

Does foreign direct investment affect poverty in BRICS?



 Kunofiwa Tsurai

Department of Finance, Risk Management and Banking, University of South Africa 0003, Pretoria South Africa.
Email: tsaurk@unisa.ac.za



ABSTRACT

Article History

Received: 19 September 2022

Revised: 8 February 2023

Accepted: 24 February 2023

Published: 22 March 2023

Keywords

BRICS

Economic growth

Foreign investment

Panel data

Poverty

Transitional economies.

JEL Classification:

F21; I3; P2; F43.

This study examined the influence of foreign direct investment (FDI) on poverty alleviation in BRICS countries (Brazil, Russia, India, China, and South Africa) using panel methods of econometric estimation, namely pooled ordinary least squares (OLS), fixed effects and fully modified ordinary least squares (FMOLS). Data from 1989 to 2020 was used in this study. The majority of research on FDI-led poverty has ignored the omitted variable bias. Economic growth as a channel in the FDI–poverty nexus was also explored. The relationship between FDI and poverty has so far produced mixed results with no general consensus, hence triggering the undertaking of this study in the context of BRICS. Except for mortality rate, poverty alleviation triggered by FDI was achieved in BRICS (model 1 under fixed effects; model 2 under pooled ordinary least squares (OLS)). Economic growth-led poverty reduction was observed across all the three panel methods. The interaction variable (FDI x economic growth) significantly enhanced poverty reduction in model 1 and model 3 across the three panel data methods employed. Similar results were observed in model 2 under the pooled OLS methodology. Policies geared at promoting FDI to reduce poverty should be implemented by BRICS authorities. Further research should explore the minimum threshold levels of FDI necessary to significantly reduce poverty in BRICS as such a study would be more useful and relevant for policymaking decisions relating to poverty reduction.

Contribution/Originality: This study is the first of its kind to explore if FDI influences poverty through the economic channel. It is also the first study to use BRICS as the focus of the analysis. Unlike similar existing studies, this research addresses the problem of omitted variable bias by including economic growth as a variable.

1. INTRODUCTION

It is no longer contestable that FDI plays a huge role in the long-term alleviation of poverty in host nations, as supported by theoretical literature (Arogundade, Mduduzi, & Eita, 2022; Calvo & Hernandez, 2006; Farole & Winkler, 2012; Gorg & Greenaway, 2004; Liu, Wang, & Wei, 2009; Lucas, 1988; Meyer, 2004). However, Bornschier and Chase-Dunn (1985) argued that FDI reliance is not good for long-term growth and poverty reduction. Empirical research exists to support the notion that FDI triggers poverty reduction (Algan, Bal, & Bayraktar, 2021; Jalilian & Weiss, 2002; Topalli, Papavangjeli, Ivanaj, & Ferra, 2021; Ucal, 2014).

Disagreements, points of departure and differences exist among empirical studies on the FDI–poverty nexus. Five groups emerge on this front. First, FDI alleviates poverty (Algan et al., 2021; Jalilian & Weiss, 2002; Topalli

et al., 2021; Ucal, 2014); second, FDI exacerbates poverty (Bornschiefer & Chase-Dunn, 1985); third, there is no relationship between the two variables (Arogundade et al., 2022; Chinyere, Christian, Ogbonna, & Igwe, 2021; Dhingra & Jain, 2021; Magombeyi & Odhiambo, 2017a); fourth, a bi-directional causality exists between FDI and poverty reduction (Arogundade et al., 2022); and fifth, FDI triggers the reduction of poverty only under certain conditions (absorption capacities) in the host nation (Arogundade et al., 2022; Dada & Akinlo, 2021; Fauzel, Seetanah, & Sannasee, 2016; Hanim, 2021; Quinonez, Saenz, & Solorzano, 2018). These mixed results, divergent views and conflicting findings motivated this investigation of FDI-led poverty alleviation to contribute to the existing literature.

Moreover, these existing empirical studies on FDI-led poverty reduction have some gaps which the current study intends to fill. No similar study has so far focused on BRICS. This study uses more recent data (1989–2020) and captures the non-linearity aspect of the relationship between FDI and poverty. This study explored if economic growth has an absorption capacity in the FDI-triggered poverty relationship, something which the majority of existing similar empirical research has ignored.

