

Acta
Universitatis
Danubius



ÆCONOMICA

FDI's Influence on International Trade in BRICS. Is Technology-Related Infrastructure Relevant?

Kunofiwa Tsaurai¹

Abstract: Objectives: The role played by foreign direct investment (FDI) in enhancing international trade in BRICS was the focus of this study. It also studied technology's ability to affect FDI's role in international trade within the same global economic bloc. **Prior Work:** Available literature on the FDI-international trade nexus still shows a lot of gaps, mixed, divergent and unanswered questions. **Approach:** Fully modified ordinary least squares (OLS) and fixed effects are the two panel methods of data (1995-2023) analysis employed. **Results:** Both methods show that FDI significantly enhanced international trade in models 1 and 2. Under both panel methods and across all three models, technological advancement's enhancing influence on international trade was found to be significant. Models 1 and 2 under both methods indicated that technology significantly enhanced FDI's effect on international trade. **Implications:** Nations which fall under this global economic bloc should develop and implement FDI and technology advancement enhancement policies to boost international trade. **Value:** The paper indicates that technology is necessary in improving FDI's impact on international trade in BRICS.

Keywords: Foreign Direct Investment; Technology; Foreign Trade; BRICS; Panel Data

JEL Classification: C23; F4; F21; N7; P2

¹ Professor, Department of Finance, Risk Management and Banking, University of South Africa, Pretoria, South Africa, Address: P.O. Box 392, UNISA 0003, Pretoria, South Africa, Corresponding author: tsaurk@unisa.ac.za.



Copyright: © 2026 by the authors.

Open access publication under the terms and conditions of the Creative Commons Attribution-NonCommercial (CC BY NC) license (<https://creativecommons.org/licenses/by-nc/4.0/>)

1. Introduction and Background of the Study

Three subsections constituting this part include background, contribution and structure of the study.

1.1. Background of the Study

The economic growth impact of FDI the world over is undisputable and cannot therefore be overemphasised, consistent with Romer (1986), Fu et al. (2011), Zhang et al. (2010), Solow (1956), Adams (2009), Ayenew (2022) and Swan (1956). FDI is a major source of international foreign capital flows from developed into emerging economies. There are production-oriented resources which flows alongside FDI, namely capital, technology, human expertise and managerial experience as highlighted by Sanchez-Robles and Bengoa-Calvo (2002). Isolated scholars like Amin (1974) argued that FDI retards the growth of the economy through creating monopolies which stifle competition. Other scholars argued that for FDI to economically benefit a host country, certain preconditions (absorption capacities) must be present (Chen et al., 2025; Mahembe & Odhiambo, 2014; Borensztein et al., 1998; Kulu et al., 2021; Mamingi & Martin, 2018; Baiashvili & Gattini, 2020; Mboko Ibara, 2020; Koojaroenprasit, 2012).

1.2. Contribution of the Study

These few empirical studies which explored FDI's impact on international trade inaccurately assumed that a linear relationship between two variables exist, totally ignored the role of absorption capacities, focused on single country studies and used data which is now outdated and cannot therefore be used for current policy making and decision making. Empirical studies on impact of FDI on international trade produced mixed, inconsistent, divergent, conflicting results which are far from agreeing. Some produced results which agree with FDI-led international trade hypothesis (Kumar et al., 2025; Sahoo & Dash, 2022; Illa, 2022; Wang, 2024; Abamu & Pietrzak, 2019; Sahail et al., 2021; Hailu, 2010; Kastratovic, 2024; Ky, 2025; Yusuf & Aras, 2025). The negative influence of FDI on international trade was supported by two empirical studies (Chitashvili & Sarishvili, 2025; Jaiswal & Kumar, 2025). The U-shaped hypothesis was supported by Chen et al. (2025). None of empirical research focused on BRICS economic bloc, investigated the impact of

the complementarity between FDI and technology on international trade and explored the influence of technology on FDI's ability to enhance international trade. The current study seeks to fill in these gaps in the literature.

Study's contribution to literature in the following five ways. Firstly, it is the first empirical study to the author's best awareness to investigate complementarity between FDI and technology on international trade. Secondly, no study except this current one explored this topic using BRICS as a global economic unit. Thirdly, this study is the first of its kind to examine the role of technology in influencing FDI's impact on international trade. Fourthly, this study used most recent data set (1995-2023).

1.3. Organization of the Paper

Seven sections constitute the remaining portion of this paper. Literature review is discussed in Section 2, research methodology is presented, described and explained in Section 3 whilst Section 4 presents and describes trend analysis, description statistics and correlation analysis. Section 5 is results discussion. Section 6 concludes. Section 7 list the references of the study.

