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Research Article

China's Outward Foreign Direct Investment and Bilateral Trade Potential: A Theoretical and Empirical Study

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As a large developing country, China's outward foreign direct investment (OFDI) and its relationship to trade have always been subjects of extensive scrutiny in academic circles. With the continuous advancement of the "Belt and Road" initiative (BRI), the pace of overseas expansion by Chinese firms has accelerated. This paper theoretically constructs a firm heterogeneity model of China's OFDI and bilateral trade, and conducts research based on panel data of China's OFDI in countries along the BRI from 2003 to 2019. The results show that China's OFDI can substantially enhance the potential for bilateral trade, and this conclusion remains robust after overcoming endogeneity and economic fluctuations. In a heterogeneity test, China's OFDI in countries along the "Land Silk Road" is shown to have a greater effect on trade potential than in countries along the "Maritime Silk Road." In the controlled test, China's OFDI to BRI countries has a greater role in upgrading trade potential than investment in other trading powerhouses. China's OFDI can promote the economic development of host countries along the BRI by strengthening the potential for bilateral trade. The results of this study are not only conducive to the "going global" of Chinese enterprises but also of practical significance for host countries to achieve high-quality economic development.

1. Introduction

The "Belt and Road" initiative (BRI), announced in 2013, has attracted the attention of scholars across the globe [1–5]. In the spirit of openness and inclusiveness, the initiative supports free trade, connects the world economy through regional cooperation, and promotes the close connection of China's foreign direct investment (FDI) and import and export trade with countries along the BRI. As the largest developing country and the second-largest economy in the world, China follows the principles of co-consultation, co-construction, and sharing in the BRI, so as to build a shared future for humankind and contribute more to the world economy. At the Global China Initiative Fall Symposium in 2019, Hornby, a Nieman scholar at Harvard University, refuted the idea that the BRI amounted to "neocolonialism." There is also evidence that Chinese investment projects are not a form of neocolonialism [6, 7].

The BRI can strengthen economic, technological, and cultural connectivity among countries. Its vision for cooperation is far greater than the potential benefits it will bring to China [8]. Studies have shown that the BRI has significantly improved trade, foreign investment, and living conditions of citizens in countries along the Belt and Road [5]. The sudden outbreak of the COVID-19 epidemic in 2020 plunged the global economy into a state of extreme sluggishness. Under its impact, China's economic and trade cooperation with countries in the BRI has shown strong resilience. In 2021, the nonfinancial direct investment of Chinese enterprises in countries along the BRI reached USD 20.3 billion, a year-on-year increase of 14.1%. This rapid growth fully reflects the vitality of the BRI, the huge potential of China's cooperating relationship with countries and regions participating in the BRI, and the positive contributions the BRI has made to the economic development of host countries [9].

China has made great efforts to promote bilateral trade with other countries. Some scholars believe that the expansion of outward FDI (OFDI) has a direct substitution effect or a complementary effect on bilateral trade [10–13]. In the short term, however, bilateral trade may also be influenced by other factors, such as each nation's level of development and governance, population density, and cultural characteristics [14–16]. In other words, the increase in trade between China and countries along the BRI may reflect primarily the characteristics of China's trade situation and other factors unrelated to China's OFDI [17]. Hence, it is not appropriate to use traditional performance indicators such as export volume or export value to evaluate the trade impact of OFDI. The trade potential index can better reflect the dynamic association between OFDI and trade performance. So, is there a connection between China's OFDI and bilateral trade potential? This paper aims to verify the relationship between these two elements by taking China's investment in countries along the BRI as a starting point and offers a new perspective for analyzing the trade performance of China's OFDI.

Scholars have yet to reach consensus on whether OFDI has a substitution effect or a complementary effect on bilateral trade. Empirical research has revealed that the impact of OFDI on bilateral trade is determined by a variety of factors: production mode [18], investment motivation [19], industry classification [20], trade pattern [21], host country differences [22], and institutional environment [23]. If the relationship between OFDI and bilateral trade is assumed to be linear (for example, by suggesting that tariff barriers promote OFDI scale and inhibit trade behavior), then the correlation between OFDI and trade seems substantial [24]. Helpman et al. [25] used industrial data to conduct an empirical study and found that OFDI had a substitution effect on export trade. Zhou and Niu [26] utilized a gravity model to study OFDI and trade relations and found that China's OFDI has both substitution and complementary effects on import and export trade. Using data on Organization for Economic Co-operation and Development countries' OFDI to the United States, together with import and export trade data from 1974 to 1994, Lin [27] found that China's OFDI in developed countries has a slight substitution effect on export trade, while in developing countries it has a slight promotion effect on export trade. Sethi et al. [28] found that OFDI has a significant negative impact on actual exports in the long run, while the effect is positive in the short term.

Nontrade barrier factors and trade-friendly OFDI will deepen the international division of labor, thereby promoting the expansion of trade scale, so there is a complementary relationship between OFDI and trade [29]. This conclusion was confirmed by many scholars. Lipsey et al. [30] studied the relationship between OFDI and trade in the United States, Japan, and Sweden, and found a complementary relationship between OFDI and trade. Cai and Liu [31] conducted an empirical analysis of the relationship between China's OFDI and trade based on Kojima's marginal industry theory, and their conclusion also showed a complementary relation between these two factors. Xiang [32], using a panel cointegration test, studied the relationship between China's OFDI and trade, and found that China's OFDI can significantly promote import and export trade in the long run. Chen et al. [33] used a generalized least squares method to conduct a regression analysis on China's OFDI and trade data in 26 countries, showing that China's OFDI has a significant driving effect on trade, and believed that OFDI should be given more attention and support. Chen [34] researched the trade effects of China's OFDI in different industries and found that it has a significant role in promoting export trade. Zhang [35] used data on China's OFDI and trade to conduct research, and found that China's resource-seeking OFDI has a strong promotion effect on imports and exports, and compared with the investment in developing countries, OFDI in developed countries has a stronger creation effect on import and export.

