

Are Korean Firms Doing Well? Evidence from Shandong Province in China

Fukunari Kimura^{#§}

Faculty of Economics, Keio University, Japan

Kazunobu Hayakawa

Graduate School of Economics, Keio University, Japan

Zheng Ji

Graduate School of Economics, Keio University, Japan

Abstract

This paper compiles firm-level data of Shandong Province and examines whether economic performance, e.g., labor productivity, of foreign-owned firms, particularly of Korean firms, is superior to that of domestically-owned firms. In regression analysis, we found the following. First, foreign-owned firms achieve significantly higher economic performance. Second, foreign-owned joint ventures or relatively small sized foreign-owned firms perform much better. Third, the differences between domestically- and foreign-owned firms are larger in chemical and machinery sectors. Fourth, Korean firms particularly in machinery sector have relatively high performance among firms including foreign-owned firms. In future's work, we need further to analyze more closely these differences with the more detailed data.

JEL Classification: F23; D21;

Keywords: foreign direct investment; foreign-owned firms; firm nationality; micro data; productivity

[#] Corresponding author. Fukunari Kimura. Address: Faculty of Economics, Keio University, 2-15-45 Mita, Minato-ku, Tokyo 108-8345, Japan. Phone: 81-3-3453-4511 ext. 23215, FAX: 81-3-3798-7480. E-mail: fkimura@econ.keio.ac.jp.

[§] We would like to thank Ryuhei Wakasugi for his valuable comments and suggestion and are also grateful to Yuan Boya and Zhang Xu for their research assistance.

1. Introduction

A large number of Korean multinational firms have invested in China. According to Chinese estimates, by the end of 2004, China has approved foreign direct investment (FDI) by 32,753 Korean companies, where Korean FDI on the contract basis and the implementation basis has amounted to \$50.564 billion and \$25.935 billion, respectively. Since 2002, China has been the largest recipient of Korean FDI.

Shandong Province occupies the largest share in China's inward foreign direct investment from Korea and hosts substantial agglomeration of Korean firms. A lot of Korean firms have concentrated on Shandong Province because it has an advantage in access to their home country and thus enables the firms to save various kinds of costs, particularly transportation costs.

Despite great interest, we have not known much about the activity of foreign-owned firms in China due largely to the lack of firm/plant-level data. The concentration of Korean firms in Shandong Province must be one of the most important sources of spillover effects. Due to the lack of the data enabling us to identify firms' nationality, however, the effect of the concentration on domestically-owned firms' activities and on foreign firms' activities themselves has remained unsettled. Most of the previous studies at firm/plant-level analysis use the data from questionnaires collected by the World Bank and the Chinese Government, which only provide small samples. Although several provinces publish firm-level data, there is no data available for us to distinguish between domestically- and foreign-owned firms. As a

result, we cannot closely investigate differences in economic activities and performance between domestically- and foreign-owned firms and among foreign-owned firms at the firm level.

The purpose of this paper is to compile firm-level data of Shandong Province and then to investigate the economic performance of Korean firms there. To do so, we utilize multiple data sources. Our dataset includes the number of employment, total assets, total liabilities, fixed assets, sales income, total profits, total pre-tax profits, value added, industrial classification, telephone number, address, and firm nationality at the firm level. To our knowledge, our data are the first that enable us to distinguish firm nationalities in details. Therefore, this paper would be also the first paper that compares Korean firms with domestically-owned firms and other foreign-owned firms by using firm-level data in China.

By using this dataset, we examine whether the economic performance, e.g., labor productivity, of foreign-owned firms, particularly of Korean firms, is significantly higher than that of domestically-owned firms. A number of studies have used micro data, analyzing differences between foreign ownership and economic performance (see, for example, Doms and Jensen, 1998; Kimura and Kiyota, 2006). In this paper, we regress the economic performance variables on nationality dummy variables, such as Korean dummy and Japanese dummy, and on some firm-specific characteristics variables, and then check whether the coefficients for the dummy variables are significantly positive or not.

In regression analysis, we found the following: first, foreign-owned firms

achieve significantly higher economic performance than domestically-owned firms. Second, foreign-owned joint ventures or relatively small sized foreign-owned firms perform much better. Third, the differences between domestically- and foreign-owned firms are larger in chemical and machinery sectors. Fourth, Korean firms particularly in machinery sector have relatively high performance even compared with other foreign-owned firms.

The rest of this paper is organized as follows: section 2 briefly takes a look at historical relationship between Korea and Shandong Province. In Section 3, we survey the previous studies that analyzed firms' performance in China with using firm/plant-level data. Section 4 compiles firm-level data of Shandong Province and provides basic statistics. Section 5 reports the regression results, and Section 6 concludes.

2. Shandong Province and Korea

This section provides an overview on Korean FDI into China and into Shandong Province. Then, we review historical relationship between Korea and Shandong Province.

2.1. Korean FDI to Shandong Province

Korea has actively invested into China, particularly into Shandong Province. According to China Foreign Investment Report (<http://www.fdi.gov.cn>), by the end of 2004, there were 32,753 Korean firms in China, which account for 6.44 per cent of the total foreign companies in China. Korean firms' geographical distribution in China is shown in Figure

1 (DACO Industrial Research Institute, 2004). There, China is divided into five regions; mid-west region, southern region, tohoku region, Bohai Sea Rim region and Yangtze River delta. From this, one can see that Bohai Sea Rim region has an overwhelming 70 percent in total number of Korean firms in China. In particular, there are 816 Korean firms in Shandong, which account for 33.76%. Shandong becomes the province that hosts the largest number of Korean firms.

