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Article

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Stochastic Panel Analysis of Globalization and Poverty Reduction in BRICS Countries: Implications for Sustainable Development

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This study investigated dynamic interaction between globalization and poverty reduction in BRICS countries within the period of 1990 and 2019. This study is motivated by the rising development challenges confronting the world today, in which poverty reduction and the lack of empirical studies regarding globalization and poverty reduction in BRICS countries are significant. The study utilized the techniques of Impulse Response Functions (IRFs) and Variance Decomposition to address the objective of this study. The results from this study showed that a long-run convergence existed among globalization components and poverty reduction in BRICS countries. Also, FDI, trade openness and the number of people using internet, and HDI responded immediately to each other's policy shocks, but not in the most desired or best direction. Therefore, the policymakers and other relevant stakeholders in BRICS countries need to embark on swift policy responses that will shape and redirect the economic components of globalization- inflows of FDI, trade openness and the number of people using internet in such a way to bring poverty reduction in this economic bloc.

Keywords: Globalization, poverty, HDI, BRICS, SDGs

JEL: F21, F23, F36

Jim O'Neill coined BRIC in 2001 as an economic bloc comprising of four prominent emerging economies which are Brazil, Russia, India, China, and with the inclusion of South Africa in 2010 changed the acronym to BRICS. These newly industrialized economies cannot be undermined in this contemporary global arena, this is because their market size growth, land mass and population made them to be distinguished among other emerging markets (O'Neill *et al.*, 2005; van Agtamael, 2012). It is important to stress that BRICS economic bloc possesses a huge capacity to influence the world geopolitics and the markets because it accounts for about forty one percent (41%) of the global population, US\$ sixteen (16) trillion domestic output in 2016 and thirty percent (30%) of the Earth's territory, respectively (BRICS Joint Statistical Publication, 2016).

Meanwhile, in the last few decades, the world economy has undergone a lot of metamorphoses in

terms of structure, integration and development. All forms of restriction to trade, movement of capital, knowledge and other natural geographical barriers among the economies of the world have been substantially eliminated by globalization and its spillovers in the recent times. This incomparable paradigm shifts in the global economy due to the advent of globalization has made the concept of globalization a popular subject of discuss in the literature (Aderemi *et al.*, 2020:1; Baldwin and Cain, 2000; Kaya, 2010; Kovářová, 2017; Olowookere *et al.*, 2021). However, the earlier scholars have amplified the dark and disastrous manifestations of globalization in developing countries as continuous rising of poverty, unemployment, inequality, and instability of economic and financial variables (Rodrik, 1998; Stiglitz, 2000; Summers, 2000).

The motivation behind this study is orchestrated by the following issues: in the recent times, poverty reduction is a global agenda because it is one of the critical development challenges confronting the world today. As a matter of the fact, about 150 million people in the globe have been estimated to live in extreme poverty due to various economic challenges including COVID–19 pandemic, which is one of the bye products of globalization (Aderemi *et al.*, 2020:2; Mamun and Ullah, 2020). But, a cursory look into BRICS situation report shows that the extreme and moderate working poverty has been considerably reduced more than other middle–income countries for the past two decades to the extent that over 540 million people were lifted out of the extreme poverty during those decades as against other middle–income countries which recorded approximately 120 million people (International Labor Organization, 2019). This above scenario calls for empirical investigation about the factors causing a reduction of poverty in this economic bloc which has been addressed in this study.

Consequently, previous empirical studies have identified globalization as the framework behind economic prosperity in many developed and emerging economies (Aderemi *et al.*, 2020:1; Chang and Lee, 2010; Dollar, 2001; Dreher, 2006; José *et al.*, 2019; Latif *et al.*, 2018). Whereas, studies regarding globalization and poverty reduction in BRICS countries, to the best of our knowledge, are currently rare in the literature. In view of the above, this study answers the following question: Does stochastic interaction exist between globalization and poverty reduction in BRICS countries? This study attempts to fill the identified knowledge gap. Similarly, the novelty of this study also lies with the employment of the impulse response functions (IRFs) and variance decomposition (VD) techniques in achieving the objectives of this study as past studies on this subject matter have not embraced.

Besides the introductory aspect, the latter part of the study is organized as follows: literature review occupies the section two. The third section accommodates the methodology. The results and discussion are presented in the fourth and fifth sections, simultaneously. Meanwhile, the conclusion of the study is contained in section six. Consequently, the limitations of the study and suggestions for future research were discussed in section seven.

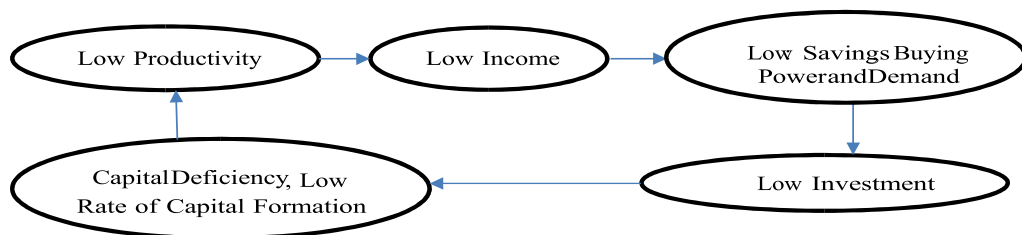
LITERATURE REVIEW

The focus of this section is to provide detailed information about the relevant theory that underpins this study and review of empirical studies that are relevant to the key variables of this study.