Chen and Huang [36] used a generalized method of moments to test the expansion effect of export scale and the progress effect of export technology from China's OFDI based on provincial economic data and concluded that OFDI did not significantly promote the expansion of export scale but can accelerate the technological development of export goods. Mao and Xu [37] systematically studied the impact of China's OFDI on the export behavior of enterprises at the micro level and found that OFDI not only significantly raises the proportion of enterprises' exports but also increases the probability of enterprises' export. Wang and Xiang [38] analyzed the relationship between China's OFDI and trade in 45 countries from 2003 to 2012 using an extended gravity model and found that China's OFDI can significantly boost import and export trade, and that the import effect is greater than the export effect. Yan et al. [39] discussed the relationship between China's OFDI and commodity exports from the perspective of enterprise heterogeneity and found that Chinese enterprises' OFDI generally promotes exports, but there were differences in the promotion effect of different investment methods. Sohail et al. [40] used an enhanced trade gravity model to empirically analyze the impact of FDI and bilateral trade in emerging economies in Southeast Asia and found that FDI inflows from developing countries had a positive impact on bilateral trade among developing countries, while FDI inflows from developed countries had no impact on bilateral trade between the developed countries and the developing countries.

In summary, the existing research focuses on the trade effects of OFDI, but there is still only limited research on the trade potential of China's OFDI in countries along the BRI, a topic that this article intends to discuss in depth. Based on its conclusions, the paper also puts forward relevant policy suggestions to provide a useful reference for the promotion of BRI.

The marginal contributions of this paper are as follows: first, from a research perspective, the paper analyses the impact of China's OFDI on bilateral trade potential in the context of BRI, which will help enrich the relevant theories on OFDI trade effects. It also provides new empirical evidence for China's "external circulation" to better come into play and comprehensively improve the level of economic openness. Second, considering that the trade potential effect of China's OFDI in countries along the BRI may be heterogeneous, this paper divides the sample countries according to their geographical characteristics. At the same time, we use not only data on China's OFDI in BRI countries but also data on China's OFDI in other trade powerhouses for comparison, aiming to analyze the impact of OFDI on trade potential. This could make the conclusions and suggestions of the paper more scientific and feasible, and provide more reference value for countries and regions similar to China in formulating investment and trade policies. Third, the paper discusses the high-quality economic development indicators of the host country to investigate whether the impact of China's OFDI on bilateral trade potential can further promote the high-quality economic development of countries along the BRI effectively. This complements the existing literature on the relationship between economic opening and sustainable economic development.

The remainder of the paper is structured as follows: Section 2 constructs the theoretical model and puts forward the research hypotheses, Section 3 outlines the research design, Section 4 analyzes the results of the empirical estimation, Section 5 contains heterogeneity test, comparative analysis, and extended analysis, and Section 6 offers concluding remarks and policy recommendations.

2. Theoretical Model and Research Hypotheses

This paper constructs an enterprise heterogeneity model of OFDI and trade to verify whether OFDI enhances bilateral trade potential, which can, in turn, promote the economic development of the host country. The model assumes that when there is no FDI, a country's economic development can rely only on foreign trade and domestic resources. When there is external investment, it can use both internal resources and the resources brought by attracting foreign capital to better promote trade cooperation with the home country, thereby achieving an increase in total factor productivity [41]. At the same time, the improvement of bilateral trade favors multinational enterprises. Based on the above assumptions, OFDI can increase trade potential between the two countries. Meanwhile, OFDI has a driving effect on high-quality economic development in the host country.

The model assumes no monetary sector in all involved states and only considers physical trading, that is, all income and expenditure are denominated in kind. There is only one monopolistic competitive industry in both the home country and the host country. In this industry, there are Ω multinational enterprises in the home country that produce different kinds of products, and each multinational enterprise can only produce one type of product. Referring to Melitz [42] and Sun et al. [43] to construct a model, production by enterprises involves labor, capital, and intermediate product inputs. The total income of the host country is given by the following equation:

$$W = wL + rK, \tag{1}$$

where L represents the number of consumers and w represents the average wage (each consumer can provide one unit of labor). K represents the total capital, and r represents the interest rate.

2.1. Consumer Preference Behavior. The consumer utility of the host country is represented by the constant elasticity of substitution utility function as follows:

$$U = \left(\int_0^{\Omega} q(i)^{\sigma - 1/\sigma} \mathrm{d}i \right)^{\sigma/\sigma - 1}, \tag{2}$$

where Ω represents the consumption set of heterogeneous products and $q(i)$ represents the consumer's consumption of product i. The variable σ represents the substitution elasticity between differentiated products, and $\sigma > 1$. Under budget constraints, consumers pursue utility maximization, which is expressed by the following combination function:

$$\begin{aligned} \max U &= \left[\int_0^{\Omega} q(i)^{\sigma - 1/\sigma} \mathrm{d}i \right]^{\sigma/\sigma - 1}, \\ \text{s.t.} W &= \int_0^{\Omega} p(i) q(i) \mathrm{d}i, \end{aligned} \tag{3}$$

where $p(i)$ is the price of a single product i and W is the total social income. It is easy to obtain the optimal consumption of product i as follows:

$$q(i) = \frac{p(i)^{-\sigma}}{P^{1-\sigma}} W, \tag{4}$$

where $P = [\int_0^{\Omega} p(i)^{1-\sigma} \mathrm{d}i]^{1/1-\sigma}$ represents the aggregate price index.

