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A Study on the Impact of Digital Economy on the Efficiency of China's OFDI

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Abstract: *The increasingly widespread impact of the digital economy has profoundly changed the efficiency, structure, regional layout, and investment patterns of cross-border enterprises in the current international investment arena. This study examines the digital economy of China's trade using panel data of 57 countries from 2013-2021.The empirical results show that the development of digital economy in host countries can improve the efficiency of China's outward OFDI. After multiple robustness tests, the results remain robust. Finally, the results of the heterogeneity test indicate that the level of digital economy development in high-income countries has the greatest impact on the efficiency of China's OFDI. Therefore, this paper proposes that countries should strengthen the digital economy.*

Keywords: *digital economy, global, OFDI, SFA*

1. Introduction

According to the World Investment Report 2022, global cross-border investment recovered strongly in 2021 but has yet to be in 2020, compared to the steep drop in global cross-border investment in 2020. China's OFDI has continued to grow, and according to the Ministry of Commerce's "2022 Statistical Bulletin on China's Outward FDI", China's outward FDI has increased. China's outward FDI has grown to become the second largest outward investor in the world, with a stock of US$2,754.81 billion. In the context of global economic integration, China, as the second-largest economy in the world, has been increasing the scale and influence of its Outward Foreign Direct Investment (OFDI). However, this process is not a smooth one, and the advantages and disadvantages of the business environment have become one of the key factors affecting the efficiency of China's OFDI. The purpose of this paper is to discuss the impact of the Digital Economy on the efficiency of China's OFDI and to provide theoretical support and practical guidance for Chinese enterprises to seek more efficient investment paths in the global context. The 20th report stressed the importance of creating a first-class business environment that is market-oriented, rule-of-law-oriented, and internationalized and promoting the high-quality development of the Belt and Road Initiative. Over the past decade or so, the industrial structure of China's outward foreign direct investment (OFDI) has been continuously optimized, and OFDI in the real economy has been growing steadily.

The rapid development of the global digital economy continues to give rise to new industrial activities and business forms, driving the global value chain towards digitalization and intelligence. The traditional roles in the international division of labor and the logic of production and operation are being rewritten, prompting multinational enterprises to re-examine their international investment patterns and routes to adjust their capital structures and location patterns. As the digital economy has become an essential determinant in attracting foreign investment inflows, countries worldwide increasingly focus on digital infrastructure development, digital technology research and innovation, and governance policy coordination. This will significantly impact international investment flows and patterns in the coming years. Is this a good opportunity and a favorable external condition for China to enhance the efficiency of its OFDI in the new situation? What is the direction and extent of the impact of the development of the host country's digital economy on the efficiency of China's OFDI? What are the underlying mechanisms? This paper attempts to solve the problem through theoretical explanation and empirical testing to determine the feasibility and potential space of utilizing the development of the host country's digital economy to enhance the efficiency of China's OFDI. This paper attempts to provide a reference for designing a strategy to promote the high-quality development of China's OFDI by using the digital economy as a launching point.

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Literature related to the research of this paper focuses on the digital economy and outward foreign direction. Since the concept of a digital economy was first proposed, many scholars have conducted extensive and in-depth research on its definition and connotation , the logic of development [6] ,and the index measurement of the scale and level of development[2] . There is a lack of a global harmonized measure of digital economy indices. The Digital Economy and Society Index (DESI) which is widely used to measure the EU economies[1], is limited to only 27 European economies. Samoilenko and Osei-Bryson(2019)Sam[7] use the Network Readiness Index (NRI) to assess the IT level in significant economies.

Research on digitization and international direct investment focuses on how the digital economy affects the patterns and paths of international direct investment. In recent years, in studies on the digital economy and China's OFDI. Zhen Lin[10] explored the application of digital economy development to China's outward FDI based on data from 25 host countries around the world for 2003-2020 and found that China tends to invest in host countries with higher digital economy development. Li[4] empirically examined the application of the development of the host country's digital economy to the binary margin of Chinese enterprises' outward foreign direct investment by using the microdata of Chinese enterprises' overseas investment in 2009-2016. The digital economy has a facilitating effect on enterprises' cross-border mergers and acquisitions[5]. The development of the host country's digital economy is conducive to technology spillovers and reverse spillovers from inward investment. Developed countries are generally more attractive to technology-seeking foreign investment due to their higher technological level and innovation capacity[9]. Jun Yan [3] found that China's investment in countries along the Belt and Road has proliferated as the level of digital economy development in these countries has increased.

Compared with the previous literature, the innovations of this paper are as follows. Firstly, global countries are selected as the research object, and the latest digital economy development indicators are used as the core explanatory variables. Secondly, the comprehensive digital economy indicators are incorporated into the extended SFA model to analyze the impact of the host country's digital economy on the efficiency of China's OFDI. Finally, the mechanism of the host country's digital economy on China's OFDI is summarized.

