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Trade openness and Economic Growth: An empirical analysis from Nigeria

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ABSTRACT: With a focus on trade openness, interest rates, exchange rates, and foreign direct investment, this study investigates the relationship between trade openness and economic growth in Nigeria between 1986 and 2021. Many observers believe that nations with poor infrastructure are unable to maintain sustained economic growth, particularly when trade openness is hampered by several obstacles. Even though trade liberalization has been extensively studied, few studies thoroughly examine how these factors collectively affect Nigeria's economic growth now, especially over a wide range of data. Using ARDL methodologies, this study shows that trade openness has a significant impact on economic growth, highlighting its critical role in the economy. The study demonstrates that trade openness and foreign direct investment significantly affect economic growth. These revelations improve understanding of the role macroeconomic analysis plays in economic growth and strategic economic management issues.

Keywords: Economic growth, FDI, Trade openness, ARDL

INTRODUCTION

Since no country can thrive without engaging with the global market, economic interconnectedness between nations is unavoidable. There is a widespread belief that nations with poor infrastructure do not have the resources to continue their path to sustainable economic growth. For this reason, they frequently turn to luring in foreign resources to boost economic expansion, which is usually accomplished through international commerce (Chen et al., 2022; Liu et al., 2022; Nam & Ryu, 2024; Oloyede et al., 2021; Zaman et al., 2021).

Most African nations experienced a 13.9% and 20.6% drop in exports and imports, respectively, and a 6.8% drop in GDP in 2020 compared to 2019 (Udeagha & Ngepah, 2021) . Based on this, it seems that Nigeria's economy has not benefited as much from trade liberalization as anticipated, as the country has been grappling with the issue of trade balance following a series of trade openness policies. In addition, most economy has been characterized by high rates of inflation, unemployment, and inequality (Nguyen et al., 2022; Tiwari et al., 2022; Yang et al., 2022).

The question that still needs to be answered is whether Nigeria's extensive adoption of trade openness policies is responsible for any appreciable economic growth in the nation. This important subject necessitates a quick examination to confirm the effectiveness of trade openness in fostering economic growth in Nigeria. Nigeria is one of the few most liberalized economies on the continent with substantial trade openness policies, which justifies the country's selection as the research area. Nigeria's economy is essentially open to economic integration, which should lead to the transfer of technology and other byproducts of trade openness. If correctly handled, these byproducts should drive the nation's economic expansion.

Additionally, technology transfers help open economies by encouraging competition and innovation in poorer countries (Bazán Navarro et al., 2024; Ehigiamusoe et al., 2024; Erero & Makanamisa, 2021; Nam & Ryu, 2024; Papadas, 2024; Wang et al., 2022; Zuo et al., 2023). International commerce has a major impact on innovation in these economies and exposes them to cutting-edge technologies (Wang et al., 2022). Through international trade, governments acquire important information, transaction agreements, and expertise. Export and import-related activities have produced a business climate that is favorable to expansion, which has led governments to enact pertinent laws intended to stabilize economic growth, streamline regulatory frameworks, and improve infrastructure. This promotes economic development by enhancing the capacities of governments and businesses involved in global trade. For developing economies, trade-led growth policies are essential.

In essence, academic publications on trade openness, aggregate variables, and emerging economic populations have grown over time, presenting a range of empirical findings and their approaches. Qabhobho et al., (2022) evaluates the connection amid trade openness and ECOWAS nations' economic growth. Using co-integration, vector error correction, and the ADF and PP unit root test, the study concentrated on Ghana and Nigeria. Real government spending and trade openness were discovered having direct effect on the economies of the chosen ECOWAS nations. Kutu & Ohonba, 2024 used a cointegration approach to study the effect of trade liberalization on economic growth in South Africa, and the results demonstrated that economic liberalization is important and positively stimulates economic growth.

