What Derives Foreign Direct Investment Inflows; Evidence from a Panel Analysis of BRICS Countries?

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Abstract: The aim of this study is to investigate the variables that derive foreign direct investment in BRICS countries. Recent past studies have shown mixed results which make further study on this subject matter imperative. Data was collected from the United Nations Conference on Trade and Development and World Bank Indicator from 1990– 2017 and the study employed various Panel Data Techniques such as Fixed Effects Model, Random Effects Model, Hausman Test and Panel Fully Modified Least Squares. The findings that emerged in this study established the active variables that derive inflows of FDI in BRICS countries as gross domestic product per capita and the standard of living of people in these countries. Whereas market size was discovered to be a passive variable that propels FDI inflows in the BRICS economic region. Based on these findings the study recommends as follows: firstly, the policy makers in BRICS countries should embark on further policy measures that will ensure the continuous improvement of living standard of people in one hand and expansion of gross domestic product per capita growth on the other hand. In addition, more policies and stable political goodwill should be embarked upon towards making local market attractive to foreign investors in these countries.

Keywords: FDI; Active Variable; Passive Variable; Panel Analysis and BRICS Countries

JEL Classification: F21; F23; F36

1. Introduction

In the last two decades, foreign direct investment inflows have been skewed among the developing countries. The industrial revolution and aggressiveness in economic management orchestrated the advent of some newly emerging economies Brazil, Russia, India, China and South Africa. In 2001, Jim O'Neill tagged these economies

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BRIC block with the inclusion of South Africa in 2010, which metamorphosed the acronyms to BRICS Economic Block.

Consequently, these countries have positioned themselves to be a paramount heart of this contemporary globalized world, and the unique factors that distinguish these economies from any other emerging countries are the capacity they possess to influence and to be influenced by the world economy (O'Neill, et. al., 2005). These countries have been the major destination of FDI inflows in the recent time. Brazil, Russia, India and China were among the top FDI inflows recipient in 2016. China was the second highest FDI inflows destination after USA in 2017. (UNCTADstat, 2018).

However, apart from the huge domestic market possessed by these countries, the sporadic rate at which their economies are growing in the last decade has created a vantage position for the BRICS economies to be the destination of multinational manufacturing companies in the world.

Meanwhile, the critical roles in which these newly emerging economies are playing in global FDI inflows and outflows have sparked off debate among the scholars and the policy makers about the aftermath effects of FDI inflows on economic growth of BRICS countries. See Ceyhun (2016), Gaurav (2015). However, there have been few attempts to establish the motivating factors behind the current flow of FDI into BRICS economies in the literature in the recent time. Also, economic structures of these countries are very complex which have made them to be subjected to several factors like competitiveness of the business environment, low labour cost, domestic market size, infrastructure, gross capital formation, governance efficiency and regulatory quality openness to trade, and rule of law. It is expedient to state here that the literature has shown divergent views about these factors. See Jadhav (2012), Nonnenberg and Mendonca (2004), Sahoo (2006), Jadhav and Katti (2012) and Vijayakumar et al. (2010), which invariably connotes the inconclusiveness of the literature about the subject matter of this paper. Hence, the relevance of this study.

This paper is arranged in the following ways: section 1 presents the background information about the study, and section 2 provides the theoretical and empirical review of literature relating to the factors that derive FDI inflows in BRICS countries in particular and developing countries as a whole. Consequently, section 3 discusses the potential relevant variables that are expected to attract FDI inflows in the BRICS economies. Data and model specification are also provided in this section alongside with empirical results, summary, conclusion and policy recommendation.

1.1. Literature Review

In this section an attempt has been made to provide the account of recent past studies on factors that derived FDI inflows in BRICS countries in particular and developing/emerging economies in general.