2. FOREIGN DIRECT INVESTMENT-LED POVERTY ALLEVIATION

Consistent with Arogundade et al. (2022), the influence of FDI on poverty is explained by the neo-classical growth theory and the horizontal and vertical spillover perspectives.

FDI enhances productivity and growth, thereby reducing welfare deficits and poverty (Arogundade et al., 2022). According to proponents of the neo-classical growth theory, an increase in the national income triggered by the inflow of FDI benefits the poorest people, especially in low income and high inequality nations (Lucas, 1988).

Horizontal spillover occurs when the technological spillovers flow from foreign companies to domestic companies (Farole & Winkler, 2012). Meyer (2004) argued that knowledge spillover, when domestic companies imitate products developed by foreign companies, is also part of the horizontal spillover view. Calvo and Hernandez (2006) state that the training of local labor and the impartation of skills to local people by foreign companies is also a demonstration of horizontal spillover. Increased skills, human capital development, a new product range and new technology inflow all improve the standard and level of human capital development and the general welfare of the recipients of such skills (Arogundade et al., 2022).

Meyer (2004) argued that the theoretical vertical spillover view happens when FDI interacts with economic growth in the host nation. Backward vertical integration arises when foreign firms source their raw materials from local firms, thereby helping them to expand, grow, create more jobs for the people, and reduce poverty levels (Liu et al., 2009). Gorg and Greenaway (2004) argued that the growth and expansion of domestic firms that use inputs from foreign firms are advantageous from a poverty reduction point of view.

Empirical research on the FDI–poverty nexus was undertaken by several authors. Topalli et al. (2021) examined the FDI–poverty nexus in Western Balkans using the generalized method of moments (GMM) to analyze panel data from 2002 to 2021. The study noted that poverty was reduced by the inflow of FDI into the Western Balkans. Arogundade et al. (2022) examined the poverty–FDI–absorption capacity nexus in Sub-Saharan Africa (SSA) using panel data from 1996 to 2018. Firstly, a direct impact of FDI on poverty was not found. Secondly, the existence of absorption capacity in SSA nations enabled FDI to reduce poverty levels. The study observed that FDI reduces poverty if it interacts with institutional quality and/or development of human capital. Thirdly, a feedback effect between poverty and FDI was observed.

Dada and Akinlo (2021) examined the FDI–poverty–environment degradation nexus in SSA using panel data from 1986 to 2018. The panel threshold regression method showed that environmental degradation at higher levels helped to improve FDI's influence on poverty reduction in SSA nations. However, the use of household consumption expenditure as a measure of poverty indicated that FDI had an insignificant influence on poverty alleviation. Using time series data from 1980 to 2012 with the ordinary least squares regression model, Ogunniyi

and Igberi (2014) examined the poverty–FDI nexus in Nigeria and confirmed that FDI can potentially reduce poverty. FDI increased gross domestic product (GDP) per capita in an insignificant manner in the Nigerian context.

Nguea, Noumba, and Noula (2020) employed the autoregressive distributive lag (ARDL) method to determine the nexus between poverty and FDI in Cameroon with time series data from 1984 to 2014. Using the infant mortality rate to proxy poverty, FDI inflow into Cameroon was found to insignificantly enhance poverty alleviation during the period under study. Ucal (2014) explored the FDI–poverty nexus in developing nations using panel data from 1990 to 2009, and poverty alleviation linked to the inflow of FDI in developing countries was observed.

Using the ARDL method, Haruna, Hassan, and Ahmad (2022) examined the FDI–poverty nexus in Nigeria using time series data from 1980 to 2019. The results showed that FDI had a significant influence on poverty alleviation in both the long and short runs. Magombeyi and Odhiambo (2017a) explored the impact of FDI on poverty in Tanzania using the ARDL approach and time series data from 1980 to 2014. When using infant mortality to proxy poverty, FDI reduced poverty in the short run. FDI had no influence on poverty when life expectancy as a measure of poverty was used in both the short and long runs.

In the case of Pakistan, Shamim, Azeem, and Naqvi (2014) examined the FDI–poverty nexus using the ARDL method and time series data from 1973 to 2011, and they found that FDI had a negative influence on poverty. Arabyat (2017) studied the influence of FDI on poverty in developing nations using a panel data analysis. The study noted that FDI reduced poverty, especially unemployment, but not in areas linked to the production sector capacity. Algan et al. (2021) investigated the linkage between poverty and FDI in Turkey using time series data from 1996 to 2019. Household consumption expenditure was used as a proxy measure, and FDI was found to reduce poverty.

