Study on Interactions between Foreign Direct Investment and Economic Growth

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Abstract. The period of 1990s is rapid development period of Foreign Direct Investment (FDI). Its growth rate even surpasses international commodity trade and gradually becomes the core force to drive growth of world economy. In 1980s-1990s, the maximum beneficiaries of FDI were undoubtedly world developing countries. Their annual mean growth rate of FDI exceeded 10%. From 2004 to 2004, global developing countries jointly attracted FDI USD 270 billion, with the growing range exceeding 97%. This creates the peak of FDI annual growing range. Among numerous developing countries, China and developing country attracted most FDI. This paper carries out empirical analysis of the relationship between FDI of the two developing countries and economic growth and explores the effects and influence of FDI on economic development of developing countries.

Introduction

Although developing countries are good at attracting FDI, interactions between attracting FDI and economic growth still have risk factors from economic system and operation structure due to imperfection of national economic system and market structure. Combination of these risk factors and FDI forms great influence on economic trend of developing countries. Thus, this paper studies FDI introduction of developing countries, correctly understands and treats FDI. This paper promotes economic growth of developing countries.

Function of FDI on economy of developing countries

FDI promotes macro-economy and micro-economy of developing countries. From the state to local enterprises, FDI not just recombines production resources, but also brings operation risks for industrial competition. Hence, for developing countries with unstable economic structure, they should evaluate the function of FDI on national economic development from dialectical perspective.

FDI recombines rich and abundant production resources for developing countries, such as land, natural resources and labor force. Thus, for China with intensive labor force, FDI owns natural competitive edge. Such advantage is transformed to national development countermeasures to develop attraction of foreign funds, and improve technology and management methods. They fully excavate potential production resources, and transfer them in competitive industries. This also accelerates development of national economy. Meanwhile, developing countries also undertake quite high cost. However, it is worthy for capital accumulation of developing countries,

To review developing countries from resource reorganization, it is required to see function degree of FDI brought to the state from different development stages of different countries. We can divide developing countries into three conditions: firstly, FDI can promote industrial economic development of developing countries. For example, the introduction of FDI in Singapore, Taiwan, Korea and other East Asian states and regions including Argentina and Brazil can rapidly improve their economic demand, boost capital operation degree and enrich technology and management concept, and offer extra power for national power growth. However, FDI also has some independent negative effects on economic development of these countries. Introduction of FDI in quantity attracts a large number of transnational corporations and funds. When transnational enterprises are stringer than native enterprises, relevant industrial economy is likely to be controlled and monopolized. Current situation

of Argentina is also the case. Their key profit-making industry is basically monopolized by overseas-funded enterprises. Only one bank in the whole Argentina belongs to pure national capital investment operation. All the others are foreign and private banks. Secondly, marketization reform advocated by FDI has positive effects on economic progress of developing countries. Especially for China, the introduction of FDI creates better internal economic environment for China's domestic economy. It brings huge upgrade and change to China's industrial structure and economic structure. Finally, it cannot be denied that FDI brings negative economic effects on behindhand developing countries. In Africa, since economy lacks sound and stable foundation, laws, regulations, political and social environment, the attraction for foreign investment is not large when FDI-related policies are implemented. FDI capital inflow results in trade monopoly of transnational enterprises described above. This obviously goes against development and progress of economy of African countries.

Empirical analysis of FDI and economic growth of China and Brazil

China and Brazil are two developing countries which attract most FDI in the world. The increase in their import and export competitiveness will depend on the influence of FDI. Thus, this paper carries out empirical analysis of interactions between FDI attraction and economic growth of two countries.

Import and export relationship between FDI and China & Brazil

Export

To study interactions of China and Brazil in terms of FDI and export trade, the relational model between export and FDI will be established first[1].

$$X_t = a + \beta FDI_t + \mu$$

In the formula, X_t represents total volume of export trade within the tth year, so FDI_t is total amount of FDI at the tth year; a represents FDI-based undetermined coefficient, while μ represents random disturbance item. This paper chooses the data from 1990 to 2014 for regression analysis. They come from world financial institutions in China and Brazil and UNCTAD, as shown in Table 1.

Table 1. Relationship between FDIt of China and Brazil and export trade volume

Name	Variable	China	Brazil
Model	FDIt correlation coefficient	0.800	0.695
	t value	9.630	5.561
	R2 adjustment	0.800	0.486
	F value	94.840	21.825

It can be seen from the results that, FDI_t models of two countries pass significance testing. R^2 values of both countries exceed 0.2, and their t values are greater than the standard value. This indicates FDI introduction can significantly improve explanatory variables of economy o two countries. Overall 90% confidence coefficient can indicate that linear relation of this model will influence changes in explanatory variables. Hence, it is convictive to explain economic problems of two countries according to dependent variables in the model. Thus, the data in Table 1 can be used to judge China is stronger than Brazil in terms of relevancy of FDI for export of two countries. Their correlation coefficients are as follows: China 0.800, Brazil 0.695.

Import

Similarly, to refer to the influence of FDI on import trade, the mode for FDI and export trade is established as follows:

$$\ln M_t = b_0 + b_1 \ln FDI_t + V$$

Where, b_0 and b_1 are basic import trade parameters; v represents random disturbance item; M_t represents total import volume of both countries in the tth year; FDI_t represents FDI limit of both countries in the tth year. Similarly, the data from 1990 to 2014 are used for regression analysis. The data come from financial institutions in China and Brazil and UNCTAD, as shown in Table 2.

