9% each), and Shandong (6%). Among them, Guangdong has always been number one in attracting FDI. Shanghai has fallen between number two and number five. The remaining provinces and cities have had ups and downs in FDI in different years. Beijing (number six in accumulated FDI) and Liaoning (number seven) have been in the top five in certain years. Jiangsu became outstanding only after 1990. In sum, as we compare this with the data in Tables 2 and 3, it seems clear that the provinces (or cities) with more FDI are also the ones that have better industrial development.

We list the amounts and ordering of the industrial production value, exports and FDI of 30 provinces (cities) in 1985 and 1993 in Tables 2 and 3. The order of the names of provinces (cities) is according to their industrial production value.

Table 1. 1979-1993 Realized Foreign Direct Investment

Unit: US\$10,000

Province (City)	1979-82	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	total
Beijing	6,740 (2)	7,561 (2)	3,548 (4)	8,882 (4)	13,994 (3)	9,534	50,278 (2)	31,846 (4)	27,695 (2)	24,482 (4)	34,985	66,694	286,266
Tianjin	449	451	1,019	5,587 (5)	2,931	12,741 (3)	3,185	2,801	3,493	13,216	10,724	54,100	110,705
Hebei	8	143	478	824	685	744	1,673	2,686	3,935	4,437	11,019	39,654	66,286
Shanxi	11	-	-	52	15	227	652	882	340	380	5,384	8,643	16,386
Inner Mongolia	-	339	-	262	98	109	337	24	1,064	110	520	8,526	11,389
Liaoning	426	687	771	2,458	4,128 (5)	6,450 (5)	11,525 (5)	11,857	24,373 (3)	34,888 (3)	48,956 (5)	126,269	272,814
Jilin	-	-	-	487	57	18	620	335	1,760	1,800	6,597	23,784	35,458
Heilongjiang	-	88	103	395	1,742	1,132	4,009	2,241	2,449	943	7,050	23,232	43,384
Shanghai	1,549 (3)	1,067 (5)	4,237 (3)	10,754 (3)	14,765 (2)	21,366 (2)	23,317 (3)	42,212 (2)	17,401 (4)	14,519	48,108	316,025 (2)	515,347 (3)
Jiangsu	218	888	2,030 (5)	3,347	1,811	4,651	10,303	9,358	12,416	21,232 (5)	146,004 (2)	284,371 (4)	496,641 (4)
Zhejiang	140	248	787	2,663	1,853	2,337	2,957	5,181	4,843	9,162	23,238	103,175	156,584
Anhui	-	-	7	303	794	139	1,151	478	1,769	954	5,002	25,764	36,361
Jiangxi	-	1	675	1,049	458	393	518	587	5,273	1,949	9,653	20,817	41,373
Fujian	553	1,634 (3)	5,055 (2)	11,860 (2)	6,149 (4)	5,139	13,017 (4)	32,880 (3)	961	46,629 (2)	141,634 (3)	286,745 (3)	552,279 (2)
Shandong	10	276	442	3,563	1,939	2,381	4,309	13,132 (5)	15,084 (5)	17,950	97,335 (4)	184,319 (5)	340,754 (5)
Henan	-	5	-	827	605	450	6,418	4,266	1,049	3,791	5,215	30,294	52,920
Hubei	49	-	-	800	1,241	1,190	2,231	2,295	2,900	4,643	20,308	29,814	65,470
Hunan	35	214	265	2,728	948	235	771	643	1,116	2,276	12,853	43,267	65,351
Guangdong	47,836 (1)	40,002 (1)	65,010 (1)	65,131 (1)	72,268 (1)	60,299 (1)	95,786 (1)	115,644 (1)	146,000 (1)	182,286 (1)	355,150 (1)	749,804 (1)	1,995,227 (1)
Guangxi	376	622	2,273	3,073	3,695	3,774	2,065	4,594	2,866	2,532	17,833	98,900	142,603
Sichuan	-	1,895 (4)	781	2,872	1,523	2,123	2,361	801	1,604	2,439	10,185	55,981	82,569
Guizhou	3	-	72	978	220	-	440	747	468	734	1,979	4,294	9,935



