

The Determinants of Outward Foreign Direct Investment in China

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The Determinants of Outward Foreign Direct Investment in China

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Index

- 1 . Introduction
- 2 . Theoretical Analysis
- 3 . Model Hypotheses
- 4 . Econometric Tests and Results
- 5 . Conclusions

1 . Introduction

China is integrated rapidly with the world economy by increasing its foreign investment linkage with other countries. China's direct investment both inward and outward foreign direct investments (FDIs) provides important net long-term economic benefits for both home and host countries. An important part of the economic reform process in China has been the encouragement of FDI.

Over the past decade, China has established itself as the top recipient of FDI among developing countries and second in the world after the United States. In recent years, the Chinese financial presence globally has increased substantially, in terms of loans provided, investments made, and other types of flows. In particular, there has been a marked rise in outward Chinese foreign direct investment in recent years. This has spurred discussion and analyses of the motivation and implications of an increased Chinese presence, not least in developing economies. On the one hand, increased Chinese investment may be good for host countries, since more companies vie for locations and markets, and potentially expand opportunities for transferring of technology. On the other hand, however, concerns have been voiced that Chinese investment or financial flows more generally have contributed to propping up bad regimes in host countries, and been conducted with a view to exploiting their natural resources.

According to the special report of the Transnational Corporations (TNCs) and Canada-China FDI, the development of China's outward FDI can be classified into two stages: (1) 1982-2000, spontaneous stage, (2) 2000-current, government-oriented stage. Starting from virtually no OFDI in 1979, the initial outward FDI flows from China are few and mainly for establishing offices and

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agencies in other countries. In 1990s the FDI flows grew increasingly volatile. In 2005 China was the 4th largest investor among emerging markets, up from 14th in 2004 with 72.4% of all economies in the world receiving Chinese FDI. The annual growth rate was 19.7%, which was much higher than that of GDP. Based on the results of the work of the Organization for Economic Co-operation and Development (OECD) investment committee, China's OFDI flow and stock stands as the 4th and 6th largest respectively among developing countries.

The rest of the essay proceeds as follows. Section 2 briefly introduces the gravity model we use. Section 3 describes 4 hypotheses and data source of this paper. Based on the hypotheses and data, econometric tests and results are presented in section 4. Section 5 summarizes and concludes the paper.

2 . Theoretical Analysis

The gravity model is a basic tool to observe and study the determinants of FDI. This model, which comes from the law of gravity of Newtonian mechanics in physics, indicates that the gravitational force between objects is in proportion to the size and quality of the objects, and in inverse proportion to the distance between the objects.

Tinbergen (1962) was the first person to explain the bilateral trade flows using the gravity model. He concluded that the trade flows between two countries depends on the scale of their economies and their geographical distance, which is the same as the basic principle of the law of the universal gravitation. He believed that the explanatory variables of the commodity flow between two countries, X_{ij} , include the GDP of country Y_i and that of country Y_j , agreements on preferential trade between countries P_{ij} and geographic distance D_{ij} , and so on. These explanatory variables contain both factors favorable to the flows of commodities and negative factors that impede the flows, as follows:

$$X_{ij} = \alpha_0 Y_i^{\alpha_1} Y_j^{\alpha_2} Y_{ij}^{\alpha_3} Y_{ij}^{\alpha_4} \quad (1)$$

Anderson (1979) explained investment flows of international direct investment using an expanded version of the gravity model, which to a certain extent compensated for shortcomings of the gravity model's theoretical basis. With the "small countries case" assumption, he explained factor mobility between countries better. His version of the classic gravity model is shown in the following equation:

$$M_{ijk} = \alpha_k Y_i^{\beta_k} Y_j^{\gamma_k} N_i^{\zeta_k} N_j^{\xi_k} d_{ij}^{\mu_k} U_{ijk} \quad (2)$$

Here, M_{ijk} is the element flows between the two economies, Y_i and Y_j are the amount of national income of the two economies, N_i and N_j are the total population of the two countries, d_{ij} is the distance between the two countries and U_{ijk} is the error term when the expected value of the natural logarithm equals 0, that is $E(\ln U_{ijk}) = 0$

