

Comparative Study on Determinants of FDI in BRICS

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Abstract. In recent years, the economy of BRICS had developed rapidly, the growth rate of GDP had exceeded the world level, the business scale had gradually extend and foreign direct investment (hereafter referred to as FDI) inflows amount has increased. The economy of BRICS played an important role in the world economy. All the BRICS nations are developing countries with a large scale of population and labor resources. They have abundant natural resources and there have a bigger demand of domestic market. Thus they are the first choice for foreign direct investment. The paper uses empirical research method, employs panel data to analyze the effected factors of FDI inflows of BRICS countries from the period 1996 to 2013 and make comparison of five BRICS countries. The results indicate that there is a positive effect on market scale of FDI inflows of BRICS countries towards to the whole BRICS; the exchange rate have a negative effect on FDI of BRICS; the infrastructure construction have no effect on FDI inflows of BRICS countries. Separately for five BRICS countries, FDI inflows of Brazil, Russia, India, South Africa and China are positively affected by each country's national market scale; the exchange rate of Russia make a negative effect on FDI; the infrastructure construction of India have a negative effect on FDI and the infrastructure construction of South Africa have a positive effect on FDI.

Introduction

The major trend of the current world economy is the internationalization. With the closing cooperation, world FDI grow rapidly. FDI could not only optimize the allocation of resources on an international scale, but also improve the productivity and increase the growth of global economy, especially for the developing countries and regions, and also create more job opportunities and promote the development of import and export. As one of most important emerging economies, FDI of BRICS countries have attracted a lot of attention throughout the world. In the recent years, Brazil, Russia, India, South Africa and China had increasingly enlarged the scale of FDI and occupied vital positions in the absorption of international FDI.

In the past few years, the overall growth rate of GDP of five 'BRICS' countries are incredible and possess a huge market space. Brazil and South Africa own abundant natural resources. Known as the 'Golden State', South Africa embraced a high reserved content of gold and mineral. Located in the main economic route of Africa, infrastructure construction of South Africa are more perfect than the others'. Ranking in the tenth largest economy in the world, Russia has a strong background of national and economic power. As for India and China, both of them have a larger market scale and a stable growth of economy and run ahead of the other countries in Aerospace and software engineering industries. Due to the large population, GDP per capita of BRICS countries still fall behind the other developing countries and regions. BRICS countries used their advantages in labor cost, natural resources and general trend of rise in international market prices of raw materials, attracted many foreign merchant to invest directly in BRICS and made a bright development prospects.

With similar national conditions and international status, this paper studied the factors which could affect FDI of BRICS, and showed practical significance in policies making about FDI of BRICS.

Hypothesis

The movement of one country's FDI might be effected by this country's market scale, the bigger the market scale, the larger the demand scale and the more the projects are invested and there would have a corresponding increase in the investment space and investment profit. Proposed by J. Dunnin (1997), the eclectic theory was that a country that was invested by foreign investor, the well location advantage in the investment environment would be its own superiority. Forming location advantage including labor cost, market potential, trade barriers and government policies, the bigger the market scale, the bigger the market potential thus the host country would have enough development scale for foreign enterprises. Therefore we built first hypothesis.

Hypothesis 1. The market scale of BRICS has positive effect on FDI inflow.

The movement of FDI inflows might be effected by this country's exchange rate. Proposed by Cushman(1985), the relative wealth effect theory was that the depreciation of a country's currency would bring down the domestic production cost comparing with abroad especially the labor cost and this reduction would improve the relative competitive advantage of host country , thereby improve FDI inflows. Therefore we built the second hypothesis.

Hypothesis 2. The exchange rate has positive effect on FDI inflow of BRICS countries.

The higher the perfection degree of one country's infrastructure construction, the better the investment environment of itself. Be able to save the upfront costs of FDI, it will be easier to attract FDI. However some scholars thought there were no significant relationships between infrastructure construction and FDI, thereby we would explore whether there had a correlation between them at the empirical part. The third hypothesis was proposed.

Hypothesis 3. The infrastructure construction factor has positive effect on FDI inflow of BRICS.