Table 1. 1979-1993 Realized Foreign Direct Investment (continued)

Unit: US\$10,000

Province (City)	1979-82	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	total
Yunnan	-	-	22	163	354	480	310	740	261	296	2,313	9,702	14,641
Shanxi	-	254	650	1,555	3,716	7,278 (4)	11,173	9,719	4,191	3,159	4,553	23,430	69,682
Gansu	3	1,280	3	57	42	21	200	-	85	93	35	324	2,143
Qinghai	-	-	80	-	-	-	200	-	-	-	68	1,195	1,558
Ningxia	-	-	20	28	5	3	30	111	25	22	352	1,190	1,786
Xinjiang	392	-	218	1,091	1,281	1,751	504	88	537	-	-	5,300	11,162
Hainan	-	-	-	-	-	-	-	9,497	10,302	17,616	45,255	70,710	153,380
Total	58,798	57,655	88,546	131,804	137,317	144,965	250,340	305,645	294,260	412,538	1,072,308	2,696,323	5,650,499
Annual growth rate (%)	-	-	53.58	48.85	4.18	5.57	72.69	22.09	-3.72	40.2	159.93	151.45	

Source: Provided by Professor Leonard K. Cheng, Department of Economics, Hong Kong University of Science and Technology.

\*The numbers in parentheses are the ranking of the province (city) in that year.

First, we wanted to see how many of those in the top 10 in industrial production value were also in the top 10 in exports and FDI for 1985. We found that Sichuan and Heilongjiang were among the top 10 in industrial production value but not in exports. Also in 1985, there were five provinces (Liaoning, Zhejiang, Hubei, Heilongjiang, Hebei) that were among the top 10 in industrial production value but were not listed in the top 10 for FDI. In the ordering of the FDI data accumulated to 1985, there were four provinces (Zhejiang, Hubei, Heilongjiang, Hebei) that were not listed in the top 10. Hence we might roughly infer that the correlation between the ranking of exports and industrial production value is larger than the correlation between the ranking of FDI and industrial production value in 1985. We shall examine this hypothesis in greater detail later.

We then considered how many of the provinces in the top 10 for industrial production value were also in the top 10 for exports and FDI in 1993. We found that there were four provinces (Sichuan, Hebei, Hubei, Henan) that were in the top 10 for production value but were not in the top 10 for exports. In 1993, Hebei, Hubei and Henan were big in production but were not in the top 10 for FDI. As for the data on FDI accumulated to 1993, there were four provinces (Sichuan, Hebei, Hubei, Henan) that were not in the top 10 though they were among the top 10 in production value.

From 1985 to 1993, Guangdong's industrial production value rose by four places in the ranking, while the ranking of Hebei rose by two, and the ranking of Shandong and Zhejiang rose by one. The exports of these provinces had been ranked among the top 10. Guangdong jumped to number one in the exports ranking, while the ranking of inland provinces like Sichuan and Hubei gradually declined. Their performance in exports and ability to attract FDI was inferior to the coastal provinces. They were able only to rely on their past strong industrial foundation to compete with the newly developed coastal provinces, with little help from the benefits from exports or FDI for their industrial development. The data indicate a likely correlation between the ranking in terms of industrial production value and in terms of exports or FDI. Hence, we calculated the Spearman Rank Correlation Coefficient among these four variables (FDI data was further decomposed into "current FDI" and "accumulated FDI").

Table 2. Ranking of Industrial Production Value, Exports, and FDI (1985)