Fauzel et al. (2016) examined the FDI–poverty nexus in Mauritius using the vector autoregressive (VAR) method and time series data from 1980 to 2013. Their study found that FDI reduced poverty in the short run by a more significant margin than in the long run. Poverty was reduced by FDI in Mauritius through the employment channel. Sodiq (2021) investigated the relationship between FDI and poverty in Africa using a panel data analysis and found that FDI reduced poverty.

Jalilian and Weiss (2002) explored the FDI–poverty linkage in the Association of Southeast Asian Nations (ASEAN) countries. The results showed that FDI increases the income level and consequently reduces the level of poverty among the poor in ASEAN countries. Klein, Carl, and Bitá (2001) investigated the nexus between poverty reduction and FDI using an analysis of literature and a review of policy documents. Their study observed that FDI plays a significant role in poverty reduction.

Tufa and Teslu (2015) examined the poverty–FDI relationship in Ethiopia using the error correction model (ECM) and time series data from 1981 to 2012. Economic growth and poverty reduction were significantly improved by FDI in Ethiopia in the long run. Magombeyi and Odhiambo (2017b) used a critical literature review analysis to analyze the influence of FDI on poverty. To a larger extent, their study supported the FDI-led poverty alleviation hypothesis. Their study also noted that FDI can have a negative influence or an insignificant impact on poverty reduction in some instances.

A study by Agarwal, Atri, and Kundu (2017) explored the FDI–poverty nexus using Indian regions as a focal point. Panel data from 1980 to 2011 was used for the analysis, and the results indicate that poverty reduction was significantly improved by FDI. Using Indonesia as a case study, Hanim (2021) investigated the relationship between poverty and FDI using a multiple regression analysis with data from 2012 to 2016. The study noted that FDI increased economic growth thereby enhancing the poverty alleviation efforts. The same study also showed that the interaction between income inequality and economic growth enhanced poverty reduction efforts in Indonesia.

Quinonez et al. (2018) used panel data from 2000 to 2014 to investigate whether FDI reduces poverty in Latin America and found that poverty was non-significantly reduced by FDI. Ngo (2019) studied the income distribution effects of FDI on poverty in Vietnam at regional and province levels. The study observed that FDI enhances

economic productivity and quickens the employment creation rate and capacity thereby lowering the poverty levels across all provinces of Vietnam. [Dhingra and Jain \(2021\)](#) also explored the FDI–poverty reduction nexus in India (Madhya Pradesh) using a descriptive statistical analysis. The relationship between FDI and poverty reduction was observed to be non-existent. Using the vector error correction model (VECM) methodology, [Chinyere et al. \(2021\)](#) examined the FDI–poverty relationship in Nigeria. The time series data set employed in the study ranged from 1981 to 2018. The short-run results indicate that no relationship exists between FDI and poverty reduction. The long-run results show that FDI had a significant positive influence on poverty alleviation.

3. EXPLANATORY VARIABLES OF THE POVERTY FUNCTION

As stated by [Son and Kakwani \(2019\)](#), economic growth provides a favorable macro environment that promotes the development of small and medium enterprises, creates jobs, and enables the success of self-help jobs, thereby generally contributing to poverty reduction. [Ijaiya, Ijaiya, Bello, and Ajayi \(2011\)](#) argued that economic growth reduces poverty levels through boosting employment and the scale of productive macroeconomic activities among poor people.

In line with [Musakwa and Odhiambo \(2019\)](#), remittance inflows provide funds for education, skills development, building household infrastructure and commencing self-help projects. These projects and initiatives have a direct impact on poverty alleviation. The over-dependence on remittance creates laziness among the recipients and weakens the economy of the receiving nation, thereby increasing poverty in the long run ([Tsauroi, 2018](#)).

A high level of trade openness is good for local industry expansion because it opens new opportunities for penetrating international markets. The growth of local industry creates more employment opportunities, aids income distribution and helps to alleviate poverty ([Pradhan & Mahesh, 2014](#)). A study by [Singh and Huang \(2011\)](#) noted that increased trade openness in Sub-Saharan Africa widened the poverty gap.

[Chaudhry and Rahman \(2009\)](#) argued that skilled, educated and healthy people are more likely to get highly paid jobs, thereby reducing the fraction of people categorized in the poverty bracket.