Theoretical Underpinnings

–The Benign Model of FDI

The Benign Model of FDI has its foundation in the ideas of Moran (1998), whose argument was based on fact that FDI could be utilized as a financial tool that could break through the vicious circle of poverty (VCP) pioneered by Ragnar in 1953. Moran attributed the lack of capital to poverty. This theory is an offshoot of the earlier investment theories, like that of Harrod–Domer Model (HMD) which proposed that investment is a function of capital, output, and savings. The expansion of investment brings about a rise in economic growth and employment which eventually orchestrate reduction in poverty in the economy. Moreover, the Benign Model is connected with Prebisch (1951) emphasizing that the capital base of FDI is packaged for developing economies to have access to technology, markets and management skills with a view to fostering their industrial advancement. Consequently, it could be stressed that the inflows of human and physical capital resources which are strategic components of FDI from Europe, particularly the Great Britain contributed to the expansion of the USA economy for instance in the 20th century (Sackey *et al.*, 2012).



Source: Rohima *et al.* (2013)

Figure 1. The Vicious Circle of Poverty

Figure 1 shows the network of variables contributing to poverty in an economy. This critically justifies the reasons why developing economies are stocked in poverty due to the existence of low income (Rohima *et al.*, 2013). According to Benign Model of FDI, countries in developing world are held up in a demand and supply trap which are difficult to break through, otherwise known as a poverty cage in this paper. From demand angle, the implication of low incomes is that consumers possess inadequate disposable income to consume, and there is a limitation to the ability of the consumer to save as well.

However, a short fall on the supply side orchestrates a rise in inventory due to the low purchasing power of the consumer. As such, producers, including households and companies, have low profits and a low capacity to save, translating into capital deficiency and low productivity. Thus, firms return to the poverty cage.

In conclusion, the Benign Model conceptualizes FDI as a strategic means of breaking the vicious cycle of poverty due to the fact that spillovers of FDI bridge the savings gap and motivate a rise in the capital base of a developing economy, and thus sparks a rise in production on the supply side. Whereas, when production increases on the demand side, demand for labor increases and likewise the wage rate. This in turn led to an increase in household incomes and as well as the profits of firms. This network of relationships will eventually erode poverty in the economy.

Empirical Review

Diabré (2001) analyses the impact of globalization on human poverty and income distribution within and between countries. While the track record has not been encouraging, the paper contends that globalization, if structured properly and managed in the interests of the poor, can lead to human growth for the majority of the world's population in the near future.

Harrison (2007) investigated whether linkages exist between poverty and globalization. The study applies two measurements to proxy globalization: inflows of foreign capital and trade openness. The first conclusion of this research is that interpreting general equilibrium trade models in such a straightforward manner is likely to be inaccurate. Second, data show that when complementing policies are in place, the poor are more likely to benefit from globalization. The data reveal that among the poor, globalization creates both winners and losers.

Rahman and Mittelhammer (2006) examines the connection between globalization and well-being of the poor in Africa. This study shows that while a large number of empirical studies have been devoted to analyzing the relationship between income measures and globalization and the analysis of well-being among various population subgroups and their causal associations with globalization has been largely ignored. To address this gap in the research, this article studies the quality of life (QOL) of "poor" and "non-poor" population groups in 40 African nations from 1980 to 2000, and then investigates the causal relationship between QOL and trade openness. The paper discovered that nearly every indicator of well-being in the study reduces when the population of poor expands in both African and non-African countries. Women suffer a double QOL setbacks in terms of health and education when the share of the poor's population expands, but globalization contributes to improvement of African countries' incomes.

Iheriohanma (2010) investigated globalization, poverty and national development: the Nigeria situation. Using Third World nations as a case study, this research investigates the relationship between

colonization, globalization, and poverty. It investigates the prevalence of poverty in Africa in connection to globalization's dynamics. The research examines how Nigeria's participation in globalization processes might be used to implement feasible methods for economic regeneration and national development. The authors of this study believe that the solutions suggested will help to halt the tide of poverty.

Ullah *et al.* (2012) investigated the impact of globalization on poverty using a case study of Pakistan by analyzing the data from 1980 to 2010. This study attempts to measure the impact of globalization on poverty reduction in Pakistan. To explain the degree of globalization, foreign direct investment, trade openness, and remittances were utilized as independent factors, while the head count ratio was employed as a proxy for the dependent variable of poverty. The data were analyzed using three time series econometric methods: unit root test, cointegration analysis, and causality analysis. According to the findings, globalization has a direct influence on poverty reduction in Pakistan. Remittances have a greater impact on poverty reduction than FDI and trade liberalization, according to empirical research. The report suggests that Pakistan's information and technology systems be enhanced in order to make the country more appealing to international investors.