2. Model construction, data description and indicator measurement

2.1 Model construction and data description

With reference, this paper constructs the SFA theoretical model to measure the efficiency of China's OFDI as follows.

$$OFDI_{ijt}^{'} = f\left(X_{ijt},\beta\right)\exp(v_{ijt}) \tag{1}$$

$$OFDI_{ijt} = f\left(X_{ijt},\beta\right)\exp(v_{ijt})\exp(-u_{ijt}),u_{ijt} \geq 0 \tag{2}$$

$$OFDIE_{ijt} = OFDI_{ijt} / OFDI_{ijt}^{'} = \exp(-u_{ijt}) \tag{3}$$

$$u_{ijt} = \sigma_k z_{ijt} + w_{ijt} \tag{4}$$

Eq. (1) is a time-varying stochastic frontier gravity model of China's outward FDI, where $OFDI_{ijt}^{'}$ is the theoretical optimal level of China's outward FDI from i to host country j in period t. X_{ijt} denotes the significant factors affecting the level of the OFDI frontier, β is a vector of parameters to be estimated, and v_{ijt} a random error term. In equation (2), $OFDI_{ijt}$ is the actual size of China's outward FDI in the host country in period t. u_{ijt} is the inefficiency of China's OFDI, which is assumed to be independent from v_{ijt}. In equation (3), A represents the efficiency of China's OFDI, which is the ratio of the actual scale of OFDI to the theoretical optimal level; It can be seen that the actual scale of OFDI is smaller than the theoretical optimal level when the effect of investment inefficiency is present, i.e., $u_{ijt} > 0$, thus $OFDIE_{ijt} \in (0,1)$. In equation (4), z_{ijt} represents the factors affecting the inefficiency term of China's

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OFDI, σ_k is the coefficient of z_{ijt} to be estimated, and w_{ijt} is the stochastic disturbance term.

Based on the above framework, we construct the following basic panel model:

$$\ln ofdi_{it} = \alpha_i + \beta_1 \ln pop_{it} + \beta_2 \ln \mathrm{gdp}_{it} + \beta_3 \ln pgdp_{it} + \beta_4 \ln dist_{it} + \beta_5 clang_{it} + \beta_6 ctig_{it} + v_{it} - u_{it} \quad (5)$$

In Eq. (5), pop_{it}, gdp_{it}, $pgdp_{it}$, $dist_{it}$, $clang_{it}$ and $ctig_{it}$ denote respectively the population, economic size, economic growth, geographical distance from China's capital, linguistic proximity to China, and border variables of the host country j in time period t.

gdp_{it} denotes the GDP of the host country, reflecting the size of the host country's market. pop_{it} denotes the population size of the host country. $pgdp_{it}$ denotes the economic growth in the host country. $dist_{it}$ represents the geographical distance between China and the host country. $clang_{it}$ is a dummy variable representing whether the host country has the same official language as China. $ctig_{it}$ is a dummy variable representing whether the host country has the same common border with China.

The investment inefficiency equation is set as:

$$u_{it} = \delta_0 + \delta_4 \ln timg_{it} + \delta_5 nature_{it} \quad (6)$$

In Eq. (5), $timg_{it}$ is level of development of the digital economy of China's outward FDI from i to host country j in period t. $nature_{it}$ denotes the natural resource endowment of the host country. In this paper, the investment frontier equation and the investment inefficiency equation are simultaneously included in equation (7), i.e. one-step OFDI inefficiency model is constructed for estimation.

The specific form is as follows:

$$\begin{aligned} \ln ofdi_{it} &= \alpha_i + \beta_1 \ln pop_{it} + \beta_2 \ln \mathrm{gdp}_{it} + \beta_3 \ln pgdp_{it} + \beta_4 \ln dist_{it} + \beta_5 clang_{it} \\ &+ \beta_6 ctig_{it} + v_{it} - (\delta_0 + \delta_4 \ln timg_{it} + \delta_5 nature_{it}) \end{aligned} \quad (7)$$

2.2 Digital Economy Measurement

Digital economy development (TIMG) index: Based on Wang[8], this paper adopts the digital economy development index (TIMG) to measure the digital economy of countries around the world. The index system consists of 4 first-level indicators, which are Digital Technology (DT), Digital Infrastructure (DI), Digital Markets (DM) and Digital Governance (DG). Data from Global Digital Economy Development Index Report (TIMG 2023).

