Information Systems and Economics (2023)
Clausius Scientific Press, Canada

DOI: 10.23977/infse.2023.040108
ISSN 2523-6407 Vol. 4 Num. 1

Study on the Impact of Host Country ICT Development Level on China's OFDI Efficiency

Junping Li

Anhui University of Finance and Economics, Bengbu, Anhui, China

Keywords: Stochastic frontier gravitational model, Foreign Direct Investment Efficiency, Information and Communication Technology

Abstract: The connotation of ownership advantages driving Chinese OFDI in the context of the IT revolution has changed significantly, and the level of ICT development in host countries may become a new type of locational advantage to attract foreign investment. In this paper, we investigate the impact of host country ICT advantage on Chinese OFDI and measure the efficiency of Chinese investment in 108 host countries from 2006 to 2015 with the help of the time-varying stochastic frontier gravity model, and empirically test the factors affecting investment efficiency, focusing on the impact of host country ICT development level on Chinese OFDI efficiency. It is found that overall the level of ICT development in host countries promotes the efficiency of Chinese OFDI; after distinguishing the sample into developed and developing countries, the level of ICT development in host countries has a differential impact effect on the efficiency of Chinese OFDI. This study helps us to better understand the relationship between Chinese OFDI and the ICT development level of host countries, and it has important insights for constructing new advantages in outward investment cooperation and improving the efficiency of outward FDI.

1. Introduction

Since it acceded to the WTO, China has deeply integrated into the world economy, and China's Outward Foreign Direct Investment (OFDI) has achieved rapid development. According to the Ministry of Commerce's "Statistical Bulletin of China's Outward Foreign Direct Investment in 2020", China's OFDI flow jumped to first place in the world in 2020, reaching USD 153.71 billion, up With a 12.3% year-on-year increase, the utilization of foreign investment ranks first among developing countries, indicating China's growing influence in the global economy. Although Chinese enterprises have made some progress in both the quality and quantity of OFDI, the problem of low efficiency of Chinese OFDI still deserves attention [1]. The current domestic environment and international situation have undergone profound changes, and the "three overlapping periods" and "triple pressure" have increased the downward pressure on China's economy, while China is facing a major change unprecedented in a century, compounded by repeated multi-point outbreaks of the Newcastle pneumonia epidemic and the Russian-Ukrainian conflict. Chinese enterprises face the risk of "decoupling and breaking the chain", which poses a new challenge for Chinese enterprises to "go global". A correct assessment of China's OFDI efficiency can help guide Chinese enterprises to continue to go out steadily in the wave of "reverse globalization" and achieve high-quality

development of Chinese OFDI, which has certain theoretical and practical significance.

The rapid development of Information and Communication Technologies (ICT), represented by the Internet, has profoundly changed the way companies operate, their daily activities, and the way they do business. Research by scholars has found that ICT is an important influencing factor in the choice of FDI location [1-5]. Currently, there are more studies on the factors influencing the efficiency of OFDI in China, but little literature has focused on the impact of the level of ICT development in the host country on the efficiency of OFDI in China.

So, in the new era of booming ICT development and the gradual shift of Chinese OFDI from scale-oriented to high-quality development, does and how does the level of host country ICT development affect the efficiency of Chinese OFDI? In this paper, we will use panel data from 108 countries to measure the level of ICT development in host countries with the Network Readiness Index (NRI) in the Global Information Technology Report published annually by the World Economic Forum and explore how the level of ICT development in host countries affects China's OFDI efficiency with the help of time-varying stochastic frontier gravity model, and also measure China's OFDI efficiency, which will help Chinese enterprises to take advantage of the rapid ICT This has some implications for Chinese enterprises to take advantage of the opportunity of rapid ICT development and carry out high-quality OFDI.

2. Research Design

2.1 Sample selection

Considering the reliability and availability of data, this paper collects the data of 108 destination countries of China's OFDI from 2006 to 2015, covering Asia Pacific, Europe, Africa, North America, and Latin America, excludes the data of "tax havens" such as Bermuda, British Virgin Islands, and the Cayman Islands, and uses interpolation and trend extrapolation to complete the variables with missing values, and finally obtain the balanced panel data containing 1080 samples.