	Province	Industrial Production Value (RMB 100 Million)	Exports (US\$10,000)	Ranking	Realized FDI (US\$10,000)	Ranking	1979-85 Accumulated Realized FDI (US\$10,000)	Ranking
1	Jiangsu	825.77	155,800	5	3,347	7	6,483	6
2	Shanghai	812.79	336,100	2	10,754	3	17,607	4
3	Liaoning	699.22	504,000	1	2,458	12	4,342	9
4	Shandong	589.90	266,700	4	3,563	6	4,291	10
5	Sichuan	460.25	24,500	19	2,872	9	5,548	8
6	Guangdong	458.21	289,800	3	65,131	1	217,979	1
7	Zhejiang	427.46	93,800	8	2,663	11	3,838	11
8	Hubei	413.87	53,000	10	800	19	849	19
9	Heilongjiang	371.36	41,269	13	395	21	586	22
10	Hebei	344.82	129,800	6	824	18	1,453	16
11	Henan	328.78	36,710	16	827	17	832	20
12	Beijing	315.67	62,075	9	8,882	4	26,731	2
13	Tianjin	287.02	115,300	7	5,587	5	7,506	5
14	Hunan	279.71	39,605	14	2,728	10	3,242	12
15	Anhui	234.90	31,000	17	303	22	310	24
16	Jilin	232.54	42,700	12	487	20	487	23
17	Shanxi	197.28	22,679	20	52	26	63	27
18	Shaanxi	172.51	10,359	24	1,555	13	2,459	13
19	Jiangxi	158.90	25,725	18	1,049	15	1,725	14
20	Fujian	144.43	49,148	11	11,860	2	19,102	3
21	Guangxi	125.85	37,200	15	3,073	8	6,344	7
22	Gansu	121.38	7,094	25	57	25	1,343	17
23	Yunnan	121.11	12,901	23	163	24	185	25
24	Inner Mongolia	104.69	13,619	22	262	23	601	21
25	Guizhou	88.08	3,554	26	978	16	1,053	18
26	Xinjiang	73.02	18,000	21	1,091	14	1,701	15
27	Ningxia	21.99	3,139	27	28	27	48	28
28	Qinghai	21.75	2,123	28	15	28	95	26

Sources:(1) People's Republic of China's Industrial Survey Data, 1985

(2) Almanac of China's Foreign Economic Relations and Trade, 1986.

(3) Same as Table 1.

Table 3. Ranking of Industrial Production Value, Exports, and FDI (1993)

	Province	Industrial Production Value (RMB 100 Million)	Exports ((US\$10,000)	Ranking	Realized FDI (US\$10,000)	Ranking	1979-93 Accumulated Realized FDI (US\$10,000)	Ranking
1	Jiangsu	4888.59	539,007	3	284,371	4	496,629	4
2	Guangdong	4189.77	3797,868	1	749,804	1	1995,216	1
3	Shandong	3310.17	464,148	6	184,319	5	340,740	5
4	Shanghai	2861.01	757,694	2	316,025	2	515,320	3
5	Liaoning	2611.41	414,761	7	126,269	6	272,788	7
6	Zhejiang	2543.73	486,303	4	103,175	7	156,584	8
7	Sichuan	2011.22	126,934	14	55,981	10	82,565	11
8	Hebei	1608.76	148,777	12	39,654	13	66,286	13
9	Hubei	1587.30	127,917	13	29,814	15	65,471	14
10	Henan	1461.98	88,285	17	30,294	14	52,920	16
11	Heilongjiang	1233.14	356,457	8	23,232	19	43,384	17
12	Beijing	1168.35	270,268	9	66,694	9	286,239	6
13	Anhui	1100.01	79,231	19	25,764	16	36,361	19
14	Tianjin	1065.83	243,244	10	54,100	11	110,697	10
15	Hunan	1064.40	106,451	15	43,267	12	65,351	15
16	Fujian	970.05	483,210	5	286,745	3	552,279	2
17	Jilin	890.43	151,983	11	23,784	17	35,458	20
18	Shanxi	738.90	82,100	18	8,643	22	16,586	21
19	Guangxi	690.24	103,745	16	98,900	8	142,603	9
20	Jiangxi	673.71	57,531	22	20,817	20	41,373	18
21	Shaanxi	643.43	62,753	21	23,430	18	69,678	12
22	Yunnan	603.83	72,920	20	9,702	21	14,641	22
23	Inner Mongolia	445.71	44,161	23	8,526	23	11,389	23
24	Gansu	444.92	24,733	25	324	28	2,143	26
25	Xinjiang	361.85	43,680	24	5,300	24	11,162	24
26	Guizhou	321.31	22,367	26	4,294	25	9,935	25
27	Ningxia	111.22	7,984	27	1,190	27	1,786	27
28	Qinghai	87.59	6,818	28	1,195	26	1,558	28

Sources: (1) China Statistical Yearbook, 1993

(2) China's Customs Statistics, 1993

(3) Same as Table 1.