2. Literature Review

According to the endogenous growth theory, FDI inflow into the host country comes alongside managerial skills, advanced technology, knowledge and physical capital, all of which are necessary ingredients to boost national productivity, economic growth and active participation in the export market (Javorcik, 2004). On the contrary, Markusen and Venables (1999) noted that FDI inflows crowds out not only domestic investment by displacing it but also economic growth and excess capacity to participate in the international export business.

According to Liu and Graham (1998), FDI reduces exports when the aim of FDI is to locally produce goods and services in the host country that were previously been exported from the home country. FDI increases exports through creating distribution and marketing capabilities that allows the home country to export products to different external markets that would have never been reached without FDI (Liu & Graham, 1998, p. 2).

Empirical research on the influence of FDI on international trade produced results which falls under four main categories. FDI-positively led international trade, FDI-negatively led international trade, feedback hypothesis, neutrality hypothesis and the U-shaped theoretical rationale.

Kumar et al. (2025) employed the panel autoregressive distributive lag (ARDL) to examine the effect of FDI on exports in Central, Eastern and Southeastern European nations. Their study used panel data spanning from 1995 to 2022. FDI alongside economic growth, domestic credit inflation and human capital development had a strong influence on enhancing exports competitiveness. Employing panel data (2000-2017) analysis, Sahoo and Dash (2022) investigated the FDI-led exports hypothesis in developing nations. The study noted that FDI had a significant enhancing influence on exports in emerging markets and less effective in low-income countries. Without being specific, the study also revealed that the impact of FDI on exports largely depend on the economic related conditions prevailing in the host country.

Illa (2022) examined the linkage between FDI and international trade in ECOWAS using the dynamic panel data analysis. International trade was positively enhanced by FDI in ECOWAS. Urban population and financial development were also noted to be key players in enhancing international trade in ECOWAS. Wang (2024) examined the influence of FDI on international trade in host nations using panel data analysis. The study noted that FDI enhanced the host country's exports competitiveness, improved trade deficit and their position in the value chain globally. It was also noted that FDI improved the host countries' technological prowess thereby boosting economic growth, value and sophistication of the exports.

Chen et al. (2025) investigated the influence of FDI on industrialization in the case of China in Africa using the generalized methods of moments (GMM) with panel data ranging from 2003 to 2020. China's FDI had a higher positive influence on industrialization in high recipient African nations than in low FDI recipient nations. The study noted that differences in the absorption capacities in the host countries played a huge role in the different levels of industrialization triggered by China's FDI. For example, host country characteristics such as human capital development, financial development, domestic investment, infrastructure development and quality of institutions influenced China's FDI enhancing effect on industrialization in African nations. A complementary relationship between FDI and international trade was observed in a study carried by Cantwell and Bellak (2000).

Abamu and Pietrzak (2019) examined the nexus between international trade and FDI in Nigeria using simple regression analysis with time series data spanning from 1995 to 2017. Correlation analysis revealed the existence of a strong positive relationship between FDI and international trade in Nigeria. Simple linear regression noted that FDI's influence on Nigeria's exports was positive and significant. Using panel data (1993-2013) analysis, Mitic and Ivic (2016) studied the role FDI plays in influencing export business in European transitional economies. The results support the FDI-led exports hypothesis in the European transitional markets, especially in relation to technological products linked exports.

Employing the augmented gravity model with panel data ranging from 2001 to 2019, Sohail et al. (2021) examined the impact of FDI on trade in Asian emerging markets. The results confirmed that FDI significantly enhanced bilateral trade in Asian emerging markets. Hailu (2010) examined the role of FDI on trade in African nations using the least square dummy variable approach. The results show that FDI led to an increase in both exports and imports in Sub Saharan African nations. Employing the quasi-maximum likelihood and system GMM approaches with panel data stretching from 2005 to 2017, Kastratovic (2024) investigated the linkage between FDI and agricultural exports in developing nations. In both the short and long run, FDI had a significant positive influence on agricultural exports in developing nations.

Chitashvili and Sarishvili (2025) investigated the role of FDI on manufacturing exports in four post-Soviet nations (Georgia, Azerbaijan, Armenia, Belarus) using panel data (2000-2023) analysis. FDI negatively affected manufacturing exports in post-Soviet group of nations. Country specific studies shows that FDI had a non-significant influence on manufacturing exports in Georgia, Azerbaijan whilst the FDI's impact on manufacturing exports was significantly positive in the case of Belarus and Armenia. Employing ARDL approach with time series data (1991-2022), Jaiswal and Kumar (2025) studied the influence of FDI on international trade performance in India. A long run relationship between FDI and international trade was confirmed by the study. The study revealed a significant negative influence of FDI on exports performance whilst FDI's positive effect on imports was found to be weak in India.

