The interaction between FDI, host country characteristics and economic growth? A new panel evidence from BRICS

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Abstract

Purpose – This study aims to assess the impact of foreign direct investment (FDI) on growth in presence of host country characteristics, namely, economic stability, human capital, financial development and trade openness, in the fastest emerging Brazil, Russia, India, China, South Africa (BRICS) economies, considered to be significant FDI destinations.

Design/methodology/approach – The panel data for the variables under study, collected from World Investment Reports published by World Bank, are analyzed using feasible generalized least squares method to examine the relationship between the dependent and explanatory variables over the period 1987–2018. The interaction effect has been studied to examine the growth impact of FDI in presence of host country characteristics.

Findings – The findings revealed that FDI does not exert a significant impact on the economic growth of BRICS individually but has a significant growth impact only in presence of host country characteristics. FDI on interacting with financial development, trade openness and human capital exerts a positive impact on the economic growth of BRICS economies, and on interacting with economic instability (inflation), FDI has a negative impact on growth.

Practical implications – The study has implications for policy makers of BRICS countries who are suggested to work toward the development of financial markets, trade liberalization and human capital development to realize the positive growth impact of FDI.

Originality/value – Very few studies have been conducted to examine the growth effect of FDI in BRICS economies, which are considered to be the fastest-growing economies and dominant players in the global investment landscape. Assessing the interaction of FDI with absorptive capacities/host country characteristics to study its growth impact in BRICS using long data and robust panel data methodology is an original contribution of this paper toward the existing body of knowledge.

Keywords FDI, Economic growth, GDP, Host country characteristics, Panel data

Paper type Research paper

1. Introduction

It is widely believed among academicians, policy makers and international institutions that foreign direct investment (FDI) is beneficial for the economic development of host countries. According to the International Monetary Fund (IMF), FDI is defined as the investment involving a long-term relationship, which reflects a lasting interest of a resident entity (direct

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investor) in one economy in an entity that is resident in an economy other than that of the direct investor. According to Organization for Economic Cooperation and Development (OECD), the lasting interest is determined when the direct investor acquires a minimum of 10% voting power in another organization. Compared to the other forms of capital inflows, the inward FDI is considered to be superior in stimulating growth of a country. FDI is a less volatile form of capital and is not only restricted to international capital movement but also encompasses the international movement of such important elements as managerial skill, technological know-how and processes. Given the belief that FDI leads to economic development of the host country, besides producing externalities in the form of technology transfer and spillovers, many countries offered significant incentives like tax holidays and subsidies to foreign investors to attract FDI flows (Alfaro *et al.*, 2009).

The theoretical assumption that FDI promotes growth has been tested by many empirical researchers from time to time using different samples and research methods. While several macroeconomic studies reveal a positive impact of FDI on growth (Hansen and Rand, 2006; Yao, 2006; Tiwari and Mutascu, 2011; Bouchoucha and Ali, 2019), others find a negative effect of FDI on the economic growth of host economy (Mencinger, 2003; Herzer, 2012). Moreover, an important strand of international economics literature emphasizes the importance of host country characteristics in realizing the growth benefits of FDI. Some significant empirical studies have proven that FDI does not have an independent influence on economic growth but affects growth only in presence of host country characteristics, which are known as the absorptive capacities possessed by countries to benefit from FDI inflows (Borensztein *et al.*, 1998; Carkovic and Levine, 2002; Cao and Jariyapan, 2012). Against this backdrop, the present study makes an attempt to study the impact of FDI on growth in presence of important characteristics present in host economy like economic stability, financial development, human capital and trade openness. Our study focusses on the fastest growing Brazil, Russia, India, China, South Africa (BRICS) economies; these countries have attracted significant FDI flows having received 15% of the total global FDI flows in 2015 according to United Nations Conference on Trade and Development (UNCTAD) report (UNCTAD, 2016). The BRICS countries have offered significant benefits from time to time to the foreign investors like availability of cheap labor, presence of natural resources and huge markets. According to UNCTAD database, the FDI inflows have witnessed a sharp rise from US$3,032m in 1985 to US$258,941m in the year 2018. As per the UNCTAD Handbook of Statistics, BRIC countries were found to be the top 20 host economies for attracting FDI flows in 2017 (UNCTAD, 2018). BRICS economies being notable FDI destinations make it an interesting case to study the impact of such FDI inflows on growth. A few studies (Agrawal, 2015; Hayrdaroglu, 2016) have assessed the growth impact of FDI in BRICS; however, the question is yet to be fully addressed in these studies as the focus has been mainly on the impact of FDI on growth, whereas the significant question of impact of FDI on growth in presence of the host country characteristics has not been addressed. We aim to address this gap in the present study, which has significant policy implications with regard to important decisions like maintenance of economic stability, human capital development, development of financial markets and trade liberalization.