Table 2. Relationship between lnFDIt of China and Brazil and import trade volume

Name	Variable	China	Brazil
Model	lnFDIt correlation coefficient	0.930	0.895
	t value	12.630	9.561
	R2 adjustment	0.877	0.786
	F value	158.430	78.593

Similarly, China and Brazil pass significance testing of models and independent variables. Their F values exceed 4.50. R^2 values of both countries exceed 0.2, and their t values are greater than the standard value. Besides, overall 90% confidence coefficient can indicate that linear relation of the model has significant explanatory variables. Hence, it is convictive to explain economic problems of two countries according to dependent variables in the model. Thus, the data in Table 2 can be used to judge China is stronger than Brazil in terms of relevancy of FDI for export of two countries. Their correlation coefficients are as follows: China 0.930, Brazil 0.895[2].

(II) Empirical analysis of interactions between FDI of China and Brazil and economy growth

Seeing from data investigation, China's FDI abstraction ability is strong, and exceeds Brazil. From 1986, China keeps this leading superiority till now. Based on overall analysis, the amount of world FDI inflow into China and Brazil is the most. It is known through comparing the data from 2010 to 2013, FDI flowing into Brazil amounts to 1/4 of China.

In this paper, we investigate their FDI interdependency according to GDP of the two countries. From 1990 to 1997, annual average value of China's FDI interdependency was 0.383%, while annual average value of Brazil's FDI interdependency reached 0.892%. Brazil's FDI interdependency is 2.5 times higher than China. In 2005, China's FDI interdependency rose to 4.22%, while Brazil's FDI interdependency was 2.01%. At this time, China far surpassed Brazil. The period of 2005 and 2010 is Brazil's economic rising period. Within this period, Brazil's FDI interdependency rose to 5.29%, while China's FDI interdependency was 4.83%. This period is also the period when Brazil seriously depended on FDI.

Correlation between FDI of China and Brazil and economic growth

To accurately analyze correlation between FDI of China and Brazil and economic growth, this paper especially adopts linear regression for modeling. Then, least square method and SPSS calculation software are used to conclude the relationship between economic growth and FDI.

Firstly, GDP of both countries serve as independent variables, while FDI presents in the form of dependent variables. Total regression theory is applied to judge that, China's GDP plays a great role on FDI attraction. Brazil's GDP has small effects on FDI attraction. The above relationship is mainly judged according to the following model.

$$FDI = \alpha_1 + \alpha_2 GDP + \varepsilon$$
$$FDI = \alpha_3 + \alpha_4 GDP + \varepsilon$$

Where, ε represents random error value; α_1、α_2 represent China's import and export trade volume; α_3、α_4 represent Brazil's import and export trade volume. GDP can reflect macro-economic development state of both countries. With the rise in GDP, national economic development state tends to be fine. So, the above formula can be used to scientifically judge national economic development is a key factor attracting FDI amount.

The function and influence of FDI absorbing ability of China and brazil and economic growth are analyzed through modeling:

$$g = a_0 + a_1 ef + \varepsilon$$

Where, ef represents national FDI absorbing ability. Its specific definition is the product between the proportion of FDI and national fixed capital and the proportion of labor force receiving medium and higher education. This formula exactly reflects interactions between FDI absorbing ability and

human capital. It is just such relationship that promotes national economic growth. g represents natural logarithm of per-capita GDP and can be understood as national economic growth coefficient. Regression analysis of the relationship between FDI and economic growth is carried out according to the data from 1990 to 2014, as shown in Table 3.

Table 3. Data sheet of interactions between FDI absorbing ability of China and Brazil and economic growth

Name	Variable	China	Brazil
Model	Ef	0.363	0.087
	t	2.850	0.153
	fdi/afc	0.621	0.382
	t	4.929	0.683
	Constant	5.382	7.321
	Adjusted R2	0.811	0.138
	F	30.123	2.920

The model is established again based on functions of FDI absorbing ability of China and Brazil:

$$g = a_0 + a_1 ef + a_2 fdi / afc + \varepsilon$$

In the formula, new data afc shows formation of national fixed capital, while fdi/afc shows the proportion of FDI and national fixed capital. FDI appears as a proxy variable.

According to the data in the table, $R^2 = kF/\{(n-k-1)+kF\}$ is applied to calculate standard value of R^2, i.e. 0.284. When $R^2 \geq 0.284$, linear relation of the above model is significant and the probability should exceed 90%. At this moment, the change in FDI as a proxy variable is obvious.

For Brazil, $R^2 = 0.138 < 0.284$, the inspection is not qualified. This indicates the linear model relationship between Brazil's FDI and economic growth is not very significant. China's $R^2 = 0.811 > 0.284$ passes the test. So, interactions of China's FDI absorbing ability and economic growth are stronger than Brazil. On the whole, although Brazil and China are developing countries in economic transformation period, higher human capital means stronger ability to absorb new technology according to the above model. In this aspect, China is far stronger than Brazil. In terms of FDI promotion effect on economic growth, China is stronger than Brazil. Functions of FDI show imbalance. This means absorbing ability of FDI host country also decides whether the country owns sufficient overflow effect to gain FDI. A series of reasoning proves that China's absorbing ability is better than Brazil. This also shows interactions between China's FDI and economic growth are more significant[3].

Conclusions

This paper contrasts interactions of China and Brazil in FDI absorbing ability and economic growth and proves China is stringer than Brazil in terms of FDI absorption. From this research, we find to make national FDI reach national economic growth, the following must be done. Firstly, FDI host country should own the attraction for foreign investors. Secondly, the host country should own the conductivity of motivating FDI effect in micro-economic and micro-economic development. Developing countries should make efforts to ensure the above two points in order to ensure sufficient FDI positive effect and promote economic development.

Acknowledgments

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