The Dynamics of Trade and Investment on the Expansion of BRICS Economies

Abstract

Purpose: The emerging economies of BRICS have an opportunity to stimulate growth and development as well as unlock the potential for cooperation among member states. BRICS has become a major global key player due to the advantage in demographic, geographic and economic attributes peculiar to the economies. Deeper ties and cooperation among BRICS have fostered growth and development from trade openness, capital inflow, acquiring technological know-how and administrative abilities to growing economies. Hence, the study assessed the dynamics of trade and investment in the expansion of BRICS economies

Methodology: The study employed cross-sectional models via the panel-corrected standard error, Discrol and Kraay and Augmented Mean Group in the context of BRICS and BRICS+ countriesbetween 1990 and 2022. Furthermore, the study evaluates the Dumitrescu–Hurlin panel causality to answer the question of potential causation among the variables.

Results: Findingsrevealthat trade and FDI have a dynamic impact on the expansion of BRICS economies. An increase in BRICS membership situates an increase in market coverage, the spread of the spillover effect, and deeper ties and cooperation among BRICS. Trade openness has a positive and significant impact on the BRICS+ economies. Meanwhile, FDI has a negative and significant impact on the BRICS+ economies. There is a bidirectional relationship between trade openness, foreign direct investment and economic growth in the expansion of BRICS economies.

Conclusion: This study concludes that trade openness and foreign direct investment should be used to foster more of deeper ties and cooperation than economic profit among BRICS.

Keywords: Trade Openness; Foreign Direct Investment, Cross-Sectional Dependence, BRICS

JEL Code: F13, F21, C52,O47

Introduction

BRICS economies have an opportunity to stimulate growth and development as well as unlock the potential for cooperation among member states. BRICS has become a major global key player due to the advantage in demographic, geographic and economic attributes peculiar to the economies. Deeper ties and cooperation among BRICS have fostered growth and development from trade openness, capital inflow, acquiring technological know-how and administrative abilities to economic growth. Although, growth and development have been an age-long phenomenon before the millennium era till sustainability. There are several contentions in the body of literature on the role of a closed and open economy towards growth and development.

Unlike the closed economy that restricts the growth and development of a country to domestic activities, an open economy facilitates export diversification, international trade, foreign capital flows and investment. According to the trade-led growth theory, an open economy also increases the productivity of its factors of production, attains economic efficiency in the distribution of its limited resources, and has access and choices to goods and services. Hence, the dynamics of foreign trade and foreign investment in the expansion of BRICS economies become imperative.

An open economy began to pay off for developing nations after the 1980s. Meanwhile, before this period, an open economy ran the danger of growing dependent on imports, raising the price of goods and services, and seeing the value of the local currency decline (Shayanewako, 2018; Jafari, and Britz, 2018; Cooke, 2010; Haussmann, Hwang, and Rodrik, 2007). Nowadays, practically all countries strive to create a strong supply chain network (like BRICS countries) to lower risk and increase supply chain surplus (Kumari & Bharti, 2021; Morrow et al., 2022) which consequently, had a major effect on labour, raw material, and other resource mobility, as well as trade and capital flow. For instance, as of 2022, underdeveloped nations have received around $32 billion from BRICS for new water supply, road, bridge, and rail projects (BRICS Summit, 2023; Cochrane and Zaidan, 2024).

Global economy particularly in trade increased dramatically, hitting around 26.02 trillion in 2012 and 28.5 trillion in 2021 (Beverelli&Ticku, 2022). Meanwhile, due to various global economic shocks and the insurgency of COVID-19, global trade witnessed a significant decrease in 2019, hovering around 18 trillion. This is a demonstration that trade openness has been a crucial factor for growth and development in many countries, the growth rate of goods trade in developing countries has outpaced that of developed countries (Gnangnon, 2024). Furthermore, an economy that is becoming increasingly internationally connected and open is indicated by a significant influx or outflow of direct investments. For instance, the proportion of foreign direct investment (FDI) in the BRICS economies has been steadily rising since their establishment, culminating in a 19% share in 2018, the World Bank Group (2018). FDI inflows to the BRICS rose dramatically in 2018, rising from USD 84,402 million to USD 261,219 million. A further benefit of FDI is the acquiring technological know-how and administrative abilities (Meyer & Sinani, 2009).