2. Review of literature

Theoretically, FDI is believed to impact the growth of economy mainly through capital accumulation and also by bringing modern technologies and new processes to the host economy. To empirically test these theoretical assumptions, the neoclassical and endogenous growth models have been used from time to time, which have yielded varying results, the reason for which could be different estimation methods, sample selected and varied time

periods chosen for these studies. The growth literature in this direction is dominated by the mixed evidence regarding the FDI–growth nexus.

Many empirical studies focused on the FDI–growth relationship have found a positive impact of FDI on the growth of host country. Dunning and Narula (1996) studied the relationship between FDI and economic growth revealing that FDI exerts a positive impact on growth by transferring new technology and capital to the host economy. Hansen and Rand (2006) assessed the FDI–growth nexus in a set of 31 developing economies, and the results revealed a long-run impact of FDI inflows on the economic growth of host country. Cakerri *et al.* (2020) also found a long-run relationship between FDI and economic growth. Mowlaei and Intezar (2021) studied the FDI–growth relationship in a set of 30 Islamic countries and found a positive impact of FDI on economic growth. Several other researchers also found a significant positive growth impact of FDI (see, e.g. Ram and Zhang, 2002; Yao, 2006; Tiwari and Mutascu, 2011; Bouchoucha and Ali, 2019). However, some studies have found an insignificant impact of FDI on growth, e.g. Ledyaeva and Linden (2006) and Gunby *et al.* (2017) found that FDI is not a significant contributor of growth in Russia and China, respectively. Lian and Ma (2013) also found an insignificant growth impact of FDI in the western region of China. Similar results have been found by Shahzad *et al.* (2019) in case of the Brazilian economy. Another group of studies revealed a negative growth effect of FDI in the host countries (Dutt, 1997; Mencinger, 2003; Herzer, 2012).

An important strand of literature supports the view that the growth enhancing effect of FDI is conditional upon the characteristics prevalent in the host economy. These host country characteristics serve as the absorptive capacities for the host economy to reap the benefit of FDI inflows. Borensztein *et al.* (1998) conducted a study to find out whether FDI affects the growth on interacting with human capital; the results revealed that the growth impact of FDI depends on the human capital present in the host economy. Balasubramanyam and Mahambare (2003) suggested that FDI produces significant technology spillovers and argued that the growth-enhancing impact of FDI is contingent upon the level of human capital present in the host country. Carkovic and Levine (2002) examined the FDI–growth nexus in developing economies using a long data for 35 years. The favorable policy environment promotes both economic growth and FDI; however, the results supported the view that FDI does not exert an independent effect on growth of the receiving (host) country. Durham (2004) revealed that there is no significant correlation between FDI and growth, suggesting that there is a requirement of absorptive capacity, and thus, the economies with better human capital can realize better the benefits of FDI. Li and Liu (2005) also found that human capital is significant for the growth enhancing impact of FDI by interacting FDI with human capital present in the host country. Similar results have been found by Alfaro and Charlton (2007) and Cao and Jariyapan (2012). The other host country characteristics like economic stability, financial development and trade openness are also important in this regard as revealed by several empirical studies conducted in this direction. It is widely believed that macroeconomic stability is favorable for a country's economic growth. Inflation, which is used as a proxy for macroeconomic instability, is adverse for the growth of a country. Mehic *et al.* (2013) studied the FDI–growth linkages in European countries and found economic stability as one of the important determinants of economic growth of a country. Jallab *et al.* (2008), while examining the effect of FDI on economic growth in Middle East and North Africa (MENA) countries, found that the growth enhancing effect of FDI is not independent but depends on the economic stability present in MENA countries. Bengoa and Sanchez-Robles (2003) found a positive nexus between FDI and growth; however, it is important for the FDI-receiving (host) country to possess a minimum level of macroeconomic stability, human capital and trade liberalization for realizing the long-term growth benefits of FDI. Similar results have been found by Prüfer and Tondl (2008), Alguacil *et al.* (2011) and Abdelmalki *et al.* (2012).

