Analysis of Factors Affecting Chinese Outward Foreign Direct Investment: An Empirical Study Based on Stochastic Frontier Model

Qinxuan Wang
Nanjing Normal University, Nanjing, China
Email: rachelw95@126.com

Abstract
This paper uses panel data of 20 target countries of China’s outward foreign direct investment (OFDI) from 2011-2019 to establish a stochastic frontier gravity model to study the influencing factors of China’s OFDI and to define and measure the investment potential by summarizing and generalizing the relevant literature. The results show that: Chinese GDP, host country GDP, host country trade openness, host country government governance capacity, and host country intellectual property protection level are positively correlated with Chinese OFDI; national investment guidance policies have a very obvious positive effect on the growth of Chinese outward investment. In the post-epidemic era, in order to promote the development of Chinese OFDI and fully exploit the potential of Chinese OFDI, we should strengthen macro and micro regulation to ensure a stable and high-quality economic development, actively introduce national investment policies to cope with changes in the international investment policy environment, optimize the investment industry structure, and avoid investment risks.

Keywords
Outward Foreign Direct Investment, Stochastic Frontier Model, Chinese Enterprise

1. Introduction
In recent years, along with the prevalence of international trade protectionism and the crisis brought by the COVID-19 epidemic, the global economy has further slowed down and the total FDI outflows have continued to shrink. According to the World Investment Report 2020 released by UNCTAD, the global OFDI flow in 2020 is expected to drop by about 40% compared with 2019, and
the amount of investment flowing to developed economies is also expected to drop by a certain percentage compared with 2019. Obviously, in the face of such a difficult international situation, the traditional investment approach of pursuing quantitative growth in scale has been unable to adapt to the economic development demand.

On the one hand, the prevalence of trade protectionism has led to constant friction and conflict among various economies. In the US, for example, the Foreign Investment Risk Review Modernization Act (FIRRM), which came into effect in 2018, directly put restrictions on Chinese OFDI activities. The FIRRM extends the dispute between China and the US in the area of trade and investment. The US government’s intention to impose direct investment controls on competing US and Chinese industries through the national security review mechanism has undoubtedly caused a significant negative impact on Chinese investment activities in the US high-tech sector, even directly affecting the supply chain of Chinese high-tech industries in the United States.

On the other hand, in response to the COVID-19 epidemic ravaging the world, governments have taken new policy measures to make necessary interventions in their economic operations. In the case of the G20 Group, for example, there have been statements from the multilateral group in support of international investment. According to the World Investment Report 2020, more than 70 countries have announced measures to mitigate the negative impact of OFDI or have chosen to protect the normal functioning of their domestic industries. From a micro perspective, multinational corporations are bound to re-examine the layout of international supply chains and the arrangement of investment projects under the influence of embargoed international policies, which will also have some impact on international investment behavior. The global investment in the context of the epidemic has shrunk significantly, but in the post-epidemic era, along with the gradual economic recovery of each country (region), the demand for international investment is bound to rebound to a higher level, and this potential imbalance may lead to competition among economies to attract investment in the future.

In terms of total volume, since China’s accession to the WTO in 2001, China’s OFDI flow has continued to grow at an average annual growth rate of 28.2% from 2002 to 2018, and according to the 2019 Statistical Bulletin of China Outward Foreign Direct Investment, China’s OFDI flow still ranked the second in the world in 2019, and the OFDI flow has been ranked the third in the world for eight years in a row and the stock of OFDI at the end of the same year reached $3.46 billion, ranking third in the world. As one of the largest-scale economies in the world, China’s outward investment activities occupy a very considerable share in the global economy, and therefore the study of China’s outward investment activities is representative in the international investment field.

As a part of Chinese enterprises’ “going out” strategy, foreign investment activities have always been the focus of government and academic circles. Nowadays, China’s domestic economic development is in a period of development
transition, the international production order is also in a decade of restructuring, and the international academic community generally believes that international investment activities will experience a downturn from 2020 to 2021 in the post-epidemic era, which makes it all the more necessary to carefully consider outbound investment decisions, explore investment potential and avoid investment risks under such an extremely unstable outlook.

