

Empirical Research of Direct Investment in Countries along the "Belt and Road" based on Gravitational Models

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Abstract: The "Belt and Road" construction has opened a new page in the world development process. Countries along ASEAN have become the first choice of China's foreign investment (OFDI) especially because of their industrial structure and location advantages. In this paper, we empirically analyze the influencing factors of China on OFDI in ASEAN countries by building gravitational models and selecting the data from 2012-2019 through CSMAR, aiming at testing the hypotheses. The analysis results show that the market size of the host country, macroeconomic risks, financial development level, trade freedom, labor costs, the distance between China and the host country and the original investment cooperation are the main influencing factors. On this basis, the relevant suggestions are put forward in order to further promote the "going global" strategy and encourage more local enterprises to actively participate in OFDI activities.

1 INTRODUCTION

Relevant statistics show that in 2019, China's net OFDI was \$136.91 billion, and the total net OFDI reached \$2198.888 billion, which was particularly impressive in ten ASEAN countries. In the case of declining overall investment, at the end of 2019, China's direct investment stock in countries along the "Belt and Road" was \$179.47 billion, accounting for 8.2% of China's foreign direct investment stock.¹ There is no doubt that from Thailand's "eastern economic corridor", to Vietnam's "two corridors", to Indonesia's "global ocean fulcrum", aims to build political mutual trust, economic integration, cultural inclusive community "Belt and Road" community "initiative" circle "bigger, dividends in ASEAN countries, the ASEAN connectivity overall plan 2025 through shows China's confidence in ASEAN countries OFDI. Based on this, we can not help but ask, what factors have restricted China's foreign investment? What is China's investment preference for OFDI in ASEAN countries?

2 REVIEWS

On the study of OFDI, the theoretical community has formed a relatively rich results. Among them, investment development level theory of Dunning (Dunning, 1988); small-scale production technology theory of Wells (Wells, 1972); technical localization theory of Rao (Lall, 1983) target developing countries and analyze the advantages of foreign investment of developing countries. There are relatively few theories of OFDI in China, and more hypothetical arguments are based on empirical testing on the basis of learning from foreign mature theories. Through the collation of the literature, it can be concluded that the academic research on OFDI mainly focuses on the investment impact factors in the host country. Among them, market size, bilateral trade, labor costs, resource endowment, infrastructure, technical level and political environment are the main concentration points of research. Xiang Benwu (Xiang, 2009) used the generalized distance estimation of GMM to draw the research conclusion of a significant and negative correlation between the host country market size and foreign investment; Wang Juan and Fang Liangjing (Wang, 2011) found that through measurement and

¹The source is the 2019 China Foreign Direct Investment

Statistical Bulletin.

analysis, Chinese enterprises tend to invest in countries and regions with close exchanges with China and low political risk; Song Weijia (Song, 2008) through the panel data research believes that China's investment scale is significantly related to the oil reserves of the host countries, It is the decisive factor in the location selection of foreign direct investment; Jiang Guan hong (Jiang, 2012) found that China has the incentive for technology export to invest in developing countries, Investment in developed countries has an incentive to seek strategic assets.

At present, the research involving investment in countries along the "Belt and Road" mainly focuses on avoiding investment risks and deepening investment strategies, and the number of empirical studies is not large. On Zhou wuqi (Zhou, 2015), by analyzing the investment pattern of the Belt and Road, it was noted that deepening cooperation with countries is an important measure to promote the Belt and Road of the initiative; Zhang Yabin (Zhang, 2021) analyzed and evaluated the convenience of investment in the countries along the route through the construction of investment facilitation index evaluation system. Meng Mingqiang (Meng, 2016)

showed that our investment in host countries was mainly affected by its infrastructure construction and trade policies and tariff rates.

3 EMPIRICAL RESEARCH

3.1 Data Source and Sample Selection

The OFDI stock data of China to ASEAN countries used in this article are from the China Foreign Direct Investment Bulletin, and the rest of the data are from World Bank statistics. All the data were processed by factor analysis and regression using SPSS software, spanning 2012 – 2019. For some missing data using the "linear Trends at Points" function in the software.

