On the Efficiency and Influencing Factors of China's Direct Investment in Countries Along the "Belt and Road"

Qu Song[1,*]

[1]*Beijing Bayi International School, Beijing, China, 100190*
Corresponding author. Email: 1860082435@163.com

ABSTRACT

With continuous economic development, China has become the second-largest economy in the world. The "Belt and Road" initiative provides a good platform for economic development and promotes China's foreign investment. This article discusses the background and significance of the "Belt and Road", the current status of China's direct investment in countries along the route, and uses the stochastic frontier gravity model to analyze the relevant data of direct investment in the countries along the "Belt and Road". The influencing factors and investment efficiency of my country D's investment in countries along the route. The results of the study are as follows: (1) Countries along the "Belt and Road" have a huge stock of foreign direct investment. (2) The overall efficiency of China's direct investment in countries along the route is low. At the same time, it analyzes the problems existing in the process of foreign investment and proposes its own solutions to the problems.

Keywords: "One Belt One Road", foreign direct investment, investment efficiency, stochastic frontier gravity model

1. INTRODUCTION

In the fall of 2013, during a visit to Southeast Asia, President Xi Jinping proposed the Belt and Road Initiative, focusing on Asia, Europe and Africa and building the Silk Road Economic Belt with global participation. The Belt and Road Belt and Road is centered in China and spans the western Pacific, Indian Ocean and Eurasia. The study found that China's outbound investment flows to countries along the route increased significantly, but investment efficiency was slow, generally low and investment risks were higher.

First of all, the author adopts the literature analysis method to collect and collate the practical results of China's investment research on the Belt and Road Countries, and secondly, using the random cutting-edge gravity model of the new international investment theory,

makes a detailed study of the efficiency of direct investment in the countries along the Belt and Road, explores the existing problems, and puts forward its own suggestions.

2. INVESTMENT EFFICIENCY OF COUNTRIES ALONG THE BELT AND ROAD

2.1. Regional division of countries along the Belt and Road

According to the "China One Belt One Road Network", the author divides 71 countries along the route into eight sections according to their regions and economic development levels, and conducts efficiency analysis on this basis.

Table 1. Countries along the "Belt and Road" are divided by region [2,1]

Region	Country
South East Asia	Singapore, Malaysia, Indonesia, Myanmar, Thailand, Laos, Cambodia, Vietnam, Brunei, Philippines, East Timor
Central Asia	Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan
West Asia and Africa	Iran, Iraq, Turkey, Syria, Jordan, Lebanon, Israel, Palestine, Saudi Arabia, Yemen, Oman, UAE, Qatar, Kuwait, Bahrain, Georgia, Azerbaijan, Armenia, Egypt, Madagascar, Ethiopia, Morocco
South Asia	India, Pakistan, Bangladesh, Afghanistan, Sri Lanka, Maldives, Nepal, Bhutan
Eastern Europe	Ukraine, Belarus, Moldova, Poland, Lithuania, Estonia, Latvia, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, Albania, Romania, Bulgaria and Macedonia
South Africa and America	South Africa, Panama
Northeast Asia	South Korea, Mongolia, Russia
Oceania	new Zealand

The industries that China invests in countries along the Belt and Road are gradually showing a diversified trend, from the development of single energy industry to a diversified investment structure that develops together in metal ore, transportation, finance, real estate, technology, and agriculture. Energy is still the most important industry sector for China's direct investment in countries along the route, followed by transportation, and the scale and importance of investment is second only to energy investment.

2.2. Overview of China's outward direct investment and direct investment in countries along the "Belt and Road"

The overall situation of my country's foreign direct investment

According to the "Statistical Bulletin of China's Foreign Direct Investment", from 2003 to 2016, China's investment in countries along the "Belt and Road" has been increasing. According to data released by the Ministry of Commerce, the "China's "Belt and Road" Trade and Investment Development Report 2020" released by the Ministry of Commerce shows that by May 2020, China has signed 200 agreements with 138 countries and 30 international organizations to jointly build the "Belt and Road".

