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RESEARCH ARTICLE

Impact of host country´s business environment on China´s OFDI in Belt and Road countries: Based on the perspective of investment motives

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ABSTRACT

This study used a two-step system generalized method of moments to examine the impact of the business environment in the Belt and Road countries on outward foreign direct investment (OFDI) of China while presenting a deeper investigation into the spatial characteristics of OFDI through a spatial error model. The results revealed that the impact mentioned above varies with different investment motivations. If Chinese businesses are motivated by local consumer markets or seeking a human workforce to make an outward direct investment, they will choose countries with poor business environments. They will select countries with stable business environments for their natural resources or strategic assets. Significant spatial agglomeration exists in China's OFDI in the countries and regions along the routes, while substantial evidence is absent on the business environment investment effect with different motivations. Finally, relevant recommendations concluded according to the study.

KEYWORDS

Business environment; Outward foreign direct investment; Investment motives; Spatial characteristics; Two-step system generalized method of moments

1 Introduction

Because of deepening economic globalization and the steady growth of China's economy, the scale and influence of China's outward foreign direct investment (OFDI) are increasing and becoming more significant in the global investment field. In recent years, with the implementation of the Belt and Road strategy, the total amount of China's OFDI to Belt and Road countries keeps rising, as does the problem of uneven regional distribution. Business environment is a variety of procedures and systems that an enterprise faces throughout its life cycle. A high-level business environment is conducive to attracting foreign investment and promoting social and economic development. The business environment of Belt and Road countries exhibits vast differences in spatial distribution, high in the northeast and low in the southwest (Zeng & Lai, 2020), which may affect the distribution of China's OFDI along the

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route to a certain extent. In addition, differences in the factor endowments in different areas in the Belt and Road countries have led to the diversity of China' s investment motives in the region. At the same time, geographical location, natural conditions, and economic factors of the host country may also be affected by spatial characteristics.

Based on the above background, this study explored the business environment impact of Belt and Road countries on China' s OFDI under different investment motives while considering the unique spatial characteristics of the region as it relates to OFDI. It proposed practical suggestions to improve the status quo of OFDI in China, improved the relevant research on the location selection of OFDI in China, and provided a scientific basis for choosing reasonable investment locations and optimizing the spatial pattern of foreign investment.

2 Literature review

The location distribution of OFDI has always attracted much attention. Early scholars focused on investigating the factors of the home country, while later research focused on the influence of the host country's economic and institution. The research on the relationship between the host country' s business environment and the home country OFDI has become a hot issue. Many scholars examined the impact of the business environment on OFDI, but their conclusions were dissimilar. For example, Zhang & Li (2022) found that optimizing the business environment can enhance the willingness to invest abroad. Bayraktar (2013) showed that a stable host country business environment can enhance its ability to attract foreign investment. Cheung & Qian (2009) found that China' s OFDI flows more to areas where legal supervision is weak and corruption is prominent. Some scholars believed the discrepancy is due to differences in investment motives. Chen, et al (2018) found from a micro perspective that labor-seeking motivation plays a significant role in China' s OFDI behavior from 1998 to 2012, especially for the African region. Ren & Yang (2020) showed that Chinese OFDI has strong natural resource-seeking motivation. Meanwhile, Li & Sun (2017) demonstrated that the more abundant the natural resources of the host country, the less obvious the negative effects of its business environment on China' s OFDI. Wang, et al (2018) used the Differences-in-Differences method to conclude that the Belt and Road initiative significantly promoted China' s OFDI in countries along the route; among them, the driving effect of market-seeking motivation was more significant. Hou & Su (2018) based their research on the investment gravity model and found that China' s OFDI has different preferences for the business environment under disparate investment motives.

Notably, with the gradual rise of spatial economics, some scholars tried to include the investigation of spatial factors in the research of OFDI and used spatial statistics, spatial econometrics, and other methods to explore its spatial distribution characteristics and influence on various effects. For example, Yu, et al (2022) build a spatial model to analysis on the influencing factors of OFDI by Jiangsu province in China, which concluded that there is a positive spatial correlation among different cities and a spatial crowding out effect of OFDI. Sun & Shao (2017) investigated the factors influencing the distribution of Chinese OFDI across different host countries, which proved that Chinese OFDI shows a significant spatial agglomeration pattern. Li & Chen (2007) used panel data from various Chinese provinces to build a spatial model and finally concluded that foreign investment in neighboring regions can stimulate local attraction of foreign investments. Through empirical research, Su & Hu (2008) concluded that the stimulating effect of traditional factors that promote foreign direct investment (FDI) is declining, and spatial agglomeration effects in the introduction of FDI

should be taken seriously.