**Table 4. The Spearman Rank Correlation Coefficient of Industrial Production Value, Exports, and FDI**

1985 \ 1993	Industrial Production Value	Exports	Current FDI	Accumulated FDI
Industrial production value	-	0.89*	0.85*	0.82*
Exports	0.85*	-	0.91*	0.90*
Current FDI	0.56*	0.70*	-	0.97*
Accumulated FDI	0.53*	0.66*	0.96*	-

\* Significant at the 1% level.

These coefficients are listed in Table 4. The 1985 data is on the lower left and the 1993 data is on the upper right.

We found that:

(1) All six sets of correlation coefficients show that in 1993 the correlation is higher than in 1985. With the deepening of reform, the degree of correlation between the rankings in terms of industrial production value, exports and FDI became higher. As discussed earlier in this paper, before 1988, the open door policy was focused on coastal regions. It was extended to the inland regions only after 1988. Hence, we might conclude that in the 1990s mainland China's open door policy has finally come to have a more homogeneous impact on different regions' industrial development.

(2) There is a high correlation between the ranking in terms of current FDI and that in terms of accumulated FDI. We might infer that the locational choice of FDI is affected by the demonstration effect of incumbent investors.

(3) No matter whether 1985 or 1993, the rank correlation coefficients between exports and FDI are always higher than the rank correlation between industrial production value and FDI. This means that the overlap between major export provinces and major FDI-attracting provinces is likely to be very high. Generally, we believe that FDI induces or promotes local exports. The actual impact will be explored in the empirical study in Section V.

Although the above-mentioned rank correlation analyses were statistically significant, we cannot explain the causal relationship between these variables. Did the FDI attracted by the open door policy bring more exports, and hence promote regional industrial development? Or, because regional industrial development was initially good, did it attract FDI, hence expanding local exports? To answer this question, we first review the related literature, then propose a solution.

#### **IV. Review of Literature**

To our knowledge, no other research has been conducted concerning the combined impact of these two types of reforms--those related to foreign trade and those related to FDI--on mainland China's regional industrial development. This paper is the first attempt to do so. There are studies concerned with these two areas of reform, though taken one at a time.

The impact of foreign trade on the industrial development of different regions has been investigated only by Chen (1992) and Lee (1994). The remaining relevant research discusses only the relationship between exports and economic growth. Some of these studies use the correlation between real per capita income or gross domestic product (GDP) and export growth rate, or the ratio of exports to GDP of dozens of countries to test the relationship between exports and economic growth, e.g., Michaely (1977) and Tyler (1981). Others perform a causality test between exports and economic growth directly, e.g., Chow (1987) and Jung and Marshall (1985). For a comparison of these different methods, please refer to Chen (1992).

Chen (1992) used a Granger causality test, grouping 30 provinces and cities into three regions (coastal, central and western), then ran a regression of these regions' GDP to exports to observe the effect of regional exports on economic growth and the impact of regional economic growth on exports. The sample period was 1979 to 1989.

He found that in the coastal region, a one-way causality runs from exports to economic growth, and there are no significant Granger causality results in either the central or western regions. The test also shows that regional economic growth does not affect exports in all three regions.

Lee (1994) pooled time series and cross-section data to research the relationship between per capita national income (PCNI) and exports. He assigned an arbitrary PCNI level (1,126 yuan/year, lower than the national average of 1,267 yuan) to separate the PCNI of 28 provinces (Tibet and Hainan excluded) into two groups: rich and poor. He also divided these provinces into coastal and inland regions according to their location. Lee regressed the growth rate of PCNI on export growth rate, the initial value of PCNI (in 1984), realized foreign direct investment, and the time trend. This was a single equation regression with pooled data and the sample period was from 1984 to 1990. He found that the correlation between the growth rate of PCNI and exports is statistically significant only in the rich provinces and the coastal region. In the regression analysis of mainland China as a whole, only the initial value of PCNI and the time trend are statistically significant. When he further separated the mainland into coastal and inland regions and then performed the regression, he found that in the coastal region all explanatory variables except foreign direct investment are statistically significant. The coefficient of determination ( $R^2$ ) is between 0.45 and 0.62. The regression analysis of the inland region did not meet his expectation, and only the "time trend" is statistically significant.