Oyewale and Amusat (2013) examined the contribution of globalization if it could eliminate poverty in Nigeria. The findings of a multiple regression study demonstrated a non-linear association between the reduction of poverty in Nigeria and globalization. As a result, the influence of globalization on poverty is contingent on the poor's participation in the income-growth process, which cannot be guaranteed.

Okungbowa and Eburajolo (2014) evaluate how globalization and poverty rate are interlinked in Nigeria from 1981 to 2009 utilizing error correction model. The authors submit that trade openness brings a significant direct impact in eliminating poverty in the country. Domestic investment (INV) shows a significant and direct impact in reducing poverty, while the FDI has an insignificant impact on poverty in the country.

Uzonwanne (2018) aims to look at the impact of economic globalization on African countries with special attention to Nigeria. The study's data were gathered from a secondary source. The data were analyzed using descriptive statistics. With the aid of E-views, the Chi-square and f-distribution revealed that economic globalization has exacerbated rather than reduced poverty in Nigeria. As a result, the study suggested a solution i.e., globalization. When correctly understood, it equates to personal, economic, and environmental solidarity.

Umair and Awan (2019) examined the impact of globalization on poverty in Pakistan. The study made use of secondary data with the application of the ARDL approach to come up with empirical findings that show that trade openness, FDI, and gross domestic product have negative relationships with poverty,

while population and external debt have positive relationships with poverty. According to this report, embracing globalization as a tool and enacting policies that benefit the poor will assist the government in eliminating poverty in Pakistan.

Nwosa (2020) assesses how inequality in income, GDP and globalization are connected in Nigeria with the application of annual secondary data from Nigeria ranging from 1981 to 2018. Both vector error correction modelling (VECM) and auto-regressive distributed lag (ARDL) tools were employed in this study. In the long-run, the VECM results demonstrate a unidirectional causality from inequality and globalization to economic development, however, in the short-run, the results reveal a unidirectional causality from inequality to economic growth. Globalization and economic growth are key causes of inequality in Nigeria, according to the ARDL estimate. Furthermore, it was discovered that income disparity was sponsored by both financial globalization and trade. In the light of these findings, the paper suggests that FDI be directed towards empowering the poor, and that economic growth rewards be dispersed equally to minimize income disparity.

Summarily, as it has been revealed in the empirical works reviewed, a huge gap exists in the literature regarding the stochastic relationship between globalization and poverty reduction. Hence, the urgency and relevance of this study makes the study to propose the following null hypothesis:

H_0 : There is no existence of stochastic relationship between globalization and poverty reduction in BRICS economic bloc.

METHODOLOGY

–Sample and Data

The various data employed for the empirical analysis, which range between 1990 and 2019 was sourced from the World Development Indicators database of World Bank (2019). This study equally focuses on five emerging economies namely Brazil, Russia, India, China and South Africa. The reason for selection of these newly industrialized countries was based on their huge market size growth, land mass, and population. These countries account for about 41.2 percent of the global population with US\$ twenty (20) trillion domestic output in 2021 and 29.6 percent of the Earth's territory (BRICS Joint Statistical Publication, 2016; O'Neill *et al.*, 2005; van Agtamael, 2012; World Population Review, 2021). In the same vein, the choice of the period of analysis, which is 1990 to 2019 is exclusively motivated by the availability of data.

–Estimation Technique

In estimating globalization and poverty reduction in BRICS countries, the Impulse Response Functions

(IRFs) and Variance Decomposition (VD) were utilized among the variables of interest in the study. The reason for using this technique is primarily motivated by the nature of the study.

–Estimation Procedure

This study examines stochastic interaction between globalization and poverty reduction in BRICS countries. In achieving this objective, both the stationarity features and the long-run equilibrium relationship of data were examined through Panel Unit Root Tests and Johansen Fisher Panel Cointegration Test, respectively, and the Impulse Response Functions (IRFs) and Variance Decomposition (VD) were estimated.

–Model Specification

Globalization is a complex phenomenon which requires multifaceted approach in conceptualizing its operational definition. Consequently, “KOF Globalization Index” operationalizes globalization into three phenomena which capture economic, political and social spheres human endeavors. Meanwhile, the economic aspect of globalization, which is the central focus of this study incorporates international capital flows, and the major components of these flows are FDI inflows and trade openness (Aderemi *et al.*, 2020:1; Dreher *et al.*, 2008; Omoyele *et al.*, 2021; Parisa and Hashem, 2014). In view of the above, this study adapted model from the works of Omoyele *et al.*, (2021) and Aderemi *et al.*, (2020:1), by modifying the dependent variable as poverty reduction, in order to reflect the current objective of this study. As such, the classic Cobb–Douglas production function of the model could be enunciated as follows:

$$PVRD = FDI^{b_1}TRO^{b_2}INT^{b_3}GCF^{b_4} \quad (1)$$

Linearizing equation (1) transforms it into equation (2) as follows:

$$PVRD_t = a + b_1LogFDI_t + b_2LogTRO_t + b_3LogINT_t + b_4LogGCF_t + \mu_t \quad (2)$$

If equation (2) is transformed into dynamic model, this could be used to estimate impulse response and decompose variance which shows how each of the variables of interest responds to its shocks and shocks of its error in the system. The description of variables and measurement is reported in Table 1 (see Appendix-I).