Before BRICS+, about 45% of the world's population and 28% of the global economy now reside in the growing emerging economy of BRICS. In 2024, countries with high profiles of FDI joined the emerging economies (see Figure 1). In addition, Table 1 shows that these newly joined countries are ranked high in human development indices (UNDP, 2024). Within this foregoing, assessing the impact of foreign trade and foreign investment on the expansion of BRICS economies becomes inevitable. Hence, the study intends to evaluate the relationship between trade openness and foreign direct investment on the economic growth of the BRICS+, taking into account the advantages and greater possibilities that come with an open economy. It also highlights how an emerging economy establishes deeper ties among members since an open economy promotes economic growth by enabling the adoption of new technologies and the flow of information and skills (Sala-i-Martin and Barro, 1995; Rivera-Batiz and Romer, 1991). Also, research has shown that an open economy negatively impacts developing nations' ability to expand economically. According to this research (Cooke, 2010; Jafari Samimi et al., 2012), an

open economy may increase inflation and cause currency rates to drop. Developing nations that manufacture low-tech and non-secondary products frequently devalue their currencies to boost exports. Therefore, trade liberalization may have a particularly negative impact on economic growth for nations that prioritize the manufacturing and production of low-quality items. Meanwhile, there is conflicting evidence in the literature with these findings about how an open economy affects developing countries' capacity to grow economically. There might be several reasons for the discrepancy between these studies, including differing explanatory variables, econometric techniques, and/or regional integration. Furthermore, when evaluating how the open economy affects developing countries' capacity to grow economically, the previous studies may ignore possible cross-country dependence and the heterogeneous nature of these countries.

In numerous areas, this specific study adds to the corpus of information already available regarding the empirical understanding of the relationship between an open economy and economic growth. For one, in contrast to other earlier research that looked into this theory utilizing a particular nation and BRICS analysis (Nguyen et al., 2022; Banday et al., 2021; Shayanewako, 2018; Hayrdaroglu, 2016), the current research examines the impact of trade openness and foreign direct investment on economic growth using a cross-sectional homogeneity assumption due to recent expansion of the emerging economies of BRICS. Also, this study is more adequate and relevant to establish the importance of global integration within the BRICS economies due to geographical advantage coupled with diverse economic factors within the BRICS expansion than individual economy study. Besides, these groups of economies could impose cross-sectional homogeneity which can situate the sufficiency of the estimate on emerging and developing economies. In addition, the potential contributions of newly joined countries will be established. Furthermore, the main distinctive characteristic of this paper on this issue lies in the additional countries, measurement of variables, econometric models and the scope of the study.

Table 1: Stylize Facts for BRICS+ Countries

Country	Population	Area	GNI per capita	Human Development Index	Member
Brazil	215.31 M	8,516,000 km²	14, 616 USD	0.760	2008
China	1,425.67 M	9,563,000 km²	18, 025 USD	0.788	2008
Egypt	110.99 M	1,001,000 km²	12, 361 USD	0.728	2024

Ethiopia	123.38 M	1,104,000 km²	2, 369 USD	0.492	2024
India	1,425.78 M	3,287,000 km²	6, 951 USD	0.644	2008
Iran	88.55 M	1,648,000 km²	14, 770 USD	0.780	2024
Russia	144.24 M	17,098,000 km²	26, 992 USD	0.821	2008
Saudi Arabia	36.41 M	2,150,000 km²	50, 620 USD	0.875	2024
South Africa	59.89 M	1,219,000 km²	13, 186 USD	0.717	2011
United Arab Emirates	9.44 M	84,000 km²	74,104 USD	0.937	2024
BRICS	3,270.89M	39,683,000 km²	15,954 USD	0.717	
BRICS+	3,639.66M	45,670,000 km²	23, 399 USD	0.754	
World	8,000.000M	510,000,000 km²	17, 254 USD	0.739	

Source: UNDP (2024)