2. Theoretical Analysis and Literature Review

2.1. Definition of OFDI

According to the 2019 Statistical Bulletin of China Outward Foreign Direct Investment and the content of the indicators explained by the National Bureau of Statistics, OFDI refers to the economic activities of investors within a country (region) with the core of controlling the operation and management of foreign enterprises, which is reflected in the goal of an economy to achieve its lasting economic interests by investing in another economy. The realization of foreign direct investment is mainly manifested in the following three types: cross-border M&A investment, greenfield-type investment, and strategic alliances. In the actual statistical process, the amount of outward investment of a country (region) is defined as the investment realized by domestic investors directly to a foreign enterprise within a certain statistical period, including three components: equity investment, reinvestment of earnings and debt instruments.

2.2. Research Development

Theoretical studies on OFDI from developing countries began in the 1970s, mainly the marginal industrial expansion theory of Kiyoshi Kojima (Kiyoshi, 1977), Dunning’s investment development cycle theory (Dunning, 1986), Louis T’s small-scale technology theory (Louis, 1998), and Lall’s technology localization theory (Lall, 1983). Hymer (Hymer, 1960) pointed out through the study of multinational corporations’ investment behavior that there are two main motives for enterprises to make multinational investments: on the one hand, multinational enterprises choose to invest overseas to internalize their external transactions, thus effectively avoiding the risk loss caused by incomplete external market conditions; on the other hand, multinational enterprises can make international investments because the enterprises have the advantage of scale monopoly compared to the host country enterprises in terms of technology, management and capital. On the other hand, multinational enterprises can invest internationally because they have monopoly advantages in technology, management and capital compared with host country enterprises, and multinational investment can effectively bypass the barriers to entry set by the host country, reducing the necessary entry costs and thus gaining and playing the advantage of economies of scale of large multinational companies. This theory has pioneered the systematic study of MNCs’ direct investment behavior in foreign academia. It takes imperfect competition as a precondition and frees the theory of outward investment
behavior from the shackles of traditional neoclassical theory, explaining the motives of outward investment from the micro perspective of developed country MNCs. But this theory is also based on the study of the economic behavior of developed countries in the 1960s, and it is based on the fact that investors have relatively high industrial quality and cannot explain the motives of such dynamic direct investment behavior in developing countries in the new century. Buckley (Buckley, 2007) and other scholars followed the assumption of market incompleteness and the new vendor theory, pointing out that the organizational form of international production of enterprises is specifically manifested in the formation and operation of multinational corporations. With the development of institutional economics, behavioral economics and business management, the role of non-economic factors in influencing OFDI has been gradually emphasized. Dunning (Dunning, 2006) points out that the introduction of institutional factors can effectively improve the explanatory power of OLI model in the real economic environment.

A review of the existing literature reveals that the current empirical methods for investment analysis are mainly focused on stochastic frontier analysis and data envelopment analysis. A large body of literature indicates that Chinese OFDI is characterized by low efficiency, under-exploited potential, and obvious country differences. Tu and Wang (Tu, 2019) studied China's investment potential in ASEAN countries using a time-varying stochastic frontier investment gravity model and found that the efficiency of China’s investment in ASEAN countries is increasing year by year but generally low and the country differences are very obvious. Yao (Yao, 2018) measured China’s direct investment efficiency and investment potential in Europe and the United States through a stochastic frontier gravity model, and he pointed out that China’s direct investment efficiency in Europe and the United States is still low, which is mainly affected by various factors such as laws and corruption regulation, the signing of bilateral investment agreements, economic freedom and political stability in Europe and the United States. Cheng & Nan (2017) empirically analyzed the efficiency and country potential of China’s direct investment in countries along the Belt and Road using a stochastic frontier gravity model, and found that the efficiency loss of China’s direct investment in countries along the Belt and Road is mainly due to the influence of “non-efficiency” factors, and the investment efficiency is generally low, and shows obvious regional and individual differences. Tian & Xu (2016) uses a super-efficient DEA model to find that China’s investment in countries along the Belt and Road is inefficient, and the investment potential is affected by natural resources and transportation and communication.