According to [Afzal, Malik, Begum, Sarwar, and Fatima \(2012\)](#), poverty is perpetuated when children are not given quality education and are used as a source of labor.

A developed infrastructure enables citizens to enjoy quality education, improved health facilities, clean water, clean energy and protection from natural disasters ([Jahan & McCleery, 2005](#)). This helps to reduce poverty and prolongs people's lives. A study which contradicts this theoretical rationale was carried out by [Pradhan and Mahesh \(2014\)](#).

A developed financial sector can offer small credit to a wider range of people who are commencing self-employment-oriented projects ([Okuneye, 2001](#)). The same study noted that a developed financial market requires punitive collateral when borrowing money, hence making access to credit for self-employment creation a pipe dream for many poor households.

4. FOREIGN INVESTMENT AND POVERTY TRENDS IN BRICS

According to [Figure 1](#), Brazil's net FDI inflow increased from 0.33% of GDP in 1989 to 1.48% of GDP in 1996; it increased by 0.34 percentage points during the subsequent seven-year period before further experiencing growth from 1.81% of GDP in 2003 to 3.73% of GDP in 2010. Brazil's net FDI inflow between 2010 and 2017 plummeted by 0.39 percentage points, whilst the subsequent seven-year period was characterized by another negative growth (0.72 percentage points) of net FDI inflows.

Russia's net FDI inflow increased by 0.49 percentage points, from 0.17% of GDP in 1989 to 0.66% of GDP in 1996; 1.19 percentage points during the subsequent seven-year period; and 0.98 percentage points during the

period between 2003 and 2010. The net inflow of Russia's FDI decreased from 2.83% of GDP in 2010 to 1.81% of GDP in 2017 before further decreasing by 1.17 percentage points during the three-year period ending in 2020.

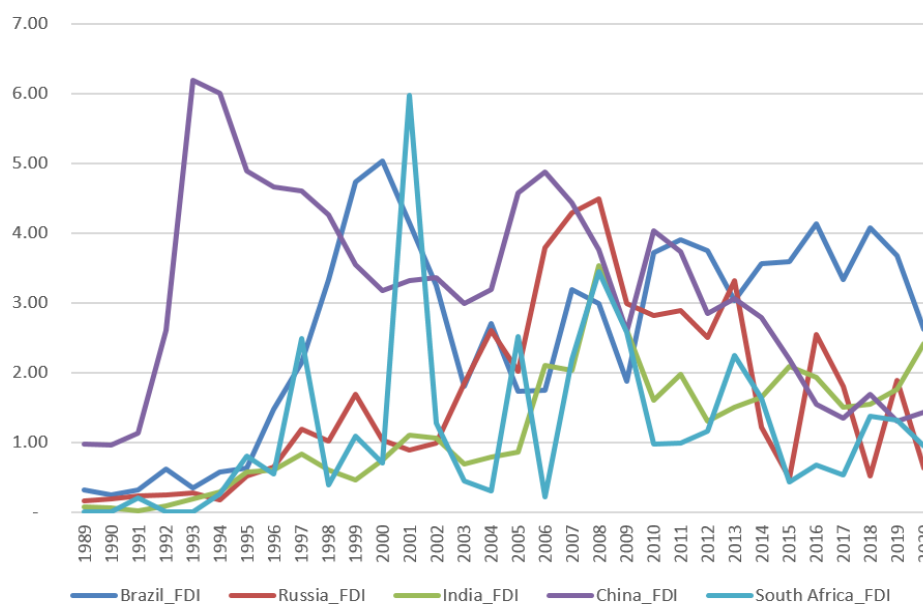


Figure 1. Net foreign direct investment inflow trends (1989–2020) for BRICS nations.

India's FDI net inflow rose from 0.09% of GDP in 1989 to 0.61% of GDP in 1996. It further increased by 0.09 percentage points during the subsequent seven-year period and rose again from 0.70% of GDP in 2003 to 1.60% of GDP in 2010. The net inflow of FDI declined by 0.10 percentage points during the subsequent seven-year period and then grew from 1.51% of GDP in 2017 to 2.42% of GDP in 2020.