Table 2. 2003-2020 China's foreign direct investment flow and stock (100 million US dollars)[2,2]

Year	Flow rate			Stock	
	Amount	Global	Percent（%）	Money	Global rank
2003	28.5	21	5.6	322.0	25
2004	55.0	20	93	448.0	27
2005	122.6	17	122.9	572.0	24
2006	211.6	13	43.8	906.0	23
2007	265.1	17	25.3	1179.1	22
2008	559.1	12	110.9	1839.7	18
2009	565.3	5	1.1	2457.5	16
2010	688.1	5	21.7	3172.1	17
2011	746.5	6	8.5	4247.8	13
2012	878.0	3	17.6	5139.4	13
2013	1078.4	3	22.8	6604.8	11
2014	1231.2	3	14.2	8826.4	8
2015	1456.7	2	18.3	10978.6	8
2016	1961.5	2	34.7	13573.9	6
2017	1582.9	3	-19.3	18090.4	2
2018	1430.4	2	-9.6	19800	3
2019	1369.1	2	-4.3	22000	3
2020	1329.4	2	---		3

Table 3. The stock and flow of froegin direct investment absorbed by countries along the "Belt and Road" from 2006 to 2020(US$100million) [2,3]

Year	The stock and flow of foreign direct investment absorbed by countries along the "Belt and Road" from 2006 to 2020 (US$100 million)					
	Countries along the Belt and Road absorb the stock of foreign direct investment	China's stock of direct investment in countries along the route	China's investment accounts for the proportion of foreign investment stocks in countries along the Belt and Road	Countries along the Belt and Road absorb foreign direct investment flows	China's direct investment flows to countries along the route	The proportion of Chinese investment in the flow of foreign investment in countries along the route
2006	18709.85	51.99	0.28	3060.47	12.78	0.42
2007	26766.73	96.1	0.36	3747.63	50.71	1.35
2008	26361.77	148.47	0.56	4028.58	95.84	2.38
2009	31903.89	200.71	0.63	2672.95	56.88	2.13
2010	37493.52	290.32	0.77	3582.1	104.97	2.93
2011	37936.25	413.9	1.09	3051.09	140.5	4.6
2012	43018.43	568.57	1.31	3370.8	187.12	5.55
2013	45400.27	723.05	1.59	3216.15	166.38	5.17
2014	44671.07	925.16	2.07	3155.57	175.64	5.57
2015	44338.07	1159.05	2.61	2952.87	195.65	6.62
2016	44136.51	1249.1	2.83	2774.34	145.3	5.24
2017	--		--	--	143.6	
2018	--		--	--	156.4	
2019	--		--	--	150.4	
2020	--		--	--		

Table 4. Analysis of China's investment in countries along the "Belt and Road" from 2014 to 2019[2,4]

Analysis of China's investment in countries along the "Belt and Road" from 2014 to 2019

Year	Non-financial direct investment	Number of investment countries	Investment trends
2014	136.6	48	Singapore, Indonesia, Laos, Pakistan, Thailand, UAE, Russia
2015	148.2	49	Singapore, Kazakhstan, Laos, Indonesia, Russia, Thailand
2016	145.3	53	Singapore, Indonesia, India, Thailand, Malaysia
2017	143.6	59	Singapore, Malaysia, Laos, Indonesia, Pakistan, Vietnam, Russia, UAE, Cambodia
2018	156.4	56	Singapore, Laos, Vietnam, Indonesia, Pakistan, Vietnam, Russia, Cambodia, Thailand, UAE
2019	150.4	56	Singapore, Vietnam, Laos, Indonesia, Pakistan, Thaila UAE, Cambodia, Kazakhstan
Sum	880.5	321	

According to the differences in the economic conditions and investment environment of the countries along the "Belt and Road", China's investment activities in the countries along the route are different. According to the data released by the Ministry of Commerce at the end of 2019, the top ten countries in investment stock are: Singapore, Russia, Indonesia, Laos, Kazakhstan, Vietnam, UAE, Pakistan, Myanmar, Thailand.

2.3. The Empirical Analysis of Stochastic Frontier Gravity Model and the Direct Investment Efficiency of Countries Along the "One Belt One Road"

2.3.1. Stochastic Frontier Gravity Model Theory

Stochastic Frontier Analysis (SFA) was initially used by companies to measure production performance, and then introduced into the field of international trade to analyze trade efficiency and potential. [6]Compared with traditional models, stochastic frontier analysis has two main advantages: First, it introduces inefficiency terms to perform independent regression analysis on unnatural factors, avoiding the need to assume frictionless defects in traditional models; second, it overcomes In the traditional model, the average effect is used to carry out the error caused by the regression analysis.