== Figure 1 ==

Generally speaking, investment climate in Shandong is hospitable. First, Shandong has a good geographical position. The adjacency to Bohai Sea Rim Economic Region (Beijing, Tianjin and Liaoning) and Yangtze delta (Shanghai, Jiangsu and Zhejiang) enables firms to easily access human resources, high-technology, and others. The firms can also easily utilize energy resources because of its adjacency to Shanxi. Second, infrastructure is well developed. Shandong has 24 sea ports and thus the highest density of ports in China. There are also seven airports in Shandong including three international airports located in Jinan, Qingdao, and Yantai. Third, Shandong government has conducted various kinds of preferential treatment policy for foreign direct investment such as tax incentives.

Particularly for Korea, Shandong is the nearest province to Korea Peninsula. Therefore, Korean firms locating in Shandong can enjoy low transaction costs in connecting their business with home country. Due to these hospitable climates, Korea has actively invested in Shandong and has formed substantial agglomeration there.

2.2. History of Korean Entry

According to the official website of Development Planning Commission of Shandong Province (<http://www.sd-china.com>), Korean firms' investment in Shandong would be divided into four stages. The first was an initiation stage between 1988 and 1991. Shandong started private business activities with Korea in 1988, that is, before the formal diplomatic relation was established. Korean Sanyang Food Co. established the first joint venture company with Qingdao Second Food Co. in February 1989. In this stage, small-sized firms engaging in labor-intensive activity was the main players in Korean investment. By the end of 1991, 95 Korean firms were established in Shandong, with a contractual FDI of US\$75.25 million.

The second stage was a period of active growth between 1992 and 1996. The establishment of diplomatic relation in August 24, 1992 provided a new opportunity for further economic exchanges between Shandong and Korea, resulting in a remarkable increase of Korean FDI into Shandong Province. Korea's contracted FDI grew by 104% annually in 1992-1996, and its total amount became \$3.38 billion in 1996.

The third stage was the period of 1997-1999 when Asian countries were hit by a currency crisis. Under the influence of the crisis, Korea's contracted FDI decreased by 79% from 1996 to 1997, resulting in \$322 million in 1997 (Shandong industrial statistics yearbook). In 1998, it fell down further to \$290 million, recording the minimum level after the diplomatic relation's establishment. During this time, the Shandong Government provided Korean firms generous support and help in any

possible way including lending. As a result, in 1999, the amount of the Korea's FDI into Shandong became \$456 million and recovered from its drop due to the crisis.

The fourth was a stage of further economic exchanges in all areas. The number of Korean firms kept growing by an average of 2,115 firms a year in 2000-2005. The actual utilized Korean FDI grew by an average of 41% annually in these six years, and its total amount reached \$9.5 billion in 2004. At this stage, Korean FDI into Shandong Province had the following features: (1) The average investment scale increased greatly to \$2.34 million, which is 0.87\$ million larger than the average investment scale until 2002. (2) Manufacturing shows an overwhelming 91.4% share in all amounts of contracted FDI, which concentrated on IT communication, general or special equipment, textile, chemical material, and processed products.

3. Literature Survey

This section provides a survey of the previous studies that use firm level data in China. Micro data sources can roughly be classified into three: the Third Industrial Census of China, microeconomic data obtained from the State Statistic Bureau of China (SSBC), and various questionnaire surveys.

First, the Third Industrial Census of China conducted in 1995 covers 7.34 million samples. This dataset would have the largest samples but is likely to be old since the census is done only once every ten years. By using this dataset, Wen, Li, and Lloyed (2002) found that foreign-owned joint ventures and foreign solely-owned enterprises are more efficient on average than

enterprises with state ownership, domestic collective ownership, and joint domestic ownership.

Second, Zhang, Zhang, and Zhao (2001) used microeconomic data on industrial firms located in Shanghai over the period from 1996 to 1998, which is obtained from SSBC. This data is firm-level statistics collected from mandatory annual reports of all government and business organizations in China. By using this, they found that non-state sector has a higher average level of productive efficiency than SOEs and that ownership is a more significant determinant of the efficiency than competition.

Third, most of the previous studies use various questionnaire surveys. These studies typically focus on the success in state-owned firm's reform, rather than analyzing higher performance of foreign firms.

By using a questionnaire survey of industrial SOEs conducted by the State Statistical Bureau in mid-1998 covering 40238 samples, Lin and Zhu (2001) investigated organizational changes including ownership restructuring conducted as a part of the economic reform in China. Using the same data as in Lin and Zhu (2001), Zhang (2004) evaluated the effects of corporatization and stock market listing on the performance of the Chinese SOEs, and Xu, Zhu, and Lin (2005) examined the effects of reducing politicians' control and agency problems on a number of reform outcomes.

Hallward-Driemeier, Wallsten, and Xu (2003) employed a survey conducted by Enterprise Survey Organization of the Chinese National Bureau of Statistics. The survey contains 1500 Chinese firms in five cities (Beijing, Chengdu, Guangzhou, Shanghai and Tianjin). Their analysis

reveals that the major determinants of firm performance in China are international integration, entry and exit, labor market issues, technology use, and access to external finance.

Cheng and Wu (2001) investigated the key determinants of the performance of foreign firms using a survey of 350 foreign firms locating in the Guangdong and Hainan Provinces, which is conducted by three universities in Guangdong and a research institute in Hainan between July 1996 and February 1997. They found that cash contributed by foreign parent companies had a significantly positive impact on current profitability, but not on future performance.

Gong, Xu, and Tan (2003) used a survey on regional protection launched by the World Bank and The Development Research Center (DRC) of Chinese State Council in 2003. The survey covers 1411 enterprises and 591 individuals who work at local governments, research institutes, universities or other related public sectors in 12 provinces. By using this survey, they found notable differences in regional protectionism across provinces and across industries.

Wang, Xu, and Zhu (2004) used a panel of pre- and post-listing data of all publicly listed companies in China between 1994 and 2000 to explore the effectiveness of public listing as a means of reforming SOEs in China. Their finding is that public listing significantly lowers state ownership, lessens firm's reliance on debt finance, and allows a firm to increase capital expenditure, at least temporarily. They also found that ownership structure affects post-listing performance but that there is no statistical

evidence of a positive effect of public listing on firms' profitability.