The net inflow of China's FDI increased from 0.98% of GDP in 1989 to 4.67% of GDP in 1996, declined by 1.67 percentage points during the next seven-year period, and rose from 3% of GDP in 2003 to 4.04% of GDP in 2010 before plummeting by 2.69 percentage points during the subsequent six-year period (2010–2017). China's net FDI inflow marginally increased by 0.09 percentage points from 1.35% of GDP in 2017 to 1.44% of GDP in 2020.

South Africa's net FDI inflow rose from 0.01% of GDP in 1989 to 0.55% of GDP in 1996, declined by 0.11 percentage points during the subsequent six-year period and then recorded a growth from 0.45% of GDP in 2003 to 0.98% of GDP in 2010. It decreased by 0.44 percentage points during the subsequent six-year period (from 2010 to 2017) before increasing by 0.41 percentage points from 0.54% of GDP in 2017 to 0.95% of GDP in 2020.

Figure 2 illustrates the poverty trends for the BRICS group of nations. Brazil's infant mortality rate declined from 54.60 per 1,000 live births in 1989 to 38.70 per 1,000 live births in 1996. It decreased by 35.14 percentage points during the period between 1996 and 2003 before further dropping from 25.10 per 1,000 live births in 2003 to 16.70 per 1,000 live births in 2010. The period from 2010 to 2017 saw Brazil's infant mortality plummet by 17.37 percentage points and then decline by 5.07 percentage points from 13.80 per 1,000 live births in 2017 to 13.10 per 1,000 live births.

Russia's infant mortality had a consistent downward trend during the period from 1989 to 2020. Its infant mortality decreased from 17.60 per 1,000 live births in 1989 to 17.30 per 1,000 live births in 1996, by 25.43 percentage points during the period from 1996 to 2003, from 12.90 per 1,000 live births in 2003 to 8.30 per 1,000 live births in 2010, by 33.73 percentage points during the subsequent six-year period (2010–2017), and from 5.50 per 1,000 live births in 2017 to 4.40 per 1,000 live births in 2020.

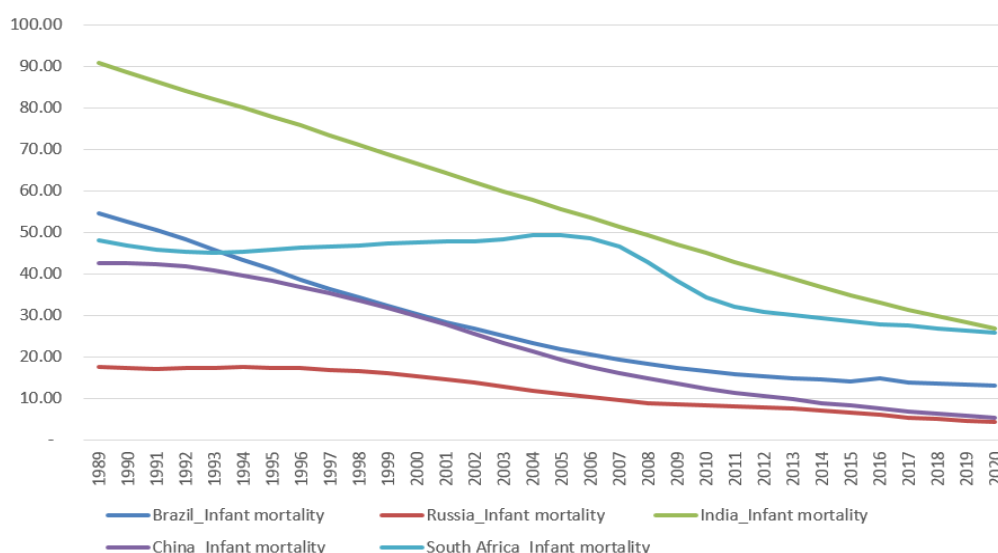


Figure 2. Infant mortality rate (Per 1,000 live births) trends for BRICS countries.

India's infant mortality dropped from 90.90 per 1,000 live births in 1989 to 75.80 per 1,000 live births in 1996, plunged to 60 per 1,000 live births in 2003 before further decreasing by 24.83 percentage points during the period from 2003 to 2010. India's mortality rate declined from 45.10 per 1,000 live births in 2010 to 31.40 per 1,000 live births in 2017 and then decreased by 14.01 percentage points from 31.40 per 1,000 live births in 2017 to 27 per 1,000 live births in 2020.

