

Evaluation of Chinese OFDI on Local Industrial Structure: A Case Study based on Countries along the “One Belt and One Road”

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ABSTRACT

With the “One Belt and One Road Initiative” (BRI) initially launched in 2013, Chinese outward foreign direct investment (OFDI) has obtained a further growth, which has had an unavoidable effect on the local economic activities of recipient countries. In order to weigh the potential and long-term impact of Chinese OFDI on local economy, this paper determines to test the correlation between Chinese OFDI and changes on local industrial structure via establishing a series of indicator. Relying on the data from countries along BRI from 2013 to 2021, the paper obtain two conclusions: (1) Chinese OFDI affects and improve the industrial efficiency of countries along BRI. (2) There are not obvious evidences on the correlation between Chinese OFDI and the proportion of different industries and the rationalization of local industrial structure, which needs a extensive study.

KEYWORDS

“One Belt and One Road” Countries; Chinese OFDI; Local Industries Structure.

1. INTRODUCTION

Since BRI was launched in 2013, Chinese overseas investment achieve a further increase. Based on the investment flow, Chinese investment flows in BRI region stood at \$12.63 billion, while by 2021, China’s outbound direct investment flows will reach \$24.15 billion. Meanwhile, concerning on investment stock, Chinese investment stock in BRI region will reach 213.84 billion US dollars up to 2021, which reflects that large-scale and long-term China investments concentrate on “One Belt and One Road” region.

With the large-scale and long-term investment, local economic activities has had obvious changes on multiple ways, local people of host countries can improve their own productivity via imitation and learning. For example, local people can learn Chinese techniques and management experience when local labors engage in Chinese overseas enterprises. Via the effect of learning by doing, the level of local technique get promoted, which contributes to changes on local industrial structure. Based on former articles, some scholar thinks that a higher level of direct investment in a country can quickly promote industrial upgrading in the country or region where the investment enterprise is located. Focusing on the case of “BRI” region, some scholarships state that Chinese OFDI can significantly influence local industrial structure and improve the level of industrial structure along BRI [1]. However, some suspicions on Chinese OFDI, such as “Chinese debt trap” [2], still last till now.

In order to respond the research puzzle, the article analyzes the role of China investment, based on correlation between China investment and local industrial structure.

2. LITERATURE REVIEW

2.1. Outbound Foreign Direct Investment (OFDI)

Foreign direct investment (OFDI) refers to the transfer of capital from the investor country to the recipient country, the use of its own production technology for production and operation, and the sale of products in the host country. The investment behavior is called OFDI. BRI is an economic cooperation initiative and encourage Chinese capital to invest abroad. For Chinese investment in the countries along the “BRI”, the relevant literature has been more detailed in terms of investment motivation and location.

2.1.1. Motivation for OFDI

Some scholars think the main incentives for Chinese overseas investment are seeking for markets, improving efficiency and ensuring natural resources supply [3]. More specifically, Chinese OFDI in countries in different regions along “BRI” has diversified motives, and the size of the market, per capita wage level and natural resource endowment are also the main factors affecting China’s direct investment. In the process of investing “BRI” region, resource-seeking motivation is not the only motivation for Chinese OFDI, let alone the existence of “resource plunder”. Market and efficiency-seeking motivation are the decisive factors [4].

2.1.2. Location Selection for OFDI

In terms of region choice, Chinese OFDI in Southeast Asia takes the largest share, Meanwhile, Chinese investment in Central Asia has the fastest growth rate. By contrast, The investment of China in Central and Eastern Europe is the least. Based on the specific nation, Chinese OFDI is concentrated on Singapore, Russia, Indonesia, Kazakhstan, Myanmar and Mongolia [5].

Focusing on the factors contributing to location choice, it is believed that BRI has a positive effect on guiding Chinese OFDI to countries along BRI, and there is negative correlation between local economic system factors and Chinese OFDI. On the contrary, local political system factors have a positive effect on Chinese OFDI, while the legal system factors have no impact on Chinese OFDI. In general, Chinese OFDI tends to those countries or regions with good institutional quality, large economic scale, high market potential, low cost of factors and rich resource endowments [6].