Cull and Xu (2005) used a survey data during the period of 2000-2002, which was collected in early 2003 by the World Bank jointly with the Enterprise Survey Organization. This dataset covers 2,400 firms locating in 18 cities. Their main finding is that secure property rights are a significant predictor of firm's reinvestment.

4. Data Issues

As seen in the previous section, there is no data that enable us to distinguish nationality at the firm level. Survey data are likely to have small samples for each province, and Census data are too old to analyze activities of foreign-owned firms. The micro data from SSBC do not publicly report information on whether each firm is foreign-owned or not. In this section, we compile micro data that can identify nationality and then present some findings obtained from its basic statistics.

4.1. Data Construction

This section reports our procedure for compiling micro corporate data of Shandong Province. Our main data source is "Main Index of Large- and Medium-scale Industrial Corporation" published both in "Shandong industrial statistics yearbook (2003 and 2004 versions)" and in "Shandong statistics yearbook (2003 and 2004 versions)". The books together report information on 1,357 and 2,054 firms in 2002 and 2003, respectively. The two books present the following items: a city of location, total assets, total

debt, total sales, total profit, a number of employees, and value added. We compile our dataset by incorporating firms' information obtained from other sources into this "base file".

First, the ownership type of firms, i.e., domestically- or foreign-owned, and their nationalities are obtained from "D&B Major Corporations in P. R. China Vol.1 Foreign Companies and Joint Ventures". In this paper, foreign-owned firms are defined as those with equal to or more than 25% equity share by foreigners. Entry modes in each foreign-owned firm, i.e., joint ventures (with domestic firms or other foreign firms) or solely-owned firms (firms with 100% equity share by foreigners), are also incorporated in the data set. Second, in order to identify foreign-owned firms as precisely as possible, we checked almost all firms' homepages so as to confirm whether the firms are foreign-owned or not. Last, industrial classification is identified with each firm's homepage, and the industrial code is assigned in the base file. In the end, the complied data contains a city of location, total assets, total debt, total sales, total profit, a number of employees, value added, firm's ownership type, the entry mode, the nationality of foreign-owned firms, and the industrial code of each firm.

To check the coverage of our data, we aggregate our data in 2003 and then compare with aggregate data reported by Shandong's government. The result is reported in Table 1. We can immediately see that the number of firms, value-added, and employment in most sectors are considerably close between both aggregate data. Therefore, our data seems to be good enough in terms of its coverage and accuracy.

== Table 1 ==

4.2. Data Description

We here provide some findings in basic statistics of our dataset. Not only variables directly available, such as labor, but real value-added per person and real total sales per person are examined. The latter two variables are calculated by dividing value added and total sales by employments and then by deflating those variables by the price indices of each sector in Shandong Province. The price indices are obtained from Shandong Statistics Yearbook.

Table 2 reports the number of observations, mean values, and standard deviations by the ownership type of firms. Here, the following is to be noted. First, the mean value and standard deviation in each item are quite stable between two years. This means that the volatility of our data is low. Second, the mean value of value-added and labor is larger in domestically-owned firms than in foreign-owned firms despite the fact that, in developing countries, the scale of firms is usually larger in foreign-owned firms. This larger value in domestically-owned firms may be because the scale of state-owned firms, e.g., Haier Co., is generally huge in China due to the past planning economy. Third, the mean value of real value-added per person in foreign-owned firms is higher than that in domestically-owned firms. Also in the real total sales per person, foreign-owned firms have a higher mean value. Therefore, the basic statistics show that foreign-owned firms have relatively high performance than domestically-owned firms in

Shandong Province.

== Table 2 ==

In Table 3, the mean values of some variables in foreign-owned firms are provided by the nationality. First, HMT (Hong Kong, Macao, or Taiwan) have the largest number of firms. There are 46 and 72 firms in 2002 and 2003, respectively. The number of Korean firms (27 in 2002 and 48 in 2003) is the second largest, and that of Japanese firms (25 in 2002 and 29 in 2003) and that of the United States (13 in 2002 and 23 in 2003) come next to them. Second, there are some doubts on the accuracy of original individual data for some nationalities. The mean values of real value added per person and real total sales per person in Malaysia, Denmark, and Thailand seem to be abnormally high. Excluding these 3 countries¹, however, the advanced countries-owned firms have relatively high values in both real VA/L and real TR/L, though the developing countries-owned firms are relatively large in scale.

== Table 3 ==

These are summarized as follows. In Shandong Province, foreign-owned firms have larger mean values in economic performance than domestically-owned firms. In particular, the performance is much higher in developed countries. In next section, we will again obtain these findings in regression analysis.

¹ In regression analysis in the next section, we do not exclude these 3 countries.

5. Empirical Analysis

In this section, by using our dataset, we empirically investigate whether foreign-owned firms perform better than domestically-owned firms. We then examine differences in economic performance between foreign-owned and domestically-owned firms by the entry mode of foreign-owned firms, scale, and sector. Last, the differences among foreign-owned firms are investigated by the nationality.

First, differences between foreign-owned and domestically-owned firms are examined. We regress the following “baseline equation”:

$$\ln Z_{irs} = \beta_0 + \beta_1 \cdot \text{foreign}_{irs} + \beta_2 \cdot \text{scale499}_{irs} + \dots + \beta_6 \cdot \text{scale4999}_{irs} + \beta_7 \cdot \text{year2002}_{irs} \\ + \beta_8 \text{Sector1}_{irs} + \dots + \beta_{36} \text{Sector29}_{irs} + \beta_{37} \text{city1}_{irs} + \dots + \beta_{52} \text{city16}_{irs} + \varepsilon_{irs},$$

where Z is either real value added over labor or real total sales over labor. i , r , and s denote firm i , region r , and sector s . A variable *foreign* is a dummy variable that takes 1 when a firm concerned is a foreign-owned firm and 0 otherwise. To control scale-specific, industry-specific, and regional-specific elements, scale dummy variables² (category variables divided according to the number of employees, i.e., less than 499, 500-999, 1000-1499, 1500-2499, 2500-4999, and more than 5000), and sector dummy variables (minor classification), and regional dummy variables³ are added. By regressing this equation in real value added per person (productivity equation) and real total sales per person (sales equation) separately, we investigate if a coefficient for the foreign dummy variable is significantly positive or not.