The mortality rate for China followed a similar downward trend to Brazil, India and Russia during the period from 1989 to 2020. South Africa's mortality rate declined from 48.20 per 1,000 live births in 1989 to 46.30 per 1,000 live births in 1996 and increased by 4.54 percentage points during the six-year period from 1996 to 2003 before massively reducing by 28.93 percentage points from 48.40 per 1,000 live births in 2003 to 34.40 per 1,000 live births in 2010. The period between 2010 and 2017 saw South Africa's mortality rate drop by 19.77 per 1,000 live births, and the period from 2017 to 2020 saw a decline in mortality rate from 27.60 per 1,000 live births to 25.80 per 1,000 live births.

5. RESEARCH METHODOLOGY

Data for BRICS from 1989 to 2020 was used in this study. The already and publicly available dataset was obtained from the International Financial Statistics and the World Bank. These databases are reliable, accessible and reputable. Equation 1 shows the general model specification.

$$POV = f(\text{FDI, GROWTH, REMIT, OPEN, HCD, INFR, FIN}) \quad [1]$$

Empirical research by Chinyere et al. (2021); Dhingra and Jain (2021); Ngo (2019); Quinonez et al. (2018); Agarwal et al. (2017); Hanim (2021); Magombeyi and Odhiambo (2017a); Tufa and Tesu (2015); Jalilian and Weiss (2002); Fauzel et al. (2016); Sodiq (2021); Algan et al. (2021); Shamim et al. (2014); Arabyat (2017); Magombeyi and Odhiambo (2017a); Haruna et al. (2022); Nguea et al. (2020); Ucal (2014); Dada and Akinlo (2021); Ogunniyi and Igberu (2014); Topalli et al. (2021) and Arogundade et al. (2022) to a large extent informed the selection of these independent variables of the poverty function.

The following three equations represent the econometric versions of the poverty function. The only difference is the proxy of poverty used in each equation.

$$\begin{aligned} POVa_{it} = & \beta_0 + \beta_1 FDI_{it} + \beta_2 GROWTH_{it} + \beta_3 (FDI_{it} \cdot GROWTH_{it}) + \beta_4 REMIT_{it} + \beta_5 OPEN_{it} + \beta_6 HCD_{it} \\ & + \beta_7 INFR_{it} + \beta_8 FIN_{it} + \mu + \varepsilon \end{aligned} \quad [2]$$

$$POV_{b_{it}} = \beta_0 + \beta_1 FDI_{it} + \beta_2 GROWTH_{it} + \beta_3 (FDI_{it} \cdot GROWTH_{it}) + \beta_4 REMIT_{it} + \beta_5 OPEN_{it} + \beta_6 HCD_{it} + \beta_7 INFR_{it} + \beta_8 FIN_{it} + \mu + \varepsilon \tag{3}$$

$$POV_{c_{it}} = \beta_0 + \beta_1 FDI_{it} + \beta_2 GROWTH_{it} + \beta_3 (FDI_{it} \cdot GROWTH_{it}) + \beta_4 REMIT_{it} + \beta_5 OPEN_{it} + \beta_6 HCD_{it} + \beta_7 INFR_{it} + \beta_8 FIN_{it} + \mu + \varepsilon \tag{4}$$

Equation 2 used total life expectancy at birth (years) as a representative of poverty, the proxy used in Equation 3 is household consumption expenditure as a ratio of GDP, and Equation 4 uses the infant mortality rate (per 1,000 live births).

These three equations estimate whether FDI affects poverty through the growth channel. This is consistent with Arogundade et al. (2022), whose study argues that the absorption capacity in SSA quickened FDI's ability to reduce poverty.

In line with Lucas (1988), foreign direct investment enhances economic growth through its ability to bring advantages such as physical capital, skills, managerial expertise, global market connectedness and jobs creation capacity to the host nation. These advantages brought by FDI cascade down to the people in the form of poverty alleviation, job creation, and income inequality reduction. Consistent with Hanim (2021), a positive influence of FDI on poverty reduction through economic growth is expected. Equations 2, 3 and 4 are econometrically estimated using the FMOLS, fixed effects and pooled OLS models.

6. ANALYSIS AND EXPLANATION OF RESULTS

Based on the advice given by Aye and Edoja (2017), the data used for the final analysis are transformed into natural logarithms.

Table 1. Stationarity tests using the individual intercept window.