Most of the current studies on OFDI potential are based on the concept of trade potential, and there is no authoritative and consistent interpretation of the concept of “potential” in economics. Scholars generally choose to interpret the definition of investment potential in its original sense—that is, the investment
potential of a country (region) means that the international investment absorbed by the country (region) is not fully utilized for various reasons, and the existence of potential means that there is still room for improving the investment efficiency of the country (region). The existence of potential means that there is still room for improving the efficiency of investment in the country (region). A comprehensive review of the relevant literature shows that a large number of scholars define investment potential as the difference between the theoretical value estimated by the model and the actual investment value. Chen & Guo (2016) defines investment potential as the difference between China’s actual investment in the host country and the theoretical value estimated by the extended gravity model, and he argues that if China’s actual investment in the host country exceeds the investment predicted by the gravity model, it can be considered that China has a close investment relationship with the host country; on the contrary, it is considered that China’s investment relationship with the host country is not close enough, there is the other way around, the investment relationship between China and the host country is considered not strong enough, i.e., there is a greater investment potential. Other papers define the investment potential as the difference between the investment frontier value and the actual investment amount from the stochastic frontier gravity model.

3. Model Setting and Variable Selection

The stochastic frontier gravity model is based on the traditional gravity model, which is generally used in the economic field to study the trade activities of bilateral trade under the conditions of free trade, and can also be further used to measure the efficiency of the model. The traditional gravity model tries to explain the trade phenomenon through natural factors such as geographical distance, total trade volume, and border length, but in actual economic activities, non-natural factors such as the signing of trade agreements and infrastructure improvements also have an impact on bilateral trade, but these factors are not included in the scope of the traditional gravity model; and policy effects are only included as part of the external random errors. However, these factors are not included in the traditional gravity model; and the policy influence is only included in the random disturbance term of the traditional gravity model as a part of the external random error. The stochastic frontier gravity model, which is based on the traditional gravity model, takes into account the impact of policy factors on bilateral trade. The stochastic frontier gravity model avoids the bias of including the random error directly in the efficiency term by dividing the random disturbance term into two independent components: the random error term and the non-negative trade inefficiency term, thus solving the problems of the traditional gravity model.

3.1. Stochastic Frontier Gravity Model

In analogy to trade, investment is also affected by not only natural factors such
as economic size and geographical distance but also institutional and policy factors. Therefore, the stochastic frontier gravity model can also be applied to analyze the efficiency of international direct investment. In this paper, we refer to the panel data model proposed by Battese and Coelli (1988) and other related literature on the choice of variables in the investment gravity model to establish the benchmark model of stochastic frontier gravity model as follows:

\[
\ln OFDI_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it} + \alpha_2 \ln GDP^*_i + \alpha_3 \ln TRADE_{it} + \alpha_4 \ln DIST_{it}^* + \alpha_5 \ln GDP_{jt} + \alpha_6 \ln GDP^*_j + \alpha_7 \ln TRADE_{jt} + \alpha_8 \ln DIST_{jt}^* + \alpha_9 \ln GDP_{it} + \alpha_{10} \ln GDP^*_i + \alpha_{11} \ln TRADE_{it} + \alpha_{12} \ln DIST_{it}^* + \alpha_{13} \ln GDP_{jt} + \alpha_{14} \ln GDP^*_j + \alpha_{15} \ln TRADE_{jt} + \alpha_{16} \ln DIST_{jt}^* + \alpha_{17} \ln GDP_{it} + \alpha_{18} \ln GDP^*_i + \alpha_{19} \ln TRADE_{it} + \alpha_{20} \ln DIST_{it}^* + \alpha_{21} \ln GDP_{jt} + \alpha_{22} \ln GDP^*_j + \alpha_{23} \ln TRADE_{jt} + \alpha_{24} \ln DIST_{jt}^* + \alpha_{25} \ln GDP_{it} + \alpha_{26} \ln GDP^*_i + \alpha_{27} \ln TRADE_{it} + \alpha_{28} \ln DIST_{it}^* + \alpha_{29} \ln GDP_{jt} + \alpha_{30} \ln GDP^*_j + \alpha_{31} \ln TRADE_{jt} + \alpha_{32} \ln DIST_{jt}^* + \alpha_{33} \ln GDP_{it} + \alpha_{34} \ln GDP^*_i + \alpha_{35} \ln TRADE_{it} + \alpha_{36} \ln DIST_{it}^* + \alpha_{37} \ln GDP_{jt} + \alpha_{38} \ln GDP^*_j + \alpha_{39} \ln TRADE_{jt} + \alpha_{40} \ln DIST_{jt}^*. \tag{1}
\]