3.2 Variable Setting

Based on the previous research results, the following seven variables were selected based on the data availability for subsequent empirical studies, and each variable is explained in Table 1:

Table 1: Variable description.

symbol	Variable name	Theoretical meaning	data sources
GDP (hereinafter called Market Size)	Host Country market size	The larger the market size, the better it is going to attract investment	The World Bank WDI database
IR (hereinafter called Macroeconomic Risk)	Host country's macroeconomic risks	The higher inflation rates, the more conducive to attracting investment	The World Bank WDI database
NDC (hereinafter called The Level of Financial Development)	Financial development level of the host countries	The more sound the financial system, the more conducive it is to attracting investment	The World Bank WDI database
TF (hereinafter called Trade Freedom)	Trade freedom of host countries	The higher the trade freedom, the more it can bypass trade barriers and attract investment	The World Bank WDI database
LC (hereinafter called Labour Cost)	Host-country labour costs	The lower the labor profit cost, the more conducive to reduce production costs and attract investment	The World Bank WDI database
DIS (hereinafter called The Distance Between The Two Countries)	Distance between the two countries	The farther the distance, the greater the suppression of external investment is	The French Social Outlook and the International Centre for Information Research CEPII database
OFDI (hereinafter called The Original Cooperation Situation)	The original economic cooperation between the two countries	The closer the cooperation, the more conducive to deepening investment	The Public Information Service website of the Ministry of Commerce

Table 2: Correlations.

		cooperation circumstances	trade free degree	two countries distance	financial development level	market house scale	labor costs
Pearson correlation	The original cooperation situation	1.000	0.425	0.108	0.484	-.240	-.082
	Trade freedom	0.425	1.000	-.026	-.341	-.355	0.657
	The distance between the two countries	0.108	-.026	1.000	-.227	-.019	0.187
	Financial development level	0.484	-.341	-.227	1.000	0.178	-.682
	Market size	-.240	-.355	-.019	0.178	1.000	-.232
	Labor costs	-.082	0.657	0.187	-.682	-.232	1.000
Sig(hemi)	The original cooperation situation	.	0.000	0.158	0.000	0.012	0.224
	Trade freedom	0.000	.	0.406	0.001	0.000	0.000
	The distance between the two countries	0.158	0.406	.	0.017	0.432	0.041
	Financial development level	0.000	0.001	0.017	.	0.049	0.000
	Market size	0.012	0.000	0.432	0.049	.	0.015
	Labor costs	0.224	0.000	0.041	0.000	0.015	.

Table 3: Coefficientsa*.

model	Non-standardized coefficients		Standard coefficient	t	Sig.	
	B	Standard, error				
1	(constant)	-16.516	2.724		-6.062	.000
	Trade freedom	3.681	.398	.742	9.257	.000
	The distance between the two countries	1.566	.286	.320	5.469	.000
	Financial development level	.248	.027	.715	9.099	.000
	Market size	-.233	.101	-.138	-2.295	.024
	Labor costs	-.173	.098	-.174	-1.769	.081

a. Caused variable: the original cooperation situation *

3.3 Conclusion of Regression Analysis

Gravitational models have been widely used in the investment sector since Dutch economist Tinbergen introduced their models into trade. Considering that the initial gravity model contained only the two elements of the market size and geographical distance between the two countries, which was not enough to cover other factors affecting the investment transactions between countries, the model gradually evolved to form an extended gravitational model. In general, the extended gravitational model is expressed as:

$$\ln OFDI_{ij} = \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \dots + \beta_n \ln X_n + \mu_{ij} \quad (1)$$

OFDI_{ij} represents the investment stock between the two countries, X₁-X_n indicates the factors

affecting investment decisions in the host countries. ij Denote the random perturbation term.

According to the assumptions of the previous part of the theoretical analysis, IR, ND, TF, LC, DIS, and OFDI, will be selected as factors affecting external investment activities. Considering the quantitative index of macroeconomic risk the inflation rate is based on the GDP flattening index, and the reaction host market scale GDP repeat, in order to avoid serious factors between the col-linear influence, in the subsequent regression analysis excluding the host macroeconomic risk this factor, finally choose host market size, financial development level, trade freedom, labor cost, the distance between China and host and the original investment cooperation six influencing factors, build the following regression equation:

$$\ln OFDI_{ij} = \beta_0 + \beta_1 \ln GDP + \beta_2 \ln NDC + \beta_3 \ln TF + \beta_4 \ln LC + \beta_5 \ln DIS + \mu_{ij} \quad (2)$$