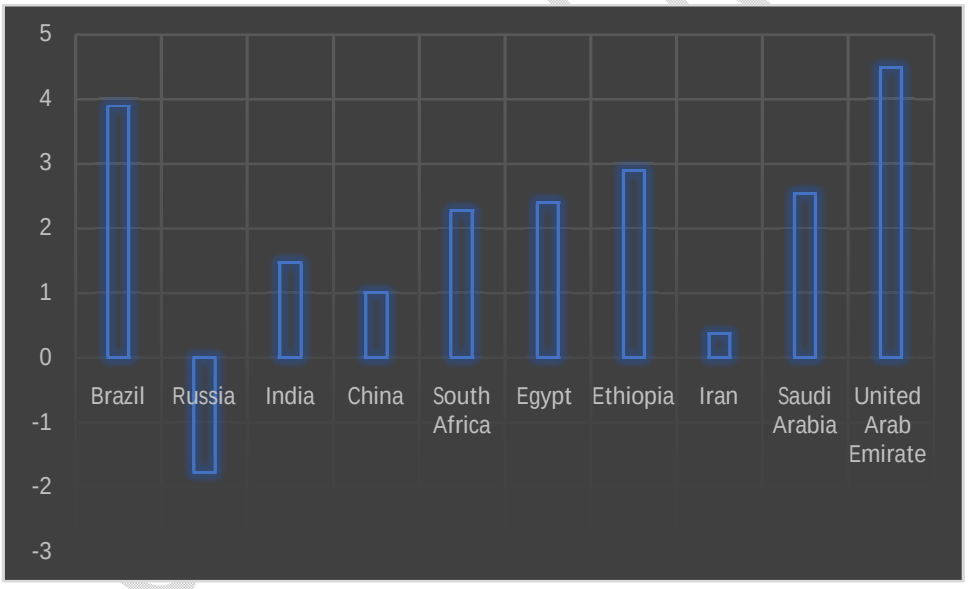

Figure 1: Foreign Direct Investment in BRICS Plus

Literature Review

The beneficial impact of trade and investment on an economy cannot be overemphasized even though there are mixed results on the contributions of trade openness and foreign direct investment in many emerging economies. The mixed results could be due to many factors including country-specific study, measurement of variables, econometric models and a panel of countries. Shayanewako (2018) offers an inquiry into the link between open trade and the growth of BRICS economies spanning 1990-2017. This research provides important concrete information to comprehend the trade-growth relationship in these emerging economies, especially in light of the BRICS nations' priority on strengthening trade and investment links. The sophisticated econometric techniques explain the long-run and causal relationships between trade openness and economic growth in the BRICS context. As evidence of the vital function that trade plays in the growth of BRICS economies, the study demonstrates the long-term implication between trade openness and economic growth in these economies. Moreover, there are two ways a relationship between trade openness and economic growth, indicating that not only does trade openness drive economic growth, but economic growth also fosters trade openness in these nations. Meanwhile, the study reveals a one-way relationship between trade openness to economic growth mainly in China, this finding suggests that there is a unique and dynamic event within the BRICS consortium, and the expansion of BRICS suggests more future uniqueness and dynamic events on the link between trade and economic growth in the BRICS economies.

Nguyen et al. (2022) further supported this, showing that trade openness can reduce the shadow economy. The study employed Bayesian panel regression, a robust statistical method, to analyse the impact of trade openness on the shadow economy. This approach allows for an understanding of the relationship and accommodates the complexities and heterogeneities of the BRICS economies. According to the research, the BRICS nations may use trade restrictions as a tactical weapon to control the size of their shadow economies. The study also emphasises the contribution of institutional structure and economic texture to the fight against the shadow economy, highlighting a multifaceted approach for policymakers. These observations can help governments in the BRICS and other regions devise policies that promote legal economic activity while limiting the expansion of the unofficial sector.

Burange et al. (2018) provide an in-depth analysis of the relationship between trade openness and economic growth within the BRICS nations, using time series analysis to explore this nexus after the liberalisation reforms of the late 1980s. The research uniquely dissects the structural composition of GDP and trade openness through various trade dimensions, offering insights into the diverse economic dynamics of BRICS countries. The study employs an econometric technique of time series analysis to investigate the causal relationships between trade openness and GDP per capita growth in BRICS countries. This method makes it possible to comprehend the relationships between various aspects of trade openness—imports and exports of goods as well as imports and exports of services—and the expansion of these emerging nations' economies. The results show that the BRICS countries have different ties. The growth-led theory of trade in services—which postulates that trade in services is driven by economic growth—is validated in India. Trade and economic growth are mutually reinforcing, as the analysis confirms growth-led export and import theories for China and South Africa. On the other hand, no meaningful causal connections were found for Russia or Brazil. The mixed results within these

emerging economies indicate that BRICS expansion will have a more beneficial impact besides the economic factors. In addition to gaining more economic status, the additional members may reduce the likelihood of conflicts in a war zone country.