RESULTS AND DISCUSSION

Unit Root Tests

Employment of time series data in empirical study is usually handled with a lot of care due to the problem of unit root which is one of the principal factors causing a spurious or nonsense regression in a study. Spurious regression could cause a biasedness in the policy implication of the study. Therefore, in order to overcome this problem, this study carried out stationarity tests on the data using Im, Pesaran and Shin W-stat Test and Levin, Lin and Chu t Test. The evidence from Table 2 (see Appendix-II) shows that the variables possess the mixture of $I(0)$, $I(1)$ and $I(2)$. In a nutshell, the estimated Im, Pesaran and Shin W-stat Test confirm that all variables are not stationary at level. Meanwhile, Levin, Lin & Chu t Test confirm that all the variables except poverty reduction are not stationary at level.

Cointegration Test

Short-run disequilibrium among economic variables could be one of the aftermath effects of unit root problem. However, the short-run disequilibrium has the possibility of becoming equilibrated as model adjusts to the long-run situation. In view of the above, this study utilized Johansen Fisher Panel Cointegration Test to investigate if the long-run equilibrium relationship exists for the variables used in this study. It is important to stress that the estimated results presented in Table 3 confirms the existence of at most four (4) cointegration equations in the model. This suggests that globalization and poverty reduction in BRICS countries have a long-run convergence.

| Hypothesized Number of CEs | Fisher Stat.* (Trace test) | Prob. | Fisher Stat.* (Max-eigen test) | Prob. |
|----------------------------|----------------------------|--------|--------------------------------|--------|
| None | 70.47 | 0.0000 | 30.25 | 0.0008 |
| At most 1 | 44.90 | 0.0000 | 20.09 | 0.0284 |
| At most 2 | 31.05 | 0.0006 | 20.06 | 0.0287 |
| At most 3 | 19.54 | 0.0339 | 23.04 | 0.0106 |
| At most 4 | 1.518 | 0.9989 | 1.518 | 0.9989 |