Another important host country characteristic that plays an important role in the growth impact of FDI is financial development. The well-developed financial markets promote the

economic growth of a country because of efficient allocation of capital and decrease in the transaction costs (King and Levine, 1993a, b; Beck *et al.*, 2000). Alfaro and Charlton (2007) revealed that in OECD countries, FDI does not have an independent impact on the economic growth but affects growth through development of financial markets and human capital. Kelly (2016) assessed the causal nexus between FDI and growth in Africa and found absence of co-integration between FDI and growth. However, the findings suggested that there is a long-run relationship between FDI and growth only in those countries that have developed financial systems. Hermes and Lensink (2003) assessed the FDI–growth linkages in least developed countries and found that FDI exerts a positive impact on growth of those countries that have well-developed financial markets. Some other researchers also found that financial development exerts a significant positive influence on the FDI–growth nexus (Alfaro *et al.*, 2004, 2009; Alfaro and Chauvin, 2020).

Trade openness has also been regarded as an important host country characteristic in the literature focused on the relationship between FDI and growth. Cinar and Nulambeh (2018) examined the linkages between FDI, trade openness, inflation and economic growth in Africa and found that FDI and trade openness exert a positive impact on growth but inflation shows a negative impact. Khamphengvong and Srithilat (2017) revealed that FDI and trade openness show a positive impact on economic growth in the long run. Nair-Reichert and Weinhold (2001) while interacting FDI with trade openness revealed that the FDI–growth relationship is heterogeneous across countries, with some evidence that FDI promotes growth more in open economies. Sakyi *et al.* (2015) studied the relationship between FDI, trade openness and growth in Ghana using the autoregressive distributed lag (ARDL) bounds testing approach to co-integration and found that FDI on interaction with trade openness promotes the economic growth significantly. Balasubramanyam *et al.* (1996) found that the positive effect of FDI on growth is more pronounced for countries following an export promotion policy regime rather than those following an import-substitution policy, thereby lending support to the popular Bhagwati hypothesis. Similar results were found by Kohpaiboon (2003) and Atique *et al.* (2004) while using an interaction term between FDI and trade openness to study its impact on economic growth.

It can be synthesized from the above literature that the host country characteristics, namely, human capital, economic stability, financial development and trade openness play a significant role in the FDI–growth relationship.

3. Model, data and methodology

The study aims at assessing the impact of FDI on growth in presence of host country characteristics in BRICS countries covering a time period of 32 years from 1987–2018. To specify our model, we start by following the basic Cobb–Douglas production function, which assumes that the output is mainly determined by two inputs in the form of capital and labor as follows:

$$Y = f(K, L) \tag{1}$$

where Y denotes the gross domestic product (GDP) growth, K specifies the gross capital formation (GCF) or domestic investment and L denotes labor.

Following the contributions of Barro and Sala-i-Martin (1995) and Levine and Renelt (1992), among others, to the development of new growth theory, we extend the above growth equation (1) to include more variables, namely, FDI inflows, macroeconomic stability (proxied by inflation), human capital (proxied by gross enrolment ratio), financial development (proxied by liquid liabilities) and trade openness, that contribute to the economic growth of a country based on the review of literature conducted in the previous section. We have also used interaction terms between FDI and the select macroeconomic variables to assess

whether FDI on interacting with these variables exerts a significant impact on economic growth or not.