2.3.2. Actual model setting

The stochastic frontier analysis method usually consists of core (natural) explanatory variables (variables such as the GDP level of the two countries, the distance between the two capitals, the population of the two countries, and the common border) and unnatural explanatory variables (joining WTO, signing of free trade agreements, infrastructure Equal variables) are composed of two models that use the stochastic frontier gravity model and the inefficiency model for correlation analysis.

2.3.2.1. Stochastic frontier gravity model setting

$\ln$ OFDI$_{ijt}$= β_0+ $\beta_1 \ln$ GDP$_{it}$+ $\beta_2 \ln$ GDP$_{jt}$+ $\beta_3 \ln$ POP$_{it}$+ $\beta_4 \ln$

POP$_{jt}$+ β_5DIS$_{ijt}$+ β_6CON$_{ijt}$+ β_7LLC$_{jt}$+ V$_{ijt}$ $-$ μ_{ijt}(7)[5]

2.3.2.2. OFDI inefficiency model setting

In order to further analyze the inefficiency factors that affect my country's direct investment in countries along the "Belt and Road", the author established an OFDI inefficiency model, which is set as follows:

μ_{ijt}= α_0+ α_1T R A$_{jt}$+ α_2NAT$_{jt}$+ α_3ATV$_{jt}$+ α_4W TO$_{jt}$+ α_5FTA$_{ijt}$+ ε_{ijt}

2.3.3. Empirical analysis results

The research in this chapter quotes Wang (2019) using the sttal4 software stochastic frontier model data regression analysis system to analyze the panel data

regression analysis of China's 46 countries along the "Belt and Road" region from 2006 to 2016. The results are as follows

Analysis results of the stochastic frontier gravity model

First, lnGDPit, lnGDPj), CONijt, lnPOPjt, etc. have a significant role in promoting my country's foreign direct investment, which is in line with theoretical expectations. Second, lnPOPit has a significant positive correlation with my country's foreign direct investment, which is contrary to expectations; DISijt, LLCjt and my country's foreign direct investment show a negative correlation, which is in line with theoretical expectations[5][6].

Analysis results of inefficiency model

First, in the efficiency of China's direct investment in the "Belt and Road" countries, there are indeed differences in technical efficiency among countries; second, the scale of China's direct investment in the countries along the "Belt and Road" and the level of bilateral economic development, whether it borders Whether there is a common language, the Internet penetration rate of the host country is positively correlated, and the geographic distance between the two countries is negatively correlated; investment inefficiency factors affect the degree of openness of the host country, whether it has joined the WTO, whether it has signed an FTA with China, the government environment and investment efficiency are positively correlated These factors are conducive to the improvement of investment efficiency, while the legal environment and investment efficiency are less relevant, which inhibits investment to a certain extent. Third, the "Belt and Road" initiative has promoted the efficiency of China's foreign direct investment, but still lacks high investment efficiency countries. In 2016, only 7 countries had an investment efficiency of over 0.6, indicating that the "Belt and Road" countries still There is huge investment potential to be tapped[5][6].

2.4. Analysis on the efficiency of my country's direct investment in countries along the "Belt and Road"

This article draws on the LIU Stata14 software system to analyze the direct investment efficiency data of 46 countries along the "Belt and Road" from 2006 to 2016, and conduct a detailed analysis and research on the investment efficiency data of 46 countries in the six major sectors, as shown in Table 4.1. It is found that the smaller the value of investment efficiency, the greater the deviation from the theoretical frontier value. It is generally recognized that the greater the efficiency value, the higher the investment benefit. The average investment efficiency value reaches 0.6, indicating that the project investment quality is good and the efficiency is high.