Throughout the existing literature, domestic and foreign scholars have made rich research results on OFDI, but few studies exist in the Belt and Road countries. In addition, the research on the host country' s business environment based on different investment motives is also lacking in the literature on China' s OFDI. However, there are many countries along the Belt and Road, and China's investment motives in disparate host countries are not the same. Moreover, after considering the investment motives between countries, the existing literature and research are inadequate as to whether there is a spatial agglomeration effect in FDI. Given this situation, in China' s vigorous development of the Belt and Road strategy, this article analyzed the impact of the host country' s business environment on China' s OFDI under different investment motives. It explored the impact of the business environment in the Belt and Road countries on China' s OFDI while considering the spatial characteristics of OFDI. Finally, this study proposed policy recommendations based on the research results.

3 Empirical analysis

3.1 Research hypothesis

The business environment is an important factor affecting China' s OFDI in Belt and Road countries. At the same time, China has various investment motives in the foreign investment process. Therefore, clarifying investment motives is a priority in making investment decisions, as motives have a major impact on the choice of investment location. This article proposed several hypotheses about the impact of the host country's business environment on China's OFDI under different investment motives.

3.1.1 The impact of the host country´s business environment on China´s OFDI

When foreign businesses enter a country' s market, they not only bear the cost of cultural differences but also must gain the trust and support of various market entities in the host country. The local business environment faced by enterprises includes politics, financing environment, and government services. The intensity of corporate investment is related closely to the business environment of the host country. Wang, et al (2020) concluded that a good business environment can reduce corporate operating costs to a certain extent, which helps enterprises avoid institutional risks and improve profit margins. Pan, et al (2022) found that Chinese enterprises tend to choose host countries with better overall tax payment performance, cross-border trade, and a high-level business environment when making FDIs. Based on these premises, hypothesis 1 is proposed as follows: The level of a host country' s business environment has a positive impact on China' s OFDI.

3.1.2 The impact from different investment motives

Market-seeking type: Increasing attention is given to business environments. China' s business environment level is rising annually but has not yet achieved complete marketization. There is still an undeniably large gap between our business environment and the world' s first-class level. Chinese enterprises are more familiar with market environments with low-level business environments (Ji, 2014). There is often fierce market competition in regions with high-level business environments, and most Chinese companies do not have the competitive advantage with businesses in developed countries. Therefore, when Chinese enterprises make OFDI out of market motivation, they often choose host countries with lower-level business environments as investment targets. Based on this information, hypothesis 2 is proposed as follows: When OFDI is made from market-seeking motivation, the host

country' s business environment harms China' s OFDI.

Labor-seeking type: The research by Zhang & Man (2018) showed that developed countries with better investment environments have high labor costs. However, Chinese enterprises motivated by labor-seeking are often unable to bear such high production costs. These companies pay more attention to operating efficiency and institutional costs and are more inclined to invest in developing countries. Chinese companies prefer investing in countries with lower-level business environments rather than in developed countries. Based on this scenario, hypothesis 3 is given as follows: When OFDI is made from labor-seeking motivation, the host country' s business environment harms China' s OFDI.

Strategic resource-seeking type: Generally speaking, developed countries enjoy more advanced scientific and technological achievements. Meanwhile, China's scientific research capabilities, technical knowledge, and organizational and management capabilities are ahead of most Belt and Road developing countries. When Chinese enterprises make OFDI motivated by strategic resource-seeking, China tends to invest in developed countries with high scientific and technological levels to acquire advanced technology patents or other capabilities (Chang, 2014). Furthermore, most enterprises investing in host country strategic resources belong to private enterprises with limited risk-taking ability. They have higher requirements of the host country' s market and institutional environment. Based on this, hypothesis 4 is given as follows: When OFDI is made from strategic resource-seeking motivation, the host country' s business environment has a positive impact on China' s OFDI.