2.2. Producer's Profit-Maximizing Behavior. To reflect that OFDI can affect bilateral trade, the model assumes that the budget of the two countries for improving bilateral trade is $\overline{h}$ and is fixed during the inspection period. The total amount of OFDI by the home country to the host country is α, and the scale of this OFDI can affect the level of bilateral trade. Thus, the function for bilateral trade can be expressed as follows:

$$t = t(\overline{h} + \alpha). \tag{5}$$

To reflect that an improvement in bilateral trade can promote the economic development of the host country, the model assumes that the output of multinational enterprises making OFDI in the host country depends not only on their own effective labor, capital, and intermediate inputs but also on the level of trade between the two countries. The form of the production function is as follows:

$$y(i) = t\beta l(i)^{\iota} k(i)^{\kappa} m(i)^{1-\iota-\kappa}, \tag{6}$$

where $l(i)$, $k(i)$, and $m(i)$ represent the employed labor force, capital, and quantity of intermediate product input, respectively, by multinational enterprise i; ι and κ represent the output elasticity of labor and capital, respectively; and $0 < \iota, \kappa < 1$. β is the labor productivity, which obeys the distribution function $Z(\beta)$ with $Z' > 0$, that is, $Z(\beta)$ is a continuous, strictly increasing function, and its probability density function is $z > 0$. This assumption is in line with economic intuition that expanding trade cooperation between the two countries is conducive to the optimal allocation of resources and the adjustment of economic structure in both. This can reduce the operating costs of multinational enterprises in the host country, thereby increasing the level of enterprise output.

Equation (6) can be restated in the form of a production function for composite inputs as follows:

$$y(i) = t\beta G(i), \tag{7}$$

where $G(i) = l(i)^{\iota} k(i)^{\kappa} m(i)^{1-\iota-\kappa}$ represents composite input. Taking f as the middle-product price, so composite input cost is as follows:

$$c(w, r, f) = \min \; \{wl(i) + rk(i) + fm(i)\}. \tag{8}$$

The net profit earned by multinational i as a result of OFDI is as follows:

$$\pi(i) = p(i)y(i) - c(w, r, f)G(i) - F, \tag{9}$$

where F is the fixed cost of FDI by a multinational enterprise. When the economy reaches equilibrium, demand equals output, namely, $q(i) = y(i)$. Substituting equations (4), (6), (7), and (8) into the profit function equation (9) results in an equation for the optimal pricing of the enterprise that maximizes profit as follows:

$$p(i) = \frac{\overline{n}c(w, r, f)}{t\beta}, \tag{10}$$

where $\overline{n} = \sigma/\sigma - 1$ is the price markup in the monopolistic competition market.

2.3. OFDI Decisions. Substituting equations (1), (4), (5), (6), (7), (8), and (10) into the profit function equation (9), we get the following equation:

$$\pi(\beta) = \frac{1}{\sigma}\left[\frac{\overline{n}c(w, r, f)}{t(\overline{h} + \alpha)\beta P}\right]^{1-\sigma} W - F. \tag{11}$$

For the sake of simplification, it is assumed that the OFDI in one country's market and the OFDI in other countries' markets are independent of each other, and the multinational enterprise's decision to make FDI depends on whether the net profit obtained in that country is greater than 0, that is, when $\pi(\beta) > 0$, the company conducts FDI, which can increase the total output of the host country. From equation (11), the net profit of the enterprise $\pi(\beta) > 0$ can be obtained as follows:

$$\beta > \left(\frac{\sigma F}{W}\right)^{1/1-\sigma} \frac{\overline{n}c(w, r, f)}{t(\overline{h} + \alpha)P}. \tag{12}$$

According to the above assumptions, enterprise productivity β obeys the distribution function $Z(\beta)$, and the probability equation of the FDI of multinational enterprises is obtained as follows:

$$\begin{aligned} \Pr[\pi(\beta) > 0] &= \Pr\left[\beta > \left(\frac{\sigma F}{wL}\right)^{1/1-\sigma} \frac{\overline{n}w}{t(\overline{h} + \alpha)P}\right] \\ &= 1 - Z\left[\left(\frac{\sigma F}{wL}\right)^{1/1-\sigma} \frac{\overline{n}w}{t(\overline{h} + \alpha)P}\right]. \end{aligned} \tag{13}$$

The partial derivative of the total FDI α can now be obtained from equation (13) as follows:

$$\frac{\partial \Pr[\pi(\beta) > 0]}{\partial t}\frac{\partial t}{\partial \alpha} = z(\beta)\left(\frac{\sigma F}{wL}\right)^{1/1-\sigma} \frac{\overline{n}w}{P} t(\overline{h} + \alpha)^{-2} t'(\overline{h} + \alpha). \tag{14}$$

Based on economic intuition, the greater the probability of positive profits through multinational enterprises' OFDI, the more likely multinational enterprises are to make OFDI, that is, the left-hand side of equation (14), $\partial \Pr[\pi(\beta) > 0]/\partial t \partial t/\partial \alpha > 0$. Finally, it is simple to determine the relationship between bilateral trade and OFDI as follows:

$$t'(\overline{h} + \alpha) > 0. \tag{15}$$

It can be seen from the above formula that the larger the scale of FDI, the larger the bilateral trade volume, that is, the OFDI of multinational enterprises can promote bilateral trade relations. According to the literature review and the foregoing model, combined with the background on the BRI and China's OFDI decision-making tendency in countries along the BRI, this paper proposes the following hypotheses:

Hypothesis 1: China's OFDI in countries along the BRI promotes the potential for trade between China and each BRI country

Hypothesis 2: China's OFDI in countries along the BRI promotes the economic development of those countries by enhancing the level of trade potential between China and each BRI country

3. Research Design

3.1. Gravity Model of Trade. The gravity model is widely used in the existing literature to analyze the trade relationship between two countries [44–47]. Its form is as follows:

$$\ln\text{Trade}_{cjt} = \alpha_0 + \alpha_1 \ln\text{CGDP}_t + \alpha_2 \ln\text{GDP}_t + \alpha_3 \ln\text{RDIS}_{cj} + \alpha X_{cjt} + \varepsilon_{cjt}, \tag{16}$$

where $\ln\text{Trade}_{cjt}$ represents China's trade volume with country j along the BRI in year t. $\ln\text{CGDP}_t$ and $\ln\text{GDP}_t$ represent the gross domestic product (GDP) of China and of host country j, respectively, in year t. $\ln\text{RDIS}_{cj}$ represents the relative distance between China and host country j. X_{cjt} is a set of control variables that are potential determinants of trade flows between the two countries, including the total population of China, the total population of the host country, and the dummy variables of conjoint boundary. The estimated value of equation (16) is used as China's potential trade volume with each country.