Sheikh and Malik (2021) emphasised the role of institutional quality in enhancing the impact of trade openness on economic growth. The study's unique contribution lies in examining the differential effects of imports and exports on economic growth within these countries, using the Generalized Method of Moments (GMM) to address endogeneity concerns. The study uncovers that, within the BRICS context, imports play a significantly more substantial role in spurring economic growth compared to exports or overall trade openness, which, while positive, do not achieve statistical significance. Furthermore, the research illustrates that the quality of institutional infrastructure indirectly influences economic growth by enhancing the positive impacts of higher imports.

Research suggests a positive relationship between Foreign Direct Investment (FDI) and economic growth in BRICS countries. Banday et al. (2021) explored the intricate dynamics between foreign direct investment (FDI), trade openness, and economic growth within the BRICS countries from 1990 to 2018. Utilising the auto-regressive distributed lag (ARDL) model, the authors conduct a cointegration analysis to examine the long-term relationships among the variables. Additionally, to ascertain which way these correlations are directed, they use the Dumitrescu and Hurlin Granger causality tests. The analytical findings highlight the significance of expanding into the international marketplace and luring foreign investments for sustainable development since both FDI and trade openness have a beneficial influence on long-term economic growth in the BRICS nations. Furthermore, the study identifies a long-run relationship between real effective exchange rates and gross capital formation to economic growth, highlighting additional factors contributing to the economic dynamics in these nations. In terms of causality, the analysis indicates two-way links either from FDI or economic growth, as well as between trade openness and FDI. There is also a one-way link between trade openness to FDI, suggesting that greater openness stimulates foreign investment and is an outcome of it in these economies.

Agrawal (2015) conducted a thorough analysis of the connection between FDI and GDP growth in the BRICS countries spanning from 1989 to 2012. The study employs advanced econometric techniques, specifically cointegration and causality analysis at the panel level, to scrutinise the long-term relationship between FDI and economic growth across the BRICS nations. The results of Agrawal's (2015) cointegration analysis demonstrate a strong long-term equilibrium associated with FDI and GDP growth throughout the BRICS nations. Further evidence that FDI is a key factor in these nations' economic success comes from the causality study, which shows a long-run causal relationship between FDI and economic growth.

Hayrdaroglu (2016) conducted a study analysing how economic freedom (EF) and foreign direct investment (FDI) influenced economic growth within the BRICS nations from 1995 to 2013. The study employs panel data analysis to assess the relationship between EF, FDI, and economic growth across the BRICS countries. The results of the inquiry indicate that GDP growth in the BRICS nations is positively and significantly correlated with the total index of economic

freedom, indicating the importance of a supportive policy environment in promoting economic development. The idea that foreign investment is essential for the development of developing nations' economies is further supported by the fact that FDI emerges as a positive and statistically significant factor of economic growth.

Methodology and Procedure

This study adapts the empirical models of (Banday et al., 2021; Gnangnon, 2024; Cochrane and Zaidan, 2024) to examine the effect of trade openness and foreign direct investment on economic growth in the context of BRICS and BRICS+ countries. The model is constructed as follows:

$$GDP_{it} = \partial_0 + \partial_1 TOP_{it} + \partial_2 FDI_{it} + \partial_3 GCF_{it} + \partial_4 GOV_{it} + \theta_i + g_i + \varepsilon_{it}$$

Where GDP is the dependent variable representing GDP per capita, TOP and FDI are the core explanatory variables representing trade openness and foreign direct investment while GCF and GOV represent capital formation and government expenditure as the control variables. The inclusion of these variables (GCF and GOV) represents domestic investment and government intervention from a Keynesian perspective within the domain of addressing economic growth in BRICS+ (Gnangnon, 2024; Cochrane and Zaidan, 2024). εit represents the residual term. ϑi is the unobserved country fixed effect, and θt is the time-specific effect. t and i are the time and country dimensions, respectively. Hence, this model established the relationship between trade openness, foreign direct investment and economic growth in the context of BRICS and BRICS+ countries.