² As argued in the previous section, state-owned firms have relatively large scale compared even with foreign-owned firms. Therefore, the scale dummy variables contribute partly to control ownership types among domestically-owned firms.

³ There are 17 cities in Shandong Province.

Regression results are shown in Table 4. We can immediately see that the coefficients for the foreign dummy variable in both equations are positively significant without/with controlling firms' scale and location. With these pooled data, we can conclude that, in Shandong Province, foreign-owned firms have significantly higher performance than domestically-owned firms.

== Table 4 ==

Second, differences in the performance among foreign-owned firms are examined by decomposing the foreign dummy variable into joint and solely dummy variables. The joint (solely) dummy variable is a binary variable that takes unity if the entry mode of a foreign-owned firm is a joint venture (a solely-owned firm). The regression results of equations replacing the foreign dummy variable with the two dummy variables are reported in Table 4. The coefficients for joint and solely dummy variables in both equations are positively significant without including scale and regional dummy variables. After adding the dummy variables, however, the coefficient for the solely dummy variable turns out to be insignificant. These results imply that foreign-owned firms, particularly foreign-owned joint ventures have higher performance.

Third, differences in the performance are examined by scale. We regress the baseline equation above by scale. Results are in Table 5. Foreign-owned firms with less than a thousand employees are significantly estimated to be positive in both equations. On the other hand, foreign-owned firms with more than 2,500 employees have lower

productivity and sales. Therefore, we can conclude that relatively small sized foreign-owned firms perform much better than domestically-owned firms, while the performance in large-sized foreign-owned firms is worse.

== Table 5 ==

It is somewhat surprising result that the large-sized domestically-owned firms have the higher performance than the foreign-owned-firms. This may be because the drastic reform of large-sized state-owned firms in the 1990s, e.g., massive layoffs, succeeds in raising their productivities. In addition, large-scaled state-owned firms in our sample are top-class firms even in the entire China such as Haier and thus seem to be easy to get supports from the local government. These reform and policy preferential treatment may give the significantly negative foreign coefficient in the sample of large-sized firms.

Fourth, differences in the performance are examined by sector (major classification). As in the case of the examination by scale, we regress the baseline equation by sector. Results are reported in Table 6. Sector 3 (petroleum, industrial chemicals) has a positive and significant foreign dummy coefficient in the productivity. The coefficients of sector 3 and sector 5 are positive and significant in the sales. On the other hand, the negative sign of the coefficients in sector 2 (textiles, wearing apparel) indicates that the real labor productivity of foreign-owned firms is lower than that of domestically-owned firms.

== Table 6 ==

When we decompose foreign dummy into joint and solely dummies, more

notable differences emerge among sectors. In sector 3, coefficients for both the two dummies are positively estimated. The coefficients for joint ventures are estimated significantly to be a relatively high positive value also in sector 5 and so do those for solely-owned firms in sector 4. It is difficult to interpret these differences among sectors. We obviously need further to analyze more closely with the more detailed data.

Fifth, we introduce spillover effects that have attracted large interest in developing countries including China. The spillover variable is constructed by region as a ratio of the number of foreign firms to the number of all firms in the same region. Regression results are presented in Table 4. Results in the coefficients for foreign, joint, and solely dummy variables are qualitatively unchanged from the results before. On the other hand, the coefficients for the spillover variable are positive and significant. That is, the more foreign firms in a region, the higher the firms' performance is. This suggests the existence of intra-regional spillover effects through intentional or unintentional technological or knowledge transfers from foreign-owned firms.

Sixth, differences in the performance among foreign-owned firms are examined by their home country. Several nationality dummy variables are introduced; Japan, Korea, HMT (Hong Kong, Macao, and Taiwan), the USA, the UK, France, Germany, and others. For instance, Japan dummy variable takes unity if the nationality of a foreign-owned firm is Japan. Regression results are shown in Table 7. The coefficients for Japan, France, and Others dummies are positively estimated in both real labor productivity

and real total sales per person. The coefficient for Germany and for Korea is estimated significantly to be positive in the productivity and the total sales, respectively. These indicate that the firms with those nationalities have higher performance compared with not only domestically-owned but the other foreign-owned firms. These results are unchanged after controlling spillover effects.

== Table 7 ==

Seventh, differences in the performance among foreign-owned firms are examined not only by their home country but also by sector. Table 7 also presents the results. The coefficients for Korea dummy in the productivity equation are positive and significant in sector 4 (formed and fabricated materials) and sector 5 (machinery). This suggests that, even among foreign-owned firms, Korean firms have relatively high productivity in sector 4 and 5. In addition, the coefficient for Japan dummy in sector 5, that for France dummy in sector 4, and that for Germany dummy in sector 3 (petroleum industrial chemicals) are estimated significantly to be positive, indicating their relatively high productivity. Almost the same results are obtained in sales equation.

6. Concluding Remarks

This paper compiled the firm-level data of Shandong Province and examined whether economic performance, e.g., labor productivity, of foreign-owned firms, particularly of Korean firms, was higher than that of domestically-owned firms. In regression analysis, we found that

foreign-owned firms achieved significantly higher economic performance. In particular, Korean firms in machinery sector have relatively high performance among firms including foreign-owned firms.