To make the estimation of the gravity model more effective, the following BRI countries were excluded due to lack of data: Afghanistan, Palestine, Bhutan, Kuwait, Maldives, Myanmar, Montenegro, Qatar, Turkmenistan, Yemen, Iraq, and Syria. The paper uses data from 53 other countries along the BRI.

3.2. Explanation of Variables and Data

3.2.1. Calculation of Trade Potential. Unlike previous studies that only considered a single trade variable, this paper focuses on trade potential, export potential, and import potential. More specifically, it aims to determine the relationship between China's OFDI and bilateral trade potential. Compared with traditional trade volume indicators, it is more advantageous to use the trade potential index to analyze how OFDI affects trade. Previous studies that used trade gravity models have shown that the volume of trade between two countries is determined by geographic distance, GDP, and other economic variables, so the growth of China's trade with countries along the BRI may only reflect China's trade conditions and economic characteristics unrelated to OFDI. In contrast, the trade potential index takes into account the trade potential between the two countries, whose relationship is heavily dependent on one country's FDI in the other. Drawing on the method of Cinar et al. [48], this paper defines trade potential as the ratio of actual trade volume to estimated trade volume, as follows:

$$\text{Potential}_{jt} = \frac{A_{jt}}{P_{jt}}, \tag{17}$$

where P_{jt} is China's estimated trade volume with host country j in year t, valued using the gravity model in equation (16) and above, and A_{jt} is the observed actual trade volume. Trade potential is used to compare actual trade with estimated trade. By definition, if the actual trade volume between the two countries is lower than the estimated value, that is, the trade potential is less than 1, then the trade volume is considered to be below the target level. The trade potential can reflect the efficiency of trade activities. The greater the value of trade potential, the closer the trade relationship between the two countries [49].

3.2.2. China's OFDI. Drawing on the experience of Hu and Qiao [22], we adopt the stock value of China's OFDI in countries along the BRI as the core explanatory variable. The data comes from the Statistical Bulletin of China's OFDI from 2003 to 2019. We use the stock of OFDI rather than the flows as the dependent variable, mainly for the following two reasons: on the one hand, the flows of China's investment in the "Belt and Road" countries change greatly every year, and the data for many years is less than zero, which is not helpful to empirical analysis. On the other hand, there are many missing values of OFDI flows. Therefore, we choose China's OFDI stock as the dependent variable to ensure the data's continuity and integrity. In addition, we use the logarithmic form of the dependent variable to eliminate heteroscedasticity.

3.2.3. Other Variables. China's economic development level (CGDP) is measured by the actual GDP in each year. The data comes from the China Statistical Yearbook. Market sizes of the host countries (GDP) are measured by the actual GDP of countries along the BRI as reported in the World Bank national accounts data. The level of economic development of each host country (RGDP) is measured by actual per capita GDP as reported in the World Bank national accounts data. Distance cost (RDIS) is described as the product of the distance from China to each host country and the average international oil price, referring to the practice of Head and Mayer [50]. The bilateral distance is given by $d_{ij} = (\sum_{k\in i}(\text{pop}_k/\text{pop}_i)\sum_{l\in j}(\text{pop}_l/\text{pop}_j)d_{kl}^{\theta})^{1/\theta}$, where d_{ij} represents the bilateral trade distance, d_{kl} represents the geographic distance between the major cities of the two countries, pop_i and pop_j represent the populations of the two countries, pop_k and pop_l represent the populations of the two major cities in the two countries, and Θ represents the elasticity of bilateral distance. Here, we refer to the research of Mayer and Zignago [51], and set $\Theta = 1$. Geographical distance data comes from the CEPII database; international oil price data comes from the International Monetary Fund database. Economic openness (TRA) is measured by the ratio of the host country's merchandise trade to GDP, with data acquired from the World Trade Organization's database. Natural resource endowment (RES) is measured by the natural resource rent as a percentage of GDP, with data drawn from the World Bank database. The host country's urbanization rate (UPR) is measured by the ratio of the host country's urban population to its total population, with data taken from World Urbanization Prospects. The host country's information and communications technology (ICT) is measured by the weighted average of the number of fixed broadband subscriptions per 100 people, fixed telephone subscriptions per 100 people, and mobile cellular subscriptions per 100 people in the host country, with data sourced from the World Telecommunication/ICT Indicators database. We use the sum of industrial added value and service industry added value as a percentage of GDP to measure the host country's industrial structure (IST), with data drawn again from the World Bank national accounts database.

3.3. Descriptive Statistics. The descriptive statistics of the main variables are shown in Table 1. It can be seen from the correlation results of each variable that the overall values are relatively stable. In particular, the standard deviation values are similar and small, indicating that there are no outliers.

Table 1: Descriptive statistics of variables.

