Research on the Quality of China's Outward Foreign Direct Investment on Economic Growth under the "Belt and Road" Initiative

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Abstract. Under the background of "Belt and Road", the scale of China's outward foreign direct investment (OFDI) has been expanding rapidly, which has also driven the high-quality development of the domestic economy to a certain extent. On the one hand, this paper uses the entropy weight method to construct the indicators of high-quality economic development, covering three aspects of growth speed, stability and sustainability. On the other hand, from the perspective of the home country, this paper used multiple regression to analyse the direct impact of OFDI on the overall economic development, so as to provide new suggestions and new ideas for the formulation of macro policies. The study finds that OFDI under the background of "Belt and Road" has a positive influence on the quality of economic growth of the home country, which mainly reflects in the stability of economic growth and it's efficiency. However, OFDI has a positive and negative impact on sustainability. Through the selection of resource efficiency and environmental governance indicators, it can be found that China still needs to optimise and upgrade its industrial structure in an environmentally friendly way.

Keywords: Outward foreign direct investment, high-quality economic growth, the "Belt and Road" Initiative.

1. Introduction

Chinese President Xi Jinping proposed the "New Silk Road Economic Belt" and the "21st Century Maritime Silk Road" (also known as the "Belt and Road") in September and October of 2013. The report from the 19th CPC National Congress stated the fact that "we should attach importance to the construction of the 'Belt and Road', adhere to the equal emphasis on 'bringing in' and 'going out' and following the principle of consultation, joint construction, and sharing, we will form an open pattern of linkage between land, sea, and domestic markets, as well as mutual assistance between the east and the west". China's outward foreign direct investment (OFDI) in the nations along the "Belt and Road" cooperative effort is growing daily due to its extensive construction. China ranked second in the world with $1631.2 billion in OFDI flow, according to the "Statistical Bulletin of China's Outward Foreign Direct Investment in 2022". Furthermore, outbound businesses operate in more than 80% of the world's nations and regions, spanning 18 major industry categories inside the domestic economy. Over $10 billion in investments are made in manufacturing, banking, leasing and business services, and other sectors. China's outward foreign direct investment has shown rapid growth, and has become an important driving force for optimising and upgrading the industrial structure and enhancing the innovation capacity in the new era [1]. In this context, the research related to China's OFDI and the quality of economic development can provide a new thinking direction for domestic high-quality development.

Regarding the research theme of OFDI, the studies of existing scholars can be roughly summarised into three aspects: firstly, the study of whether the relevant changes in the countries and regions along the routes affect China's OFDI, such as the construction of overseas trade cooperation zones and the potential of the digital economy development in relevant countries on China's OFDI [2, 3]. Secondly, some scholars pay attention to the impact on China, which mainly includes the effect of OFDI on technology spillover effect, export trade effect, etc [4, 5]. Thirdly, there are also some researches focusing on the individuals involved in the context of the realities, and conducting researches on the

location choices of enterprises under the background of the digital economy, as well as whether the social responsibility of the enterprises has been changed, etc [6, 7]. Compared with the existing studies, this paper will expand from the those aspects. Firstly, and more comprehensive than a single total factor productivity, this study creates a measurement index of high-quality development of the economy embracing three aspects: growth rate, stability, and sustainability. Secondly, from the research direction of the home country, the study of the straightforward impact of OFDI on the overall economic development so as to give new suggestions and new thinking for the formulation of macro policy.

2. Literature Review and Theoretical Assumptions

2.1. Economic Effects of OFDI

Existing literature has a relatively rich research on the economic effects of OFDI. In terms of the theory of OFDI, the existing literature mostly based on Dunning's international production trade-off theory, combined with the institutional theory, the theory of outward investment from developing countries and so on, forming the Ownership, Location and Internalization paradigm (OLI paradigm), institutional perspective and third-country perspective in the study of the impact factors of outward investment under the Belt and Road Initiative background [8]. In this new age, scholars in China have also studied the international production trade-off theory with new theoretical background.