Model and Data

This paper made reference to the model which was employed by Cong Wei(2012) in research on the comparative study between FDI introduced by BRICS and international trade. Combining with the specific circumstances of BRICS, introducing the panel data of FDI inflows of BRICS, nominal data of GDP, real effective exchange rate and the data of infrastructure construction of BRICS during the period from 1996 to 2013, using unit root test, co-integration analysis, fixed effect variable intercept model and individual variable coefficient fixed effects model to study the correlation of FDI inflows of BRICS and the influence factors of FDI in BRICS.

$$\ln FDI_{it} = \alpha + \beta \ln GDP_{it} + \gamma \ln REER_{it} + \delta \ln INF_{it}$$

$$i = 1, 2, 3, 4, 5 ; t = 1996, 1997, \dots, 2013$$

i respectively represent the BRICS countries including Brazil, Russia, India, China, South Africa; t respectively represent the hands of samples' time.

FDI represented the real FDI inflows of i BRICS country from 1996 to 2013. The market scale measured by GDP of i country to represent i BRICS country' s market scale. REER measured by real effective exchange rate of i BRICS country during 1996 to 2013 to represent the exchange rate of the BRICS. INF measured by the overall railway route kilometrage to represent the level of infrastructure construction of the BRICS.

And after conducting unit root test, at the 5% significance level which included intercept and trend items, LNFDI and LNREER had past LLC Test, Breitung Test, IPS Test, Fisher-ADF Test and Fisher-PP Test respectively; at the 5% significance level which included intercept items without trend items, LNGDP and LNINF past LLC Test, IPST Test, Fisher-ADF Test and Fisher-PP Test respectively. Thus all variables are first order stationary and we could conduct co-integration test on four variables.

Empirical Results

Based on the panel model built above, Table 4 and 5 shows the regression results of BRICS and the influence factors of BRICS:

As for the overall BRICS, the market scale and FDI presented a positive relationship; we could confirm the first hypothesis. elasticity of FDI inflows and market scale is 1.501 which means the increase of 1% of market scale of BRICS would lead to the increase of FDI inflows of BRICS to 1.5%. For BRICS, the bigger the market scale, the greater the amounts and items of market demands which could absorb the foreign investors. And there would have more space, profits and opportunities for the foreign investment in BRICS. Thereby the foreign investors are more likely to invest in such economic entity with bigger market scale.

For attracting factors of FDI of overall BRICS, real effective exchange rate plays a significant negative role, which could confirm the second hypothesis. 1% descent of the BRICS' s real effective exchange rate would bring the increase of FDI for 0.01%. Relative to the foreign production cost, the depreciation of the BRICS' s currency would lower the labor and other resources' cost. Thus the depreciation of BRICS' s currency would have a limited promotion at FDI inflows.

TABLE I. RESULTS OF VARYING-INTERCEPT FIXED EFFECTS REGRESSION MODEL

Variable	Coef.	Std. Error	t-Statistic	Prob.
C	-5.438	2.148	-2.531	0.013
LNGDP	1.501	0.131	11.37	0.000
REER	-0.012	0.006	-1.914	0.059
LNINF	-0.174	0.209	-0.835	0.406
R-squared	0.892		Mean	5.052
Adjusted R-squared	0.882		S.D.	1.567
S.E.	0.536		AIC	1.676
Log likelihood	-67.445		SC	1.898
F-statistic	96.926		H-Q.	1.766
Prob(F-statistic)	0.000		D-W	1.732

Note: The method of estimation is Varying-Intercept Fixed Effects Regression Model and the software for calculation is E-VIEWS8.0.

Infrastructure construction has no significant effect on the FDI of whole BRICS countries, which Wu Xianhua and Hu Hanhui(2005) had similar conclusion. The foreign investors pay more attention on the market potential and the economic development (Park Sun Tian 2004), which brought less consideration on the level of infrastructure construction.

Table2 indicates that as for FDI inflows of Brazil, Russia, India, China, South Africa, the market scale factor have significantly positive relationships. 1% increase of market scale of Brazil' s would bring up FDI for 1.9%; 1% increase of market scale in Russia' s would bring up FDI for 2.6%; India would bring up FDI for 2.2%; China would bring up FDI for 1.2%; South Africa would bring up FDI for 1.2%. Comparing with Russia, India and Brazil, the elasticities of market scale of China and South Africa are lower. Among five BRICS countries, the market scale of China rank in the first place and the market scale of India rank in the fifth place which might be the reason why their market scale has less effect on FDI, compared with the middle market scale.

The exchange rate had significant effect on FDI inflow in Russia. 1% decrease of real effective exchange rate of Russia would bring up FDI for 0.05%. In other words, the depreciation would promote FDI inflows of Russia.