Table 5. Analysis and comparison of the efficiency of China's direct investment in countries along the "Belt and Road" from 2010 to 2016[2,5]

Region	Average efficiency of the region							2010-2016 seven-year average efficiency index	Number of country	2016 Investment Country			
										Efficiency>0.6		Efficiency<Seven-year average of efficiency index	
	2010	2011	2012	2013	2014	2015	2016			N of Country	%	N of Country	%
South East Asia	0.355	0.359	0.363	0.367	0.371	0.373	0.379	0.367	10	3	30	5	50
South Asia	0.09	0.093	0.096	0.099	0.119	0.103	0.115	0.102	6	0	0	5	83
Central Asia	0.347	0.352	0.358	0.364	0.382	0.382	0.379	0.367	5	0	0	1	20
Central and Eastern Europe	0.121	0.125	0.129	0.132	0.136	0.136	0.149	0.133	8	0	0	7	88
West Asia and North Africa	0.292	0.295	0.332	0.313	0.307	0.33	0.313	0.312	15	3	7	9	60
Part of the CIS	0.386	0.39	0.394	0.399	0.403		0.397	0.338	2	1	0	1	50
Average annual efficiency	0.265	0.269	0.279	0.279	0.286	0.221	0.289	0.26	46	6	13	28	61

It can be seen from the data in the above table that the smaller the value of investment efficiency, the greater the deviation from the theoretical frontier value. The greater the efficiency value, the higher the investment benefit. It is generally recognized that the average investment efficiency value reaches 0.6, indicating that the project investment quality is good and the efficiency is high. conclusion as below:

First, investment efficiency is on the rise, and the overall efficiency is low. In 2016, the investment efficiency of 46 countries in my country exceeded 0.6 in only 6 countries, accounting for only 13% of the total, and about 61% of the investment efficiency in 28 of the 46 countries was lower than the average investment efficiency index, and the efficiency was generally low.

Second, there are large differences in investment efficiency among regions. The investment efficiency in South Asia and Central and Eastern European countries has not yet reached the average investment value; the investment efficiency in Central Asia and West Asia has just exceeded the average; the investment efficiency in Southeast Asia and the CIS is relatively high;

Third, investment in developing countries is much higher than that in developed countries, and investment is mainly concentrated in Asia, most of which are developing countries, and there is insufficient investment in developed European economies.

Since the "Belt and Road" initiative was put forward, China's direct investment in countries along the route has shown an upward trend, but the growth rate is still far from expected, indicating that the construction of the "Belt and Road" still has a long way to go.

3. DISCUSSION

After analyzing the above content, suggestions are made for this disadvantage of China's investment efficiency.

First, increase investment in advanced European and developed countries. Developed countries have a high degree of investment facilitation, low costs, and a more complete investment environment. In 2015, my country and Russia signed a joint statement on the connection between the Silk Road Economic Belt and the Eurasian Economic Union, and the connection between the "Belt and Road" and the European investment plan with the European Union is also gradually advancing. This series of measures will help reduce the trade barriers for

multinational investors of Chinese enterprises, and are vital to the improvement of investment efficiency.

Secondly, in view of the low efficiency of my country's investment in countries along the "Belt and Road", multinational companies should regard technology and innovation as their important strategic objectives for foreign investment in the investment process. On the one hand, multinational companies can set up technology research and development centers in developed countries to develop their own core technologies; on the other hand, they can increase investment in countries with rich natural resources and high efficiency.

Finally, multinational companies must establish a risk assessment system, conduct in-depth research and analysis on the political situation of the invested country, and make risk assessment reports to reduce the possibility of risks. When determining to invest in it, it is necessary to actively contact the invested country and sign relevant agreements to ensure the progress of cooperation. For example, in 2009, China and ASEAN signed the China-ASEAN Investment Agreement. Under clear insurance regulations, ASEAN trade is effectively protected. Reduce investment in countries with higher political risks.

4. CONCLUSION

With the continuous economic development, China has become the second largest economy in the world. The "Belt and Road" initiative provides a good platform for economic development and promotes China's foreign investment. This chapter explains the background, significance and research methods of the "Belt and Road Initiative". Researched the regional division of countries along the "Belt and Road" and the main industries for investment. At the same time, it analyzes China's foreign direct investment and the direct investment stock and flow data of countries along the "Belt and Road", and briefly describes the investment direction. It also gives an overview of the stochastic frontier gravity model; secondly, Liu and Wang (2019) used stata4 software stochastic frontier model data regression analysis system to return panel data from China to 46 countries along the "Belt and Road" region from 2006 to 2016. Analyze this results. Analyzing the efficiency of China's direct investment in countries along with the "Belt and Road" and related influencing factors, and drawing a conclusion that investment efficiency is low. However, there are still shortcomings in the article. This paper quoted part of the basic data of the model of Liu and Wang. This paper also have many ideas about the influencing factors of direct

investment efficiency, but due to the limitation of the article, I did not elaborate on them.

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