Variables	Symbol	Average	Standard deviation	Minimum	Maximum
Total trade volume	*lnCTRA*	12.602	2.002	0	16.611
Export volume	*lnCEXP*	12.178	1.928	0	16.107
Import volume	*lnCIMP*	10.958	2.661	0	15.799
Trade potential	*lnCTP*	−0.002	0.079	−0.354	0.412
Export potential	*lnCEP*	−0.002	0.079	−0.352	0.366
Import potential	*lnCIP*	−0.013	0.165	−1.365	0.963
China's OFDI	*lnOFDI*	8.681	2.991	−0.041	15.487
Market size	*lnGDP*	24.327	1.574	18.774	27.753
Economic development level	*lnRGDP*	8.05	1.392	4.611	10.837
China's economic development	*lnCGDP*	12.944	0.62	11.831	13.812
Total population of host country	*lnPOP*	16.288	1.605	12.775	21.038
Total population of China	*lnCPOP*	21.019	0.025	20.977	21.058
Distance cost	*lnRDIS*	12.689	0.548	10.809	13.626
Economic openness	*lnTRA*	4.27	0.57	0	5.839
Natural resources	*lnRES*	0.492	2.325	−8.581	4.014
Urbanization rate	*lnUPR*	3.998	0.411	2.677	4.605
ICT	*lnICT*	3.547	0.764	−0.652	4.478
Industrial structure	*lnIST*	4.405	0.119	4.032	4.663
Share borders	*lnBOR*	0.189	0.391	0	1

3.4. Model Settings. This paper constructs the trade potential analysis model of China's OFDI in countries along the BRI as follows:

$$\mathrm{lnPotential}_{jt} = \alpha_0 + \alpha_1 \mathrm{lnOFDI}_{jt} + \sum_{i=2}^{I} \alpha_i C_{jt}^{i} + \omega_t + \varepsilon_{jt}, \quad (18)$$

where $\mathrm{lnPotential}_{jt}$ represents China's trade potential with countries along the BRI, which is the explained variable. This includes three aspects: total trade potential (*lnCTPjt*), export potential ($lnCEP_{jt}$), and import potential ($lnCIP_{jt}$). China's OFDI ($lnOFDI_{jt}$) is the core explanatory variable. The control variables (C_{jt}^{i}) include the host country's market size ($lnGDP_{jt}$), economic development level ($lnRGDP_{jt}$), distance cost ($lnRDIS_{cjt}$), economic openness ($lnTRA_{jt}$), natural resources endowment ($lnRES_{jt}$), urbanization rate ($lnUPR_{jt}$), ICT ($lnICT_{jt}$), and industrial structure ($lnIST_{jt}$). The variables ω_t and ε_{jt} represent time fixed effects and random disturbance terms, respectively. We also conduct a variance inflation factor (VIF) test of all the variables and find that the VIF value of each variable is less than 10, and the average VIF value only 2.19, indicating that there is no multicollinearity.

4. Empirical Results

4.1. Results of Gravity Model Estimation. The estimated results of the gravity model of equation (16) are reported in Table 2. Columns (1), (3), and (5) are the estimated regression of China's trade volume, export volume, and import volume, respectively, of countries along the BRI. The selected control variables include only the GDP of the host country, China's GDP, and the distance between the two countries. The regression results show that trade volume, export volume, and import volume are all positively correlated with the GDP of the two countries but negatively correlated with the distance cost between the two countries, which is consistent with the results of most studies and in line with our expectations. On this basis, when control variables such as the population of the two countries and the common border are added, it is found that except for coefficient modification, the significance of the regression results remains unchanged, with the results shown in columns (2), (4), and (6). In addition, we also find that the population of the host country has a much greater impact on China's trade volume and export volume than on the import volume, and all of the impacts are positive, that is, an increase in the population of the host country can significantly promote its trade activities with China. The population of China noticeably inhibits the trade activities between China and the countries along the BRI. Finally, from the results of the regression when the dummy variable is included, it can be seen that a shared border between China and the host country can increase the trade volume and export volume between the two countries, while the impact on China's import volume is minimal.

The regression results show that under different control variables, the coefficients of GDP and distance cost are all significant and remain unchanged, which confirms the validity of the gravity model in the analysis of trade flows. By comparing the two columns of the coefficient of determination (R^2), we select the estimating equations in columns (2), (4), and (6) (where R^2 is the largest) to obtain the estimated value of trade volume, export volume, and import volume, respectively, of China to countries along the BRI. Equation (19) is then used to calculate the bilateral trade potential, export potential, and import potential.

4.2. Benchmark Regression Results. We use the stepwise regression method to examine the impact of China's OFDI in countries along the BRI on trade potential, export potential, and import potential. Before empirical tests, it is necessary to choose the estimation method of the panel data. First, the Hausman test result is $p < 0.01$, rejecting the null hypothesis, which indicates that the fixed effects model is appropriate. Second, we use the White test and the

Table 2: Regression results of the gravity model.

Variables	CTRA		CEXP		CIMP	
	(1)	(2)	(3)	(4)	(5)	(6)
lnGDP	0.924*** (0.023)	0.859*** (0.028)	0.885*** (0.022)	0.786*** (0.027)	1.170*** (0.035)	1.132*** (0.047)
lnCGDP	1.136*** (0.059)	6.435*** (0.511)	1.156*** (0.057)	5.546*** (0.479)	1.305*** (0.090)	9.290*** (0.842)
lnRDIS	−0.938*** (0.067)	−1.100*** (0.084)	−0.767*** (0.065)	−0.784*** (0.079)	−1.404*** (0.103)	−1.950*** (0.139)
lnPOP		0.138*** (0.029)		0.190*** (0.027)		0.0915* (0.048)
lnCPOP		−132.4*** (12.57)		−110.1*** (11.77)		−198.4*** (20.71)
BOR		0.601*** (0.099)		0.676*** (0.093)		0.197 (0.163)
Constant	−12.58*** (1.129)	2703.2*** (258.3)	−14.51*** (1.083)	2242.9*** (241.9)	−16.46*** (1.720)	4057.5*** (425.6)
Obs.	896	896	896	896	896	896
R^2	0.697	0.774	0.699	0.786	0.610	0.660

Notes. ***, **, and * mean that the variables are significant at the 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

Wooldridge test to detect heteroscedasticity and serial correlation, and both results reject the null hypothesis, showing that there are both heteroscedasticity and serial correlation. Therefore, we adopt a feasible generalized least squares (FGLS) method to estimate equation (18). The results are shown in Table 3.