It is obvious that we need further to investigate the determinants of differences in economic performance among foreign-owned firms in Shandong Province. It became quite difficult to interpret regression results once we analyzed the differences between joint ventures and solely-owned firms, between large- and small-sized firms, and among sectors. To clear these differences, we need the more detailed analyses and data.

The investigation on the determinants in Shandong Province may become important also in the area of spatial economy. As argued above, Shandong Province has hosted a large number of Korean firms. Examining economic performance of Korean firms in Shandong Province may also enable us to clear relationship between the performance and agglomeration benefits.

Appendix. Sectoral codes

Major classification		Minor classification	
1	Foods, Beverages, and Tobacco	1	Food from Agricultural Products
		2	Foods
		3	Beverages
		4	Tobacco
2	Textiles, Wearing Apparel	5	Textile
		6	Textile Wearing Apparel
		7	Leather, Fur, Feather, and Related Products
3	Petroleum, Industrial Chemicals	13	Petroleum, Coking, Processing of Nuclear Fuel
		14	Raw Chemical Materials and Chemical Products
		15	Medicines
		16	Chemical Fibers
4	Formed and Fabricated Materials	17	Rubber
		18	Plastics
		19	Non-metallic Mineral Products
		20	Ferrous Metals
		21	Non-ferrous Metals
		22	Metal Products
5	Machinery	23	General Purpose Machinery
		24	Special Purpose Machinery
		25	Transport Equipment
		26	Electrical Machinery and Equipment
		27	Communication Equipment, Computers and Other Electronic Equipment
		28	Manufacture of Measuring Instruments and Machinery for Cultural Activity and Office Work
6	Other Manufactured Product	8	Wood, Bamboo, Rattan, Palm, and Straw Products
		9	Furniture
		10	Paper and Paper Products
		11	Printing, Reproduction of Recording Media
		12	Articles For Culture, Education, and Sport Activity
		29	Other Manufacturing Industries
		30	Recycling

References

- Cheng, L. K. and Wu, C. (2001), 'Determinants of the Performance of Foreign Invested Enterprises in China', *Journal of Comparative Economics*, **29**, 347-365.
- Cull, R. J. and Xu, L. C. (2005), 'Institutions, Ownership, and Finance: the Determinants of Profit Reinvestment among Chinese Firms', *Journal of Financial Economics*, **77** (1), 117-146.
- DACO Industrial Research Institute (2004), *List of Korean Corporations in China*, VISTA P. S.
- Doms, M. E. and Jensen, J. B. (1998), 'Comparing Wages, Skills, and Productivity between Domestically and Foreign-Owned Manufacturing Establishments in the United States', in Baldwin, R. E., Lipsey, R. E. and Richardson, J. D. (eds), *Geography and Ownership as Bases for Economic Accounting*, Chicago, IL: University of Chicago Press.
- Gong, B., Xu, L. C. and Tan, K. (2003), 'Regional Protectionism in China: Direct Micro Evidence', Forthcoming in *China Journal of Economics*.
- Kimura, F. and Kiyota, K. (2004), 'Foreign-owned versus Domestically-owned Firms: Economic Performance in Japan', Forthcoming in *Review of Development Economics*.
- Lin, Y. and Zhu, T. (2001), 'Ownership Restructuring in Chinese State Industry: an Analysis of Evidence on Initial Organizational Changes', *the China Quarterly*, (166), 305-341.
- Hallward-Driemeier, M., Wallsten, S. J. and Xu, L. C. (2003), 'The

- Investment Climate and the Firm: Firm-Level Evidence from China', *World Bank Policy Research Working Paper*, No. 3003.
- Wang, X., Xu, L. C. and Zhu, T. (2004), 'State-owned Enterprises Going Public-the Case of China', *Economics of Transition*, **12** (3), 467-487.
- Wen, M., Li, D. and Peter, L. (2002), 'Ownership and Technical Efficiency--a Cross-section Study on the Third Industrial Census of China', *Economic Development and Cultural Changes*, **50** (3), 709-34.
- Xu, L. C., Zhu, T. and Lin, Y. (2005), 'Politician Control, Agency Problems and Ownership Reform Evidence from China', *Economics of Transition*, **13** (1), 1-24.
- Zhang, A., Zhang Y. and Zhao, R. (2001), 'Impact of Ownership and Competition on the Productivity of Chinese Enterprises', *Journal of Comparative Economics*, **29** (2), 327-346.
- Zhang, L. (2004), 'The Roles of Corporatization and Stock Market Listing in Reforming China's State Industry', *World Development*, **32** (12), 2031-2047.

Table1. Reliability Check

Sector	Number of Firms		Value Added (10 thousand yuan)		Labor (person)	
	Statistics	Our Data	Statistics	Our Data	Statistics	Our Data
1	343	308	3,960,650	4,061,582	396,805	379,309
2	366	347	2,875,096	2,963,071	632,586	620,609
3	291	262	4,303,663	7,612,140	366,751	432,535
4	492	430	5,095,119	5,321,164	592,319	571,270
5	581	509	7,004,625	6,691,668	646,158	620,932
6	194	166	1,637,720	1,582,128	242,866	220,715
Total	2,267	2,022	24,876,873	28,231,753	2,877,485	2,845,370

Notes: As for sectoral code (major classification), see Appendix. “Statistics” and “Our Data” mean aggregate data in 2003 reported by Shandong’s government and aggregate data produced from data we compiled, respectively.