2.2 Description of core explanatory variables

The World Economic Forum has published the Global Information Technology Report since 2001, which measures the level of ICT development in each country by the Network Readiness Index, so this paper collects the Network Readiness Index of each country from 2006 to 2015 as the core explanatory variables in this paper.

2.3 Econometric model construction

In this paper, we construct the following stochastic frontier equation for Chinese outward FDI by referring to Armstrong [6].

$$lnOFDI_{ijt} = \alpha_0 + \alpha_1 lnGDP_{jt} + \alpha_2 lnGDP_{it} + \alpha_3 lnDist_{ij} + \alpha_4 Res_{jt} + \alpha_5 lnPop_{jt} + \alpha_6 Comlang_{ij} + \alpha_7 Contig_{ij} + v_{ijt} - u_{ijt} \quad (1)$$

where i is China, j is the host country, and t represents the year. $OFDI_{ijt}$ is the explanatory variable indicating China's OFDI stock in the host country in period t. GDP_{jt} is the GDP of the host country in period t, reflecting the market size of the host country, and the higher the GDP_{jt} of the host country indicates the larger the market size and the greater the potential to attract foreign capital; GDP_{it} represents China's GDP_it represents China's GDP in period t. The higher China's GDP is, the stronger the economy is and the stronger the international capital supply capacity is. Both the host country and China's GDP are deflated using the dollar GDP deflator to obtain constant 2006 dollars

and logarithmically. $Dist_{ij}$ represents the relative geographic distance between China and the host country weighted by population and city size. Res_{jt} represents the host country's natural resource rent share in period t, which measures the host country's natural resource endowment.Pop_{jt} represents the total population aged 15 to 64 in the host country and measures the abundance of labor resources in the host country. $Comlang_{ij}$ and $Contig_{ij}$ represent whether China and the host country share a common language and a common border, respectively.

Based on previous studies on the factors affecting the efficiency of OFDI in China, the core explanatory variables of this paper and other factors affecting investment efficiency are incorporated into the inefficiency model to construct the following investment inefficiency equation.

$$u_{ijt} = \beta_0 + \beta_1 NRI_{jt} + \beta_2 ECOF_{jt} + \beta_4 Rq_{jt} + \beta_3 BIT_{ij} + +\beta_5 Ge_{jt} + \varepsilon_{ijt} \tag{2}$$

Where β_0 is the constant term of the non-efficiency model and β_i ($0<i<6$) is the coefficient to be estimated for the non-efficiency factor. NRI_{jt} represents the host country network readiness index, which ranges from 1 to 7, with closer to 7 representing a higher level of ICT development. $ECOF_{jt}$ represents the host country's economic freedom index, which indicates the host country's market economic activity and takes values from 0 to 100. Rq_{jt} represents the host country's regulatory quality, which takes values from -2.5 to 2.5. The higher the quality of regulation, the better the protection for Chinese enterprises investing in the host country and the lower the investment uncertainty. SIS_{jt} denotes the number of secure Internet servers per million people and is used to replace the core explanatory variable in the robustness test. ε_{ijt} is a random disturbance term in the non-efficiency equation. Descriptive statistics for each variable are shown in Table 1, respectively.

3. Empirical analysis

After determining the form of the stochastic frontier equation through the above model applicability test, this paper uses the "one-step method" to substitute the inefficiency model into the stochastic frontier model to estimate the composite model, and the model estimation results are shown in Table 1. Based on the robustness consideration, this paper gradually adds the host country network readiness index, host country economic freedom, regulatory quality, bilateral investment agreement, and government efficiency, and finally obtains the regression results of five models.

From σ_u, σ_v of the model (5), we can find that the variance of the inefficiency term accounts for the variance of the composite disturbance term $\gamma = \sigma_u^2/(\sigma_u^2 + \sigma_v^2) = 0.542$, which indicates that the inefficiency factor hinders China's OFDI stock from reaching the frontier level. The coefficient of the host country network readiness index is significantly negative in the inefficiency model, indicating that overall the level of ICT development in the host country has a significant contribution to the efficiency of OFDI in China.