An assessment of the cross-sectional dependent (CD) test was done owing to the dataset's peculiar attributes to ascertain the results' robustness. Besides, assuming independence among BRICS and BRICS+ countries could be unrealistic (Gnangnon, 2024; Cochrane and Zaidan, 2024; Kongbuamai et al. 2020). Hence, the variables are tested based on the cross-sectionally augmented Im, Pesaran, and Shin (CIPS) and Dickey-Fuller (CADF) tests. This ensures an unbiased estimate pf the models. Following the position of extant studies (Kongbuamai et al. 2020), the panel-corrected standard error (PCSE), Discrol and Kraay (D-K) and Augmented Mean Group (AMG) were deployed to examine the relationship between trade openness, foreign direct investment and economic growth in the context of BRICS and BRICS+ countries. This approach is robust to CD and heterogeneity (Kongbuamai et al. 2020; Baloch and Wang 2019). It is suitable for balanced and unbalanced panel datasets, as it estimates the consistent standard errors in line with linear panel model regression. Furthermore, the study evaluates the Dumitrescu–Hurlin panel causality to answer the question of potential causation among the variables. Moreover, Dumitrescu-Hurlin panel causality has the advantage of being more successful when CD is present.

This study uses a panel dataset consisting of BRICS-5 and BRICS-8 (Egypt, Iran and Saudi-Arabia) countries between the period 2000 and 2022 to examine the relationship between trade openness, foreign direct investment and economic growth in the context of BRICS and BRICS+ countries. Panel A explains BRICS while panel B explains BRICS+ countries. The measure of

variables is presented in Table 2. Overall, these variables are annual data sourced from World Bank World Development Indicators.

Table 3 indicates that the GDP per person in BRICS was $11482 on average, but increased to $15398 as a result of BRICS expansion. This suggests that economic strength may be induced for individuals through the BRICS expansion. Considering this expansion, BRICS+ is a step away from enhancing deeper ties and cooperation within the organization and solving shared geopolitical and economic concerns (Bloomberg, 2023a; Sun, 2016). In addition, BRICS have liberalized trade and FDI at a consistent rate over the past few years. Hence, there are growing contributions of trade and FDI in the BRICS economies. The degree of association between variables is between 0 and 1 as expected. In BRICS countries, there is a 0.035 positive correlation between trade openness and foreign direct investment and a 0.046 positive correlation between trade openness and capital formation. However, in BRICS+, there is a 0.054 negative correlation between trade openness and foreign direct investment and a 0.035 negative correlation between trade openness and capital formation. The reason could be that an open economy with deeper ties like BRICS has the potential to increase efficiency and promote the possibility of foreign direct investment in the global economy, unlike BRICS+ which has limited deeper ties been newly emerging economies. Furthermore, the correlation shows that trade and FDI correlate oppositely with economic growth in BRICS and BRICS+. However, to effectively capture and analyse the relationship between trade openness, foreign direct investment and economic growth in BRICS and BRICS+, it is necessary to subject the variables to a more robust analysis within the emerging economies.

Table 2: Description of Variables

Variable	**Symbol**	**Measurement**	**Source**
Economic Growth	GDP	Constant GDP per capita	WDI, 2023
Trade Openness	TOP	Trade as a % of GDP	WDI, 2023
Foreign Direct Investment	FDI	Foreign Direct Inflow as a % of GDP	WDI, 2023
Capital Formation	GCF	Gross Fixed Capital Formation as a % of GDP	WDI, 2023
Government Spending	GOV	Government Spending as a % of GDP	WDI, 2023

Source: Authors' Compilation (2024)

Table 3: Preliminary Statistics

BRICS							**BRICS+**					
Var.	**GDP**	**TOP**	**FDI**	**GCF**	**GOV**		**GDP**	**TOP**	**FDI**	**GCF**	**GOV**	**Var.**
Mean	11482.3	40.929	2.013	24.412	16.234		15398.75	45.835	1.706	23.887	16.139	**Mean**
Std. Dev.	6792.11	14.734	1.569	8.648	3.18		12187.84	16.339	1.647	7.663	4.708	**Std. Dev.**
Min	1423.9	15.156	-	13.184	9.802		1423.89	15.156	-1.776	12.446	7.268	**Min**