Table 2. Basic Statistics

	All firms			Foreign-owned firms			Domestically-owned firms		
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.
Value added (10 thousand yuan)									
2002	1,357	13263	75989	181	6812	9991	1,176	14256	81493
2003	2,054	13860	79557	293	7839	14421	1,761	14862	85683
Labor (person)									
2002	1,356	1582	3092	181	831	962	1,175	1697	3285
2003	2,054	1400	2848	293	888	885	1,761	1485	3046
Total sales (10 thousand yuan)									
2002	1,357	42511	155236	181	23373	35232	1,176	45456	165998
2003	2,054	43555	156875	293	25214	44765	1,761	46606	168253
Real Value added/Labor									
2002	1,341	9	12	180	13	17	1,161	8	11
2003	2,021	10	13	292	11	20	1,729	9	12
Real Total sales/Labor									
2002	1,341	29	42	180	46	63	1,161	27	38
2003	2,021	30	41	292	36	69	1,729	29	35

Table 3. Mean Values by Nationality

	Value added 10 thousand yuan		Labor (person)		Total sales 10 thousand yuan		Real VA/L		Real TS/L	
	2002	2003	2002	2003	2002	2003	2002	2003	2002	2003
Australia	7162 (1)		278 (1)		21559 (1)		26 (1)		78 (1)	
Canada		1719 (1)		388 (1)		8594 (1)		4 (1)		21 (1)
Denmark	20981 (1)	32771 (1)	730 (1)	900 (1)	74622 (1)	95111 (1)	29 (1)	36 (1)	102 (1)	103 (1)
France	5237 (3)	14158 (2)	370 (3)	549 (2)	21696 (3)	40584 (2)	16 (3)	25 (2)	67 (3)	72 (2)
Germany	4341 (5)	4778 (6)	218 (5)	489 (6)	10787 (5)	13866 (6)	25 (5)	12 (6)	63 (5)	35 (6)
HMT	6315 (46)	7119 (72)	912 (46)	916 (72)	20046 (46)	20200 (72)	10 (46)	8 (72)	34 (46)	24 (72)
Indonesia	4959 (2)	15206 (1)	1494 (2)	2100 (1)	46312 (2)	76083 (1)	2 (2)	7 (1)	30 (2)	37 (1)
Italy		4272 (3)		394 (3)		16855 (3)		13 (3)		49 (3)
Japan	7693 (25)	8250 (29)	966 (25)	1051 (29)	27714 (25)	33257 (29)	17 (25)	12 (29)	55 (25)	49 (29)
Korea	7393 (27)	10563 (48)	773 (27)	830 (48)	30895 (27)	32764 (48)	13 (27)	18 (48)	58 (27)	55 (48)
Malaysia	29746 (1)	48575 (1)	348 (1)	393 (1)	109726 (1)	190100 (1)	85 (1)	117 (1)	315 (1)	459 (1)
Philippines	2002 (1)	2490 (1)	925 (1)	830 (1)	7627 (1)	9625 (1)	2 (1)	3 (1)	8 (1)	11 (1)
Singapore	2545 (4)	3317 (7)	411 (4)	668 (7)	11814 (4)	17504 (7)	7 (4)	5 (7)	33 (4)	25 (7)
Sweden	3305 (1)		150 (1)		9094 (1)		22 (1)		61 (1)	
Switzerland	5590 (4)	11405 (2)	215 (4)	469 (2)	18412 (4)	28113 (2)	27 (4)	23 (2)	89 (4)	56 (2)
Thailand	43316 (1)	37122 (1)	1995 (1)	2001 (1)	107125 (1)	98002 (1)	22 (1)	18 (1)	54 (1)	47 (1)
UAE		3704 (1)		689 (1)		20481 (1)		5 (1)		28 (1)
UK	4388 (2)	5727 (4)	519 (2)	506 (4)	15072 (2)	17025 (4)	11 (2)	12 (4)	36 (2)	37 (4)
USA	7319 (13)	9363 (23)	558 (13)	1105 (23)	19823 (13)	30909 (23)	17 (12)	11 (22)	46 (12)	38 (22)
Total	7100 (137)	8643 (203)	784 (137)	896 (203)	24812 (137)	27893 (203)	14 (136)	13 (202)	50 (136)	41 (202)

Notes: The parenthesis indicates the number of firms. “Real VA/L” and “Real TR/L” indicate real value-added per employment and real total sales per employment, respectively.

Table 4. Foreign-owned Firms vs. Domestically-owned Firms

	Productivity		Sales		
foreign	0.251** (0.045)	0.099* (0.043)	0.111* (0.044)	0.228** 0.078* (0.039) (0.038)	0.094* (0.038)
joint		0.332** 0.168** (0.059) (0.057)	0.191** (0.058)	0.304** 0.147** (0.052) (0.049)	0.171** (0.050)
solely		0.167* 0.043 (0.075) (0.072)	0.035 (0.073)	0.181** 0.050 (0.065) (0.062)	0.054 (0.063)
spillover		0.098** 0.099** (0.021) (0.021)		0.098** 0.097** (0.018) (0.018)	
constant	2.166** 2.798** (0.064) (0.076)	2.169** 2.799** (0.064) (0.076)	2.698** 2.701** (0.078) (0.078)	3.565** 4.086** 3.567** 4.085** (0.056) (0.066) (0.056) (0.066)	4.091** 4.089** (0.068) (0.067)
scale	no	yes	yes	no	yes
year	yes	yes	yes	yes	yes
sector	yes	yes	yes	yes	yes
city	no	yes	no	yes	no
Obs.	3,340	3,340	3,340	3,340	3,340
R-sq	0.1275	0.2380	0.1283	0.2388	0.1985
				0.1512	0.2679
				0.1528	0.2384
				0.2690	0.2398

Notes: Heteroskedasticity-consistent standard errors (White) are in parentheses. ** and * show 1% and 5% significance, respectively.