Ky (2025) examined the FDI-international trade linkage using ASEAN group of countries as a focal point of analysis. Panel data (2001-2022) analysis methods (pooled ordinary least squares, random effects, fixed effects) were employed. FDI was found to have had long run enhancing influence on international trade in

ASEAN nations. Using Economic Community of Western African States (ECOWAS) as a unit of analysis, Yusuf and Aras (2023) investigated the impact of FDI on international trade. Their study employed the ARDL approach and found out that FDI enhanced trade volumes, efficiency, flow during the period under study.

What is very clear in the empirical review is that the results are divergent, mixed, conflicting and does not agree on the exact influence of FDI on international trade. Theoretical literature also shows that FDI's impact on international trade can also be either way, positive or negative. None of the empirical studies on FDI's influence on international trade focused exclusively on BRICS, which is a misnomer considering the importance of this economic bloc in global geo-political economics. This study intends to contribute specifically to address these issues on FDI-international trade nexus.

3. Methodology

BRICS panel data spanning from 1995 to 2023 was used to establish the influence of FDI on international trade. The entire data sets were obtained from World Development Indicators, whose main advantage is that it is verifiable, publicly available, comparable, less costly and reliable. BRICS's broad and unique influence in geo-political economics was the main reason the researcher was thrilled to use the bloc as a focal point of analysis. The general model of international trade is represented in equation 1, in line with Kumar et al. (2025), Sahoo and Dash (2022), Illa (2022), Wang (2024), Cantwell and Bellak (2000), and Chen et al. (2025).

$$\text{INTRADE} = f(\text{FDI}, \text{TECH}, \text{REMIT}, \text{ASG}, \text{FD}, \text{HCD}, \text{EG}) \quad [1]$$

Where international trade (INTRADE) represents the dependent variable whilst foreign direct investment (FDI) stands for the independent variable. Technology (TECH), personal remittances (REMIT), agriculture sector growth (ASG), financial development (FD), human capital development (HCD) and economic growth (EG) are control variables in the international trade general model specification.

The theoretical influence of each control variable on international trade is summarized in Table 1.

Table 1. Control variables' explanations

Variable	Theoretical explanations	Impact
Technology infrastructure (TECH)	Xiong (2023) argued that technology improves efficiency and quality of innovation, boosts variety and volume of trade in goods and services in international markets.	+
Personal remittances (REMIT)	Bourdet and Falck (2006) noted that increased remittance inflow strengthens the local currency hence reducing the competitiveness of the country's exports. The argument was supported by Tung (2018)'s empirical study which exclusively focused on developing countries.	-
Agriculture sector growth (ASG)	Mbogela (2019) argued that high levels of agricultural sector output enable the country to export excess produce to earn foreign currency. On the contrary, Mbogela (2019) revealed that a country producing enough agricultural output is self-enough and has got a less need to import agricultural related products.	+/-
Financial development (FD)	Consistent with Rajan and Zingales (2003), improved financial development is better able to facilitate international trade related payments, risk management services provision to international trade participants and offering foreign currency management options.	+
Human capital development (HCD)	According to Tahir et al. (2018), educated people spur economic growth and high production levels that enable a nation to satisfactorily meet the demands of both local and international markets.	+
Economic growth (EG)	Yanikkaya (2003) argued that boom in the economy allows the country to not only satisfy the local market but also international trade expansion to offload excess goods and services in foreign markets. The argument was supported by Tahir et al. (2018) whose study explained that high income nations are more involved in both domestic and foreign trade. Zannou (2010)'s empirical study also supported the economic growth-led international trade hypothesis.	+

Source: Author

$$\text{INTRADE}_{it} = \beta_0 + \beta_1 \text{FDI}_{it} + \beta_2 \text{TECH}_{it} + \beta_3 (\text{FDI}_{it} \cdot \text{TECH}_{it}) + \beta_4 \text{REMIT}_{it} + \beta_5 \text{ASG}_{it} + \beta_6 \text{FD}_{it} + \beta_7 \text{HCD}_{it} + \beta_8 \text{EG}_{it} + \mu + \varepsilon \quad [2]$$

The equation 2 includes the complementary variable (FDI x TECH) on international trade in line with Xiong (2023), whose study noted that technology infrastructure facilitates FDI's positive influence on international trade. Technology infrastructure

as a channel through which international trade is enhanced by FDI was theoretically supported by Xiong (2023).

A significant positive co-efficient (β_3) means that technology enables FDI's positive effect on international trade on BRICS. Consistent with Boateng et al. (2017), fixed effects were employed as an econometric estimation approach due to its superiority in managing omitted variable bias. The study also employed FMOLS for robustness checks and managing simultaneity bias.