Source: Authors' Computation

*Probabilities are computed using asymptotic Chi-square distribution

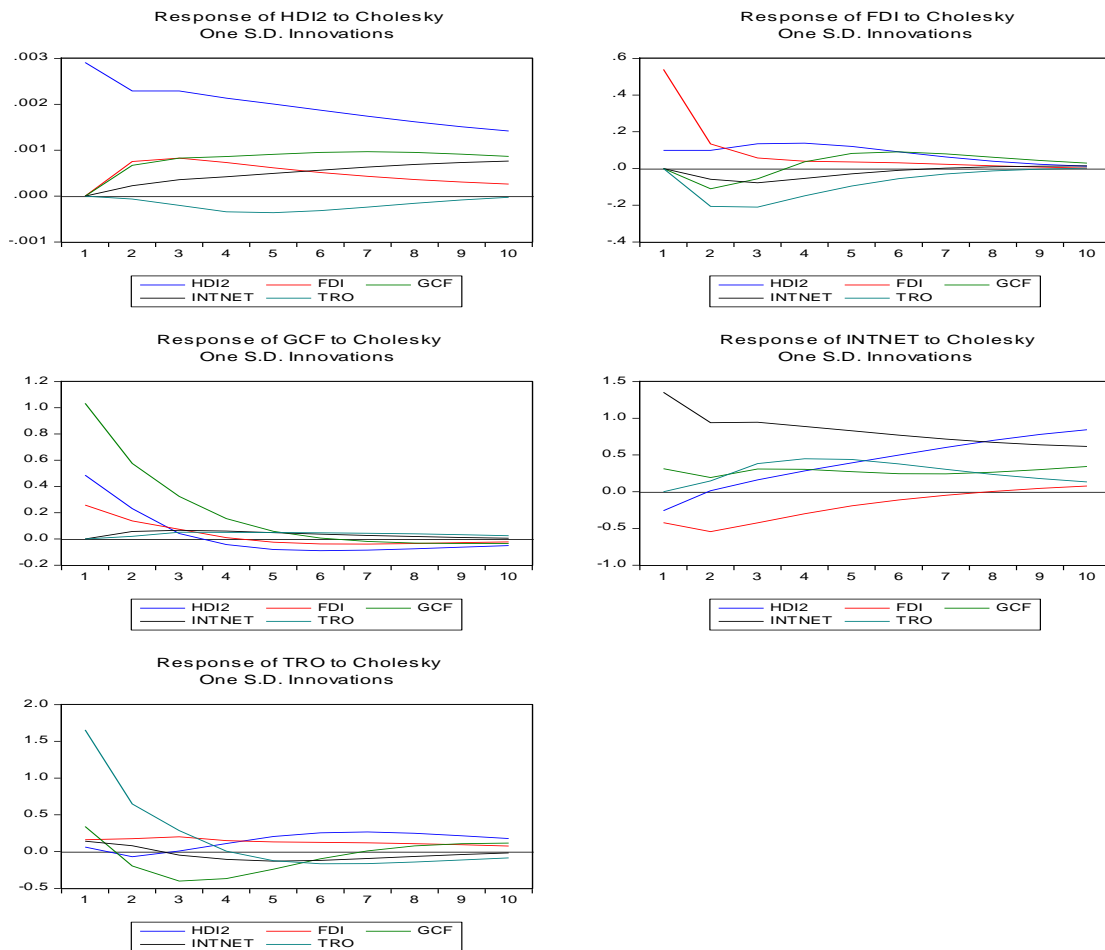
Table 3. Cointegration Test

Dynamic Interaction between FDI Inflows and Poverty Reduction

The future behaviors of macro-economic variables are of great importance to scholars, investors, policy analysts and policymakers, respectively. In view of the above, this study examined the interaction among the variables of interest, by utilizing the impulse responses over a 10-year period when a standard deviation of variables is interacted with one another in the system.

Consequently, the Impulse Response Functions (IRFs) in Figure 2 shows that human development index, used to proxy poverty, falls in the first period when responding to its shocks, which rises in the

second period. Meanwhile, it starts to slump in the third period, and continues till the end of the tenth period. In the same vein, FDI rises sharply in the positive direction in the first period and gradually stabilizes in the third period before it starts to decline continuously till the end of tenth period. Gross fixed capital formation rises sharply in the positive direction in the first period, and stabilizes continuously to the end of forecast period. Number of individuals using internet rises gradually and steadily in the first period to the end of the tenth period. Whereas, trade openness rises gradually in the negative direction in the first period to the fourth period before it starts to decline continuously till the end of the tenth period.



Source: Authors' Computation using EViews

Figure 2. Impulse Response Functions (IRFs) among FDI, HDI, TRO and INTE

Furthermore, after a shock to FDI, the response of FDI to its own shocks shows that the inflows of FDI fall sharply in the first period in which it continues to slump gradually and continuously to the end of

tenth period. But in the case of HDI, it rises steadily to the third period before it slumps steadily and continuously to the end of the tenth period. Whereas, GCF rises sharply in the negative direction in the first period, and slumps gradually to the fourth period and starts to rise in the positive direction to the end of seventh period when it declines continuously to the end of forecast period. The number of individuals using internet rises gradually in a negative direction in the first period after which it starts to decline to the starting point in the middle of third period.

In the same vein, the response of gross fixed capital formation to its own shocks shows that GCF declines continuously from the first period to the sixth period before it becomes asymptotic to the origin till the end of the forecast period. The response of HDI shows continuous decline to the end of the fourth period, and later becomes negative continuously to the end of the tenth period. FDI follows the same pattern with HDI but it becomes negative in the sixth period to the end of the tenth period. Whereas, trade openness and the number of individuals using internet rise sluggishly in the first period to the middle of the third period and stabilize to the end of the forecast period.

In addition, the response of the number of individuals using internet to its own shocks shows that this variable slumps sharply in the first period, and stabilizes in the second period before it continues to slump gradually in the third period to the end of the tenth period. GCF slumps slowly in the first period, but it begins to rise gradually and slowly in the second period to the end of the forecast period. Trade openness rises slowly and steadily in the first period to the end of the sixth period before it becomes slump lowly to the end of the forecast period. The response of HDI indicates that it rises gradually and steadily from the first period to the end of the forecast period. The case of FDI shows that it slumps in the first period. However, it rises steadily in the second period to the end of the forecast period.

Similarly, while responding to its own shocks, trade openness slumps sharply and continuously in the negative direction from the first period to the third period. Whereas, in its negative position, it commences to rise gradually in the middle of the third period and becomes positive in the seventh period, in which it continues to rise to the end of the forecast period. The number of individuals using internet declines sharply and continuously from the period one to the fifth period and stabilizes before it sluggishly rises in the sixth period to the end of the tenth period. GCF falls gradually and continuously from the beginning of the forecasting to the end of the tenth period. FDI fluctuates sluggishly between the period one to the period five and establishes to the seventh period before it shows a slight decline, and thereafter maintains its position to the tenth period. Initially, HDI slumps to the end of the of the period two before it witnesses a gradual but consistent rise in the period three till the middle of the seventh period before it starts to decline sluggishly to the end of the forecast period.

In a nutshell, outcomes of the impulse response of the relevant variables of interest in this study established a very strong linkage between globalization and poverty reduction in BRICS countries. This

confirms the indispensable role of globalization in reducing poverty in this economic bloc. This implies that the economic components of globalization, FDI inflows and trade openness are pertinent variables influence reduction poverty in terms of human development in the selected countries under investigation.