Table 5. Foreign-owned Firms vs. Domestically-owned Firms by Scale

	0-499	500-999	1000-1499	1500-2499	2500-4999	5000-
<u>Productivity</u>						
foreign coef.	0.246** (0.070)	0.146* (0.070)	0.044 (0.125)	-0.154 (0.131)	-0.717** (0.270)	-1.613** (0.275)
scale	no	no	no	no	no	no
year	yes	yes	yes	yes	yes	yes
sector	yes	yes	yes	yes	yes	yes
city	yes	yes	yes	yes	yes	yes
R-sq	0.178	0.1622	0.2714	0.3613	0.3758	0.7428
Obs.	806	1,143	509	482	277	123
<u>Sales</u>						
foreign coef.	0.205** (0.060)	0.190** (0.061)	0.081 (0.100)	-0.195 (0.123)	-0.798** (0.218)	-1.700** (0.301)
scale	no	no	no	no	no	no
year	yes	yes	yes	yes	yes	yes
sector	yes	yes	yes	yes	yes	yes
city	yes	yes	yes	yes	yes	yes
R-sq	0.2102	0.1714	0.3336	0.3271	0.4290	0.7177
Obs.	806	1,143	509	482	277	123

Notes: Only a coefficient for foreign dummy variable is reported. Heteroskedasticity-consistent standard errors (White) are in parentheses. ** and * show 1% and 5% significance, respectively.

Table 6. Foreign-owned Firms vs. Domestically-owned Firms by Sector

	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6
<u>Productivity</u>						
foreign	0.213 (0.115)	-0.204* (0.087)	0.464** (0.148)	0.137 (0.086)	0.168 (0.097)	-0.093 (0.114)
joint	0.031 (0.162)	-0.301* (0.141)	0.438* (0.172)	-0.060 (0.118)	0.398** (0.118)	0.138 (0.148)
solely	0.316 (0.189)	-0.187 (0.123)	0.772* (0.324)	0.696** (0.163)	-0.073 (0.159)	-0.499** (0.187)
scale	yes	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes	yes
sector	yes	yes	yes	yes	yes	yes
city	yes	yes	yes	yes	yes	yes
R-sq	0.1967	0.2981	0.3154	0.2491	0.1934	0.2184
Obs.	538	563	461	673	818	287
<u>Sales</u>						
foreign	0.160 (0.101)	-0.150* (0.075)	0.332** (0.123)	0.080 (0.080)	0.186* (0.081)	-0.066 (0.088)
joint	0.091 (0.142)	-0.219 (0.121)	0.304* (0.144)	-0.104 (0.104)	0.423** (0.104)	0.148 (0.117)
solely	0.114 (0.165)	-0.146 (0.106)	0.608* (0.271)	0.574** (0.153)	0.061 (0.139)	-0.274 (0.148)
scale	yes	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes	yes
sector	yes	yes	yes	yes	yes	yes
city	yes	yes	yes	yes	yes	yes
R-sq	0.2501	0.3000	0.3377	0.2439	0.2130	0.3157
Obs.	538	563	461	673	818	287

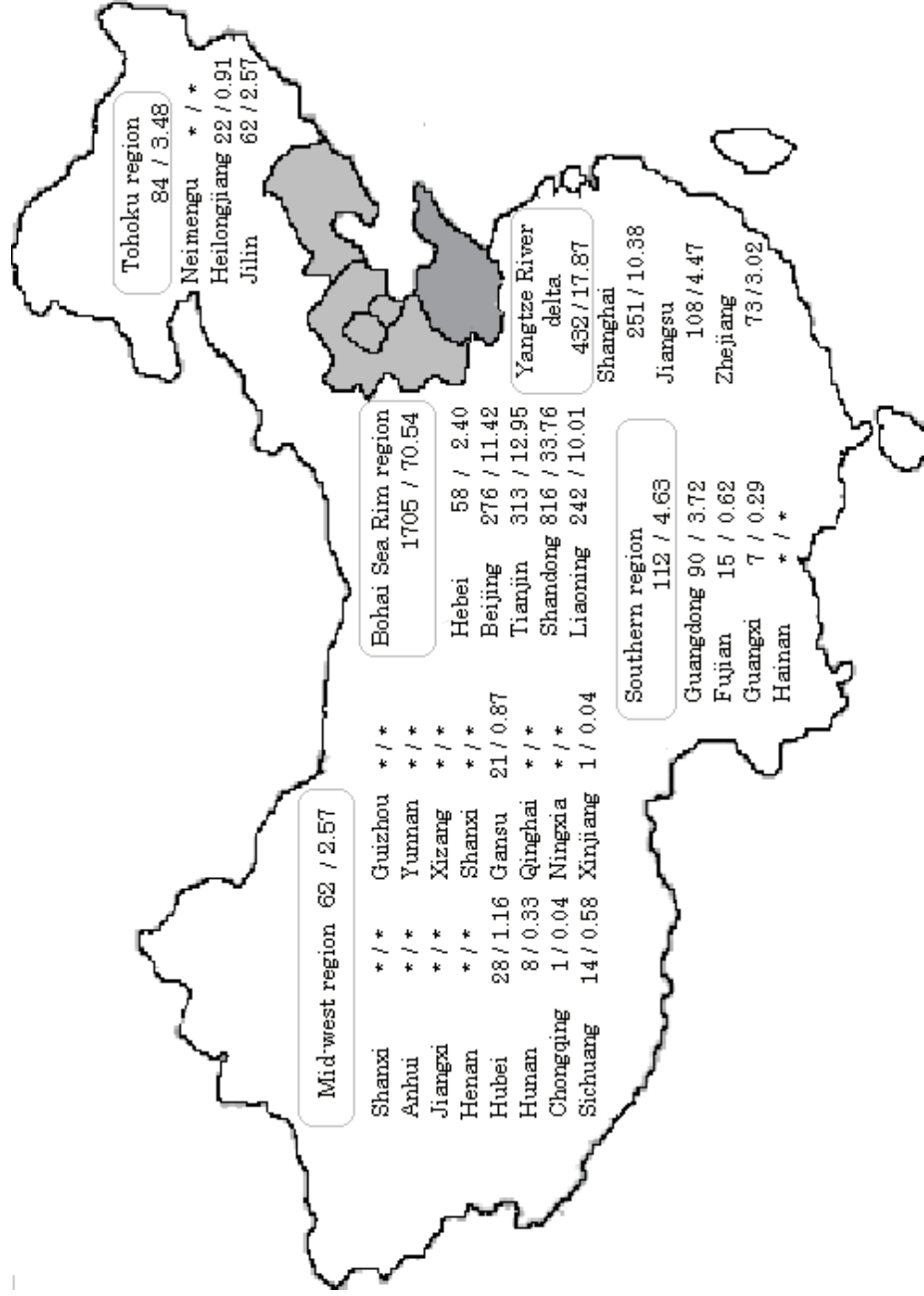
Notes: Heteroskedasticity-consistent standard errors (White) are in parentheses. ** and * show 1% and 5% significance, respectively. As for sectoral code (major classification), see Appendix.