Natural resource-seeking type: Some companies rely on the Belt and Road platform to actively expand overseas business. They invest in the countries with abundant natural resources with good policy environments. The research of Luo & Bi (2018) showed that for Belt and Road countries with sufficient natural resources, their legal construction quality significantly affects China's OFDI. The investment for natural resource-seeking is usually large scale, high risk costly, and highly dependent on a high-level host country institutional and market environment. Based on this fact, hypothesis 5 is as follows: When OFDI is made from natural resource-seeking motivation, the host country' s business environment has a positive impact on China' s OFDI.

3.2 Research design

3.2.1 Variable selection and data sources

Based on the data availability, 50 Belt and Road countries[1] were selected and sampled between 2011 and 2019. The model' s variable indicators were selected as follows:

(1) Explained variable *ofdi*. China's OFDI is expressed as China's OFDI stock in the host country over the years. The data come from "*Statistical Bulletin of China's FDI*".

(2) Core explanatory variable *be*: The World Bank's "*Doing Business Report*" covers 190 economies, and its index covers 10 major areas of business operations: starting a business, dealing with construction permits, getting electricity, registering property, paying taxes, trading across borders, getting credit, protecting minority investors, enforcing contracts, and resolving insolvency. Within this authoritative and influential report, the business environment

[1] 50 Belt and Road countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Israel, Latvia, Lithuania, Poland, Slovakia, Slovenia, Bahrain, Bangladesh, Brunei, Cambodia, Egypt, India, Indonesia, Jordan, Kuwait, Laos, Lebanon, Malaysia, Mongolia, Myanmar, Nepal, Pakistan, Palestine, Philippines, Qatar, Saudi Arabia, Singapore, Sri Lanka, Thailand, Turkey, United Arab Emirates, Vietnam, Yemen, Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Macedonia, Ukraine.

frontier distance score[1] measures the business environment of countries along the route. The specific indicator data derives from the World Bank's Business Environment Project database.

(3) Other variables: The per capita gross national product *pgdp* is expressed by dividing the host country's GDP by the total population. The unit is based on a 2011 constant dollar, which measures market-seeking motivation. The labor abundance status *labor*, expressed as the proportion of the host country' s labor force population against the total population, measures labor-seeking motivation. Natural resource status *energy*, expressed as the proportion of the host country' s ore and oil in exports, measures natural resource-seeking motivation. The level of strategic asset ownership *science*, expressed as the proportion of host country' s high-tech products in manufactured exports, measures the strategic resource-seeking motivation. The data derive from World Bank World Development Index. Descriptive statistics for specific variables are analyzed in the Table 1.

Table 1 Descriptive statistics of variables

Variables	Minimum value	Maximum value	Average value	Standard deviation
ln*ofdi*	0.69	15.49	9.82	1.09
ln*be*	3.46	4.51	4.27	0.17
ln*pgdp*	6.55	11.36	8.82	1.16
ln*labor*	2.95	1.79	6.33	1.59
ln*energy*	–2.52	4.57	2.73	1.34
ln*science*	1.79	10.82	6.19	1.98

3.2.2 Model setting

We constructed the following empirical model to test hypotheses 1 through 5:

$$ln\,ofdi_{it} = \alpha_0 + \varphi\, ln\,ofdi_{it-1} + \alpha_1\, ln\,be_{it} + \alpha_2\, ln\,be_{it} \times ln\,pgdp_{it} + \alpha_3\, ln\,be_{it} \times \ ln\,labor_{it} + \alpha_4 \ln be_{it} \times \ln energy_{it} + \alpha_5 \ln be_{it} \times \ln science_{it} + \sum \alpha_i \ln X_{it} + v_{it} \quad (1)$$

Here, *i* and *t* represent the country and year, respectively. *ofdi* represents China's OFDI, and the choice of the lagging term is to consider the endogeneity of the variable. *be* represents the level of the business environment in the host country. *labor, energy, science*, and *pgdp* indicate the degree of labor sufficiency, resource sufficiency, strategic asset holding level, and market size of the host country, respectively. Its interaction term with *be* measures the relationship between the host country' s business environment and China' s FDI based on labor, natural resources, strategic assets, and market-seeking motivation. *X* represents control variables, including *labor, energy, science*, and *pgdp*, to test the direct influence of each one on OFDI. a_0 represents a constant term and a_i is the coefficient of each explanatory variable. v_{it} represents the random error term.