2.2. The Manifestations on Changes of Industrial Structure and Related Affecting Factors

According to the Petti-Clark theorem, with the continuous prosperity of a country’s economy, a series of changes on domestic industrial structure will happen. Due to economic development, the income of different industries is different, so the labor force will transfer from low-income industries to high-income industries. According to the division of industry by Petti and Clark (that is, the national economy is divided into three sectors of agriculture, industry and service), Labor force are transferred from peasants to manufacturing workers. Furthermore the people who engage in industry will be appealed by the high-salary tertiary industry. Therefore, dominated agriculture will transfer to manufacturing industry with economic development of a country. With the further development of the economy, the proportion of manufacturing industry will decline while the share of the service industry will rise.

Considering that most of the countries along BRI are developing countries, when Chinese OFDI enters these countries. The number of enterprises engaged in a certain industry will increase along with the participation of new enterprises in the production activities of the host country, which may lead to the transformation of the industrial structure from agriculture to the manufacturing industry and service industry. In other words, the proportion of each industry in the national economy has changed.

2.3. The Relationship between OFDI and Changes of Local Industrial Structure

Some scholarships demonstrate that Chinese OFDI can significantly promote the process of improving local industrial structure of the countries along BRI, and with the upgrading of the industrial structure of the countries along BRI. Via the supply effect, technology spillover effect and trade promotion effect generated by Chinese OFDI have led to industrial upgrading of countries along BRI [7]. More specifically, Due to the BRI, local industrial structure of countries along BRI can be optimized and upgraded by expanding the scale of trade between China and Other countries along BRI, strengthening local production capacity, and improvement of promoting infrastructure connectivity in countries along BRI [8].

3. METHOD

3.1. Data Source

The database used in this paper derives from China's OFDI Statistical Bulletin 2021 and the relevant data in the World Bank database. Both databases are authoritative data.

3.2. Model

Referring the method proposed by Yuan Hang and Zhu Chengliang in 2018 [9], this paper will describe the changes of industrial structure in the countries along the line from the aspects of industrial proportion, industrial efficiency and industrial structure rationalization.

3.2.1. Dependent Variable

The dependent variables are calculated through corresponding data and corresponding indicators are constructed. The specific measurement indicators are as follows:

1) Industrial Proportion

The industrial proportion ($Ais1$) is represented by the industrial structure level coefficient, that is, the evolution process of the three industries at the quantity level is described from the relative change of the proportion. The specific calculation formula is as follows:

$$Ais1_{i,t} = \sum_{m=1}^3 y_{i,m,t} \times m, m = 1,2,3 \quad (1)$$

$y_{i,m,t}$ demonstrates the proportion of the added value of the m industry in the gross product of the i country along the BRI in t period. This index reflects the variation of the proportional relationship between the different industries in the country along BRI from agriculture to the manufacturing industry and the tertiary industry, which represents the change of local industrial structure.

2) Industrial efficiency

Industrial efficiency ($Ais2$) is defined as the product of the value added of an industry by the labor productivity of that industry. The specific calculation formula is as follows:

$$Ais2_{i,t} = \sum_{m=1}^3 y_{i,m,t} \times lp_{i,m,t}, m = 1,2,3 \quad (2)$$

$y_{i,m,t}$ is the same as (1), and $lp_{i,m,t}$ represents the productivity of m industry in i country in t period, calculated by the formula:

$$lp_{i,m,t} = Y_{i,m,t}/L_{i,m,t} \quad (3)$$

$Y_{i,m,t}$ represents the added value of the m industry in i country in t period and $L_{i,m,t}$ demonstrates the employment of m industry in i country in t period. $Ais2$ can be obtained by formula (2).