The application of variables is multitudinous when using the gravity model for FDI study. Not only does the model use regular variables such as difference in per capita income, difference in GDP and difference in geographical distance, but other kinds of variables also have been widely used in gravity model study, for example, difference in the population size, difference in languages, difference in birth rates, difference in per capita agricultural land, difference in the average temperature, difference between the urban and rural population, difference in consumer preferences and so on. The connotation and extension of variables continue to be expanded. To be useful in the long term, some indicators have undergone major changes in content, for example, distance no longer refers to just the “geographical distance” but now also includes the “time distance” and “psychological distance”, “economic distance” and other type of distance. For economies in different periods, the factors promoting or hindering their foreign investment are different, for example, current FDI activities in China are mostly concentrated on seeking resource and market, and investment direction has a close relationship with richness of the mineral resource and total market capacity of the host country. This will be reflected in the subsequent empirical test.

The FDI gravity model is usually used in the following form:

$$\ln(FDI_{ij}) = \alpha + \beta \ln(GDP_i) + \theta \ln(GDP_j) + \phi \ln(d_{ij}) + \mu_{ij} \quad (3)$$

Here, GDP_i and GDP_j stand for the GDP of the two countries and d_{ij} represents the difference between the two systems or their distance; μ_{ij} is the error term.

3 . Model Hypotheses

In this section we will focus on the factors affecting China's FDI, including market size, development level and richness of natural resources in the host country and the country's trade relation with China. We use relevant data in 2009 from 28 economies located on different continents as needed, including Hong Kong, China, India, Indonesia, Japan, Kazakhstan, Korea, China Macau, Malaysia, Kyrgyzstan, Pakistan, Singapore, Thailand, Turkey, Algeria, Zambia, South Africa, Nigeria, Germany, Italy, Russia, Great Britain, France, Brazil, Mexico, Venezuela, the United States, Canada and Australia. They form a group of cross-sectional data. Through testing the cross-sectional data, we will examine the importance of host country market factors and analyze the impact of the country's natural resources on China's FDI.

To eliminate the factors that determine the real motivation of FDI, such as return on investment, capital flight and so on, we exclude the British Virgin Islands and Cayman Islands, two offshore financial centers, from our analysis. Stock of FDI selected from these economies accounts for about 82% of China's FDI and the sample has good representation in reality.

We tested the following model hypotheses:

Hypothesis 1: the market size of the host country is positively correlated with China's direct investment in it;

Hypothesis 2: the economic development level of the host country (using "GDP per capita") is positively correlated with China's direct investment in it;

Hypothesis 3: China's direct investment in the region is positively correlated with China's history of export trade there;

Hypothesis 4: China's FDI is mostly comprised of resource-seeking investments.

The test equation is as follows:

$$\ln FDI_i = \alpha + \beta_1 \ln GDP_i + \beta_2 \ln PCGDP_i + \beta_3 \ln EXPO_i + \beta_4 \ln PE_i + \varepsilon_i \quad (4)$$

In the equation, FDI: stock direct investment of China in region *i*. Data come from the Statistical Bulletin of China's FDI in 2010;

GDP_{*i*}: the real GDP of the sample region *i*, which is a commonly used index in the gravity model. Data are from the website of the World Bank;

PCGDP: per capita GDP. It stands for the gap with China's economic development stage. Data are from the website of the World Bank;

EXPO: China's total exports to the sample region *i* in 2009. It indicates the strength of economic ties between the sample region and China and it is also one of the most important indicators of the "psychological distance" of direct investment. Data are from the China General Administration of Customs in 2010. Generally speaking, the more exports to a region, the more familiar the enterprises of China are with the region and the shorter the psychological distance is, and thus there would be more direct investment in the region. With the economic globalization today, the impact of geographical distance is shrinking, and therefore, we used the quotas of history export trade as an alternative index of "psychological distance".

PE_{*i*}: the proportion of agricultural raw materials, fuels, minerals and metals exports in the total export goods value of sample areas *i*. Data are from the website of the World Bank. This proportion is used to determine whether a country is a primary product exporter. If the index is generally significant, it indicates that our current FDI tends to be a resource-seeking investment. If not, it indicates that our current FDI is not of the resource-seeking type.