3.3 Empirical results and analysis

3.3.1 Data preprocessing and estimation method selection

To solve the model' s possible heteroscedasticity and potential multicollinearity problem caused by the existence of the interaction term, we first took the logarithm of all the vari-

[1] Frontier distance score: The *Doing Business Report* assigns a score of 100 to the best-performing economy in each index and a score of 0 to the worst-performing economy. The index score being calculated based on the distance of the economy's performance in that index from the frontier level. A higher arithmetic mean score of the 10 indicators indicating a better business environment.

ables and then decentralized them, so that the model had stronger practical significance.

When the number of panel data periods is small, the model has inconsistent Ordinary Least Square estimators. Generally, the generalized method of moments (GMM), or the instrumental variable method, can be used to solve the error, but finding suitable instrumental variables has low operability and is often difficult to achieve, so it easily affects the robustness of the model (Yang, 2013). Given this challenge, the study used a two-step system GMM to estimate the model. We constructed a variance-covariance matrix using the residuals estimated in the first stage and then re-estimated the model in the second stage.

3.3.2 Two–step system GMM estimation results and analysis

In processing the empirical analysis, this study first examined the impact of core variables and control variables on OFDI and then gradually incorporated the intersection of the business environment and investment motivation to further verify whether there was a difference in this relationship under different investment motivations. Finally, a robustness test was performed.

As shown in Table 2, model (1.1) first conducted a separate test on the business environment and examines its direct impact on China' s OFDI. Next, based on model (1.1), we added the interaction terms of the business environment and different investment motives one by one in models (1.2)-(1.5). In this way, we examined the impact of host country's business environment on China's OFDI under different investment motives.

The estimated results of the model obtained using Stata 15.1 are shown in Table 2. The auto-regression (AR) (1) and AR (2) values of each model show that the model has a first-order autocorrelation at a significance level of 0.05, but there is no second-order autocorrelation. Combined with the results of Sargan's test, the model setting is reasonable and the theoretical hypothesis mentioned above can be verified. There is no over-identification problem.

The coefficients of the business environment variable in each model in Table 2 are all significantly positive, indicating that the business environment has a significant positive impact on the scale of China' s investment in the Belt and Road countries. The higher the business environment level, the higher China' s investment level in the host country. This result aligns with hypothesis 1. The coefficients of the OFDI variable ln$ofdi_{it-1}$ lagging one period are also significantly positive, indicating that the inertia of China' s foreign investment has a significant positive promotion effect on subsequent investment. The coefficients of ln*pgdp* and ln*labor* are significantly positive in all models, and the values are relatively large, indicating that the economic development level and labor status of Belt and Road countries are important factors to attract China's OFDI. The coefficient of ln*energy* is negative in all models and has passed the 1% significance test in models (1.3)-(1.5), indicating that Chinese companies invest more in the host countries with insufficient natural resources. The coefficient of ln*science* is generally small, and except for the model(1.5) which passed the 10% significance test, the other models are not significant. It shows that the science and technology level of the host country is not a significant factor of concern for Chinese corporate investment.

Under different investment motives, the empirical results also have significant differences. Among them, the coefficients of ln*be*× ln*pgdp* are significantly negative, indicating that, driven by market-seeking motives, Chinese companies prefer to conduct investment activities in countries with lower-level business environments, enhancing competitiveness and a broader market. At the same time, hypothesis 2 is verified. The coefficients of ln*be*× ln*labor* are significantly negative so that hypothesis 3 is established. Driven by labor-seeking motivation, countries with poor business environments are more attractive to China' s OFDI. The coeffi-

cients of ln*be*× ln*energy* are significantly positive in each model, indicating that good business environments of the host country have a positive impact on China's OFDI when motivated by natural resource-seeking. This conclusion confirms hypothesis 4 preliminarily. The coefficients of ln*be*× ln*science* are significantly positive, meaning that Chinese companies are more inclined to invest in countries with a better business environment when they seek strategic assets for FDI. Such companies rely on good political and legal environments to protect them from investment risk. This finding also verifies hypothesis 5.