After inclusion of these variables in addition to capital (K) and labor (L), the model is specified as under:

$$Y = f(K, L, FDI, INF, LL, HC, TO, FDI*INF, FDI*LL, FDI*HC, FDI*TO) \quad (2)$$

where FDI denotes foreign direct investment inflows, INF is inflation, LL indicates liquid liabilities, HC is human capital and TO means trade openness. FDITO is the interaction term between FDI and trade openness, FDIINF is the interaction term between FDI and inflation, FDIHC is the interaction term between FDI and human capital, and FDILL is the interaction term between FDI and liquid liabilities.

The annual data on economic growth (GDP growth), gross capital formation, labor, FDI (net FDI inflows), macroeconomic stability, human capital, financial development and trade openness have been collected from the World Investment Reports published by UNCTAD and World Bank (World Bank, 2019a). The World Investment Report compiles data on around 1,600 World Development Indicators for 217 countries drawn from official sources and is an open data source available on the World Bank website. For measuring macroeconomic stability, inflation has been taken as a proxy that accounts for economic instability as has been used in previous studies (Jallab *et al.*, 2008; Abdelmalki *et al.*, 2012), human capital is proxied by gross enrollment ratio (Abbas and Mujahid-Mukhtar, 2001) and liquid liabilities has been taken as a proxy for financial development (Alfaro *et al.*, 2009; Lee and Chang, 2009). Inflation has been measured by the consumer price index (World Bank, 2019b). Gross enrollment ratio (proxy for human capital) is the ratio of total school enrollment to the population, irrespective of age (World Bank, 2019c). Liquid liabilities, also known as broad money, is equal to the currency plus demand and interest-bearing liabilities of banks and non-financial intermediaries (World Bank, 2019d). Trade openness equals the sum of exports and imports, and gives an idea about the trade liberalization in a country (World Bank, 2019e).

First, we understand the general behavior of data through descriptive statistics; the summary statistics used mainly are mean and standard deviation. Correlation analysis is conducted next to assess the linear relationship between the dependent and explanatory variables. After assessing the degree of linear relationship among variables, we test for cross-sectional dependence in our panel data series. In panel data studies, the issue of cross-sectional dependence is common, which may be due to presence of some common factors or unobservable effects, and therefore, it is important to check whether the individual units or cross-sections are independent or not. The Pesaran's cross-sectional dependence test is used to check whether the cross-sections are independent or not, and in this regard, the following null hypothesis is tested:

Null Hypothesis (Ho). Residuals are cross-sectionally uncorrelated.

Next, it is important to test for stationarity of the data series, i.e. whether the data series contains a unit root or not. Based on the results of cross-sectional dependence test, one may choose to perform either the first- or the second-generation panel unit root tests. After performing the unit root test, the four different panel data methods are conducted, namely, pooled ordinary least squares (OLS) regression, fixed effects least squares dummy variable (LSDV) method, fixed effects (within) and random effects methods. Pooled OLS is the simplest regression technique used for panel data analysis assuming no differences among the cross-sectional data matrices (Asteriou and Hall, 2007). The LSDV regression is performed next, which allows heterogeneity and separate intercept value for each cross-section but constant slope coefficients. Next, the fixed effects method is conducted, which allows within-

transformation of data. The random effects method is considered next. In the random effects method, it is assumed that for each cross-section, the intercepts arise from a common intercept, β_1 (constant across cross-sections and over time), plus a random variable, ε_i, allowed to differ across cross-sections but remains constant over time (Brooks, 2008).

To arrive at the best method, different tests are conducted. *F*-test and Wald test have been used to select between pooled OLS and LSDV regression (Gujarati and Porter, 2009). Breusch–Pagan Lagrange multiplier (LM) test is applied to choose between random effects and pooled OLS regressions. Finally, Hausman test decides between the fixed and random effects methods (Hausman, 1978).