In columns (1), (3), and (5), without any control variables, the coefficients of OFDI are all positive, and all have passed the 1% significance test, that is, China's OFDI can significantly promote the enhancement of bilateral trade potential, export potential, and import potential. Therefore, Hypothesis 1 is supported. Columns (2), (4), and (6) report the estimated results after adding control variables, including host country GDP, per capita GDP, distance cost, economic openness, natural resource endowment, urbanization rate, ICT, and industry structure. After adding those control variables, the estimated coefficient of OFDI for export potential increases, while the estimated coefficients of trade potential and import potential have reduced, but the coefficient signs are still positive and significant at 1% level. According to Aizenman and Noy [52]and Culem [53], there is a bidirectional linkage between FDI and trade.

However, the import potential of China's OFDI promotion is greater than the export potential. China's direct investment in countries along the BRI depends on imported inputs such as raw material, human skill, and other intangibles assets, which has a positive impact on imports [54]. A possible reason is that most countries along the BRI are developing countries with relatively small market sizes but abundant natural resources, especially in regions such as Central Asia, Central and Eastern Europe, where oil, natural gas, nonferrous metals, and other natural resources are abundant, and Southeast Asia, which is rich in natural rubber, coconut, and other plant resources [55]. Therefore, China's investment here can greatly increase China's import potential from countries in these regions.

4.3. Robustness Tests

4.3.1. Endogeneity Problems. Missing variables and two-way causality are the main causes of endogenous problems. It should be noted that the endogenous problem in this paper is relatively weak. In this paper, while considering the market size, economic development level, distance cost, economic openness, natural resource endowment, urbanization rate, ICT and industrial structure, and other variables, the regional fixed effect and time fixed effect are also controlled to reduce the problem of missing variables. Therefore, this paper mainly considers the endogenous problem caused by two-way causality. Considering that China's OFDI in the countries along the BRI has a continuous impact on the growth of trade potential, that is, the current trade potential may be affected by the previous OFDI, it is assumed that the core explanatory variable is an endogenous one. The results of the Hausman test (whose null hypothesis is that the explanatory variables are exogenous) show that $p < 0.01$, indicating that China's OFDI is an endogenous variable. Columns (1) to (3) of Table 4 report the estimation results using the instrumental variable method. It can be seen that China's OFDI has a significant positive correlation with trade potential, export potential, and import potential, that is, an increase in China's OFDI scale can promote an increase in trade activities. Then, comparing with the results in columns (2), (4), and (6) of Table 3, it is found that the influence coefficients of OFDI on trade potential, export potential, and import potential have increased from 0.011, 0.012, and 0.0136, to 0.0146, 0.0167, and 0.0148, respectively. Thus, ignoring the endogeneity problem can lead to a significant underestimation bias in the FGLS estimation results. That is to say, the existence of endogeneity significantly reduces the promotion effect of China's OFDI in the countries along the BRI on bilateral trade potential. Therefore, this paper adopts the instrumental variable method to overcome endogeneity problems. Overall, the sign symbol and significance results are the same except for the change in coefficients, which also confirms the robustness of the regression.

4.3.2. Sample Staging Test. China's OFDI in countries along the BRI could have a relatively long-term influence. Therefore, to eliminate the effects of short-term economic cyclical fluctuations on the above benchmark results, this paper refers to the sample staging method of Peng [56] and averages the sample period into three intervals to create new variables. Since the time range of the sample data in this

Table 3: Benchmark regression results.

Variables	CTP		CEP		CIP	
	(1)	(2)	(3)	(4)	(5)	(6)
lnOFDI	0.012*** (0.001)	0.011*** (0.001)	0.011*** (0.001)	0.012*** (0.001)	0.0189*** (0.002)	0.0136*** (0.002)
lnGDP		−0.011*** (0.001)		−0.011*** (0.001)		−0.008*** (0.003)
lnRGDP		−0.029*** (0.002)		−0.022*** (0.002)		−0.038*** (0.005)
lnRDIS		0.017*** (0.005)		0.028*** (0.006)		−0.006 (0.012)
lnTRA		0.045*** (0.003)		0.036*** (0.004)		0.091*** (0.006)
lnRES		0.002*** (0.001)		−0.005*** (0.001)		0.020*** (0.001)
lnUPR		0.063*** (0.006)		0.029*** (0.007)		0.200*** (0.013)
lnICT		0.009*** (0.003)		0.0118*** (0.004)		−0.019** (0.008)
lnIST		0.301*** (0.020)		0.237*** (0.022)		0.174*** (0.041)
Constant term	−0.117*** (0.012)	−1.597*** (0.106)	−0.108*** (0.012)	−1.319*** (0.115)	−0.189*** (0.027)	−1.453*** (0.214)
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	896	896	896	896	896	896
R^2	0.233	0.684	0.196	0.529	0.158	0.630

Note. ***, **, and * mean that the variables are significant at the 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

Table 4: Robustness tests.

Variables	Instrumental variable method			Sample staging test		
	CTP	*CEP*	*CIP*	*CTP*	*CEP*	*CIP*
	(1)	(2)	(3)	(4)	(5)	(6)
lnOFDI	0.015*** (0.002)	0.017*** (0.002)	0.015*** (0.003)	0.012*** (0.001)	0.0107*** (0.002)	0.016*** (0.003)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	845	845	845	265	265	265
R^2	0.490	0.375	0.507	0.723	0.608	0.657
F-statistics	48.44 (0.000)	25.50 (0.000)	48.18 [0.000]	50.39 (0.000)	29.93 (0.000)	37.06 (0.000)

Note. ***, **, and * mean that the variables are significant at 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

paper is 17 years, it is impossible to directly assign the sample years. Therefore, the data from 2003 and 2004 are excluded and the remaining 15 years are staged into three periods. Finally, the balanced panel data of 53 BRI countries is obtained, with the test results shown in columns (4), (5), and (6) of Table 4. It can be seen that the impact of China's OFDI in countries along the BRI on trade potential, export potential, and import potential is significantly positive. Nonetheless, compared with the valuation results of the benchmark regression, the estimated coefficient of China's OFDI on export potential has decreased. Moreover, the estimated coefficients of trade potential and import potential have increased. This also shows that short-term economic cyclical fluctuations will indeed disturb the trade potential effect of China's OFDI in countries along the BRI. Overall, the results of the sample staging test also show that the benchmark regression results are robust.