Table 2 Results of two-step system generalized method of moments estimation

variables	model (1.1)	model (1.2)	model (1.3)	model (1.4)	model (1.5)
ln$ofdi_{it-1}$	0.583*** (9.342)	0.512*** (10.122)	0.763*** (10.338)	0.648*** (10.431)	0.5652** (10.593)
ln*be*	0.976* (1.791)	3.311** (2.489)	4.541** (2.228)	6.421* (1.567)	8.431** (2.366)
ln*pgdp*	1.438*** (5.431)	2.238*** (4.232)	3.438*** (3.538)	3.127*** (3.978)	5.329*** (5.232)
ln*labor*	1.643*** (5.983)	1.543*** (7.231)	1.654*** (4.132)	1.243*** (5.982)	4.543*** (8.813)
ln*energy*	–0.072 (–0.338)	–0.073 (–0.478)	–1.432*** (–6.98)	–2.234*** (–6.867)	–1.987*** (–4.702)
ln*science*	0.019(0.341)	0.013 (0.121)	0.017 (0.32)	–0.442 (–0.531)	–0.298* (–1.393)
ln*be*×ln*pgdp*	—	–0.542** (–1.972)	–0.234** (–2.122)	–0.532** (–2.324)	–1.234** (–2.131)
ln*be*×ln*energy*	—	—	0.432*** (3.945)	0.543** (2.113)	0.542** (2.342)
ln*be*×ln*science*	—	—	—	0.422 (0.301)	0.522* (1.478)
ln*be*×ln*labor*	—	—	—	—	–0.432** (–2.183)
a_0	–36.24*** (–3.342)	–43.18*** (–3.778)	–43.68** (–2.338)	–41.43** (–2.431)	–55.43** (–2.302)
AR (1)	0.023	0.024	0.024	0.021	0.019
AR (2)	0.294	0.291	0.234	0.224	0.215
Sargen test	0.364	0.383	0.448	0.434	0.444
Observation	450	450	450	450	450

Note: model (1.1) conducted a separate test on the business environment and examines its direct impact on China' s OFDI; based on model (1.1), the interaction terms of the business environment and different investment motives were added one by one in models (1.2)-(1.5).— indicate not applicable; ***, **, * indicate a significance level below 0.01, 0.05, and 0.1, respectively; the *t*-statistic is in parentheses; the data in the three rows of AR (1), AR (2) and Sargan test are all *P* values.

3.3.3 Robustness test

To further test the robustness of the model, we used the method in Zhou, et al (2019), and removed Singapore from the research sample, and then we re-estimated each model. Because Singapore is a well-known offshore financial center and tax haven, it attracts far

more FDI than other countries and regions along the Belt and Road. It is an abnormal sample. After deleting it, the model was tested for robustness. Model estimation results are shown in Table 3. After excluding the Singapore sample, the signs and significance of the core explanatory variables, other variables, or cross-term variable coefficients do not change significantly, indicating that the regression results in Table 2 are robust. It is credible to analyze the business environment impact of Belt and Road countries on China' s OFDI under different investment motives.

Table 3 Robustness test results

variables	model (2.1)	model (2.2)	model (2.3)	model (2.4)	model (2.5)
ln$ofdi_{it-1}$	0.543*** (10.201)	0.543*** (10.864)	0.543*** (10.958)	0.543*** (11.632)	0.531*** (11.745)
ln*be*	0.529* (1.382)	2.341** (2.382)	5.324*** (4.831)	4.540** (1.979)	12.351*** (3.889)
ln*pgdp*	1.231*** (5.081)	2.231*** (3.011)	3.431*** (3.219)	4.432*** (3.156)	5.432*** (3.589)
ln*labor*	1.654*** (3.572)	1.452*** (3.882)	1.445*** (4.134)	1.345*** (3.942)	4.123*** (4.122)
ln*energy*	–0.031 (–0.701)	–0.042 (–0.954)	–1.645*** (–3.778)	–2.051*** (–3.922)	–1.964*** (–4.723)
ln*science*	0.015 (0.223)	0.013 (0.092)	0.016 (0.292)	–0.236 (–0.301)	–1.267* (–1.345)
ln*be*×ln*pgdp*	—	–0.346* (–1.572)	–0.436** (–2.37)	–0.347** (–2.167)	–1.304*** (–3.422)
ln*be*×ln*energy*	—	—	0.769*** (3.882)	0.329*** (4.052)	0.435*** (5.831)
ln*be*×ln*science*	—	—	—	0.125 (0.124)	0.334** (1.967)
ln*be*×ln*labor*	—	—	—	—	–0.432*** (–4.922)
a_0	–29.432*** (–3.812)	–38.324*** (–3.918)	–48.083*** (–4.312)	–41.322*** (–4.854)	–97.938*** (–3.763)
AR (1)	0.019	0.020	0.022	0.021	0.017
AR (2)	0.300	0.298	0.240	0.242	0.215
Sargen test	0.372	0.399	0.464	0.470	0.467
Observation	441	441	441	441	441