We know of no research publications on the subject of the impact of foreign direct investment (FDI) on mainland China's regional industrial development. Some mainland Chinese scholars have studied the impact of FDI on mainland China's foreign trade, especially on exports, including Sun Jiaheng (1994) and Hua Xiaohong (1994). Hong Kong scholars Cheng and Zhao (1995) studied the geographical patterns of FDI in mainland China. Their major findings follow.

Sun Jiaheng (1994) discussed the position and function of FDI enterprises in mainland China's foreign trade. He found that the foreign trade of the FDI

enterprises continues to expand, and their proportion in the mainland's total imports and exports is constantly on the rise, from 1.1% in 1985 to 27.5% in 1993. The FDI enterprises also have a better commodity structure of imports and exports, which helps improve the mainland's foreign trade structure. In recent years, the proportion of manufactures in the exports of FDI enterprises has been over 90%, which is higher than the overall averages of the mainland. Hence, FDI helps to improve China's export structure. Sun acknowledges that FDI enterprises have introduced advanced technology, thus promoting adjustment of the industrial structure, and they have introduced more advanced management skills as well, which has been helpful in reforming Chinese foreign trade enterprises.

Hua Xiaohong (1994) compared the export performance of FDI enterprises and state-owned foreign trade enterprises. She found that the exports of FDI enterprises had an average growth rate of 80.03% from 1987 to 1992, which far exceeded the 12.64% of state-owned foreign trade enterprises. These two types of enterprises have both made Hong Kong, Japan, the U.S., and European Community countries their major markets. They differ only slightly in which market is third and which is fourth in importance. FDI enterprises have a better export structure (the ratio of manufactures is higher) than state-owned enterprises. FDI enterprises mostly export their own products, while the latter mostly buy products from other enterprises and export them. Hua concluded that FDI enterprises are one of the major forces in exporting and have promoted mainland China's exports greatly. She notes also that FDI enterprises are strong competition for state-owned foreign trade enterprises.

Cheng and Zhao (1995) use panel data from FDI in 28 mainland regions over a ten-year period (1983-92) to statistically assess the importance of geographical location, factor endowments, policies toward foreign investment, and macroeconomic conditions in explaining the FDI in these regions. They found that FDI depended positively on the state of the Chinese national economy. There was also some evidence, though inconclusive, that it depended negatively on relative wages and positively on regional real income. Education and infrastructure, while unimportant at the beginning, become



more important over time. The special economic zones were significant in attracting FDI, but gradually lost their competitive advantages. The impact of the open coastal cities and economic and technological development zones was dubious. Proximity to Hong Kong and Taiwan played an increasingly positive role in attracting FDI. Additionally, there was some evidence of benefits to FDI from agglomeration at the regional level (Cheng and Zhao 1995).

## V. Methodology and Empirical Results

Chen's (1992) paper tells us only whether there existed a one-way or two-way relationship between exports and economic growth in a certain region, Lee's (1994) paper used per capita national income as a dependent variable, and Cheng and Zhao's (1995) paper emphasized discovering what factors in mainland China attract FDI. None of these satisfy our goal of studying the impact of the open door policy on the mainland's regional industrial development. We have to find another way.

To determine our method, we examined the variables used in the papers above and adjusted them as necessary for our research purpose on the one hand, and according to the characteristics of the data, which show high correlation between the ranking in terms of exports, FDI, and industrial production value of all provinces, as shown in Section III of this paper, on the other.

We divided the data on exports, accumulated realized FDI, and industrial production value of 28 provinces from 1985 to 1993 into two groups. Group 1 uses exports (EX) as a dependent variable, and accumulated realized FDI (ACU) and industrial production value (IND) as independent variables. Group 2 uses the industrial production value as a dependent variable, and exports and accumulated realized FDI as independent variables.