where \( ODI_{ijt} \) denotes the amount of China’s direct investment in country \( i \) in period \( t \), \( t \) represents the nine periods from 2011-2019, \( i \) represents the 20 investment target countries (regions) selected in this paper, and \( j \) represents China. \( GDP_{it} \) denotes the amount of China’s GDP in year \( t \). \( GDP^*_i \) denotes the amount of GDP of country \( i \) in year \( t \) in constant 2010 US dollars. \( TRADE_{it} \) is the share of total exports and imports in GDP of country \( i \), which is used to measure the degree of trade openness of country \( i \). \( DIST_{it}^* \) is the spherical shortest geographic distance of country \( i \)'s capital from China’s capital Beijing.

To facilitate the regression, all the above explanatory variables are logarithmized in this paper. \( LANG_{it} \) is the language variable, which is set as a dummy variable here because language is not controlled by time, indicating whether China and country \( i \)'s official first or second language are connected, and is 1 if they are, and 0 otherwise. \( \gamma \) is the s-random disturbance that obeys a normal distribution with mean 0. \( u_{it} \) is the investment inefficiency term truncating the normal distribution, and the two are independent of each other.

To further study the impact of non-natural factors on investment efficiency in Chinese OFDI activities, this paper then constructs an investment inefficiency frontier model based on the benchmark model as following:

\[
\ln ODI_{it} = \beta_0 + \beta_1 GA_{it} + \beta_2 PR_{it} + \beta_3 FR_{it} + \beta_4 TB_{it} + \beta_5 BR_{it} + \gamma_{it} \tag{2}
\]

The meaning of \( i \) and \( t \) in Equation (2) is the same as that in Equation (1). Where \( u_{it} \) represents the investment inefficiency term, the \( \gamma_{it} \) represents the compound disturbance term, and \( GA_{it} \) denotes the index of governmental governance capacity of country \( i \) as the target of direct investment, and \( PR_{it} \) denotes the index of the degree of protection of intellectual property rights in host country \( i \), and \( FR_{it} \) represents the index of economic freedom in country \( i \), and \( TB_{it} \) represents the tax burden index of country \( i \). \( BR_{it} \) is a dummy variable representing whether country \( i \) is a country in the Belt and Road Initiative, and is denoted as 1 if it is a country in the Belt and Road Initiative, and 0 otherwise. For the potential study, the model sets the expression of investment efficiency as follows:

\[
TE_{it} = \ln ODI_{it}/\ln ODI_{it} = \exp(-u_{it}) \tag{3}
\]

Investment efficiency \( TE_{it} \) refers to the stochastic frontier efficiency of OFDI. \( \ln ODI_{it} \) refers to the actual value of OFDI, and its ratio to the frontier value \( \ln ODI_{it} \). This efficiency value is also equal to the exponential func-
tion of the investment inefficiency term. If $0 > T_{a} > 1$, it indicates the existence of technical inefficiency and investment potential to be explored.

3.2. Indicator Selection

The sample data in this paper are 20 countries (regions) to which Chinese OFDI came and went from 2011-2019, namely as the United States, United Arab Emirates, Pakistan, Kazakhstan, South Korea, Cambodia, Laos, Malaysia, Japan, Saudi Arabia, Thailand, Singapore, Iraq, India, Indonesia, Vietnam, Congo (DRC), South Africa, Sudan, Germany, France. The data were collected from the following countries: Russia, Netherlands, Luxembourg, Sweden, Switzerland, Italy, UK, Brazil, Chile, Canada, Australia, New Zealand. When selecting the sample data, it can be found that although there are many target countries (regions) for Chinese direct investment, many of them have abnormal data and missing data on some important indicators, such as Portugal and Greece, which have missing OFDI data for 2011 and 2014. In order to ensure the completeness and accuracy of the data, this paper eliminates some countries (regions) with abnormal data, and also eliminates the data of countries that receive too small amounts of Chinese direct investment flows, and only retains the data of 20 countries (regions) that have long-term and stable investment transactions with China from 2011-2019. These 20 countries are the United States, South Korea, Cambodia, Laos, Malaysia, Japan, Thailand, Singapore, India, Indonesia, Vietnam, South Africa, Germany, Sweden, Italy, United Kingdom, Chile, Canada, Australia and New Zealand.