By looking at various economic indicators, the study seeks to comprehend their combined impact on GDP. In essence, this research examines how trade openness affects economic growth in Nigeria. It provides a thorough analysis of their importance to the expansion of the Nigerian economy. This study is significant from an academic and practical standpoint. In terms of academia, it adds to the body of evidence already available on trade openness analysis in the Nigerian economy, with a particular emphasis on long-term data trends. In practice, the results offer useful information for managing aggregate analysis to boost economic growth and for the government looking for data-driven decision-making techniques. This study gives international trade analysts useful tools to efficiently improve macroeconomic management and operational strategies by determining the relative effects of trade openness and exchange rates.

Based on the above analysis, the research model framework is as follows:

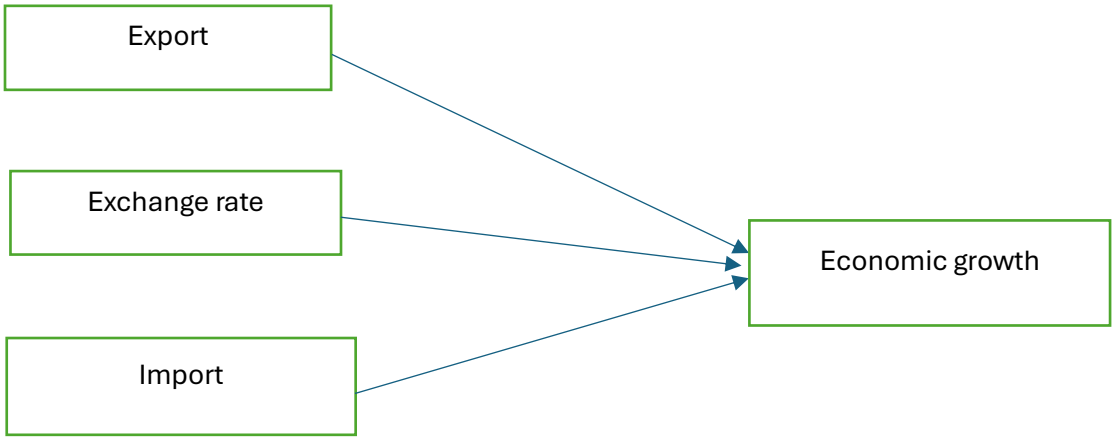

Figure 1. Framework Source: Author's compilation (2023)

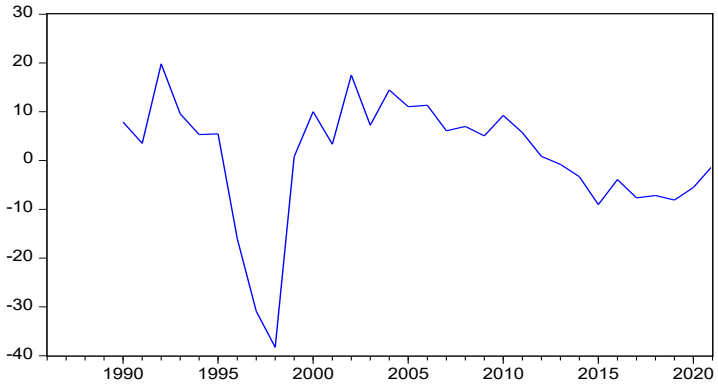

Figure 2. Cointegration graph Source: Author's compilation (2023)

METHOD

For the purposes of this investigation, trade openness is determined by dividing trade volume by GDP. As it represents a nation's true level of economic integration with the rest of the globe, this is a legitimate metric (Banday et al., 2021; Kutu & Ohonba, 2024). Kutu & Ohonba, (2024) concentrate on the dynamic and macro indicators of trade liberalization, they also classified the metric as De-facto.

Interestingly, this study introduces trade openness growth as a logical variable that catches the exhibition of most aggregate factors, such as imports and exports. To prevent potential endogeneity and multicollinearity problems, these variables are included in the economic growth metric. To the best of the author's knowledge, the study only contained the explanatory factors that were required to determine economic growth.