Table 8 (Hausman test) shows that there was no heteroscedasticity in fixed effects model as indicated by Wald test's insignificant positive value. For the random effects, the Wald test value was significantly positive, hence showing the presence of heteroscedasticity. It is on this basis that the study opted for fixed effects model and shunned the random effects, in support of Boateng et al. (2017).

4. Trend Analysis, Correlation and Descriptive Statistics

The net FDI inflows trends (1995-2023) for BRICS is presented in Figure 1.

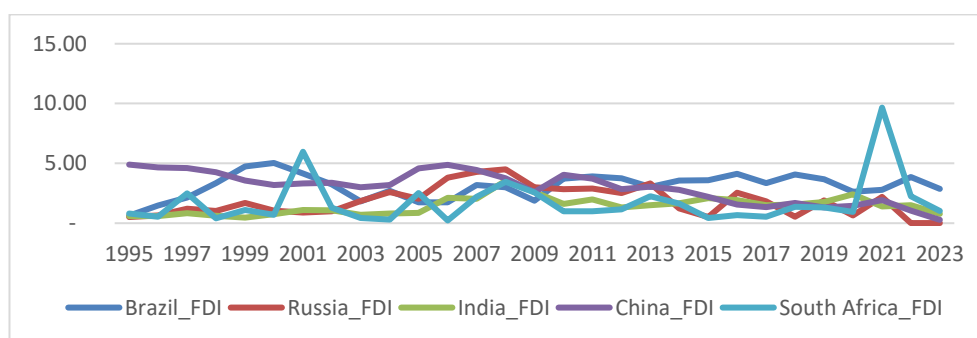


Figure 1. Net FDI inflows (% of GDP) for BRICS nations (1995-2023)

It is clear from Figure 1 that the FDI trends for BRICS nations is quite mixed, divergent and interconnected during the period from 1995 to 2023.

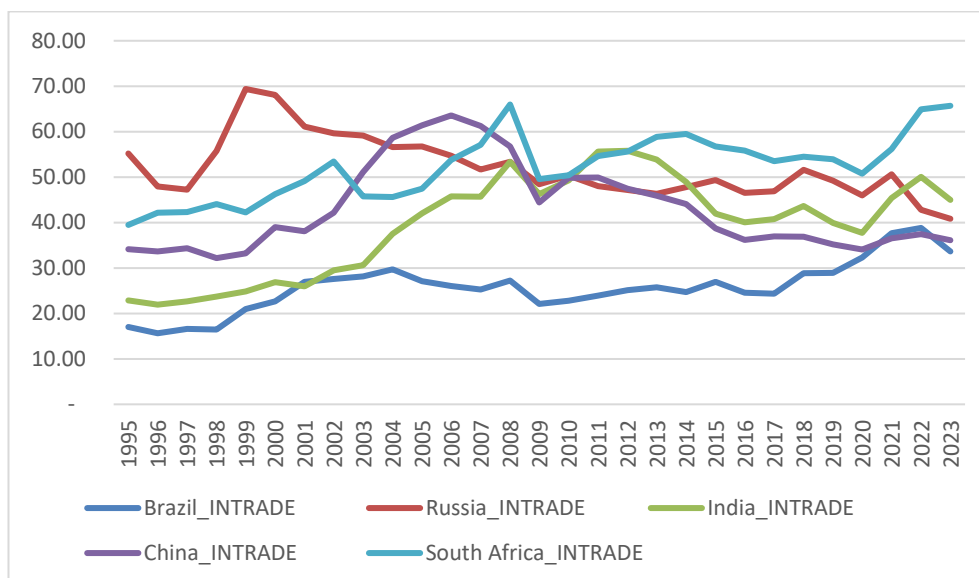


Figure 2. Total trade as a ratio of GDP for BRICS nations (1995-2023)

It is clear in Figure 2 that Brazil's total trade ratios were the lowest during the period under study. Between 1995 and 2004, Russia's total trade ratio were the highest, followed by South Africa, then China and then followed by India. The period between 2004 and 2009, the total trade ratios for the BRICS nations were quite mixed and their pattern was inconsistent. From 2009 to 2023, the total trade ratios for the BRICS countries were steady and quite predictive. South Africa had the highest trade ratios, followed by Russia, India, China and then followed by Brazil.

The weakness of correlation analysis is that the results (Table 2) does not show the causality aspect of the variables.

Table 2. Correlation results

VARIABLE	INTRAD E	FDI	TECH	REMI T	ASG	FD	HCD	EG
INTRADE	1.00							
FDI	-0.07	1.00						
TECH	0.05	0.0001	1.00					
REMIT	-0.06	-0.23** *	-0.29** *	1.00				

ASG	-0.23***	-0.06	-0.43** *	0.77** *	1.00			
FD	0.14*	-0.11	0.34** *	-0.28** *	-0.34** *	1.00		
HCD	0.04	0.16*	0.51** *	-0.71** *	-0.66** *	-0.01	1.00	
EG	-0.06	0.05	0.80** *	-0.52** *	-0.65** *	0.33** *	0.60** *	1.00

Source: Author

The maximum correlation is 80%, between technology infrastructure and economic growth. The correlation between remittances and agricultural sector growth is 77% whilst human capital development and remittances are 71% related. These statistics shows that there is a multi-collinearity problem, in line with Stead (2007)'s argument.