Note: model (2.1) conducted a separate test on the business environment and examines its direct impact on China' s OFDI; based on model (2.1), the interaction terms of the business environment and different investment motives were added one by one in models (2.2)- (2.5). — indicate not applicable; ***, **, * indicate a significance level below 0.01, 0.05, and 0.1 respectively; the *t*-statistic is in brackets; the data in AR(1), AR(2) and Sargan test are all *P* values.

4 Further empirical analysis considering spatial characteristics

According to the theory of new economic geography, investment activity is not a simple individual activity but a dynamic spatial agglomeration activity. When the spatial agglomera-

tion of investment activities reaches a certain level, it produces a third-country effect. That is, the changes of the investment environment and factor levels in countries and regions surrounding the host country will have an impact on the host country' s attraction of OFDI. This impact may be positive or negative. If multinational companies choose the host country for investment not only to obtain the local market but also to export their products to the investing country' s market, the expansion of the market potential of the investing country and its neighboring countries and regions will help the host country attract more investment from multinational companies. In this case, the influence of the third-country effect is positive. If the investment environment in the surrounding countries and regions of the investing country improves, the investment of multinational companies in the host country is squeezed out and capital is transferred. In this case, the influence of the third-country effect is negative. Given this situation, in the next sections, we built a spatial econometric model based on the OFDI spatial correlation test in the Belt and Road countries and empirically analyzed its possible impact on the investment effect of business environments under different investment motives.

4.1 Research preparation

4.1.1 Spatial correlation test

Table 4 shows the Moran' s *I* index test results of China' s OFDI in the Belt and Road countries from 2011 to 2019. The results preliminarily indicate that China' s OFDI in the Belt and Road countries has positive spatial auto-correlation and third-country effects. Meanwhile there is a significant spatial agglomeration effect on China' s OFDI in the Belt and Road countries.

Table 4 Results of Moran' s I index test of China' s OFDI from 2011 to 2019

year	Moran´*I*	E(*I*)	sd(*I*)	*z*	*P* value
2011	0.208	–0.020	0.046	4.987	0.000
2012	0.213	–0.020	0.046	5.088	0.000
2013	0.211	–0.020	0.046	5.048	0.000
2014	0.227	–0.020	0.046	4.987	0.000
2015	0.212	–0.020	0.046	5.077	0.000
2016	0.174	–0.020	0.046	4.248	0.000
2017	0.149	–0.020	0.046	3.673	0.000
2018	0.152	–0.020	0.046	3.763	0.000
2019	0.163	–0.020	0.046	4.035	0.000
2011–2019	0.208	–0.003	0.020	10.785	0.000

Note: OFDI: outward foreign direct investment

4.1.2 Spatial model setting

Based on OFDI' s spatial correlation, a spatial measurement model tested whether this spatial correlation impacted the investment effect of the business environment of Belt and Road countries under different investment motives. Based on the Lagrange Multiplier (LM) test, we made a choice between the spatial autoregressive model (SAR) and the spatial error model (SEM). And based on the Likelihood Ratio (LR) test and Wald test, we choose whether or not to use the spatial Dubin model (SDM). The specific test results are shown in Table 5.

Table 5 Results of the LM, LR, and Wald tests

Statistics name	Statistic value	*P* value
LM–error	205.029	0.000
Robust LM–error	195.408	0.000
LM–lag	9.659	0.002
Robust LM–lag	0.038	0.846
LR–Spatial–error	11.159	0.112
LR–Spatial–lag	5.872	0.168
Wald–Spatial–error	47.051	0.127
Wald–Spatial–lag	44.783	0.141

Note: LM: Lagrange Multiplier; LR: Likelihood Ratio

Table 5 shows that China' s OFDI in the Belt and Road countries can pass the LM-error and LM-lag tests. Further observation of the Robust LM-error and Robust LM-lag statistics shows that only the former is significant at the 1% level. However, China' s OFDI in the Belt and Road countries can' t pass the LR test or Wald test which means the spatial Dubin model is not suitable. Therefore, we constructed a SEM as shown in equation (2) to analyze the possible influence of OFDI spatial characteristics.