This work is empirically based on the submission of earlier research on the South African country, including Kutu & Ohonba, 2024

$$CGDP = f(TrO, ExR, FDI, InR) \quad 1$$

$$CGDP = \emptyset_0 + \emptyset_1 TrO + \emptyset_2 ExR + \emptyset_3 FDI + \emptyset_4 InR + \mu \quad 2$$

$$\Delta CGDP = \emptyset_0 + \sum_{s=1}^{J} . \emptyset_{1s} \Delta CGDP_{.t-n} + \sum_{s=1}^{J} . \emptyset_{2s} \Delta TrO_{.t-n} + \sum_{s=0}^{J} . \emptyset_{3s} \Delta ExR_{.t-n} + \sum_{s=0}^{J} . \emptyset_{4s} \Delta FDI_{.t-n} + \sum_{s=0}^{J} . \emptyset_{5s} \Delta InR_{.t-n} + \partial_1 CGDP_{t-1} + \partial_2 TRO_{t-1} + \partial_3 ExR_{t-1} + \partial_4 FDI_{t-1} + \partial_5 InR_{t-1} + \mu \quad 3$$

$$\Delta CGDP = \emptyset_0 + \sum_{s=1}^{J} . \emptyset_{1s} \Delta CGDP_{.t-n} + \sum_{s=1}^{J} . \emptyset_{2s} \Delta TrO_{.t-n} + \sum_{s=0}^{J} . \emptyset_{3s} \Delta ExR_{.t-n} + \sum_{m=0}^{J} . \emptyset_{4m} \Delta FDI_{.t-n} + \sum_{m=0}^{J} . \emptyset_{5m} \Delta InR_{.t-n} + \partial_1 CGDP_{t-1} + \partial_2 TrO_{t-1} + \partial_3 ExR_{t-1} + \partial_4 FDI_{t-1} + \partial_5 InR_{t-1} + \in ECT_{t-1} + \in_t \quad 4$$

The error correction model (ECTt) is a mechanism that give the feedback effect or speed of adjustment of the model. It reveals how much and faster the disequilibrium in the short term has been adjusted. In essence, it entails the extent to which any imbalance in the previous period has been corrected in the independent variable. ARDL regression model is limited because it provides only the short run result. However, the long run findings are more critical to researchers as its guide serve as a guide for policy formulation. Hence, the co-integration test and error correction model becomes imperative (Chen et al., 2022; Zaman et al., 2021).

Thus, a positive coefficient of ECt signifies a deviation, while an indirect coefficient presents a merging. A coefficient of ECt = 1, suggests that hundred percent of the modification occurred speedily over time, while an estimated coefficient of ECt = 0.5, implies that fifty percent of the modification takes place over time. More critically, ECt = 0, shows that there is no correction, hence, making a meaningless representation of the long run relationship Duru et al., (2020) , Kutu & Ohonba, (2024) and Osabuohien et al., (2019)

RESULT AND DISCUSSION

Cointegration Evaluation Using Bound Testing Approach in 1986-2021

Table 1. Cointegration Evaluation Using Bound Testing Approach in 1986-2021

Test Statistic	Value	K
F-statistic	5.484899	4
C.V.B		
Significance	I0	I1
10%	1.56	2.63

5%	1.97	3.12
2.5%	2.36	3.38
1%	2.85	4.17

Source: Author Compilations, 2023

Cointegration among our variables of interest is indicated in Table 1 above. It is basically evident that the F-statistic (5.48) is higher than both the lower (1.97) and upper (3.12) bounds. As a result, we may move forward with our ARDL analysis, both short- and long-term.