Level	LLC (Levin, Lin, & Chu, 2002)	IPS (Im, Pesaran, & Shin, 2003)	ADF (Augmented Dickey-Fuller)	PP (Phillips-Perron)
LPOV1	-3.52***	-0.56	15.71	31.90***
LPOV2	-1.28	-1.75**	17.20*	31.08***
LPOV3	-1.32***	-4.02***	-4.96***	-2.458**
LFDI	-3.28***	-2.63***	23.10**	18.70**
LREMIT	-3.13***	-3.21***	29.40***	30.41***
LOPEN	-2.29**	-1.90**	20.09**	22.62**
LGROWTH	-1.00	1.10	4.59	3.42
LHCD	-3.19***	-2.70***	25.10***	32.93***
LINFR	-3.98***	-1.61*	20.52**	16.14*
LFIN	-0.53	1.10	6.76	15.73
First difference				
LPOV1	-1.42*	-6.39***	63.53***	114.52***
LPOV2	-3.86***	-5.93***	54.49***	108.66***
LPOV3	-3.17***	-7.28***	-8.19***	-6.17***
LFDI	-6.66***	-7.73***	71.62***	115.04***
LREMIT	-4.01***	-7.94***	73.49***	123.74***
LOPEN	-5.11***	-5.93***	54.50***	110.67***
LGROWTH	-3.43***	-4.01***	34.38***	45.06***
LHCD	-11.29***	-10.74***	103.50***	133.39***
LINFR	-7.17***	-3.18***	21.86**	14.02**
LFIN	-4.01***	-6.49***	60.29***	72.50***

Note: ***/**/* indicate 1%, 5% and 10% significance levels respectively.

The results in Table 1 show that the data were stationary at first difference.

Table 2. Johansen Fisher panel cointegration.

Hypothesized no. of CE(s)	Trace test statistic	Probability	Max-Eigen test statistic	Probability
None	4.16	0.9399	41.00	0.0000
At most 1	92.10	0.0000	465.0	0.0000
At most 2	559.0	0.0000	182.6	0.0000
At most 3	272.7	0.0000	156.8	0.0000
At most 4	203.6	0.0000	92.14	0.0000
At most 5	130.4	0.0000	53.73	0.0000
At most 6	86.09	0.0000	37.85	0.0000
At most 7	56.41	0.0000	37.39	0.0000
At most 8	30.70	0.0007	30.66	0.0007
At most 9	12.28	0.2668	12.28	0.2668

According to Table 2, both Johansen Fisher test statistics indicate that there are, at most, eight cointegrating vectors among the variables studied. The existence of long-run relationships prompted the study to enter the main data analysis phase.

Tables 3, 4 and 5 present the final data analysis results using econometric approaches (fixed effects, pooled OLS, FMOLS). Each model used a different measure of poverty. Model 1 used total life expectancy (years), model 2 used household consumption expenditure as a fraction of GDP, and model 3 employed the infant mortality rate (per 1,000 live births).

Table 3. Poverty and FDI (Fixed effects).

Variable	Poverty		
	(1)	(2)	(3)
FDI (Foreign direct investment)	0.04*	0.02	0.31***
GROWTH (Economic growth)	0.04***	0.06	-0.41***
FDI.GROWTH	0.07***	0.001	-0.04**
HCD (Human capital development)	0.19***	0.02	-0.70***
REMIT (Remittances)	-0.01***	0.08**	-0.01
OPEN (Trade openness)	0.03**	-0.15***	-0.14*
INFR (Infrastructural development)	-0.02***	-0.01	0.06**
FIN (Financial development)	0.03**	0.06***	-0.37***
Number of countries	5	5	5
Adjusted R-squared	0.88	0.91	0.93
F-statistic	97.71	172.53	249.92
Prob(F-statistic)	0.00	0.00	0.00

Note: ***, ** and * indicate 1%, 5% and 10% significance levels, respectively.

A positive but significant effect of FDI on life expectancy was observed under the fixed effects method (Table 3), while life expectancy was insignificantly enhanced by FDI (model 1) under pooled OLS (Table 5) and FMOLS Table 4. These FDI-triggered poverty reduction results are consistent with Arogundade et al. (2022).

Economic growth significantly increased the life expectancy (model 1) under all three econometric estimation methodologies. This is in line with Ijaiya et al. (2011), whose study noted that economic growth reduces poverty levels through boosting employment levels and productive macroeconomic activities among poor people.