Table 3. Descriptive statistics

Statistic	INTRAD E	FDI	TEC H	REMI T	ASG	FD	HC D	EG
Mean	42.54	2.22	30.88	0.76	8.27	66.76	0.71	5566.88
Median	44.99	1.94	19.07	0.22	5.48	53.10	0.72	5105.89
Maximum	69.39	9.66	92.25	4.17	25.20	266.61	0.85	15941.45
Minimum	15.64	0.01	0.01	0.03	1.93	13.67	0.48	375.18
Standard. deviation	12.71	1.46	29.39	1.15	6.36	40.92	0.08	4142.44
Skewness	-0.19	1.17	0.53	1.63	1.01	1.48	-0.61	0.60
Kurtosis	2.17	6.18	1.82	3.92	2.72	6.30	2.66	2.35
Jarque-Bera	5.03	94.16	15.22	69.42	25.31	118.88	9.72	11.16
Probability	0.01	0.00	0.00	0.00	0.06	0.00	0.00	0.00
Observations	145	145	145	145	145	145	145	145

Source: Author

The standard deviation for economic growth variable and the range for financial development and economic growth exceeded 100. Such results indicate that outliers exist in the economic growth and financial development variables. Probabilities of the Jarque-Bera criterion are equivalent to zero, indicating that the data set does not

follow a normal distribution. In line with Aye & Edoja (2017), natural logarithm format of the data was followed to effectively address the issue of abnormally distributed data, extreme values and multi-collinearity problem.

5. Results Discussion

Table 4 presents panel stationarity tests results.

Table 4. Panel stationarity - Individual intercept

Level stage				
Variable	Levin et al. (2002)	Im et al. (2003)	ADF (Augumented Dick Fuller)	PP (Phillip Perron)
LINTRADE	-1.76**	-0.64	9.91	6.86
LFDI	1.37	-0.37	21.22**	37.71***
LTECH	-9.01***	-7.02***	64.46***	105.65***
LREMIT	-14.64***	-9.02***	44.92***	64.30***
LASG	-3.76***	-1.93**	18.29*	21.00**
LFD	-1.40*	0.78	6.75	6.17
LHCD	-2.58***	-1.87**	19.07**	29.56***
LEG	-0.99	1.05	4.01	3.10
First difference stage				
LINTRADE	-4.63***	-4.95***	43.26***	78.18***
LFDI	-1.23*	-5.04***	45.34***	82.78***
LTECH	-2.25**	-2.29**	21.05**	37.21***
LREMIT	-9.16***	-10.82***	99.62***	97.75***
LASG	-5.41***	-5.48***	47.93***	80.38***
LFD	-2.06**	-3.28***	28.35***	66.65***
LHCD	-10.45***	-10.39***	97.13***	111.62***
LEG	-4.63***	-3.68***	31.88***	48.09***

Source: Author

The results indicate that the data is stationary at first difference (integrated of order 1), in line with Odhiambo (2015).

Table 5 shows a long run relationship among the used variables, consistent with the existence of at most seven co-integrating relationships. These results resonate with Ayenew (2022).

Table 5. Johansen Fisher's approach

Hypothesised number of co-integrating equations	Fisher's trace test	Probability	Fisher's max-eigen test	Probability
None	553.3	0.0000	184.4	0.0000
At most 1	229.1	0.0000	93.76	0.0000
At most 2	161.6	0.0000	72.77	0.0000
At most 3	99.83	0.0000	45.59	0.0000
At most 4	61.54	0.0000	27.33	0.0023
At most 5	41.79	0.0000	19.09	0.0391
At most 6	33.42	0.0002	23.61	0.0087
At most 7	29.97	0.0009	29.97	0.0009

Source: Author

The ensuing section of the paper focuses on results discussion.