4 . Econometric Tests and Results

4.1 Stationarity Tests

Some non-stationary economic time series exhibit a common trend, but these sequences themselves do not have a certain direct correlation. If we regress these data, the R^2 value would be high, but the result is moot and the regression is spurious. According to conventional procedures, to avoid spurious regression and ensure the validity of estimation, we first use the

augmented Dickey - Fuller (ADF) unit root test method respectively to do the stationary test of the FDI, GDP, PCGDP, EXPO and PE sequence before performing regression analysis. After a comparative analysis, we take the lagging number as two, and the test results are as shown in Table 1 to Table 6:

Table 1 LNFDI unit root test result

	t-Statistic	Prob.
Augmented Dickey-Fuller test statistic	-7.172369	0.0000
Test critical values:		
1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

Table 2 LNGDP unit root test result

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.004846	0.5694
Test critical values:		
1% level	-4.394309	
5% level	-3.612199	
10% level	-3.243079	

Table 3 LNGDP unit root test results in a first-order difference

Variable	Coefficient	Std.Error	t-Statistic	Prob.
LNGDP(-1)	-0.504897	0.251838	-2.004846	0.0587
D(LNGDP(-1))	-0.427062	0.192317	-2.220609	0.0381
C	3.306149	1.903842	1.736567	0.0078
@TREND(1)	0.073612	0.054356	1.354249	0.1908

Table 4 LNPCGDP unit root test result

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.781199	0.0041
Test critical values:		
1% level	-4.374307	
5% level	-3.603202	
10% level	-3.238054	

From Tables 1, 4, 5 and 6, it can be concluded that ADF test statistics of the logarithm of FDI, PCGDP, EXPO and PE are significantly less than the critical value 1%. We thus conclude that the logarithm of FDI, PCGDP, EXPO and PE is stationary, and from Tables 2 and 3, it can be concluded that the ADF test statistic of the logarithm of GDP is significantly greater than the

Table 5 LNEXPO unit root test result

		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		-4.759680	0.0043
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

Table 6 LNPE unit root test result

		t-Statistic	Prob.
Augmented Dickey-Fuller test statistic		-5.375996	0.0011
Test critical values:	1% level	-4.374307	
	5% level	-3.603202	
	10% level	-3.238054	

critical value 10%, so it is non-stationary. After taking the logarithm of GDP, the first-order difference shows the stationarity.

4.2 Regression analysis

According to the results of stationarity analysis, do the regression analysis to the test equation

(4). The regression results are as follows:

$$\ln FDI_i = 0.7959 - 0.1942 \ln GDP_i + 0.6255 \ln PCGDP_i + 0.2283 \ln EXPO_i + 0.7516 \ln PE_i + \varepsilon_i \quad (5)$$

Table 7 Regression analysis results

Variable	coefficient	Std. Error	t-Statistic	Prob.
C	0.795867	1.908006	0.417120	0.6810
D(LNGDP, 1)	-0.194159	0.101430	1.914225	0.0070
LNPCGDP	0.625462	0.192899	3.242423	0.0041
LNEXPO	0.228265	0.189183	-1.206585	0.0317
LNPE	0.751565	0.204946	3.667133	0.0015
R-squared	0.881144	Mean dependent var		6.767142
Adjusted R-squared	0.897372	S.D. dependent var		1.003882
S.E. of regression	0.792131	Akaike info criterion		2.548676
Sum squared resid	12.54942	Schwarz criterion		2.792451
Log likelihood	-26.85845	Hannan-Quinn criter.		2.616289
F-statistic	4.636580	durbin-Watson star		1.874588
Prob(F-statistic)	0.008218			

The regression analysis results in Table 7 show that the goodness of fit of R^2 reaches 0.8811 and adjusted R^2 equals 0.8974. This is excellent goodness of fit, and the result of the T-test of the independent variables D (LNGDP, 1), LNPCGDP, LNEXPO and LNPE is significant at the 5% level. Generally speaking, the results of the regression are satisfying.