-Variance Decomposition (VD) of HDI

Besides generating the IRFs for HDI using to proxy poverty reduction in this study, further efforts were made to determine the Variance Decomposition (VD) as well, in which its estimated results were presented in Table 4 (see Appendix-III). As indicated in the above table, the variation to HDI exhibited 100 percent due to its own shock in the period one. It was observed from the second period that, HDI displayed a quick decline to 92 percent which it continued consistently to the end of the tenth period. But, in the case of FDI, its variation shows a slight and steady increase in the period two to the period five before it witnessed a slow and continuous slump in the sixth period to the end of the forecast period. In the same vein, GCF variance displayed a gradual rise in the second period with 3 percent, which it continued to the end of the ninth period before a slight slump in the tenth period. Meanwhile, the number of individuals using internet displayed slight variation of 0.34 percent in the second period. As time went on, this variation continued to rise though slowly and consistently to the end of tenth period. The response of trade openness showed that its variation displayed a slight rise by 0.02 percent in the second period, and this consistently rose to 1 percent in the eighth period before it fell in the ninth period.

-Variance Decomposition (VD) of FDI

In the first period, the variation to FDI was majorly due to its shocks as it displayed 96 percent variation (Table 5, see Appendix-IV). As time went on the variation drastically declined in the fifth period before it started to experience a slow and steady decline to the end of the forecast period. Similarly, variation in HDI rose in period 1 by 3.2 percent, this continued steadily and consistently to the end of the forecast period. Likewise, the share of the variation caused by GCF shocks rose by 3.1 percent in the second period, this rise continued slowly and consistently to the end of the forecast period, which ended with 7.6 percent. Also, the number of individuals using internet showed a slight rise variation in period two, this continued though slowly to the fifth period. And later to declined gradually in the sixth period to the eighth period before it rose slowly again to the end of the forecast period. The response of trade openness showed that its variation displayed a very significant rise by 10.8 percent and 18.7 percent in the second and third periods respectively, and though the rise continued in the fourth and fifth period but slightly. The sixth period marked the beginning of fall variation of this variable which recorded 20.9 percent at the end of the forecast period.

-Variance Decomposition (VD) of GCF

In the first three periods, GCF accounted for a significant and increasing portion of the variations which are 77.9 percent in the first period and 79.3 percent in the third period before it started to decline slowly in the period four and to the end of the forecast period (Table 6, see Appendix–V). But FDI and HDI showed continuous slump in the variation from the first period to the period five. These sixth period marked the beginning of a slight rise in variations in these variables to the end of the forecast period. However, trade openness and the number of individuals using internet showed displayed a very slight but consistent increasing portion of the variations from the period one to the end of the tenth period.

–Variance Decomposition (VD) of INTE

In period one, 84.2 percent of the variation in the number of individuals using internet was attributed to its own shocks (Table 7, see Appendix–VI). This declined moderately and persistently to 58.6 percent at the end of the forecast period. In the same vein, FDI showed the same pattern of variation as it declined continuously but slowly from period one to the end of the tenth period. Except period two in which GCF witnessed a slump in variation, it displayed a slowly and continuous rise in portion of the variations throughout the forecast period. Similarly, trade openness witnessed a slowly and consistent rise in variation from the second period of the forecasting to its end in the tenth period.

–Variance Decomposition (VD) of TRO

In the first period, the variation to trade openness was majorly due to its shocks as it displayed 94 percent (Table 8, see Appendix–VII). As time progresses, the variation diminishes gradually and consistently as it registered 74 percent at the end of the forecast period. Looking at GCF, FDI and the number of people using internet, these variables accounted for a minimal but progressive portion of the variations respectively from the beginning of the forecast to the end of the tenth period. Meanwhile, HDI displayed a rise in variation from period three, which continues to the end of the tenth period.

CONCLUSION

Dynamic interaction among globalization and poverty reduction in BRICS countries over the period of 1990 to 2019 has been examined in this study. This study has bridged the existing knowledge gap because it establishes, among others, the existence of a long–run convergence among globalisation components and poverty reduction in the panel of BRICS countries. This suggests that the components of globalisation could reduce poverty in the long–run in this economic bloc. Also, the strategic components of globalization in this study such as FDI, trade openness and the number of people using internet, and HDI used to proxy poverty reduction responded to each other’s policy shocks in BRICS countries. Whereas, it is important to stress that policy shocks to the components of globalization and

poverty reduction in BRICS economic bloc do show immediate responses, but not in the most desired or best direction.

IMPLICATIONS

In terms of theoretical implication, this study underscores the Benign Model of FDI which argues that FDI could be utilized as a financial tool that could break through the vicious circle of poverty because this study establishes that the components of globalisation can reduce poverty in the long-run in BRICS countries. Also, the strategic components of globalization in this study such as FDI, trade openness and the number of people using internet, and HDI used to proxy poverty reduction responded to each other's policy shocks in BRICS countries.

In terms of practical implication, this study recommends that the policymakers and other relevant stakeholders in BRICS countries need to embark on a swift policy response that will shape and redirect the economic components of globalization– inflows of FDI, trade openness the number of people using internet in such a way to bring poverty reduction in this economic bloc. If these policy responses are well implemented, it is possible for the economic components of globalization to stimulate BRICS countries to achieve the 1st Sustainable Development Goal (Poverty Eradication before the end the SDGs timeline in 2030). In addition, in terms of methodological implication, the methodology utilized in this study can serve as a reference point for future studies focusing on similar emerging markets like BRICS countries and beyond.