Table 6. Fixed effects

Variable	Model 1	Model 2	Model 3
FDI	0.04***	0.25***	-0.06
TECH	0.07*	0.27***	0.10***
FDI.TECH	0.003***	0.19***	0.02
REMIT	0.03	0.04	0.001
ASG	0.43***	0.31**	0.38**
FD	0.09	0.02	0.11
HCD	0.91	0.97**	0.53
EG	-0.19**	0.28	0.62
Prob F-statistic	0.00	0.00	0.00
F-statistic	23.66	29.73	25.57
Adjusted R-squared	0.67	0.73	0.62

***, ** and * denote 1%, 5% and 10% levels of significance, respectively

Source: E-Views

Model 1 employs individuals using the internet (% of population), model 2 uses fixed telephone subscriptions (per 100 people) whilst mobile cellular subscriptions (per 100 people) was used in model 3. Under both fixed effects and FMOLS methods, FDI significantly enhanced international trade under model 1 and 2, consistent with Javorcik (2004) and Markusen and Venables (1999)'s arguments. A non-significant negative impact of FDI on international trade was observed in model 3 under both FMOLS and fixed effects. The results are consistent with an argument put forward by Liu and Graham (1998) whose study noted that FDI reduces exports when the

aim of FDI is to locally produce goods and services in the host country that were previously been exported from the home country.

Under both panel methods, technology advancement had a significant positive effect on international trade across all the models, in line with Xiong (2023) whose study explained that technology improves efficiency and quality of innovation, boosts variety and volume of trade in goods and services in international markets. The complementarity between FDI and technology significantly improved international trade in model 1 and 2 under FMOLS and fixed effects. In other words, technology helped FDI to significantly enhance international trade, consistent with Xiong (2023) whose study showed that both FDI and technology pulls along the same direction in improving innovation, efficiency and international trade.

Under fixed effects, personal remittances' influence on international trade was positive but non-significant across all models and similar results were shown under FMOLS in model 2. Model 1 and 3 under FMOLS indicated that personal remittances had a non-significant negative effect on international trade, in agreement with Bourdet and Falck (2006) whose study noted that increased remittance inflow strengthens the local currency hence reducing the competitiveness of the country's exports.

Table 7. FMOLS

Variable	Model 1	Model 2	Model 3
FDI	0.15***	0.48***	-0.006
TECH	0.14***	0.33***	0.15***
FDI.TECH	0.17***	0.11***	0.003
REMIT	-0.001	0.05	-0.03
ASG	0.60***	0.53**	0.69***
FD	0.17**	0.01	0.19
HCD	0.004	0.61	0.38
EG	0.02	0.21***	0.02
Observations	145	145	145
Number of countries	5	5	5
Adjusted R-squared	0.66	0.70	0.58

***, ** and * denote 1%, 5% and 10% levels of significance, respectively

Source: E-Views

Agricultural sector growth's positive impact on international trade was found to be significant across the three models under both fixed effects and FMOLS. These results agree with Mbogela (2019) whose study noted that high levels of agricultural sector output enable the country to export excess produce to earn foreign currency.

Under the FMOLS approach in model 1, financial development's positive impact on international trade was found to be significant. Under fixed effects, all three models show that financial development had a non-significant enhancing influence on international trade and similar results were observed under FMOLS (model 2 and 3). These results generally agree with Rajan and Zingales (2003) whose study noted that financial development is better able to facilitate international trade related payments and risk management services provision.

Model 2 (fixed effects) approach indicates that international trade was significantly enhanced by human capital development. Model 1 and 3 under fixed effects and all three models under FMOLS indicates that human capital development's positive effect on international trade was found to be non-significant. The results agree with Tahir et al. (2018) whose study argued that educated people spur economic growth and high production levels that enable a nation to satisfactorily meet the demands of both local and international markets. Fixed effects show that economic growth non-significantly enhanced international trade in models 2 and 3 and similar results are evident under FMOLS in models 1 and 3. The results resonate with Yanikkaya (2003) whose study explained that economic boom allows the country to not only satisfy the local market but also international trade expansion.

Table 8. The Hausman test results are presented next

Statistic	Fixed effects			Random effects			FMOLS		
Test	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Hausman (Chi2)	9.14***	19.05***	37.17***	11.11***	14.12***	38.92***			
Wald tests (Chi 2)	3.17	11.21	13.17	4.92 **	39.32***	19.02***			

***and ** denote 1% and 5% levels of significance, respectively

Source: E-Views

Fixed effects approach was preferred because Table 8 results (probability of 0.00) indicates that fixed effects should be accepted ahead of random effects. The 0.00 probability values of the two approaches' F-statistics is also evidence that regression models employed fitted well with the used data sets.

6. Conclusion

The study explored the role played by FDI in enhancing international trade in BRICS nations. It also studied technology's ability to affect FDI's role in international trade within the same global economic bloc. The available literature on the FDI-international trade nexus still shows a lot of gaps, unanswered questions, mixed, divergent and inconsistent hence this study attempted to fill the gap(s). Fixed effects and fully modified ordinary least squares (OLS) are the two panel methods of data (1995-2023) analysis employed in this study. Both FMOLS and fixed effects show that FDI significantly enhanced international trade in models 1 and 2. Under both panel methods and across all three models, technological advancement's enhancing influence on international trade was found to be significant. Moreover, models 1 and 2 under both panel methods indicated that technology significantly enhanced FDI's effect on international trade. In other words, the complementary relationship between FDI and technology significantly improved international trade in BRICS. Countries which fall under this global economic bloc should develop and implement FDI and technology advancement enhancement policies to boost international trade. Further research should focus on investigating minimum FDI and technology threshold levels that significantly enhances international trade in BRICS.