3) Rationalization of industrial structure

The rationalization of industrial structure (Theil) is the reflection of the level of correlation and coordination among industries, and it shows the level of a country's rational utilization of all its resources. This paper uses Theil coefficient to evaluate the rationalization degree of industrial structure in countries along the Belt and Road. The specific calculation formula is:

$$Theil_{i,t} = \sum_{m=1}^3 y_{i,m,t} \times \ln(y_{i,m,t}/l_{i,m,t}) , m = 1,2,3 \quad (4)$$

3.2.2. Independent Variable

The indicators to measure OFDI include OFDI flow, OFDI stock, contractual investment, etc. Considering that outbound investment flows vary widely in different countries from year to year, it is not easy to measure the long-term effects of China's outbound investment flows in B&R countries. Contractual investments are not real investments. Therefore, this paper chooses the data of Chinese investment stock in countries along BRI as the core explanatory variable to describe the long-term investment effect of China in countries along BRI.

This paper chooses the statistics of Chinese OFDI stock in countries along BRI from 2013 to 2021 to set up independent variable. The data is from China's OFDI Statistical Bulletin 2021.

3.2.3. Control Variable

1) Consumption Demand

Consumption Demand (PGDP). Consumer demand is linked to GDP per capita. It is generally believed that with the increasing of GDP per capita, people's consumption demand will also get promoted. The upgrading of consumer demand means that people's demand for high-end industries has increased. As a result, consumer demand will motivate the adjustment of industrial structure within the countries along BRI. The GDP per capita data of the countries along BRI is used to analyze the local consumption demand, and the data comes from the World Bank database.

2) Export Demand

Export Demand (EXPORT). Export demand refers to the demand of foreign consumers. In order to satisfy the needs of foreign consumers, domestic enterprises try to adopt renew technology to produce high-quality products. At the same time, because the foreign trade barriers also require domestic local enterprises to change the mode of production, through these changes, the industrial structure of the countries along BRI will change. In order to describe Export Demand, this paper uses the ratio of the total exports of goods and services to GDP of the countries along BRI to measure. The data of Export Demand is chosen from World Bank database.

3) Human Capital Supply

Human Capital Supply (LABOR). A country needs human capital supply for industrial upgrading. The scale of human capital will affect the production efficiency of the industrial sector, and then affect the industrial structure. This paper uses the total number of local labor force of the countries along BRI, using data from World Bank database.

4) Supply of Materials and Capital

Supply of Materials and Capital (CAPITAL) will affect the industrial situation. Increasing capital investment will promote industrial development, affect industrial distribution, and then affect industrial structure. This paper chooses the proportion of local gross domestic investment to GDP of countries along BRI to measure local spontaneous materials and capital. The relevant data derives from World Bank database.

The definitions and measurements of all relevant variables mentioned above are shown in Table 1.

Table 1. Name and meaning of each variable

Nature of Variables	Name of Variables	Meaning of Variables	Data Source
Dependent Variables	Ais1	Industrial proportion calculated by the proportion of the added value of each industry in the GDP of each country along BRI over the years	World Bank database
	Ais2	Industrial efficiency obtained by calculating the product of the proportion of the added value of each industry in the GDP of each country along BRI and the labor productivity over the years	
	Theil	Rationalization of industrial structure Calculated by Theil coefficient	
Independent Variable	lnOFDI	Chinese OFDI in countries along BRI, logarithm	Chinese OFDI Statistical Bulletin 2021
Control Variables	lnPGDP	Consumption demand: GDP per capita of countries along R&D (2015 constant US \$), logarithm	World Bank database