			1.776				6					
Max	28057	110.577	9.678	44.519	21.067		50188.3	110.577	9.678	44.519	34.155	**Max**
Obs	165	165	165	165	165		264	264	264	264	264	**Obs**
GDP	1.000						1.000					**GDP**
TOP	0.295*	1.000					0.601**	1.000				**TOP**
FDI	-0.023	0.035	1.000				-0.213**	-0.054	1.000			**FDI**
GCF	-0.359*	0.046	0.196*	1.000			-0.224**	-0.035	0.094	1.000		**GCF**
GOV	0.673*	0.008	0.114	-0.528*	1.000		0.763**	0.318**	-0.081	-0.299**	1.000	**GOV**

Source: Authors' Compilation (2024), **** p<0.01, ** p<0.05, * p<0.1*

Results and Discussion

The test outcomes presented in Table 4 show that multiple levels of significance substantially rejected the null hypothesis of cross-sectional independence, demonstrating the existence of cross-sectional dependency in the study. Hence, country-specific effects in examining the relationship between trade openness, foreign direct investment and economic growth might result in biased conclusions about BRICS and BRICS+. Since CD has been established in the panel, the application of first-generation estimation techniques such as traditional unit roots become inept. Thus, this study applies second-generation unit root and estimation techniques. Cross-sectionally augmented Im, Pesaran, and Shin (CIPS) and cross-sectionally augmented Dickey-Fuller (CADF), which take care of both CD and heterogeneity, are used. The unit root tests presented in Table 5 reveal that the variables are integrated of orders 0 and 1 with intercepts.

Table 4: Cross-Sectional Dependence

	Variable	CD-test	p-value	Corr	abs(Corr)
	GDP	16.220***	0.000	0.893	0.893
	TOP	5.720***	0.000	0.315	0.454
BRICS	**FDI**	3.210***	0.001	0.177	0.265
	GCF	4.010***	0.000	0.221	0.258
	GOV	2.560***	0.010	0.141	0.230
	GDP	24.950***	0.000	0.821	0.821
	TOP	8.330***	0.000	0.274	0.384
BRICS+	**FDI**	4.780***	0.000	0.157	0.216
	GCF	2.170**	0.030	0.071	0.316
	GOV	2.000**	0.046	0.066	0.228

Source: Authors' Computation (2024),Notes: Under the null hypothesis of cross-section independence CD ~ N(0,1)

Table 5: Panel Unit Root with Intercept

Region	Var.	CIPS			CADF		
		I(0)	I(1)	Remarks	I(0)	I(1)	Remarks
BRICS	GDP	-1.556	-2.820***	I(1)	-2.674**		I(0)
	TOP	-1.938	-4.863***	I(1)	-2.416*		I(0)
	FDI	-2.098*		I(0)	-1.768	-3.805***	I(1)
	GCF	-2.472***		I(0)	-2.528**		I(0)
	GOV	-2.30**		I(0)	-2.976***		I(0)
BRICS+	GDP	-0.789	-3.681***	I(1)	-1.612	-2.787***	I(1)
	TOP	-1.725	-5.132***	I(1)	-2.192	-4.287***	I(1)
	FDI	-2.862***		I(0)	-2.590***		I(0)
	GCF	-2.596***		I(0)	-2.234*		I(0)
	GOV	-2.13*		I(0)	-2.959***		I(0)

Source: Authors' Computation (2024), **** p<0.01, ** p<0.05, * p<0.1*

Having established the preliminary results, this study adopts the panel-corrected standard error (PCSE), Discrol and Kraay (D-K) and Augmented Mean Group (AMG) techniques to examine the dynamics of trade openness and foreign direct investment on the economic growth of BRICS and BRICS+ countries. Table 6 documents the dynamics.

The result revealed that the coefficient of trade openness is positively and significantly related to BRICS and BRICS+ economies. This implies that an increase in trade openness led to an increase in the economic growth of these countries. This result is consistent with empirical studies (Shahzad et al., 2022; Miranda-Pinto and Zhang, 2023) and the export-led growth hypothesis. A country with trade openness or market coverage portends a greater advantage to increase economic growth due to better resource allocation, increased economies of scale and production efficiency. However, trade openness has a negative and significant impact on economic growth in BRICS and BRICS+ economies when the unobservable factors across these countries are considered. This is not unexpected due to the dynamics in demographic, geographic and economic factors that characterized the BRICS+ economies. Besides, this result points out the need for BRICS expansion in order to harness huge potential in demographic, geographic and economic for the growth and development of these emerging economies. The dynamics of trade openness in these economies are key for facilitating export-led growth and deadening economic growth rigidity (Tacchella et al., 2013; Shahzad et al., 2022; Miranda-Pinto and Zhang, 2023).