Declaration

I hereby declare that this is my own work, no conflict of interest and I did not use any artificial intelligence to help generate this article.

References

- Abamu, B. E., & Pietrzak, J. (2019). Relationship between FDI and international trade. *International Business and Global Economy*, 38, 105-118.
- Adams, S. (2009). Foreign direct investment, domestic investment and economic growth in Sub-Saharan Africa. *Journal of Policy Modeling*, 31(6), 939-949.
- Adeoye, A. (2007). *Macro-economic level corporate governance and FDI in emerging markets: Is there a close relationship?* Dissertation Thesis, King's College London. <https://ssrn.com/abstract=1120816>
- Amin, S. (1974). *Accumulation on a world scale: A critique of the theory of underdevelopment*. Monthly Review Press.

- Aye, G. C., & Edoja, P. E. (2017). Effect of economic growth on CO2 emission in developing countries: Evidence from a dynamic panel threshold regression model. *General and Applied Economics*. <https://doi.org/10.1080/23322039.2017.1379239>
- Ayenew, B. B. (2022). The effect of foreign direct investment on the economic growth of Sub-Saharan African countries: An empirical approach. *Cogent Economics and Finance*, 10(1), 1-12.
- Baiashvili, T., & Gattini, L. (2020). *Impact of FDI on economic growth: The role of country income levels and institutional strength: European Investment Bank*. <http://dx.doi.org/10.2753/REE1540-496x450106>
- Bailliu, J. N. (2000). *Private Capital Flows, Financial Development, and Economic Growth in Developing Countries*. International Department Bank of Canada.
- Boateng, E., Amponsah, M., & Baah, A., (2017). Complementarity effect of financial development and FDI on investment in Sub-Saharan Africa: A panel data analysis. *African Development Review*, 29, 305–318.
- Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45(1), 115-135.
- Bourdet, Y., & Falck, H. (2006). Emigrants' remittances and Dutch disease in Cape Verde. *International Economic Journal*, 20(3), 267-284.
- Cantwell, J., & Bellak, C. (2000). The impact of foreign direct investment on international trade. *Journal of International Relations and Development*, 3(2), 120-127.
- Chen, D., Isah, A. B., & Gummi, U. M. (2025). Effect of foreign direct investments on industrialization: The case of China in Africa. *Journal of African Economies*, 34(1), 53-79.
- Chitashvili, V., & Sarishvili, D. (2025). The impact of foreign direct investment on manufacturing industry exports. *German International Journal of Modern Science*, 99, 27-37.
- Fu, X., Pietrobelli, C., & Soete, L. (2020). The effect of foreign technology and indigenous innovation in the emerging economies: Technological change and catching up. *World Development*, 39(7), 1204-1212.
- Hailu, Z. A. (2010). Impact of foreign direct investment on trade of African countries. *International Journal of Economics and Finance*, 2(3), 122-133.
- Illa, E. I. (2022). Impact of foreign direct investment on international trade in West African Economic and Monetary Union countries using dynamic panel. *Modern Economy*, 13(6), 833-851.
- Im, K. S., Pesaran, M. H., & Shin, Y. (2003). Testing unit roots in heterogeneous panels. *Journal of Econometrics*, 115(1), 53-74. [doi.org/10.1016/S0304-4076\(03\)00092-7](https://doi.org/10.1016/S0304-4076(03)00092-7)
- Jaiswal, K. K., & Kumar, N. (2025). How does inward FDI lead to trade performance and sustainable growth in India? *Journal of Lifestyle and SDG's Review*, 5(2), 1-24.
- Javorcik, B. S. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *The American Economic Review*, 94(3), 605-627.