With the convening of the first working conference on promoting the establishment of the "Belt and Road" in Beijing in 2015 and the official launch of the China-Pakistan Economic Corridor (CPEC), which is a project during the period of the "Belt and Road", China's OFDI has become more active. Chinese businesses invested directly in 49 "Belt and Road" nations in 2015, with an increase of 18.2% over the previous year. The "Belt and Road" initiative has undoubtedly increased OFDI, which is beneficial from the standpoint of measuring economic growth quantitatively. Liu Danyang et al. found that investment in the financial sector can promote the spillover effect of fintech by strengthening the promotion and application of fintech innovations, and ultimately improve financial efficiency effectively [9]. And the application of direct investments made by China in nations and areas connected by the "Belt and Road" can promote its greater economic effect. It shows that the "Belt and Road" initiative has a positive effect on China's economic growth. Scholars such as Chen Wanying and other scholars use hierarchical factor model and time-varying factor model to dismantle the quantity and quality of a province's economic growth in detail, and come to the conclusion that the quantity and quality of economic growth basically show a synergistic promotion trend for most provinces [10]. Based on the above, it can be inferred that China has basically set the tone of benign high-quality development conclusion. According to Wang Lijuan's research on the relationship between the two influences, the overall quality of economic growth is improved by OFDI [11].

Accordingly, this paper presents:

Hypothesis 1: OFDI in the context of the Belt and Road has a positive impact on the quality of economic growth in home countries.

2.2. Analysis of the Measurement of OFDI on Economic Growth

Regarding studies researching the relationship between OFDI and economic expansion, the majority of the research gives significantly less attention to the quality of local economic growth and more focus on the host country's economic growth. An empirical investigation by Kong Qunxi et al. looked at the beneficial impact of OFDI on the quality of economic growth from the perspectives of region and enterprise [12]. On this basis, some scholars have made a further breakdown of the quality of economic growth. Scholar Wang Lijuan divided it into three dimensions: the economic growth efficiency, stability and sustainability and ultimately discovered that increasing the scope of OFDI is beneficial to both the sustainable development of economic growth and the enhancement of its efficiency, but it has little effect on the stability of economic growth [13].

For the measurement of economic growth, the majority of the literature now in publication examines quantitative economic growth, such as the use of total factor productivity (TFP) as a measurement index, which is used by scholars such as Luo Changyuan and others to study the impact of the Belt and Road construction on industrial enterprises [14]. It usually includes data on technological progress, labour and capital, but in fact total factor productivity still has its limitations, such as the characteristics of the service industry itself limit the accuracy of total factor productivity measurement, and there is a tendency of underestimation of the digital economy, and so on. Thus, it is not accurate enough to gauge the quality of economic growth using just one metric so it requires a multidimensional synthesis.

In the traditional measurement of economic growth, the growth rate is usually used as the indicator of economic growth, the size of which refers to the speed of economic growth, implying the length of time it takes to raise people's living standards, with interest rate policy, tax policy and fiscal policy as the means of adjustment. Therefore, the economic growth rate will continue to be used. Taking into account the fact that the main participants in the Belt and Road Initiative are enterprises, whose changes in productivity will be an intuitive reflection of economic growth, and therefore including capital and labour productivity as the main measures of factor productivity.

Prices are a crucial component of economic performance because they serve as a "barometer" for the general state of supply and demand in society. Preserving price stability, or preventing deflation, limiting inflation, and preserving currency stability, is one of the goals of macroeconomic management. In light of this, the rate of inflation may be a key sign of the stability of economic growth. Inflation is commonly measured using the GDP deflator, the consumer price index, the industrial producer price index, and other measures. Since the main body of outward foreign direct investment in the context of the "Belt and Road" is mainly domestic enterprises, the industrial producer price index (PPI) is chosen to reflect the price changes in the production sector during this period.

The measurement of economic sustainability involves a number of aspects, such as social justice, green development and innovation capacity, among many other indicators. In the 20th Party Congress report, President Xi Jinping noted that encouraging the greening and decarbonization of social and economic development is essential to attaining high-quality development. Considering the green development trend of the society and the measurability of the indicators, the indicators in the direction of green development are chosen. According to the green development indicator system document issued by the National Development and Reform Commission, the two secondary indicators with the highest weights (2.75%) in the directions of environmental governance and resource utilisation in the first level indicators - total chemical oxygen demand (COD) and energy consumption per unit of GDP (RES) - are chosen as the indicators for measuring the sustainability of the economy.