ARDL Long Run Output for the Study in 1986-2021

Table 2: ARDL Long Run Output for the Study in 1986-2021

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDPC(-1)	0.236867	0.148869	1.591118	0.1339
GDPC(-2)	0.417445	0.132199	3.157710	0.0070
TRO	1.47E-11	1.16E-11	1.269201	0.2251
EXR	0.051030	0.016971	3.006911	0.0094
EXR(-1)	-0.009929	0.014255	-0.696543	0.4975
EXR(-2)	0.007168	0.013514	0.530460	0.6041
EXR(-3)	0.031579	0.013209	2.390750	0.0314
EXR(-4)	0.050869	0.011474	4.433491	0.0006
INR	0.066034	0.073419	0.899416	0.3836
INR(-1)	-0.067177	0.053166	-1.263535	0.2270
INR(-2)	0.095008	0.064009	1.484296	0.1599
INR(-3)	0.063996	0.066931	0.956155	0.3552
FDI	-4.25E-10	3.81E-10	-1.113678	0.2842
FDI(-1)	8.20E-10	4.29E-10	1.910273	0.0768
FDI(-2)	9.63E-10	4.20E-10	2.294071	0.0378
FDI(-3)	-2.06E-10	4.05E-10	-0.509905	0.6181
FDI(-4)	-1.41E-09	4.88E-10	-2.889176	0.0119
C	-6.089933	3.177301	-1.916700	0.0759

Source: Author Compilations, 2023

Trade openness is a strong predictor of economic growth in Nigeria, Following the long-run output shown in Table 2. As a result, a 1% rise in trade openness would greatly boost economic expansion by 1.4%. The endogenous development hypothesis' apiori hypothetical assumption is met by this result. Thus, as per endogenous development models, exchange influences a country's specialization research-serious innovations and creation frameworks, changes the viable size of the market confronting makers, and gives admittance to imported merchandise that exemplifies that innovation. The outcomes additionally support the exact exploration directed in South Africa and Nigeria (Adekunle, et al., 2023; Gbadebo, et al., 2023; Adekunle, 2024; Bekun et al., 2023; Kutu & Ohonba, 2024). Qabhobho et al., (2022) assert that trade openness policies implemented by South Africa's consecutive governments significantly contribute to the nation's economic progress. observing that there is flexibility in the connection amid economic development and trade openness, indicating that

a small change in trade openness will result in a more than proportionate shift in economic growth. Therefore, economic openness is necessary for the Nigerian economy to thrive as intended. For South Africa's government and stakeholders, this is crucial and instructive. Additional findings showed that a 1% increase in exchange rates leads to a robust 0.3% long-term advance in economic growth. Accordingly, we draw the conclusion that exchange rates play a crucial role in boosting Nigeria's economic growth, which is consistent with both our apriori expectations and the theoretical foundation of neoclassical theory. The theory states that higher exchange rates have the power to pull an economy out of any state of decline. The research conducted in South Africa by Kutu & Ohonba, 2024 provides empirical support for this. Over time, foreign direct investment has a significant and detrimental impact on economic growth. A 9.6% rise in economy expansion will result from a 1% rise in FDI (lag 2) entrance, which is consistent with the findings of Kutu & Ohonba, 2024 in South Africa. The study concludes that FDI is a prime factor in stimulating transformation in Nigeria. This supports both our appriori expectation and the modernization theory's theoretical tenet that the recipient economy will gain from the influx of foreign direct investment. Additionally, it was found that interest rates had no discernible impact on economic expansion. An intangible reversal in economic growth would be degenerated by 0.06% for every 1% increase in interest rates. This study carried out four diagnostic tests on the model in Nigeria to guarantee its validity, stability, and credibility. Tables 4 and 5 below show the outcomes of these tests.

ARDL Short Run Output for the Study in 1986-2021

Table 3: ARDL Short Run Output for the Study in 1986-2021

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDPC(-1))	-0.417445	0.132199	-3.157710	0.0070
D(TRO)	0.030000	0.018000	1.666666	0.0251
D(EXR)	0.051030	0.016971	3.006911	0.0094
D(EXR(-1))	-0.007168	0.013514	-0.530460	0.6041
D(EXR(-2))	0.031579	0.013209	2.390750	0.0314
D(EXR(-3))	-0.050869	0.011474	-4.433491	0.0006
D(INR)	0.066034	0.073419	0.899416	0.3836
D(INR(-1))	-0.095008	0.064009	-1.484296	0.1599
D(INR(-2))	-0.063996	0.066931	-0.956155	0.3552
D(FDI)	-0.000000	0.000000	-1.113678	0.2842
D(FDI(-1))	-0.040000	0.180000	-0.222071	0.0378
D(FDI(-2))	0.000000	0.000000	0.509905	0.6181
D(FDI(-3))	0.000000	0.000000	2.889176	0.0119
CointEq(-1)	-0.345687	0.194885	-1.773800	0.0978