$$y = X\beta + \lambda W\mu + \varepsilon, \varepsilon \sim N(0, \sigma^2 I_n) \tag{2}$$

In equation (2), *W* is the spatial weight matrix. The brief form of the spatial geographic weight matrix is defined as follows:

$$W = \begin{pmatrix} 0 & w(d_{ij}) & w(d_{ik}) \\ w(d_{ji}) & 0 & w(d_{jk}) \\ w(d_{ki}) & w(d_{kj}) & 0 \end{pmatrix}, w(d_{ij}) = d_{min}/d_{ij} \tag{3}$$

Here, d_{ij} represents the straight-line distance between the capitals of country *i* and country *j*. Among the 50 countries we studied, the distance between the bilateral capitals of Israel and Palestine is the shortest at 68.902 km. Therefore,

$$w(d_{ij}) = \frac{68.902}{d_{ij}}, i \neq j \tag{4}$$

The indicator selection and variable data source in the model are the same as in the previous study.

4.2 Empirical results and analysis

As shown in Table 6, model (3.1) first conducted a separate test of the business environment, generally verifying its impact, considering the spatial characteristics on China' s OFDI. Next, based on model (3.1), we added the interaction terms of the business environment and different investment motives one by one in models (3.2)-(3.5). This method allowed us to evaluate the impact of the host country' s business environment on China's OFDI under different investment motivations and spatial characteristics.

The estimated results in Table 6 show that the value of sigma2_e is small and passes the 1% significance level test. The coefficient of determination R^2 exceeds 0.5, indicating that the fitting effect of the model is better. The auto-correlation coefficients of the spatial errors λ are all positive and significant at the 1% level, indicating that China has a positive spatial dependence on OFDI in the Belt and Road countries and that unpredictable factors in the sur-

rounding countries of the host country have a significant impact on China' s OFDI. The regression results of models (3.2)-(3.5) show that regardless of the investment motive, China' s OFDI in the Belt and Road countries is positively agglomerating. At the same time, changes in the country' s business environment not only affect the investment strategy of the investing country but also indirectly affect the acceptance of outward investment by neighboring countries or regions.

Table 6 Results of the spatial error model estimation

variables	model (3.1)	model (3.2)	model (3.3)	model (3.4)	model (3.5)
ln*be*	0.948*** (6.496)	2.431*** (7.386)	4.087*** (6.365)	3.431*** (6.881)	5.432*** (7.273)
ln*pgdp*	1.298*** (7.268)	2.133*** (9.219)	2.431*** (8.198)	2.876*** (6.232)	3.329*** (7.276)
ln*labor*	1.432*** (9.228)	1.231*** (7.239)	1.432*** (5.241)	1.342*** (6.198)	2.543*** (5.231)
ln*energy*	–0.432 (–0.083)	–0.543 (–0.077)	–1.431** (–2.288)	–1.613*** (–3.917)	–1.321*** (–4.179)
ln*science*	0.061 (0.044)	0.074 (0.246)	0.079 (0.162)	–0.076 (–0.027)	–0.132 (0.035)
ln*be*×ln*pgdp*		–0.532* (–0.918)	–0.843** (–1.942)	–0.475** (–1.817)	–1.123** (–1.965)
ln*be*×ln*energy*			0.836*** (4.231)	0.411** (2.136)	0.432** (2.088)
ln*be*×ln*science*				0.086 (0.067)	0.521** (2.086)
ln*be*×ln*labor*					–0.431** (–2.107)
constant	–24.876*** (–5.34)	–32.731*** (–4.69)	–44.431** (–1.934)	–33.232** (–1.943)	–48.653** (–2.031)
λ	0.354*** (4.027)	0.253*** (3.922)	0.311*** (4.919)	0.287*** (5.024)	0.228*** (4.022)
sigma2_e	0.243***	0.245***	0.294***	0.295***	0.246***
R^2	0.621	0.623	0.543	0.566	0.625
log *L*	–443.431	–441.657	–463.587	–506.563	–498.56

Note: model (3.1) conducted a separate test of the business environment; based on model (3.1), the interaction terms of the business environment and different investment motives were added one by one in models (3.2)- (3.5). — indicate not applicable; ***, **, and * indicate a significance level below 0.01, 0.05, and 0.1 respectively; *t* statistic in brackets.