1) Economic scale and market potential

GDP can be used to measure the economic scale and market potential of the investor. For the investor, the larger the economic size the more frequent the economic activity of the investor and the more likely to generate foreign direct investment, so the expected $\text{GDP}_{jt}$ is related to $\text{ODI}_{ijt}$ positive correlation. The impact of the economic level on the host side on OFDI depends on the type of OFDI: horizontal OFDI aims at seeking a broader international market, and the economic size and market potential of the host country have a significant positive relationship on horizontal OFDI; vertical investment aims at obtaining cheaper factors of production and has no direct concern on the market potential of the host country. Therefore $\text{GDP}_{it}$ the sign of the host country needs further consideration.

2) Trade transactions

At present, it is generally believed that there are two effects of trade exchange on investment: complementary effect and substitution effect: on the one hand, foreign direct investment can replace international trade to a certain extent to complete the factor exchange; on the other hand, frequent trade exchanges will deepen the economic relationship between trade parties, and in this environment, trade parties are more likely to generate investment behavior. Combined with the above analysis of the current situation of trade and investment between
China and the United States, this paper argues that the flow of capital here is not caused by tariffs, but rather investment and trade tend to show a complementary relationship, and the higher the degree of trade openness, the more likely it is to drive investment, so it is expected that TRADE\_\text{ijt} \text{ The effect on } ODI\_\text{ijt} \text{ The effect is expected to be positive.}

3) Geographical distance

Traditional international investment theory holds that the greater the geographic distance between two investing parties, the higher the additional cost to be paid for the investment. The location choice of investment is inextricably linked to geographical distance; countries with close proximity have a greater advantage in seeking international cooperation, and countries with close geographical distance tend to have stronger cultural and psychological convergence among themselves, which can also have an important impact on cross-border investment, so the geographical distance variable DIST\_\text{ijt} has a negative relationship with ODI\_\text{ijt} the relationship is expected to be negative.

4) Language background

This paper introduces a dummy variable LANG to measure the linguistic and cultural contextual variability of a country. It is often assumed that the same language implies a similar cultural background, which helps to reduce communication costs and thus promotes investment, expected LANG and ODI\_\text{ijt} is expected to be proportional.

5) Other non-efficiency factors

WGI generally measures the governmental governance capacity of the host country in a comprehensive manner from six dimensions: democratic freedom and rights index, political stability index, government effectiveness index, regulatory governance index, legal system index and corruption control index, and here the arithmetic mean of the six indices is taken to construct the variables GA\_\text{it} to comprehensively measure the governmental governance capacity of the host country. In general, a democratic country under the rule of law with a stable political environment and an efficient government operation is more capable of providing a stable and effective investment environment and attracting more FDI. Therefore, this paper expects that GA\_\text{it} and ODI\_\text{ijt} are proportional. The more effective a country’s protection of intellectual property rights is, the more likely it is to attract investment. PR\_\text{it} is expected to be proportional to ODI\_\text{ijt} is proportional. PR\_\text{it} The index is an arithmetic average of six indices: freedom of business, freedom of labor, freedom of money, freedom of trade, freedom of investment, and freedom of finance, and in general, the higher the index of economic freedom, the more investment is attracted. PR\_\text{it} The expected relationship between ODI\_\text{ijt} The index is proportional. One important motivation for international foreign investment is to reduce tax payments, so countries with higher tax burden have a strong deterrent effect on foreign investment, so this paper expects TB\_\text{it} and ODI\_\text{ijt} are inversely proportional to each other. The “Belt and Road” countries are very attractive to Chinese investors because of their strong national policy support, which can also be used as an indicator to
judge the responsiveness of Chinese investors to national policies. BR_i is estimated to be \( \frac{ODI_{ijt}}{\text{final mle estimates}} \). The ratio is estimated to be positive.