The positive effect of the complementarity variable (FDI x growth) on life expectancy was significant (model 1) under the FMOLS, fixed effects and pooled OLS. The results support the findings of the study by Hanim (2021).

Household consumption expenditure was non-significantly enhanced by FDI (model 2) under the fixed effects and FMOLS, whilst FDI significantly improved household consumption expenditure (model 2) under the pooled OLS. The results generally support the findings by Ogunniyi and Igberi (2014), whose study confirmed that FDI enhanced poverty reduction in the context of Nigeria.

Table 4. Poverty and FDI (FMOLS).

Variables	Poverty		
	(1)	(2)	(3)
FDI	0.04	0.03	0.44**
GROWTH	0.03***	0.18	-0.36***
FDI.GROWTH	0.01**	0.07	-0.05**
HCD	0.25***	0.06	-1.13***
REMIT	-0.02**	-0.02**	0.02
OPEN	0.04*	-0.15***	-0.16
INFR	-0.02**	-0.01	0.05
FIN	0.05**	0.12***	-0.44***
Number of countries	5	5	5
Adjusted R-squared	0.89	0.73	0.78
Prob(F-statistic)	0.00	0.00	0.00

Note: ***, ** and * indicate 1%, 5% and 10% significance levels, respectively.

Household consumption expenditure was significantly improved by economic growth (model 2) under the pooled OLS, whereas economic growth insignificantly enhanced household consumption expenditure (model 2) under the fixed effects and FMOLS. The results resonate with the findings of a study done by [Son and Kakwani \(2019\)](#), which states that economic growth provides a favorable macro environment that promotes the development of small and medium enterprises, creates jobs, enable the success of self-help jobs, and generally contributes to poverty reduction.

Household consumption expenditure (model 2) was non-significantly improved by the complementarity variable (FDI x economic growth) under the FMOLS and fixed effects. Yet the complementarity variable significantly improved household consumption expenditure (model 2) under the pooled OLS, which supports the findings by [Ngo \(2019\)](#).

Table 5. Poverty and FDI (Pooled OLS).

Variable	Poverty		
	(1)	(2)	(3)
FDI	0.15	0.24***	1.77***
GROWTH	0.21***	0.11***	-0.24***
FDI.GROWTH	0.05*	0.01***	-0.23***
HCD	0.02	0.16	-0.21***
REMIT	-0.03	0.02*	-0.13***
OPEN	0.26***	-0.21***	-0.13
INFR	-0.01	-0.04**	-0.03
FIN	0.25***	0.25	-0.10
Number of countries	5	5	5
Adjusted R-squared	0.57	0.63	0.59
Prob(F-statistic)	0.00	0.00	0.00

Note: ***, ** and * indicate 1%, 5% and 10% significance levels, respectively.

Model 3 shows that FDI increased the mortality rate in all the three panel methods used, meaning that FDI increased poverty levels. The results resonate with [Bornschieer and Chase-Dunn \(1985\)](#), whose study argued that FDI negatively affects economic growth and income distribution in the long run if host countries overly depend on it.

According to the three methods used, economic growth had a significant negative influence on the mortality rate (model 3), which is consistent with [Son and Kakwani \(2019\)](#) and [Ijaiya et al. \(2011\)](#), whose studies produced results which support the growth-led poverty alleviation hypothesis.

A significant negative impact of the complementarity variable on the mortality rate was observed in model 3 in each of the three panel estimation approaches.

7. CONCLUSION

This study examined the influence of FDI on poverty alleviation in BRICS via panel methods for econometric estimation using data from 1989 to 2020. Economic growth as a channel in the FDI–poverty nexus was also explored. Except for mortality rate, poverty alleviation triggered by FDI was achieved in BRICS (model 1 under fixed effects; model 2 under pooled OLS). Economic growth-led poverty reduction was observed across all three panel methods (models 1 and 3) and in model 2 under the pooled OLS. The interaction variable (FDI x economic growth) significantly enhanced poverty reduction in models 1 and 3 across the three panel data methods employed. Similar results were observed in model 2 under the pooled OLS methodology. Policies geared at promoting FDI to reduce poverty should be implemented by BRICS authorities. Further research should explore the minimum threshold levels of FDI necessary to significantly reduce poverty in BRICS. Such a study would be more useful and relevant for policy making decisions related to poverty reduction.

Funding: This study received no specific financial support.

Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

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