Table 1 Regression results of the one-step stochastic frontier gravity model

	(1)	(2)	(3)	(4)	(5)
$lnGDP_{jt}$	0.274***	0.268***	0.327***	0.252***	0.266***
	(3.616)	(4.798)	(4.598)	(5.171)	(5.411)
$lnGDP_{it}$	2.338***	2.324***	2.141***	2.275***	2.230***
	(16.606)	(17.673)	(14.532)	(17.134)	(17.048)
$lnDist_{ij}$	-0.319**	-0.290**	-0.250**	-0.092	-0.089
	(-2.462)	(-11.043)	(-1.965)	(-0.703)	(-0.695)
Res_{jt}	0.052***	0.049***	0.037***	0.046***	0.046***
	(6.254)	(6.707)	(4.202)	(6.571)	(6.940)
$lnPop_{jt}$	0.618***	0.606***	0.481***	0.650***	0.639***
	(5.587)	(8.006)	(3.598)	(11.521)	(11.523)
$Comlang_{jt}$	2.562***	2.533***	2.342***	2.671***	2.705***
	(5.888)	(6.021)	(5.669)	(6.346)	(6.387)

$Contig_{jt}$	1.177***	1.075***	1.127***	1.175***	1.157***
	(4.625)	(3.996)	(4.388)	(4.489)	(4.489)
_cons	-63.296***	-63.146***	-57.108***	-64.434***	-63.470***
	(-14.633)	(-15.267)	(-11.067)	(-15.603)	(-15.561)
NRI_{jt}	-3.699**	-12.487*	-13.415**	-42.064***	-19.515**
	(-2.137)	(-1.695)	(-2.411)	(-2.603)	(-2.054)
$ECOF_{jt}$		8.913	0.358	9.069	5.972
		(1.563)	(0.147)	(1.114)	(0.967)
Rq_{jt}			10.188***	20.747*	42.336**
			(2.648)	(1.939)	(2.479)
BIT_{ij}				-5.965**	-6.972***
				(2.156)	(-2.455)
Ge_{jt}					-34.687**
					(-2.324)
_cons	2.257	-1.421	-0.149	-1.582	-7.332*
	(1.549)	(-0.459)	(-0.092)	(-0.590)	(-1.67)
N	1080	1080	1080	1080	1080
Log-likelihood value	-2258.301	-2250.545	-2244.332	-2229.898	-220.843
σ_u	1.962	2.446	2.423	2.334	1.956
σ_v	1.507	1.582	1.386	1.769	1.799

Note: t-test values in parentheses, *, ** and *** indicate significant at the 10%, 5% and 1% levels, respectively
Source: Authors' calculations based on the "one-step" stochastic frontier gravity model

4. Conclusion

This paper uses the stochastic frontier gravity model to measure the level of ICT development in the host country by using the Network Readiness Index published in the Global Information Technology Report, and puts it into the inefficiency term of the stochastic frontier gravity model as an explanatory variable to explore its impact on the efficiency of Chinese OFDI and measures the efficiency of Chinese OFDI to the host country, with the following final conclusions: The level of ICT development in the host country significantly affects the efficiency of Chinese OFDI. Specifically, the level of host country ICT development significantly suppresses investment inefficiency and promotes the efficiency of Chinese OFDI.

Acknowledgments

This work was supported by the Research on the Impact of Trade Friction on Reverse Technology Spillover of OFDI and its Mechanism of Action (No. ACYC2020072), Graduate Research Innovation Fund of Anhui University of Finance and Economics

References

[1] GHOLAMI R, TOM LEE S Y, HESHMATI A. The causal relationship between information and communication technology and foreign direct investment [J].World Economy,2006(1): 43-62.
[2] CHOI C. Does the Internet stimulate inward foreign direct investment? [J].Journal of Policy Modeling,2003(4):319-326.
[3] AXHIU M, HUSEJNI M. Information Communication Technology as a Determinant of the FDI Flows [J]. Mediterranean Journal of Social Sciences, 2013(11):218.
[4] WARSAME A S. The Relationship between Information & Communication Technology and Foreign Direct Investment Inflow to Africa [J].International Journal of Economics and Finance, 2021(5):1-22.
[5] Belloumi M, Touati K. Do FDI Inflows and ICT Affect Economic Growth? An Evidence from Arab Countries [J].Sustainability,2022(10):62-93.
[6] Armstrong S P. Measuring trade and trade potential: a survey[R].Asia Pacific Economic Paper, Australia-Japan Research Centre, Crawford School of Public Policy, the Australian National University, 2007.