5. Further Discussion

5.1. Heterogeneity Test of Maritime and Land Silk Road Countries. Generally speaking, countries along the BRI can be divided into "Land Silk Road" and "Maritime Silk Road" countries. This is mainly based on routes and transportation. The Land Silk Road includes the China-Mongolia-Russia economic corridor and the New Eurasian Land Bridge, and extends westward to Central Asia, West Asia, and Central and Eastern Europe. The Maritime Silk Road is from China to Southeast Asia, South Asia, the Persian Gulf, the Red Sea, the west coast of the Indian Ocean, and other regional routes. The distinction is fundamental. Although the countries along the two Silk Roads are all involved in BRI implementation, there are great differences between them, such as the states' economic development level, historical backgrounds, and the focus of implementation. This paper refers to the classification method of BRI countries by Lv et al. [57], first identifying the countries that belong to the Maritime Silk Road and then categorizing the remaining countries as belonging to the Land Silk Road. The first three columns and the last three columns of Table 5 report the regression results of the Maritime Silk Road economic belt and the Land Silk Road economic belt, respectively. It can be seen that the OFDI coefficient is significantly positive in both the Maritime Silk Road countries and the Land Silk Road countries, indicating that China's OFDI significantly promotes the improvement of China's trade potential, export potential, and import potential with host countries. Then, by comparing the coefficients under the two economic belts, it can be seen that China's OFDI in the Land Silk Road economic belt has a greater influence on trade potential than in the Maritime Silk Road economic belt. This may be caused by the characteristics of transportation because compared

Table 5: Heterogeneity test of maritime and land silk road countries.

Variables	Maritime silk road countries			Land silk road countries		
	(1)	(2)	(3)	(4)	(5)	(6)
lnOFDI	0.012*** (0.002)	0.013*** (0.002)	0.017*** (0.005)	0.015*** (0.003)	0.017*** (0.003)	0.017*** (0.005)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	304	304	304	541	541	541
R^2	0.768	0.651	0.755	0.484	0.372	0.523

Note. ***, **, and * mean that the variables are significant at 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

with land transportation, ocean transportation has a larger freight volume and lower cost, yet the speed of transport is relatively low. Therefore, China is more likely to participate in economic and trade cooperation via OFDI in Maritime Silk Road countries. The same is true when analyzing the effects of export potential and import potential.

5.2. A Comparative Experiment between Countries along the BRI and Other Strong Trading Powers. Most countries along the BRI are developing countries, whereas developed countries commonly have strong trade capacity. Considering that the motivation for China's OFDI in developing countries is significantly different than in developed countries, this paper compares the trade potential of China's OFDI in BRI countries with other, stronger trading partners. We select the world's top 30 trade powerhouses (excluding China and Hong Kong) as samples. Columns (1) to (3) and (4) to (6) in Table 6 show the regression results of the trade potential, export potential, and import potential of China's OFDI in the BRI countries and in the trade powerhouses, respectively. The results show that China's OFDI in trade powerhouses has a complementary effect on trade potential, export potential, and import potential. Nevertheless, it is weaker than the complementary effect of China's OFDI on import and export trade potential in countries along the BRI. This may be because of the different motivations of China to invest in different economies, resulting in differences in the scale of the complementary effect. Therefore, a comparative analysis with strong trading powers is more conducive to assessing the trade potential of China's OFDI in the BRI countries.

5.3. Effect Test of High-Quality Economic Development. In the post-epidemic era, the BRI has become an increasingly important platform for China to promote its external circulation model of the international economy. In this context, have Chinese enterprises investing abroad brought new momentum to the high-quality economic development of countries along the BRI? This section explores the impact of China's OFDI on the high-quality economic development of countries along the BRI from the perspective of trade potential. Drawing on the research of Jahanger [58], total factor productivity is used as a measure of high-quality economic development. We use the mediating effect model to test its potential transmission mechanism. If there is a vertical transmission process from China's OFDI to trade potential, export potential, and import potential, and then to the high-quality economic development of countries along the BRI, then the specific process is as follows:

(1) It is necessary to verify that China's OFDI can significantly affect the high-quality economic development of countries along the BRI.

(2) Try to prove that China's OFDI affects the trade potential level of the countries along the BRI, which has been verified in the above benchmark regression and robustness analysis.

(3) To verify that China's OFDI improves trade potential and then affects the high-quality economic development of countries along the BRI. Referring to the research methods of Yang et al. [59] and Guan and Xing [60], the model is as follows:

$$\mathrm{QUA}_{jt} = \delta_0 + \delta_1 \mathrm{OFDI}_{jt} + \sum_{i=2}^{I} \delta_j C_{it}^{j} + \omega_t + \varepsilon_{it}, \tag{19}$$

$$\mathrm{QUA}_{jt} = \eta_0 + \eta_1 \mathrm{OFDI}_{jt} + \eta_2 \mathrm{lnPotentjal}_{jt} + \sum_{i=3}^{I} \alpha_j C_{it}^{j} + \omega_t + \varepsilon_{it}, \tag{20}$$

where QUA_{jt} represents the high-quality economic development of country j along the BRI in year t. We used Solo residual method to calculate total factor productivity. The specific process is as follows:

Table 6: A comparative experiment between countries along the BRI and strong trading powers.

Variables	Countries along the BRI			Strong trading powers		
	(1)	(2)	(3)	(4)	(5)	(6)
lnOFDI	0.015*** (0.002)	0.017*** (0.002)	0.015*** (0.003)	0.006*** (0.001)	0.006*** (0.001)	0.005** (0.002)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	845	845	845	448	448	448
R^2	0.490	0.375	0.507	0.494	0.538	0.228

Note. ***, **, and * mean that the variables are significant at 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

Table 7: Effect test of high-quality economic development.