3.3. Results

This article builds the following three models and get main three results:

$$Ais1_{i,t} = \beta_1 \ln OFDI_{i,t} + \beta_2 \ln PGDP_{i,t} + \beta_3 \ln CAPITAL_{i,t} + \beta_4 EXPORT + \beta_5 LABOR + \beta_0 + \theta_i + \varphi_t + \mu_{i,t} \quad (5)$$

$$Ais2_{i,t} = \gamma_1 \ln OFDI_{i,t} + \gamma_2 \ln PGDP_{i,t} + \gamma_3 \ln CAPITAL_{i,t} + \gamma_4 EXPORT + \gamma_5 LABOR + \beta_0 + \theta_i + \varphi_t + \mu_{i,t} \quad (6)$$

$$Theil_{i,t} = \alpha_1 \ln OFDI_{i,t} + \alpha_2 \ln PGDP_{i,t} + \alpha_3 \ln CAPITAL_{i,t} + \alpha_4 EXPORT + \alpha_5 LABOR + \beta_0 + \theta_i + \varphi_t + \mu_{i,t} \quad (7)$$

Table 2. Base regression results

	(1)	(2)	(3)
	Ais1	Ais2	Theil
lnOFDI	-1.0720***	0.0416***	1.6941***
	(-12.9081)	(9.5462)	(5.6307)
lnPGDP	9.1678***	0.7979***	-9.4809***
	(37.8736)	(191.0336)	(-45.5303)
EXPORT	0.0368**	-0.0015***	0.0048
	(3.0333)	(-5.6156)	(0.3996)
lnCAPITAL	-1.3993***	-0.0868***	-2.6844***
	(-6.4405)	(-8.6220)	(-5.2771)
LABOR	-0.3203***	-0.0002	-0.0461
	(-10.3475)	(-0.3421)	(-1.0000)
_cons	214.6582***	8.3767***	120.0810***
	(74.3241)	(80.0830)	(20.3819)
National fixed effect	Yes	Yes	Yes
Time-fixed effect	Yes	Yes	Yes
observed values	733	733	733
Adjusted R ²	0.6072	0.9192	0.3308

Note: ***, ** and * are significant at 1%, 5% and 10% levels respectively; Individual and time effects are controlled for the above regression.

3.3.1. The Effect of OFDI on the Proportion of Industry (Ais1)

According to Table 2, The result of Ais1 demonstrates that the stock of China's OFDI in the countries along BRI increases by 1%, and the industrial proportion of the countries along BRI decreases by 1.072, when the coefficient of industry proportion (Ais1) is at the significance level of 1%, but not positive. There is not enough to prove that Chinese OFDI changes local industrial proportion.

3.3.2. The Effect of OFDI on Industrial Efficiency (Ais2)

At the significance level of 1%, the stock of Chinese OFDI in the countries along BRI increased by 1%, and the industrial efficiency level of the countries along BRI increased by 0.0416 from the perspective of the production efficiency of the industrial sectors. According to Table 2, this article believes that Chinese OFDI not only affects the industrial structure of the countries along the route, but also promotes the efficiency of the industrial sector by affecting the labor productivity of the industries in the countries along BRI.

3.3.3. The Effect of OFDI on Rationalization of Industrial Structure (Theil)

As can be seen from Table 2, at the significance level of 1%, Chinese OFDI in the countries along BRI does not significantly promote the industrial rationalization of the countries along BRI. Thus, the result dose not prove that Chinese OFDI promotes rationalization of local industrial structure.

4. CONCLUSION

Since the BRI cooperation initiative started in 2013, Chinese OFDI has experienced a lasting expansion from 2013 to 2021, and has had a certain impact on the local industrial structure. In order to study the impact of China's OFDI in local industrial structure of countries along BRI, this paper analyses industrial structure from three aspects: industrial proportion, industrial efficiency and industrial structure rationalization. Based on panel data composed of Chinese outbound investment stock data and relevant data of countries along BRI from 2013 to 2021, the fixed effect model is used to take into account control variables including consumer demand, export demand, human capital supply, and supply of materials and capital of countries along BRI. This paper describes the impact of China's OFDI on local industrial structure along BRI.

Based on regression results, the article thinks that Chinese OFDI have important influence on local industrial structure via improve local productivity. But the impacts of Chinese OFDI on local industrial proportion and industrial structure rationalization is not positive, which needs a extensive research.

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