Source: Author Compilations, 2023

The short-term dynamic estimates of the connection amid Nigeria's economic expansion and TrO are displayed in Table 3. The output of the empirical analysis indicates that, at the 1% level of significance in the present year, trade openness was shown to have a positive and significant impact on economic

growth. Therefore, there would be a 0.3% gain in economic growth for every 1% increase in openness in trade. In line with the findings of Qabhobho et al., (2022) and Kutu & Ohonba, 2024 in South Africa, this suggests that TrO is a key factor of economic expansion in Nigeria. Udeagha & Ngepah, (2021), trade openness only has a short-term, substantial effect on economic growth. This must have been fixed this year, though it may not be unrelated to conflicting policy. Trade openness continues to be a growth-promoting factor in Nigeria. Additionally, the results indicated that foreign direct investment had a negative and significant impact during the lag 1 period, suggesting that FDI inflow had a weak and negative impact on Nigeria's economic growth. This is consistent with the findings of Qabhobho et al., (2022) and (Kutu & Ohonba, 2024) in South Africa. A 1% increase in foreign direct investment would result in a 0.04% decrease in economic growth. On the other hand, FDI entry during the last year and two years has had a beneficial but negligible impact. However, interest rates have a substantial effect on economic expansion, they are the short-term predictor of economic growth in Nigeria. Interest rates increased by 1% in the current year, lag 1 and lag 2, respectively, producing a high and negligible opposite growth rate of 0.06%, 0.09%, and 0.06%. This implies that because of its volatility, Nigeria's present interest rate policy is anti-growth. Considering the outcomes above, it very well may be closed that TrO has a short-term effect on the Nigerian economy. In essence, the cointEq(-1) indicates that any short-term disequilibrium will be restored by a 34% speed of adjustment in the long-term, with a negative sign (-0.34) and a probability of 0.09 level of significance.

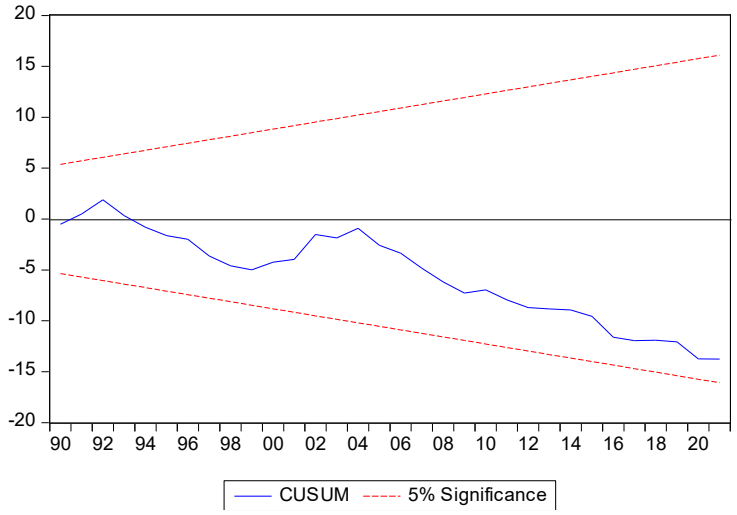

Figure 3. CUSUM Stability Test (2023)