The coefficient of foreign direct investment is negatively and significantly related to BRICS and BRICS+ economies. This implies that an increase in foreign direct investment led to a decrease in the economic growth of these countries. This suggests that FDI dampen economic growth in the host country. The reason could be country-specific attributes that characterize BRICS+ economies. Meanwhile, the coefficient of foreign direct investment has a positive and significant

impact on economic growth in emerging economies when heterogeneity attributes are addressed. This implies that an increase in foreign direct investment led to an increase in the economic growth of these countries. FDI has the potential to enhance technological know-how and administrative abilities and as such stimulate growth and development. This finding is in consonant with the FDI-led growth hypothesis.

Furthermore, capital formation has a positive and significant impact on economic growth in the emerging economies. This implies that an increase in capital formation leads to an increase in economic growth in BRICS economies. This is not unexpected as domestic investment points out how capital formation boosts the economy's productive capacity. One of the country-specific attributes is the utilization of domestic investment; when capital formation is used to enhance technological know-how and administrative abilities, growth and development become inevitable. This finding is in agreement with empirical studies (Kumari & Bharti, 2021; Morrow et al., 2022) that investment has a major effect on labour, raw material, and other resource mobility, and consequently drives growth and development. The result is also in line with the apriori expectation, and that investment in infrastructural facilities can increase health, education, infrastructure and employment, and stimulate growth as well as development. The model suggests that capital formation in infrastructural facilities can stimulate growth and development through human and physical capital accumulation, which is also consistent with Elmi and Sadeghi (2012) and Murthy and Okunade (2009). Also, the result revealed that the coefficient of government expenditure is positively and significantly related to economic growth in BRICS and BRICS+ economies. This implies that an increase in government expenditure leads to an increase in economic growth in BRICS. This result is consistent with most bodies of existing knowledge that an increase in government expenditure influences an increase in growth and development. The result also established the positive degree of association found in the correlation matrix. The reason for the positive influence of government expenditure on growth and development is not far-fetched. Government expenditure addresses welfare objectives of the populace through intervention in development programs, coordination of various sectors and enhancing efficient service delivery as such stimulates more significant growth and development. This submission is consonant with the existing studies that fiscal stance has significant contributions to welfare objectives (Barro, 1990; Afonso and St. Aubyn, 2011).

Table 6: The dynamics of trade and investment on the expansion of BRICS Economies

Dep: LGDP	**Model I PCSE**		**Model II D-K**		**Model III AMG**	
	A	**B**	**A**	**B**	**A**	**B**
TOP	0.0173*** (0.0019)	0.0181*** (0.0018)	0.0071** (0.0023)	0.0056** (0.0023)	-0.0026*** (0.0006)	-0.0022*** (0.0007)
FDI	-0.0500** (0.0218)	-0.0450** (0.0176)	0.0020 (0.0164)	0.0033 (0.0200)	0.0201 (0.0147)	0.0215** (0.0108)
GCF	0.0023 (0.0057)	-0.0143*** (0.0040)	0.0787*** (0.0091)	0.0405*** (0.0034)	0.0159* (0.0094)	0.0094 (0.0062)

GOV	0.1869*** (0.0100)	0.0912*** (0.0037)	0.0755* (0.0332)	0.0332*** (0.0093)	-0.0009 (0.0120)	0.0027 (0.0103)
Constant	5.4191*** (0.2499)	7.4644*** (0.1309)	5.6764*** (0.5618)	7.5839*** (0.3036)	8.3959*** (0.4988)	8.7898*** (0.4163)
OBS	165	264	165	264	165	264
No of Group	5	8	5	8	5	8
Wald Test/ F-Stat	616.02***	1638.61***	20.70***	59.28***	338.39***	26.22***
CDP					1.0848*** (0.3809)	1.0629***
RMSE					0.0403	0.0419