- Kastratovic, R. (2024). The impact of foreign direct investment on agricultural exports: The evidence from developing countries. *The Journal of International Trade and Economic Development: An International and Comparative Review*, 33(2), 276-293.
- Koojaroenprasit, S. (2012). The impact of foreign direct investment on economic growth: A case study of South Korea. *International Journal of Business and Social Science*, 3(21), 8-19.
- Kulu, E., Mensah, S., & Mike Sena, P. (2021). Effects of foreign direct investment on economic growth in Ghana: The role of institutions. *Economics of Development*, 20(1), 23-34.
- Kumar, P., Moridian, A., Radulescu, M., & Margarita, I. (2025). The impact of foreign direct investment on exports: A study of selected countries in the CESEE region. *Economies*, 13(6), 1-25.
- Ky, S. (2025). The examination of the effects of FDI on international trade of the ASEAN economic community. *Journal of Ecohumanism*, 4(1), 675-681.
- Lean, H. H. (2008). The Impact of Foreign Direct Investment on the Growth of the Manufacturing Sector in Malaysia. *International Applied Economics and Management Letters*, 1(1), 41-45.
- Levin, A., Lin, C. F., & Chu, C. S. J. (2002). Unit root tests in panel data: Asymptotic and finite-sample properties. *Journal of Econometrics*, 108(1), 1-24.
- Liu, L., & Graham, E. M. (1998). The relationship between trade and foreign direct investment: Empirical results for Taiwan and South Korea. Peterson Institute for International Economics. *Working Paper Series*, 98/7, 1-11.
- Mahembe, E., & Odhiambo, N. M. (2014). Foreign direct investment and economic growth: A theoretical framework. *Journal of Governance and Regulation*, 3(2), 63-70.
- Mamingi, N., & Martin, K. (2018). Foreign direct investment and growth in developing countries: Evidence from the countries of the Organization of Eastern Caribbean States. *CEPAL Review*, 124, 79-98.
- Markusen, J. R., & Venables, A. J. (1999). Foreign direct investment as a catalyst for industrial development, *European Economic Review*, 43(2), 335-356.
- Mbogela, C. S. (2019). An empirical study on the determinants of trade openness in the African economies, *Advances in Management and Applied Economies*, 9(3), 9-42.
- Mboko Ibara, S. B. (2020). Effect of foreign direct investments on economic growth in CEMAC zone: Role of human capital. *Modern Economy*, 11, 2122-2144.
- Mitic, B., & Ivic, M. (2016). The impact of foreign direct investment on export performance: Case of European transition economies, *Independent Journal of Management and Production*, 7(3), 771-785.
- Rajan, R. G., & Zingales, L. (2003). The Great Reversals: The politics of financial development in the 20th century, *Journal of Financial Economics*, 69(1), 5-55.
- Romer, P. (1986). Increasing returns and long run economic growth. *Journal of Political Economy*, 94(5), 1002-1037.
- Sahoo, P., & Dash, R. K. (2022). Does FDI have differential impacts on exports? Evidence from developing countries. *International Economics*, 172(2022), 227-237.

- Sanchez-Robles, B., & Bengoa-Calvo, M. (2002). *Foreign direct investment, Economic Freedom and Growth: New evidence from Latin-America*. Universidad de Cantabria, Economics Working Paper No. 4/03. <http://dx.doi.org/10.2139/ssrn.353940>.
- Sohail, H. M., Zatullah, M., & Zengfu, L. (2021). *Effect of foreign direct investment on bilateral trade: Experience from Asian emerging economies*. Sage Journals. <https://doi.org/10.1177/21582440211054487>
- Solow, R. M. (1956). A contribution to the theory of economic growth. *The Quarterly Journal of Economics*, 70(1), 65-94.
- Stead, R. (2007). *Foundation quantitative methods for business*. Prentice Hall.
- Swan, T. (1956). Economic growth and capital accumulation. *The Economic Record*, 32(2), 334-361.
- Tahir, M., Hasnu, S., & Estrada, M.R., (2018). Macroeconomic determinants of trade openness: Empirical investigation SAARC region, *Journal of Asia Business Studies*, 12(2), 151-161.
- Tung, I. T. (2018). Impact of remittance inflows on trade balance in developing countries. *Economics and Sociology*, 11(4), 80-95.
- Wang, Z. (2024). Analysis of the influence of foreign direct investment on the international trade pattern of host countries. *SHS Web of Conferences*, 200(2024), 1-5.
- Xie, X., & Wang, H. (2009). On effects of Foreign Direct Investment on Economic Growth. *International Business Research*, 2(4), 100-108.
- Xiong, T. (2023). The effect of technological intensity on international trade. *International Economics*, 176(December), 1-12.
- Yakubu, A. S., Aboagye, A. Q. Q., Mensah, L., & Bokpin, G. A. (2018). Effect of financial development on international trade in Africa: Does measure of finance matter. *The Journal of International Trade and Economic Development*, 27(8), 917-936.
- Yanikkaya, H. (2003). Trade openness and economic growth: a cross-country empirical investigation. *Journal of Development Economics*, 72, 57-89.
- Yusuf, I., & Aras, O. N. (2023). The impact of foreign direct investment on international trade in the ECOWAS region. *Journal of Management Economics and Industrial Organization*, 7(2), 61-76.
- Zannou, A. (2010). Determinants of Intra-ECOWAS trade flows. *African Journal of Business Management*, 4, 678-686.