Author(s)	Year	Study & Country	Methodology	Results & Conclusion
Gui-Diby	2014	Estimation of nexus between FDI and economic growth in 50 countries in Africa between 1980 and 1994.	GMM Technique	A negative relationship exists between FDI and economic growth over the period 1980-1994 but reverse was the case between 1995 and 2009. The positive impact in the latter period of the study was attributed to the significant improvement in the business environment and the multiplier effect of export on the economies
Vijayakumar et al.	2010	Estimation of the factors propelling FDI inflows in BRICS countries.	Panel Data Analysis	The paper concludes that the market size, labor cost, infrastructure, and gross capital formation are the significant positive variables that are propelling FDI inflows in BRICS countries, but trade openness and inflation are identified to be insignificant propelling factors.
Kyrkilis and Pantelidis	2003	Investigation of the key determinants of FDI inflows in both developing and developed countries	Quantitative Analysis	It was discovered that effective exchange rate, real GNP, and human capital are the key determinants of FDI flows in the countries under investigation by the researchers
Tiwari	2011	Estimation of the effectiveness of foreign aid, foreign direct investment, and economic freedom 28 economies in Asia	Econometrics Technique	It was concluded from the results of the study that a rise in the financial freedom, fiscal freedom and domestic capital stock are the significant factors that directly affect growth of the economy. Meanwhile, freedom from corruption, FDI inflows and foreign aid are identified as the significant factors that inversely affect economic growth
Mahmood et al.,)	2010	Examination of the relationship between economic freedom and economic growth in SAARC Member Countries	Econometrics Technique	The study discovers that government size has a negative correlation with growth, but financial, trade, investment, business, property rights, and freedom from corruption show a positive relationship with growth
Azman-Saini, Baharumshah , and Law	2010	Evaluation of the nexus between systemic, foreign direct investment, economic freedom and economic growth	Econometrics Technique	It could be established from the findings from the paper that foreign direct investment has an indirect positive effect on economic growth, but the impact of FDI is contingent on the level of economic freedom in

				the host economies. This implies that the countries with higher level of economic freedom get higher benefits from the inflows of cross border capital
Pearson et. al.	2012	Analysis of the link between economic freedom, state growth and FDI of fifty states in the United States of America	Panel Data Analysis	The authors discover that both economic freedom and growth rate of the each of the state have both positive and significant impact on the inflow of FDI
Janicki and Wunnava)	2004	Evaluation of the relationship between economic growth, political risk, trade openness, labor cost and FDI inflows in Central and Eastern European nations	Panel Data Analysis	It was discovered from the results of the study that economic growth, political risk, trade openness and labor cost are the major variables that caused FDI inflows to Central and Eastern European nations
Akinlo	2003	Investigation of the impact of FDI inflows in 12 African countries.	Panel Data Analysis	The author submits that the impact of FDI inflows is primarily felt by economic growth through accumulation of capital, as opposing to increasing productivity
Jadhav	2012	Investigation of institutional and political determinants of foreign direct investment in BRICS countries	Panel Data Analysis	The paper concludes that openness to trade, market size, and rule of law play strategic roles in attracting FDI to BRICS economies, but the availability of natural resources shows a negative effect. This connotes that the flows of FDI to BRICS countries is largely market-oriented
Jadhav and Katti	2012	Evaluation of the link between efficient governance, quality of regulatory and FDI inflow in BRICS economies.	Panel Data Analysis	It was discovered from the study that efficient governance and quality of regulatory show a direct impact on FDI inflow in BRICS economies. However, the reverse is the case for political instability, voice, accountability, and control of corruption.
Asiedu	2004	Investigation of the relationship between foreign direct investment, market size, government policy, the role of natural resources, institutions and political instability in Africa	Fixed Effect Panel Model	The paper concludes that infrastructural development, natural resources, human capital, market size, host countries' investment policies, reliability of legal system and stability of political climate propel FDI flows in Africa, meanwhile reverse is the case for corruption, political instability
Sahoo .	2006	Estimation of determination and impact of FDI inflows in South Asian countries	Panel Co-integration Test	The author submits that the market size, the growth of labour force, infrastructure index, and openness of economies are the main

				determinants of FDI inflows in South Asian countries
Saibu and Akinbobola	2014	Estimation of the nexus between globalization, FDI and economic growth in some selected Sub Saharan African countries	Vector Error Correction Modeling (VECM)	The author posits that trade liberalization has an insignificant effect on economic growth process of the SSA nations, and also the upsurge in the capital flows to African nations was not sufficient to insulate the African economies from the global economic shocks.
Lucas	1993	Investigation of factors that determine FDI inflows in some selected East and South Asian	Multiple Regression	The author argues that FDI inflows show higher degree of responsiveness to aggregate demand of exports than domestic exports, and similarly higher degree of responsiveness to interest rate than wages.