Source: Authors' Computation (2024), **** p<0.01, ** p<0.05, * p<0.1*

The study evaluates the Dumitrescu–Hurlin panel causality to answer the question of potential causation among trade openness, foreign direct investment and economic growth. Table 7 documents the dynamics. In BRICS countries, there is a unidirectional relationship between economic growth and trade openness. This implies that trade openness granger causes economic growth but economic growth does not granger cause trade openness. This suggests a trade-induced rise in economic growth allows the economy to transform its production resources into a greater value of final output. Meanwhile, an expansion of BRICS brings about a bidirectional relationship between economic growth and trade openness. Also, there is a unidirectional relationship between economic growth and foreign direct investment in BRICS economies. This implies that foreign direct investment does not granger causes economic growth but economic growth granger causes foreign direct investment. This suggests that foreign direct investment can crowd out the host country's economy via technology transfer and diffusion until the host country's economy stimulates the foreign direct investment towards growth and development. However, an expansion of BRICS brings about a bidirectional relationship between economic growth and foreign direct investment. This suggests the spread of the spillover effect between foreign direct investment and economic growth due to the expansion of BRICS economies.

Table 7: The Dumitrescu–Hurlin Panel Causality

	BRICS Economies	**BRICS+ Economies**
Trade Openness	Unidirectional	Bidirectional
Foreign Direct Investment	Unidirectional	Bidirectional
Capital Formation	Bidirectional	Bidirectional
Government Spending	No Causality	No Causality

Source: Authors' Computation (2024).

Conclusion and Suggestions

The emerging economies of BRICS have an opportunity to stimulate growth and development as well as unlock the potential for cooperation among member states. BRICS has become a major global key player due to the advantage in demographic, geographic and economic attributes peculiar to the economies. Deeper ties and cooperation among BRICS have fostered growth and development from trade openness, capital inflow, acquiring technological know-how and administrative abilities to economic growth. Hence, this study seeks to examine the dynamics of foreign trade and foreign investment in the expansion of BRICS economies between 1990 and 2022 via the panel-corrected standard error (PCSE), Discrol and Kraay (D-K) and Augmented Mean Group (AMG) in the context of BRICS and BRICS+ countries. Furthermore, the study evaluates the Dumitrescu–Hurlin panel causality to answer the question of potential causation among foreign trade, foreign investment and economic growth.

The key findings reveal that trade and FDI have a dynamic impact on the expansion of BRICS economies. First, economic strength may be induced for individuals through the BRICS expansion. An increase in BRICS membership situates an increase in market coverage, spread of spillover effect, and deeper ties and cooperation among BRICS. Secondly, BRICS expansion makes the economy open and flexible. It has the potential to increase efficiency and promote the possibility of foreign capital inflow in the global economy. Thirdly, trade openness has a positive and significant impact on the BRICS+ economies. A country with trade openness or market coverage portends a greater advantage to increase economic growth due to better resource allocation, increased economies of scale and production efficiency. The dynamics of trade openness in these economies are key for facilitating export-led growth and deadening economic growth rigidity. Fourthly, foreign direct investment has a negative and significant impact on the BRICS+ economies. FDI has the potential to dampen economic growth in the host country if country-specific attributes that characterize BRICS+ economies are not addressed. Lastly, there is a bidirectional relationship between trade openness, foreign direct investment and economic growth in the expansion of BRICS economies.

This study recommends that trade openness and foreign direct investment should be used to foster more of deeper ties and cooperation than economic profit among BRICS. Secondly, the import duty and other tariffs should be flexible and/ or suspended in order to make trade openness sustainable among the membership. BRICS should uphold the comparative advantage in trade-related decisions among members. Lastly, BRICS should review membership conditions towards increasing technology transfer and diffusion and spread of the spillover effect. It is thus possible to conclude that there are dynamics of trade and investment in the expansion of BRICS economies.

This study, like other studies, contains limitations that present an opportunity for more research. We combine many countries in our study to look at the dynamics of trade and investment in the expansion of BRICS economies. It is necessary to look into what may be obtained from G7 countries. Furthermore, it may be worthwhile to carry out other capital inflow analyses in the BRICS context to verify if the findings of this research remain valid. However, our study is one of the few that provides more depth to the body of research on the dynamics of trade and investment in the expansion of BRICS economies.

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