Table 7. Economic Performance by Nationality

	All	All	Sector 1	Sector 2	Sector 3	Sector 4	Sector 5	Sector 6
Productivity								
Japan	0.239*	0.235*	-0.130	-0.272	0.754	0.172	0.555**	-1.090*
	(0.109)	(0.111)	(0.226)	(0.241)	(0.498)	(0.254)	(0.210)	(0.516)
Korea	0.185	0.173	0.373	-0.186	0.521	1.712**	0.516**	-1.174**
	(0.102)	(0.104)	(0.514)	(0.158)	(0.372)	(0.412)	(0.174)	(0.275)
HMT	-0.068	-0.007	-0.112	-0.313*	-0.061	-0.053	-0.017	0.238
	(0.079)	(0.080)	(0.234)	(0.150)	(0.484)	(0.130)	(0.212)	(0.172)
USA	0.216	0.200	0.389	-0.198	0.980*	0.407	0.071	-0.636
	(0.138)	(0.142)	(0.444)	(0.373)	(0.438)	(0.297)	(0.246)	(0.375)
UK	0.031	0.084			-0.036		0.128	
	(0.334)	(0.342)			(0.478)	1.652**	(0.527)	
France	0.832*	0.808*			0.337	0.508	0.999	
	(0.370)	(0.379)			(0.584)	-0.360	(0.908)	
Germany	0.373	0.474			1.331**	0.706	0.385	-0.638
	(0.248)	(0.253)			(0.483)		(0.409)	(0.590)
Other	0.455**	0.375*	0.672*	-0.160	0.368	0.505	-0.227	1.026*
	(0.143)	(0.146)	(0.263)	(0.440)	(0.341)	(0.318)	(0.408)	(0.431)
spillover		0.098**						
		(0.021)						
constant	2.774**	2.664**	2.541**	2.509**	2.375**	2.709**	2.386**	2.162**
	(0.077)	(0.080)	(0.126)	(0.150)	(0.194)	(0.128)	(0.125)	(0.177)
scale	yes	yes	yes	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes	yes	yes	yes
sector	yes	yes	no	no	no	no	no	no
city	yes	no	yes	yes	yes	yes	yes	yes
R-sq	0.2442	0.2025	0.1141	0.2807	0.2877	0.2747	0.1721	0.2380
Obs.	3,214	3,214	519	544	453	647	787	264
Sales								
Japan	0.251**	0.250**	-0.115	-0.125	0.695	0.082	0.566**	-0.154
	(0.094)	(0.096)	(0.195)	(0.207)	(0.419)	(0.237)	(0.183)	(0.403)
Korea	0.230**	0.218*	0.280	0.021	0.269	1.526**	0.523**	-0.714**
	(0.088)	(0.090)	(0.445)	(0.135)	(0.313)	(0.385)	(0.151)	(0.215)
HMT	-0.126	-0.066	-0.274	-0.377**	0.023	-0.055	0.016	0.072
	(0.068)	(0.069)	(0.203)	(0.129)	(0.406)	(0.121)	(0.185)	(0.134)
USA	0.205	0.202	0.307	-0.345	0.504	0.473	0.310	-0.289
	(0.119)	(0.122)	(0.385)	(0.319)	(0.368)	(0.278)	(0.214)	(0.293)
UK	-0.004	0.028			-0.091		0.139	
	(0.288)	(0.295)			(0.401)	1.546**	(0.458)	
France	0.995**	0.945**			0.437	0.474	1.426	
	(0.320)	(0.326)			(0.491)	-0.811	(0.790)	
Germany	0.115	0.224			0.942*	0.659	0.212	-0.577
	(0.214)	(0.218)			(0.405)		(0.356)	(0.461)
Other	0.510**	0.464**	0.770**	0.154	0.427	0.427	0.207	1.256**
	(0.123)	(0.125)	(0.228)	(0.377)	(0.287)	(0.297)	(0.355)	(0.336)
spillover		0.095**						
		(0.018)						
constant	4.062**	4.056**	3.897**	3.586**	3.327**	3.770**	3.541**	3.230**
	(0.067)	(0.068)	(0.109)	(0.129)	(0.163)	(0.120)	(0.108)	(0.138)
scale	yes	yes	yes	yes	yes	yes	yes	yes
year	yes	yes	yes	yes	yes	yes	yes	yes
sector	yes	yes	no	no	no	no	no	no
city	yes	no	yes	yes	yes	yes	yes	yes
R-sq	0.2789	0.2460	0.1867	0.2910	0.2924	0.2662	0.1837	0.3096
Obs.	3,214	3,214	519	544	453	647	787	264

Notes: Heteroskedasticity-consistent standard errors (White) are in parentheses. ** and * show 1% and 5% significance, respectively. As for sectoral code (major classification), see Appendix.

Figure 1. Geographical Distribution of Korean FDI into China



Source: DACO Industrial Research Institute (2004)

Note: The numbers in left hand side and in right hand side indicate the number of Korean firms and its share in the whole number, respectively.