3. Regression results and analyses

3.1 Data description

Table 1: Data description

variable	N	mean	sd	min	p50	max	Data sources
lnstock	513.00	11.35	2.28	3.99	11.58	15.72	China Statistical Yearbook
lntimg	513.00	4.095	0.219	3.455	4.107	4.472	TIMG index
lnpop	513.00	16.93	1.46	14.09	17.02	21.07	WDI
lngdp	513.00	36.19	5.12	22.73	38.03	40.67	WDI
lnpgdp	513.00	21.64	1.05	14.49	21.89	23.03	WDI
lndistcap	513.00	8.85	0.52	6.86	8.90	9.87	CEPII
comlang	513.00	0.04	0.18	0.00	0.00	1.00	CEPII
nature	513.00	3.22	6.75	0.00	0.91	56.15	WDI
contig	513.00	0.07	0.26	0.00	0.00	1.00	CEPII

Significant gaps in the data generated by linear interpolation are due to missing data for some years in some countries. Therefore, this paper chooses to exclude missing values and outliers, and the valid observations for the empirical regression after excluding missing values are 513. Due to the different scales of each variable, to reduce the sample heteroscedasticity, this paper logarithms all the variables in

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this paper except for the digital economy, natural resources, distance variable, and bordering variable. The descriptive statistics of the main variables are shown in Table 1. The standard deviation of the level of digital economy across countries is 0.219, and the maximum and minimum values are 4.472 and -3.455, respectively.

3.2 Baseline regression analysis

The regression results are shown in Table 2, according to the results of Table 2, the regression coefficient of *lntimg* is significantly positive at 1% level, which indicates that the host country's digital economy development index has a facilitating effect on the efficiency of China's outward FDI, this is because the level of development of the host country's digital economy can contribute to the growth of China's outward FDI by lowering the cost of trade. Meanwhile, according to the results of the regression coefficients of the control variables, it can be seen that the coefficients of *lnpop, lngdp, lnpgdp lndistcap, comlang_off,* and *contig* are all significantly positive in the production frontier equation. This indicates that these control variables significantly affect the efficiency of China's OFDI. In addition, in the inefficiency equation, the regression coefficient of the *nature* is significantly negative at 1% level, which indicates that the natural resources of the host country have a facilitating effect on China's OFDI efficiency.

Table 2: Baseline regression analysis

	(1)	
	Model	t-value
Frontier		
lnpop	0.559***	(9.80)
lngdp	0.153***	(9.11)
lnpgdp	0.171***	(4.01)
lndistcap	0.0822	(0.70)
comlang_off	2.241***	(11.00)
contig	0.742***	(2.88)
_cons	-4.793***	(-3.17)
Mu		
lntimg	-3.703***	(-10.90)
nature	-0.0587***	(-6.12)
_cons	18.75***	(13.22)
Usigma		
_cons	0.425***	(6.26)
Vsigma		
_cons	-26.59***	(-20.74)
N	513	

3.3 Robustness Tests

In order to test the accuracy of the findings of this paper, the core explanatory variable substitution method is used to test the results of the benchmark regressions robustly. The results of the robustness tests are reported in columns (1)(2)(3) of Table 3, where the core explanatory variable TIMG is regressed by replacing it with the host country's digital technology (dt), digital infrastructure (di) and digital market (dm). The results show that the estimated coefficients of the host country's digital technology (dt), digital infrastructure (di), and digital market (dm) are all significantly positive at a 1% confidence level, which indicates that the development of the host country's digital economy can significantly improve the efficiency of China's outward FDI.

In order to exclude endogeneity issues from affecting the estimation results, this paper regresses the core explanatory variables one period lagged. The regression results are shown in in columns (4) of Table 3, and the coefficient of the result remains significantly negative, indicating robust results. The above results are consistent with the initial benchmark regression results, which indicate that the empirical results are robust, i.e., the host country's digital economy promotes China's OFDI efficiency.

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Table 3: Robustness Tests

	(1)	(2)	(3)	(4)
	MD1	MD2	MD3	MD4
Mu				
lntimg				-0.0602***
				(-12.06)
dt	-0.0297***			
	(-5.86)			
nature	-0.0379***	-0.0432***	-0.0451***	-0.0547***
	(-3.70)	(-4.60)	(-4.94)	(-5.83)
di		-0.0540***		
		(-9.60)		
dm			-0.0583***	
			(-11.55)	
cons	4.992***	6.811***	6.861***	7.190***
	(13.51)	(16.60)	(21.83)	(22.81)
Usigma				
_cons	0.574***	0.467***	0.406***	0.318***
	(7.90)	(6.52)	(5.90)	(4.31)
Vsigma				
_cons	-4.054**	-4.223**	-28.33	-36.36
	(-2.54)	(-2.46)	(.)	(.)
N	513	513	513	416

Note: ***, **, * indicate significant at the 1 per cent, 5 percent and 10 per cent levels, respectively, with corresponding standard errors in parentheses.