Accordingly, this paper presents:

Hypothesis 2: OFDI in the context of the Belt and Road can affect the rate of economic growth in terms of its speed, stability and sustainability.

In conclusion, the majority of the research that has been done on China's OFDI and domestic economic growth is quantitative in nature, and there is still a dearth of information on the relationship between OFDI and the caliber of domestic economic growth. In the context of the "Belt and Road" initiative, research on OFDI and the quality of home country economic growth can help to both visualize the economic effects of the initiative and study the problem of macroeconomic quality development under the initiative while concentrating on analyzing the effects of the new economy on enterprises, new business forms, economic development and quality development.

3. Research Design

3.1. Data Sources

This study examined and analyzed data from 30 Chinese provinces, autonomous areas, and municipalities that are directly governed by the central government (apart from Tibet, Hong Kong,

Macao, and Taiwan) between 2006 and 2020. The China Population and Employment Statistical Yearbook provides basic data on urbanization (Urb), while the China Statistical Yearbooks of previous years and the statistical yearbooks of individual provinces provide basic data on industrial development (Ind) and openness to the outside world (Open). The data on outward foreign direct investment (OFDI) comes from "the Statistical Bulletin of China's Outward Foreign Direct Investment."

3.2. Description of Variables

3.2.1 Explained variables

Table 1. Three-dimensional Framework of Quality Indicators for Economic Growth

Dimensional indicators	Sub-indicators		proxy variable	causality	weights
Efficiency of economic growth	economic growth rate		end-period GDP/base-period GDP	+	6.61%
	Factor productivity	capital productivity	GDP/capital stock	+	49.67%
		labour productivity	GDP/number of employees	+	20.89%
Stability of economic growth	Level of inflation	Industrial producers' ex-factory price index	Gross industrial output index/gross industrial production index	-	9.64%
Sustainability of economic growth	Resource efficiency	Energy consumption per unit of GDP	Total social energy consumption (tonnes of standard coal)/GDP	+	4.27%
	environmental management	Total chemical oxygen demand emissions	Database direct access	-	8.91%

High-quality economic development is a composite concept, and so far there is still no uniform definition. On the basis of combing related literature, this paper will adopt the measurement dimensions of Wang Lijuan and the Macro Group of China Center for Economic Research, Peking University, to measure the quality of economic growth from three aspects: economic growth rate, stability and sustainability [15]. Specifically, the entropy weight method will be used to determine the weights of the three and ultimately constitute a high-quality development index, as shown in Table 1.

3.2.2 Explanatory and control variables

Outward foreign direct investment (OFDI): OFDI flows ($ million). The ratio of the urban population to the overall population is used to quantify urbanization (Urb). The level of industrial development (Ind) is expressed as the ratio of the output value of the secondary industry to the GDP. The level of openness to the outside world (Open) is expressed as (total import and export + total foreign direct investment)/GDP.

3.3. Modelling

The impact of OFDI on the economy's high-quality development is the main topic of this essay, and this paper combines the analyses in the previous section to construct the following basic econometric model:

$$qual_{it} = \alpha_0 + \alpha_1 OFDI_{it} + \beta_1 X_{it} + \mu_i + \gamma_t + \varepsilon_{it} \quad (1)$$

Of these, $qual_{it}$ denotes the quality of economic development of the region i in the year, the $OFDI_{it}$ denotes the foreign direct investment of the region i in year t. The control variables X mainly include urbanisation (Urb), industrial development level (Ind), the level of openness to the outside world (Open), and the degree of receptivity to external influences is measured by the amount of goods imported and exported/gross regional product. ε_{it} denotes the random perturbation term.

4. Analysis of Empirical Results

4.1. Descriptive Statistics of Variables

Descriptive statistics of all the variables in the sample were initially performed in order to get a preliminary opinion on the influence of OFDI on the caliber of economic growth. The findings are displayed in Table 2 as follows. The initial regression conclusions were then intuitively deduced by plotting the fitting diagram of the quality of economic development and growth for the entire sample.