LIMITATIONS AND FUTURE DIRECTIONS

The major limitation of present study is its focus on only economic component of globalization and poverty reduction in BRICS countries. However, future studies could be extended further using international tourism foreign population (in percent of total population) to investigate the social component of globalization or number of foreign embassies in a given country to investigate the political component of globalization in BRICS countries or other emerging economies. Similarly, future researchers could also employ poverty head count (where there is availability of data) to measure poverty reduction. In addition, future researchers could also use GDP per capita as a proxy for poverty reduction.

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| Abbreviation | Description | Unit of Measurement | Source |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------------------------------------|
| PVRD | PVRD represents poverty reduction and human development index HDI is used to proxy it. The UNDP operationally defines HDI as a composite index which uses three basic aspects of human development, namely health, knowledge, and standard of living to measure human welfare. The technical calculation of HDI could be consulted from the technical note of the Human Development Reports available in United Nations Development Program website. | Percentage | World Development Indicators of World Bank |
| FDI | FDI inflows are the sum of equity capital, reinvested earnings, and long- and short-term capital. i.e., the value of inward direct investment made by non-resident investors in the reporting economy. FDI inflows as a percentage of GDP is used in this study | Percentage | United Nations Conference on Trade and Development |
| GCF | Gross fixed capital formation This is defined by World Development Indicators as outlays or additions to the fixed assets of the economy plus net changes in the level of inventories. It was measured in the present study as percentage of gross capital formation relative to GDP. Capital accumulation was included in the estimated model leaning on endogenous growth model, this represents level of physical capital in the economy that can be used in the production of output and knowledge | Percentage | World Development Indicators of World Bank |
| TRO | Trade Openness; this is addition of imports and exports as percentage of GDP | Percentage | World Development Indicators of World Bank |
| INTE | Individual using internet as percentage of population | Percentage | World Development Indicators of World Bank |

Source: Authors' Presentation

Table 1. Variables Description and Measurement

| Variables | Im, Pesaran and Shin W-stat Test | | | | Remarks |
|-----------|----------------------------------|-------------|----------------------|-------------|---------|
| | Level | Probability | 1 st Diff | Probability | |
| FDI | -1.45367 | 0.0730 | -4.83483 | 0.0000 | I(1) |
| GCF | -0.77100 | 0.2204 | 5.97039 | 0.0000 | I(1) |
| PVRD | -0.57387 | 0.2830 | 31.7665 | 0.0004 | I(1) |
| INTE | 5.86346 | 1.0000 | -1.08593 | 0.1388 | I(2) |
| TRO | -0.07711 | 0.4693 | -4.23589 | 0.0000 | I(1) |
| Variables | Levin, Lin & Chu t* Test | | | | Remarks |
| | Level | Probability | 1 st Diff | Probability | |
| FDI | -1.20549 | 0.1140 | -6.28761 | 0.0000 | I(1) |
| GCF | 0.08677 | 0.5346 | -6.68128 | 0.0000 | I(1) |
| PVRD | -3.88147 | 0.0001 | | | I(0) |
| INTE | 3.63455 | 0.9999 | 1.26709 | 0.8974 | I(2) |
| TRO | -0.31146 | 0.3777 | -3.35203 | 0.0004 | I(1) |

Source: Authors' Computation

Table 2. Unit Root Tests

| Period | S.E. | HDI | FDI | GCF | INTNET | TRO |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 0.002910 | 100.0000 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 0.003843 | 92.76594 | 3.824589 | 3.035185 | 0.346538 | 0.027750 |
| 3 | 0.004642 | 87.93124 | 5.794097 | 5.242619 | 0.823408 | 0.208637 |
| 4 | 0.005259 | 84.93155 | 6.433464 | 6.762958 | 1.283685 | 0.588346 |
| 5 | 0.005767 | 82.71375 | 6.493143 | 8.112890 | 1.796375 | 0.883842 |
| 6 | 0.006192 | 80.87044 | 6.319173 | 9.391735 | 2.387936 | 1.030721 |
| 7 | 0.006553 | 79.26086 | 6.071175 | 10.55277 | 3.058934 | 1.056258 |
| 8 | 0.006863 | 77.83792 | 5.812187 | 11.53983 | 3.792805 | 1.017259 |
| 9 | 0.007130 | 76.58340 | 5.565852 | 12.32978 | 4.564189 | 0.956778 |
| 10 | 0.007365 | 75.48165 | 5.339747 | 12.93358 | 5.347121 | 0.897898 |