3.4 Heterogeneity analysis

According to the income level of the sample countries, the countries are divided into high-income countries and low-income countries. The regression results are shown in Table 4, from which it can be seen that the digital economy of both high-income and low-income countries significantly impacts the efficiency of China's outward foreign direct investment; however, the impact of high-income countries is relatively significant, and the impact of low-income countries is relatively small. This is because developing the digital economy in host countries favors inward investment. Developing the digital economy in host countries is conducive to foreign investment in technological and reverse spillovers, thus attracting Chinese enterprises to invest.

Table 4: heterogeneity analysis

Mu	High	low
lntimg	-5.623***	-2.478***
t-value	(-8.58)	(-6.58)
nature	-0.0959***	-0.0342***
t-value	(-4.79)	(-3.24)

Note: ***, **, * indicate significant at the 1 per cent, 5 per cent and 10 per cent levels, respectively, with corresponding standard errors in parentheses.

4. Conclusions and Implications

4.1 Conclusion

This paper empirically investigates the impact of the host country's digital economy approach on China's OFDI efficiency, using data from countries around the world from 2013 to 2021. The results show that the development of digital economy in host countries has a significant positive impact on China's OFDI efficiency, and the results remain robust after transforming the core explanatory variables. In addition, this paper divides the sample countries into high-income countries and low-income countries, and the impact of high-income countries on China's OFDI efficiency is more significant.

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4.2 Recommendations

In the context of the rapid development of the digital economy, China's outward foreign direct investment (OFDI) efficiency can be significantly enhanced through a series of targeted policies. The following recommendations aim to leverage the potential of the digital economy to optimize China's OFDI strategy: Firstly, when making outward foreign direct investment, China should pay more attention to the quality and effectiveness of investment projects and avoid blind investment and duplicated construction. Secondly, Enterprises are encouraged to invest in innovative and high-value-added industries related to the digital economy to enhance China's position in the global value chain. Strengthen risk management and supervision of outward foreign direct investment to ensure compliance and sustainability of investment activities. Thirdly, Chinese enterprises should actively participate in reforming and constructing the global digital economy governance system, promoting the formation of an open, inclusive, and universal global digital economy environment and encouraging enterprises to increase investment in research and development. Thirdly, China should strengthen the cultivation of enterprises' internationalized business capacity and improve their competitiveness and influence in the global market. It should also establish a sound protection mechanism for enterprises' overseas investment and reduce its associated risks. Lastly, Encourage Chinese enterprises to seize opportunities in overseas digital infrastructure markets, investing in communication networks such as submarine cables, broadband networks, and satellite communications, as well as computing infrastructure like big data centers and cloud computing. Participate actively in the digitalization, networking, and intelligent upgrading of traditional infrastructure in host countries, including municipal, transportation, energy, power, and water conservancy projects.

References

[1] I Benedetti , G Guarini and T Laureti. Digitalization in Europe: A Potential Driver of Energy Efficiency for the Twin Transition Policy Strategy[J]. Socio-Economic Planning Sciences, 2023. 89: .101701.

[2] S Bin and L Yuying. A Study on the Measurement and Spatial Differentiation Characteristics of China's Digital Economy Development Index[J]. Nanjing Social Science, 2022. (01): 43-54.

[3] Q Junyan and R Yida. Digital Economy Development, Institutional Quality and the Upstreamness of Global Value Chains[J]. International Economic and Trade Exploration, 2022.38(01): 51-67.

[4] S Li and C Tianhui. Whether the Development of Digital Economy in Host Countries Can Promote Chinese Enterprises' Outward Fdi: An Empirical Study Based on Micro Enterprises[J]. International Business (Journal of the University of International Business and Economics), 2023. (03): 61-79.

[5] X Li , W Zhou and J N Hou. Research on the Impact of Ofdi on the Home Country's Global Value Chain Upgrading[J]. International Review of Financial Analysis, 2021.77: 101862.

[6] Z Peng. The Nature of the Digital Economy and the Logic of Its Development [J]. The Economist, 2019. (02): 25-33.

[7] S Samoilenko and K M Osei-Bryson. Representation Matters: An Exploration of the Socio-Economic Impacts of Ict-Enabled Public Value in the Context of Sub-Saharan Economies[J]. International Journal of Information Management, 2019.49: 69-85.

[8] Z Wang , Y M Chen and M Zheng. Measuring the Development of the Global Digital Economy: Stylized Facts Based on Timg Index[J].Financial Review (Chinese), 2021.13(06): 118-119.

[9] Y Wenjing and F Shaojun. Has the Development of Digital Economy in Host Countries Promoted China's Outward Fdi? -Based on the Empirical Analysis of Rcep Member Countries [J]. Financial Market Research, 2024. (01): 95-108.

[10] L Zhenlin. A Study on the Impact of Digital Economy Development in Host Countries (Regions) on China's Outward Fdi [J]. Contemporary Finance and Economics, 2023. (04): 118-130