$OFDI_{ij}$ represents the investment stock between the two countries, μ_{ij} Denote the random perturbation term. Since the specific values of the variables in the above model differ greatly in orders of magnitude, log treatment on both sides of the equation to eliminate the effect of hetero variance on the test results. At the same time, considering the actual operation, the enterprise always takes the import and export amount of the above one year as the basis of the investment decision of the current year, so the variable of trade freedom in the model lags behind the value of the first phase of the same group data, that is, the import and export trade volume of the previous period. Relevant data analysis software is concluded as above:

From Table 2, There is a significant positive correlation between OFDI and GDP, NDC and TF. That is, a country's direct foreign investment decision is affected by the host country's market size, financial development level and trade freedom. The larger the market scale of the host country, the higher the level of financial development, and the more free the trade environment, and the easier it is to attract the inflow of foreign capital. Further linear regression on the influencing factors, overall the equation was adjusted for R^2 at 0.744 and an F value of 47.574, it proves that the variables selected in the extended gravity model strongly explain the dependent variables. Therefore, the host country market size, financial development level, trade freedom, labor cost, and the distance between China and the host country can largely explain China's investment choice preference for ASEAN countries along the "Belt and Road" For the individual variables in Table 3 alone, the coefficient symbols obtained after regression are basically consistent with the above expectations. The coefficient of the $\ln TF$ was 3.681, the degree of interpretation of the $\ln OFDI$ was extremely significant, It means that there are obvious trade exchanges between China and the host countries, Trade plays an obvious role in driving investment; From the regression results, For every 1% increase in $\ln NDC$, $\ln OFDI$ is up 0.248%, That is to say, the more complete the financial infrastructure of ASEAN countries along the Belt and Road, Strong willingness to enter foreign capital, The greater the possibility; For each 1% increase in wages in host countries, China's investment stock will drop by 0.173%, That is, the rise in labor costs greatly suppresses the enthusiasm for foreign investment at the 10% significance level. From the data, the distance between the two countries positive foreign direct

investment, the two is basically 1.5 times positive trend, this conclusion is inconsistent with expectations, this may be explained by the difference in geographical location in the transportation and other transaction costs rise also bring customs and human costs, and cultural costs can bring transaction cost for foreign enterprises in a long time, which means friendly foreign relations to establish can bring future earnings, considering this part, can explain the significant positive relationship between the two countries and foreign direct investment. Moreover, the negative correlation between the market size of the host country and a country's direct foreign investment decision is at the 5% significance level, which is also inconsistent with the expected conclusions, probably due to the insufficient range of sample data during data collection and processing.

4 CONCLUSION AND SUGGESTIONS

The analysis results show that the market size of the host country, macroeconomic risks, financial development level, trade freedom, labor costs, the distance between China and the host country and the original investment cooperation are the main influencing factors.

Based on the above studies, although China's OFDI has achieved more gratifying achievements, in order to further promote the "going global" strategy and encourage more local enterprises to actively participate in OFDI activities, this paper puts forward the following suggestions:

4.1 Update the Information Platform to Help Enterprises Avoid Foreign Investment Risks

The international economic situation is changing rapidly, and the serious asymmetry of information can easily lead to the inaccurate judgment of enterprise foreign investment and ultimately lead to the consequences of irreparable investment. In fact, this concern is also an important factor in further restricting the foreign investment of Chinese enterprises. The government can continuously follow up the political and economic situation of countries along the Belt and Road by establishing special websites, and detail the political and economic risk rating and recent average investment return of ASEAN countries, to help enterprises to reduce the uncertainty of foreign investment, enhance

investment willingness and facilitate enterprises to make practical investment decisions through the window of the website to alleviate the capital bottleneck.

4.2 Formulate Diversified Investment Strategies in Combination with the Actual Domestic Development Strategies

Considering the Asian countries with abundant energy and labor intensive, the market is relatively broad, combined with the current domestic production resources shortage, environmental deterioration, the current situation of industrial structure imbalance, according to local conditions to countries along the differentiated investment strategy, through investment drive domestic industrial transformation and upgrading at the same time to achieve complementary advantages. When investing in ASEAN countries, they can provide funds, technology, talents to host countries, aiming to help host countries extract energy quickly and efficiently. In addition, considering the large economic development level gap, some phased out sunset industry is likely in other countries along the route is facing a new turnaround, through consultation to encourage domestic sunset industry transfer to other developing countries, on the one hand, the advantages of backward enterprises to preserve, maximize concessions to emerging industries, drive industry independent upgrading, on the other hand also provides countries along the economic growth new ideas, thus realizing the win-win.

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