We first use data from 1985 and 1993 of these two groups of variables to build a double-log simultaneous equation model (using the natural log of both dependent and independent variables):

$$\ln IND = \alpha_0 + \beta_0 \ln EX + \gamma_0 \ln ACU \quad (1)$$

$$\ln EX = \alpha_1 + \beta_1 \ln IND + \gamma_1 \ln ACU \quad (2)$$

We then use the iterative two-stage-least-square (2SLS) method to run a regression. The regression results are shown in Table 5.

Diagram 2 can help the reader better understand the results in Table 5. We found that there is a two-way causal relationship between exports and industrial production value. (The coefficients in both years are statistically significant at the 1% level in both years.) In addition, the impacts between these two variables are stronger (coefficients are larger) in 1993 than in 1985. We also found that the direct impact of accumulated FDI on industrial production value is insignificant in 1985 but significant in 1993. This implies that more FDI has gradually shown its impact on regional industrial development. The direct impact of accumulated FDI on exports is significant in 1985 but insignificant in 1993. It seems that the direct effect of FDI on exports was eclipsed by other factors as time passed.

**Table 5. Simultaneous Equation Model**

Dependent Variable	Constant	Independent Variables	R <sup>2</sup>	Objective × N
(1) IND (1985)=	-0.69 (-1.02)	+0.58*EX +0.002ACU (6.75) (0.04)	0.77	50.00 (N=28)
(2) EX (1985) =	3.19* (4.32)	+1.12*IND+0.17**ACU (6.75) (2.13)	0.80	
(1) IND (1993)=	-2.05** (-2.39)	+0.61*EX+0.14**ACU (8.25) (2.36)	0.80	50.00 (N=28)
(2) EX (1993) =	4.66* (4.93)	+1.19*IND-0.08 ACU (8.25) (-0.91)	0.77	

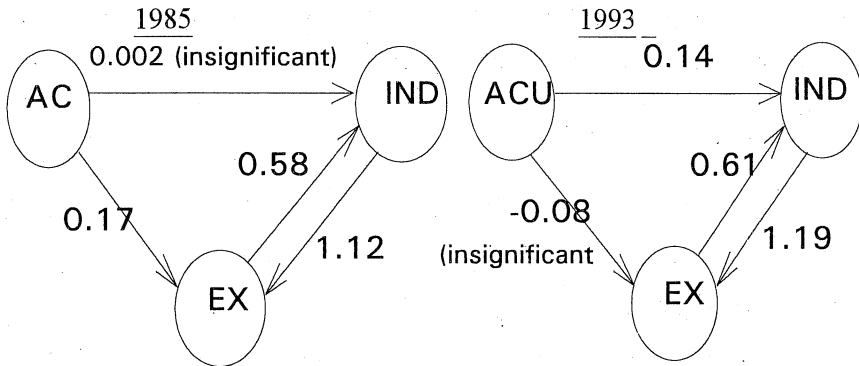
t-statistics are in parentheses

N-number of observations

\*significant at the 1% level

\*\*significant at the 5% level

\*The figures are the estimated coefficients for the related variables.



**Diagram 2. The Relationships between the Three Variables**

The 2SLS simultaneous regression only performed comparative static tests between year 1993 and 1985. We also want to examine the changes by year, So we apply the Ordinary Least Square (OLS) to the aforementioned two groups year by year. At the same time, we use both linear and double-log models to do the regression analysis.

After obtaining 36 regression equations (9 years  $\times$  2 groups  $\times$  2 models), we compare the correctness of the sign (according to economic theory) of the coefficients, their t-values, adjusted  $R^2$ , and the trend of past changes. We determine that the best fitted model, and the one which can be statistically tested by historical data, is the double-log model of group 1. It is better able to explain the changes in exports by using industrial production value and accumulated realized FDI. This finding does not conflict with the main theme of this paper since we have found that there exists a two-way causal relationship between industrial production value and exports.