It is also important to check that the underlying assumptions of regression are not violated. Therefore, some diagnostic tests pertaining to serial correlation, heteroscedasticity and multicollinearity are conducted before drawing any final conclusions.

4. Results and discussion

In this section, we discuss the results obtained from the panel data analysis conducted using the methodology outlined above.

4.1 Descriptive statistics

The summary statistics are presented in Table 1. The total observations for each variable are 160, as the panel data of five BRICS countries for 32 years are used. The analysis presents the mean and standard deviation of both dependent and independent variables. The GDPG of the BRICS on an average for past 32 years has been 4.23%, indicating healthy economic growth during the period taken for the study. The variability of GDPG in terms of dispersion is 4.657, indicating sharp variation in growth of BRICS. The FDI has a mean of 1.867. However, variability for the FDI is 1.54. The mean score of trade openness is recorded at 40.664. The variability for trade openness is recorded on the higher side as $\sigma = 16.248$. The mean score for inflation is 189.97, and the variability in terms of dispersion is 663.73, indicating sharp variation in inflation. The mean for liquid liabilities is recorded at 61.232, and the standard deviation is 43.078, indicating less variation. The mean score of human capital is witnessed at 87.292. The ratio is less constant, as its variability in terms of dispersion is very sharp ($\sigma = 36.757$). Gross capital formation has a mean of 26.84, and variability equal to 9.369. The mean score for labor is 2.47, and the standard deviation is 2.86.

4.2 Correlation analysis

The bivariate correlation is used to assess the degree of linear relationship between the dependent variable, economic growth (GDPG) and explanatory variables.

The bivariate correlation results between dependent and independent variables are exhibited in Table 2. A positive significant correlation is found between FDI and GDPG at 1% level of significance. Also, a positive correlation exists between gross capital formation and labor with GDPG at 1% significance level. A negative significant correlation is found between inflation and GDPG. The analysis also reveals that there is a positive correlation between liquid liabilities and GDPG, at 1% level of significance. The correlation between human capital and GDPG is negative, significant at 1% level.

4.3 Cross-sectional dependence test

It is important to test for cross-sectional dependence in panel data to avoid the possibility of obtaining inconsistent and biased estimators. The Pesaran's cross-sectional dependence test is conducted to test the null hypothesis that the residuals are cross-sectionally uncorrelated, the results of which are presented in Table 3. The test results reveal that the *p*-value is less

than 0.01, so null hypothesis is rejected, and therefore, the panel data suffer from the problem of cross-sectional dependence.

4.4 Unit root test

It is a pre-condition to check for the stationarity of variables, i.e. whether the mean and variance of variables remain constant over time. Based on the results of cross-sectional dependence test, we use the second generation stationarity test, namely, Pesaran (2007) cross-sectional augmented Dickey–Fuller (PESCADF) unit root test, which allows for cross-sectional dependence in panel data. Table 4 presents the results of the PESCADF unit root test that tests the null hypothesis of non-stationarity. The results reveal that GDPG, trade openness, liquid liabilities and human capital are stationary at level, whereas FDI, inflation, gross capital formation and labor are stationary at first difference; therefore, first difference of these variables is taken for conducting regression.

4.5 Panel data analysis

After the stationary test of data series, panel data analysis is conducted to assess the impact of FDI on the economic growth in presence of select host country characteristics present in

Variables	*N*	Mean	Std. deviation
Dependent			
GDPG	160	4.230	4.657
Independent			
FDI	160	1.867	1.540
Trade openness	160	40.66	16.248
Inflation	160	189.9	663.727
Liquid liabilities	160	61.23	43.078
Human capital	160	87.29	36.757
Gross capital formation	160	26.84	9.369
Labor	160	2.47	2.86