Source: Authors` Compilation (2019)

However, the empirical literature reviewed above shows that studies of FDI inflows in BRICS countries are limited and it is clear that there was no consensus yet regarding the variables that derive FDI inflows in these countries. Hence, the relevance of this study.

2. Methodology

This study makes use of secondary data from 1990 to 2017. The data on FDI are sourced from UNCTAD database published by World Bank. Meanwhile, data on market size, growth rate of the economy, growth per capita and per capita output are extracted from World Bank Development Indicator. E-Views software was employed for the running of the panel data.

2.1. Model Specification

FDI = F(MKTZ, GRT, GDP/CA, PCA/OP) ----------1

If model 1 is linearized to form model 2

$LnFDI_{it} = \propto_i + \beta 0 LnMKTZ_{it} + \beta 1 GDPGRT_{it} + \beta 2 GDP/CA_{it} + \beta 3 PCA/OP_{it} + \varepsilon_{it}$----------2

Where $LnGDP_{it}$ is log of real GDP to proxy the market size of economy, $LnFDI_{it}$ is log of FDI inflows, $GDPGRT_{it}$ is annual growth rate and GDP/CA_{it} is annual GDP per capita growth and PCA/OP connotes per capita output which measures the standard of living of people in the country and ε captures error term. Meanwhile, i= 1…5, t= 1990----------2017.

$\propto$ *is an intercept and* $\beta 1$, $\beta 2$ *and* $\beta 3$ *are slope parameters.*

By estimating model 2, it would give us the results of the variables that derive FDI inflows in BRICS countries, as evidenced from the panel analysis.

2.2. Estimation Technique

This study employs a panel data analysis which allows the control of variables that are unobservable or immeasurable. The fixed and random effects models were introduced to address the issue of heterogeneity in the estimation technique. It should be stressed that the fixed effects model assumes that the unobservable variables or country specific variables factored in the error term are correlated with the explanatory variables or regressors, whereas the random effects model assumes that the unobservable variables are not correlated with the explanatory variables or regressors. The Hausman test is adopted to test the validity of fixed or random effects in the study.

From the results to test for the heterogeneity effect of the panel models by the test statistics (Pr> $\chi 2$=0.000). This implies that the fixed effects model is the more appropriate model for the analysis of the study.

2.3. Results and Discussion

This study utilizes secondary data of BRICS countries from 1990 to 2017. Data on FDI were extracted from UNCTAD database published by World Bank. Meanwhile data on GDP and growth were sourced from World Bank Indicator.

Table 1. Descriptive Statistics of Annual Data Series (1990-2017)

Descriptive Statistics	LMKTZ	LFDI	GDP/CA	STD OF LIVING	GRT RATE
Mean	3.15E+13	7.12E+10	8.721429	2921.214	9.532143
Median	2.36E+13	5.71E+10	8.600000	1398.650	9.350000
Maximum	7.86E+13	1.36E+11	13.60000	8827.000	14.20000
Minimum	6.42E+09	3.49E+09	2.400000	317.9000	3.900000
Std. Deviation	2.25E+13	4.25E+10	2.429193	2840.364	2.444941
Skewness	0.639811	0.183548	-0.008820	0.890488	0.251021
Kurtosis	2.148039	1.708151	3.209016	2.243657	2.863887
Jargue-Bera	13.78575	10.52120	0.256659	21.83959	1.578336
Probability	0.001015	0.005192	0.879563	0.000018	0.454222
Sum	4.41E+15	9.97E+12	1221.000	408970.0	1334.500
Sum. Sq. Deviation	7.02E+28	2.51E+23	820.2357	1.12E+09	830.9054
Observation	140	140	140	140	140

Source: Authors` Computation (2019)

The descriptive statistics such as mean, median, minimum and maximum values; and the distribution of the sample measured by the skewness, kurtosis and Jaque-Bera statistics of the data are examined in this paper.