Table 2. Descriptive Statistics of Variables

variable name	sample size	average value	standard deviation	minimum value	maximum values
Urb	465	0.548	0.145	0.211	0.896
Ind	465	0.446	0.0881	0.158	0.615
Open	465	0.276	0.313	0.00714	1.668
OFDI	460	171,941	349,225	2	2.397e+06
qual	465	0.440	0.141	0.130	0.797

The standard deviation of the explanatory variables, or the indicators of high-quality economic development in each province, is 0.141, which indicates a tendency toward generally high-quality development and the relative concentration of the quality of economic development in each province, based on the descriptive statistical results of the variables. Its standard deviation result is higher when compared to the explanatory variables, i.e., the outward foreign direct investment flow of each province, suggesting that the outward foreign direct investment flow is highly variable and exhibits regional heterogeneity.

Observing the fitted diagram of the quality of economic growth versus the quality of economic development, the following conclusion can be drawn: there is a significant positive correlation between the size of OFDI and the quality of economic growth, but the data distribution is more dispersed when the quality of economic growth indicator is at a high level. The coefficient of OFDI is expected to be positive according to the figure 1, but further testing is still needed to draw a more accurate conclusion.

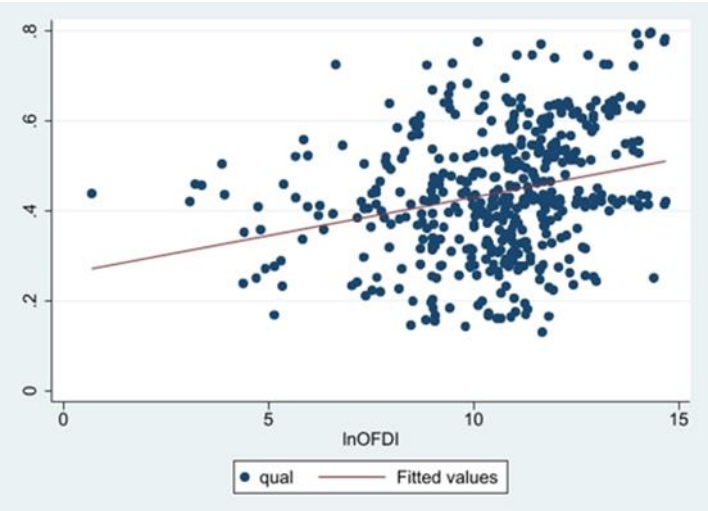


Figure 1. Scatterplot of OFDI and the Quality of Economic Growth

4.2. Regression Results

Table 3. Regression Results

variable name	(1) qual	(2) qual	(3) eff	(4) sud	(5) sustain
OFDI	0.103***	0.079***	0.299***	0.379***	1.557*
	(8.28)	(5.46)	(5.04)	(2.63)	(1.78)
Urb		0.136**	0.939***	-0.721	-8.164**
		(2.06)	(3.00)	(-0.98)	(-2.08)
Ind		0.154***	0.781***	1.392**	3.446
		(3.74)	(4.18)	(2.58)	(1.24)
Open		-0.072***	-0.116*	-0.152	2.823**
		(-4.49)	(-1.71)	(-0.89)	(2.47)
Constant	0.432***	0.310***	0.111	-0.080	6.538***
	(336.99)	(8.27)	(0.67)	(-0.20)	(2.81)
Observations	450	450	450	450	450
R-squared	0.979	0.981	0.895	0.782	0.827
Region FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Standardised post-processing of OFDI yields results as above. The results in Table 3 show that, in the absence of control variables, the coefficient of OFDI is 0.103, significant at the 1% level. This suggests that altering the amount of OFDI has a favorable impact on the standard of economic growth, supporting hypothesis one.