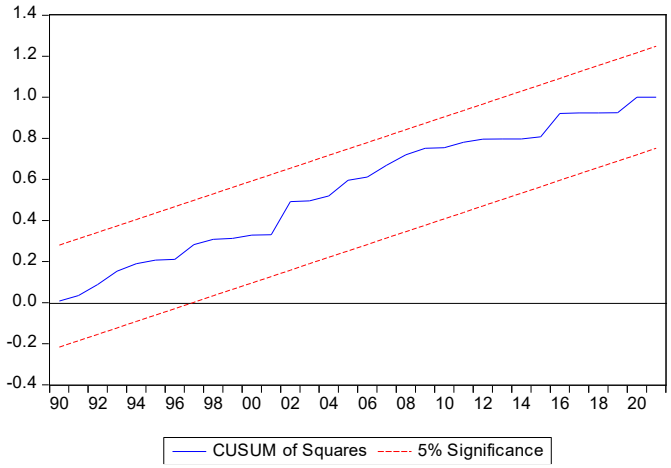

Figure 4. CUSUM of Squares Stability Test (2024)

The study used the cumulative sum of recursive residuals (CUSUM) and cumulative sum of recursive residuals of the squares (CUSUM of square) tests to determine the model's stability. The plot of the model's CUSUM statistic and CUSUM of squares is inside the critical bound, according to the stability test displayed in Figures 2 and 3. The model is hence stable and appropriate for policy implications. Since the model passed all stability and diagnostic tests, it tends to be reasoned that the model derived in the study is valid, credible, stable, and dependable.

Heteroskedasticity Test for the study in 1986-2021

Table 5. Heteroskedasticity Test for the Study in 1986-2021

F-statistic	0.124871	Prob. F(1,33)	0.7261
Obs*R-squared	0.131940	Prob. Chi-Square(1)	0.7164

Serial Correlation Test for the study in 1986-2021

Table 6. Serial Correlation Test for the Study in 1986-2021

F-statistic	4.132147	Prob. F(2,30)	0.0260
Obs*R-squared	6.931860	Prob. Chi-Square(2)	0.0312

We are unable to reject the null hypothesis since this suggests that the variable in the model is regularly distributed. Likewise, the Breusch-Godfrey Serial Correlation LM Test was used to determine whether a serial correlation was present. Since the likelihood esteem is more prominent than the 5% importance level, the invalid speculation, which expresses that there is no sequential connection, can't be discredited. Also, the result of the test for heteroscedasticity. We cannot dismiss the invalid speculation since this recommends that the variable in the model is routinely dispersed. Similarly, the Breusch-Godfrey Sequential Connection LM Test was utilized to decide if a sequential relationship was available. Since the likelihood esteem is more prominent than the 5% importance level, the invalid

speculation, which expresses that there is no sequential connection, can't be refuted. Also, the result of the test for heteroscedasticity.

CONCLUSION

Several important implications may be made from the study's findings about the relationship between trade openness and economic growth in Nigeria from 1986 to 2021. First, the analysis's most significant finding demonstrates that trade openness is a crucial component that supports Nigeria's economic expansion. The implication is that trade liberalization will boost the country's economy. Second, FDI has a significant impact on Nigeria's economic expansion. The overall conclusion is that the economy's participation in international trade will have a cascading effect that will lead to greater economic scale, benefits from information and technological advancement, increased export competitiveness, and ultimately, economic growth.

The following suggestions are offered for policy implications considering the findings: The government should endeavor to guarantee that trade openness has a substantial impact on economic growth. For complete economic connection with the rest of the world, the government of the nation will strategically open its borders. Additionally, the economy must embrace measures that encourage liberalization, such diversifying the export structure by making sure that more manufactured goods are exported rather than relying just on primary exports. This is relevant to boost their benefits from trade openness. Therefore, strategies aimed at boosting local output by reviving home industries so they can manufacture items that can effectively compete with goods from other countries should be implemented. The existing liberalization policies, which are already producing greater performance, need to be strengthened. Last but not least, the exchange rate plays a significant role in trade and is a key factor that affects how the economy functions overall. It establishes the pace of international trade between the home economy and the global economy. Therefore, to maintain a steady rate that is beneficial to the domestic economy, monetary authorities must keep an eye on and regulate changes in the rates. In this way, it will stimulate export growth, increase investor trust, and promote competitiveness.

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