Variables	*QUA*			
	(1)	(2)	(3)	(4)
lnOFDI	0.022*** (0.002)	0.020*** (0.003)	0.021*** (0.003)	0.021*** (0.002)
lnCTP		0.122*** (0.040)		
lnCEP			0.069* (0.038)	
lnCIP				0.032 (0.021)
Control variables	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes
Individual effects	Yes	Yes	Yes	Yes
Obs.	831	831	831	831
R^2	0.729	0.731	0.730	0.730

Note. ***, **, and * mean that the variables are significant at 1%, 5%, and 10% level, respectively; standard deviations are shown in parentheses.

Under the assumption that the return to scale is constant, the Cobb Douglas production function can be expressed as follows:

$$Y_{jt} = A_{jt}K_{jt}^{\alpha}L_{jt}^{1-\alpha}0 < \alpha < 1, \tag{21}$$

where Y_{jt} represents the total output, K is capital investment, L represents labor input, α is the elasticity of capital output, and A stands for total factor productivity. The total factor productivity of countries in different periods can be expressed as follows:

$$A_{jt} = \frac{Y_{jt}}{K_{jt}^{\alpha}L_{jt}^{1-\alpha}}, \tag{22}$$

where Y is measured by real GDP, L is reflected by the number of employees in each country, and K is measured by estimating the material capital stock of each country over the years using the internationally accepted perpetual inventory method. The specific formula is as follows: $K_t = I_t + (1 - \delta)K_{t-1}$, where I_t is the investment amount in year t, which is represented by the gross fixed capital formation and δ refers to the depreciation rate of fixed assets. This paper refers to Hall and Jones's [61] method of calculating capital stock and sets it as 6%.

Column (1) of Table 7 shows the regression results of equation (19), which verifies the impact of China's OFDI on the high-quality economic development of countries along the BRI. It can be seen that the regression coefficient of OFDI is positive and statistically significant, indicating that China's OFDI has a noticeable promoting impact on the high-quality economic development of host countries. Columns (2) to (4) show the regression results of formula (20); the regression coefficients of China's trade potential and export potential with countries along the BRI are significantly positive, which indicates that a mediation effect exists, that is, China's OFDI promotes the high-quality development of the host country's economy by increasing bilateral trade potential and export potential, which supports Hypothesis 2. While the regression coefficient of China's import potential to countries along the BRI is positive, it does not pass the 10% significance level. This indicates that import potential is not a primary channel for China's OFDI to promote the high-quality economic development of host countries along the BRI.

6. Conclusions and Policy Recommendations

This paper analyzes panel data of China's OFDI in countries along the BRI from 2003 to 2019 from the perspective of bilateral trade potential. The main conclusions are as follows: first, China's OFDI in countries along the BRI can significantly enhance bilateral trade potential and has a greater role in promoting import potential than export potential. After overcoming the interference of endogeneity and economic fluctuations, these conclusions remain robust. Second, we find that China's OFDI in countries along the Land Silk Road has a greater effect on trade potential. Third, the complementary effect on the import potential and export potential of China's OFDI is greater in countries along the BRI than in countries with strong trade capacity. Fourth, by introducing the diffusion effect of high-quality economic development, China's OFDI can promote the high-quality economic development of countries along the BRI by enhancing bilateral trade potential and export potential. This means that trade potential and export potential are core channels for China's OFDI to promote high-quality economic development of the host countries. Through empirical evidence, we demonstrate that China's OFDI in countries along the BRI is reflective of shared interests.

Drawing on the conclusions of this paper, the following policy suggestions are put forward. First, since China's OFDI in countries along the BRI can significantly enhance the potential for bilateral trade, China should encourage and guide enterprises to "go global" and further optimize China's OFDI and trade policies toward countries along the BRI, so as to give full play to the promotion effect of China's OFDI on bilateral trade. Second, the BRI has achieved remarkable results since its establishment. Even in the aftermath of the COVID-19 epidemic, investment cooperation between China and the BRI countries remains stable and continues to advance. Therefore, enterprises should implement internationalization strategies to actively respond to the BRI and accelerate abroad layout. Third, this paper finds that the performance of China's OFDI in countries along the Land Silk Road shows greater trade potential. Therefore, OFDI in such countries should be highly valued and vigorously developed. Fourth, the government should give more subsidies to companies in high-tech industries, and encourage high-tech enterprises to establish research institutes in host countries along the BRI, so that Chinese science and technology can benefit more countries along the BRI and promote the realization of high-quality development in local economies.

Although this paper has discovered and discussed the positive relationship between China's OFDI and bilateral trade potential, it has some limitations. First, we did not consider the infrastructure investment related to the "the Belt and Road," which is more important on the land Silk Road than on the sea Silk Road. Second, the paper only employs national macrolevel data for research; there is a lack of microlevel evidence, which we wish to investigate in greater depth in the future. Third, this article uses only the total trade volume to indicate trade potential, and does not distinguish between trade in goods and trade in services. Future research can not only analyze the effect of China's direct investment in other regions but also explore a greater number of influencing mechanisms to make the analysis more comprehensive. At the same time, we can also make a comparative analysis of China's investment in the Belt and Road countries and non-Belt and Road countries. In addition, research should pay more attention to the microlevel analysis and put forward more targeted policy suggestions for the government. Finally, the OFDI generally exhibits market-seeking, resource-seeking, efficiency-seeking, and technology-seeking motivations [62], so we should try to study the impact of OFDI on trade in goods and services, respectively, under different motivations.

Data Availability

Section 3.2.3 describes all data sources in detail. All data comes from the following databases: Statistical Bulletin of China's OFDI, China Statistical Yearbook, World Bank National Economic Accounts Data, CEPII database, IMF database, World Trade Organization database, World Bank database, World Urbanization Prospects, and World Telecommunication/Information and Communication Technology Development Report and Database.

Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this article.

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