In terms of control variables, first, urbanisation and industrialisation have a more comprehensive impact on the quality of economic growth, and the technological progress and product iteration brought about by industrialisation are conducive to the improvement of economic efficiency. As people's demand for quality of life is increasingly improved, environmental protection is gradually being taken seriously, and a series of policies for environmental protection, such as green credit and dual-carbon policy, have all contributed to the green transformation of industry, which has a positive impact on the sustainability of economic development. Secondly, the degree of regional openness directly affects the quality of economic growth, the higher the degree of openness, the easier access to cutting-edge production technology, is conducive to learning advanced management experience in developed countries. But at the same time, with the increase in the level of regional openness to the external world, the inflow of a large number of foreign products into the domestic market so that China's related industries are facing the challenge of China's economic order to put forward a higher demand for the management of the country's economic order capacity [16]. China still exists in the overall industrial structure upgrading and optimisation is incomplete, at the same time, China's foreign trade also exists in a single export market, the main body of the imbalance and other characteristics [17].

According to the results in Table 3, OFDI has a greater impact on the sustainability of the economy, and has a certain influence on the efficiency and stability of economic growth. The expansion of OFDI boosts the flow of goods in both domestic and foreign markets, puts more pressure on businesses to compete, and encourages them to constantly innovate in technology, increase the input and labor utilization efficiency, strengthen their core competitiveness, and ultimately support the high-quality development of the economy. On the one hand, it improves the efficiency of resource utilisation, but on the other hand, the optimisation and upgrading of enterprises inevitably brings certain negative impacts, which are mainly reflected in the aspect of environmental governance, such as the rise in the total amount of chemical oxygen demand emissions. Although its coefficient is 1.557,

the effect is obvious in the economic sense, but it is significant at the 10% level, thus it needs to be further studied. At the 1% level of significance, the coefficient of the increase in OFDI on the degree of inflation and the stability of economic growth is 0.379, indicating a negative impact on the stability of economic growth. This is consistent with the conclusion of Sheng Wenjun and other research: too fast growth will also bring the domestic price instability and the degree of inflation, the increase in foreign trade openness, making the domestic economy more vulnerable to price fluctuations in the international market, resulting in imported inflation [18], which confirms the hypothesis that OFDI affects the quality of growth through the impact of the speed of growth and stability, while OFDI has a negative impact on economic sustainability, which is significant at the 1% level. The situation that OFDI has both positive and negative impacts on economic sustainability still needs to be further researched.

5. Conclusion

This article analyzes the influence of China's outward foreign direct investment on the quality of economic growth under the Belt and Road Initiative and explores the impact on various channels of economic growth based on interprovincial data from 2006 to 2020. The effects on various economic growth channels are examined, with particular emphasis on the importance of foreign direct investment in terms of the nation's scientific and technological innovation, industrial efficiency improvements in the sector, green transformation, opening up new markets, and increasing degree of openness to the outside world, all of which enhance the effectiveness and stability of economic growth.

The "unstable, unbalanced, uncoordinated and unsustainable" issues with China's old economic growth model have become abundantly clear in the wake of the global financial crisis, and achieving high-quality economic development has become a pressing priority. The strategy of "going out" and utilizing the international market, technology, and resources must be maintained under the new pattern of opening up to the external world. This can both strengthen China's economy's integration with the global economy and provide fresh external kinetic energy for the country's high-quality development. However, as the scale of outward foreign direct investment is expanded, China must also be mindful of the absorption and transformation of outward foreign direct investment reverse spillover technology, which primarily depends on the caliber of technology research and development personnel as well as human capital.

China's outward foreign direct investment has been growing at a rapid pace within the framework of the Belt and Road Initiative, which has partially fueled the high-quality expansion of the domestic economy. Nowadays, the quantitative expansion phase of China's economic growth has basically come to an end, investment and exports have reached their limits, and there is a general overcapacity in various industries, as well as a surplus of property and infrastructure, which reduces the space for quantitative economic growth. As a result, society must focus on the high-quality development of the economy. It is evident that increasing the amount of foreign direct investment has a favorable impact on GDP growth, but pursuing international trade growth on its own may lead to economic instability. The effect of opening up foreign trade is related to the cyclical stage of China's economic operation, in addition, the effect of foreign trade is also asymmetric, and in today's green development has become a major issue, the impact on the environment is also one of the most important indicators to consider the quality of economic development.

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