### 3.3. Empirical Estimation Result

Frontier4.1 was used to estimate the fronts Equation (1), and the results are as follows.

The results are shown below. The coefficients estimated using Frontier4.1 for the fronts Equation (1) are shown in Table 1. The output of the Frontier4.1 estimates of efficiency is shown in Table 2.

**Table 1. Coefficients estimated using Frontier4.1.**

| Variables | Coefficient | t-test |
|-----------|-------------|--------|
| \( \alpha_i \) | −20.53693 | −13.31670*** |
| ln GDP_{ijt} | 2.20121 | 10.21116*** |
| ln GDP_{jt} | 0.15218 | 7.06446*** |
| ln TRADE_{jt} | 0.69870 | 5.35523*** |
| ln DIST_{jt} | −0.17782 | −1.55934 |
| LANG_{jt} | 0.98700 | 0.27270 |
| \( \beta_i \) | 17.58383 | 8.13012*** |
| GA_{jt} | 0.86799 | 2.06281* |
| PR_{jt} | 0.08107 | 6.12466*** |
| FR_{jt} | −0.24202 | −15.04025*** |
| TB_{jt} | −4.01392 | −2.37312** |
| BR_{jt} | 6.70229 | 8.82357*** |
| sigma-squared | 13.05578 | 5.31245 |
| gamma | 0.73215 | 21.86390 |

Log likelihood function = −378.45902; LR test of the one-sided error = 57.89210.

**Table 2. Technical efficiency table using Frontier4.1.**

| Countries | 2019 |
|-----------|-----|
| United States | 0.70055 |
| Korea | 0.59513 |
| Cambodia | 0.13661 |
| Laos | 0.29274 |
| Malaysia | 0.53415 |
| Japan | 0.59601 |
| Thailand | 0.38405 |
| Singapore | 0.68212 |
| India | 0.46040 |
Continued

| Country      | Value  |
|--------------|--------|
| Indonesia    | 0.22269|
| Vietnam      | 0.21182|
| South Africa | 0.59928|
| Germany      | 0.54888|
| Sweden       | 0.43529|
| Italy        | 0.51478|
| United Kingdom| 0.73410|
| Chile        | 0.21006|
| Canada       | 0.61585|
| Australia    | 0.67069|
| New Zealand  | 0.59698|

From Table 1, log likelihood function = –378.45902, LR test of the one-sided error = 57.89210, it can be seen that the likelihood ratio LR one-sided test passes the 5% significance test, indicating that there is indeed a technical inefficiency in the mixed error term, and the gamma coefficient is estimated to be 0.73215, t-value is 21.86390, for the proportion of the error due to technical inefficiency in the total error, γ = 0.73215 and passes the 5% significance test, γ is very close to 1.

The above empirical findings show: first, that the use of stochastic frontier analysis (SFA) is appropriate, and that it is reasonable to draw on the BC (1995) model; second, that technical inefficiency has a significant impact in the deviation from the stochastic frontier surface, while the impact of random factors from statistical errors in the traditional sense is small; and third, that the impact of statistical errors in the failure to realize the potential is very small and mostly comes from the loss of efficiency.

According to Table 1, it can be seen that:

1) as two variables that measure the size of economic development and market potential \( \ln GDP_j \), the \( \ln GDP_i \). The positive sign indicates that the larger the economic scale can bring more international investment flows, regardless of the investment host country or the investment home country. It can also indicate that Chinese outward FDI is mostly horizontal FDI, which aims to seek a broader international market within the same industry. In addition, the \( \ln GDP_j \) coefficient is greater than \( \ln GDP_i \) indicates that the increase of China’s own GDP contributes more significantly to the increase of OFDI quantity.