The empirical results are given in Table 6. Generally speaking, all the coefficient estimates of explanatory variables are statistically significant for each year, and the explanatory ability of the model as a whole, which is represented by the adjusted  $R^2$ , is quite good. We also found that in 1985 and 1986, the elasticities of industrial production value to exports are greater than 1 (1.12 and 1.02, respectively). This means that when industrial production

value doubled, exports more than doubled. But with the deepening of reforms, the contribution of regional industrial production to exports is gradually declining. It was only 0.39 in 1993. The statistical significance of this coefficient also has declined since 1986.

On the other hand, the contribution of accumulated realized FDI to exports is increasing with time. The elasticity of this coefficient in the model shows that in 1985, every one percent increase in accumulated realized FDI induced regional exports to grow only 0.17%. In 1993, however, the elasticity of the coefficient increased to 0.53%. The statistical significance of this coefficient has also been increasing since 1985 (except for 1992).

This empirical result fits quite closely with the timetable of mainland China's open door policy reform and its impact. In 1985, the level of FDI was still low and the export industry was not a major interest of FDI enterprises. Some investments focused on hotels for tourists, hence their impact on exports was not as obvious as regional industrial development. The impact of

**Table 6. Double-log Model (Exports as Dependent Variable)**

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993
Constant	*3.190 (4.32)	*3.640 (6.54)	*3.930 (7.73)	*4.020 (7.21)	*3.730 (6.85)	*3.830 (7.65)	*4.070 (9.07)	*4.390 (9.63)	*3.240 (5.25)
IND	*1.120 (6.75)	*1.020 (7.87)	*0.950 (7.94)	*0.850 (6.37)	*0.840 (6.42)	*0.740 (5.83)	*0.710 (5.98)	*0.590 (4.51)	**0.390 (2.22)
ACU	**0.170 (2.13)	**0.170 (2.83)	*0.190 (3.25)	*0.230 (3.41)	*0.250 (3.97)	*0.310 (4.93)	*0.300 (5.08)	*0.340 (5.07)	*0.530 (5.49)
Adj-R <sup>2</sup>	0.79	0.86	0.88	0.86	0.88	0.90	0.92	0.92	0.89
n	28	28	28	28	28	28	28	28	28

t-statistics are in parentheses

\*significant at the 1% level

\*\*significant at the 5% level

FDI on exports has been increasing with the enlargement of FDI and with the number of Taiwanese businessmen investing in the export processing industry since 1988. It especially increased during a two-year FDI vertex in 1992 and 1993. The elasticity coefficient of accumulated realized FDI in 1993 jumped accordingly to 0.53.

In sum, this empirical study has reached four important conclusions: (1) There does exist a two-way causal relationship between exports and regional industrial development. This is indirect evidence of the impact of the open door policy's preferential measures toward exports and on regional industrial development. However, further empirical studies show that it is more appropriate to say that regional industrial development and FDI are cofactors in promoting regional export growth rather than saying that export expansion and FDI together promoted regional industrial development. (2) The quantity relationship between these three variables (EX, IND, ACU) is better explained by the log model (elasticity relationship) than the linear model (changes in absolute quantities). (3) The induced effect of regional industrial development on exports (judged by the value of elasticity coefficients) is declining with time. (4) On the other hand, the effect of FDI on regional export expansion is increasing with time (with the deepening of reforms and increasing FDI).

## VI. Concluding Remarks

In this paper, we first summarize the important measures of mainland China's open door policy and focus on the two realms of foreign trade and foreign direct investment. We then explored the relations between FDI, exports, and regional industrial development. We briefly reviewed existing studies on the impact of exports and foreign direct investment on regional industrial development in China. We conducted an empirical analysis using a log form, single equation regression model. We found that regional industrial development is not only affected by regional exports and accumulated realized FDI, it is itself also one of the sources affecting regional exports. Loosely speaking, the open door policy measures reviewed in this paper have had

some impact on regional industrial development through their contribution to the expansion of regional exports and to attracting more foreign direct investment. However, there is an obvious difference between the impact of regional industrial development and FDI on regional exports as the reform deepens. With the expansion of exports, the preferential measures have gradually shrunk. The impact of regional industrial development on regional export growth decreases as time passes. As reforms deepen, though, more FDI is attracted, partly because of the preferential measures, and the impact of this accumulated realized FDI on regional export expansion strengthens as time passes.

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