Comparing the regression results of test equation (5) with hypothesis testing, we found that GDP is negative and not consistent with the hypothesis. This indicates that China's FDIs are mostly in countries with small overall market size. Developing in these countries with less competition from other investors is beneficial to our multinational corporations. In addition, Hong Kong takes a large part in China's total stock investments, and its overall market size is small. Including Hong Kong in our analysis also has a large impact on the measurement results. Economies with small overall size of the market include developed economies and developing economies. The overall market size is not a certain indication of whether the economy is developing in a country, per capita income of the region also needs to be considered. Overall, China's FDIs are mainly focused in small economies. In future development, China will gradually enter into the markets of the United States, Germany and other major countries. Therefore, there will be numerous strong competitors and more intense international competitions.

GDP per capita is positive with the opposite sign of GDP. It indicates that the greater the per capita incomes of the host country, the more FDIs from China's enterprises would be attracted there. The key factor may be that the current FDI in China are mostly trade-based, and these investors prefer to choose developed countries. For example, in 1999 in Zhejiang Province, the non-trade-based FDIs accounted for only 8% of the total FDIs and the proportion had risen to 16% by 2005. This suggests that trade-based FDIs were the primary investments for a long time in this region; 70% of the trade-based FDIs were in high-income countries whose per capita GDP was above \$ 9600. The trend that trade-based FDIs prefer high-income countries is very obvious.

If a country has a large overall market size but low per capita income, its attraction to the direct investment of multinational companies in China is relatively weak. For example, China's current investment in India is still relatively low, and it is not commensurate with India's overall economic size. Overall, our market-seeking direct investors prefer to enter countries with higher income levels.

The EXPO export target is positive, in line with hypothesis 3. This shows that China's FDIs have a close positive relationship with our international trade. The investments are of the trade-promotion type but not the trade-substitution type. The greater exports to the region, the more direct investments China will make in the region. This shows that China's FDIs lead to domestic exports and that FDI has a positive interaction with the international trade. At the same time it indicates that China's corporations are accumulating international experience from international trades. Those export activities of host countries will help reduce the "psychologi-

cal distance” between those countries and China. On the basis of familiarity, the FDI activities will be occur at a higher level.

PE is positive. This indicates that our multinational enterprises prefer to invest in countries with rich natural resources. Those countries with high proportions of exports of mineral, agricultural and other primary products are more attractive to China’s FDI. This is consistent with hypothesis 4 and also matches the actual development situation in China recently. In 2007, for example, the investment in the mining industry alone accounted for 61.9% of the total flow of China’s FDI, which were mainly investments in the oil and natural gas industry.

In recent years, because China’s enterprises have participated in developing foreign mineral resources, FDI in nature resources has increased significantly. FDI for oil, potash, iron ore and other minerals for which there is a shortage have reached a larger scale. By 2010, there were only 23 kinds of mineral resources of the 45 major mineral resources that can ensure our needs, and thus China depends on the foreign supply of more and more mineral species. Therefore, China’s FDI in the primary products may increase a lot in the near future. Huifang Cheng (2004) surveyed the FDI motivation of private enterprises in Zhejiang Province and found that accessing the host country’s natural resources and raw materials accounted for 40.9% of the demand, that for collecting and using patents and technical information accounted for 39.5% of the demand and that for using the abundant cheap labor resources in the host country accounted for 17.2% of the demand. Based on China’s rapid economic development in recent years, foreign and domestic investors are increasingly showing high investment enthusiasm for mineral and natural resources.

The key feature of the primary products proportion in total exports of the host country has had a significant impact on China’s FDI for a long time. China has gradually lost its advantage in having raw materials and its companies have begun to actively explore raw material supply channels. With economic growth, China has become an importer of oil and imports of other bulk minerals such as metal ore are increasing year by year. All of these factors indicate that the proportion of primary products in the exports of the host country reflects the richness of mineral resources in that country, which is positively correlated with the extent of China’s direct investment in the country. According to the statistics from the Ministry of Commerce, in 2006, China’s FDI in the mining industry accounted for 40.3% of FDI flows, which indicates that the natural resource-seeking character of investment is obvious.

5 . Conclusions

In this paper we will focus on the factors affecting China’s FDI, including market size, development level and richness of natural resources in the host country and the country’s trade relation with China. We use relevant data in 2009 from 28 economies located on different

continents as needed, forming a group of cross-sectional data. Through testing the cross-sectional data, we will examine the importance of host country market factors and analyze the impact of the country's natural resources on China's FDI. The followings are summaries and conclusions of the essay.