And the infrastructure construction had significant effect on India and South Africa. The lower the infrastructure construction in India, the higher FDI inflow in India. The national territorial area of India ranking 7th in world but the railway transport is rather underdeveloped, and the coverage and carrying capacity of railway are quite limited. Along with the heavy population in India, the per capita of infrastructure construction are very weak comparing with the other countries. Based on this, many foreign investors have their eyes on the larger profit margin and development opportunities in

Indian infrastructure construction. And the India government also provide the preferential policies on FDI in infrastructure construction including railway, light rail, harbor, airport, highway, oil and gas pipeline, shipping, telecom, electricity generation and transmission.

TABLE II. RESULT OF INDIVIDUAL VARIABLE COEFFICIENT FIXED EFFECT MODEL REGRESSION

Variable	Coef.	S. E	t	Prob.
C	66.106	55.002	1.201	0.233
BRAZIL--LNGDP	1.965**	0.841	2.335	0.022
RUSSIA--LNGDP	2.647***	0.577	4.581	0.000
INDIA--LNGDP	2.176***	0.415	5.233	0.000
CHINA--LNGDP	1.188**	0.565	2.102	0.0391
SA--LNGDP	1.163***	0.255	4.544	0.0000
BRAZIL--REER	-0.032	0.025	-1.293	0.200
RUSSIA--REER	-0.045*	0.024	-1.853	0.068
INDIA--REER	0.023	0.035	0.654	0.515
CHINA--REER	-0.009	0.020	-0.493	0.623
SA--REER	-0.012	0.014	-0.838	0.404
BRAZIL--LNINF	-0.430	0.419	-1.026	0.308
RUSSIA--LNINF	2.745	5.693	0.482	0.631
INDIA--LNINF	-40.695*	23.398	-1.739	0.086
CHINA--LNINF	-1.358	7.040	-0.192	0.847
SOUTHAFRICA--LNINF	5.702***	2.030	2.807	0.006
Fixed Effects (Cross)				
BRAZIL--C	-71.755			
RUSSIA--C	-112.098			
INDIA--C	366.66			
CHINA--C	-55.324			
SOUTHAFRICA--C	-127.48			
R-squared	0.930	Mean		5.052
Adjusted R-squared	0.911	S.D.		1.567
S.E. of regression	0.465	AIC		1.501
Log likelihood	-47.5	SC		2.056
F-statistic	49.47	H-Q.		1.725
Prob(F-statistic)	0.000	D-W		2.552

Notes: The method of estimation is Individual variable coefficient fixed effect model and the software for calculation is E-VIEWS8.0.

As for South Africa, 1% increase of infrastructure construction would bring up FDI for 5.7%. South Africa owns modern transportation system and the most perfect traffic and transportation system. This transportation system in South Africa not only has important function on domestic economic development but the lifeline of the other countries' economic development as well. In 2012 the South Africa government pushed out national infrastructure planning item to attract FDI. Infrastructure construction has been a vital factor which influences FDI of South Africa.

Conclusions

This paper used empirical research to describe and analyze the macro economy factors impact on FDI of BRICS countries. The results show the general FDI of all BRICS countries were effected by their domestic market scale. The bigger the market scale, the more FDI inflows. FDI inflows in Russia was mainly effected by the exchange rate. The infrastructure construction would influence FDI of India and South Africa significantly.

The conclusion of empirical part might bring some political implications to the BRICS. The market scale have important effect on FDI inflows of five countries, in order to keep the economic growth stably and maintain FDI rising steadily, the country could focus on the improvement on domestic investment environment, enlarge the market scale, improve the market potential of the BRICS and expand domestic demand. As for exchange rate, it has significant impact on FDI of Russia. Thereby Russia should keep the steadibility of Rouble to attract FDI. FDI inflows of South Africa and India are effected by each infrastructure construction and there have negative influence in

India because of its weak infrastructure construction. India should insist on policies about railway, light rail, harbor, airport, highway, oil and gas pipeline, shipping, telecom, electricity generation and transmission where the areas are permitted foreign investors to invest and put the railway construction into the investment area, make it easier for FDI, reduce tax in order to establish the encouragement policies on FDI. This policy would attract FDI by the weak part of the domestic infrastructure construction. On the contrary, the infrastructure construction in South Africa is comparatively perfect, owned the highest level of infrastructure construction in Africa, we suggest South Africa to reinforce the infrastructure construction and make good use of the geographical advantage and infrastructure construction advantage, get full use of the leading function of Africa and attract FDI inflows of South Africa all over the world. Thereby we can see the great demand for the BRICS Bank to play a role to steady the currency and to provide investment to improve the infrastructure construction in BRICS.

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