Source: Authors' Computation

Table 4. Variance Decomposition (VD) of HDI

| Period | S.E. | HDI | FDI | GCF | INTNET | TRO |
|---------------|-------------|------------|------------|------------|---------------|------------|
| 1 | 0.548705 | 3.244248 | 96.75575 | 0.000000 | 0.000000 | 0.000000 |
| 2 | 0.621976 | 5.066504 | 79.91736 | 3.149431 | 0.883245 | 10.98346 |
| 3 | 0.679555 | 8.175669 | 67.65607 | 3.324868 | 2.045436 | 18.79796 |
| 4 | 0.713302 | 11.15437 | 61.71834 | 3.276976 | 2.421075 | 21.42924 |
| 5 | 0.735679 | 13.14717 | 58.25465 | 4.327723 | 2.434878 | 21.83558 |
| 6 | 0.749629 | 14.13843 | 56.27663 | 5.644432 | 2.363329 | 21.57718 |
| 7 | 0.757370 | 14.53214 | 55.22574 | 6.636450 | 2.316236 | 21.28943 |
| 8 | 0.761197 | 14.65488 | 54.70913 | 7.220802 | 2.308251 | 21.10694 |
| 9 | 0.762954 | 14.67906 | 54.46705 | 7.515739 | 2.325877 | 21.01227 |
| 10 | 0.763761 | 14.67570 | 54.35300 | 7.648079 | 2.354742 | 20.96848 |

Source: Authors' Computation

Table 5. Variance Decomposition (VD) of FDI

| Period | S.E. | HDI | FDI | GCF | INTNET | TRO |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 1.171361 | 17.24854 | 4.833188 | 77.91827 | 0.000000 | 0.000000 |
| 2 | 1.333741 | 16.30207 | 4.782577 | 78.71513 | 0.178186 | 0.022045 |
| 3 | 1.377574 | 15.37134 | 4.768366 | 79.31453 | 0.390363 | 0.155402 |
| 4 | 1.389201 | 15.20991 | 4.693883 | 79.24277 | 0.569974 | 0.283458 |
| 5 | 1.394594 | 15.42578 | 4.688422 | 78.80042 | 0.683417 | 0.401955 |
| 6 | 1.399290 | 15.73461 | 4.730453 | 78.27433 | 0.747929 | 0.512674 |
| 7 | 1.403538 | 16.01186 | 4.780757 | 77.82075 | 0.779812 | 0.606823 |
| 8 | 1.406995 | 16.22087 | 4.819639 | 77.48850 | 0.792591 | 0.678396 |
| 9 | 1.409551 | 16.36372 | 4.843958 | 77.27035 | 0.795616 | 0.726362 |
| 10 | 1.411310 | 16.45488 | 4.856980 | 77.13870 | 0.794824 | 0.754620 |

Source: Authors' Computation

Table 6. Variance Decomposition (VD) of GCF

| Period | S.E. | HDI | FDI | GCF | INTNET | TRO |
|---------------|-------------|------------|------------|------------|---------------|------------|
| 1 | 1.474027 | 3.078134 | 8.193554 | 4.492717 | 84.23560 | 0.000000 |
| 2 | 1.847076 | 1.964932 | 13.89491 | 3.946906 | 79.55127 | 0.641982 |
| 3 | 2.180683 | 1.956287 | 13.76129 | 4.826537 | 75.91385 | 3.542035 |
| 4 | 2.451099 | 2.886757 | 12.38974 | 5.368441 | 73.20616 | 6.148906 |
| 5 | 2.674730 | 4.572844 | 10.92232 | 5.543351 | 71.11686 | 7.844625 |
| 6 | 2.865586 | 7.015603 | 9.667830 | 5.560357 | 69.17852 | 8.577694 |
| 7 | 3.040027 | 10.17199 | 8.615285 | 5.577344 | 67.00640 | 8.628982 |
| 8 | 3.210335 | 13.85895 | 7.725544 | 5.678681 | 64.45940 | 8.277424 |
| 9 | 3.383304 | 17.79357 | 6.973105 | 5.903593 | 61.59983 | 7.729897 |
| 10 | 3.561020 | 21.68618 | 6.341242 | 6.256482 | 58.59751 | 7.118581 |

Source: Authors' Computation

Table 7. Variance Decomposition (VD) of INTE

| Period | S.E. | HDI | FDI | GCF | INTNET | TRO |
|--------|----------|----------|----------|----------|----------|----------|
| 1 | 1.705180 | 0.131551 | 0.891593 | 4.017372 | 0.687176 | 94.27231 |
| 2 | 1.846366 | 0.259527 | 1.662131 | 4.538953 | 0.776176 | 92.76321 |
| 3 | 1.921954 | 0.241579 | 2.638093 | 8.526146 | 0.779409 | 87.81477 |
| 4 | 1.968135 | 0.538469 | 3.093145 | 11.59540 | 1.029826 | 83.74316 |
| 5 | 2.005511 | 1.560800 | 3.405634 | 12.59358 | 1.406464 | 81.03353 |
| 6 | 2.038200 | 3.083109 | 3.673278 | 12.42213 | 1.702884 | 79.11860 |
| 7 | 2.067699 | 4.656018 | 3.901845 | 12.07293 | 1.865030 | 77.50418 |
| 8 | 2.092719 | 5.956431 | 4.077992 | 11.92152 | 1.922329 | 76.12173 |
| 9 | 2.112092 | 6.889599 | 4.196893 | 11.96626 | 1.924151 | 75.02310 |
| 10 | 2.125860 | 7.499337 | 4.266809 | 12.10673 | 1.907183 | 74.21994 |

Source: Authors' Computation

Table 8. Variance Decomposition (VD) of TRO