However, it is important to state that when the values of mean, mode and median are converged, this implies that the distribution of data is symmetrical. From the table

above, the values of mean and median are very close for the majority of the study which indicates that the distribution of data is nearly symmetrical.

Table 2. The variables that derive FDI inflows: Panel Data Estimation Results Based on Fixed Effects (FE) and Random Effects (RE) Models

Dependent variable: LFDI		
Variables	FE Estimation	RE Estimation
LMKTZ	0.0006* (1.9)	0.0021** (8.7)
GDP/CA	3.6110** (9.2)	7.4609** (9.2)
GRTRATE	-3.521** (9.1)	-7.511** (5.8)
STD OF LIVING	67796** (3.0)	-31871* (1.5)
Adj. R^2	0.96	0.97
Hausman test (prob> chi^2) 10.12 (0.138		

Source: Authors` Computation (2019)

a. The asterix ** indicates 5% level of significance, * indicates 10% level of significance b. *Figures in the parenthesis represent t- value*

c. A constant term is included but not reported

Table 3. Determinants of FDI Inflows: Panel Data Estimation Results Based on Panel Fully Modified Least Squares (FMOLS)

Repressors	Coefficient	t-statistics	P-value
LMKTZ	0.0003*	1.12	0.2631
GDP/CA	3.7000**	12.7	0.0000
GRTRATE	-3.5810**	12.4	0.0000
STD OF LIVING	87610**	5.11	0.0000
R-Squared	0.965934		
Adjusted R-Squared	0.963771		

Source: Authors` computation (2019)

*Notes: Figures in the parenthesis represent t- value, ** denote 5% percent level of significance & a constant term is included but not reported.*

In this study various variables such as the market size, GDP per capita growth, growth rate of economy and standard of living have been subjected to various tests in order to establish the factors that derive FDI inflows in BRICS countries.

Consequently, the result from the fixed effect model established that GDP per capita and standard of living are significant variables that derive FDI inflows in the BRICS country. However, the market size of these country though a contributory factor but not significant in propelling inflows of FDI in these economies. In another perspective, the finding from the random effect model submitted that the market size

and GDP per capita growth are the major variables that catalyzed the inflows of FDI in the BRICS countries in the last 2018.

In order to address the problem of heterogeneity associated with the panel data analysis, the estimated result of Hausman test favours adoption of the fixed effect model as the more appriopriate for this study. In the same vein, the results from the Panel Fully Modified Least Squares (FMOLS**)** corroborates that GDP per capita and standard of living are the principal variables that derive FDI inflows in the BRICS countries, while market size is not a significant variable, though contributory factor. This finding is in consonance with the result of the fixed effect model.

2.4. Conclusion and Recommendation

This study examined the potential variables that derive inflows of FDI in BRICS countries during the period of 1990 to 2017 with the aid of various panel analysis techniques. From the findings that originated from the study, it is paramount to establish the following about the factors that derive FDI inflows in BRICS countries. The study herby establishes among others, that there are two categories of the variables that derive FDI inflows in these economies, namely active variable and passive variable. The active variables that derive inflows of FDI in BRICS countries are gross domestic product per capita and the standard of living of people in these countries. Whereas market size was discovered to be a passive variable that propels FDI inflows in the BRICS economic region. Based on the findings that originated from this study, it is expedient that this paper makes the following recommendations. Firstly, the policy makers in BRICS countries should embark on further policy measures that will ensure the continuous improvement of living standard of people in one hand and expansion of gross domestic product per capita growth on the other hand. In addition, more policies and stable political goodwill should be embarked upon towards making local market attractive to foreign investors in these countries.

Reference

Akinlo, A.E. (2003). Foreign Direct Investment and Economic Growth in Sub-Saharan Africa. *RISEC; International Review of Economics and Business*, Vol. 50, no. 4, December, pp. 569-580.