Comparing the regression results of test equation with hypothesis testing, we found that: (1) China's FDIs are mostly in countries with small overall market size. Developing in these countries with less competition from other investors is beneficial to our multinational corporations. (2) The greater the per capita incomes of the host country, the more FDIs from China's enterprises would be attracted there. The key factor may be that the current FDI in China are mostly trade-based, and these investors prefer to choose developed countries. (3) China's FDIs have a close positive relationship with our international trade. The investments are of the trade-promotion type but not the trade-substitution type. The greater exports to the region, the more direct investments China will make in the region. (4) China's multinational enterprises prefer to invest in countries with rich natural resources. Those countries with high proportions of exports of mineral, agricultural and other primary products are more attractive to China's FDI.

Our analysis shows that currently China's FDI currently is in higher coincidence with export destinations, and it prefers to invest in countries with higher per capita income and rich natural resources. Areas with small overall market size, like Hong Kong are the destination of our FDI. With the accelerating economic development of China and gradually increased competitiveness of domestic enterprises, FDI in China will gradually transfer from developed countries or small countries to developing countries and big countries. The advantage of the ownership will change to capital-intensive and technology-intensive industries. There will be more enterprises exploring international markets by FDI and becoming multinational companies with international competitiveness.

References

- China Statistical Yearbooks (2005-2009). Beijing: China Statistical Press.
- Haiying Ma. (2011) Overview of Outward FDI Flows of China International Business Research 4(3) 103-107
- Huifang Cheng. (2004) The Strategy China's Foreign Direct Investment in Private Enterprise Development. Beijing: China Social Sciences Publishing House
- Huifang Liu. (2007) The Research of FDI on Multinational Enterprises. Beijing: China Market Press Ltd
- James E Anderson. (1979) A Theoretical Foundation for the Gravity Equation. American Economic Review 69(1): 106-109
- Jan Tinbergen (1962) Shaping the World Economy: Suggestions for an International Economic Policy. New York: Twentieth Century Fund.
- Jens M. Arnold and Katrin Hussinger. (2010) Exports versus FDI German Manufacturing: Firm Performance and Participation in International Markets. Review of International Economics 18(4) 595-606
- John H. Dunning and Rajneesh Narula. (1996) The Investment Development Path Revisited: Some Emerging Issues.

- Foreign Direct Investment and Governments*, 1-41.
- John H. Dunning. (1988) Explaining International Production. London: Unwin Hyman, Ltd. 76-79
- John H. Dunning and Lin J. (2001) Incorporating Trade into the Investment Development Path: A Case Study of Korea and Taiwan. *Oxford Development Studies* (29/2) 145-154
- Katherin Marton and Cornelia McCarthy (2007) Is China on the Investment Development Path? *Journal of Asia Business* (2)
- Sanjiaya Lall (1982) Developing Countries as Exporters of Technology: A First Look at the Indian Experience. London: The Macmillon Press Ltd
- Louis T. Wells (1986) Third World Multinationals. Shanghai Translation Publishing Company 3, 6, 37-38
- Nicholas R. Lardy (1994) China in the World Economy. *Washington DC*, Institute for International Economics
- Peter J Buckley, and Mark Casson (1992) Multinational Enterprises in the Word Economy. Worcester, England Edward Elgar 10
- Peter J Buckley, and Mark Casson (2005) The Future of Multinational Enterprises. Beijing: China Financial Publishing House.
- Statistical Bulletin of China's Outward FDI 2009. The Website of the Ministry of Commerce of the People's Republic of China
- The Website of China General Administration of Customs in 2010
- The Website of the Ministry of Land and Resource of the People's Republic of China
- UNCTAD, World Investment Report, various issues
- Wei, S. J (1995) Attracting Foreign Investment: Has China Reached Its Potential? *China Economic Review* (6,2) 187-200
- Xiaohui Liu, Trevor Buck and Chang Shu (2005) Chinese Economic Development, the Next Stage: Outward FDI? *International Business Review* (14) 97-115
- Zongbin Zhang and Jing Ma (2007) The Research on Large-scale Foreign Direct Investment of China. *Theory Journal* (12) 39-44