Table 1. Summary statistics of dependent and independent variables

Independent variables	*r*-value	*p*-value
FDI	0.3684	0.000*
Trade openness	−0.0941	0.2366
Inflation	−0.2913	0.000*
Liquid liabilities	0.4996	0.000*
Human capital	−0.3719	0.000*
Gross capital formation	0.5407	0.000*
Labor	0.6582	0.000*

Note(s): *Significant at 1% level

Table 2. Bivariate correlation results between independent variables and GDPG

H_0: Residuals are cross-sectionally uncorrelated	
Pesaran's test statistics	3.608*
p-value	0.000
Average absolute value of the off-diagonal elements	0.227

Note(s): *Significant at 1% level

Table 3. Test for cross-sectional dependence

Variables	PESCADF unit root test: Level *t*-statistics	Level *p*-value	1st difference *t*-statistics	1st difference *p*-value	Decision
Dependent variable					
GDPG	−2.715**	0.013	–	–	Stationary at level
Independent variables					
FDI	−2.267	0.124	−3.944*	0.000	Stationary at first difference
Trade openness	−2.655**	0.019	–	–	Stationary at level
Inflation	−2.029	0.277	−3.170*	0.000	Stationary at first difference
Liquid liabilities	−2.551**	0.033	–	–	Stationary at level
Human capital	−2.894*	0.004	–	–	Stationary at level
Gross capital formation	−2.158	0.184	−4.077*	0.000	Stationary at first difference
Labor	−0.538	0.998	−2.807*	0.007	Stationary at first difference

Table 4.
Panel unit root test

Note(s): *Significant at 1% level, **significant at 5% level

BRICS countries. The four panel data methods, namely, pooled OLS regression, fixed effects LSDV method, fixed effects (within) method and random effects method are conducted and evaluated against each other to arrive at the best method.

The results of LM test presented in Table 5 reveal that there is no significant random effect in the panel data, and pooled OLS regression seems better. However, the test results as presented in Table 5 exhibit that *F*-test as well as Wald test are significant at 1% level, so the null hypothesis (i.e. no difference exists in the cross sectional units) is rejected as *p*-value < 0.01. Hence, there is a significant fixed effect, and the data are not poolable, so pooled OLS is not suitable in comparison to fixed effects.

Next, we use the Hausman specification test that compares the fixed and random effects methods under the null hypotheses that individual effects are uncorrelated with any regressor to ensure that we choose the most appropriate method. The result of the test (Table 5) depicts that chi-square value is significant at 1% level of significance; thus, the null hypothesis is rejected, and it can be concluded that individual effects (μ_i) are significantly correlated with other regressors, so the fixed effects method is most appropriate.

On the basis of Hausman test, it has been found that the fixed effects (within) method is suitable, the equation for which is specified as follows:

$$\ddot{GDPG}_{it} = \beta_1 \ddot{FDI}_{it} + \beta_2 \ddot{GCF}_{it} + \beta_3 \ddot{L}_{it} + \beta_4 \ddot{TO}_{it} + \beta_5 \ddot{INF}_{it} + \beta_6 \ddot{LL}_{it} + \beta_7 \ddot{HC}_{it} + \beta_8 (\ddot{FDITO})_{it} + \beta_9 (\ddot{FDIINF})_{it} + \beta_{10} (\ddot{FDILL})_{it} + \beta_{11} (\ddot{FDIHC})_{it} + \ddot{u}_{it}$$

Models	Tests	Test statistics	*Decision*
Fixed vs OLS	*F*-test	3.53*	H_0 is rejected
	p-value	0.0089	
	Wald test	11.09*	H_0 is rejected
	p-value	0.000	
Random vs OLS	LM test	0.00	H_0 is accepted
	p-value	1.000	
Fixed vs random	Hausman test	13.19*	H_0 is rejected
	p-value	0.010	

Table 5.
Results of *F*-test/Wald test, LM test and Hausman test

Note(s): *Significant at 1% level

where i indicates country, t implies time and u_{it} denotes the error term. The double dots placed above the variables denote their mean corrected values.