Asiedu, E. (2004). Foreign direct investment in Africa: the role of natural resources, market size, government policy, institutions and political instability. *Working Paper Series*, University of Kansas.

Azman-Saini, W.N.; Baharumshah, A.Z. & Law, S.H. (2010). Foreign Direct Investment, Economic Freedom and Economic Growth: International Evidence. Economic Modelling, Vol. 27, no. 5, pp. 1079–1089.

Ceyhun, H. (2016). The Effect of Foreign Direct Investment and Economic Freedom on Economic Growth: The Case of BRICS Countries. *Research in World Economy*, Vol. 7, no. 1, pp. 1-12.

Gaurav, Agrawal (2015). Foreign Direct Investment and Economic Growth in BRICS Economies: A Panel Data Analysis. *Journal of Economics, Business and Management*, Vol. 3, no. 4. pp. 421-424.

Gui-Diby S.L. (2014). Impact of Foreign Direct Investment on Economic Growth in Africa: Evidence from three decades of panel data analyses. *Research in Economics*, Vol. 68, pp. 248-256.

Jadhav, P. (2012). Determinants of Foreign Direct Investments in BRICS Economies: Analysis of Economic, Institutional and Political Factors. *Procedia-Social and Behavioral Sciences*, Vol. 37, pp. 5-14.

Jadhav, P. & Katti, V. (2012). Institutional and Political Determinants of Foreign Direct Investment: Evidence from BRICS Economies. *Poverty & Public Policy*, Vol. 4, no. 3, pp. 49-57.

Janicki, H.P. & Wunnava, P.V. (2004). Determinants of Foreign Direct Investment: Empirical Evidence from EU Accession Candidates. *Applied Economics*, Vol. 36, no. 5, pp. 505-509.

.Kyrkilis, D. & Pantelidis, P. (2003). Macroeconomic Determinants of Outward Foreign Direct Investment. *International Journal of Social Economics*, Vol. 30, no. 7, pp. 827-836.

Mahmood, K.; Azid, T.; Chaudhry, I.S. & Faridi, M.Z. (2010). Impact of Economic Freedom on Economic Growth: The Case of Some Selected SAARC Member Countries. *International Research Journal of Finance and Economics*, Vol. 52, pp. 7-16.

Lucas, R. (1993). The Making of a Miracle. *Econometrica*, Vol. 61, no. 2, March; pp. 251-272.

Nonnenberg & Mendonça (2004). The Determinants of Direct Foreign Investment in Developing Countries. *IPEA Working Paper*.

O'Neill, J.; Wilson, A.; Purushothaman, V. & Stupnytska, N. (2005). How Solid Are The Brics? *Goldman Sachs Economic Research*, (134).

Pearson, D.; Nyonna D. & Kim, K.J. (2012). The Relationship between Economic Freedom, State Growth and Foreign Direct Investment in US States. International Journal of Economics and Finance, Vol. 4, no. 10, pp. 140-146.

Saibu, M. & Akinbobola, T. (2014). Globalization, Foreign Direct Investment and Economic Growth in Sub Saharan Africa. *Journal of Economics and International Finance*, Vol. 6, no. 3, pp. 62-68.

Sahoo, P. (2006). Foreign Direct Investment in South Asia: Policy, Trends, Impact and Determinants. *ADB Institute Discussion Paper*, no. 56.

Tiwari, A.K. (2011). Foreign Aid, FDI, Economic Freedom and Economic Growth in Asian Countries. *Global Economy Journal*, Vol. 11, no. 3, pp. 1–26.

UNCTAD (2018). World investment Report 2018 published by the United Nations on TradeandInvestmentavailableatunctad.orgDATA%20on%20FDI%20BRICS%201.htm.

Vijayakumar, N.; Sridharan, P. & Rao, K.C. (2010). Determinants of FDI in BRICS Countries: A Panel Analysis. *International Journal of Business Science and Applied Management*, Vol. 5, no. 3, pp. 1-13.