2) Trade indicators \( \ln TRADE_i \). The relationship with the dependent variable ODI also shows a positive correlation, indicating that China’s outward investment prefers countries with high trade openness, which also proves that the relationship between China’s international investment and international trade mostly shows complementarity, in line with the expectations of the earlier part of the paper.
3) Geographical distance indicator $\ln \text{DIST}_{it}$ and language dummy variables LANG fail the significance test, which may be due to the fact that geographical distance and language are no longer significant factors that hinder outward investment due to the development of transportation and communication methods and the advancement of translation technology nowadays.

As can be seen from Table 2, mean efficiency is 0.487432, which is in a state of technical inefficiency when $0 < \text{TE} < 1$. The mean efficiency value of 0.487432 implies that the overall potential of China is in a state far from being realized, and also confirms once again the point made earlier in the article that China’s overall potential of China is in a far from realized state, and also confirms once again that the relationship between Chinese direct investment and bilateral trade is extremely asymmetrical as mentioned earlier in the article, and that there is expected to be a lot of room for exploration and realization of potential. Secondly, also from Table 2, it can be seen that the majority of individual efficiency values of Chinese direct investment in the 20 member countries are below 0.8, which means that with the established variables of GDP, distance, trade dependence and economic freedom, Chinese direct investment is inefficient, implying that Chinese direct investment is not utilizing its potential under the current economic variables.

4. Research Conclusion and Policy Recommendations

This paper empirically analyzes the influencing factors of China’s outward foreign direct investment by using panel data of 20 countries from 2009-2018, measures the potential of China’s outward foreign direct investment by means of a stochastic frontier gravity model, and makes further distinctions and divisions with respect to China’s investment potential. The main findings of the study are as follows.

First, China’s GDP, host country GDP, and trade openness of host country have positive effects on the growth of Chinese OFDI, among which the increase of Chinese GDP has the most obvious promotion effect on the Chinese OFDI. As hypothesized in the previous section, the effect of the economic level of the host country on FDI depends on the type of FDI: horizontal FDI aims at seeking broader international markets, and the economic size and market potential of the host country have a significant positive relationship with horizontal FDI; a positive effects of host country GDP means that the type of Chinese outward FDI is dominated by horizontal FDI. It shows that the purpose of China’s outward investment is still mainly motivated by seeking a broader international market, and the amount of outward investment will be improved as the size of China’s economy expands. Besides, an open trade environment will also lead to active outward investment activities, which could be learnt from positive trade openness indicators.

Second, Chinese outbound FDI has been significantly boosted by the Belt and
Road Initiative and positively influenced by the level of government governance and intellectual property protection, while the trade war and other conflicts between China and the other countries. It has put downward pressure on Chinese FDI flows, but the impact on the stock is small. The Chinese government’s active measures to fight for negotiation opportunities while preparing for self-protection and countermeasures have played a substantial role in protecting Chinese companies’ investment in the host counties. The Chinese government’s active actions to control the domestic situation in response to the crisis of the new crown outbreak in 2019 are also conducive to the economic recovery in the post-epidemic era.

Third, compared to some countries whose investment potential is highly exploited, it is expected that there is still some investment potential for Chinese OFDI in the future. This requires Chinese multinational companies to review the situation in time, make a quick judgment on the future economic performance and formulate a corresponding investment strategy.

Based on the above findings, this paper proposes the following recommendations for the efficiency of China’s OFDI and its influencing factors, taking into account the current international hotspots and the background of the times.

First, considering that China’s GDP has a very significant role in promoting its OFDI activities, the government should scientifically and steadily grasp the strength of counter-cyclical adjustment of macro policy at the macro level, adhere to the general keynote of seeking progress in a stable manner, and scientifically set economic development goals around national strategies and China’s actual situation; the government should strengthen macro and micro regulation and control, make every effort to ensure stable and high-quality economic development, and drive the improvement of OFDI level with national economic development.

Second, relying on major national strategic decisions, the government should strengthen international exchanges and policy communication to promote the steady improvement of OFDI efficiency. China needs to take advantage of the development opportunities provided by major strategic policies such as the “One Belt, One Road” national initiative, and take a more proactive approach in dealing with disputes arising from economic transactions with other countries. Enhancing the government’s governance capacity is conducive to unlocking investment potential. The Chinese government must remain proactive, taking steps to prevent near-term economic controls from trade protectionism on the one hand, and on the other hand, the Chinese government must still not abandon dialogue and communication with governments at the national level to work together to combat the epidemic. The government should continue to work to remove barriers to foreign investment and develop a policy-oriented outward-looking economy.