It is, however, important to check the underlying assumptions of regression, namely, serial correlation, heteroscedasticity and multicollinearity, before drawing any final conclusions. Therefore, the next step is to conduct the diagnostic tests to ensure our model is valid and reliable.

To test the presence of serial correlation, Wooldridge test for autocorrelation is conducted testing the null hypothesis of no serial correlation. The results of the test exhibited in Table 6 depict that the p-value < 0.01, rejecting the null hypothesis, and therefore, the panel data suffer from the issue of serial correlation.

In case of fixed effects method, Wald test for group-wise heteroscedasticity is employed. In this context, the null hypothesis that the residuals are homogenous is tested. As can be seen from Table 6, the p-value < 0.01, so null hypothesis is rejected, indicating that the model suffers from heteroscedasticity.

It is important to test the presence of multicollinearity in a regression model. The multicollinearity occurs when the variance inflation factor (VIF) is more than 10 (Gujarati and Sangeetha, 2007). The result of collinearity test presented in Table 6 shows that the VIF value (4.24) is less than 10, so it means that the model does not suffer from multicollinearity.

The fixed effects method is found to be an appropriate method for our panel data; however, it is evident that our model suffers from the problem of autocorrelation, cross-sectional dependence and heteroscedasticity. Thus, the fixed effects panel data method may yield misleading and absurd results. In this case, the feasible generalized least squares (FGLS) method is generally recommended (Reed and Ye, 2011), which gives autocorrelation, cross-sectional dependence and heteroscedasticity consistent estimation, provided T > N (Parks, 1967). Hence, we used the FGLS method to examine the impact of FDI on the GDPG of BRICS in the presence of select macro-economic variables (host country characteristics), namely, trade openness, inflation, human capital and liquid liabilities.

The results of the five sets of cross-sectional time-series FGLS regression conducted are presented in Table 7. The results reveal that the FGLS model fits the data well at the 0.01 significance level. The first set of regression (1) does not include any interaction term and examines the impact of explanatory variables, inflation, liquid liabilities, human capital, trade openness, gross capital formation and labor on the economic growth (GDPG) of BRICS economies, and in the remaining four sets, the interaction terms between FDI and host country characteristics (FDITO, FDIINF, FDILL AND FDIHC) have been added step by step. It is found that FDI does not exert any significant impact on growth individually, whereas gross capital formation and labor have a significant positive impact on growth in all five sets of regressions. Liquid liabilities (proxy for financial development) also exert a significant positive impact on GDPG of BRICS in all the five cases. However, trade openness, inflation and human capital have no significant impact on growth individually, but it is interesting to find that these host county characteristics exert a significant impact on economic growth of BRICS on interacting with FDI inflows. FDI on interacting with trade openness, as shown in Regression 2, exerts a significant positive impact on GDPG at 1% level of significance, corroborating the findings of earlier studies (Prüfer and Tondl, 2008; Sakyi *et al.*, 2015). Nair-Reichert and Weinhold (2001) also suggested that the growth impact of FDI is higher in case

Test	Test statistics	p-value
Wooldridge autocorrelation test	33.36*	0.0045
Wald test for heteroscedasticity	49.72*	0.0000
Collinearity test (VIF)	4.24	–