Comparing the estimation results in Tables 2 and 6, it is apparent that after adding OFDI spatial characteristics, the coefficient of ln*be* does not change much, indicating that the OFDI spatial characteristics have little impact on the investment effect on the business environment of countries along the route. Also, the coefficients of ln*pgdp*, ln*labor* , ln*energy* do not change much, and the significance test results are the same. The coefficient of ln*science* is insignificant in all models, which reiterates that the technological factor in the Belt and Road countries is not a significant reason for China' s OFDI.

The results of adding interaction coefficients to the SEM, in turn, are consistent with the regression results of the two-step system GMM, which further confirms the previous analysis. China has a significant spatial agglomeration effect on OFDI in the Belt and Road countries. There is a significant positive correlation between the business environment and China' s OFDI. At the same time, under different investment motives, the business environment impact on the investment level varies. The specific manifestations are as follows: First, when the investment motive seeks to expand the market, China tends to prefer countries with a relatively poor business environment. The interaction coefficient between the economic development degree of the host country and the business environment is negative, indicating that under this motivation, the impact of the business environment on China' s OFDI has been weakened. Second, when the investment motivation is labor-seeking, the interaction coefficient of the host country's labor situation and the business environment is negative, indicating that under this motivation, the impact of the business environment on China' s OFDI is weakened. The reason may be that when seeking more labor, companies are more inclined to reduce costs and choose host countries with relatively poor business environments. Third, when the investment motive is seeking natural resources, a better business environment is conducive for companies to obtain the right to use resources in the host country. Therefore, under this motive, a positive business environment impact is more significant. Finally, when the investment motivation is to seek strategic assets, the better the business environment, the more favorable the investment country. Therefore, when China implements FDI decisions according to the Belt and Road strategy, conducting a comprehensive survey of the host country' s business environment and its surrounding countries or regions is a critical. China also needs to consider its own investment motives and combine the business environment with investment motivations when formulating strategies.

5 Conclusions and policy recommendations

5.1 Conclusions

Based on different investment motives, this study analyzed the impact of business environment of Belt and Road countries on China's OFDI and attempted to incorporate the spatial characteristics of OFDI into the analysis framework. The study made the following conclusions:

First, the host country' s business environment has a significant positive impact on the scale of China' s investment in the Belt and Road countries and is an important factor affecting China' s OFDI. The market and labor scale of the countries along the route have a significant positive impact on China' s OFDI. The abundance of natural resources in the countries along the route harms China' s OFDI, while the level of science and technology in the countries along the route has no significant impact on China' s OFDI.

Second, the business environment impact of Belt and Road countries on China's OFDI is different under different investment motives. If Chinese enterprises are motivated by the local consumer market or if they seek a human workforce to make an outward direct investment, countries with poor business environments will be preferred, whereas countries providing good business environments will tend to be chosen for their natural resources or strategic assets.

Third, China' s OFDI will generate agglomeration in space based on different factors. Unpredictable factors in the surrounding countries of the host country have a significant impact

on China' s OFDI. Changes in a country' s business environment affect the amount of investment attracted by the country and its neighboring countries. But the spatial characteristics of OFDI have no obvious impact on the investment effect of the business environment of the countries along the route under different investment motives.

5.2 Suggestions

Based on our research, we recommended the following policies.

First, when Chinese companies formulate foreign investment strategies, they need to consider the host country business environment but must also formulate development strategies that match the company based on reasonable investment motives. Of course, enhancing international competitiveness cannot be ignored.

Second, spatial characteristics are an essential factor affecting foreign investment. To solve the uneven investment distribution, determining the "gathering point" of foreign investment at the national level is essential. Major investment countries with development advantages should further strengthen cooperation and expand the investment scale. After a large-scale growth pole is formed, it will radiate outwards from point to point.

5.3 Limitations and future research lines

This paper still has the following limitations: First, this paper uses the World Bank' s business environment evaluation index system for research. But the business environment evaluation index system is constantly updated, more scientific and reasonable evaluation index system of business environment appears, and its research on the effect of OFDI and even other aspects of the effect can become the future research direction. Second, this paper mainly analyzes the impact of business environment on OFDI based on the perspective of investment motivation. The impact under other perspectives can be used as the direction of future research.

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