Third, optimize the investment structure and promote the diversification of outward direct investment. Chinese enterprises investing abroad should develop appropriate investment strategies according to local conditions, focus on pre-
venting and controlling political risks arising from improper governance behaviors of host governments, and enhance enterprises’ awareness of risk prevention and control. At the same time, Chinese companies investing abroad need to be more cautious in adopting internalization strategies to prevent internal control risks. Compared with multinational investment enterprises in other countries, Chinese foreign investment enterprises are backed by the Chinese market with huge purchasing power. Chinese foreign investment enterprises can consider starting with related industries in the supply chain of the target investment industry and play the role of supply chain finance to obtain the resources they need in a curved path. They can also give priority to reducing the sensitivity of the host country’s market regulatory mechanism by opening up the market, and then use the host country’s advanced science and technology and management level to realize the transformation and upgrading of Chinese enterprises’ own production.

The deficiency of this paper is that it only analyzes the factors affecting the flow of Chinese OFDI from the macro level, but lacks analysis and research on the micro level data mainly on multinational corporations. It lacks of further explanation of micro-firms’ cross-border investment behavior. Furthermore, the countries selected in this paper are the countries that have frequent dealings with China’s OFDI activities, but no regional division of countries is discussed. In the future, further detailed regional studies could be made for ASEAN and countries along the “Belt and Road”, to develop the study of Chinese OFDI activities.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

Battese, G. E., & Colli, T. J. (1988). Prediction of Firm-Level Technical Efficiencies with a Generalized Frontier Production Function and Panel Data. *Journal of Econometrics, 38*, 387-399. [https://doi.org/10.1016/0304-4076(88)90053-X](https://doi.org/10.1016/0304-4076(88)90053-X)

Buckley, P. J. (2007). The Determinants of Chinese outward Foreign Direct Investment. *Journal of International Business Studies, 38*, 499-518. [https://doi.org/10.1057/palgrave.jibs.8400277](https://doi.org/10.1057/palgrave.jibs.8400277)

Chen, W. G., & Guo, Q. (2016). Potential Estimation and Location Selection of China’s Investment in Countries along the "Belt and Road". *Macroeconomics, 9*, 148-161.

Cheng, Z. H., & Nan, N. (2017). China’s Direct Investment Efficiency and Potential Evaluation for the Countries along “Belt and Road”. *Commercial Research, 8*, 64-73.

Dunning, H. (1986). The Investment Development Cycle Revisited. *Weltwirtschaftlicher Archive, 122*, 667-676. [https://doi.org/10.1007/BF02707854](https://doi.org/10.1007/BF02707854)

Hymer, S. (1960). *International Operations of National Firms: A Study of Direct Foreign Investment*. Doctoral Dissertation, Cambridge, MA: Massachusetts Institute of Technology.

Kiyoshi, K. (1977). *Japan and a New World Economic Order* (pp. 142-156). London: Taylor & Francis.
Lall, S. (1983). *The New Multinationals: The Spread of Third World Enterprises* (pp. 250-268). New York: John Wiley & Sons.

Louis, T. (1998). Multinationals and the Developing Countries. *Journal of International Business Studies, 29*, 40-55. https://doi.org/10.1057/palgrave.jibs.8490027

Tian, Z., & Xu, D. M. (2016). Study on the Environment and Effects of China’s OFDI to the Middle East in the Context of Silk Road Economic Belt. *Social Sciences in Ningxia, 5*, 97-103.

Tu, N. S., & Cao, J. H. (2019). Analysis of the Effect of RMB Exchange Rate on China’s OFDI in the ASEAN. *Financial Theory & Practice, 7*, 1-6.

Yao, Z. Q. (2018). Efficiency of China’s Outward Foreign Direct Investment in Europe and America in the Context of Global Value Chai. *Journal of Graduate School of Chinese Academy of Social Sciences, 3*, 80-90.