Note(s): *Significant at 1% level

Table 6.
Diagnostic tests

Table 7.
Cross-sectional time-series FGLS regression

Dependent Variable-GDPG	(1)	(2)	(3)	(4)	(5)
FDI	0.283 (0.244)	−0.252 (0.253)	0.278 (0.238)	0.140 (0.253)	0.0604 (0.260)
GCF	0.624*** (0.102)	0.631*** (0.0956)	0.661*** (0.101)	0.628*** (0.101)	0.626*** (0.101)
Labor	6.060*** (1.040)	5.610*** (9.780)	6.840*** (1.060)	5.710*** (1.050)	6.540*** (1.050)
Trade openness	0.0156 (0.0176)	−0.0250 (0.0185)	0.0191 (0.0172)	0.00976 (0.0177)	0.0196 (0.0174)
Inflation	0.000751 (0.000741)	0.000500 (0.000694)	0.00102 (0.000731)	0.000816 (0.000734)	0.000639 (0.000731)
Liquid liabilities	0.0446*** (0.00581)	0.0295*** (0.00627)	0.0400*** (0.00593)	0.0284*** (0.0105)	0.0383*** (0.00637)
Human capital	0.00389 (0.0102)	0.000647 (0.00956)	0.0209* (0.0118)	0.000945 (0.0102)	0.00173 (0.0101)
FDITO		0.0213*** (0.00444)			
FDIINF			−0.00543*** (0.00201)		
FDILL				0.00488* (0.00264)	
FDIHC					0.00478** (0.00213)
Constant	−1.026 (1.610)	0.286 (1.527)	−2.237 (1.636)	−0.158 (1.661)	−1.501 (1.599)

Note(s): Standard errors in parentheses
***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

of more liberalized and open economies. Since the interaction term between FDI and trade openness is found to be positive in this study, it is suggested to the policymakers of BRICS countries to adopt a liberalized trade policy regime and attract export oriented FDI for reaping the growth benefits of FDI. Inflation (economic instability) does not have any significant impact on growth in all the five sets of regressions individually, but on interacting with FDI, macroeconomic instability exerts a negative impact on growth, supporting the findings of Jallab *et al.* (2008), Alguacil *et al.* (2011) and Abdelmalki *et al.* (2012). It is, therefore, important for a host country to maintain macroeconomic stability for absorbing the benefits of FDI. Individually, financial development proxied by liquid liabilities has a significant positive impact on GDPG in all cases, supporting the results of Beck *et al.* (2000) and King and Levine (1993a, b); moreover, the interaction term between FDI and liquid liabilities is also positive and significant, revealing the importance of financial development in promoting the growth of BRICS bloc. Our findings support the results of previous studies that have analyzed the effect of interaction between FDI and financial development on growth (Hermes and Lensink, 2003; Alfaro *et al.*, 2009). It is, therefore, suggested to these emerging economies to focus on the development of financial markets to gain from the spillovers generated by FDI. Human capital has no significant effect on growth individually; however, FDI on interacting with human capital exerts a positive impact on growth, corroborating the findings of Borensztein *et al.* (1998) and Balasubramanyam and Mahambare (2003), thereby highlighting the significance of human capital development as an important absorptive capacity for FDI to impact the growth of the host country.

5. Conclusion

It is widely held that FDI promotes the economic growth of host economies; however, the empirical evidence, is mixed in this direction. While some studies revealed a positive impact of FDI on growth, others found an insignificant and even negative impact of FDI on the economic growth of a country. Moreover, there is some evidence in the growth literature suggesting that FDI does not exert an independent influence on growth but depends on unique country characteristics present in the host (FDI-receiving) economy. It was against this backdrop that the present study assessed the growth effect of FDI in the presence of the host country characteristics, namely, economic stability, human capital, financial development and trade openness, in the fastest growing and representative developing BRICS economies having attracted huge inward FDI flows in the past few decades. The findings of the study suggested that FDI has no significant impact on growth individually, but a significant growth enhancing impact is observed when FDI interacts with the host country characteristics that act as absorptive capacities prevalent in the host economy to gain from the spillovers generated from FDI inflows. It is found that FDI on interacting with trade openness, financial development and human capital exerted a significant positive impact on the growth of BRICS economies, highlighting the significance of these absorptive capacities in promoting the economic growth. The interaction term of FDI and inflation (economic instability) was found to be negative, thereby implying that it is important for a host country to maintain macroeconomic stability for realizing the favorable impact of FDI on growth. In light of these findings, it is suggested to the policymakers of BRICS economies to focus on the development of financial markets and human capital while maintaining a liberalized trade policy stance and macroeconomic stability at the same time for realizing the growth enhancing impact of FDI.

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